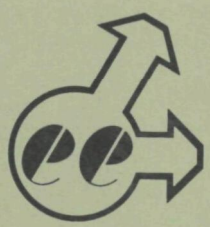
Test No. 71-CI-36
C.F. Chemicals, Inc.
Wet Process Phosphoric Acid
Bartow, Florida
December 14-15, 1971



environmental engineering, inc.

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

Table of Contents

	Page No.
List of Figures	ii
List of Tables	ii
Introduction	1
Summary of Results	1
Process Description	8
Process Operation	11
Location of Sampling Points	12
Sampling and Analytical Procedures	18
Appendices	23
A. Emission Calculations and Results	
B. Field Data	
C. Standard Analytical Procedures	
D. Laboratory Results	
E. Project Participants	

List of Figures

		Page
1.	Flow Diagram and Sampling Stations	3
2.	Scrubber Design	10
3.	Port Location - Station C	14
4.	Port Location - Station D	15
5.	Port Location - Station E	16
6.	Port Location - Station F	17
7.	Moisture Sampling Train	19
8.	Fluoride Sampling Train	21

List of Tables

1.	Summary of Results - Station C	4
2.	Summary of Results - Station D	5
3.	Summary of Results - Station E	6
4.	Summary of Results - Station F	7
5.	Sampling Points	13

INTRODUCTION

Emission tests were conducted by Environmental Engineering, Inc., under the direction of EPA at the C.F. Chemicals, Inc., wet process phosphoric acid plant No. 3 located in Bartow, Florida. Three test runs were conducted on December 14-15, 1971. The purpose of the tests was to obtain data to be used by both the Industrial Studies Branch and the Performance Standards Branch.

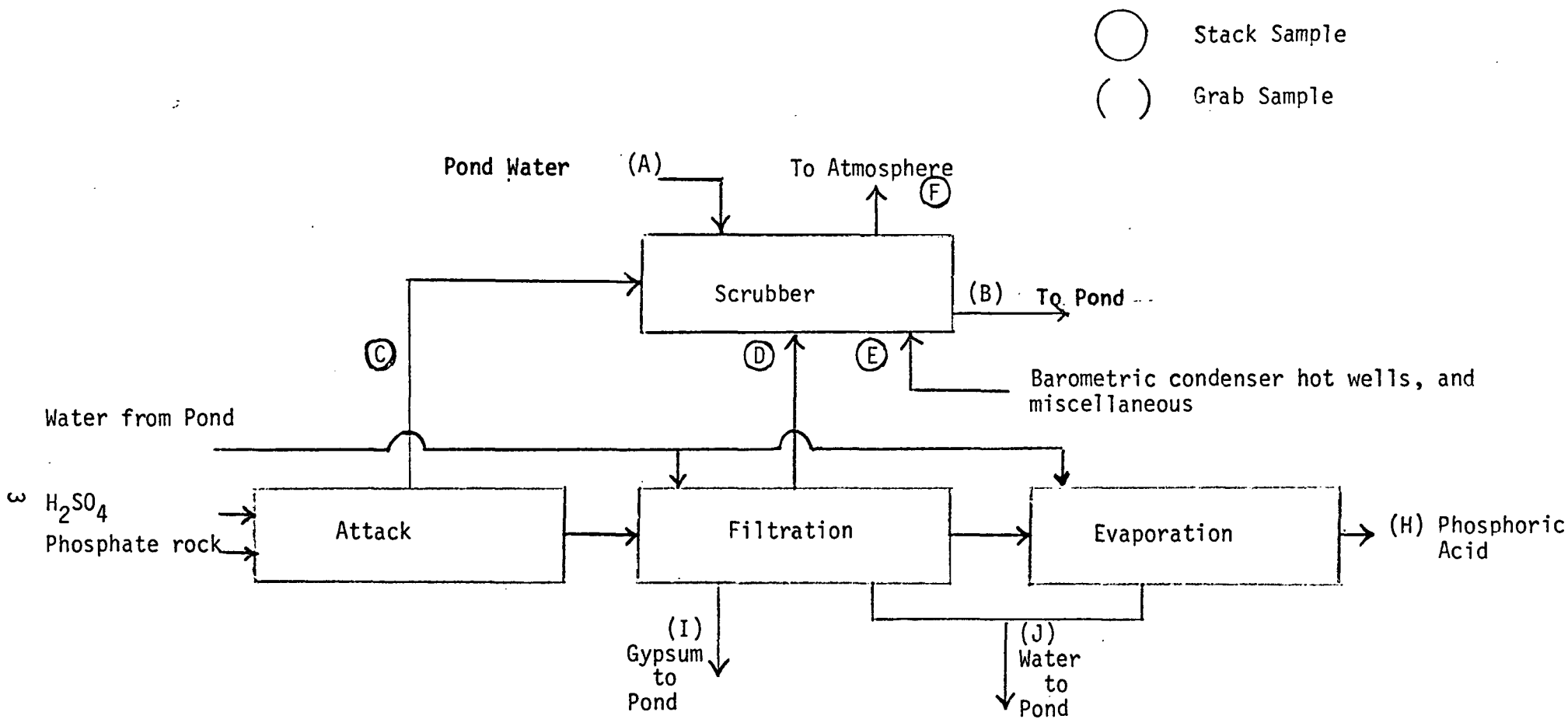
Measurements for total fluorides were made in the inlet ducts and outlet stack of the cocurrent scrubber. Three inlets, those leading from the attack tank, filter, and barometric condenser hot wells, were sampled. Numerous grab samples of the process reactants and products were taken and analyzed for fluorides and P_2O_5 content. A schematic diagram of all sampling locations is given in Figure 1.

Pertinent results of the tests are listed in Table 1; complete test results are given in Appendix A.

SUMMARY OF RESULTS

The scrubber inlet from the attack tank showed fluoride emissions ranging from .452-.907 lb/ton P_2O_5 fed. At the inlet from the filtration system, the fluoride emissions ranged from .0025-.0042 lb/ton P_2O_5 fed, while emissions at the inlet from the condenser ranged from .005-.006 lb/ton P_2O_5 fed. It should be noted that for the first run of the tests taken at the inlet from the condenser, no emission data are available for insoluble fluorides. Some of the test samples were lost and the results of this test run are reported as soluble fluorides and not total fluorides (see Table 3). At the scrubber outlet, total

fluoride emissions ranged from .011-.064 lb/ton P_2O_5 fed. Compared to the other two test runs, the value obtained for the first run (.064 #/ton P_2O_5 fed) is extremely high. This irregularity is unexplainable, except for the possibility that the sample for run 1 was contaminated. Scrubber efficiency was calculated and ranged from 93.0% to 98.7%. For a complete summary of the test results see Tables 1-4.



Schematic Flow Diagram with Locations of Sampling Stations
Acid Plant No. 3, C.F. Chemicals, Incorporated

Figure 1

TABLE 1

SUMMARY OF RESULTS
FLUORIDES

STATION C -- SCRUBBER INLET FROM ATTACK TANK

Run No.	1	2	3
Date	12-14-71	12-15-71	12-15-71
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	30	30	30
Stack gas moisture, % volume	12.6	13.0	14.2
Average stack gas temperature, °F.	132	130	113
Stack gas flow rate @ S.T.P., SCFM	23,146	24,303	23,657
Vol. gas sampled @ S.T.P.*, SCF	106.758	110.567	114.580
Fluoride, water soluble, mg	1000.0	890.0	523.0
Fluoride, total, mg	1001.3	891.9	523.9
Fluoride, water soluble, gr/SCF	0.1443	0.1242	0.0703
Fluoride, total, gr/SCF	0.1444	0.1245	0.0704
Fluoride, water soluble, gr/CF stk. cond.	0.1131	0.0973	0.0559
Fluoride, total, gr/CF stk. cond.	0.1132	0.0975	0.0560
Fluoride, water soluble, lb/hour	28.61	25.87	14.25
Fluoride, total, lb/hour	28.65	25.93	14.27
P_2O_5 Fed, tons/hour	31.6	31.6	31.6
Fluoride, water soluble, lb/ton P_2O_5 Fed.	0.906	0.819	0.451
Fluoride, total, lb/ton P_2O_5 Fed.	0.907	0.821	0.452
Scrubber efficiency, %			

* Dry, 70°F., 29.92 inches Hg.

TABLE 2

SUMMARY OF RESULTS
FLUORIDES

STATION D -- SCRUBBER INLET FROM FILTRATION SYSTEM

Run No.	1	2	3
Date	12-14-71	12-15-71	12-15-71
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	30	30	30
Stack gas moisture, % volume	3.4	4.6	3.6
Average stack gas temperature, °F.	93	92	92
Stack gas flow rate @ S.T.P.*, SCFM	2,446	2,533	2,364
Vol. gas sampled @ S.T.P.*, SCF	70.246	64.483	57.130
Fluoride, water soluble, mg	16.7	18.0	24.0
Fluoride, total, mg	16.72	18.1	24.0
Fluoride, water soluble, gr/SCF	0.0037	0.0043	0.0065
Fluoride, total, gr/SCF	0.0037	0.0043	0.0065
Fluoride, water soluble, gr/CF stk. cond.	0.0034	0.0039	0.0060
Fluoride, total, gr/CF stk. cond.	0.0034	0.0039	0.0060
Fluoride, water soluble, lb/hour	0.08	0.09	0.13
Fluoride, total, lb/hour	0.08	0.09	0.13
P_2O_5 Fed, tons/hour	31.6	31.6	31.6
Fluoride, water soluble, lb/ton P_2O_5 Fed.	0.0024	0.0029	0.0042
Fluoride, total, lb/ton P_2O_5 Fed.	0.0025	0.0029	0.0042
Scrubber efficiency, %			

* Dry, 70°F., 29.92 inches Hg.

TABLE 3

SUMMARY OF RESULTS
FLUORIDES
STATION E -- SCRUBBER INLET FROM CONDENSER, HOT WELLS, ETC.

Run No.	1	2	3
Date	12-14-71	12-15-71	12-15-71
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	30	30	30
Stack gas moisture, % volume	3.1	2.7	3.2
Average stack gas temperature, °F.	94	92	92
Stack gas flow rate @ S.T.P.*, SCFM	7,090	7,204	7,647
Vol. gas sampled at S.T.P.*, SCF	98.809	97.715	102.166
Fluoride, water soluble, mg	21.9	15.0	18.0
Fluoride, total, mg	No Data**	15.0	18.1
Fluoride, water soluble, gr/SCF	0.0034	0.0024	0.0027
Fluoride, total, gr/SCF	No Data**	0.0024	0.0027
Fluoride, water soluble, gr/CF stk. cond.	0.0032	0.0022	0.0025
Fluoride, total, gr/CF stk. cond.	No Data**	0.0022	0.0025
Fluoride, water soluble, lb/hour	0.21	0.15	0.18
Fluoride, total, lb/hour	No Data**	0.15	0.18
P_2O_5 Fed, tons/hour	31.6	31.6	31.6
Fluoride, water soluble, lb/ton P_2O_5 Fed.	0.007	0.005	0.006
Fluoride, total, lb/ton P_2O_5 Fed.	No Data**	0.005	0.006
Scrubber efficiency, %			

* Dry, 70°F., 29.92 inches Hg.

** Emission samples missing

TABLE 4

SUMMARY OF RESULTS
FLUORIDES

STATION F -- SCRUBBER OUTLET

Run No.	1	2	3
Date	12-14-71	12-15-71	12-15-71
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	30	30	30
Stack gas moisture, % volume	3.8	4.1	3.8
Average stack gas temperature, °F.	85	85	84
Stack gas flow rate @ S.T.P., SCFM	34,327	33,384	34,635
Vol.gas sampled @ S.T.P.*, SCF	92.137	89.849	93.493
Fluoride, water soluble, mg	41.0	7.2	12.0
Fluoride, total, mg	41.2	7.2	12.0
Fluoride, water soluble, gr/SCF	0.0069	0.0012	0.0020
Fluoride, total, gr/SCF	0.0069	0.0012	0.0020
Fluoride, water soluble, gr/CF stk. cond.	0.0064	0.0012	0.0019
Fluoride, total, gr/CF stk. cond.	0.0065	0.0012	0.0019
Fluoride, water soluble, lb/hour	2.02	0.35	0.59
Fluoride, total, lb/hour	2.02	0.35	0.59
P_2O_5 Fed, tons/hour	31.6	31.6	31.6
Fluoride, water soluble, lb/ton P_2O_5 Fed.	0.064	0.011	0.019
Fluoride, total, lb/ton P_2O_5 Fed.	0.064	0.011	0.019
Scrubber efficiency, %			

* Dry, 70°F., 29.92 inches Hg.

PROCESS DESCRIPTION

The first step in the basic process involves mixing phosphate rock, sulfuric acid, and water to form a reaction slurry.

The basic reaction is the acidulation of tricalcium phosphate in the rock with sulfuric acid and water to produce phosphoric acid and calcium sulfate dihydrate (gypsum). The reaction is:

$$Ca_3(PO_4)_2 + 3H_2SO_4 + 6H_2O \rightarrow 2H_3PO_4 + 3CaSO_4 \cdot 2H_2O$$

Hydrogen fluoride gas (HF) is produced by a side reaction between the fluorine in the rock and sulfuric acid. HF subsequently reacts with the silicates in the digesting slurry to form fluosilicic acid as follows:

$$CaF_2 + H_2SO_4 + 2H_2O \rightarrow CaSO_4 \cdot 2H_2O + 2HF$$

$$6HF + SiO_2 \rightarrow H_2SiF_6 + 2H_2O$$

The fluosilicic acid in turn can decompose:

$$H_2SiF_6 + \text{Heat and/or Acid} \rightarrow SiF_4 + 2\ HF$$

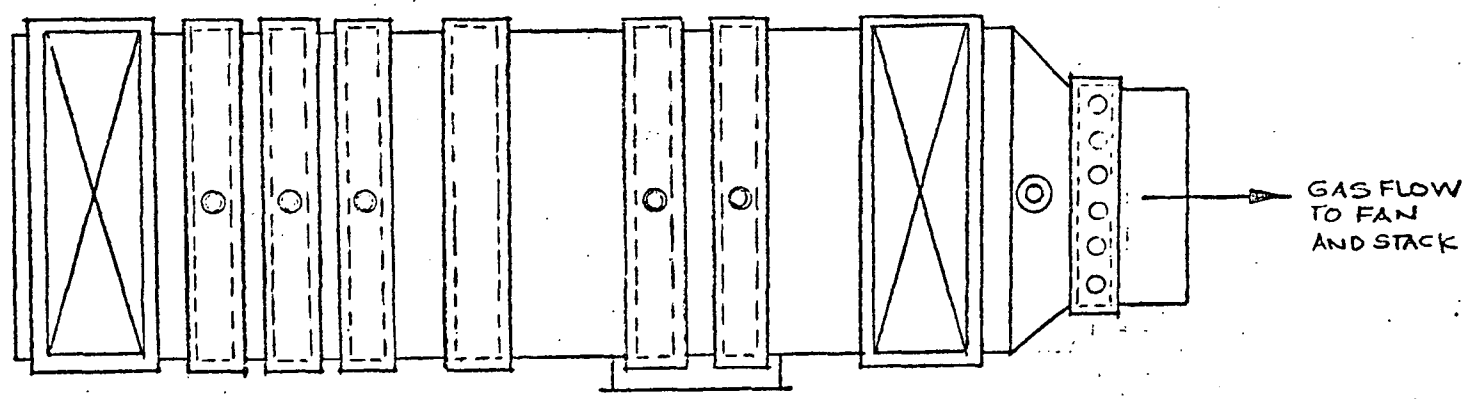
The reactor consists of a series of tanks with the slurry alternately overflowing and underflowing from one compartment to the next. The multi-compartment design allows temperature and agitation to vary throughout the reaction sequence as slurry recirculates through the tank arrangement. The acidulation or digestion step is a highly exothermic reaction requiring considerable apparatus for cooling. A vacuum flash cooler maintains temperature in the reactor and degasifies the recirculated slurry of dissolved air, carbon dioxide, and fluorides.

The acid slurry from the last attack compartment of the reactor is pumped to a rotating-tilting-pan filter where the phosphoric acid is filtered from the gypsum. The byproduct gypsum is repulped and pumped to a nearby pond. The product acid is pumped to a storage vessel and then to vacuum evaporators in which the acid can be concentrated from 30 to 54% P_2O_5.

