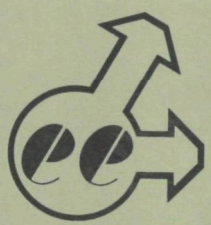
TEST NO. 71 - CI - 37
C. F. CHEMICALS, INC.
DIAMMONIUM PHOSPHATE
BARTOW, FLORIDA
DECEMBER 16 - 20, 1971



environmental engineering, inc.

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

TEST NO. 71 - CI - 37
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DIAMMONIUM PHOSPHATE
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Tests Conducted by:
ENVIRONMENTAL ENGINEERING, INC.
Contract # CPA - 70 - 82

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INTRODUCTION

Under the direction of the Environmental Protection Agency, Environmental Engineering, Inc. conducted emission tests at the C. F. Chemicals, Inc. diammonium phosphate plant number three located in Bartow, Florida. Three test runs were conducted on December 16 - 20, 1971. 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 EPA.

Using separate sample trains, measurements were made for both total fluorides and ammonia in the inlet and outlet ducts of the reactor, cooler, and dryer scrubbers. Grab samples of the scrubbing liquids, the process reactants, and the process products were taken and analyzed for fluoride and P_2O_5 content. A schematic flow diagram of all the sampling locations is given in Figure I.

Pertinent results of the tests are listed in Tables I - XII; complete test results are given in Appendix A.

SUMMARY OF RESULTS

The plant operated under normal process conditions during the three test runs. However, two minor irregularities occurred in the sampling. During the third run at Station "L", the probe became plugged with solid material and the nozzle had to be removed and cleaned before the test could be continued. Secondly, at Station "M", negative flow occurred at the first three traverse points and these points were therefore skipped during the sample runs. In determining total stack gas flow rates, a value of zero velocity was used for these negative points.

A few irregularities in the test data need to be noted. For run number two the total fluoride concentration measured at the reactor scrubber outlet is greater than the fluoride concentration at the inlet (see Tables I and VI). Like wise, for both runs number two and three the ammonia concentrations measured at the cooler scrubber outlet are higher than the concentrations at the scrubber inlet (see Tables X and

XI). With the exception that perhaps some of these samples were contaminated, no explanation for these anomolies has been confirmed. For a complete summary of the stack conditions and emission levels for each test run refer to Tables I - XII.

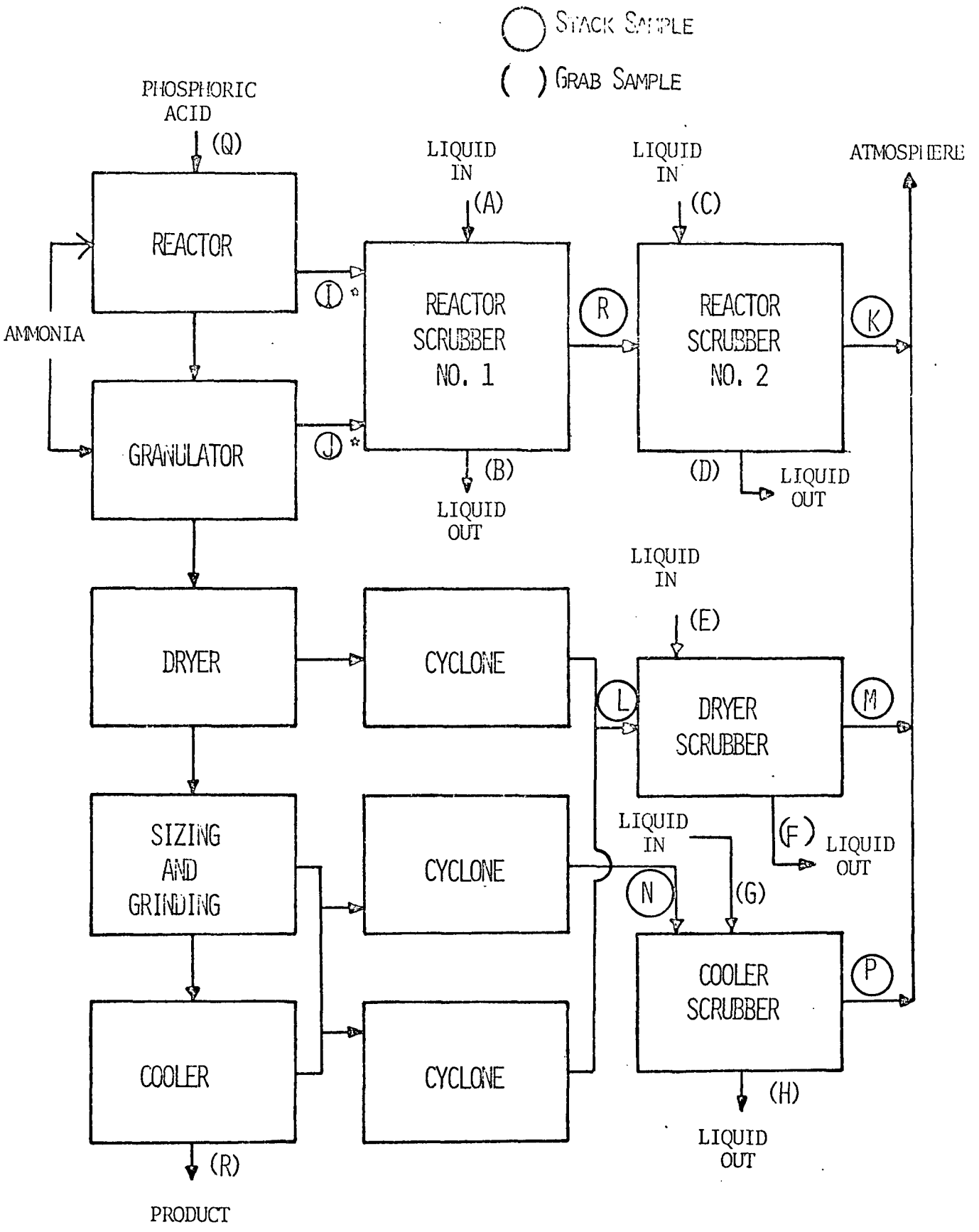


FIGURE 1

SCHEMATIC LOCATIONS OF SAMPLING STATIONS,
DIAMMONIUM PHOSPHATE PLANT NO. 3, C. F. CHEMICALS, INC.

*** These points could not be sampled because of plugging problems.**

TABLE 1

SUMMARY OF RESULTS
FLUORIDES

STATION "K" SECOND STAGE
REACTOR SCRUBBER OUTLET

Run No.	1	2	3
Date	12-16-71	12-18-71	12-20-71
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	29	29	29
Stack gas moisture, % volume	22.6	27	23.6
Average stack gas temperature, °F.	164	169	170
Stack gas flow rate @ S.T.P., SCFM	23066	33660	21940
Vol. dry gas @ S.T.P.*, SCF	104.233	133.2	102.895
Fluoride, water soluble, mg	67	147	57
Fluoride, total, mg	67.67	147.77	64.3
Fluoride, water soluble, gr/SCF	0.0095	0.0169	0.0084
Fluoride, total, gr/SCF	0.0096	0.017	0.0095
Fluoride, water soluble, gr/CF stk. cond.	0.0061	0.0101	0.0052
Fluoride, total, gr/CF stk. cond.	0.0061	0.0101	0.0059
Fluoride, water soluble, lb/hour	1.88	4.87	1.58
Fluoride, total, lb/hour	1.90	4.90	1.78
Fluoride, water soluble, lb/ton P_2O_5 Fed.	0.06	0.19	0.06
Fluoride, total, lb/ton P_2O_5 Fed.	0.07	0.20	0.07
Second Stage Scrubber Efficiency, %	44.3	----	82.3

* Dry, 70°F., 29.92 inches Hg.

TABLE 2

SUMMARY OF RESULTS
FLUORIDES
STATION "L" DRYER
SCRUBBER INLET

Run No.	1	2	3
Date	12-16-71	12-18-71	12-20-71
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	30	30	30
Stack gas moisture, % volume	19.5	10.4	9
Average stack gas temperature, °F.	160	150	151
Stack gas flow rate @ S.T.P., SCFM	30655	36625	34855
Vol. dry gas @ S.T.P.*, SCF	85.228	88.388	81.827
Fluoride, water soluble, mg	154	91	22.6
Fluoride, total, mg	216	141	37.9
Fluoride, water soluble, gr/SCF	0.0252	0.0149	0.004
Fluoride, total, gr/SCF	0.0354	0.0231	0.0066
Fluoride, water soluble, gr/CF stk. cond.	0.0174	0.0116	0.0031
Fluoride, total, gr/CF stk. cond.	0.0244	0.018	0.0052
Fluoride, water soluble, lb/hour	6.62	4.68	1.18
Fluoride, total, lb/hour	9.29	7.25	1.98
Fluoride, water soluble, lb/ton P_2O_5 Fed.	0.23	0.19	0.05
Fluoride, total, lb/ton P_2O_5 Fed.	0.32	0.29	0.08
Scrubber efficiency, %	----	----	----

* Dry, 70°F., 29.92 inches Hg.

TABLE 3

SUMMARY OF RESULTS
FLUORIDES
STATION "M" DRYER
SCRUBBER OUTLET

Run No.	1	2	3
Date	12-16-71	12-18-71	12-20-71
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	28.1	28.1	28.2
Stack gas moisture, % volume	11.7	11.7	14.3
Average stack gas temperature, °F.	132	111	111
Stack gas flow rate @ S.T.P., SCFM	39130	36103	31979
Vol. dry gas @ S.T.P.*, SCF	80.528	80.301	79.294
Fluoride, water soluble, mg	2.4	8.1	1.2
Fluoride, total, mg	2.466	8.42	1.41
Fluoride, water soluble, gr/SCF	0.0004	0.0015	0.0002
Fluoride, total, gr/SCF	0.0005	0.0016	0.0003
Fluoride, water soluble, gr/CF stk. cond.	0.0003	0.0012	0.0002
Fluoride, total, gr/CF stk. cond.	0.0003	0.0012	0.0002
Fluoride, water soluble, lb/hour	0.15	0.48	0.07
Fluoride, total, lb/hour	0.15	0.51	0.08
Fluoride, water soluble, lb/ton P_2O_5 Fed.	0.005	0.019	0.003
Fluoride, total, lb/ton P_2O_5 Fed.	0.005	0.020	0.003
Scrubber efficiency, %	98.4	93.0	96.0

* Dry, 70°F., 29.92 inches Hg.

TABLE 4

SUMMARY OF RESULTS
FLUORIDES
Station "N" Cooler
Scrubber Inlet

Run No.	1	2	3
Date	12-16-71	12-18-71	12-20-71
Barometric pressure, inches Hg	30.	30	30
Stack pressure, inches Hg	29.71	29.71	29.71
Stack gas moisture, % volume	2.6	2.1	2.5
Average stack gas temperature, °F.	121	121	121
Stack gas flow rate @ S.T.P., SCFM	36019	34373	41447
Vol. dry gas @ S.T.P.*, SCF	75.538	74.057	84.862
Fluoride, water soluble, mg	34	25	31
Fluoride, total, mg	64.2	43.5	48.6
Fluoride, water soluble, gr/SCF	0.0065	0.0052	0.0055
Fluoride, total, gr/SCF	0.0123	0.009	0.0086
Fluoride, water soluble, gr/CF stk. cond.	0.0055	0.0044	0.0047
Fluoride, total, gr/CF stk. cond.	0.0105	0.0077	0.0074
Fluoride, water soluble, lb/hour	2.00	1.52	1.96
Fluoride, total, lb/hour	3.74	2.65	3.07
Fluoride, water soluble, lb/ton P_2O_5 Fed.	0.07	0.06	0.08
Fluoride, total, lb/ton P_2O_5 Fed.	0.13	0.11	0.12
Scrubber efficiency, %			

* Dry, 70°F., 29.92 inches Hg.

TABLE 5

SUMMARY OF RESULTS
FLUORIDES
STATION "P" COOLER
SCRUBBER OUTLET

Run No.	1	2	3
Date	12-16-71	12-18-71	12-20-71
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	28.7	28.7	28.7
Stack gas moisture, % volume	11.4	9.5	7.5
Average stack gas temperature, °F.	124	100	95
Stack gas flow rate @ S.T.P., SCFM	46921	52423	60675
Vol. dry gas @ S.T.P.*, SCF	83.789	99.759	114.24
Fluoride, water soluble, mg	2.8	4.6	2.7
Fluoride, total, mg	2.8	4.671	2.751
Fluoride, water soluble, gr/SCF	0.0005	0.0007	0.0003
Fluoride, total, gr/SCF	0.0005	0.0007	0.0003
Fluoride, water soluble, gr/CF stk. cond.	0.0004	0.0006	0.0003
Fluoride, total, gr/CF stk. cond.	0.0004	0.0006	0.0003
Fluoride, water soluble, lb/hour	0.19	0.30	0.18
Fluoride, total, lb/hour	0.19	0.31	0.18
Fluoride, water soluble, lb/ton P_2O_5 Fed.	0.007	0.012	0.007
Fluoride, total, lb/ton P_2O_5 Fed.	0.007	0.012	0.007
Scrubber efficiency, %	95.0	88.3	94.1

* Dry, 70°F., 29.92 inches Hg.

TABLE 6

SUMMARY OF RESULTS
FLUORIDES
STATION " R" SECOND STAGE
REACTOR SCRUBBER INLET

Run No.	1	2	3
Date	12-16-71	12-18-71	12-20-71
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	29	29	29
Stack gas moisture, % volume	29	30.2	32.5
Average stack gas temperature, °F.	171	171	173
Stack gas flow rate @ S.T.P., SCFM	19812	19019	17540
Vol. dry gas @ S.T.P.*, SCF	120.332	91.427	84.318
Fluoride, water soluble, mg	143	71	319
Fluoride, total, mg	164.4	91.3	373
Fluoride, water soluble, gr/SCF	0.0175	0.012	0.0571
Fluoride, total, gr/SCF	0.0201	0.0154	0.0667
Fluoride, water soluble, gr/CF stk. cond.	0.0101	0.0068	0.0312
Fluoride, total, gr/CF stk. cond.	0.0116	0.0088	0.0365
Fluoride, water soluble, lb/hour	2.96	1.96	8.58
Fluoride, total, lb/hour	3.41	2.51	10.03
Fluoride, water soluble, lb/ton P_2O_5 Fed.	0.10	0.08	0.34
Fluoride, total, lb/ton P_2O_5 Fed.	0.12	0.10	0.40
Scrubber efficiency, %	----	----	----

* Dry, 70°F., 29.92 inches Hg.

TABLE 7

SUMMARY OF RESULTS
AMMONIA

STATION "K" SECOND STAGE
Reactor Scrubber Outlet

Run No.	1	2	3
Date	12-16-71	12-18-71	12-20-71
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	29	29	29
Stack gas moisture, % volume	22.6	27	23.6
Average stack gas temperature, °F.	164	170	170
Stack gas flow rate @ S.T.P. SCFM.	23066	33660	21940
Vol. dry gas @ S.T.P.*, SCF	3.133	3.033	2.854
Ammonia, mg	1.3	1.8	0.3
Ammonia, gr/SCF	0.006	0.009	0.002
Ammonia, gr/CF	0.004	0.005	0.001
Ammonia, lbs/hour	1.26	2.64	0.30
Ammonia lb/ton NH_3 fed	0.27	0.24	0.03
Scrubber efficiency - %, Second Stage	97.6	99.7	99.9

* Dry, 70°F., 29.92 inches Hg.

TABLE 8

SUMMARY OF RESULTS
AMMONIA

STATION "L"
Dryer Scrubber Inlet

Run No.	1	2	3
Date	12-16-71	12-18-71	12-20-71
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	29.7	29.7	29.7
Stack gas moisture, % volume	19.5	10.4	9
Average stack gas temperature, °F.	160	150	151
Stack gas flow rate @ S.T.P. SCFM.	30655	36625	34855
Vol. dry gas @ S.T.P.*, SCF	2.731	2.826	2.758
Ammonia, mg	170.5	126.7	160.3
Ammonia, gr/SCF	0.96	0.69	0.89
Ammonia, gr/CF	0.65	0.53	0.70
Ammonia, lbs/hour	252.6	216.7	267.4
Ammonia lb/ton NH_3 fed	54.9	19.3	25.7
Scrubber efficiency - %	----	----	----

* Dry, 70°F., 29.92 inches Hg.

TABLE 9

SUMMARY OF RESULTS
AMMONIA

STATION 'M'
Dryer Scrubbrr Outlet

Run No.	1	2	3
Date	12-16-71	12-18-71	12-20-71
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	28.1	28.1	28.1
Stack gas moisture, % volume	11.7	11.7	14.3
Average stack gas temperature, °F.	132	111	111
Stack gas flow rate @ S.T.P. SCFM.	39130	36103	31979
Vol. dry gas @ S.T.P.*, SCF	3.049	3.103	2.950
Ammonia, mg	0.04	2	1
Ammonia, gr/SCF	0.0002	0.0099	0.0052
Ammonia, gr/CF	0.0001	0.0076	0.0039
Ammonia, lbs/hour	0.07	3.07	1.43
Ammonia lb/ton NH_3 fed	0.015	0.274	0.138
Scrubber efficiency - %	99.9	98.6	99.5

* Dry, 70°F., 29.92 inches Hg.

TABLE 10

SUMMARY OF RESULTS
AMMONIA

STATION "N"
Cooler Scrubber Inlet

Run No.	1	2	3
Date	12-16-71	12-18-71	12-20-71
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	29.7	29.7	29.7
Stack gas moisture, % volume	2.6	2.1	2.5
Average stack gas temperature, °F.	140	140	140
Stack gas flow rate @ S.T.P. SCFM.	36019	34373	41447
Vol. dry gas @ S.T.P.*, SCF	2.812	3.519	3.027
Ammonia, mg	23.2	0.05	0.1
Ammonia, gr/SCF	0.13	0.0002	0.0005
Ammonia, gr/CF	0.108	0.0002	0.0004
Ammonia, lbs/hour	39.2	0.06	0.18
Ammonia lb/ton NH_3 fed	8.5	0.006	0.017
Scrubber efficiency - %	----	----	----

* Dry, 70°F., 29.92 inches Hg.

TABLE 11

SUMMARY OF RESULTS
AMMONIA

STATION "P"
Cooler Scrubber Outlet

Run No.	1	2	3
Date	12-16-71	12-18-71	12-20-71
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	28.7	28.7	28.7
Stack gas moisture, % volume	11.4	9.5	7.5
Average stack gas temperature, °F.	124	100	95
Stack gas flow rate @ S.T.P. SCFM.	46921	52423	60675
Vol. dry gas @ S.T.P.*, SCF	3.179	3.773	3.557
Ammonia, mg	1.6	1	0.2
Ammonia, gr/SCF	0.008	0.004	0.0009
Ammonia, gr/CF	0.006	0.003	0.0007
Ammonia, lbs/hour	3.1	1.8	0.4
Ammonia lb/ton NH_3 fed	0.68	0.16	0.04
Scrubber efficiency - %	98.7	----	----

* Dry, 70°F., 29.92 inches Hg.

TABLE 12

SUMMARY OF RESULTS
AMMONIA

STATION "R" SECOND STAGE
Reactor Scrubber Inlet

Run No.	1	2	3
Date	12-16-71	12-18-71	12-20-71
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	29	29	29
Stack gas moisture, % volume	29	30.2	32.5
Average stack gas temperature, °F.	174	171	173
Stack gas flow rate @ S.T.P. SCFM.	19812	19019	17540
Vol. dry gas @ S.T.P.*, SCF	2.857	3.443	2.667
Ammonia, mg	57.9	1267.9	257.4
Ammonia, gr/SCF	0.31	5.6	1.5
Ammonia, gr/CF	0.18	3.2	0.8
Ammonia, lbs/hour	53	924	223
	4.6	11.2	10.4
Ammonia lb/ton NH_3 fed	11.5	82.5	21.5
Scrubber efficiency - %	----	----	----

* Dry, 70°F., 29.92 inches Hg.