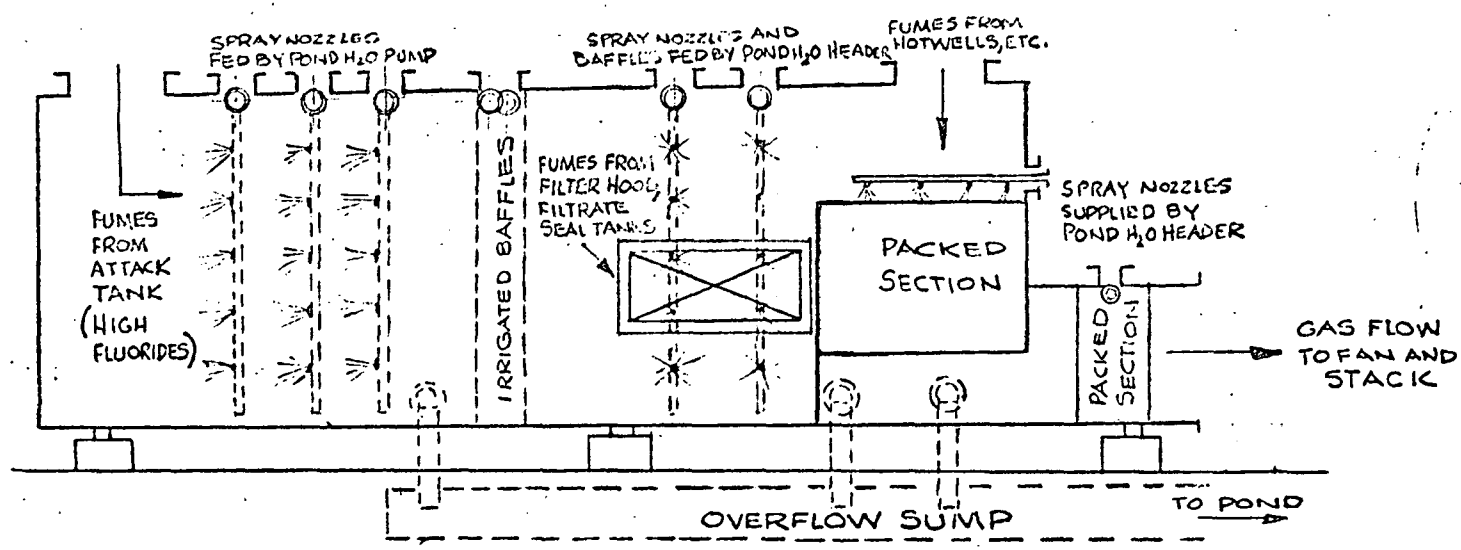
The cocurrent scrubber design has a primary scrubbing section consisting of countercurrent sprays of gypsum pond water. The gases then pass through a section of irrigated baffles before flowing through the packing in the secondary scrubbing section.

C.F. CHEMICALS, INC.

FUME SCRUBBER-WET PROCESS PHOSPHORIC ACID



PLAN



ELEVATION

Figure 2

PROCESS OPERATION

Run I was begun at 5:20 p.m. on December 14, 1971. Filtration was very good. All pans were dumping dry. Process conditions were very stable and only a few minor adjustments had to be made during the run. Excellent filtration continued throughout Runs II and III with no upsets. Other process conditions remained essentially unchanged.

CFCI had previously replaced pressure gages and manometers on the scrubber. Scrubber conditions remained unchanged throughout Runs II and III.

V. 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.

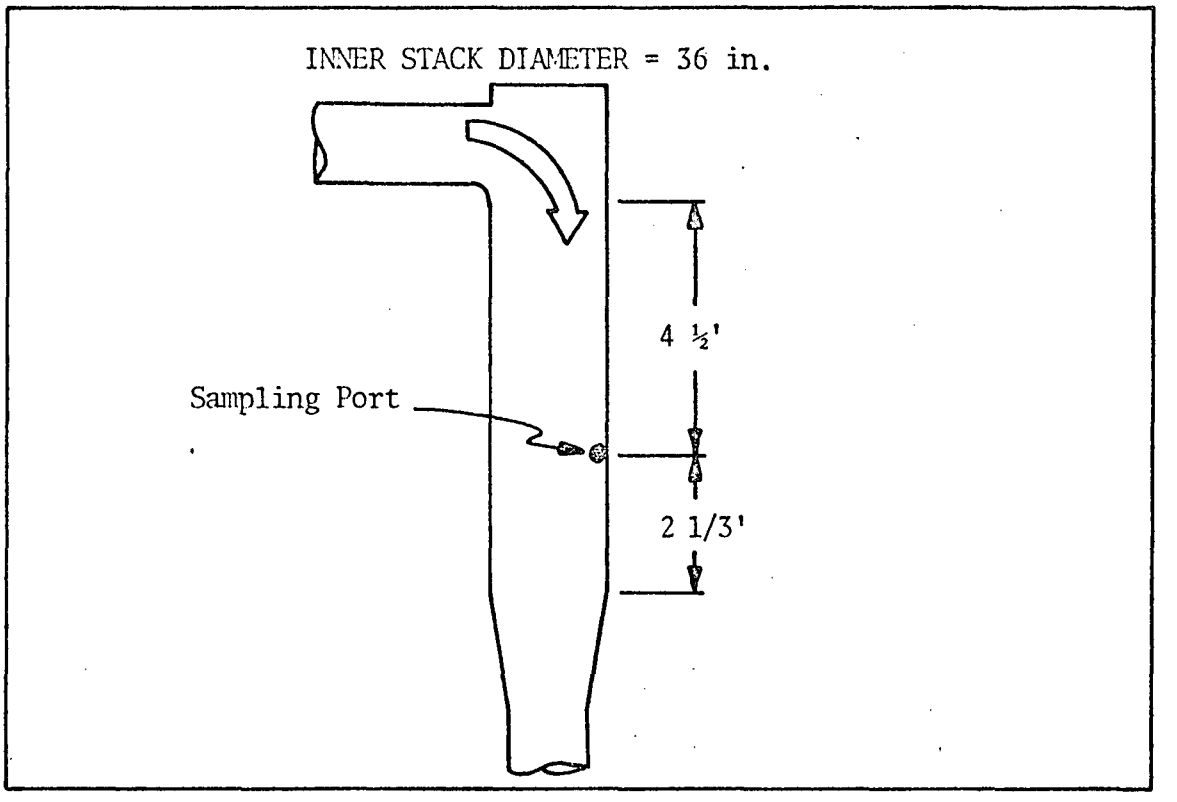
The above method suggests using two perpendicular diameters of traverse points per sampling station, however, on-site conditions necessitated the use of only one traverse diameter. The suggested number of traverse points per diameter was used where possible without sampling within one inch of the inner wall. Table 5 summarizes the suggested and actual number of traverse points for each sampling site.

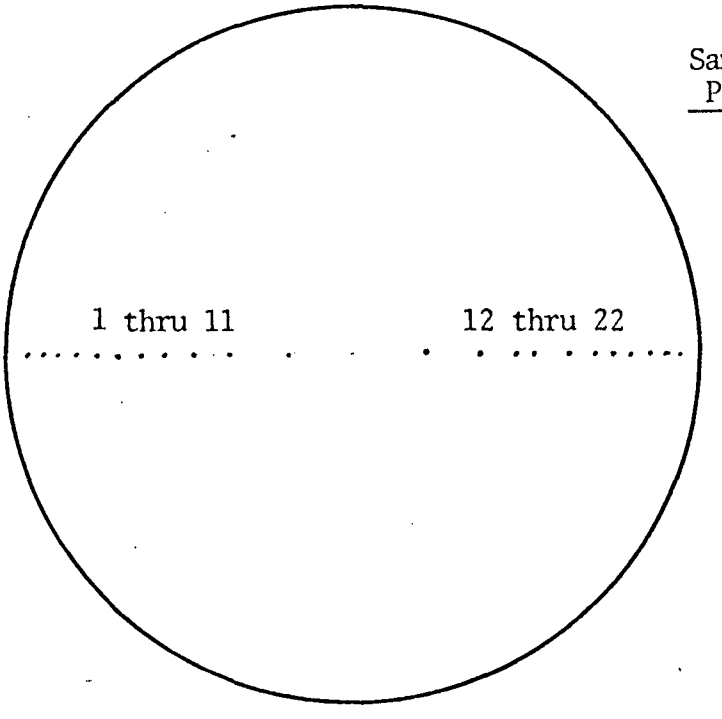
Figures 3 through 6 are schematic diagrams of the stack configurations near the sampling location, and the sampling points traversed during the emission tests.

TABLE 5

DESCRIPTION OF SAMPLING POINTS

Plant	Sampling Point Description	Sampling Point Identification	Suggested No. of Traverse Points	Actual No. of Traverse Points Used	Stack Diameter (ft)
C. F. Chemicals, Inc. Wet Phosphoric Acid Plant No. 3	Attack Tank Effluent	C	24	22	3.0
	Filtration Tank Effluent	D	16	10	2.0
	Barometric Condenser, Hot Wells and Miscellaneous Effluents	E	14	10	1.9
	Exhaust Stack	F	6	6	4.3

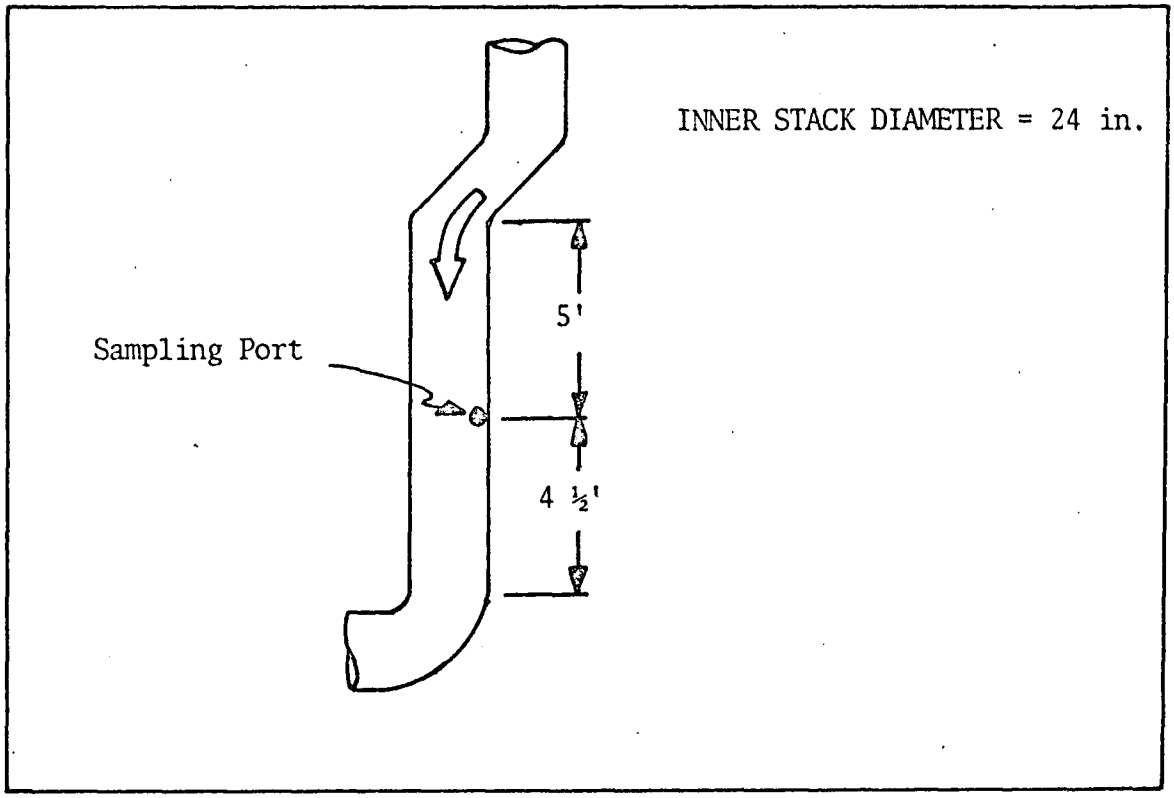


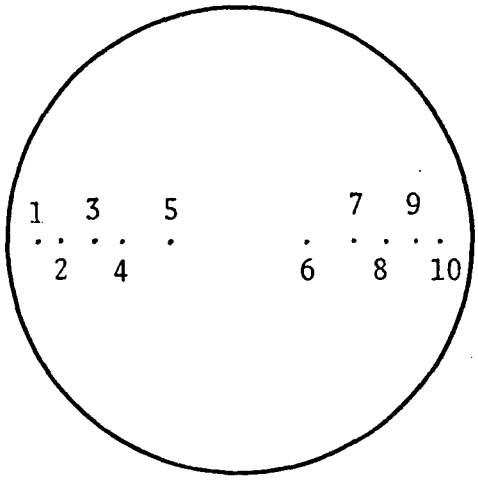


Sampling Point	Distance From Inner Wall (in)
1	1 1/8
2	2
3	2 3/4
4	3 3/4
5	4 3/4
6	5 3/4
7	7
8	8 1/4
9	9 3/4
10	11 5/8
11	14 5/16
12	21 5/8
13	24 3/8
14	26 3/16
15	27 1/4
16	29
17	30 3/16
18	31 1/4
19	32 1/4
20	33 1/8
21	34
22	34 3/4

FIGURE 3

LOCATION OF PORT AND SAMPLING POINTS,
STATION C
C. F. CHEMICALS, INC.

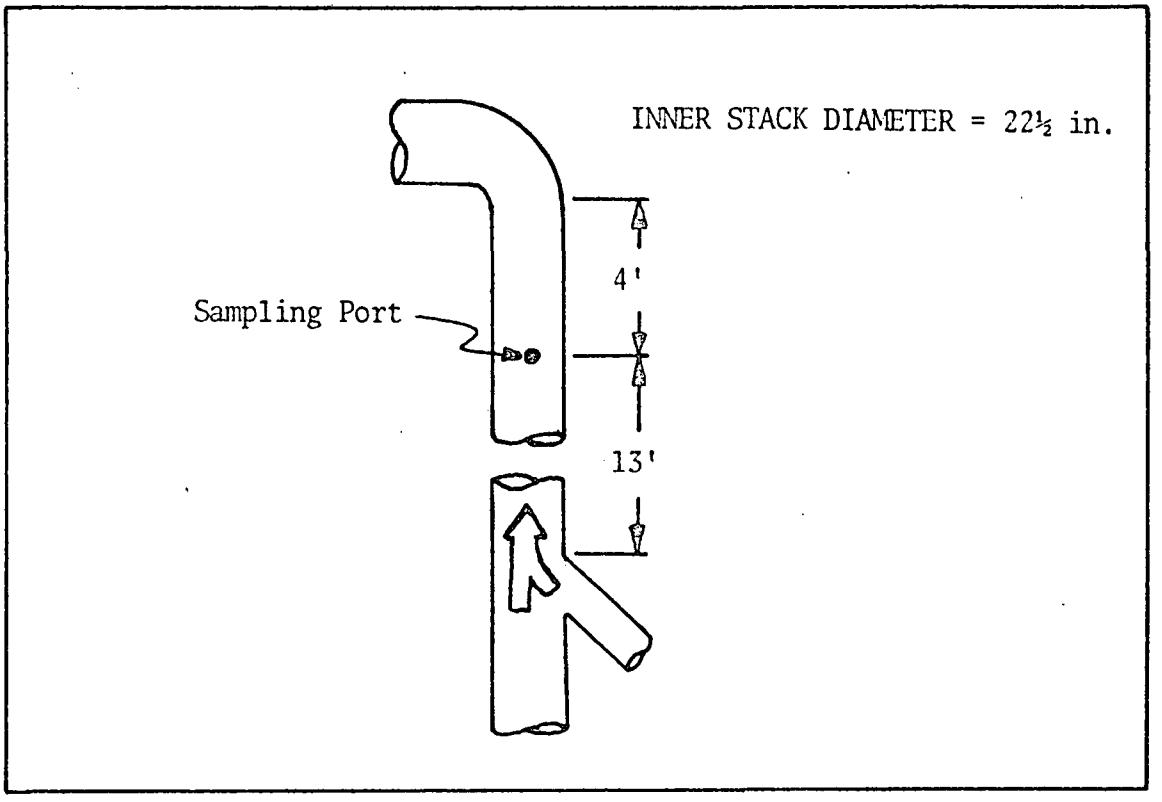


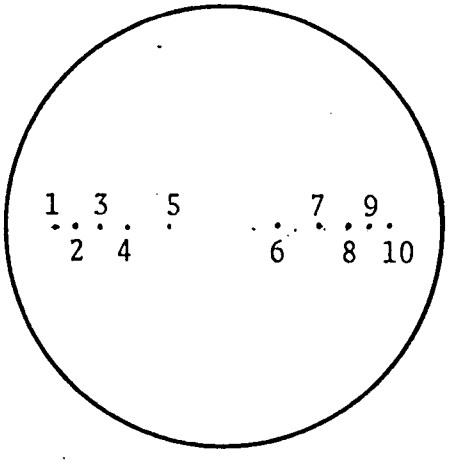


Sampling Point	Distance From Inner Wall (in)
1	1 5/8
2	2 7/8
3	4 1/2
4	6
5	8 1/2
6	15 1/2
7	18
8	19 5/8
9	21 1/8
10	22 3/8

FIGURE 4

LOCATION OF PORT AND SAMPLING POINTS,
STATION D
C. F. CHEMICALS, INC.

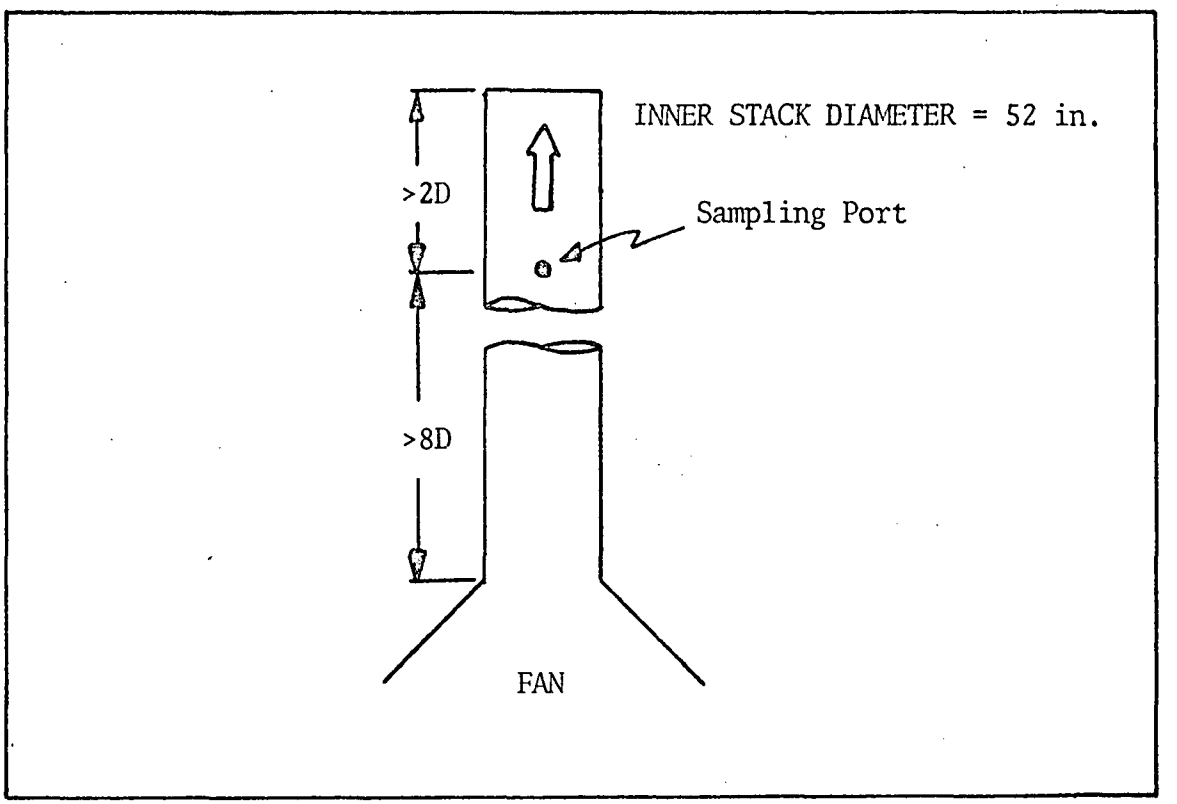


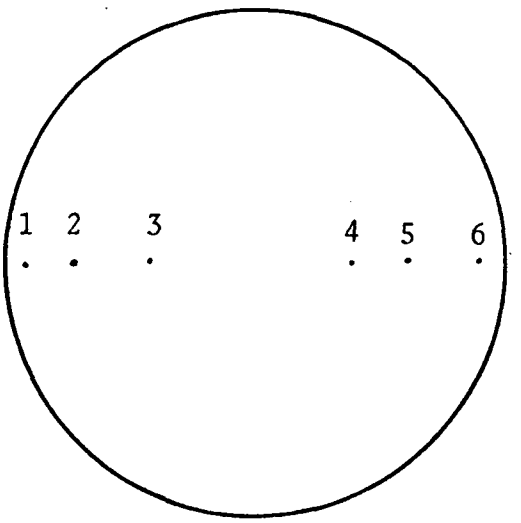


Sampling Point	Distance From Inner Wall (in)
1	2 1/2
2	3 1/2
3	4 3/4
4	6 1/4
5	8 3/8
6	14 1/8
7	16 1/4
8	17 3/4
9	18 7/8
10	19 7/8

FIGURE 5

LOCATION OF PORT AND SAMPLING POINTS,
STATION E
C. F. CHEMICALS, INC.





Sampling Point	Distance From Inner Wall (in)
1	2 1/4
2	7 5/8
3	15 5/16
4	36 11/16
5	44 5/16
6	49 3/4

FIGURE 6

LOCATION OF PORT AND SAMPLING POINTS,
STATION F
C. F. CHEMICALS, INC.

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 7). 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 through 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 referenced 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 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.

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

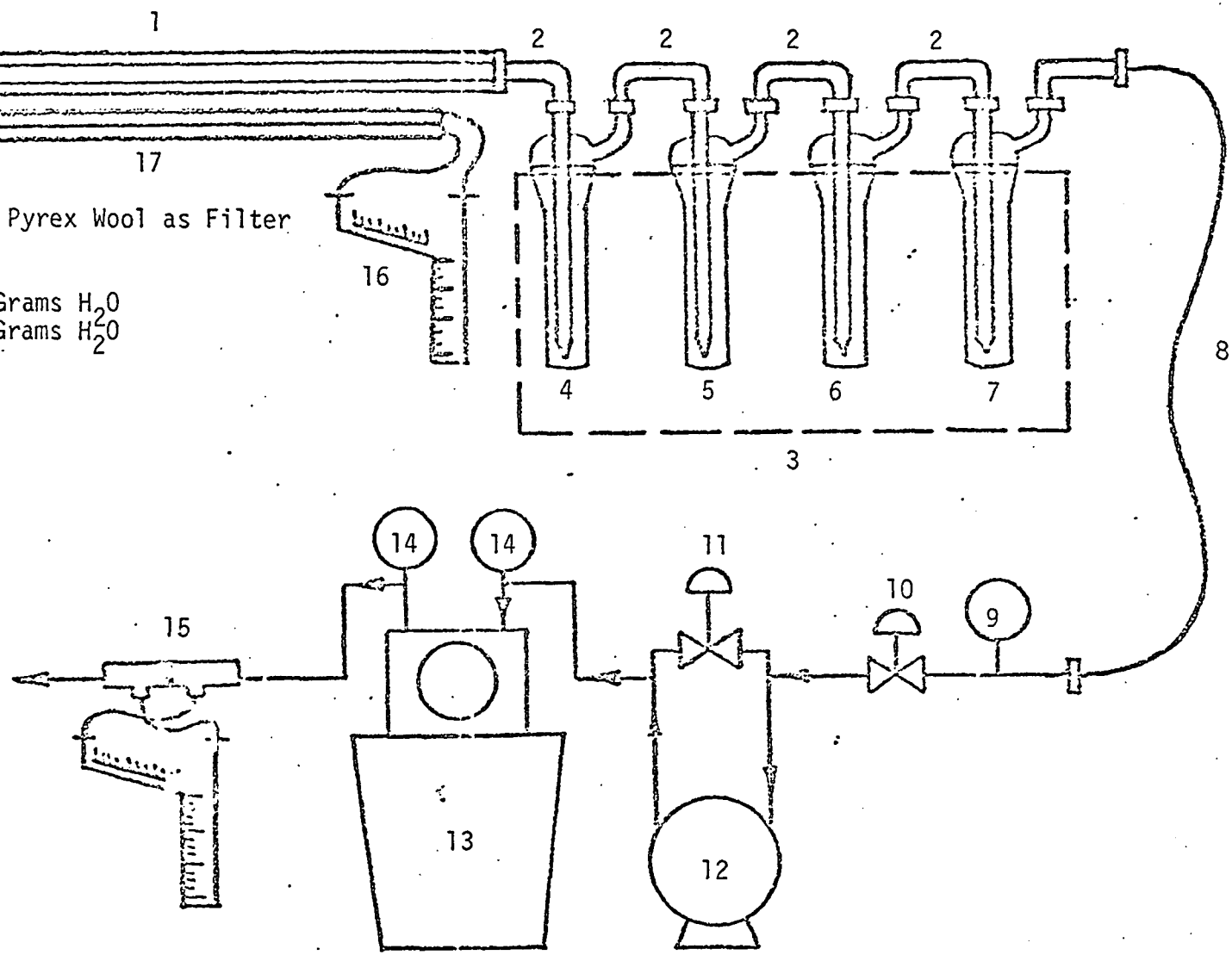


Figure 7

MOISTURE SAMPLING TRAIN

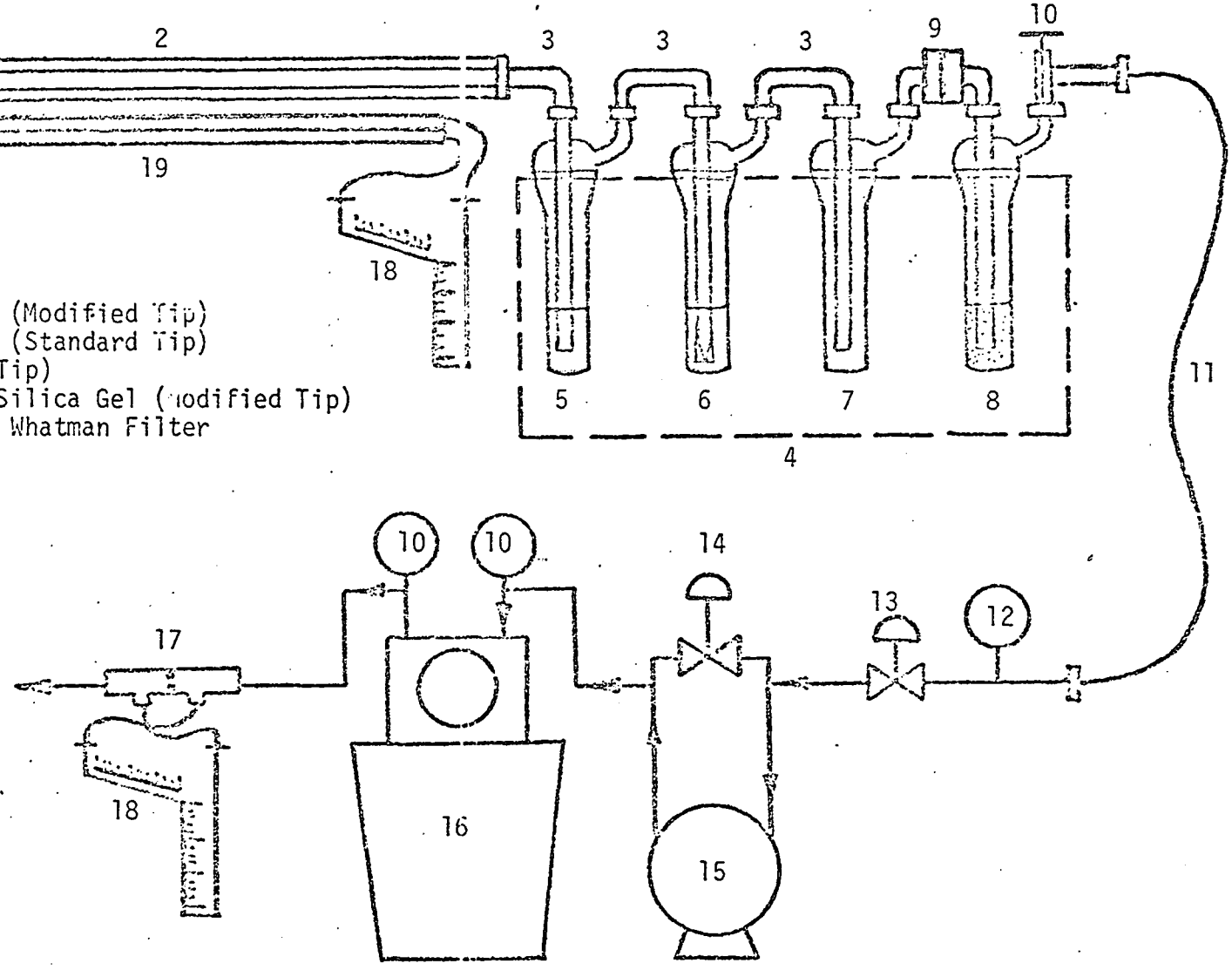
C. Sampling for Fluoride Emissions

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 8 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. During some runs the different sample fractions were placed in separate containers, while during others, all of the recovered sample was placed into one container (see Appendix (D)).

Field data sheets are included in Appendix B.



1. Stainless Steel Nozzle
2. Heated Glass Probe
3. Glass Connector
4. Ice Bath
5. Impinger with 100 ml H_2O (Modified Tip)
6. Impinger with 100 ml H_2O (Standard Tip)
7. Impinger, Dry (Modified Tip)
8. Impinger with 180 grams Silica Gel (Modified Tip)
9. Filter Holder with No. 1 Whatman Filter
10. Thermometer
11. Flexible Sample Line
12. Vacuum Gauge
13. Main Control Valve
14. By-Pass Control Valve
15. Air Tight Vacuum Pump
16. Dry Test Meter
17. Calibrated Orifice
18. Inclined Manometer
19. S-Type Pitot Tube

Figure 8

FLUORIDE SAMPLING TRAIN

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.