PROCESS DESCRIPTION

The process consists of a preneutralizer for ammoniation of wet-process phosphoric acid, an ammoniator-granulator, and accessory equipment for drying, cooling, and screening the product. The primary reaction is as follows:

$$2\ NH_3 + H_3PO_4 \rightarrow (NH_4)_2\ HPO_4$$

Unabsorbed ammonia gas flows out with exhaust gases; however, most of this ammonia is returned to the process by means of a scrubbing system using weak phosphoric acid as the scrubbing medium.

The scrubber acid is mixed with 54 percent P_2O_5 acid (from the wet-acid plant) in the preneutralizer resulting in a solution usually averaging about 39 percent P_2O_5.

The DAP slurry is pumped from the reactor to the granulator where additional ammonia is added along with recycled product to form a solid material averaging 18 percent N and 46 percent P_2O_5. Then it is dried, cooled, and screened before being conveyed to storage.

PROCESS OPERATION

Run #1 was conducted on December 16, 1971, from 4:20 to 6:20 p.m. Process operation was normal for the duration of the run. Before the start of Run #2 the next morning, the 30% P_2O_5 acid line to

the scrubbers plugged forcing the plant to switch to 54% P_2O_5 makeup acid. This change altered the strength of the scrubbing acid which constituted an abnormal condition. Testing had to be postponed until the 30% P_2O_5 line could be reopened.

At 9:35 a.m. on the morning of the 18th, the test crew had just begun Run #2 when a power failure shut the plant down. The plant started up again at 9:50 a.m.; only to shut down again at 10:30 a.m. when a slurry pump plugged. At 12:40 p.m. the unit started up again and continued to run without difficulty for the rest of the day. Run #2 was conducted under normal process conditions from 1:45 p.m. to 3:45 p.m.

Plant operating problems were also experienced on the next morning. A vibration problem with the ammoniator and screen fans caused a shutdown at 7:55 a.m. Dust buildup on the fan blades was removed by sandblasting and the plant started up again at 11:30 a.m. After the plant had been in operation a short time, the duct from the reactor to the scrubber plugged causing excessive ammonia fumes from the reactor to be leaked into the area. The plant was started up again at 5:30 p.m. High pH and decreasing specific gravities were observed on both scrubber acid sumps just prior to the start of Run #3 at 6:05 p.m. However, the plant operator indicated that this condition would be quickly stabilized. Other than some minor adjustments to the ammonia feed rate, process operation remained normal throughout Run #3 which was concluded at 8:30 p.m.

LOCATION OF SAMPLING POINTS

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

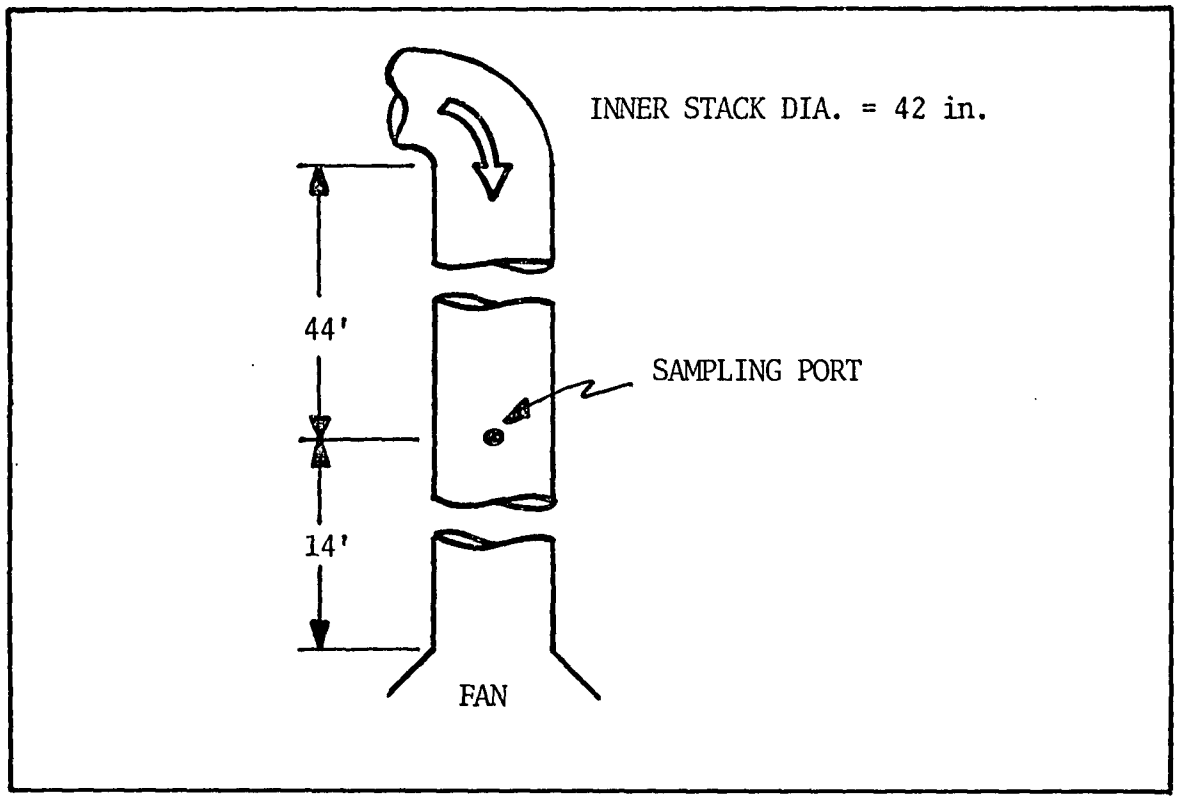
The above method suggests using two perpendicular diameters of traverse points per sampling station, however, on-site conditions necessitated the use of only one traverse diameter in all cases. The suggested number of traverse points per diameter was used where possible without sampling within one inch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

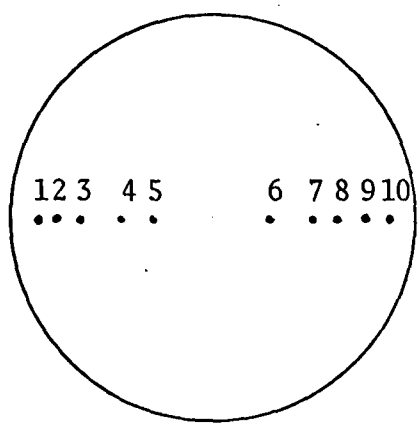
Figures 2 through 7 are schematic diagrams of the stack configuration near the sampling location, and the sampling points traversed during the emission tests.

TABLE 13

DESCRIPTION OF SAMPLING POINTS

Sampling Point Description	Sampling Point Identification	Actual Number of Traverse Points	Stack Diameter(ft.)
Reactor Scrubber Outlet	K	10	3.5
Dryer Scrubber Inlet	L	16	4.5
Dryer Scrubber Outlet	M	20	4.6
Cooler Scrubber Inlet	N	22	5.0
Cooler Scrubber Outlet	P	18	5.0
Reactor Scrubber Inlet	R	22	3.1

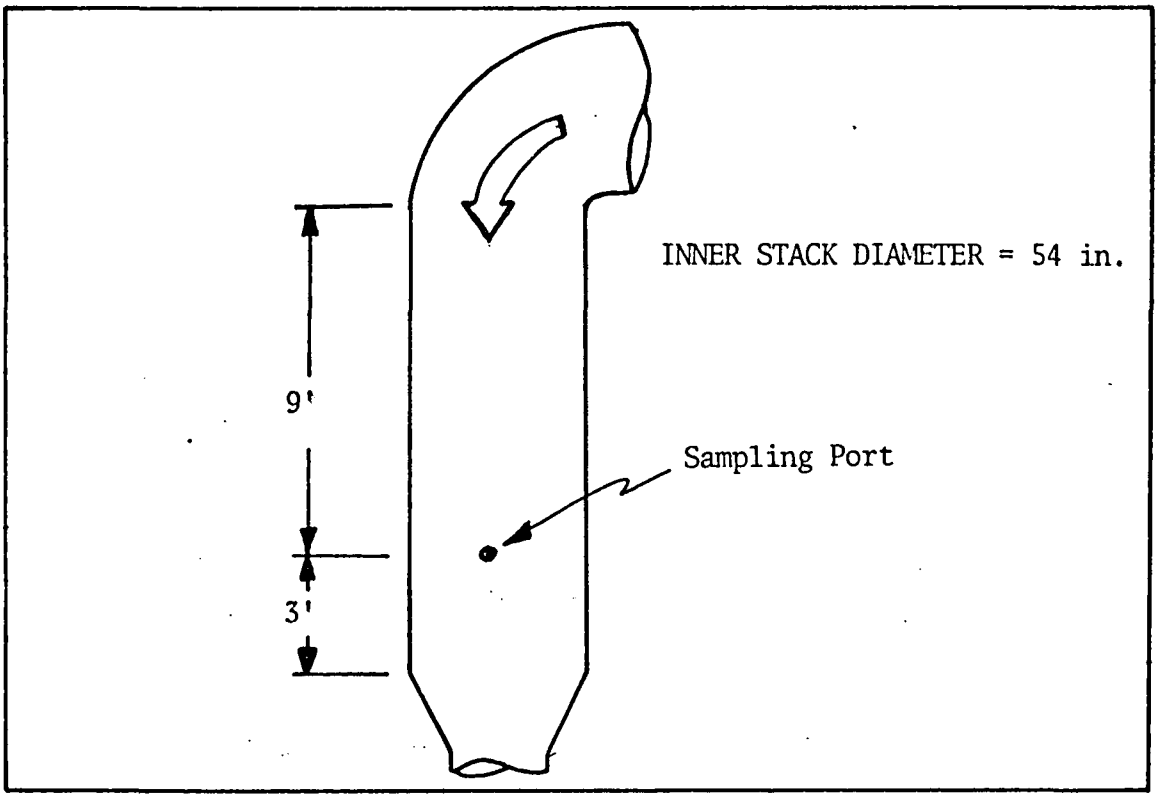


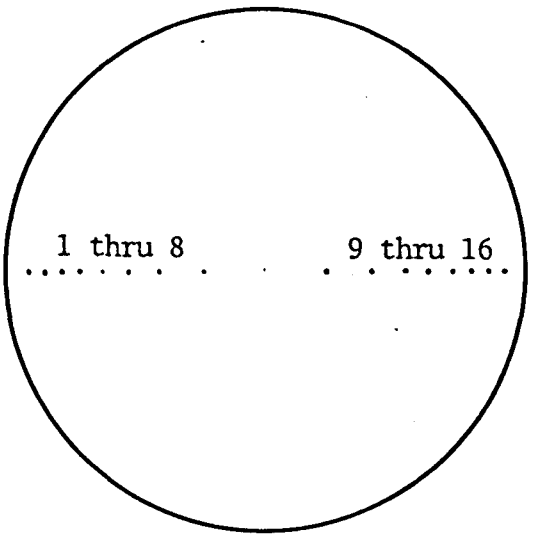


Sampling Point	Distance From Inner Wall (in.)
1	2 7/8
2	4 7/8
3	7 3/8
4	10 1/2
5	14 7/8
6	27
7	31 1/2
8	34 5/8
9	37
10	39 1/4

FIGURE 2

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

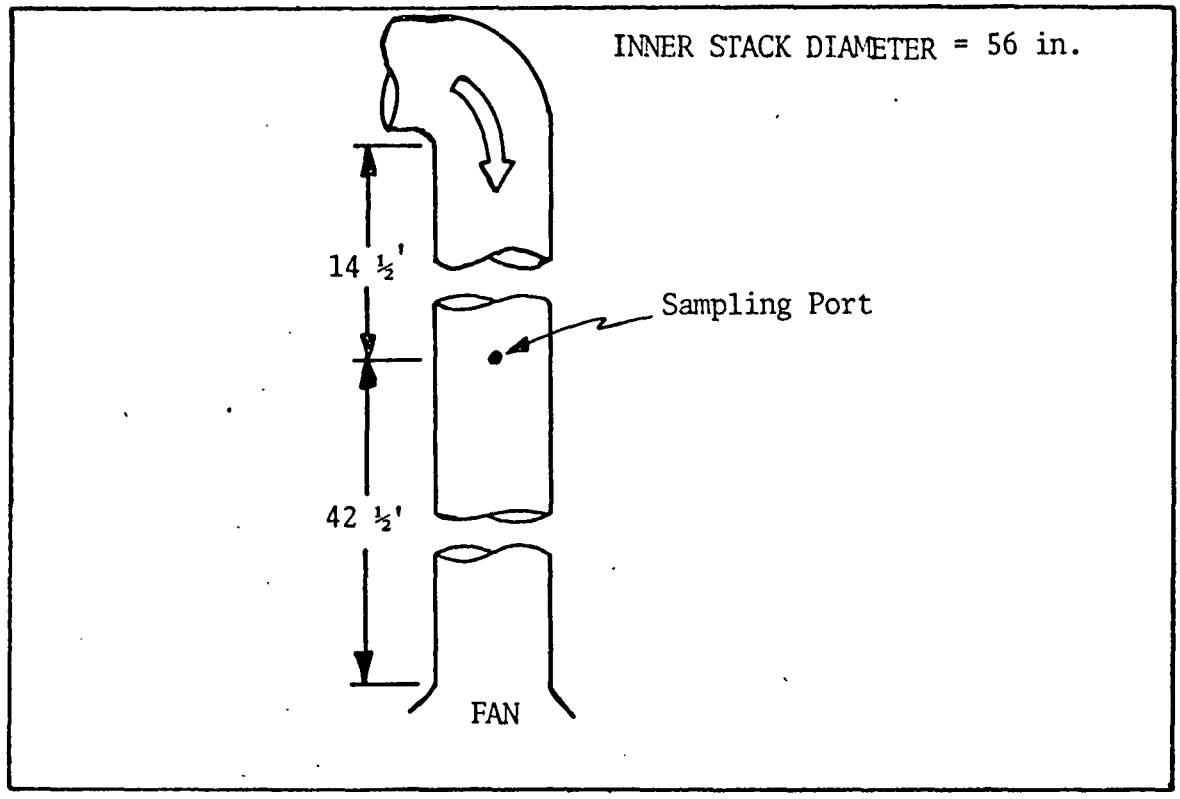


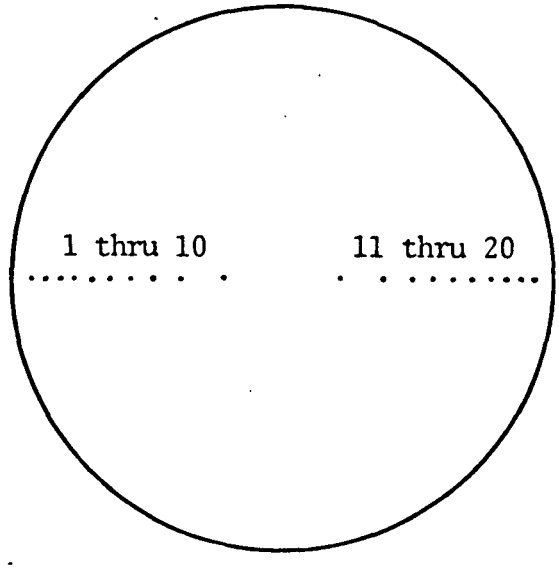


Sampling Point	Distance From Inner Wall (in)
1	2 3/8
2	4
3	5 7/8
4	7 7/8
5	10 1/8
6	12 3/4
7	16
8	20 5/8
9	33 3/8
10	38
11	41 1/4
12	43 7/8
13	46 1/8
14	48 1/8
15	50
16	51 5/8

FIGURE 3

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

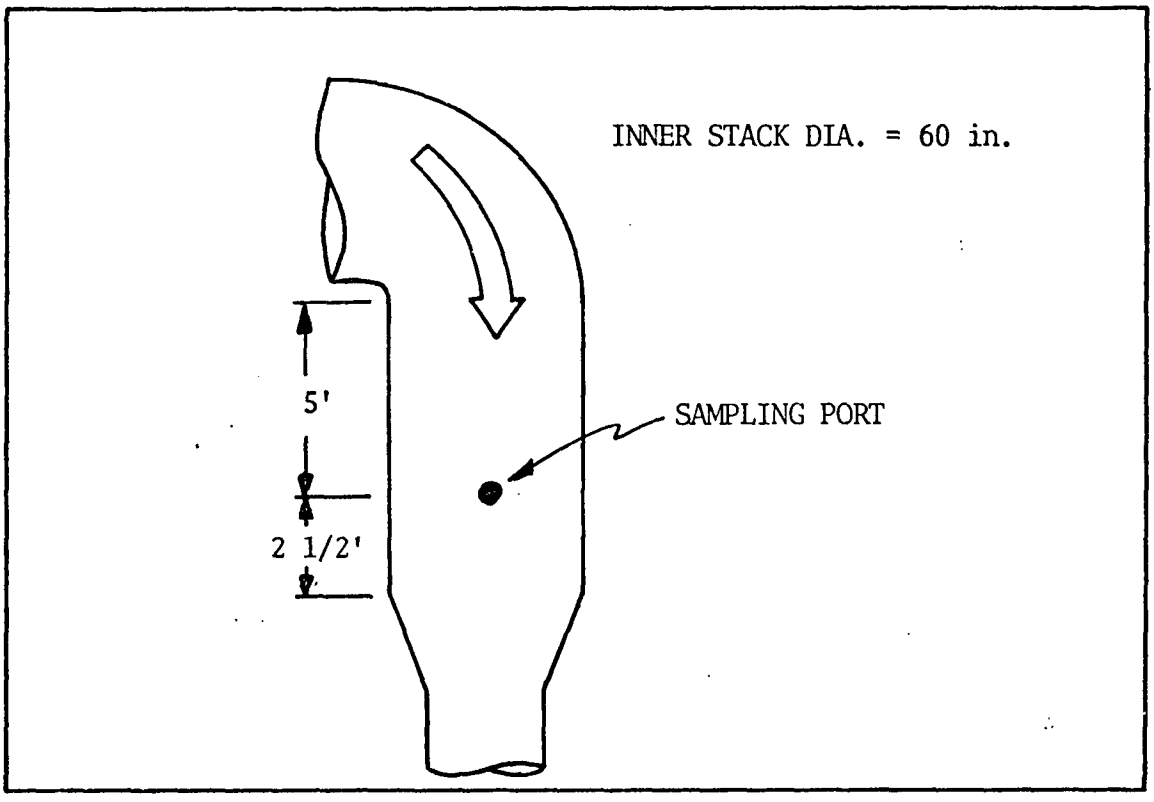


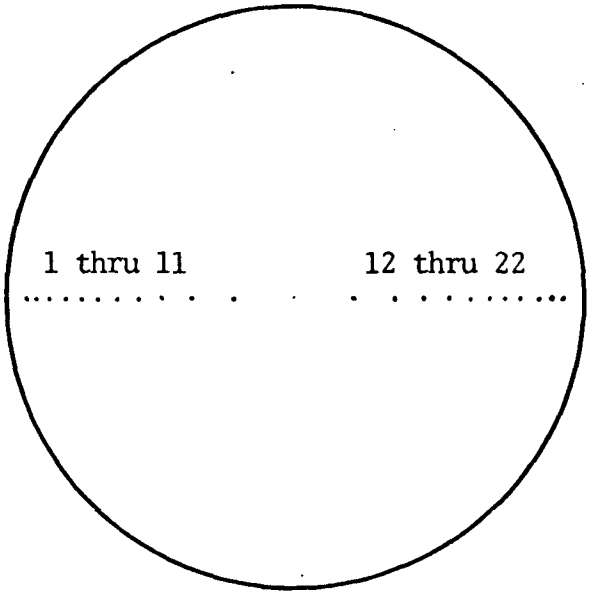


Sampling Point	Distance From Inner Wall (in.)
1	2
2	3 3/8
3	4 7/8
4	6 1/2
5	8 1/4
6	10 1/8
7	12 1/4
8	14 5/8
9	17 5/8
10	22
11	34
12	38 3/8
13	41 3/8
14	43 3/4
15	45 7/8
16	47 3/4
17	49 1/2
18	51 1/8
19	52 5/8
20	54