APPENDICES

APPENDIX A

Emission Calculations and Results

NOMENCLATURE FOR SOURCE SAMPLING CALCULATIONS

PB - Barometric pressure, inches Hg
PS - Stack pressure, inches Hg
AS - Stack area, sq. ft.
TS - Stack temperature, °R
TM - Meter temperature, °R
$\overline{H}$ - Average square root of velocity head, $\sqrt{\text{inches } H_2O}$
$\Delta\overline{H}$ Average meter orifice pressure differential, inches H_2O
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
P_o Pressure at the dry test meter orifice, $\left(PB + \frac{\Delta H}{13.6}\right)$ inches Hg

VWV - Conversion of condensate in milliliters to water vapor in cu. ft.
VSTPD - Volume samples, cubic feet (dry, 70°, 29.92 inches Hg)
VT - Total water vapor volume and dry gas volume sampled, cu. ft.
W - Moisture fraction of stack gas
FDA - Dry gas fraction
FMOIST - Assumed moisture from preliminary check
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, %
$\overline{U}$ - Stack gas velocity, feet per minute
$\overline{QS}$ - 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 (dry, 70°F, 29.92 in. Hg)
VI - Isokinetic sample volume, cubic feet (dry, 70°F, 29.92 in. Hg)
PISO - Percent isokinetic volume sampled
$PSIO_1$ Percent isokinetic volume sampled
$PSIO_2$ Percent isokinetic volume sampled (method described in Federal Register

EQUATIONS FOR CALCULATING FLUORIDE EMISSIONS

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

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

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

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

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

$$FMOIST = \text{Assumed moisture fraction}$$

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

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

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

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

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

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

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

$$QSTPD = (530) \times (QD) \div (TS)$$

$$VI = (530) \times (\underline{U}) \times (AN) \times (FDA) \times (Time) \div (TS)$$

$$PISO = (100) \times (VSTPD) \div (VI)$$

$$PISO_1 = (5.626 \times TS \times VM) \div (\underline{U} \times Time \times PS \times FDA \times AN)$$

$$PISO_2 = \left[(0.00267 \times VC \times TS) + (P_o \times TS \times VM \div TM)\right] \div \left[(Time \times \underline{U} \times PS \times AN)\right]$$

Fluoride Emissions:

MG = Milligrams of fluoride from lab analysis

Grains/SCF = (0.01543) x (MG) ÷ VSTPD

Grains/CF, Stack Cond. = (17.71) x (PS) x (FDA) x (Grains/SCF) ÷ (TS)

Lbs/hour = (Grains/SCF) x (0.00857) x (QSTPD)

P_2O_5 Fed = Tons/hour, determined from plant data

Lbs/ton P_2O_5 Fed = (lbs/hour) ÷ (Tons/hour P_2O_5 Fed)

SOURCE TEST DATA

E.P.A. TEST NO. _____ NO. OF RUNS 3

NAME OF FIRM C. F. CHEMICALS

LOCATION OF PLANT BARTOW FLORIDA

TYPE OF PLANT WET PHOSPHORIC ACID PLANT

CONTROL EQUIPMENT SCRUBBER

SAMPLING POINT LOCATION WET PHOS ACID ATTACK INLET-STATION C

POLLUTANTS SAMPLED FLUORIDES

	1	2	3
1) RUN NO.	12/14/71	12/15/71	12/15/72
2) DATE	17:50	9:40	15:15
3) TIME BEGAN	19:40	11:30	17:05
4) TIME END	30	30	30
5) BAROMETRIC PRESSURE, "Hg ABSOLUTE	2.72	3.18	3.25
6) METER ORIFICE PRESSURE DROP, "H_2O	109.361	112.515	117.993
7) VOL DRY GAS @ METER CONDITIONS, ft^3	88	85	91.6
8) AVERAGE GAS METER TEMPERATURE, °F	106.758	110.567	114.58
9) VOL DRY GAS @ S.T.P.*, ft^3	325.3	349.1	400.8
10) TOTAL H_2O COLLECTED, ml	15.42	16.55	19
11) VOL WATER VAPOR COLL. @ S.T.P., ft^3	12.6	13	14.2
12) STACK GAS MOISTURE, %VOLUME	5	5	5.0
13) ASSUMED STACK GAS MOISTURE, %VOLUME	0	0	1.6
14) % CO_2	20.5	20.5	20
15) % O_2	0	0	0
16) % CO	79.5	79.5	78.4
17) % N_2	3168	3168	2341
18) % EXCESS AIR	28.82	28.82	29.06
19) MOLECULAR WT. OF STACK GAS, DRY	27.45	27.41	27.48
20) MOLECULAR WT. OF STACK GAS, STACK COND.	0.95	0.95	0.95
21) STACK GAS SP. GRAVITY, REF. TO AIR	1.161	1.221	1.19
22) AVG $\sqrt{\text{VEL. HEAD OF STACK GAS}}$, "$H_2O$	132	130	113
23) AVERAGE STACK GAS TEMPERATURE, °F	0.83	0.83	0.83
24) PITOT CORRECTION FACTOR	30	30	30
25) STACK PRESSURE, "Hg ABSOLUTE	4185.8	4400.2	4218.2
26) STACK GAS VEL @ STACK COND., fpm	7.07	7.07	7.07
27) STACK AREA, ft^2	23146	24303	23657
28) STACK GAS FLOW RATE @ S.T.P., scfm	110	110	110
29) NET TIME OF TEST, min.	0.25	0.25	0.25
30) SAMPLING NOZZLE DIAMETER, in.	86.7	85.5	91
31) PERCENT ISOKINETIC			
32) FLUORIDE - WATER SOLUBLE, MG	1000	890	523
33) FLUORIDE - TOTAL, MG	1001.3	2.79	523.85
34) FLUORIDE - WATER SOLUBLE, GR/SCF	0.1443	0.0001	0.0703
35) FLUORIDE - TOTAL, GR/SCF	0.1444	0.0004	0.0704
36) FLUORIDE - H2O SOL.→ GR/ CF STACK COND	0.1131	0.0001	0.0559
37) FLUORIDE - TOTAL, GR/ CF STACK COND.	0.1132	0.0003	0.056
38) FLUORIDE - WATER SOLUBLE, LB/HOUR	28.6139	0.0258	14.2513
39) FLUORIDE - TOTAL, LB/ HOUR	28.6511	0.0809	14.2744
40) FLUORIDE - WATER SOLUBLE, LB/TON P2O5	0.9055	0.0008	0.451
41) FLUORIDE - TOTAL, LBS/TON P2O5 FED	0.9067	0.0026	0.4517

*DRY, 70 °F, 29.92 in. Hg

SOURCE TEST DATA

E.P.A. TEST NO. _____ NO. OF RUNS 3
NAME OF FIRM C. F. CHEMICALS
LOCATION OF PLANT BARTOW FLORIDA
TYPE OF PLANT WET PHOSPHORIC ACID PLANT
CONTROL EQUIPMENT SCRUBBER?
SAMPLING POINT LOCATION STATION D WET PHOS ACID INLET
POLLUTANTS SAMPLED FLUORIDES

	1	2	3
1) RUN NO.	1	2	3
2) DATE	12/14/71	12/15/71	12/15/71
3) TIME BEGAN	17:51	9:40	15:15
4) TIME END	19:51	11:40	17:15
5) BAROMETRIC PRESSURE, "Hg ABSOLUTE	30	30	30
6) METER ORIFICE PRESSURE DROP, "H_2O	1.22	0.81	0.75
7) VOL DRY GAS @ METER CONDITIONS, ft^3	75.957	69.004	62.4
8) AVERAGE GAS METER TEMPERATURE, °F	116.3	109.8	121.5
9) VOL DRY GAS @ S.T.P.*, ft^3	70.246	64.483	57.13
10) TOTAL H_2O COLLECTED, ml	52	65	44.9
11) VOL WATER VAPOR COLL. @ S.T.P., ft^3	2.46	3.08	2.13
12) STACK GAS MOISTURE, %VOLUME	3.4	4.6	3.6
13) ASSUMED STACK GAS MOISTURE, %VOLUME	3.4	5	5
14) % CO_2	0	0	0
15) % O_2	20.1	20.3	20.8
16) % CO	0	0	0
17) % N_2	79.9	79.7	79.2
18) % EXCESS AIR	1743	2255	7784
19) MOLECULAR WT. OF STACK GAS, DRY	28.8	28.81	28.83
20) MOLECULAR WT. OF STACK GAS, STACK COND.	28.44	28.32	28.44
21) STACK GAS SP. GRAVITY, REF. TO AIR	0.98	0.98	0.98
22) AVG $\sqrt{\text{VEL. HEAD OF STACK GAS}}$, "$H_2O$	0.521	0.545	0.505
23) AVERAGE STACK GAS TEMPERATURE, °F	93	92	92
24) PITOT CORRECTION FACTOR	0.83	0.83	0.83
25) STACK PRESSURE, "Hg ABSOLUTE	30	30	30
26) STACK GAS VEL @ STACK COND., fpm	1784.3	1867.2	1725.9
27) STACK AREA, ft^2	1.48	1.48	1.48
28) STACK GAS FLOW RATE @ S.T.P., scfm	2446	2533	2364
29) NET TIME OF TEST, min.	120	120	120
30) SAMPLING NOZZLE DIAMETER, in.	0.25	0.25	0.25
31) PERCENT ISOKINETIC	103.7	91.9	87.2
32) FLUORIDE - WATER SOLUBLE, MG	16.7	18	24
33) FLUORIDE - TOTAL, MG	16.722	18.13	24
34) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0037	0.0043	0.0065
35) FLUORIDE - TOTAL, GR/SCF	0.0037	0.0043	0.0065
36) FLUORIDE - H2O SOL.→ GR/ CF STACK COND	0.0034	0.0039	0.006
37) FLUORIDE - TOTAL, GR/ CF STACK COND.	0.0034	0.004	0.006
38) FLUORIDE - WATER SOLUBLE, LB/HOUR	0.0767	0.0933	0.1311
39) FLUORIDE - TOTAL, LB/ HOUR	0.0768	0.094	0.1311
40) FLUORIDE - WATER SOLUBLE, LB/TON P2O5	0.0024	0.0029	7.0042
41) FLUORIDE - TOTAL, LBS/TON P2O5 FED	0.0025	0.0029	7.0042

*DRY, 70 °F, 29.92 in. Hg

SOURCE TEST DATA

E.P.A. TEST NO. _____ NO. OF RUNS 3
NAME OF FIRM C. F. CHEMICALS
LOCATION OF PLANT BARTOW FLORIDA
TYPE OF PLANT WET PHOSPHORIC ACID PLANT
CONTROL EQUIPMENT [illegible]
SAMPLING POINT LOCATION STATION E - WET PHOS ACID INLET
POLLUTANTS SAMPLED FLUORIDES

	1	2	3
1) RUN NO.	1	2	3
2) DATE	12/14/71	12/15/71	12/15/71
3) TIME BEGAN	17:20	9:45	15:30
4) TIME END	19:20	11:45	17:30
5) BAROMETRIC PRESSURE, "Hg ABSOLUTE	30	30	30
6) METER ORIFICE PRESSURE DROP, "H_2O	2.3	2.26	2.42
7) VOL DRY GAS @ METER CONDITIONS, ft^3	101.321	100.027	105.86
8) AVERAGE GAS METER TEMPERATURE, °F	88	87	93.9
9) VOL DRY GAS @ S.T.P.*, ft^3	98.809	97.715	102.166
10) TOTAL H_2O COLLECTED, ml	67.6	56.6	71.1
11) VOL WATER VAPOR COLL. @ S.T.P., ft^3	3.2	2.68	3.37
12) STACK GAS MOISTURE, %VOLUME	3.1	2.7	3.2
13) ASSUMED STACK GAS MOISTURE, %VOLUME	400	400	4
14) % CO_2	0	0.2	0.8
15) % O_2	20	20.7	20
16) % CO	0	0	0
17) % N_2	80	79.1	79.2
18) % EXCESS AIR	1563	6078	1874
19) MOLECULAR WT. OF STACK GAS, DRY	28.8	28.86	28.93
20) MOLECULAR WT. OF STACK GAS, STACK COND.	28.46	28.57	28.58
21) STACK GAS SP. GRAVITY, REF. TO AIR	0.98	0.99	0.99
22) AVG $\sqrt{\text{VEL. HEAD OF STACK GAS}}$, "$H_2O$	0.809	0.818	0.873
23) AVERAGE STACK GAS TEMPERATURE, °F	94	92	92
24) PITOT CORRECTION FACTOR	0.83	0.83	0.83
25) STACK PRESSURE, "Hg ABSOLUTE	30	30	30
26) STACK GAS VEL @ STACK COND., fpm	2771.2	2792.1	2979.4
27) STACK AREA, ft^2	2.76	2.76	2.76
28) STACK GAS FLOW RATE @ S.T.P., scfm	7090	7204	7647
29) NET TIME OF TEST, min.	120	120	120
30) SAMPLING NOZZLE DIAMETER, in.	0.25	0.25	0.25
31) PERCENT ISOKINETIC	93.8	91.3	89.9
32) FLUORIDE - WATER SOLUBLE, MG	21.9	15	18
33) FLUORIDE - TOTAL, MG		15	18.073
34) FLUORIDE - WATER SOLUBLE, GR/SCF		0.0024	0.0027
35) FLUORIDE - TOTAL, GR/SCF		0.0024	0.0027
36) FLUORIDE - H2O SOL.→ GR/CF STACK COND	No Data	0.0022	0.0025
37) FLUORIDE - TOTAL, GR/CF STACK COND.		0.0022	0.0025
38) FLUORIDE - WATER SOLUBLE, LB/HOUR		0.146	0.1778
39) FLUORIDE - TOTAL, LB/HOUR		0.146	0.1785
40) FLUORIDE - WATER SOLUBLE, LB/TON P2O5		0.0046	0.0056
41) FLUORIDE - TOTAL, LBS/TON P2O5 FED		0.0046	0.0056

*DRY, 70 °F, 29.92 in. Hg

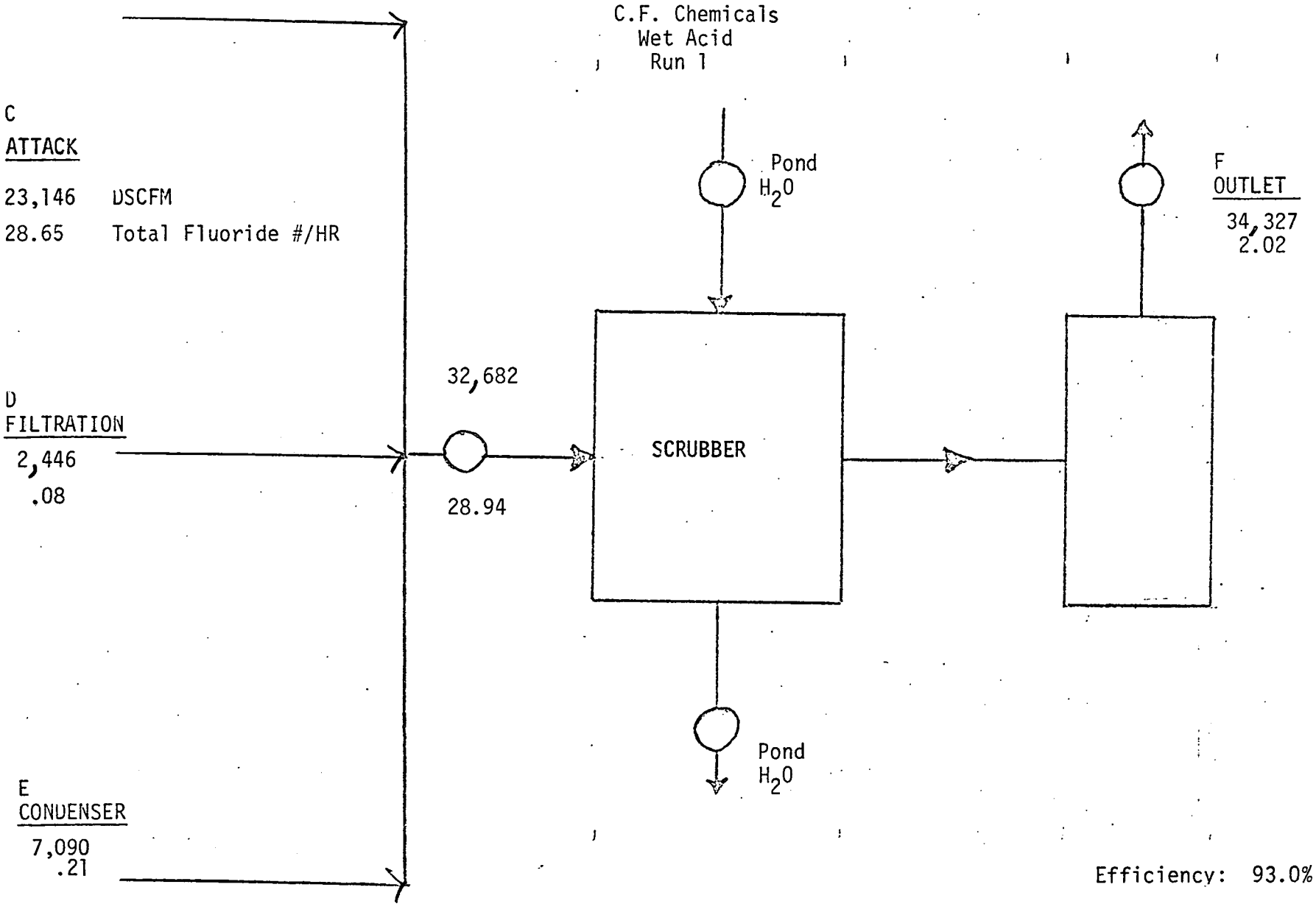
SOURCE TEST DATA

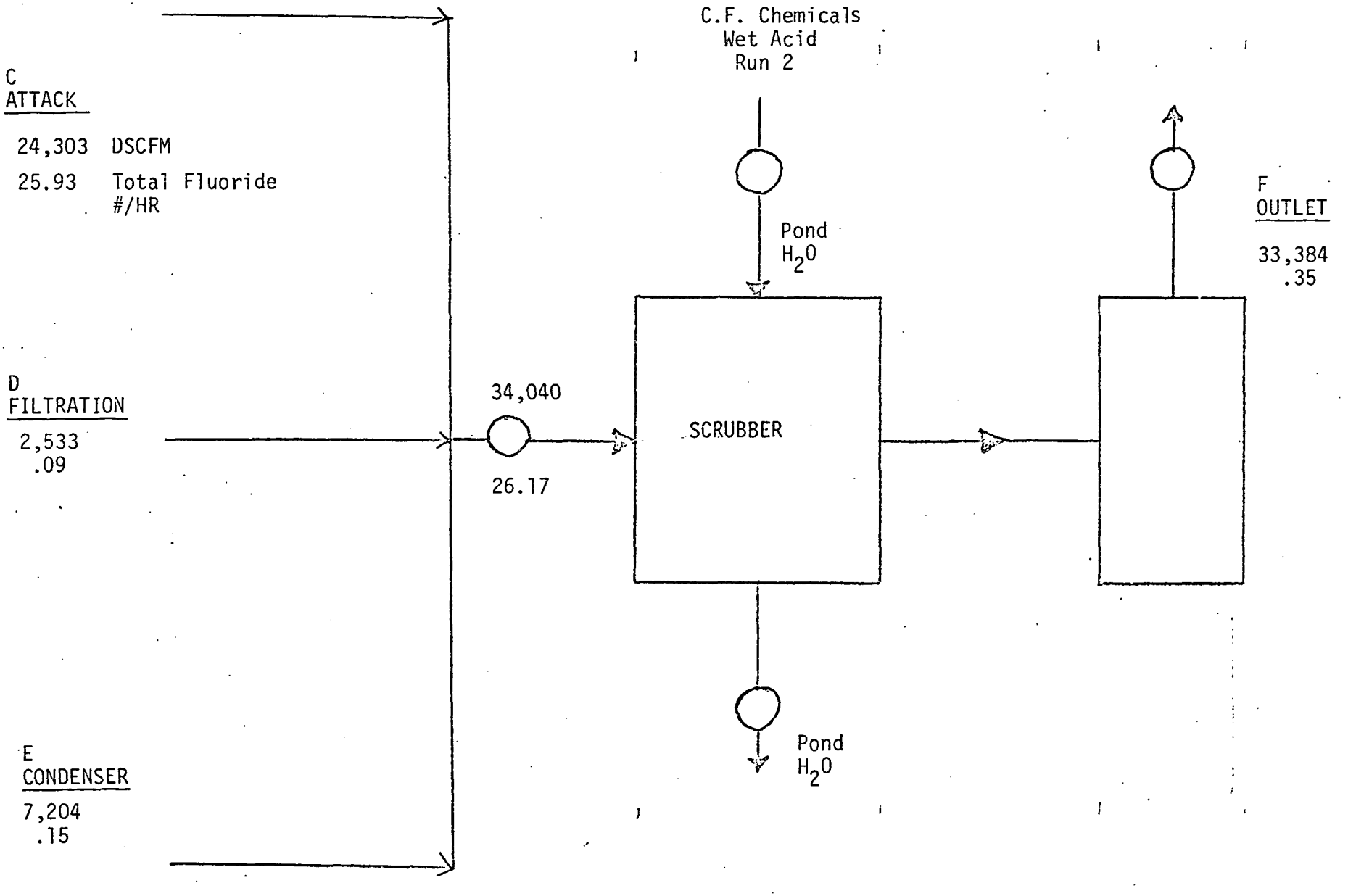
E.P.A. TEST NO. _____ NO. OF RUNS 3
NAME OF FIRM C. F. CHEMICALS
LOCATION OF PLANT BARTOW FLORIDA
TYPE OF PLANT WET PHOSPHORIC ACID PLANT
CONTROL EQUIPMENT SCRUBBER
SAMPLING POINT LOCATION STATION F-OUTLET-WET PHOS. ACID PLANT
POLLUTANTS SAMPLED FLUORIDES

4

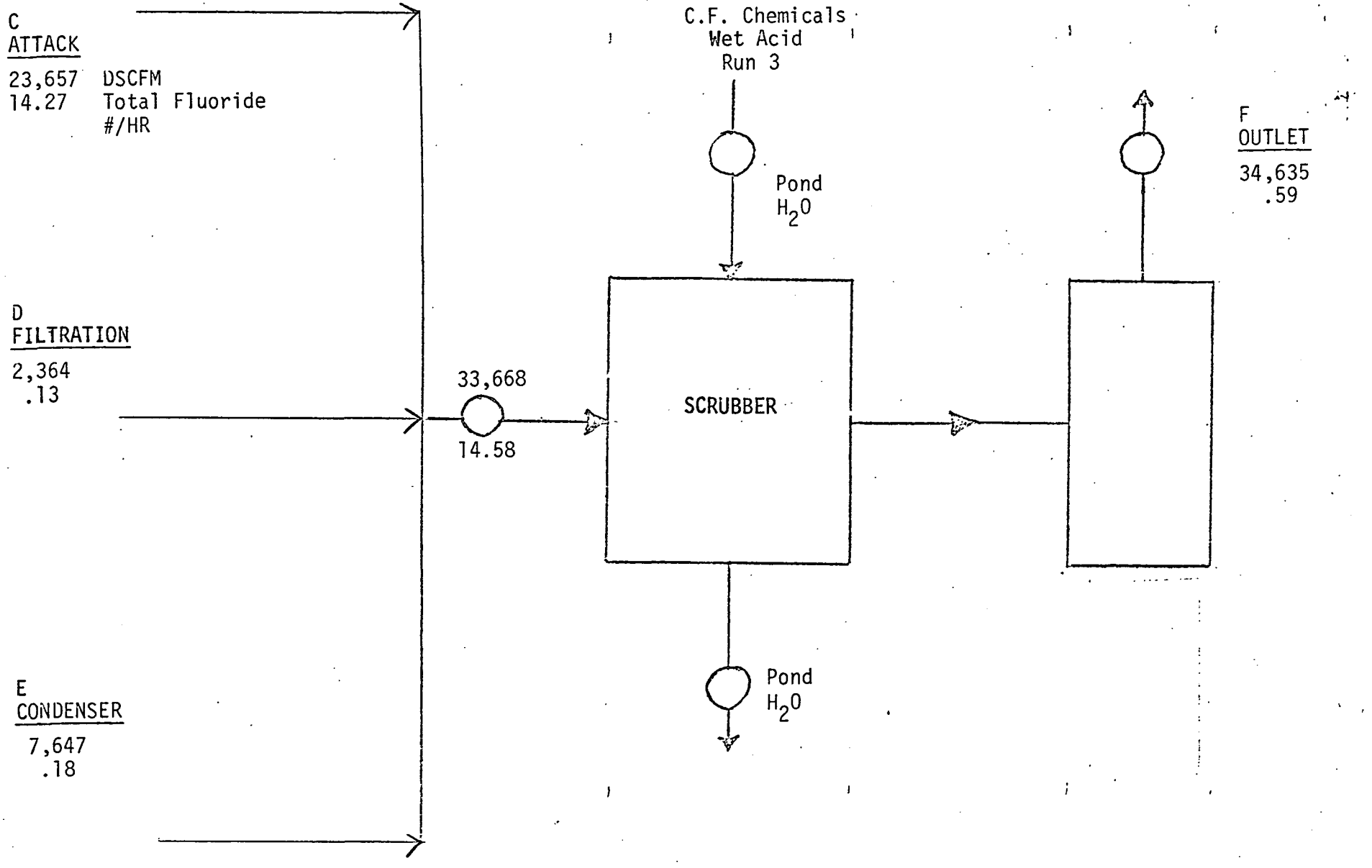
	1	2	3
1) RUN NO.	1	2	3
2) DATE	12/14/71	12/15/71	12/15/71
3) TIME BEGAN	17:42	0942	15:18
4) TIME END	19:42	11:42	17:18
5) BAROMETRIC PRESSURE, "Hg ABSOLUTE	30	30	30
6) METER ORIFICE PRESSURE DROP, "H_2O	1.86	1.78	1.9
7) VOL DRY GAS @ METER CONDITIONS, ft^3	92.854	91.24	95.789
8) AVERAGE GAS METER TEMPERATURE, °F	78	82	87
9) VOL DRY GAS @ S.T.P.*, ft^3	92.137	89.849	93.493
10) TOTAL H_2O COLLECTED, ml	76	81.6	78.2
11) VOL WATER VAPOR COLL. @ S.T.P., ft^3	3.6	3.87	3.71
12) STACK GAS MOISTURE, %VOLUME	3.8	4.1	3.8
13) ASSUMED STACK GAS MOISTURE, %VOLUME	540	500	500
14) % CO_2	0	0	0.5
15) % O_2	20	20.2	20.5
16) % CO	0	0	0
17) % N_2	80	79.8	79
18) % EXCESS AIR	1563	1967	3988
19) MOLECULAR WT. OF STACK GAS, DRY	28.8	28.81	28.9
20) MOLECULAR WT. OF STACK GAS, STACK COND.	28.39	28.36	28.48
21) STACK GAS SP. GRAVITY, REF. TO AIR	0.98	0.98	0.98
22) AVG $\sqrt{\text{VEL. HEAD OF STACK GAS}}$, "$H_2O$	0.731	0.713	0.738
23) AVERAGE STACK GAS TEMPERATURE, °F	85	85	84
24) PITOT CORRECTION FACTOR	0.83	0.83	0.83
25) STACK PRESSURE, "Hg ABSOLUTE	30	30	30
26) STACK GAS VEL @ STACK COND., fpm	2487	2427.9	2506.1
27) STACK AREA, ft^2	14.75	14.75	14.75
28) STACK GAS FLOW RATE @ S.T.P., scfm	34327	33384	34635
29) NET TIME OF TEST, min.	120	120	120
30) SAMPLING NOZZLE DIAMETER, in.	0.25	0.25	0.25
31) PERCENT ISOKINETIC	96.5	96.8	97.1
32) FLUORIDE - WATER SOLUBLE, MG	41	7.2	12
33) FLUORIDE - TOTAL, MG	41.16	7.221	12
34) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0069	0.0012	0.002
35) FLUORIDE - TOTAL, GR/SCF	0.0069	0.0012	0.002
36) FLUORIDE - H2O SOL.→ GR/ CF STACK COND	0.0064	0.0012	0.0019
37) FLUORIDE - TOTAL, GR/ CF STACK COND.	0.0065	0.0012	0.0019
38) FLUORIDE - WATER SOLUBLE, LB/HOUR	2.016	0.3531	0.5867
39) FLUORIDE - TOTAL, LB/ HOUR	2.0239	0.3541	0.5867
40) FLUORIDE - WATER SOLUBLE, LB/TON P2O5	0.0638	0.0112	0.0186
41) FLUORIDE - TOTAL, LBS/TON P2O5 FED	0.064	0.0112	0.0186

*DRY, 70 °F, 29.92 in. Hg


C.F. Chemicals
Wet Acid
Run 1
C
ATTACK
23,146 DSCFM
28.65 Total Fluoride #/HR
Pond
H_2O
F
OUTLET
34,327
2.02
32,682
D
FILTRATION
2,446
.08
SCRUBBER
28.94
Pond
H_2O
E
CONDENSER
7,090
.21
Efficiency: 93.0%



Efficiency 98.7%



Efficiency 95.9%

APPENDIX B

Field Data

PRELIMINARY CHECK FOR STACK GAS

MOISTURE CONTENT AND SPECIFIC GRAVITY

Plant C.F. Chemicals, Inc. Stack Wet Phos. Acid, Station "C"

Date 12-14-71 Sample Time 1300-1315 Barometric Pressure 30 "Hg

Moisture Content -- Method 1

Final Dry Test Meter Reading	3.190	Ft^3
Initial Dry Test Meter Reading	1.109	Ft^3
Dry Test Meter Volume Sampled	2.081	Ft^3
Average Meter Temperature	81	°F
Average Meter Vacuum	—	"Hg
Average Meter Orifice Δ H	0.035	"H_2O
Sampling Rate	3.9	LPM
Barometric Pressure @ Meter Orifice	30	"Hg
Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg	2.094	Ft^3
Condensate Volume	1	ml
Water Vapor Volume @ 70 °F, 29,92 "Hg	0.047	Ft^3

Moisture Fraction, H_2O 0.05 Fraction Of Dry Air, FDA 0.95

Moisture Content -- Method 2

Dry Bulb Temp. ____ °F Wet Bulb Temp. ____ °F Dew Point Temp. ____ °F

Vapor Pressure Of H_2O @ DP ____ "Hg Stack Pressure ____ "Hg

Moisture Fraction, H_2O ____ 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, $M_s = [(M_d)x(FDA)] + [(18)x(H_2O)] =$ ____

Specific Gravity (Referred to air), $G_s = (M_s) \div (28.99) =$ ____

PRELIMINARY CHECK FOR STACK GAS

MOISTURE CONTENT AND SPECIFIC GRAVITY

Plant C.F. Chemicals, Inc. Stack Wet Phos. Acid, Station "D"

Date 12-14-71 Sample Time _____ Barometric Pressure 30 "Hg

Moisture Content -- Method 1

Final Dry Test Meter Reading	172.659	Ft^3
Initial Dry Test Meter Reading	171.659	Ft^3
Dry Test Meter Volume Sampled	1.000	Ft^3
Average Meter Temperature	87	°F
Average Meter Vacuum	—	"Hg
Average Meter Orifice Δ H	0.05	"H_2O
Sampling Rate	2.1	LPM
Barometric Pressure @ Meter Orifice	30	"Hg
Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg	0.971	Ft^3
Condensate Volume	0.1	ml
Water Vapor Volume @ 70 °F, 29.92 "Hg	0.005	Ft^3

Moisture Fraction, H_2O 0.03 Fraction Of Dry Air, FDA 0.97

Moisture Content -- Method 2

Dry Bulb Temp. 91 °F Wet Bulb Temp. 87 °F Dew Point Temp. 86 °F

Vapor Pressure Of H_2O @ DP 1.25 "Hg Stack Pressure 30 "Hg

Moisture Fraction, H_2O 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, $M_s = [(M_d)x(FDA)] + [(18)x(H_2O)] =$ _____

Specific Gravity (Referred to air), $G_s = (M_s) \div (28.99) =$ _____

PRELIMINARY CHECK FOR STACK GAS

MOISTURE CONTENT AND SPECIFIC GRAVITY

Plant C.F Chemicals, Inc. Stack Wet Phos. Acid, Station "E"

Date 12-14-71 Sample Time 1300-1316 Barometric Pressure 30 "Hg

Moisture Content -- Method 1

Final Dry Test Meter Reading	294.722	Ft^3
Initial Dry Test Meter Reading	291.722	Ft^3
Dry Test Meter Volume Sampled	3.000	Ft^3
Average Meter Temperature	82	°F
Average Meter Vacuum	—	"Hg
Average Meter Orifice Δ H	0.05	"H_2O
Sampling Rate	5.31	LPM
Barometric Pressure @ Meter Orifice	30	"Hg
Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg	2.941	Ft^3
Condensate Volume	1	ml
Water Vapor Volume @ 70 °F, 29,92 "Hg	0.047	Ft^3

Moisture Fraction, H_2O 0.04 Fraction Of Dry Air, FDA 0.96

Moisture Content -- Method 2

Dry Bulb Temp. 92 °F Wet Bulb Temp. 86 °F Dew Point Temp. 84 °F

Vapor Pressure Of H_2O @ DP 1.18 "Hg Stack Pressure 30 "Hg

Moisture Fraction, H_2O 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, $M_s = [(M_d)x(FDA)] + [(18)x(H_2O)] =$ _____

Specific Gravity (Referred to air), $G_s = (M_s) \div (28.99) =$ _____

PRELIMINARY CHECK FOR STACK GAS

MOISTURE CONTENT AND SPECIFIC GRAVITY

Plant C.F. Chemicals, Inc. Stack Wet Phos Acid, Station "F"

Date 12-14-71 Sample Time 1308 Barometric Pressure 30 "Hg

Moisture Content -- Method 1

Final Dry Test Meter Reading	813.700	Ft^3
Initial Dry Test Meter Reading	812.100	Ft^3
Dry Test Meter Volume Sampled	1.600	Ft^3
Average Meter Temperature	82	°F
Average Meter Vacuum	—	"Hg
Average Meter Orifice Δ H	0.05	"H_2O
Sampling Rate	—	LPM
Barometric Pressure @ Meter Orifice	30	"Hg
Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg	1.568	Ft^3
Condensate Volume	1	ml
Water Vapor Volume @ 70 °F, 29,92 "Hg	0.047	Ft^3