FIGURE 4

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

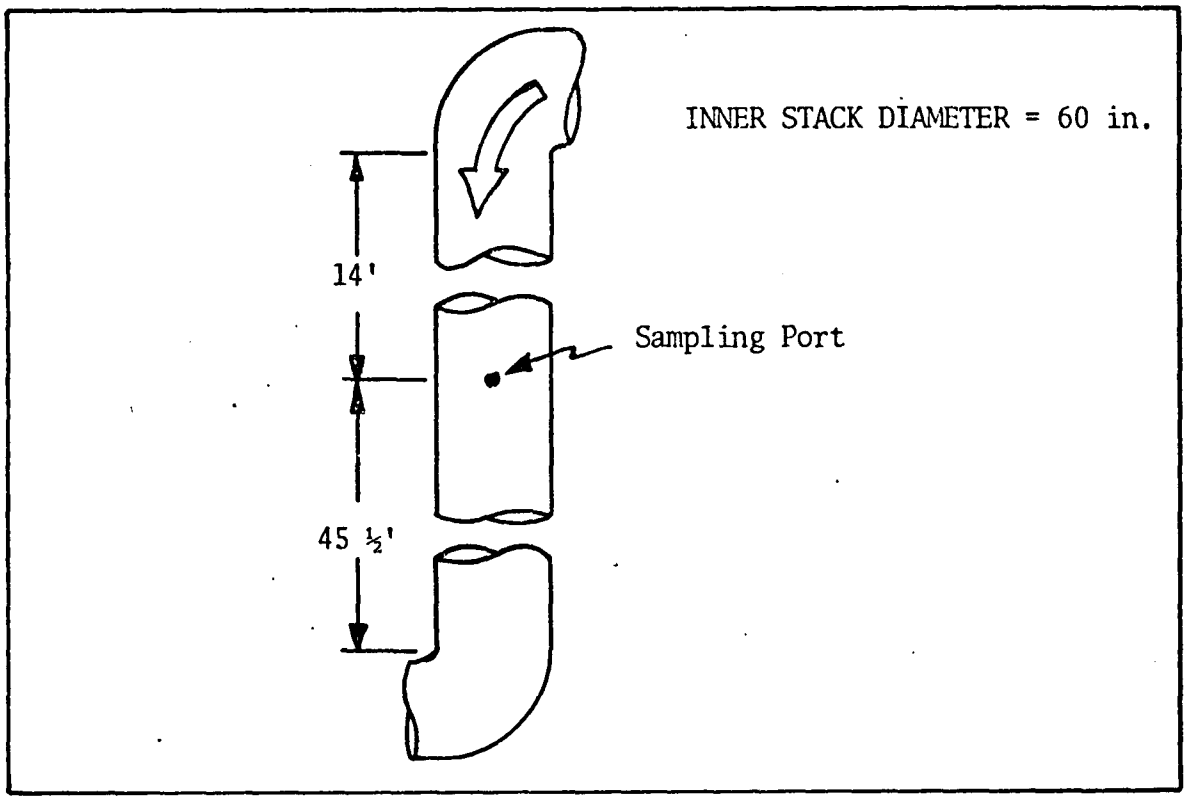


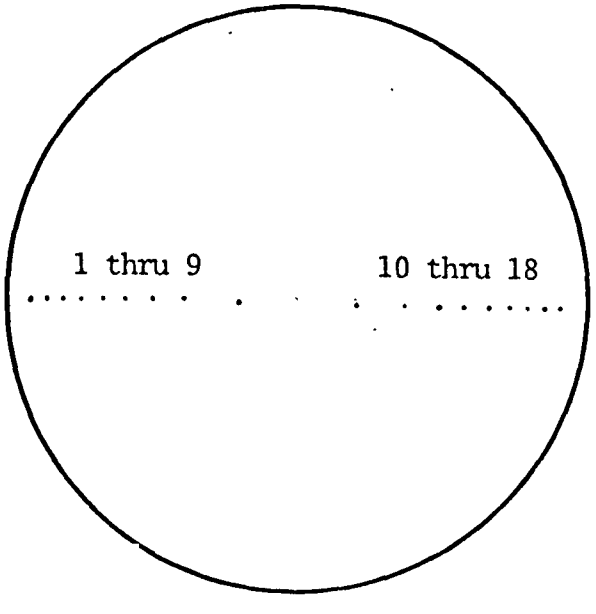


Sampling Point	Distance From Inner Wall (in.)
1	2 1/8
2	3 1/4
3	4 3/4
4	6 1/4
5	8
6	9 5/8
7	11 5/8
8	13 7/8
9	16 3/8
10	19 3/8
11	23 7/8
12	36 1/8
13	40 5/8
14	43 5/8
15	46 1/4
16	48 3/8
17	50 3/8
18	52
19	53 3/4
20	55 3/8
21	56 3/4
22	58

FIGURE 5

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

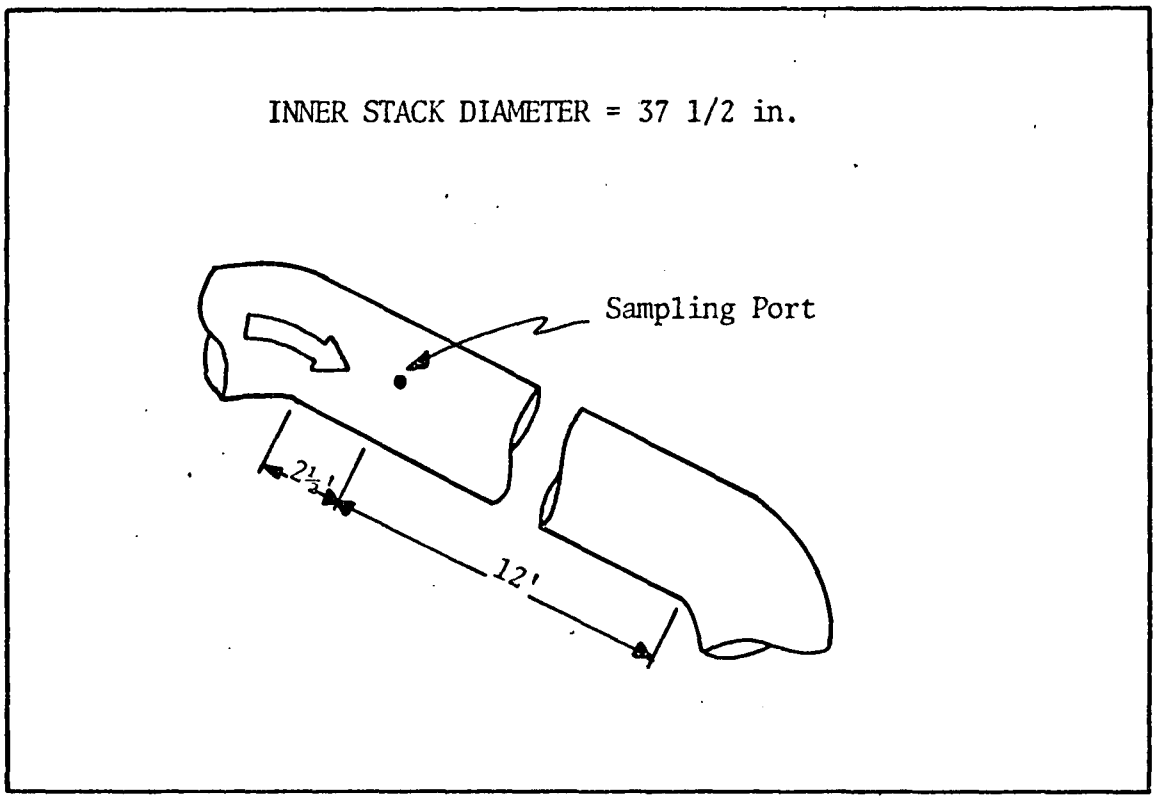




Sampling Point	Distance From Inner Wall (in)
1	2 3/8
2	4
3	5 7/8
4	7 3/4
5	9 7/8
6	12 1/4
7	15
8	18 3/8
9	24 1/4
10	36 3/4
11	41 5/8
12	45
13	47 3/4
14	50 1/8
15	52 1/4
16	54 1/4
17	56
18	57 5/8

FIGURE 6

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



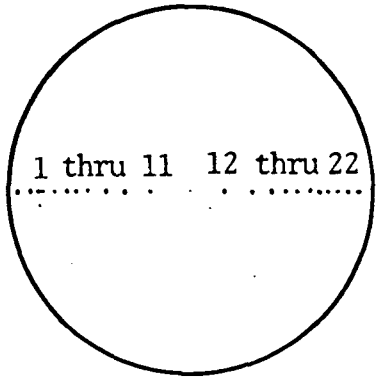


FIGURE 7

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

Sampling Point	Distance From Inner Wall (in.)
1	1 1/4
2	2 1/8
3	2 7/8
4	3 7/8
5	4 7/8
6	6 1/8
7	7 1/4
8	8 5/8
9	10 1/4
10	12 1/8
11	14 7/8
12	22 5/8
13	25 3/8
14	27 3/8
15	28 7/8
16	30 1/4
17	31 1/2
18	32 5/8
19	33 5/8
20	34 5/8
21	35 1/2
22	36 3/8

SAMPLING AND ANALYTICAL PROCEDURES

A. Preliminary Moisture Determination

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

The only significant difference between F. R. Method 4 and the method used was the configuration of the sampling train (see Figure 8). The sampling train used in these tests consisted of the first two midget impingers with five 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 eight ounce polyethylene container. The samples were held by EPA personnel for further analyses.

B. Preliminary Velocity Determination

Method two 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

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

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

C. Sampling for Fluoride Emissions

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

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

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 the recovered sample was placed into one container (See Appendix D). Field data sheets are included in Appendix B.

D. Sampling and Analytical Procedure for Ammonia

Ammonia was collected from the stack gas stream by passing the gas through three series-connected midget impingers containing 15 ml of 1N sulfuric acid. The sampling procedure was conducted per the EPA Officer and is very similar to the procedure described by Decker and Hogan in the U.S.P.H.S. publication "Determination of Ammonia in Stack Gas."

The apparatus consisted of a heated glass probe, midget impingers, pump, rotameter, and a dry gas test meter assembled as shown in Figure 10. Glass wool was placed in the end of the probe to act as a filter. Glass ball joint connectors were used between the probe and impingers. The first three impingers contained the absorbing reagent and the fourth impinger was left dry to collect any entrained liquid.

The sampling train was leak tested prior to sampling by plugging the inlet of the first impinger and letting the pump create a vacuum on the system. Any movement of the dry test meter was then recorded.

Due to the sensitivity of the analytical method only a small sample was required. The sampling rate was maintained at approximately

0.1 CFM for a 30-minute sampling time.

After each of the three sample runs, the total impinger liquid plus a distilled water rinsing of all four impingers was placed into an eight-ounce polyethylene jar for storage.

Field data sheets are contained in Appendix B.

E. 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.

F. 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.

Ammonia is quantitatively recovered as ammonia borate by using a modified kjeldahl distillation procedure. The ammonia samples were split with plant personnel. The analyses done by the Environmental Protection Agency are reported.

P_2O_5 analysis of the stack effluent was done by EPA personnel.

For more details of exact method used see Appendix C.

1. Nozzle (Optional)
2. Heated Glass Probe with Glass Wool as Filter
3. Ice Bath
4. Midget Impinger Containing 5 ml H_2O
5. Midget Impinger Containing 5 ml H_2O
6. Midget Impinger, Dry
7. Dry Midget Impinger
8. Flexible Sample Line
9. Drying Tube
10. Pump
11. Control Valve
12. Rotameter
13. Dry Test Meter
14. Thermometer

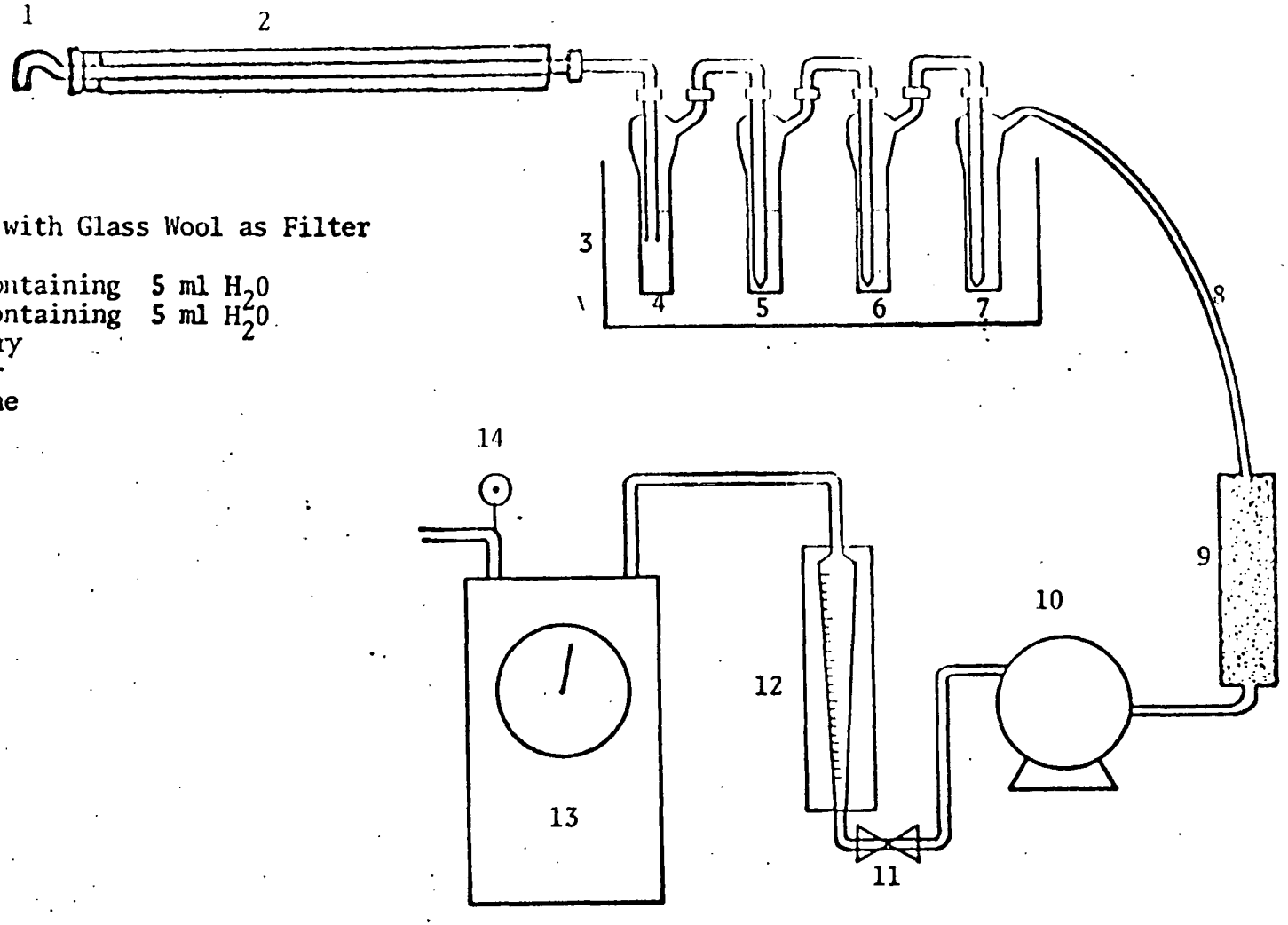


FIGURE 8

PRELIMINARY MOISTURE SAMPLING TRAIN

1. Nozzle
2. Heated Glass Probe
3. Glass Connector
4. Ice Bath
5. Impinger with 100 ml Distilled H_2O
6. Impinger with 100 ml Distilled H_2O
7. Impinger, Dry
8. Filter Holder Containing No. 1 Whatman Filter
9. Impinger with Silica Gel
10. Thermometer
11. Flexible Sample Line
12. Vacuum Gauge
13. Main Control Valve
14. Air Tight Vacuum Pump
15. By-pass Control Valve
16. Thermometer
17. Dry Test Meter
18. Thermometer
19. Calibrated Orifice
20. Inclined Manometer
21. "S" Type Pitot Tube
22. Inclined Manometer

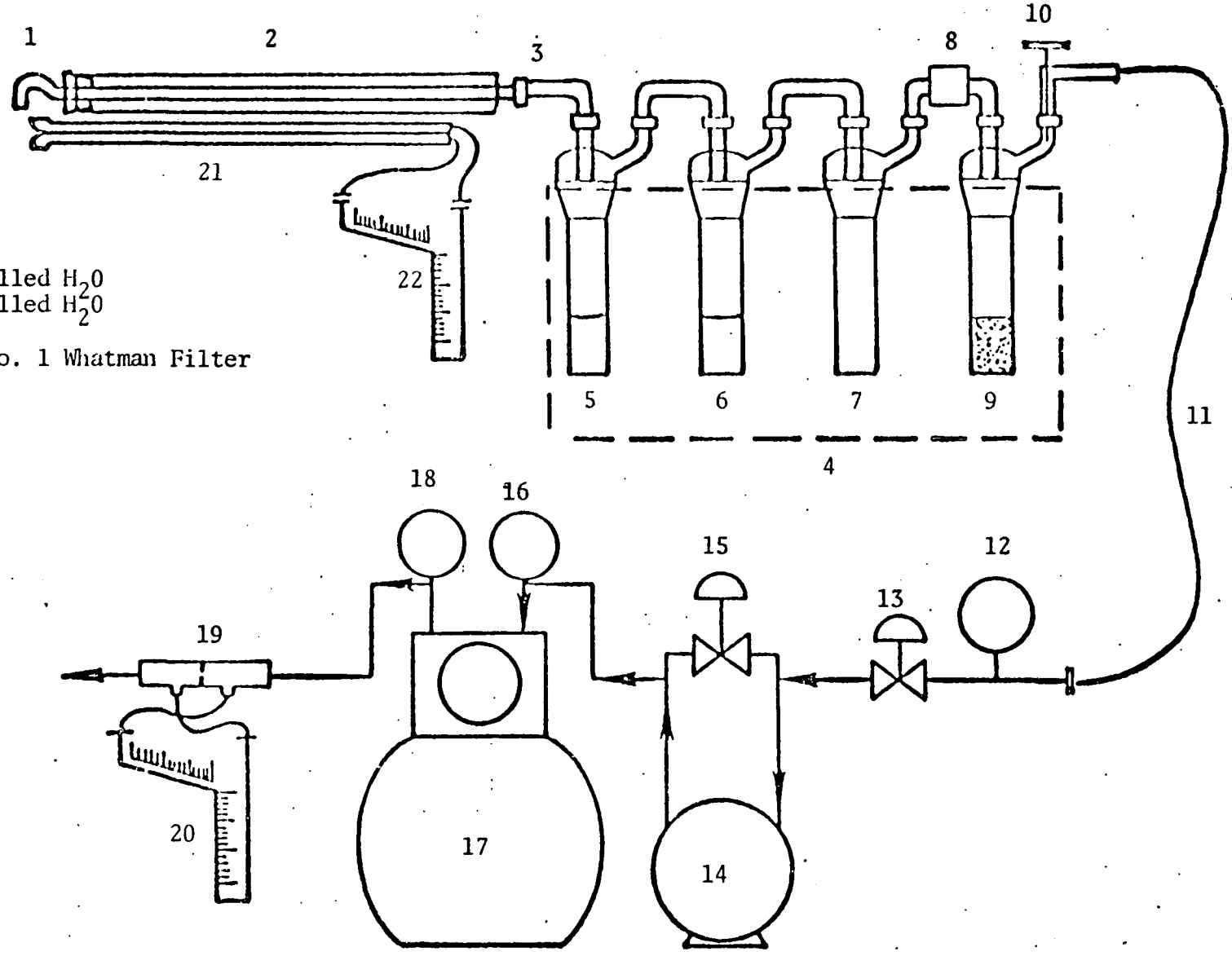


FIGURE 9

FLUORIDE SAMPLING TRAIN

1. Nozzle (Optional)
2. Heated Glass Probe with Glass Wool as Filter
3. Ice Bath
4. Midget Impingers Containing 15 ml 1N H_2SO_4
5. Midget Impingers Containing 15 ml 1N H_2SO_4
6. Midget Impingers Containing 15 ml 1N H_2SO_4
7. Dry Midget Impinger
8. Flexible Sample Line
9. Drying Tube
10. Pump
11. Control Valve
12. Rotameter
13. Dry Test Meter
14. Thermometer