Moisture Fraction, H_2O 0.05 Fraction Of Dry Air, FDA 0.95

Moisture Content -- Method 2

Dry Bulb Temp. ____ °F Wet Bulb Temp. ____ °F Dew Point Temp. ____ °F

Vapor Pressure Of H_2O @ DP ____ "Hg Stack Pressure ____ "Hg

Moisture Fraction, H_2O ____ 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, $M_s = [(M_d)x(FDA)] + [(18)x(H_2O)] =$ ____

Specific Gravity (Referred to air), $G_s = (M_s) \div (28.99) =$ ____

SOURCE SAMPLING FIELD DATA SHEET

C F. Chemicals — INlet

Sampling Location Attack Stack Inlet

Date 12/14/71 Run No. 1

Time Start 1750 Time End 1940

Sampling Time/Point 5 min (110 total)

DB 127 °F, WB ____ °F, VF @ DP ____ "Hg

Moisture 5 %, FDA 0.95 Gas Density Factor ____

Barometric Press 30 "Hg, Stack Press 30 "Hg

Weather Hot

Temp. 85 °F, W/D ____, W/S ____

Sample Box No. ____ Meter Box No. 5

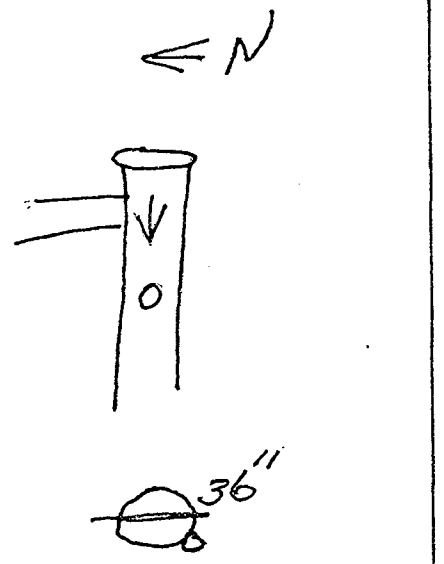
Meter ΔH@ 1.68 Pitot Corr. Factor 0.83

Nozzle Dia. 1/4 in., Probe Length 6 ft

Probe Heater Setting ____

Stack Dimensions: Inside Diameter 36 in
Inside Area 7.06 ft²
Height ____ ft

Sketch of Stack



Mat'l Processing Rate ____

Final Gas Meter Reading 113.265 ft³

Initial Gas Meter Reading 003.904 ft³

Total Condensate in Impingers 293 ml

Moisture in Silica Gel 221.8 (32.3) gm

Silica Gel Container No. 4 Filter No. 71-003

Orsat: CO_2 0
O_2 20.5
CO 0
N_2 ____
Excess Air ____

Test Conducted By: George Allen, Mike Jackson

Remarks: ____

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3) 003.904	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O) Calc.	Actual	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F) In	Out	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
1) 1	1 1/8"	5.50	010.5	4.0	—	5.0	132	84	85		83	8.8
2	2"	5.55	017.4	4.0	—	4.8	134	84	85		82	8.8
3	2 3/4"	6.00	024.0	3.5	—	4.7	133	84	85		82	8.8
4	3 3/4"	6.05	030.7	3.5	—	4.7	133	85	85		83	8.8
5	4 3/4	6.10	037.3	3.5	—	4.7	132	86	85		84	8.9
6	5 3/4	6.15	043.9	3.5	—	4.7	132	87	85		85	22
7	7	6.20	050.5	3.0	—	4.6	132	89	86		85	22
8	8 1/4	6.25	056.9	3.0	—	4.6	132	92	87		90	23
9	9 3/4	6.30	063.4	2.5	8.0	4.5	132	95	88		91	23

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
					Cal.	Actual		In	Out			
10	11 5/8"	6.35	069.8	2.0	6.8	4.5	130	99	91		95	23
11	14 5/16	6.40	076.5	1.5	5.0	4.6	130	97	92		95	23
12	21 5/8	6.45	080.5	0.4	1.35	1.35	134	94	93		87	4.5
13	24 3/8	6.50	083.9	0.35	1.20	1.20	133	89	92		87	4.0
14	26 3/16	6.55	087.3	0.35	1.20	1.20	132	88	91		92	4.0
15	27 1/4	7.00	090.5	0.30	1.0	1.0	132	88	90		91	3.9
16	29"	7.05	093.4	0.30	1.0	1.0	134	88	89		88	4.0
17	30 3/16	7.10	097.0	0.35	1.20	1.20	132	88	87		86	4.2
18	31 1/4	7.15	099.9	0.35	1.20	1.20	132	88	87		85	4.3
19	32 1/4	7.20	103.5	0.4	1.35	1.35	132	88	87		85	5.0
20	33 1/8	7.25	107.0	0.30	1.0	1.0	132	88	86		85	4.2
21	34	7.30	110.	0.3	1.0	1.0	133	87	87		85	4.2
22	34 3/4	7.35	113.265	0.3	1.0	1.0	133	87	86		85	4.2
		7.40										

SOURCE SAMPLING FIELD DATA SHEET

Plant C F Chemicals

Sampling Location Attack (Inlet)

Date 12/15/71 Run No. 2

Time Start 940 Time End 11.30

Sampling Time/Point 5 min 110

DB ____ °F, WB ____ °F, VF @ DP ____ "Hg

Moisture 5 %, FDA 0.95, Gas Density Factor ____

Barometric Press 30 "Hg, Stack Press 30 Hg

Weather Hot

Temp. 80 °F, W/D ____, W/S ____

Sample Box No. ____ Meter Box No. 5

Meter ΔH@ 1.68 Pitot Corr. Factor 0.83

Nozzle Dia. 1/4 in., Probe Length 6 ft

Probe Heater Setting ____

Stack Dimensions: Inside Diameter 36 in
Inside Area ____ ft²
Height ____ ft

Sketch of Stack

Mat'l Processing Rate ____

Final Gas Meter Reading 225.681 ft³

Initial Gas Meter Reading 113.166 ft³

Total Condensate in Impingers 330 ml

Moisture in Silica Gel 206.1 − 187 = 19.1 gm

Silica Gel Container No. 108 Filter No. 72-025

Orsat:

CO_2	0				
O_2	20.5				
CO	0				
N_2					

Excess Air ____

Test Conducted By: ____

Remarks: V-Head very unsteady cannot pull iso. on many points.

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3) 113.166	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O) Calc.	Actual	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F) In	Out	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
1	1 1/8	9.40	119.8	3.5	—	5.1	130	79	79		81	23
2	2	9.45	126.4	3.5	—	4.9	130	80	79		78	23
3	2 3/4	9.50	133.0	4.0	—	5.0	130	81	79		72	23
4	3 3/4	9.55	139.8	4.0	—	5.0	130	82	79		72	23
5	4 3/4	10.00	—	3.5	—	5.0	130	84	80		71	22.5
6	5 3/4	10.05	152.9	3.0	—	4.9	130	85	80		71	22.5
7	7	10.10	159.4	3.0	—	4.8	130	86	80		69	22.5
8	8 1/4	10.15	166.0	3.0	—	4.8	130	87	81		69	22.5
9	9 3/4	10.20	172.6	3.0	—	4.75	130	88	81		69	22.5

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
					Cal.	Actual		In	Out			
10	11 5/8	10.25	179.1	2.8	9.3	4.75	130	89	82		70	22.5
11	14 5/16	10.30	185.6	2.5	8.0	4.75	130	90	82		70	22.5
12	21 5/8	10.35	192.0	1.5	5.0	4.75	130	90	83		70	22.5
13	24 3/8	10.40	195.6	0.3	1.0	1.0	130	90	83		69	4.0
14	26 3/16	10.45	198 7	0.3	1.0	1.0	130	89	84		69	4.0
15	27 1/4	10.50	201.9	0.3	1.0	1.0	130	89	84		69	4.0
16	29	10.55	205.0	0.3	1.0	1.0	130	88	84		73	4.0
17	30 3/16	11.00	208.2	0.3	1.0	1.0	130	88	84		74	4.0
18	31 1/4	11.05	211.2	0.3	1.0	1.0	130	88	84		74	4.0
19	32 1/4	11.10	214.9	0.4	1.35	1.35	130	87	84		75	4.9
20	33 1/8	11.15	218.3	0.4	1.35	1.35	130	87	84		75	4.9
21	34	11.20	222.1	0.5	1.65	1.65	130	86	84		75	6.0
22	34 3/4	11.25	225.681	0.35	1.19	1.19	130	86	85		75	4.6
		11.30										

SOURCE SAMPLING FIELD DATA SHEET

C"

Plant C F Chemicals

Sampling Location Attack (Inlet)

Date 12/15/71 Run No. 3

Time Start 1515 Time End 17.05

Sampling Time/Point 5 min 110 TOTAL

DB 130 °F, WB ____ °F, VF @ DP ____ "Hg

Moisture 5 %, FDA 0.95, Gas Density Factor ____

Barometric Press ____ "Hg, Stack Press ____ "Hg

Weather Hot

Temp. 80 °F, W/D ____, W/S —

Sample Box No. ____ Meter Box No. 5

Meter ΔH@ 1.68 Pitot Corr. Factor 0.83

Nozzle Dia. 1/4 in., Probe Length 6 ft

Probe Heater Setting ____

Stack Dimensions: Inside Diameter 36 in
Inside Area ____ ft²
Height ____ ft

Sketch of Stack

Mat'l Processing Rate ____

Final Gas Meter Reading 343.674 ft³

Initial Gas Meter Reading 225.681 ft³

Total Condensate in Impingers 182 ml

Moisture in Silica Gel 218.8 gm

Silica Gel Container No. 203 Filter No. 72-024

Orsat: CO_2 1.6
O_2 20
CO
N_2
Excess Air

Test Conducted By: [illegible]

Remarks: ____

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3) 225.681	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O) Calc.	Actual	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F) In	Out	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
1		3.15	—	3.0	—	5.0	113	88	88		75	22.5
2		3.20	238.3	3.0	—	4.9	113	89	88		79	22.5
3	Sample Run #1	3.25	245.8	3.5	—	4.9	113	89	88		82	22.5
4		3.30	—	3.5	—	4.9	113	91	88		82	22.5
5		3.35	259.3	3.5	—	4.9	113	91	88		95	22.2
6		3.40	266.1	3.5	—	4.9	113	93	88		75	22.5
7		3.45	273.0	3.0	—	4.86	113	94	89		74	22.5
8		3.50	279.6	3.0	—	4.85	113	95	89		74	22.5
9		3.55	286.4	2.5	8.0	4.8	113	96	90		74	22.5

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
					Cal.	Actual		In	Out			
10		4.00	293.2	2.0	6.75	4.8	113	97	90		74	22.5
11		4.05	300.1	1.5	5.0	4.8	113	98	90		74	22.5
12		4.10	304.6	0.4	1.35	1.35	113	98	91		74	5.0
13		4.15	307.8	0.35	1.19	1.19	113	97	91		75	4.0
14		4.20	311.3	0.4	1.35	1.35	113	96	91		75	4.2
15		4.25	315.0	0.45	1.5	1.5	113	96	91		75	4.9
16		4.30	318.7	0.4	1.35	1.35	120	95	91		75	4.8
17		4.35	322.7	0.5	1.75	1.75	115	94	91		75	5.8
18		4.40	326.8	0.55	1.9	1.9	113	94	91		73	6.0
19		4.46	331.1	0.55	1.9	1.9	113	93	91		73	6.0
20		4.50	335 3	0.5	1.75	1.75	113	93	91		73	5.9
21		4.55	339.5	0.55	1.9	1.9	113	93	91		73	6.2
22		5.00	343.674	0.55	1.9	1.9	113	93	91		76	6.2
		~~5.05~~										

SOURCE SAMPLING FIELD DATA SHEET

Plant C.F. Chemicals

D" Sampling Location Wet Phosphoric Acid - Inlet (D)

Date Dec. 19, 1971 Run No. 1

Time Start 7:51 PM Time End 9:51 PM

Sampling Time/Point 20 min x 6 pts = 120 min

DB ____ °F, WB ____ °F, VF @ DP ____ "Hg

Moisture 3.4 %, FDA .966 Gas Density Factor ____

Barometric Press ____ "Hg, Stack Press ____ "Hg

Weather Inside

Temp. 80s °F, W/D ~, W/S ~

Sample Box No. ____ Meter Box No. ____

Meter ΔH@ 1.72 Pitot Corr. Factor ____

Nozzle Dia. 1/4 in., Probe Length 6 ft

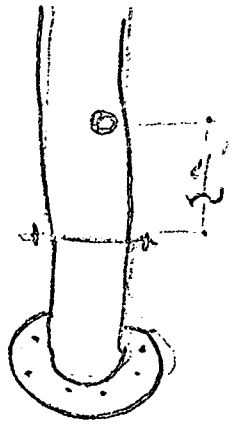
Probe Heater Setting ____

Stack Dimensions: Inside Diameter 24 in — 16.5

Inside Area ~~3.14~~ 1.88 ft²

Height ____ ft

Sketch of Stack



Mat'l Processing Rate ____

Final Gas Meter Reading 243.621 ft³

Initial Gas Meter Reading 172.664 ft³

Total Condensate in Impingers Net 41 ml } 52

Moisture in Silica Gel 207 - 196.0 = 11 gm

Silica Gel Container No. 110 Filter No. 72001

Orsat: CO_2 0

O_2 20.1%

CO 0

N_2 ____

Excess Air ____

Test Conducted By: Dan Black

Eric Johnson

Remarks: Points 1 thru 4 had a negative velocity head

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O) Calc.	Meter Orifice Press.Diff. ("H_2O) Actual	Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F) In	Gas Sample Temp.@ Dry Gas Meter (°F) Out	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
				8								
1	1 5/8	—	—	Negative								
2	2 7/8	—	—	Pressure								
3	4 1/2	—	—	9								
4	6	—	172.664									
5	8 1/2	—	183.8	0.26		1.20	93	93	93	—	63	3.0
6	15 1/2	—	196.1	0.28		1.25	94	105	96	—	63	3.0
7	18	—	209.2	0.28		1.25	94	120	106	—	64	3.0
8	19 5/8	—	223.1	0.29		1.30	92	130	117	—	64	3.5

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
					Cal.	Actual		In	Out			
			223.1									
9	21 1/8		235.9	0.27		1.20	93	138	125	93	63	3.5
10	22 3/8		248.621	0.25		1.10	93	142	131	93	63	3.5
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												

1.1 c

SOURCE SAMPLING FIELD DATA SHEET

"D"

Plant C.F. Chemicals

Sampling Location Wet Phosphoric Acid - Inlet (D)

Date Dec. 15, 1971 Run No. 2

Time Start 9:40 Am Time End 11:40 AM

Sampling Time/Point 20 min x 6 pts = 120 min

DB ____ °F, WB ____ °F, VF @ DP ____ "Hg

Moisture ____ %, FDA ____, Gas Density Factor ____

Barometric Press ____ "Hg, Stack Press ____ "Hg

Weather Inside

Temp. 80's °F, W/D —, W/S —

Sample Box No. ____ Meter Box No. ____

Meter ΔH@ 1.72 Pitot Corr. Factor ____

Nozzle Dia. 1/4 in., Probe Length 6 ft

Probe Heater Setting ____

Stack Dimensions: Inside Diameter 24 in = (16.5) Effective

Inside Area 1.48 ft² Effective Area

Height ____ ft

Sketch of Stack

See Run 1

Mat'l Processing Rate ____

Final Gas Meter Reading 318.204 ft³

Initial Gas Meter Reading 249.200 ft³

Total Condensate in Impingers Net 50 ml

Moisture in Silica Gel 196.5 - 181.5 = 15.0 gm } 65

Silica Gel Container No. 207 Filter No. 72004

Orsat:

CO_2		0			
O_2		20.3			
CO		0			
N_2					

Excess Air ____

Test Conducted By: Ray Black

Bill Johnson

Remarks: Points 1 thru 4 had a negative velocity head

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		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			
			249.200									
5	8 1/2	—	260.1	0.29		0.94	90	85	82	—	70	3.0
6	15 1/2	—	271.5	0.31		1.00	90	96	88	—	72	3.0
7	18	—	283.3	0.30		0.97	91	112	100	—	70	3.0
8	19 5/8	—	295.2	0.30		0.97	91	124	110	—	68	3.5
9	21 1/8	—	306.9	0.30		0.97	92	131	119	—	69	3.5
10	22 3/8	—	318.204	0.28		0.88	92	140	130	—	70	4.0
										—		
										—		

SOURCE SAMPLING FIELD DATA SHEET

"D"

Plant C.F. Chemicals

Sampling Location Wet Phosphoric Acid - Inlet (D)

Date Dec. 15, 1971 Run No. 3

Time Start 15/15 Time End 17:15

Sampling Time/Point 20 min x 6 pts = 120 min

DB ____ °F, WB ____ °F, VF @ DP ____ "Hg

Moisture ____ %, FDA ____, Gas Density Factor ____

Barometric Press ____ "Hg, Stack Press ____ "Hg

Weather Inside

Temp. 80's °F, W/D ~, W/S —

Sample Box No. ____ Meter Box No. ____

Meter ΔH@ 1.72 Pitot Corr. Factor ____

Nozzle Dia. 1/4 in., Probe Length 6 ft

Probe Heater Setting ____

Stack Dimensions: Inside Diameter ~~24~~ in = 165

Inside Area 1.48 ft²

Height ____ ft ← Effective Area

Sketch of Stack

See Run 1 for sketch

Mat'l Processing Rate ____

Final Gas Meter Reading 380.844 ft³

Initial Gas Meter Reading 318.444 ft³

Total Condensate in Impingers Net 33 ml > 44.6

Moisture in Silica Gel 194.4 / 182.5 / 11.9 gm

Silica Gel Container No. 107 Filter No. 72009

Orsat: CO_2 0

O_2 20.8

CO 0

N_2 79.2

Excess Air ____

Test Conducted By: Ray Black

Eric Johnson

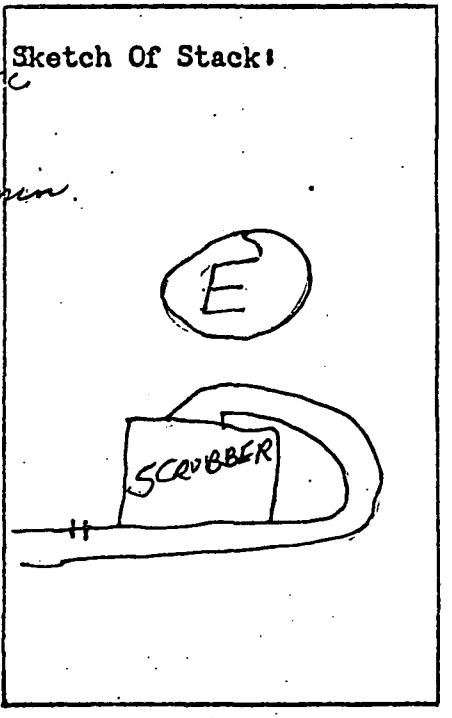
Remarks: Points 1 thru 4 had a negative velocity head

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		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			
			318.444									
5	8 1/2	—	328.0	0.23		0.67	93	98	98	—	68	2.0
6	15 1/2	—	338.6	0.29		0.79	93	116	102	—	66	2.5
7	18	—	349.2	0.29		0.79	92	128	110	—	66	2.5
8	19 5/8	—	359.9	0.29		0.79	92	140	120	—	68	3.0
9	21 1/8	—	370.9	0.27		0.79	92	144	128	—	69	3.0
10	22 3/8	—	380.844	0.22		0.64	91	144	130	—	68	3.0
										—		
										—		

SOURCE SAMPLING FIELD DATA SHEET

Plant C.F. CHEMICALS – [illegible]
Sampling Location BAROMETRIC CONDENSER - Hot wells MSC
Date 12-14-71, Run No. 1
Time Start 17:20, Time End 19:20
Sampling Time/Point 10 points @ 12 min = 120 min.
DB 92 °F, WB 86 °F, DP 84 °F, VF @ DP 1.175 "Hg
Moisture 4.0%, FDA 96.0, Gas Density Factor 0.99
Barometric Press. 30 "Hg, Stack Press. 30 "Hg
Weather INSIDE BLDG.
Temp. 75 °F, W/D —, W/S —
Sample Box No. 1, Meter Box No. 1
Meter ΔHg 1.74, Pitot Corr. Factor 0.83
Nozzle Dia. 1/4 in., Probe Length 4 ft
Probe Heater Setting 10%
Stack Dimensions: Inside Diameter 22.5* in
Inside Area [illegible] ft²
Height [illegible] ft

Sketch Of Stack:



Mat'l Processing Rate [illegible]
Final Gas Meter Reading [illegible] ft³
Initial Gas Meter Reading 2 [illegible] 3/5 ft³
Total Condensate In Impingers 41 ml
Moisture In Silica Gel 185.0 2 6.6 } 67.6 gm
Silica Gel Container No. 1, Filter No. [illegible] 002

Orsat:					
CO_2	0				
O_2	20				
CO	0				
N_2					
Excess Air					

Test Conducted By: [illegible]
[illegible] WORK
Remarks:
WET PHOSPHORIC ACID PLANT
SW [illegible] 17th

*[illegible] actual open distance [illegible] 22.5" [illegible] of 22.5"

Port And Traverse Point No.	Distance From End Of Port (in)	Clock Time 5:20	Gas Meter Reading (ft³)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O) Calc.	Meter Orifice Press.Diff. ("H_2O) Actual	Stack Gas Temperature (°F)	Gas Sample Temp. @ Dry Gas Meter (°F) In	Gas Sample Temp. @ Dry Gas Meter (°F) Out	Sample Box Temp. (F)	Last Impinger Temp. (F)	Vacuum On Sample Train ("Hg)
1	1 3/16	5:26	300.8	1.00	3.90	2.90	92	86	84	—	85	22.5
		5:32	306.2	1.00	3.90	2.70	92	87	82	—		22.5
2	2 5/16	5:38	311.0	0.45	1.80	1.80	92	88	83	—		11.5
		5:44	315.4	0.45	1.80	1.80	92	90	83	—		7.5
3	3 1/2	5:50	319.9	0.50	1.96	1.96	92	91	83	—		8.0
		5:56	325.1	0.65	2.55	2.55	93	91	83	—		16.2
4	5	6:02	330.2	0.55	2.20	2.20	93	92	83	—		10.8
		6:08	335.3	0.60	2.35	2.35	93	92	83	—	↓	10.5

Port And Traverse Point No.	Distance From End Of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temperature (°F)	Gas Sample Temp. @ Dry Gas Motor (°F)		Sample Box Temp. (F)	Last Impinger Temp. (F)	Vacuum On Sample Train (" Hg)
					Calc.	Actual		In	Out			
5	7 1/8	6:14	340.4	0.60	2.35	2.35	93	92	83	—	85	12.5
		6:20	345.5	0.60	2.35	2.35	93	92	84	—		12.5
6	12 7/8	6:26	350.7	0.65	2.55	2.35	94	92	84	—		22.0
		6:32	355.9	0.65	2.55	2.35	95	94	84	—		22.5
7	15	6:38	361.2	0.65	2.55	2.35	95	94	85	—		22.5
		6:44	366.1	0.65	2.55	2.35	95	94	85	—		22.5
8	16 1/2	6:50	371.3	0.68	2.70	2.30	96	94	85	—		22.5
		6:56	376.4	0.74	2.95	2.30	96	94	86	—		22.5
9	17 5/8	7:02	381.5	0.70	2.75	2.25	96	95	86	—		22.5
		7:08	386.5	0.70	2.75	2.25	96	95	86	—		22.5
10	18 5/8	7:14	391.6	0.70	2.75	2.25	96	95	86	—		22.5
		7:20	396.636	0.70	2.75	2.25	96	95	86	—	▼	22.5

SOURCE SAMPLING FIELD DATA SHEET

Plant C. F. CHEMICALS - BARTOW, Fla.

Sampling Location BAROMETRIC COND. Hot wells mist.

Date 12-15-71 Run No. 2

Time Start 9:45 Time End 11:45

Sampling Time/Point 10 points @ 12 min = 120 min.

DB 92 °F, WB — °F, VF @ DP — "Hg

Moisture 4.0%, FDA 96.0 Gas Density Factor 0.99

Barometric Press 30 "Hg, Stack Press 30 "Hg

Weather INSIDE BLDG.

Temp. 75 °F, W/D —, W/S —

Sample Box No. 1 Meter Box No. 1

Meter ΔH@ 1.74 Pitot Corr. Factor 0.83

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

Probe Heater Setting —

Stack Dimensions: Inside Diameter 22.5 in
Inside Area ____ ft²
Height Horizontal ft

Sketch of Stack

22.5

Mat'l Processing Rate ____

Final Gas Meter Reading 496.869 ft³

Initial Gas Meter Reading 396.842 ft³

Total Condensate in Impingers 34 ml

Moisture in Silica Gel 205.6 − 183.0 = 22.6 gm

Silica Gel Container No. 211 Filter No. 72 008

Orsat: CO_2 0.2
O_2 20.7
CO —
N_2
Excess Air

Test Conducted By: R DURGAN
L. WURTS

Remarks: Wet Phos. Acid plant
Powerstat for probe heats not working
Silica Gel - 198 PR

☆ = equal area distances based on 20" instead of 22.5" because of deposits in bottom of stack.

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O) Calc.	Meter Orifice Press. Diff. ("H_2O) Actual	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F) In	Gas Sample Temp. @ Dry Gas Meter (°F) Out	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
		9:45	396.842									
Port #1 1	1 5/16"	9:51	401.5	0.75	2.95	2.50	92	80	80	—	80	22.5
		9:57	406.4	0.70	2.75	2.50		81	80	—		22.5
2	2 5/16	10:03	411.8	0.60	2.35	2.35		82	80	—		21.5
		10:09	416.9	0.62	2.40	2.40		84	80	—		22.5
3	3 1/2	10:15	422.0	0.62	2.40	2.35		85	80	—		22.5
		10:21	427.0	0.60	2.35	2.25		87	80	—		22.5
4	5	10:27	432.0	0.62	2.40	2.20		88	80	—		22.5
		10:33	437.0	0.62	2.40	2.20	▽	89	81	—	▽	22.5

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
					Cal.	Actual		In	Out			
5	7 1/8	10:39	442.0	0.62	2.40	2.20	92	90	82	—	75	22.5
		10:45	447.0	0.70	2.75	2.20	92	91	82	—		22.5
6	12 7/8	10:51	452.0	0.74	2.90	2.20	92	93	83	—		22.5
		10:57	457.0	0.74	2.90	2.20	92	93	84	—		22.5
7	15	11:03	462.0	0.70	2.75	2.20	92	93	84	—		22.5
		11:09	466.9	0.74	2.90	2.20	92	93	85	—		22.5
8	16 1/2	11:15	471.9	0.70	2.75	2.20	92	94	85	—		22.5
		11:21	476.9	0.70	2.75	2.20	92	94	86	—		22.5
9	17 5/8	11:27	481.9	0.60	2.35	2.20	92	95	86	—		22.5
		11:33	486.9	0.56	2.20	2.20	92	96	87	—		22.5
10	18 5/8	11:39	491.9	0.74	2.90	2.20	92	97	87	—		22.5
		11:45	496.869	0.74	2.90	2.20	92	97	87	—		22.5

SOURCE SAMPLING FIELD DATA SHEET

"E"

Plant C.F. CHEMICALS - BARTOW, FLA.

Sampling Location BAR. COND. - HOT WELLS - MISC.

Date 12-15-71 Run No. 3

Time Start 3:30 Time End 5:30

Sampling Time/Point 10 point @ 12 min = 120 min

DB 92 °F, WB — °F, VF @ DP — "Hg

Moisture 4.0%, FDA 96.0 Gas Density Factor 0.99

Barometric Press 30 "Hg, Stack Press 38 Hg

Weather INSIDE BLDG.

Temp. 75 °F, W/D —, W/S —

Sample Box No. 1 Meter Box No. 1

Meter ΔH@ 1.74 Pitot Corr. Factor 0.83

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

Probe Heater Setting —

Stack Dimensions: Inside Diameter 22.5 in ★

Inside Area ____ ft²

Height Horizontal ft

Sketch of Stack

Mat'l Processing Rate ____

Final Gas Meter Reading 609.632 ft³

Initial Gas Meter Reading 503.772 ft³

Total Condensate in Impingers 40.0 ml

Moisture in Silica Gel 227.1 - 196.0 = 31.1 gm

Silica Gel Container No. 3 Filter No. 72011

Orsat: CO_2 0.8

Moisture 227.1 F.W. 196 (31.1) O_2 20.0

CO —

N_2

Excess Air

Test Conducted By: R. Durgan

L. Wurts

Remarks: Wet Phos. Acid Plant

Power Stat for Probe Heater not working

Silica Gel 222 PF

★ = equal area distances based on 20" instead of 22.5" because of deposits in bottom of stack.

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O) Calc.	Meter Orifice Press. Diff. ("H_2O) Actual	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F) In	Gas Sample Temp. @ Dry Gas Meter (°F) Out	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
		3:30	503.772									
Port #1 1	15/16"	3:36	509.1	1.00	3.90	2.50	92	88	88	—	80	22.5
		3:42	514.4	1.40	5.50	2.50	↓	90	88	—	↓	22.5
2	2 5/16	3:48	519.6	0.90	3.50	2.50		91	88	—		22.5
		3:54	524.9	0.90	3.50	2.50		92	88	—		22.5
3	3 1/2	4:00	530.3	0.65	2.55	2.50		94	89	—		22.5
		4:06	535.6	0.65	2.55	2.45		95	89	—		22.5
4	5	4:12	540.8	0.60	2.35	2.35		96	89	—		20.5
		4:18	546.1	0.60	2.35	2.35	↓	96	89	—	↓	19.5

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
					Cal.	Actual		In	Out			
5	7 1/8	4:24	551.3	0.60	2.35	2.35	92	97	90	—	80	19.5
		4:30	556.6	0.65	2.55	2.40		98	90	—		22.5
6	12 7/8	4:36	562.0	0.70	2.75	2.40		99	91	—		22.5
		4:42	567.2	0.70	2.75	2.40		99	91	—		22.5
7	15	4:48	572.5	0.75	2.95	2.40		99	92	—		22.5
		4:54	577.8	0.75	2.95	2.40		100	92	—		22.5
8	16 1/2	5:00	583.1	0.75	2.95	2.40		100	92	—		22.5
		5:06	588.4	0.75	2.95	2.40		101	93	—		22.5
9	17 5/8	5:12	593.7	0.76	2.95	2.40		101	93	—		22.5
		5:18	599.0	0.75	2.95	2.40		103	94	—		22.5
10	18 5/8	5:24	604.3	0.80	3.10	2.40		103	94	—		22.5
		5:30	609.632	0.75	2.95	2.40		104	94	—		22.5

SOURCE SAMPLING FIELD DATA SHEET

Plant C.F. Chemicals, Inc.