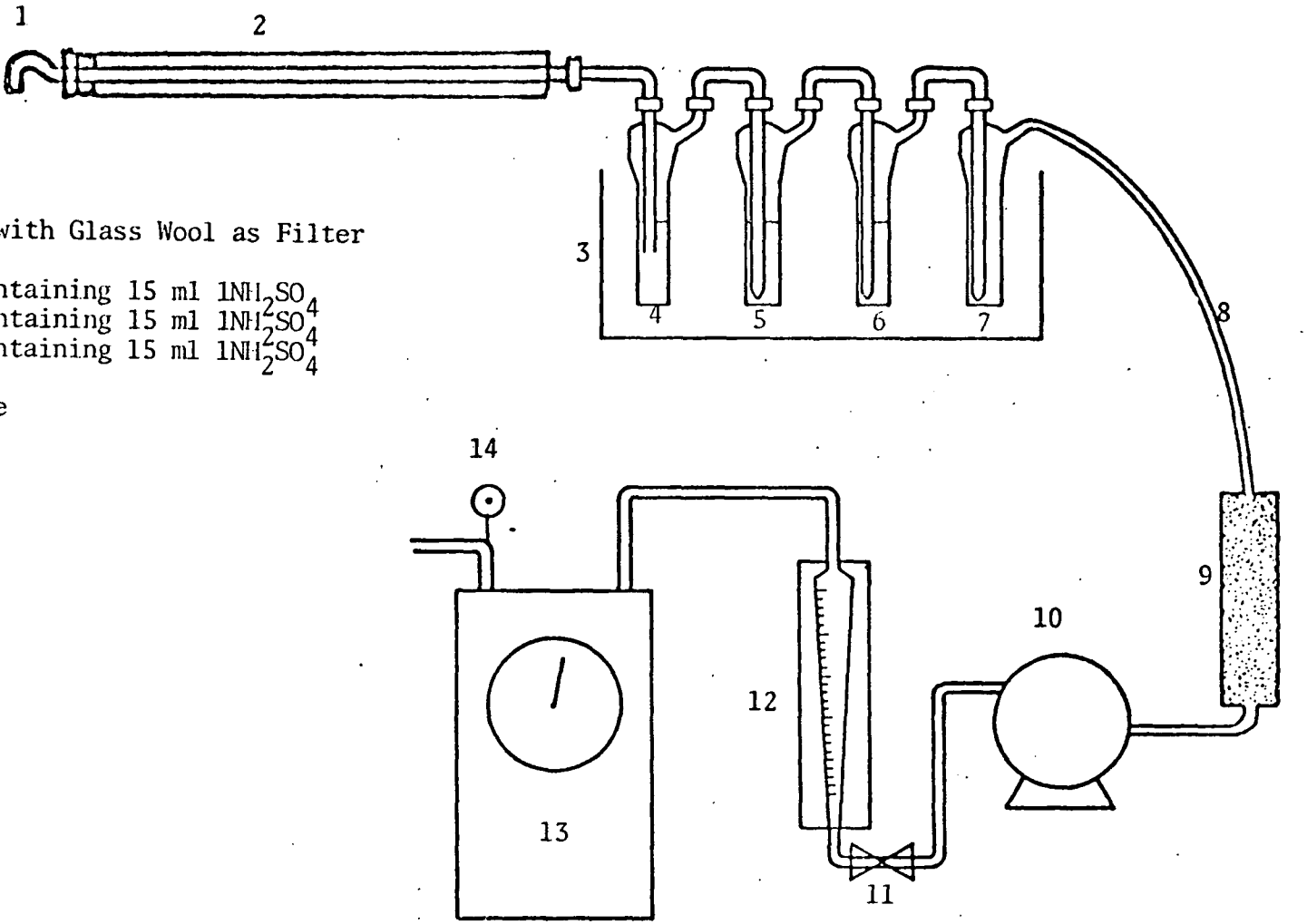


FIGURE 10

AMMONIA SAMPLING TRAIN

APPENDICES

APPENDIX A

Emission Calculations and Results

E.E.I. SOURCE SAMPLING NOMENCLATURE SHEET

PB - Barometric pressure, inches Hg
PS - Stack pressure, inches Hg
As - Stack area, sq. ft.
AS' - Effective area of positive stack gas flow, sq. ft.
NPTS - Number of traverse points where the pitot velocity head was greater than zer
TS - Stack temperature, °R
TM - Meter temperature, °R
$\overline{H}$ - Average square root of velocity head, $\sqrt{\text{inches } H_2O}$
$\overline{\Delta H}$ - 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 impringers, milliliters
Po - Pressure at the dry test meter orifice, $\left[PB + \frac{\Delta H}{13.6}\right]$ 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, %
$\sqrt{\overline{H} \times TS}$ - Average square root of velocity head times stack temperature
U - Stack gas velocity, feet per minute
QS - Stack gas flow rate, cubic feet per minute (stack conditions)
QD - Stack gas flow rate, cubic feet per minute (dry conditions)
QSTPD - Stack gas flow rate, cubic feet per minute (STP)
PISO - Percent isokinetic volume sampled (method described in Federal Register)

EQUATIONS FOR CALCULATING FLUORIDE EMISSIONS

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

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

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

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

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

FMOIST = Assumed moisture fraction

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

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

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

$$EA = \left[(100) \times (\% O_2 - \frac{\% CO}{2})\right] \div \left[(o.266 \times \% N_2) - (\% O_2 - \frac{\% CO}{2})\right]$$

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

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

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

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

$$PISO = (o.oo267 \times VC \times TS) + (P_o \times TS \times VM \div TM) \div (Time \times \underline{U} \times PS \times AN)$$

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)

EQUATIONS FOR CALCULATING AMMONIA EMISSIONS

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

FDA = obtained from fluoride emission test

QSTPD = obtained from fluoride emission test

Ammonia Emissions:

Mg = Milligrams of NH_3, determined from lab analysis

Grains/SCF = (0.01543) x (MG) ÷ VSTPD

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

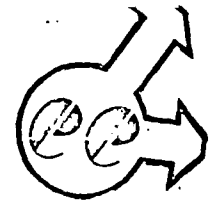
Lbs/hour = (Grains/SCF) x (0.00857) x (QSTPD)

NH_3 Fed = Tons/hour, determined from plant data

Lbs/ton NH_3 Fed = (lbs/hour) ÷ (tons/hour NH_3 Fed)

FLUORIDE EMISSIONS

SOURCE TEST DATA



TEST NO. _____ NO. OF RUNS 3

NAME OF FIRM C.F. CHEMICALS

LOCATION OF PLANT BARTOW FLORIDA

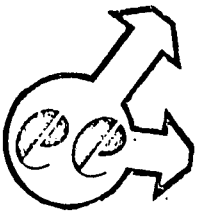
TYPE OF PLANT D.A.P.

CONTROL EQUIPMENT _____

SAMPLING POINT LOCATION STATION K REACTOR SCRUBBER OUTLET

POLLUTANTS SAMPLED _____

	1	2	3
1) RUN NO.	1	2	3
2) DATE	12/16/71	12/18/71	12/20/71
3) TIME BEGAN	16:20	13:45	16:00
4) TIME END	18:20	15:45	20:00
5) BAROMETRIC PRESSURE, "Hg ABSOLUTE	30	30	30
6) METER ORIFICE PRESSURE DROP, "H_2O	2.29	3.49	2.22
7) VOL DRY GAS @ METER CONDITIONS, ft^3	108.461	134.054	104.333
8) AVERAGE GAS METER TEMPERATURE, °F	96.1	79.4	81.8
9) VOL DRY GAS @ S.T.P.*, ft^3	104.233	133.2	102.895
10) TOTAL H_2O COLLECTED, ml	642.3	1037.1	670.5
11) VOL WATER VAPOR COLL. @ S.T.P., ft^3	30.45	49.16	31.78
12) STACK GAS MOISTURE, %VOLUME	22.6	27	23.6
13) ASSUMED STACK GAS MOISTURE, %VOLUME	8	22	22
14) % CO_2	0	0	0
15) % O_2	19.4	21	20.6
16) % CO	0	0	0
17) % N_2	80.6	79	79.4
18) % EXCESS AIR	951	150000	3958
19) MOLECULAR WT. OF STACK GAS, DRY	28.78	28.84	28.82
20) MOLECULAR WT. OF STACK GAS, STACK COND.	26.34	25.92	26.27
21) STACK GAS SP. GRAVITY, REF. TO AIR	0.91	0.89	0.91
22) AVG $\sqrt{\text{VEL. HEAD OF STACK GAS}}$, "$H_2O$	0.949	1.461	0.917
23) AVERAGE STACK GAS TEMPERATURE, °F	164	169.5	170
24) PITOT CORRECTION FACTOR	0.83	0.83	0.83
25) STACK PRESSURE, "Hg ABSOLUTE	29	29	29
26) STACK GAS VEL @ STACK COND., fpm	3647.1	5689	3547.9
27) STACK AREA, ft^2	9.62	9.62	9.62
28) STACK GAS FLOW RATE @ S.T.P., scfm	23066	33660	21940
29) NET TIME OF TEST, min.	120	120	120
30) SAMPLING NOZZLE DIAMETER, in.	0.25	0.25	0.25
31) PERCENT ISOKINETIC	109.6	96	113.7
32) FLUORIDE - WATER SOLUBLE, MG	67	147	57
33) FLUORIDE - TOTAL, MG	67.67	147.77	64.3
34) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0095	0.0169	0.0084
35) FLUORIDE - TOTAL, GR/SCF	0.0096	0.017	0.0095
36) FLOURIDE - WATER SOL. GR/CF STK COND.	0.0061	0.0101	0.0052
37) FLOURIDE - TOTAL GR/CF STK COND.	0.0061	0.0101	0.0059
38) FLUORIDE - WATER SOLUBLE, LB/HOUR	1.8805	4.8714	1.5819
39) FLUORIDE - TOTAL, LB/HOUR	1.8993	4.8969	1.7845
41) FLOURIDE - WATER SOL. LB/TON P2O5 FED.	0.0646	0.1949	0.0625
42) FLUORIDE - TOTAL, LBS/TON P2O5 FED.	0.0653	0.1959	0.0705



SOURCE TEST DATA

TEST NO. _____ NO. OF RUNS 3

NAME OF FIRM C. F. CHEMICALS

LOCATION OF PLANT BARTOW FLORIDA

TYPE OF PLANT D.A.P.

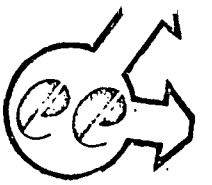
CONTROL EQUIPMENT _____

SAMPLING POINT LOCATION STATION L DRYER SCRUBBER INLET

POLLUTANTS SAMPLED _____

	1	2	3
1) RUN NO.	1	2	3
2) DATE	12/16/71	12/18/71	12/20/71
3) TIME BEGAN	16:20	13:50	18:05
4) TIME END	18:20	15:50	20:05
5) BAROMETRIC PRESSURE, "Hg ABSOLUTE	30	30	30
6) METER ORIFICE PRESSURE DROP, "H_2O	1.75	1.72	1.62
7) VOL DRY GAS @ METER CONDITIONS, ft^3	94.054	93.982	88.097
8) AVERAGE GAS METER TEMPERATURE, °F	129	107.4	114.4
9) VOL DRY GAS @ S.T.P.*, ft^3	85.228	88.388	81.827
10) TOTAL H_2O COLLECTED, ml	435.6	215.9	170.1
11) VOL WATER VAPOR COLL. @ S.T.P., ft^3	20.65	10.23	8.06
12) STACK GAS MOISTURE, %VOLUME	19.5	10.4	9
13) ASSUMED STACK GAS MOISTURE, %VOLUME	9	18	18
14) % CO_2	0	0	
15) % O_2	20.4	20.5	
16) % CO	0	0	
17) % N_2	79.6	79.5	
18) % EXCESS AIR	2637	3168	0
19) MOLECULAR WT. OF STACK GAS, DRY	28.82	28.82	28.99
20) MOLECULAR WT. OF STACK GAS, STACK COND.	26.71	27.7	28
21) STACK GAS SP. GRAVITY, REF. TO AIR	0.92	0.96	0.97
22) AVG $\sqrt{\text{VEL. HEAD OF STACK GAS}}$, "$H_2O$	0.749	0.811	0.765
23) AVERAGE STACK GAS TEMPERATURE, °F	100.1	149.6	151.1
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	2801.6	2955.2	2776.1
27) STACK AREA, ft^2	15.9	15.9	15.9
28) STACK GAS FLOW RATE @ S.T.P., scfm	30655	36625	34855
29) NET TIME OF TEST, min.	120	120	120
30) SAMPLING NOZZLE DIAMETER, in.	0.25	0.25	0.25
31) PERCENT ISOKINETIC	107.8	93.6	91
32) FLUORIDE - WATER SOLUBLE, MG	154	91	22.6
33) FLUORIDE - TOTAL, MG	216	141	37.9
34) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0252	0.0149	0.004
35) FLUORIDE - TOTAL, GR/SCF	0.0354	0.0231	0.0066
36) FLOURIDE - WATER SOL. GR/CF STK COND.	0.0174	0.0116	0.0031
37) FLOURIDE - TOTAL GR/CF STK COND.	0.0244	0.018	0.0052
38) FLUORIDE - WATER SOLUBLE, LB/HOUR	6.6244	4.6803	1.1801
39) FLUORIDE - TOTAL. LB/HOUR	9.2914	7.2519	1.979
41) FLOURIDE - WATER SOL. LB/TON P2O5 FED.	0.2276	0.1872	0.0466
42) FLUORIDE - TOTAL, LBS/TON P2O5 FED.	0.3193	0.2901	0.0782

SOURCE TEST DATA



TEST NO. _____ NO. OF RUNS 3

NAME OF FIRM C. F. CHEMICALS

LOCATION OF PLANT BARTOW FLORIDA

TYPE OF PLANT D.A.P.

CONTROL EQUIPMENT _____

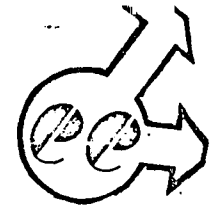
SAMPLING POINT LOCATION STATION M DRYER SCRUBBER OUTLET

POLLUTANTS SAMPLED _____

	1	2	3
1) RUN NO.	1	2	3
2) DATE	12/16/71	12/18/71	12/20/71
3) TIME BEGAN	17:30	13:45	18:00
4) TIME END	19:12	15:33	19:36
5) BAROMETRIC PRESSURE, "Hg ABSOLUTE	30	30	30
6) METER ORIFICE PRESSURE DROP, "H_2O	2.32	1.8	1.88
7) VOL DRY GAS @ METER CONDITIONS, ft^3	83.382	80.732	75.425
8) AVERAGE GAS METER TEMPERATURE, °F	93.4	76.6	82
9) VOL DRY GAS @ S.T.P.*, ft^3	80.528	80.301	74.294
10) TOTAL H_2O COLLECTED, ml	225	225	262
11) VOL WATER VAPOR COLL. @ S.T.P., ft^3	10.67	10.67	12.42
12) STACK GAS MOISTURE, %VOLUME	11.7	11.7	14.3
13) ASSUMED STACK GAS MOISTURE, %VOLUME	13.9	15	9.7
14) % CO_2	0.6	0	0
15) % O_2	19.8	20	20.3
16) % CO	0	0	0
17) % N_2	79.6	80	79.7
18) % EXCESS AIR	1441	1563	2255
19) MOLECULAR WT. OF STACK GAS, DRY	28.89	28.8	28.81
20) MOLECULAR WT. OF STACK GAS, STACK COND.	27.61	27.53	27.26
21) STACK GAS SP. GRAVITY, REF. TO AIR	0.95	0.95	0.94
22) AVG $\sqrt{\text{VEL. HEAD OF STACK GAS}}$, "$H_2O$	0.779	0.705	0.641
23) AVERAGE STACK GAS TEMPERATURE, °F	132	111	110.8
24) PITOT CORRECTION FACTOR	0.83	0.83	0.83
25) STACK PRESSURE, "Hg ABSOLUTE	28.1	28.1	28.2
26) STACK GAS VEL @ STACK COND., fpm	2893.8	2576.1	2349.9
27) STACK AREA, ft^2	17.1	17.1	17.1
28) STACK GAS FLOW RATE @ S.T.P., scfm	39130	36103	31979
29) NET TIME OF TEST, min.	102	102	96
30) SAMPLING NOZZLE DIAMETER, in.	0.25	0.25	0.25
31) PERCENT ISOKINETIC	107.8	116.5	128.8
32) FLUORIDE - WATER SOLUBLE, MG	2.4	8.1	1.2
33) FLUORIDE - TOTAL, MG	2.466	8.42	1.41
34) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0004	0.0015	0.0002
35) FLUORIDE - TOTAL, GR/SCF	0.0005	0.0016	0.0003
36) FLOURIDE - WATER SOL. GR/CF STK COND.	0.0003	0.0012	0.0002
37) FLOURIDE - TOTAL GR/CF STK COND.	0.0003	0.0012	0.0002
38) FLUORIDE - WATER SOLUBLE, LB/HOUR	0.1486	0.4781	0.0671
39) FLUORIDE - TOTAL, LB/HOUR	0.1527	0.5054	0.0789
41) FLOURIDE - WATER SOL. LB/TON P2O5 FED.	0.0051	0.0191	0.0027
42) FLUORIDE - TOTAL, LBS/TON P2O5 FED.	0.0052	0.0202	0.0031

*DRY. 70 °F. 29.92 in. Hg

SOURCE TEST DATA



TEST NO. _____ NO. OF RUNS 3

NAME OF FIRM C. F. CHEMICALS

LOCATION OF PLANT BARTOW FLORIDA

TYPE OF PLANT D.A.P.

CONTROL EQUIPMENT _____

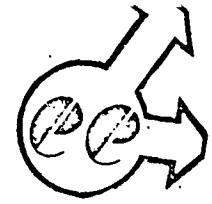
SAMPLING POINT LOCATION STATION N COOLER SCRUBBER INLET

POLLUTANTS SAMPLED _____

	1	2	3
1) RUN NO.	1	2	3
2) DATE	12/16/71	12/18/71	12/20/71
3) TIME BEGAN	16:20	13:50	18:00
4) TIME END	18:21	15:51	20:01
5) BAROMETRIC PRESSURE, "Hg ABSOLUTE	30	30	30
6) METER ORIFICE PRESSURE DROP, "H_2O	1.3	1.22	1.75
7) VOL DRY GAS @ METER CONDITIONS, ft^3	80.579	74.567	86.616
8) AVERAGE GAS METER TEMPERATURE, °F	108.7	76.7	84.7
9) VOL DRY GAS @ S.T.P.*, ft^3	75.538	74.057	84.862
10) TOTAL H_2O COLLECTED, ml	42.8	33.1	45.8
11) VOL WATER VAPOR COLL. @ S.T.P., ft^3	2.03	1.57	2.17
12) STACK GAS MOISTURE, %VOLUME	2.6	2.1	2.5
13) ASSUMED STACK GAS MOISTURE, %VOLUME	5	3	3
14) % CO_2	0	0	0
15) % O_2	19.8	20.3	20
16) % CO	0	0	0
17) % N_2	80.2	79.7	80
18) % EXCESS AIR	1291	2255	1563
19) MOLECULAR WT. OF STACK GAS, DRY	28.79	28.81	28.8
20) MOLECULAR WT. OF STACK GAS, STACK COND.	28.51	28.59	28.53
21) STACK GAS SP. GRAVITY, REF. TO AIR	0.98	0.99	0.98
22) AVG $\sqrt{\text{VEL. HEAD OF STACK GAS}}$, "$H_2O$	0.596	0.566	0.685
23) AVERAGE STACK GAS TEMPERATURE, °F	140	140	140
24) PITOT CORRECTION FACTOR	0.83	0.83	0.83
25) STACK PRESSURE, "Hg ABSOLUTE	29.71	29.71	29.71
26) STACK GAS VEL @ STACK COND., fpm	2132.5	2023.8	2450.8
27) STACK AREA, ft^2	19.63	19.63	19.63
28) STACK GAS FLOW RATE @ S.T.P., scfm	36019	34373	41447
29) NET TIME OF TEST, min.	121	121	121
30) SAMPLING NOZZLE DIAMETER, in.	0.25	0.25	0.25
31) PERCENT ISOKINETIC	100.5	103.3	98.1
32) FLUORIDE - WATER SOLUBLE, MG	34	25	31
33) FLUORIDE - TOTAL, MG	64.2	43.5	48.6
34) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0065	0.0052	0.0055
35) FLUORIDE - TOTAL, GR/SCF	0.0123	0.009	0.0086
36) FLOURIDE - WATER SOL. GR/CF STK COND.	0.0055	0.0044	0.0047
37) FLOURIDE - TOTAL GR/CF STK COND.	0.0105	0.0077	0.0074
38) FLUORIDE - WATER SOLUBLE, LB/HOUR	2.0058	1.5209	1.9578
39) FLUORIDE - TOTAL, LB/HOUR	3.7874	2.6464	3.0693
41) FLOURIDE - WATER SOL. LB/TON P2O5 FED.	0.0689	0.0608	0.0774
42) FLUORIDE - TOTAL, LBS/TON P2O5 FED.	0.1302	0.1059	0.1213

*DRY. 70 °F. 29.92 in. Hg

SOURCE TEST DATA



. TEST NO._____ NO. OF RUNS 3

NAME OF FIRM C. F. CHEMICALS

LOCATION OF PLANT BARTOW FLORIDA

TYPE OF PLANT D.A.P.

CONTROL EQUIPMENT_____

SAMPLING POINT LOCATION STATION P COOLER SCRUBBER OUTLET

POLLUTANTS SAMPLED_____

	1	2	3
1) RUN NO.	1	2	3
2) DATE	12/16/71	12/18/71	12/20/71
3) TIME BEGAN	16:32	13:46	18:00
4) TIME END	18:29	15:43	19:57
5) BAROMETRIC PRESSURE, "Hg ABSOLUTE	30	30	30
6) METER ORIFICE PRESSURE DROP, "H_2O	2.23	2.58	3.31
7) VOL DRY GAS @ METER CONDITIONS, ft^3	90.39	105.346	123.14
8) AVERAGE GAS METER TEMPERATURE, °F	116.4	104.7	117.5
9) VOL DRY GAS @ S.T.P.*, ft^3	83.789	99.759	114.24
10) TOTAL H_2O COLLECTED, ml	227.5	221.5	196
11) VOL WATER VAPOR COLL. @ S.T.P., ft^3	10.78	10.5	9.29
12) STACK GAS MOISTURE, %VOLUME	11.4	9.5	7.5
13) ASSUMED STACK GAS MOISTURE, %VOLUME	10.5	11.5	11.5
14) % CO_2	0	0	0
15) % O_2	19.5	20.6	20.3
16) % CO	0	0	0
17) % N_2	80.5	79.4	79.7
18) % EXCESS AIR	1019	3958	2255
19) MOLECULAR WT. OF STACK GAS, DRY	28.78	28.82	28.81
20) MOLECULAR WT. OF STACK GAS, STACK COND.	27.55	27.79	28
21) STACK GAS SP. GRAVITY, REF. TO AIR	0.95	0.96	0.97
22) AVG $\sqrt{\text{VEL. HEAD OF STACK GAS}}$, "$H_2O$	0.813	0.875	0.93
23) AVERAGE STACK GAS TEMPERATURE, °F	124.1	100	95.1
24) PITOT CORRECTION FACTOR	0.83	0.83	0.83
25) STACK PRESSURE, "Hg ABSOLUTE	28.7	28.7	28.7
26) STACK GAS VEL @ STACK COND., fpm	2972.6	3117.9	3439.6
27) STACK AREA, ft^2	19.63	19.63	19.63
28) STACK GAS FLOW RATE @ S.T.P., scfm	46921	52423	60675
29) NET TIME OF TEST, min.	117	117	117
30) SAMPLING NOZZLE DIAMETER, in.	0.25	0.25	0.25
31) PERCENT ISOKINETIC	91.6	97.6	96.6
32) FLUORIDE - WATER SOLUBLE, MG	2.8	4.6	2.7
33) FLUORIDE - TOTAL, MG	2.8	4.671	2.751
34) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0005	0.0007	0.0003
35) FLUORIDE - TOTAL, GR/SCF	0.0005	0.0007	0.0003
36) FLOURIDE - WATER SOL. GR/CF STK COND.	0.0004	0.0006	0.0003
37) FLOURIDE - TOTAL GR/CF STK COND.	0.0004	0.0006	0.0003
38) FLUORIDE - WATER SOLUBLE, LB/HOUR	0.1918	0.3021	0.1756
39) FLUORIDE - TOTAL, LB/HOUR	0.1918	0.3068	0.1789
41) FLOURIDE - WATER SOL. LB/TON P2O5 FED.	0.0066	0.0121	0.0069
42) FLUORIDE - TOTAL, LBS/TON P2O5 FED.	0.0066	0.0123	0.0071

*DRY. 70 °F. 29.92 in. Hg

SOURCE TEST DATA

TEST NO. _____ NO. OF RUNS 3

NAME OF FIRM C. F. CHEMICALS

LOCATION OF PLANT BARTOW FLORIDA

TYPE OF PLANT D.A.P.

CONTROL EQUIPMENT _____

SAMPLING POINT LOCATION STATION R REACTOR SCRUBBER INLET

POLLUTANTS SAMPLED _____

	1	2	3
1) RUN NO.	1	2	3
2) DATE	12/16/71	12/18/71	12/20/71
3) TIME BEGAN	16:35	13:45	18:05
4) TIME END	18:40	15:38	19:59
5) BAROMETRIC PRESSURE, "Hg ABSOLUTE	30	30	30
6) METER ORIFICE PRESSURE DROP, "H_2O	4.04	2.65	2.34
7) VOL DRY GAS @ METER CONDITIONS, ft^3	126.2	91.153	86.1
8) AVERAGE GAS METER TEMPERATURE, °F	102.8	73.3	85.8
9) VOL DRY GAS @ S.T.P.*, ft^3	120.332	91.427	84.318
10) TOTAL H_2O COLLECTED, ml	1039	834.6	856
11) VOL WATER VAPOR COLL. @ S.T.P., ft^3	49.25	39.56	40.57
12) STACK GAS MOISTURE, %VOLUME	29	30.2	32.5
13) ASSUMED STACK GAS MOISTURE, %VOLUME	28	0	35
14) % CO_2	0	0	0.7
15) % O_2	19.8	20.7	19.8
16) % CO	0	0	0
17) % N_2	80.2	79.3	79.5
18) % EXCESS AIR	1291	5256	1470
19) MOLECULAR WT. OF STACK GAS, DRY	28.79	28.83	28.9
20) MOLECULAR WT. OF STACK GAS, STACK COND.	25.66	25.56	25.36
21) STACK GAS SP. GRAVITY, REF. TO AIR	0.89	0.88	0.87
22) AVG $\sqrt{\text{VEL. HEAD OF STACK GAS}}$, "$H_2O$	1.106	1.078	1.025
23) AVERAGE STACK GAS TEMPERATURE, °F	171.6	171.3	173.4
24) PITOT CORRECTION FACTOR	0.83	0.83	0.83
25) STACK PRESSURE, "Hg ABSOLUTE	29 ×	29 ×	29 ×
26) STACK GAS VEL @ STACK COND., fpm	4337.9	4231.6	4047.9
27) STACK AREA, ft^2	7.67	7.67	7.67
28) STACK GAS FLOW RATE @ S.T.P., scfm	19812	19019	17540
29) NET TIME OF TEST, min.	110	110	110
30) SAMPLING NOZZLE DIAMETER, in.	0.25	0.25	0.25
31) PERCENT ISOKINETIC	128.1	101.4	101.4
32) FLUORIDE - WATER SOLUBLE, MG	143	71	319
33) FLUORIDE - TOTAL, MG	164.4	91.3	373
34) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0175	0.012	0.0571
35) FLUORIDE - TOTAL, GR/SCF	0.0201	0.0154	0.0667
36) FLOURIDE - WATER SOL. GR/CF STK COND.	0.0101	0.0068	0.0312
37) FLOURIDE - TOTAL GR/CF STK COND.	0.0116	0.0088	0.0365
38) FLUORIDE - WATER SOLUBLE, LB/HOUR	2.9628	1.9551	8.5767
39) FLUORIDE - TOTAL, LB/HOUR	3.4062	2.5141	10.0285
41) FLOURIDE - WATER SOL. LB/TON P2O5 FED.	0.1018	0.0782	0.339
42) FLUORIDE - TOTAL, LBS/TON P2O5 FED.	0.1171	0.1006	0.3964

*DRY. 70 °F. 29.92 in. Hg

AMMONIA EMISSIONS

AMMONIA EMISSIONS DATA

PLANT C.F. CHEMICALS, INC. BARTOW, FLA.

STACK D.A.P. NO. 3 STATION K

Run No.	1	2	3
Date	12/16/71	12/18/71	12/20/71
Time Started	18:55	16:05	20:15
Time Ended	19:25	16:35	20:45
Barometric Pressure, "Hg	30	30	30
Stack Pressure, "Hg	29	29	29
Final Meter Reading Ft^3	11.711	14.824	17.751
Initial Meter Reading Ft^3	8.439	11.725	14.824
Meter Volume (meter cond. Ft^3)	3.272	3.099	2.927
Gas Volume Sampled, *Ft^3	3.133	3.0329	2.8541
Meter Temperature ^oF	95	83	85
Stack Temperature ^oF	164	170	170
Average Gas Flow Rate, *Ft^3/min	23066	33660	21940
Ammonia, mg	1.3	1.8	0.3
Ammonia lbs/hr	1.2632	2.6366	0.3008
Ammonia lb/ton NH_3 fed	0.27461	0.23541	0.0029267
Ammonia gr/SCF	0.0063486	0.0090804	0.0016
Ammonia gr/CF Stack Cond.	0.0040453	0.0054051	0.0010

* Dry, 70^{o}F, 29.92 "Hg

environmental engineering, inc.

AMMONIA EMISSIONS DATA

PLANT C.F. CHEMICALS, INC. BARTOW, FLA.

STACK D.A.P. NO. 3 STATION L

Run No.	1	2	3
Date	12/16/71	12/18/71	12/20/71
Time Started	19:00	16:30	20:40
Time Ended	19:30	17:00	21:10
Barometric Pressure, "Hg	30	30	30
Stack Pressure, "Hg	29.7	29.7	29.7
Final Meter Reading Ft^3	158.44	258.1	353.57
Initial Meter Reading Ft^3	155.47	255.11	350.57
Meter Volume (meter cond. Ft^3)	2.97	2.989	3
Gas Volume Sampled, *Ft^3	2.7306	2.8263	2.7582
Meter Temperature ^oF	118	102	118
Stack Temperature ^oF	160	150	151
Average Gas Flow Rate, *Ft^3/min	30655	36625	34855
Ammonia, mg	170.5	126.7	160.3
Ammonia lbs/hr	252.62	216.69	267.35
Ammonia lb/ton NH_3 fed	54.918	19.347	25.707
Ammonia gr/SCF	0.95533	0.68587	0.88919
Ammonia gr/CF Stack Cond.	0.65257	0.53002	0.69673

* Dry, 70^{o}F, 29.92 "Hg

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AMMONIA EMISSIONS DATA

PLANT *C. F. CHEMICALS, INC. BARTOW, FLA.*

STACK *D.A.P. NO. 3 STATION M*

Run No.	1	2	3
Date	12/16/71	12/18/71	12/20/71
Time Started	19:00	16:00	20:00
Time Ended	19:30	16:30	20:30
Barometric Pressure, "Hg	30	30	30
Stack Pressure, "Hg	28.1	28.1	28.1
Final Meter Reading Ft^3	96.437	100.53	103.58
Initial Meter Reading Ft^3	93.253	97.4	100.57
Meter Volume (meter cond. Ft^3)	3.184	3.13	3.014
Gas Volume Sampled, *Ft^3	3.0487	3.1032	2.9497
Meter Temperature ^oF	95	76	83
Stack Temperature ^oF	132	111	111
Average Gas Flow Rate, *Ft^3/min	39130	36103	31979
Ammonia, mg	0.04	2	1
Ammonia lbs/hr	0.067758	3.0709	1.4308
Ammonia lb/ton NH_3 fed	0.01473	0.27419	0.13758
Ammonia gr/SCF	0.00020074	0.0098607	0.005187
Ammonia gr/CF Stack Cond.	0.00014904	0.0075902	0.0038751

* Dry, 70°F, 29.92 "Hg

environmental engineering, inc.

AMMONIA EMISSIONS DATA

PLANT *C.F. CHEMICALS, INC. BARTOW, FLA.*

STACK *D.A.P. NO. 3 STATION N*

Run No.	1	2	3
Date	12/16/71	12/18/71	12/20/71
Time Started	19:00	16:03	20:05
Time Ended	19:30	16:33	20:35
Barometric Pressure, "Hg	30	30	30
Stack Pressure, "Hg	29.7	29.7	29.7
Final Meter Reading Ft^3	3.52	7.159	10.291
Initial Meter Reading Ft^3	0.61	3.543	7.17
Meter Volume (meter cond. Ft^3)	2.91	3.616	3.121
Gas Volume Sampled, *Ft^3	2.8117	3.5194	3.0266
Meter Temperature ^oF	90	86	88
Stack Temperature ^oF	140	140	140
Average Gas Flow Rate, *Ft^3/min	36019	34373	41447
Ammonia, mg	23.2	0.05	0.1
Ammonia lbs/hr	39.225	0.06445	0.18074
Ammonia lb/ton NH_3 fed	8.5272	0.0057545	0.017379
Ammonia gr/SCF	0.12624	0.00021737	0.00050553
Ammonia gr/CF Stack Cond.	0.10782	0.00018659	0.00043218

* Dry, 70^{o}F, 29.92 "Hg

environmental engineering, inc.

AMMONIA EMISSIONS DATA

PLANT *C.F. CHEMICALS, INC. BARTOW, FLA.*

STACK *D.A.P. NO. 3 STATION P*

Run No.	1	2	3
Date	12/16/71	12/18/71	12/20/71
Time Started	19:45	16:15	20:20
Time Ended	20:15	16:45	20:50
Barometric Pressure, "Hg	30	30	30
Stack Pressure, "Hg	28.7	28.7	28.7
Final Meter Reading Ft^3	486.88	605.37	732.72
Initial Meter Reading Ft^3	483.54	601.32	728.81
Meter Volume (meter cond. Ft^3)	3.338	4.047	3.902
Gas Volume Sampled, *Ft^3	3.179	3.7731	3.5568
Meter Temperature ^oF	98	110	123
Stack Temperature ^oF	124	100	95
Average Gas Flow Rate, *Ft^3/min	46921	52423	60675
Ammonia, mg	1.6	1	0.2
Ammonia lbs/hr	3.1168	1.8337	0.45029
Ammonia lb/ton NH_3 fed	0.67756	0.16373	0.043297
Ammonia gr/SCF	0.0077006	0.0040551	0.00086033
Ammonia gr/CF Stack Cond.	0.0059394	0.0033316	0.00072897

* Dry, 70^oF, 29.92 "Hg

environmental engineering, inc.