Sampling Location Wet Phos. Acid-Outlet

Date 12-14-71 Run No. 1

Time Start 1742 Time End 1942

Sampling Time/Point 20 min/pt. (Total=120)

DB 85 °F, WB ____ °F, VF @ DP ____ "Hg

Moisture 5.4 %, FD 0.95, Gas Density Factor ____

Barometric Press 30 "Hg, Stack Press 30 "Hg

Weather Clear

Temp. 78 °F, W/D E, W/S ____

Sample Box No. — Meter Box No. 2

Meter ΔH@ 1.70 Pitot Corr. Factor 0.83

Nozzle Dia. 0.25 in., Probe Length 6 ft

Probe Heater Setting ____

Stack Dimensions: Inside Diameter 52 in
Inside Area 14.74 ft²
Height ____ ft

Sketch of Stack

Mat'l Processing Rate ____

Final Gas Meter Reading 906.554 ft³

Initial Gas Meter Reading 813.700 ft³

Total Condensate in Impingers 44 ml

W_f = 236.5

Moisture in Silica Gel 236.5 − 204.5 = 32 gm

Silica Gel Container No. 220 Filter No. 72005 & 6 172PF

Orsat: CO_2 ____
O_2 20.0
CO ____
N_2 ____
Excess Air ____

Test Conducted By: J. Dollar
A. Wilson

Remarks: ____

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		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			
		1742	813.7									
1	2¼+4	1747	—	0.58	2.0	2.0	85	80	79	—	72	4.6
1		1752	821.8	0.58	2.0	2.0	85	79	78	—	72	4.2
1		1757	825.8	0.58	2.0	2.0	85	79	78	—	75	4.2
1		1802	830.0	0.58	2.0	2.0	85	78	78	—	75	4.2
2	7⅝+4	1807	834.0	0.70	2.4	2.4	85	78	77	—	75	4.8
2		1812	838.5	0.69	2.35	2.35	85	79	77	—	75	4.8
2		1817	842.9	0.69	2.35	2.35	84	79	77	—	75	4.8
2		1822	847.3	0.69	2.35	2.35	84	79	77	—	76	4.8

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
					Cal.	Actual		In	Out			
3	15 5/16+4	1827	851.4	0.69	2.35	2.35	84	79	77	—	76	4.8
		1832	855.7	0.69	2.35	2.35	85	79	77	—	76	4.8
		1837	860.0	0.69	2.35	2.35	85	79	77	—	76	4.8
		1842	864.0	0.69	2.35	2.35	85	79	77	—	76	4.8
4	36 4/16+4	1847	868.1	0.50	1.7	1.7	85	79	77	—	76	4.0
		1852	872.0	0.52	1.8	1.8	84	78	76	—	76	4.0
		1857	875.9	0.54	1.85	1.85	85	78	76	—	75	4.0
5	44 3/16+4	1902	879.6	0.45	1.58	1.58	85	78	76	—	75	3.8
		1907	883.4	0.45	1.58	1.58	84	78	76	—	75	3.8
		1912	887.0	0.45	1.58	1.58	84	78	76	—	74	3.8
		1917	890.7	0.45	1.58	1.58	85	78	76	—	74	3.8
6	49 3/4+4	1922	894.0	0.36	1.24	1.24	85	77	75	—	74	3.1
		1927	897.5	0.36	1.24	1.24	85	77	75	—	74	3.1
		1932	900.3	0.36	1.24	1.24	85	77	75	—	73	3.0
		1937	903.4	0.36	1.24	1.24	85	76	75	—	73	3.0
		1942	906.6	0.36	1.24	1.24	85	76	75	—	73	3.0
AVE.				$\sqrt{H}$ = 0.731		1.863	85	77				

SOURCE SAMPLING FIELD DATA SHEET

Plant C.F. Chemicals, Inc.
Sampling Location Wet Phos. Acid-Outlet
Date 12-15-71 Run No. 2
Time Start 0942 Time End 1142
Sampling Time/Point 20 min/pt (Total=120)
DB ____ °F, WB ____ °F, VF @ DP ____ "Hg
Moisture ____ %, FDA ____, Gas Density Factor ____
Barometric Press ____ "Hg, Stack Press ____ "Hg
Weather ____
Temp. 14 °F, W/D S, W/S ____
Sample Box No. ____ Meter Box No. 2
Meter ΔH@ 1.70 Pitot Corr. Factor 0.83
Nozzle Dia. 0.25 in., Probe Length 6 ft
Probe Heater Setting ____
Stack Dimensions: Inside Diameter 52 in
Inside Area 14.74 ft²
Height ____ ft

Sketch of Stack

Mat'l Processing Rate ____
Final Gas Meter Reading 997.940 ft³
Initial Gas Meter Reading 906.700 ft³
Total Condensate in Impingers 55 ml } 81.6
Moisture in Silica Gel 215.1 − 188.5 = 26.6 gm }
Silica Gel Container No. AP-113 Filter No. 72007

Orsat: CO_2 ____
O_2 20.2
CO ____
N_2 ____
Excess Air ____

Test Conducted By: J. Dollar
A. Wilson

Remarks: ____

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O) Calc.	Meter Orifice Press. Diff. ("H_2O) Actual	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F) In	Gas Sample Temp. @ Dry Gas Meter (°F) Out	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
		0942	906.7									
1	2¼ + 4	0947	910.2	0.44	1.52	1.52	85	75	73	—	73	2.8
1		0952	913.7	0.44	1.52	1.52	85	76	73	—	73	2.8
1		0957	917.3	0.44	1.52	1.52	85	77	73	—	74	2.8
1		0962	920.8	0.44	1.52	1.52	85	78	74	—	75	2.8
2	7⅝ + 4	1007	924.9	0.67	2.25	2.25	85	79	74	—	78	3.6
2		1012	929.2	0.67	2.25	2.25	85	80	74	—	80	3.6
2		1017	933.4	0.67	2.25	2.25	85	80	75	—	83	3.6
2		1022	937.6	0.67	2.25	2.25	85	81	75	—	83	3.8

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
					Cal.	Actual		In	Out			
3	15 5/16 + 4	1027	941.9	0.70	2.45	2.45	85	82	76	—	84	4.0
3		1032	946.3	0.70	2.45	2.45	85	83	76	—	85	4.0
3		1037	950.7	0.70	2.45	2.45	85	84	76	—	85	4.0
3		1042	954.9	0.70	2.45	2.45	85	84	77	—	85	4.0
4	36 11/16 + 4	1047	959.0	0.52	1.8	1.8	85	85	77	—	85	3.8
4		1052	963.0	0.52	1.8	1.8	85	85	78	—	85	3.8
4		1057	967.0	0.52	1.8	1.8	85	85	78	—	85	3.8
4		1102	970.9	0.52	1.8	1.8	85	85	79	—	85	3.8
5	44 5/16 + 4	1107	974.4	0.42	1.45	1.45	85	85	79	—	85	3.4
5		1112	977.9	0.42	1.45	1.45	85	85	80	—	85	3.4
5		1117	981.4	0.42	1.45	1.45	85	85	80	—	80	3.4
5		1122	984.9	0.42	1.45	1.45	85	85	80	—	80	3.4
6	49 3/4 + 4	1127	988.2	0.35	1.22	1.22	85	85	80	—	80	3.2
6		1132	991.5	0.35	1.22	1.22	85	85	80	—	80	3.2
6		1137	994.7	0.35	1.22	1.22	85	85	80	—	80	3.2
6		1142	997.940	0.35	1.22	1.22	85	85	80	—	80	3.2

SOURCE SAMPLING FIELD DATA SHEET

Plant C. F. CHEMICALS, INC.

"F" Sampling Location Wet Phos. Acid-Outlet

Date 12-15-71 Run No. 3

Time Start 1518 Time End 1718

Sampling Time/Point 20 min/pt (Total=120)

DB ____ °F, WB ____ °F, VF @ DP ____ "Hg

Moisture ____ %, FDA ____, Gas Density Factor ____

Barometric Press ____ "Hg, Stack Press ____ "Hg

Weather ____

Temp. 82 °F, W/D 5, W/S ____

Sample Box No. ____ Meter Box No. 2

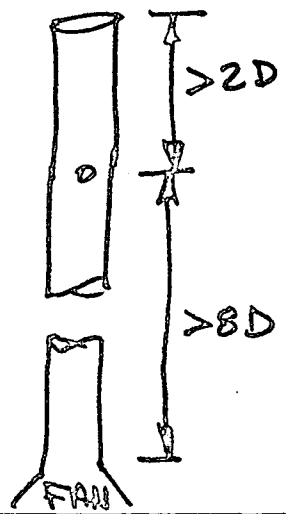
Meter ΔH@ 1.70 Pitot Corr. Factor 0.83

Nozzle Dia 0.25 in., Probe Length 6 ft

Probe Heater Setting ____

Stack Dimensions: Inside Diameter 52 in
Inside Area 1474 ft²
Height ____ ft

Sketch of Stack



Mat'l Processing Rate ____

Final Gas Meter Reading 1093.729 ft³

Initial Gas Meter Reading 997.940 ft³

Total Condensate in Impingers 5? ml

Moisture in Silica Gel 200.7 - 180.5 = 20.2 gm

Silica Gel Container No. 103 Filter No. 72010

Orsat: CO_2 0.5
O_2 20.5
CO
N_2
Excess Air

Test Conducted By: J. DOLLAR
A. WILSON

Remarks: ____

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		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			
		1518	997.940									
1	2¼+4	1523	002.0	0.55	1.92	1.92	82	88	87	—	85	5.5
1		1528	006.0	0.55	1.92	1.92	82	88	86	—	84	5.5
1		1533	010.0	0.55	1.92	1.92	82	88	86	—	83	5.5
1		1538	013.9	0.55	1.92	1.92	82	88	86	—	83	5.5
2	7⅝+4	1543	018.2	0.68	2.3	2.3	82	88	86	—	83	6.8
2		1548	022.6	0.68	2.3	2.3	82	88	86	—	83	6.8
2		1553	026.9	0.68	2.3	2.3	82	88	86	—	83	6.8
2		1558	031.3	0.68	2.3	2.3	85	88	86	—	81	6.8

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
					Cal.	Actual		In	Out			
3	15 5/16 + 4	1603	035.7	0.70	2.4	2.4	85	88	86	—	81	7.0
3		1608	040.2	0.70	2.4	2.4	85	88	86	—	81	7.0
3		1613	—	0.70	2.4	2.4	85	88	85	—	81	7.2
3		1618	049.0	0.70	2.4	2.4	85	88	85	—	81	7.3
4	36 1/16 + 4	1623	053.1	0.52	1.8	1.8	84	88	85	—	81	6.4
4		1628	057.1	0.52	1.8	1.8	83	88	85	—	80	6.4
4		1633	060.8	0.52	1.8	1.8	83	88	85	—	80	6.4
4		1638	064.8	0.54	1.85	1.85	83	88	85	—	80	6.8
5	44 5/16 + 4	1643	068.5	0.45	1.55	1.55	85	89	85	—	78	6.0
5		1648	072.2	0.45	1.55	1.55	85	89	85	—	78	6.0
5		1653	075.9	0.45	1.55	1.55	85	88	85	—	78	6.0
5		1658	079.5	0.45	1.55	1.55	85	88	85	—	77	6.0
6	49 3/4 + 4	1703	083.1	0.40	1.40	1.40	85	88	85	—	76	5.8
6		1708	086.7	0.40	1.40	1.40	85	88	85	—	76	5.8
6		1713	090.2	0.40	1.40	1.40	85	88	85	—	76	5.8
6		1718	093.729	0.40	1.40	1.40	85	88	85	—	76	5.8

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 throughly 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 Crist

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

cc: R. E. Lee

APPENDIX D

Laboratory Results

ENVIRONMENTAL PROTECTION AGENCY
Research Triangle Park, North Carolina 27711

Reply to Attn of:

Date: 2/4/72

Subject: Fluoride Analysis Central Farmers Chemical Inc.

To: Mr. Jerome J. Rom
Emission Testing Branch
Division of Applied Technology
THROUGH: Mr. Howard Crist
SSAS, SSFAB, DAS

Attached is the Fluoride Data for the Central Farmer Chemical Inc. The water soluble fluoride was done by sulfuric acid distillation followed by the SPADNS-ZIRCONIUM Lake Method.

The products were fussed with NaOH followed by sulfuric acid distillation then by the SPADNS-ZIRCONIUM Lake Method.

Allen E. Riley
Source Sample Analysis
Section, SSFAB, DAS

Attachment

cc: R. Lampe
J. McGinnity
J. Reynolds
D. von Lehmden
R. E. Lee, Jr.

FLUORIDE DATA

Central Farmer Chemical

Soluble F^-

			PH	
156	PF	Scrubber H_2O Inlet	1.8	9.2 g/L
157	"	" " Outlet	1.8	8.8 g/L
158	"	Flask cooler H_2O	1.8	9.6 g/L
159	"	Hotwell Evap. H_2O	1.8	9.7 g/L
160	"	Cake		11.5 mg/g
161	"	Rock		35.8 mg/g
162	"	30% Phos. Acid		29.8 g/L
163	"	54 % " "		11.8 g/L
164	"	H_2O Blank		25 µg/150 ml
165	"	Probe Wash	SAMPLE STATION "C"	
166	"	Impingers		1.0 g/Sample
167	"	Filter		
168	"	Total Sample	"D"	
230	"	Filter		16.7 mg/Sample
170	"	Total Sample	"E"	
229	"	Filter gone		21.9 mg/Sample
172	"	Total Sample	F"	
232	"	Filter		41 mg/Sample
178	"	Scrubber H_2O Inlet	1.8	7.5 g/L
179	"	Scrubber H_2O Outlet	1.8	7.6 g/L
180	"	Flask Cooler H_2O	1.8	7.8 g/L
181	"	Hotwell Evap. H_2O	1.7	8.3 g/L
182	"	Cake		8.7 mg/g
183	"	Rock		36.1 mg/g
184	"	30% Phos. Acid		29.3 g/L
185	"	54 % " "		8.0 g/L
186	"	H_2O Blank	SAMPLE STATION	36 µg/100ml
187	PF	Total Sample	C	0.89 g/Sample
238	"	Filter		
189	"	Total Sample	D	18.0 mg/Sample
234	"	Filter		

RUN #1

RUN #2

FLUORIDE DATA

Central Farmer Chemical

Soluble F⁻

			Sample Station	PH	
191	PF	Probe Wash	"E"		15 mg/Sample
192	"	Impingers			
193	"	Filter			
194	"	Total Sample	"F"		7.2 mg/Sample
237	"	Filter			
200	"	Scrubber H_2O Inlet		1.8	7.8 g/L
201	"	Scrubber H_2O Outlet		1.8	8.3 g/L
202	"	Flask Cooler H_2O		1.8	7.6 g/L
203	"	Hotwell Evap. H_2O		1.7	9.7 g/L
204	"	Cake			9.8 mg/g
205	"	Rock			36.8 mg/g
206	"	30 % Phos. Acid			31.0 g/L
207	"	54 % " "			10.5 g/L
208	"	H_2O Blank			< 6 µg/211 ml
209	"	Total Sample	"C"		523 mg/Sample
236	"	Filter			
211	"	Probe	"D"		24 mg/Sample
212	"	1st. Impinger			
213	"	2nd. Impinger			
214	"	3rd. Impinger			
215	"	Filter			
216	"	Total Sample	"E"		18 mg/Sample
235	"	Filter			
218	"	Total Sample	"F"		12 mg/Sample
233	"	Filter			
224	"	Gaseous F^-	"C"		26 µg/Sample
225	"	" "	"D"		155 µg/Sample
226	"	" "	"E"		13 µg/Sample
227	"	" "	"F"		25 µg/Sample

Allen

ENVIRONMENTAL PROTECTION AGENCY
Research Triangle Park, North Carolina 27711

Reply to Attn of:

Date: 2/15/72

Subject: Fluoride Analysis, Central Farmer Chemical Inc.

To: Mr. Jerome J. Rom
Emission Testing Branch
Division of Applied Technology
THROUGH: Mr. Howard Crist
SSES, SSFAB, DAS

Attached is the fluoride data for Central Farmer Chemical Inc. The water insoluble were first fussed with NaOH followed by sulfuric acid distillation then by the SPADNS-ZIRCONIUM Lake Method.

Allen E. Riley
Source Sample Analysis
Section, SSFAB, DAS

Attachment

cc: R. Lampe
J. McGinnity
J. Reynolds
D. von Lehmden
R. Lee, Jr.
H. Crist

CENTRAL FARMER CHEMICAL INC.

Insoluble Fluoride

Sample Number		Sample	
165, 166, 167	PF	1.3	mg/Sample
168, 230	PF	22	µg/Sample
170, 229	PF		missing Sample
172, 232	PF	0.16	mg/Sample
187, 238	PF	1.9	mg/Sample
189, 234	PF	0.13	mg/Sample
191, 192, 193	PF	0	
194, 237	PF	21	µg/Sample
209, 236	PF	0.85	mg/Sample
211, 212, 213 214, 215	PF	0	
216, 235	PF	73	µg/Sample
218, 233	PF	0	

APPENDIX E

Project Participants

PROJECT PARTICIPANTS

Environmental Engineering, Inc.

Name	Title
John Dollar, E.I.T., M.S.	Project Manager
Dennis Falgout, E.I.T., M.S.	Environmental Engineer
A. L. Wilson, M.S.	Environmental Engineer
Ray Black, B.S.	Environmental Engineer
Bob Durgan, Tech.	Environmental Specialist
George Allen, Tech.	Environmental Specialist
Eric Johnson, Tech.	Environmental Specialist
Larry Wurts, Tech.	Environmental Specialist
Mike Jackson, Tech.	Environmental Specialist
Jim Tscherfinger, Tech.	Environmental Specialist

Environmental Protection Agency

Name	Title
Jerome J. Rom	Project Test Officer
John Reynolds	Project Engineer
Phil K. York	Project Engineer