AMMONIA EMISSIONS DATA

PLANT *C.F. CHEMICALS, INC. BARTOW, FLA.*

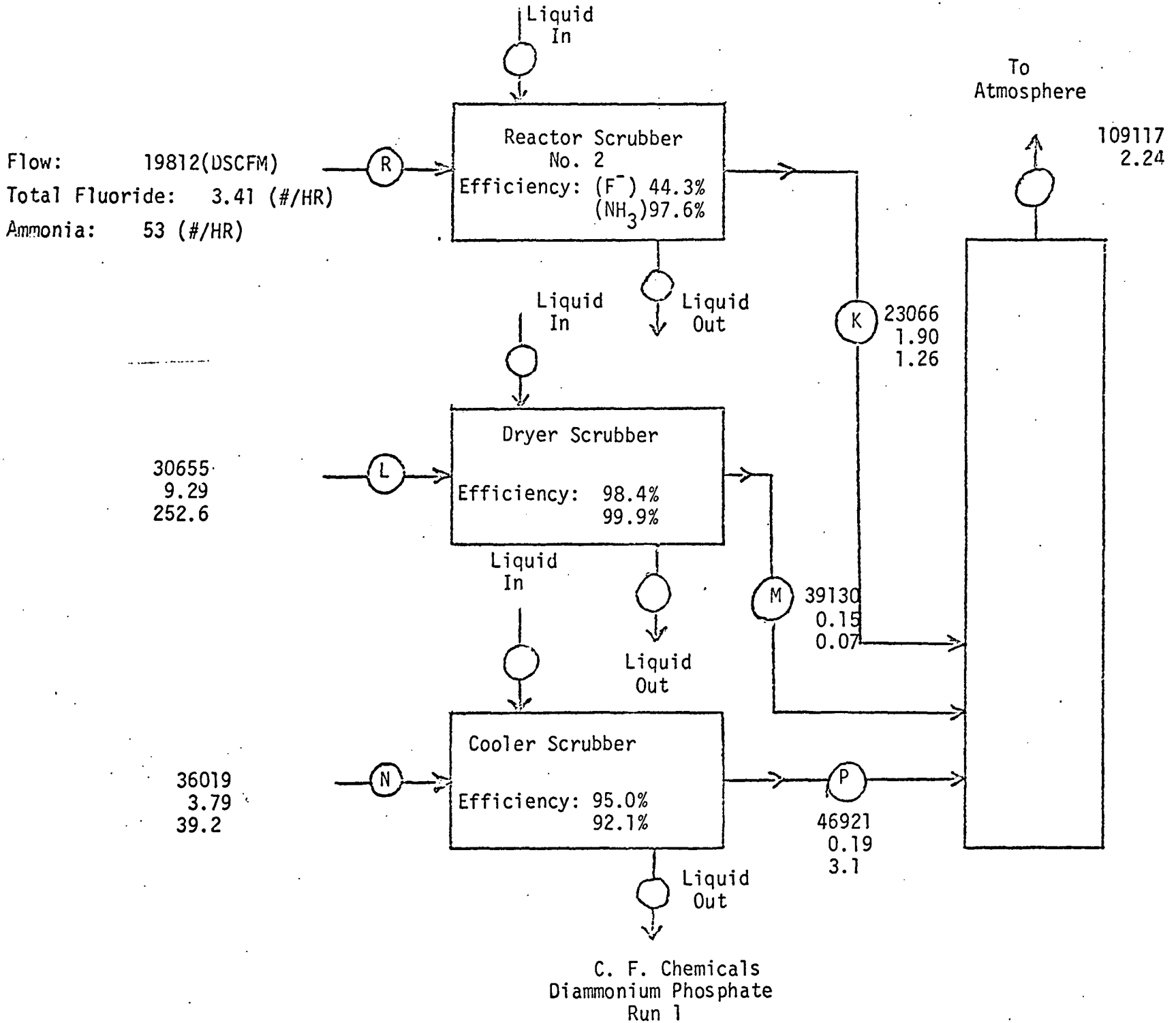
STACK *D.A.P. NO. 3 STATION R*

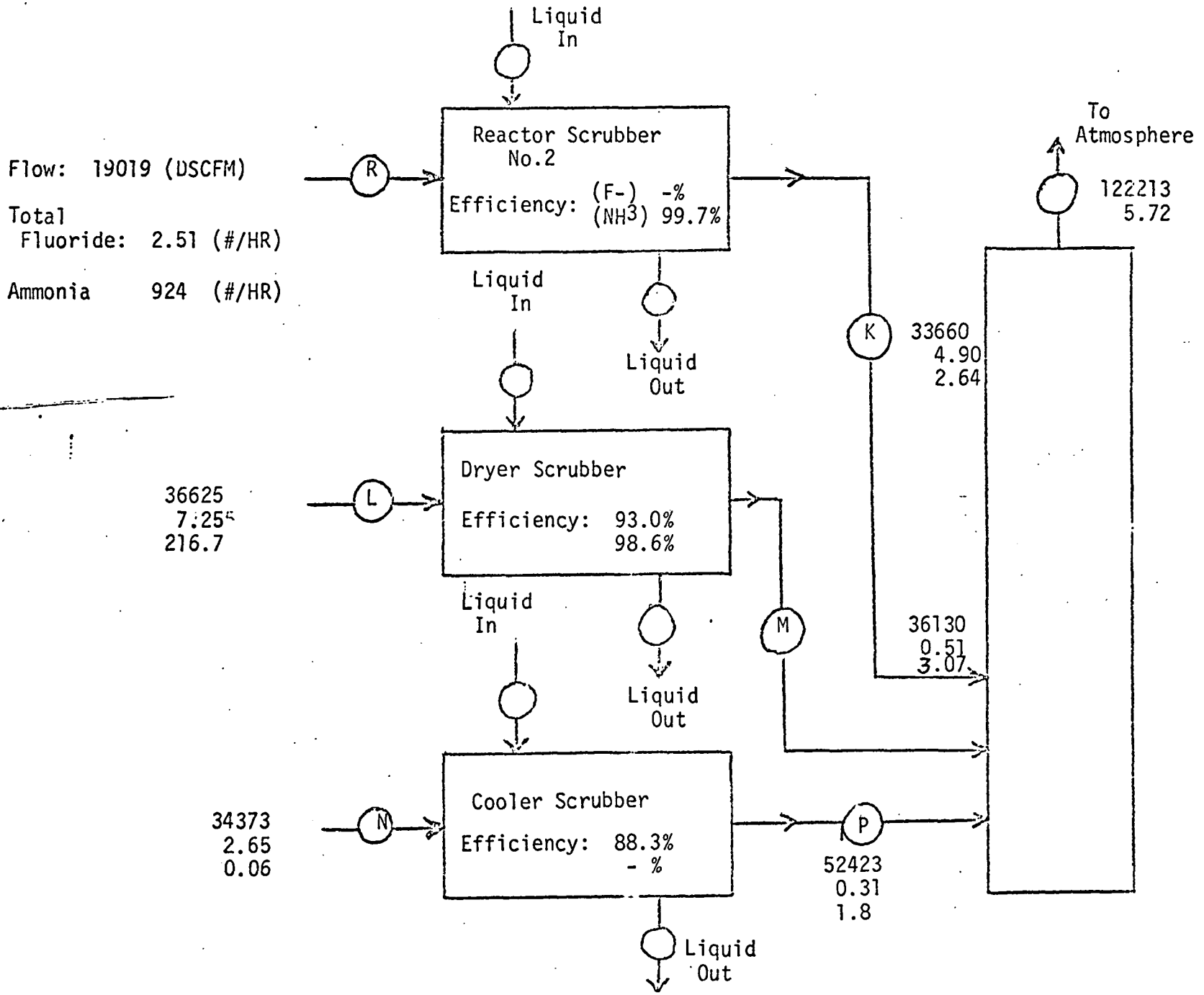
Run No.	1	2	3
Date	12/16/71	12/18/71	12/20/71
Time Started	18:56	15:51	19:12
Time Ended	19:27	16:21	19:43
Barometric Pressure, "Hg	30	30	30
Stack Pressure, "Hg	29	29	29
Final Meter Reading Ft^3	10.4	14.05	16.9
Initial Meter Reading Ft^3	7.4	10.5	14.1
Meter Volume (meter cond. Ft^3)	3	3.55	2.8
Gas Volume Sampled, *Ft^3	2.8571	3.4426	2.6666
Meter Temperature ^oF	98	88	98
Stack Temperature ^oF	174	171	173
Average Gas Flow Rate, *Ft^3/min	19812	19019	17540
Ammonia, mg	57.9	1267.9	257.4
Ammonia lbs/hr	52.99	924.48	223.45
Ammonia lb/ton NH_3 fed	11.52	82.543	21.486
Ammonia gr/SCF	0.31006	5.635	1.4769
Ammonia gr/CF Stack Cond.	0.17837	3.2021	0.80901

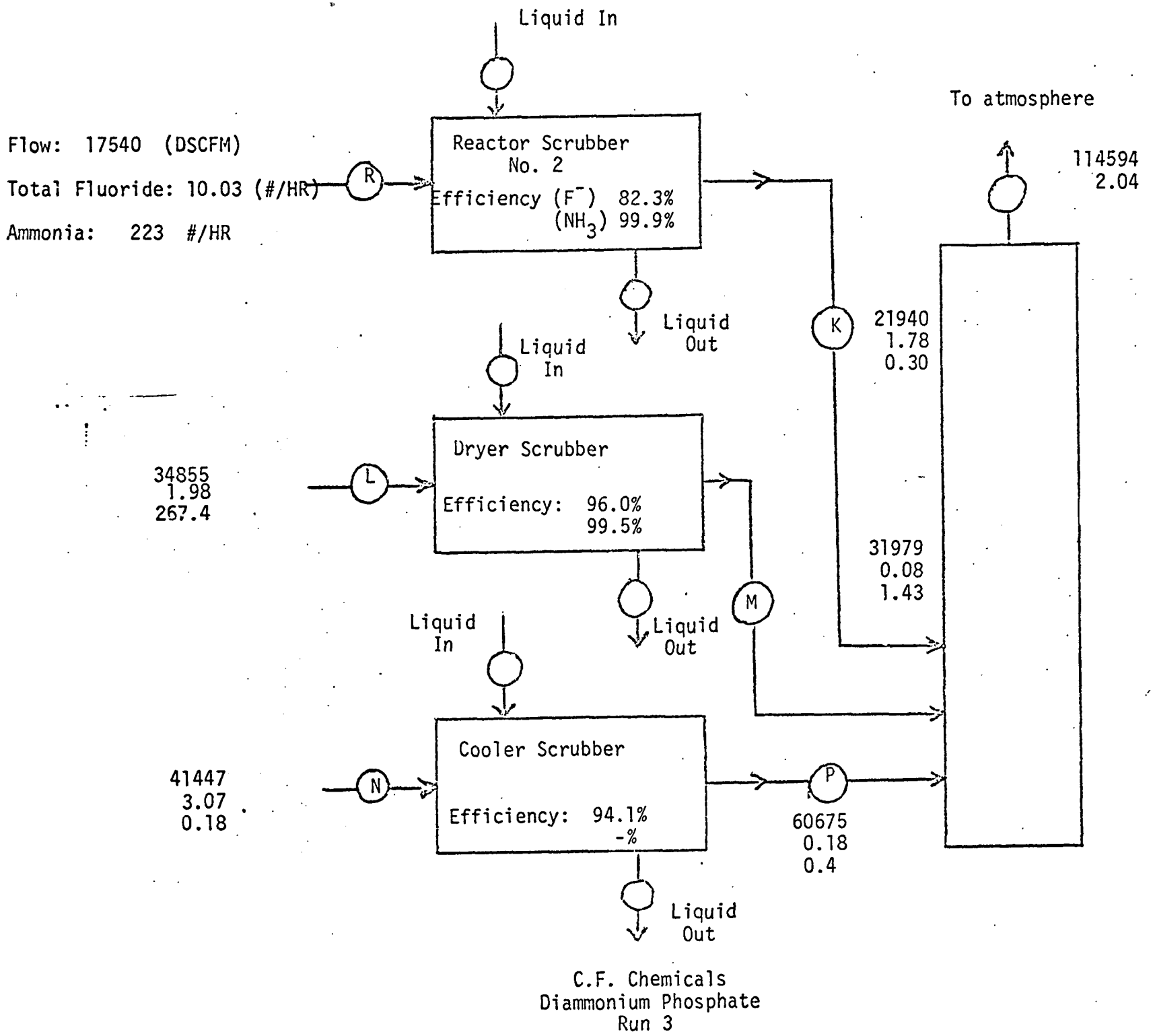
* Dry, 70^{o}F, 29.92 "Hg

environmental engineering, inc.

SCRUBBER EFFICIENCY


Liquid In
To Atmosphere
Reactor Scrubber No. 2
Efficiency: (F⁻) 44.3%
(NH3)97.6%
Flow: 19812(DSCFM)
Total Fluoride: 3.41 (#/HR)
Ammonia: 53 (#/HR)
R
109117
2.24
Liquid In
Liquid Out
K
23066
1.90
1.26
Dryer Scrubber
Efficiency: 98.4%
99.9%
30655
9.29
252.6
L
Liquid In
Liquid Out
M
39130
0.15
0.07
Cooler Scrubber
Efficiency: 95.0%
92.1%
36019
3.79
39.2
N
P
46921
0.19
3.1
Liquid Out
C. F. Chemicals
Diammonium Phosphate
Run 1


Liquid In
Reactor Scrubber No.2
Efficiency: (F-) -%
(NH3) 99.7%
Flow: 19019 (DSCFM)
Total Fluoride: 2.51 (#/HR)
Ammonia 924 (#/HR)
R
Liquid In
Liquid Out
To Atmosphere
122213
5.72
K
33660
4.90
2.64
Dryer Scrubber
Efficiency: 93.0%
98.6%
36625
7.25
216.7
L
Liquid In
Liquid Out
M
36130
0.51
3.07
Cooler Scrubber
Efficiency: 88.3%
- %
34373
2.65
0.06
N
P
52423
0.31
1.8
Liquid Out
C. F. Chemicals
Diammonium Phosphate
Run 2


Liquid In
To atmosphere
Flow: 17540 (DSCFM)
Total Fluoride: 10.03 (#/HR)
Ammonia: 223 #/HR
R
Reactor Scrubber
No. 2
Efficiency (F^-) 82.3%
(NH_3) 99.9%
Liquid Out
114594
2.04
K
21940
1.78
0.30
Liquid In
Dryer Scrubber
Efficiency: 96.0%
99.5%
34855
1.98
267.4
L
31979
0.08
1.43
M
Liquid In
Liquid Out
Cooler Scrubber
Efficiency: 94.1%
-%
41447
3.07
0.18
N
P
60675
0.18
0.4
Liquid Out
C.F. Chemicals
Diammonium Phosphate
Run 3

APPENDIX B

Field Data

PRELIMINARY MOISTURE DETERMINATION

PRELIMINARY CHECK FOR STACK GAS
MOISTURE CONTENT AND SPECIFIC GRAVITY

Plant C.F. Chemicals, Inc Stack DAP #3, Station "K"

Date 12-16-71 Sample Time 1145-1200 Barometric Pressure 30

Moisture Content -- Method 1

Final Dry Test Meter Reading 8.438 Ft^3

Initial Dry Test Meter Reading 6.880 Ft^3

Dry Test Meter Volume Sampled 1.558 Ft^3

Average Meter Temperature 92 °F

Average Meter Vacuum — "Hg

Average Meter Orifice Δ H — $"H_2O$

Sampling Rate 2.9 LPM

Barometric Pressure @ Meter Orifice — "Hg

Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg 1.500 Ft^3

Condensate Volume 2 ml

Water Vapor Volume @ 70 °F, 29,92 "Hg 0.095 Ft^3

Moisture Fraction, H_2O 0.08 Fraction Of Dry Air, FDA 0.92

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 DAP#3, Station "L"

Date 12-16-71 Sample Time 1145 Barometric Pressure 30

Moisture Content -- Method 1

Final Dry Test Meter Reading	60.766	Ft^3
Initial Dry Test Meter Reading	59.766	Ft^3
Dry Test Meter Volume Sampled	1.000	Ft^3
Average Meter Temperature	91	°F
Average Meter Vacuum	—	"Hg
Average Meter Orifice Δ H	—	"H_2O
Sampling Rate		LPM
Barometric Pressure @ Meter Orifice	—	"Hg
Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg	0.964	Ft^3
Condensate Volume	2.1	ml
Water Vapor Volume @ 70 °F, 29,92 "Hg	0.10	Ft^3

Moisture Fraction, H_2O 0.12 Fraction Of Dry Air, FDA 0.88

Moisture Content -- Method 2

Dry Bulb Temp. 160 °F Wet Bulb Temp. 125 °F Dew Point Temp. 122 °F

Vapor Pressure Of H_2O @ DP 3.64 "Hg Stack Pressure 29.7 "Hg

Moisture Fraction, H_2O 0.12 Fraction Of Dry Air, FDA 0.88

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 DAP #3, Station "M"

Date 12-16-71 Sample Time 1220-1240 Barometric Pressure 30 "Hg

Moisture Content -- Method 1

Final Dry Test Meter Reading 939.600 Ft^3

Initial Dry Test Meter Reading 935.700 Ft^3

Dry Test Meter Volume Sampled 3.900 Ft^3

Average Meter Temperature 82 °F

Average Meter Vacuum — "Hg

Average Meter Orifice Δ H 0.12 "H_2O

Sampling Rate 5.5 LPM

Barometric Pressure @ Meter Orifice 30 "Hg

Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg 3.823 Ft^3

Condensate Volume 10.6 ml

Water Vapor Volume @ 70 °F, 29,92 "Hg 0.502 Ft^3

Moisture Fraction, H_2O 0.14 Fraction Of Dry Air, FDA 0.86

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 DAP#3, Station "N"

Date 12-16-71 Sample Time 1200-1215 Barometric Pressure 30 "Hg

Moisture Content -- Method 1

Final Dry Test Meter Reading	635.000	Ft^3
Initial Dry Test Meter Reading	632.145	Ft^3
Dry Test Meter Volume Sampled	2.855	Ft^3
Average Meter Temperature	92	°F
Average Meter Vacuum	—	"Hg
Average Meter Orifice Δ H	0.05	"H_2O
Sampling Rate	5.4	LPM
Barometric Pressure @ Meter Orifice	30	"Hg
Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg	2.748	Ft^3
Condensate Volume	1.3	ml
Water Vapor Volume @ 70 °F, 29,92 "Hg	0.062	Ft^3

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

Moisture Content -- Method 2

Dry Bulb Temp. 140 °F Wet Bulb Temp. 100 °F Dew Point Temp. 92 °F

Vapor Pressure Of H_2O @ DP 1.51 "Hg Stack Pressure 29.7 "Hg

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

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 DAP #3, Station "P"

Date 12-16-71 Sample Time 1150-1200 Barometric Pressure 30 "Hg

Moisture Content -- Method 1

Final Dry Test Meter Reading	391.456	Ft^3
Initial Dry Test Meter Reading	390.456	Ft^3
Dry Test Meter Volume Sampled	1.000	Ft^3
Average Meter Temperature	90	°F
Average Meter Vacuum	—	"Hg
Average Meter Orifice Δ H	—	"H_2O
Sampling Rate	2.8	LPM
Barometric Pressure @ Meter Orifice	—	"Hg
Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg	0.966	Ft^3
Condensate Volume	2.5	ml
Water Vapor Volume @ 70 °F, 29,92 "Hg	0.119	Ft^3

Moisture Fraction, H_2O 0.13 Fraction Of Dry Air, FDA 0.87

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 DAP #3, Station "R"

Date 12-16-71 Sample Time 1145-1202 Barometric Pressure 30 "Hg

Moisture Content -- Method 1

Final Dry Test Meter Reading	096.500	Ft^3
Initial Dry Test Meter Reading	094.000	Ft^3
Dry Test Meter Volume Sampled	2.500	Ft^3
Average Meter Temperature	90	°F
Average Meter Vacuum	—	"Hg
Average Meter Orifice Δ H	0.05	"H_2O
Sampling Rate	4.2	LPM
Barometric Pressure @ Meter Orifice	30	"Hg
Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg	2.415	Ft^3
Condensate Volume	2	ml
Water Vapor Volume @ 70 °F, 29,92 "Hg	0.095	Ft^3

Moisture Fraction, H_2O 0.06 Fraction Of Dry Air, FDA 0.94

Moisture Content -- Method 2 (12-20-71)

Dry Bulb Temp. 169 °F Wet Bulb Temp. 165 °F Dew Point Temp. 164.5°F

Vapor Pressure Of H_2O @ DP 10.8 "Hg Stack Pressure 29 "Hg

Moisture Fraction, H_2O 0.37 Fraction Of Dry Air, FDA 0.63

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), $G_s = (M_s) \div (28.99) =$ _____

FLUORIDE EMISSIONS

SOURCE SAMPLING FIELD DATA SHEET

Plant C.F. Chemicals (Dap)

Sampling Location K outlet Reactor Scrubber #2

Date 12/16/71 Run No. 1

Time Start 11:55 Time End 6.20

Sampling Time/Point 10 @ 12 min

DB 170 °F, WB ____ °F, VF @ DP ____ "Hg

Moisture 8 %, FDA 0.92 Gas Density Factor ____

Barometric Press 30 "Hg, Stack Press 29 "Hg

Weather HOT

Temp. ____ °F, W/D ____, W/S ____

Sample Box No. ____ Meter Box No. 5

Meter ΔH@ 1.68 Pitot Corr. Factor 0.82

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

Probe Heater Setting ____

Stack Dimensions: Inside Diameter 42 in
Inside Area 9.61 ft²
Height ____ ft

Sketch of Stack

Mat'l Processing Rate ____

Final Gas Meter Reading 452.379 ft³

Initial Gas Meter Reading 343.918 ft³

Total Condensate in Impingers 605 ml, (342.3)

Moisture in Silica Gel 229.8 - 192.5 = ____ gm (37.3)

Silica Gel Container No. 208 Filter No. 72-023

Orsat: CO_2 0
O_2 19.4
CO 0
N_2
Excess Air

Test Conducted By: G. Allen
B. Demery
T. Arroyo

Remarks: ____

Port and Traverse Point No.	Distance from Ind of Port (in)	Clock Time	Gas Meter Reading (ft^3) 343.918	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) Clocktime	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
17 1	2 7/8	4.20	348.600	0.54	1.7	1.7	160	99	100	0	90	7.1
			353.700	0.53	1.65	1.65	165	97	100	6	79	7.9
2	7/8		357.85	0.41	1.39	1.39	165	97	99	12	86	6.8
			362.85	0.43	1.29	1.29	162	97	99	3	89	6.1
3			366.58	0.40	1.26	1.26	162	97	99	9	85	6.1
			370.96	0.44	1.35	1.35	162	96	99	15	84	6.2
* 4			377.11	0.55	1.67	1.67	160	96	99	6	82	7.5
			384.5	3.5	—	4.3	150	96	98	12	83	22.5
5			391.8	4.5	—	4.3	165	96	98	3	88	23

* V. Head Jumped from .55 to 3.5 at this Point

[redacted] at [redacted] Traverse Point No.	[redacted] Distance from End of Port (in)	[redacted] Clock Time	[redacted] 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			
			394.51	.8	2.4	2.4	162	95	98	9	94	10
** 6	27		407.61	.5	1.5	1.5	168	95	98	15	95	6.9
			407.71	.58	1.75	1.75	165	94	98	6	97	7.0
7	31½		412.81	.66	2.0	2.0	168	94	97	12	90	7.1
			417.97	.66	2.0	2.0	160	94	97	3	80	7.2
8	34 2/3		423.3	.85	2.5	2.50	170	93	96	9	80	8.9
			428.85	.72	2.15	2.45	170	93	95	15	79	8.7
9	37		434.29	.82	2.45	2.45	165	92	95	6	79	9.1
			441.24	2.5	2.5	4.2	165	92	95	12	79	22.5
10	39 ¼		446.9	.92	2.8	2.8	165	93	95	3	79	12.
			—	.98	3.0	3.0	168	93	94	9	81	12.8
			452.379							15		

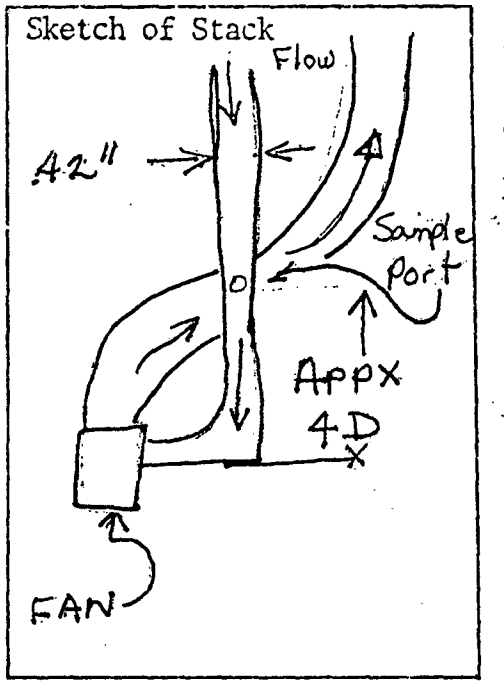
** V. Head Back to Normal

SOURCE SAMPLING FIELD DATA SHEET

K

Plant C. E. Chemical
Sampling Location Outlet Reactor Scrubber
Date 12/18/71 Run No. Station K 2
Time Start 1345 Time End 15:43
Sampling Time/Point 6 mins - 120 Total
DB — °F, WB — °F, VF @ DP — "Hg
Moisture 22%, FDA 68, Gas Density Factor
Barometric Press 30 "Hg, Stack Press 29 "Hg
Weather Partly Cloudy - Fair
Temp. 75 °F, W/D S, W/S 5-10
Sample Box No. 5 Meter Box No. 5
Meter ΔH@ 1.68 Pitot Corr. Factor 0.82
Nozzle Dia. .25 in., Probe Length 8 ft
Probe Heater Setting
Stack Dimensions: Inside Diameter 42 in
Inside Area ft²
Height ft

Sketch of Stack



Mat'l Processing Rate
Final Gas Meter Reading 596.322 ft³
Initial Gas Meter Reading 462.268 ft³
Total Condensate in Impingers 940 ml
Moisture in Silica Gel 97.1 gm
Silica Gel Container No. AP-111 Filter No. 72-02

Orsat:					
CO_2	0				
O_2	21				
CO	0				
N_2					
Excess Air					

Test Conducted By: Allen
Arroyo
Demery

Remarks:

Stop watch

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft³) 462.268	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)
1) 1		13.45	468.8	1.00	2.5	2.5	170	72	72	0	72	8.9
		13.51	473.55	0.95	2.4	2.4	170	72	73	6	71	8.2
2		13.57	479.16	0.99	2.45	2.45	170	72	73	12	71	9.1
		14.03	484.87	1.0	2.5	2.5	170	72	73	3	73	9.1
3		14.09	490.78	1.15	2.85	2.85	160	72	73	9	76	11.5
		14.15	497.65	1.7	3.25	3.9	170	73	73	15	85	22.2
4		14.21	504.66	2.2	5.5	3.7	170	79	75	6	85	22.6
		14.27	512.11	2.3	5.8	4.1	170	81	76	12	80	22.6
5		14.33	519.31	2.9	7.2	4.1	170	79	78	3	67	22.6

Stopt [redacted]

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	dial		
		14.39	526.51	3.0	7.3	3.95	170	78	78	9	69	22.6
6		14.45	533.68	4.1	>10	4.0	170	78	78	15	70	22.6
		14.51	540.87	4.0	9.7	3.7	170	79	79	6	69	22.6
7		14.57	547.93	4.0	9.7	3.9	170	80	79	12	73	22.6
		15.03	550.00	1.9	4.6	3.7	170	82	80	3	69	22.6
8*		15.09	561.72	2.6	6.3	3.6	170	83	81	9	70	22.7
		15.19	568.85	2.1	5.2	3.8	170	83	82	15	74	22.6
9		15.25	575.67	2.15	5.4	3.7	170	87	82	6	79	22.6
		15.31	582.72	2.15	5.4	3.7	170	93	84	12	79	22.6
10		15.37	589.62	2.4	6.0	3.6	170	98	86	3	81	22.6
		15.43	596.322	2.25	5.7	3.65	170	99	89	9	82	22.6
										15		

* STOPPED TO EMPTY WATER IN FILTER + 3rd IMPRINGER

SOURCE SAMPLING FIELD DATA SHEET

Plant C.F. Chemicals DAP

Sampling Location Outlet Reactor Scrubber

Date 12/20/71 Run No. 3

Time Start 6:00 Time End 8:00

Sampling Time/Point 6 min.

DB — °F, WB — °F, VF @ DP — "Hg

Moisture 22%, FDA —, Gas Density Factor —

Barometric Press 30 "Hg, Stack Press 29 Hg

Weather Night

Temp. — °F, W/D —, W/S —

Sample Box No. — Meter Box No. 5

Meter ΔH@ 6.68 Pitot Corr. Factor 0.82

Nozzle Dia. 0.25 in., Probe Length 8 ft

Probe Heater Setting —

Stack Dimensions: Inside Diameter 42 in
Inside Area — ft²
Height — ft

Sketch of Stack
#2

Mat'l Processing Rate —

Final Gas Meter Reading 700.805 ft³

Initial Gas Meter Reading 596.472 ft³

Total Condensate in Impingers 640 ml

Moisture in Silica Gel 2311 − 2005 = 306 gm

Silica Gel Container No. 2/2 Filter No. 72-633

Orsat: CO_2 0
O_2 20.6
CO 0
N_2 79.4
Excess Air —

Test Conducted By: G. Allen
B. Demery

Remarks: —

Same as run #1

Stopwatch

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			
			596.472									
1 — 1		6:00	600.0	0.33	0.89	0.89	170	86	87	0	70	4.1
			603.4	0.34	0.87	0.87	170	87	82	6	67	4.0
2			606.6	0.33	0.90	0.90	170	85	77	12	69	4.1
			610.4	0.34	0.95	0.95	170	84	75	3	69	4.1
3			613.9	0.34	0.95	0.95	170	83	74	9	70	4.2
			617.8	0.47	1.20	1.20	170	81	74	15	70	5.0
4			622.4	0.68	1.20	1.20	170	80	75	6	70	5.2
			627.1	0.72	1.80	1.80	170	79	76	12	70	7.2
5			632.6	1.1	2.70	2.70	170	79	78	3	70	12.2

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			
			638.4	1.10	2.70	2.70	170	79	79	9	70	12.8
6			644.4	1.10	2.70	2.70	170	79	80	15	75	13.2
			650.6	0.95	2.40	2.40	170	79	80	6	75	12.8
7			656.1	1.10	2.70	2.70	170	79	81	12	76	14.2
			661.9	1.10	2.70	2.70	170	78	81	3	76	13.8
8			668.1	1.20	3.00	3.00	170	80	81	9	80	16.2
			674.1	1.10	2.70	2.70	170	80	81	15	80	14.9
9			680.0	1.20	2.9	2.9	170	81	83	6	79	17.4
			687.0	1.30	3.20	3.20	170	82	90	12	79	15.0
10			693.9	1.60	4.2	3.7	170	86	100	3	100	21.8
				1.50	3.7	3.6	170	86	103	9	102	21.8
										15		

IAP [redacted]

SOURCE SAMPLING FIELD DATA SHEET

Plant CF Chemicals

Sampling Location Stack No. 1 (Ammonia)

Date 12/16/71 Run No. 1

Time Start 4:20p Time End _____

Sampling Time/Point 7.5 min @ 12 pts

DB 160 °F, WB 125 °F, VF @ DP _____ "Hg

Moisture 9.2%, FDA 81.7% Gas Density Factor _____

Barometric Press 30 "Hg, Stack Press 30 "Hg

Weather clear

Temp. _____ °F, W/D _____, W/S _____

Sample Box No. _____ Meter Box No. _____

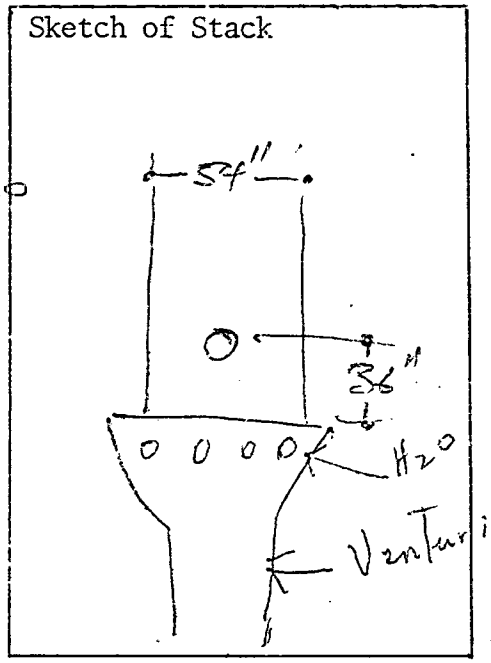
Meter ΔH@ 1.6 Pitot Corr. Factor .82

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

Probe Heater Setting 55%

Stack Dimensions: Inside Diameter 54 in
Inside Area _____ ft²
Height _____ ft

Sketch of Stack



Mat'l Processing Rate _____

Final Gas Meter Reading 154.949 ft³

Initial Gas Meter Reading 60.895 ft³

Total Condensate in Impingers 4104 ml → 435.6

Moisture in Silica Gel 25.6 gm

Silica Gel Container No. 2 Filter No. 72015

Orsat: CO_2 _____
O_2 20.4
CO _____
N_2 _____
Excess Air _____

Test Conducted By: Tom Jackson
Eric Johnson

Remarks: _____

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft³) 60.895	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	2 3/8	4:23	65.300	0.35	1.10	1.10	160	104	100	—	85	5.0
2	4	4:30	70.2	0.38	1.20	1.20	160	112	100	—	85	6.0
3	5 7/8	4:36	75.2	0.45	1.4	1.4	160	120	100	—	85	6.0
4	7 7/8	4:45	80.3	0.42	1.25	1.25	160	124	104	—	85	6.0
5	10 1/8	4:52	85.4	0.44	1.40	1.40	162	126	110	—	85	6.5
6	12 3/4	5:00	90.7	0.46	1.40	1.40	162	130	114	—	86	6.5
7	16	5:08	96.0	0.46	1.40	1.60	162	130	116	—	90	6.5
8	20 5/8	5:16	101.5	0.46	1.40	1.40	162	142	120	—	84	6.5
9	33 3/8	5:27	106.9	0.53	1.70	1.70	161	145	123	—	82	7.5

5.3

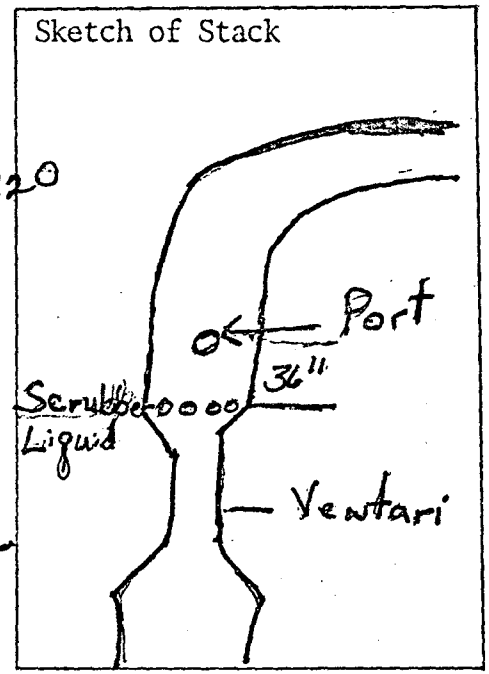
Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
					Cal.	Actual		In	Out			
10	38	5:38	113.4	0.58	1.8	1.8	161	150	124		84	13.5
11	4 1/4	5:45	120.9	0.90	2.7	2.7	162	154	126		86	14.5
12	42 7/8	5:52	127.2	0.60	1.85	1.85	158	154	130		82	9.5
13	45 1/8	6:00	133.4	0.65	1.95	1.95	158	154	132		81	9.5
14	47 1/8	6:08	139.5	0.58	1.7	1.70	158	155	132		81	8.0
15	50	6:15	146.9	~~0.00~~	3.0	3.0	156	157	133		82	~~16.5~~ 17.0
16	51 5/8	6:23	154.949	~~0.95~~	~~5.0~~	~~3.0~~	158	158	134		82	17.0
					2.8	2.8						

* head increase during last 2 min. of point ~~last~~ test during first 2 min of Point

SOURCE SAMPLING FIELD DATA SHEET

Plant FC Chemicals
Sampling Location Point 2
Date 12/15/71 Run No. 2
Time Start 1:50 Time End 3:50
Sampling Time/Point 7.5 min/Point 120
DB ____ °F, WB ____ °F, VF @ DP ____ "Hg
Moisture 80%, FDA 82 Gas Density Factor +
Barometric Press. ____ "Hg, Stack Press. 30 "Hg
Weather Over Cast
Temp. ____ °F, W/D ____, W/S ____
Sample Box No. ____ Meter Box No. ____
Meter ΔH@ 01.60 Pitot Corr. Factor 0.82
Nozzle Dia. 0.25 in., Probe Length 8 ft
Probe Heater Setting 60%
Stack Dimensions: Inside Diameter 54 in
Inside Area ____ ft²
Height ____ ft

Sketch of Stack



Mat'l Processing Rate ____
Final Gas Meter Reading 254.540 ft³
Initial Gas Meter Reading 160.558 ft³
Total Condensate in Impingers 191 ml
Moisture in Silica Gel 24.9 gm
Silica Gel Container No. 215 Filter No. 7201

Orsat:	
CO_2	
O_2	20.5
CO	
N_2	
Excess Air	

Test Conducted By: T. Tucker
Andy Taylor

Remarks: ____

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time 1:50	Gas Meter Reading (ft^3) 160.558	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	2 3/8	1:57	166.400	0.38	1.0	1.0	150	80	72		62	4.5
2	4	2:05	171.100	0.45	1.15	1.15	150	85	73		75	5.5
3	5 7/8	2:13	175.8	0.48	1.15	1.15	150	96	78		86	6.0
4	7 7/8	2:20	180.4	0.45	1.15	1.15	148	102	82		80	6.0
5	10 1/8	2:28	185.4	0.45	1.15	1.15	149	110	86		75	5.5
6	12 3/4	2:35	190.1	0.45	1.15	1.15	149	112	90		72	6.0
7	16	2:42	194.9	0.43	1.14	1.14	149	118	95		78	5.5
8	20 5/8	2:50	200.2	0.43	1.14	1.14	149	118	98		70	5.5
9	33 3/8	2:57	204.8	0.43	1.14	1.14	149	120	100		68	5.5

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	~~38~~	3:05	211.0	0.90	2.5	2.3	150	128	104		68	11.0
11	41 1/4	3:18	214.3	1.2	3.0	3.0	150	132	108		72	15.5
12	43 3/8	3:20	225.7	1.1	2.8	2.8	150	134	110		72	16.5
13	46 1/8	3:28	233.3	0.98	2.6	2.6	150	131	111		70	16.0
14	48 1/8	3:35	240.5	0.98	2.6	2.6	150	139	114		70	16.5
15	50	3:45	———	1.0	2.6	2.6	150	138	117		70	20.0
16	51 7/8	3:50	254.546	0.94	2.4	2.4	150	136	118		72	22.0

SOURCE SAMPLING FIELD DATA SHEET

Plant C F Chemicals

Sampling Location "L"

Date 12/29/71 Run No. 3

Time Start 1805 Time End 20:05

Sampling Time/Point 2.5/16 = 120

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

Moisture 18 %, FDA 82 Gas Density Factor ____

Barometric Press 30 "Hg, Stack Press 30 "Hg

Weather Clear

Temp. ____ °F, W/D ____, W/S ____

Sample Box No. ____ Meter Box No. ____

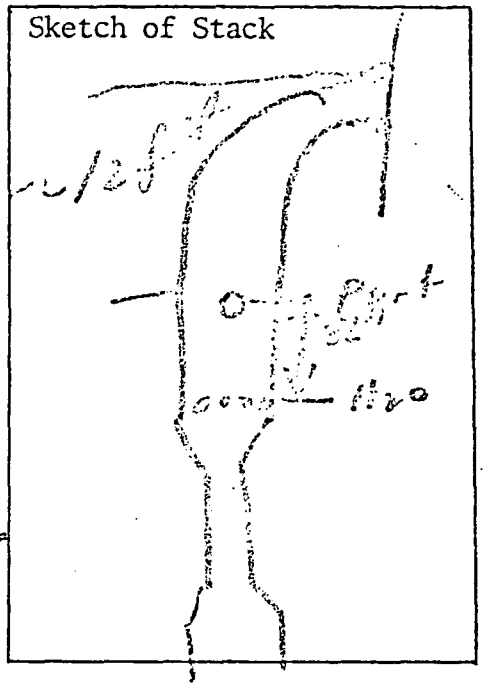
Meter ΔH@ 1.60 Pitot Corr. Factor 0.82

Nozzle Dia. 0.25 in., Probe Length 8 ft

Probe Heater Setting 60%

Stack Dimensions: Inside Diameter 54 in
Inside Area ____ ft²
Height ____ ft

Sketch of Stack



Mat'l Processing Rate ____

Final Gas Meter Reading 348.330 ft³

Initial Gas Meter Reading 260.233 ft³

Total Condensate in Impingers (349-200) 149 ml 170.1

Moisture in Silica Gel 211.1 - 180 = 29.1 gm 211.1

Silica Gel Container No. 223 Filter No. 7203

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

Test Conducted By: T. Tucker
Rod Taylor

Remarks: ____

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time 6:03	Gas Meter Reading (ft^3) 260.233	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)
1	2 3/8	6:10	265.400	0.60	1.6	1.6	150	90	83		64	5.0
2	4	6:18	270.6 *	0.58	1.4	1.4	150	98	85		66	5.0
3	5 7/8	6:25	276.3	0.4/0.52	1.4/2.2	1.4/2.2	150	106	88		68	6.0
4	7 7/8	6:33	282.0	0.53	1.5	1.5	150	112	92		70	6.0
5	10 1/8	6:40	286.1	0.55	1.5	1.5	150	112	95		70	20.0
6	12 3/4	6:48	292.0	0.55	1.5	1.5	150	114	96		70	20.0
7	16	7:05	297.0	0.50	1.4	1.4	151	118	102		72	5.0
8	20 1/8	7:12	302.3	0.45	1.25	1.25	151	122	108		74	5.0
9	23 7/8	7:20	307.0	0.48	1.25	1.25	152	126	110		76	6.0

Note plugged

* 23 min into run - Velocity Change —

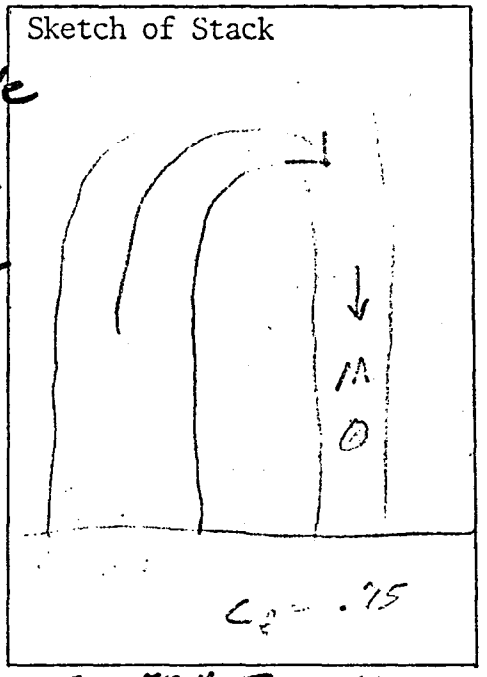
Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
					Cal.	Actual		In	Out			
10	38	7:27	312.4	0.54	1.5	1.5	152	130	112		76	6.0
11	41 1/4	7:35	317.7	0.55	1.5	1.5	152	134	114		78	6.0
12	43 3/8	7:42	323.4	0.50	1.1	1.4	152	138	118		78	6.0
13	46 5/8	7:50	328.1	0.55	1.4	1.5	152	138	119		80	6.0
14	48 1/8	7:57	333.6	0.55	1.5	1.5	152	140	120		80	6.0
15	50	8:05	340.2	0.95	2.7	2.7	152	148	122		92	12.0
16	51 1/8		348.33	1.1	3.0	3.0	152	148	124		90	14.0

Note: Between Points 3 and 6 the Probe Plugged with Solid Material. The Nozzle was removed, cleaned, and the run continued after point 6.

SOURCE SAMPLING FIELD DATA SHEET

Plant C F CHEMICALS
Sampling Location Scrubber "M"
Date 12/16/71 Run No. 1 Fluoride
Time Start 5:30 Time End 7:12
Sampling Time/Point 6 min 102
DB 126 °F, WB ____ °F, VF @ DP ____ "Hg
Moisture 1.39 %, FDA 86, Gas Density Factor .95
Barometric Press 30 "Hg, Stack Press 26.1 "Hg
Weather Beautiful / SB At Beach
Temp. ____ °F, W/D ____, W/S ____
Sample Box No. 4 Meter Box No. ____
Meter ΔH@ 1.62 Pitot Corr. Factor .84
Nozzle Dia. .25 in., Probe Length ____ ft
Probe Heater Setting 40%
Stack Dimensions: Inside Diameter 56 in
Inside Area ____ ft2
Height ____ ft

Sketch of Stack



FILTER # 72013

Mat'l Processing Rate 1031.582
Final Gas Meter Reading ____ ft3
Initial Gas Meter Reading 948.200 ft3
Total Condensate in Impingers 225 Total ml
Moisture in Silica Gel ____ gm
Silica Gel Container No. 214 Filter No. NONE
Orsat: CO_2 0.6%
O_2 19.8%
CO 0%
Bal → N_2 79.6
Excess Air ____

Test Conducted By: T. Chadbourne
M. Jackson

Remarks:
6" Nipple protruding / Actual time is plus 30 min
Start 5:30 END 7:12

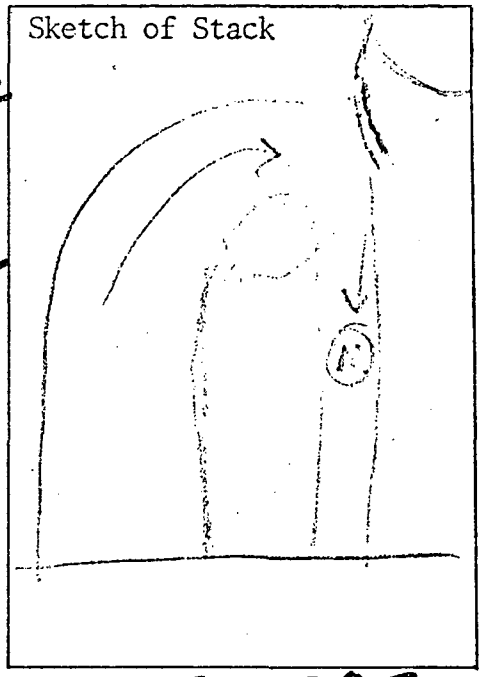
Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O) Calc.	Actual	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F) In	Out	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
1A												
3.5	8	6:42	31.582 (std) FINAL									
6.0	19 3/8	↓		Negative								
8.7	10 7/8	Assumed zero flow. Leak				.0002						
11.6	12 1/2	6:36	28.7	0.12	0.35	0.35		91	92		90	4
14.6	14 1/4	6:30	24.9	0.47	1.35	1.35		91	92		90	8
18.0	16 1/8	6:24	20.1	0.52	1.5	1.5	132	91	92		87	8
21.8	18 1/4	6:18	15.8	0.57	1.6	1.6		91	92		89	8
26.1	20 5/8	6:12	—	0.54	1.52	1.5		91	92		84	8

·t and ave.e int No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft3)	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			
31.5	23 5/8	6:05	7.70	0.43	1.25	1.25		93	94		82	7
39.3	28	6:00	4.20	0.210	0.40	0.40		93	94		82	5
60.7	40	5:54	999.900	0.47	1.30	1.30		93	94		82	7
68.5	44 3/8	5:48	995.25	0.65	1.85	1.85		93	94		82	9
73.9	47 3/8	5:42	990.900	0.75	2.1	2.1	132	91	95		84	10
78.2	49 3/4	5:36	984.44	0.85	2.9	2.4		94	95		82	12
82.0	51 7/8	5:30	979.1	1.0	2.8	2.8	131	94	95		82	14
85.4	53 3/4	5:24	973.0	1.1	3.1	3.1		95	95		81	22
88.1	55 1/2	5:18	966.7	1.1	3.1	3.1		95	95		81	22
91.3	57 1/8	5:12	960.8	1.2	3.4	3.1	131	95	95		81	22
94.0	58 5/8	5:06	954.2	1.2	3.4	3.1		95	95		79	22
96.5	60	5:00	948.200	1.2	3.4	3.1-2		95	95		79	22
	61 3/8											

SOURCE SAMPLING FIELD DATA SHEET

ant C F CHEMICALS
mpling Location Scrubber "M"
te 12/18/71 Run No. 2 Fluoride
me Start 1:45 Time End 3:33
mpling Time/Point 6 min 102
130 °F, WB 128 °F, VF @ DP . "Hg
oisture 15 %, FDA 85 Gas Density Factor .95
arometric Press 30 "Hg, Stack Press 28.1 "Hg
eather Fair
emp. 75 °F, W/D S, W/S 5 mph
ample Box No. 4 Meter Box No.
eter AH@ 1.62 Pitot Corr. Factor
ozzle Dia. .25 in., Probe Length ft
robe Heater Setting
tack Dimensions: Inside Diameter 56 in
Inside Area ft²
Height ft

Sketch of Stack



6g = .12 75°Tm

Mat'l Processing Rate
Final Gas Meter Reading 133.072 ft³
Initial Gas Meter Reading 52.34 ft³
Total Condensate in Impingers ml
Moisture in Silica Gel 2065-1925 = 140 225 gm
Silica Gel Container No. 205 Filter No.

Orsat:						
	CO_2	0				
	O_2	20.0				
	CO	0				
BJ	N_2	80.0				
	Excess Air					

Test Conducted By: J. Chadbourne
M. Jackson

Remarks:

6" Nipple protruding

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	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)
	6 5/8											
Neg	8			12 Negative points								
Neg	9 3/8	3:33	133.072	Final	Vol							
0	10 7/8	3:27	132.40	.03	.07	.07	111	80	80		69	0
	12 5/8	3:21	129.10	.275	.735	.235	111	-80	80		69	2
	14 1/4	3:15	124.60	.59	1.60	1.60	111	81	78		69	3
	16 5/8	3:09	120.06	.60	1.60	1.60	111	-81	77		69	3
	18 1/4	3:03	114.6	.625	1.70	1.70	111	81	77		69	3
	20 5/8	2:57	110.8	.675	1.82	1.82	111	80	77		69	4

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			
	23 5/8	2:51	106.45	.52	1.4	1.41	111	79	77		68	3
	28	2:45	103.32	.28	.75	.75	111	78	76		68	1
	40	2:39	100.45	.24	.65	.65	111	77	75		67	1
	44 3/8	2.33	96.45	.46	1.25	1.25	111	77	75		67	3
	47 3/8	2.27	91.85	.63	1.7	1.7	111	77	74		67	3
	49 3/4	2.21	86.48	.83	2.25	2.25	111	76	74		68	4
	51 3/4	2:15	81.3	0.81	2.2	2.2	111	75	74		68	4
	53 3/4	2:09	76.0	0.90	24	2.4	111	74	75		67	4
	55 1/2	2:03	70.6	0.98	2.7	2.7	111	74	76		68	5
	57 1/8	01:57	64.5	1.20	3.25	3.25	111	74	76		67	6.5
	58 7/8	1:51		1.25	3.4	3.4	111	74	76		66	7
	60	1:45	52.34	1.15	3.0	3.0	111	74	76		59	9
			NH_3	Sample								
		4:00	97.4						76			4.0
		4:08	93.2						76			4.0
		4:15	99.02						76			4.0
		4:22	97.71						75			4.0
		4:30	100.53						76			4.0

[redacted] [redacted] [redacted] [redacted] SOURCE SAMPLING FIELD DATA SHEET

Plant CF CHEMICALS

Sampling Location Scrubber "#1"

Date 12/20/71 Run No. 3 Fluoride

Time Start 1800 Time End 1936

Sampling Time/Point 6 MIN 96

DB 114 °F, WB 112 °F, VF @ DP _____ "Hg

Moisture 9.7 %, FD 90.3 Gas Density Factor .95

Barometric Press 30 "Hg, Stack Press 28.2 Hg

Weather FAIR

Temp. 80 °F, W/D _____, W/S _____

Sample Box No. 4 Meter Box No. _____

Meter ΔH@ 1.62 Pitot Corr. Factor .84

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

Probe Heater Setting _____

Stack Dimensions: Inside Diameter 56 in
Inside Area _____ ft²
Height _____ ft

6" nipple protruding

Sketch of Stack

.2 > .02

Cg = .75 .94 P_s/P_a

24.2" H_2O vac in stack ≈ 1.8" Hg

Mat'l Processing Rate _____

Final Gas Meter Reading 210.340 ft³

Initial Gas Meter Reading 134.915 ft³

Total Condensate in Impingers 242.0 ml

Moisture in Silica Gel 20.0 gm

Silica Gel Container No. 206 Filter No. _____

Orsat: CO_2 0
O_2 20.3
CO 0
N_2 _____
Excess Air _____

Test Conducted By: J. Chadbourne
M. Jackson

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)
Neg	8		4 pts Negative				109					
	9 3/8						109					
	10 7/8			Final time + Vol			109					
	12 5/8	7:36	210.340				109					
	14 4/4	7:30	207.530	0.44	1.25	1.25	109	81	83		73	10.0
	16 4/4	7:24	203.800	0.35	0.97	0.97	109	81	83		73	7.0
	18 4/4	7:18	199.820	0.43	1.20	1.20	109	81	82		73	8.0
	20 5/8	7:12	196.010	0.40	1.10	1.10	109	81	82		73	8.0

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			
	23 5/8	7:06	192.63	0.34	0.99	0.99	109	81	82		73	2.5
	28	7:00	190.125	0.12	0.35	0.35	104	82	82		73	4.5
	40	6:54	186.211	0.375	1.03	1.05	109	82	82		73	7.5
	44 3/8	6:48	181.414	0.65	1.78	1.78	112	82	82		74	11.0
	47 3/4	6:42	176.475	0.70	1.9	1.9	112	81	82		75	10.5
	49 3/4	6:36	171.036	0.87	2.4	2.41	112	81	83		75	11.5
	51 3/4	6:30	165.600	0.88	2.4	2.4	112	81	83		74	14.5
	53 3/4	6:24	159.670	1.10	3.0	3.0	112	80	83		74	18
	55 1/2	6:18	153.725	1.10	3.0	3.0	114	80	83		74	18
	57 1/8	6:12	147.8	1.10	3.0	3.0	114	80	83		74	18
	58 5/8	6:06	141.3	1.15	3.1	3.1	114	81	83		70	21
	60	6:00	134.915	0.96	2.65	2.65	114	81	83		69	15

SOURCE SAMPLING FIELD DATA SHEET

Plant CF CHEMICALS

Sampling Location D.A.P. INLET TO COOLER SCRUBBER

Date 12/16/71 Run No. 1

Time Start 1500 Time End 6:21

Sampling Time/Point 2 pts/Port 5 Ports = 121 min

DB 140 °F, WB 100 °F, VF @ DP 92 "Hg

Moisture 05 %, FDA 95, Gas Density Factor 99

Barometric Press 30 "Hg, Stack Press 29.71 "Hg

Weather Clear - Warm

Temp. 80 °F, W/D —, W/S —

Sample Box No. 1 Meter Box No. 1

Meter ΔH@ 1.74 Pitot Corr. Factor 0.88

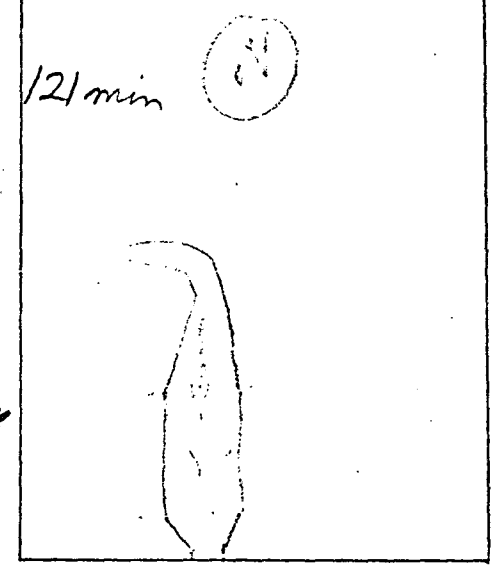
Nozzle Dia. 1/4 in., Probe Length 6 ft

Probe Heater Setting —

Stack Dimensions: Inside Diameter 60 in
Inside Area 19.625 ft²
Height 30 ft*

*= approx. above floor level

Sketch of Stack



Mat'l Processing Rate

Final Gas Meter Reading 715.590 ft³

Initial Gas Meter Reading 635.011 ft³

Total Condensate in Impingers 20 ml

Moisture in Silica Gel 220.3 - 197.5 = 22.8 gm

Silica Gel Container No. 209 Filter No. 72012

Orsat: CO_2 0
O_2 19.8
CO —
N_2
Excess Air

Test Conducted By: R. Durgan
L. Wurts

Remarks: "Fluorides"

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.	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)
		4:20	635.011									
Port #1	5/8	—	—	—	—	—	—	—	—	—	—	—
2	2 1/8	4:25 1/2	639.7	1.10	4.05	2.35	140	112	112	—	104	22.5
3	3 5/8	4:31	644.4	0.65	2.40	2.30		112	112	—		22.5
4	4 5/8	4:36 1/2	648.4	0.40	1.50	1.50		113	112	—		8.5
5	6 1/4	4:42	652.1	0.35	1.35	1.35		113	112	—		7.0
6	8	4:47 1/2	655.8	0.35	1.35	1.35		113	112	—		7.0
7	9 5/8	4:53	659.5	0.33	1.25	1.25		113	112	—		6.5
8	11 5/8	4:58 1/2	663.0	0.33	1.25	1.25		113	112	—		6.5
9	13 7/8	5:04	666.7	0.33	1.25	1.25		113	112	—		7.0

[redacted] 12[redacted]-[redacted] [redacted] Run #1

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	16 3/8	5:09½	670.3	0.33	1.25	1.25	140	113	112	—	90	7.0
11	19 3/8	5:15	673.9	0.33	1.25	1.25	↓	113	112	—	↓	6.8
12	23 3/8	5:20½	—	0.30	1.15	1.15		113	112	—		6.5
13	36 1/8	5:26	681.0	0.30	1.15	1.15		111	110	—		6.5
14	40 1/8	5:31½	684.4	0.30	1.15	1.15		110	110	—		6.5
15	43 3/8	5:37	687.9	0.30	1.15	1.15		108	108	—		6.5
16	46 1/8	5:42½	691.2	0.28	1.05	1.05		106	107	—		6.0
17	48 3/8	5:48	694.5	0.28	1.05	1.05		105	106	—		5.8
18	50 3/8	5:53½	698.0	0.30	1.15	1.15		105	105	—		5.8
19	52	5:59	701.5	0.30	1.15	1.15		103	104	—		6.8
20	53 3/4	6:04½	705.1	0.30	1.15	1.15		102	103	—		6.8
21	55 3/8	6:10	708.6	0.33	1.25	1.25		101	102	—		7.0
22	56 3/4	6:15½	712.1	0.30	1.15	1.15		100	102	—		7.0
23	58	6:21	715.590	0.30	1.15	1.15	↓	100	102	—	↓	7.0
24	59 3/8	—	—	—	—	—	—	—	—	—	—	—

SOURCE SAMPLING FIELD DATA SHEET

"N"

Plant CF CHEMICALS

Sampling Location D.A.P. INLET ~~SCRUBBER~~ TO COOLER SCRUBBER

Date 12-18-71 Run No. 2

Time Start 1:50 Time End 3:51

Sampling Time/Point 22 pts. @ 5½ min = 121 min.

DB 140 °F, WB — °F, VF @ DP — "Hg

Moisture .03 %, FDA .97, Gas Density Factor 0.98

Barometric Press 30 "Hg, Stack Press 29.71 "Hg

Weather CLEAR

Temp. 80 °F, W/D —, W/S —

Sample Box No. 1 Meter Box No. 1

Meter ΔH@ 1.74 Pitot Corr. Factor 0.83

Nozzle Dia. ¼ in., Probe Length 6 ft

Probe Heater Setting —

Stack Dimensions: Inside Diameter 60 in
Inside Area 19.625 ft²
Height 30 ft*

*= appox. above floor level

Sketch of Stack

121 min.

(N)

Mat'l Processing Rate

Final Gas Meter Reading 799.904 ft³

Initial Gas Meter Reading 725.337 ft³

Total Condensate in Impingers 12 ml

Moisture in Silica Gel 206.1 − 185 (511) gm

Silica Gel Container No. 204 Filter No. 7202

Orsat: CO_2 0
O_2 20.3
CO —
N_2
Excess Air

Test Conducted By: R. Organ
L. Wurts

Remarks: "FLUORIDES"

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)
Port #1		1:50	725.337									
1	5/8	—	—	—	—	—	—	—	—	—	—	—
2	2 4/8	1:55½	—	0.55	2.10	2.10	140	71	71	—	70	20.5
3	3 4/4	2:01	732.2	0.45	1.75	1.75		72	72	-		10.0
4	4 3/4	2:06½	735.5	0.28	1.05	1.05		73	72	-		5.5
5	6 4/4	2:12	738.9	0.33	1.25	1.25		74	72	-		7.0
6	8	2:17½	742.4	0.30	1.15	1.15		74	72	-		6.5
7	9 5/8	2:23	745.8	0.30	1.15	1.15		75	73	-		6.5
8	11 5/8	2:28½	749.2	0.33	1.25	1.25		76	73	-		6.8
9	13 3/8	2:34	752.8	0.33	1.25	1.25		77	73	-		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			
10	16 3/8	2:39½	756.3	0.33	1.25	1.25	140	78	74	—	70	7.0
11	19 3/8	2:45	760.0	0.35	1.35	1.35		78	74	—		7.5
12	23 7/8	2:50½	763.7	0.37	1.42	1.42		79	75	—		7.8
13	36 1/8	2:56	766.7	0.35	1.35	1.35		80	75	—		7.5
14	40 5/8	3:01½	770.1	0.30	1.15	1.15		80	76	—		6.5
15	43 5/8	3:07	773.4	0.28	1.05	1.05		80	77	—		5.8
16	46 4/4	3:12½	776.7	0.28	1.05	1.05		81	77	—		5.8
17	48 3/8	3:18	780.0	0.28	1.05	1.05		81	77	—		5.8
18	50 3/8	3:23½	783.2	0.28	1.00	1.00		81	77	—		5.8
19	52	3:29	786.5	0.28	1.05	1.05		81	78	—		6.0
20	53 3/4	3:34½	789.8	0.28	1.05	1.05		81	79	—		6.0
21	55 3/8	3:40	793.1	0.28	1.05	1.05		81	79	—		6.0
22	56 3/4	3:45½	796.5	0.30	1.15	1.15		81	79	—		6.0
23	58	3:51	799.904	0.30	1.15	1.15		81	79	—		6.0
24	59 7/8	—	—	—	—	—	—	—	—	—	—	—

SOURCE SAMPLING FIELD DATA SHEET

Plant CF CHEMICALS - BARTOW, FL
Sampling Location
Date 12-20-71 Run No. 3
Time Start 6:00 Time End 8:01
Sampling Time/Point
DB 140 °F, WB — °F, VF @ DP — "Hg
Moisture .03 %, FDA .97, Gas Density Factor 0.98
Barometric Press 30 "Hg, Stack Press 29.71 "Hg
Weather clear - warm
Temp. 80 °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 6 ft
Probe Heater Setting —
Stack Dimensions: Inside Diameter 60 in
Inside Area 19.625 ft²
Height 36 ft*

Sketch of Stack

(N)

Mat'l Processing Rate
Final Gas Meter Reading 902.421 ft³
Initial Gas Meter Reading 815.805 ft³
Total Condensate in Impingers 22 ml
Moisture in Silica Gel 200.8 - 177 = gm
Silica Gel Container No. 1101 Filter No. 72030

Orsat: CO_2 0
O_2 20.0
CO —
N_2
Excess Air

Test Conducted By: R. Durgan
L. Wurts

Remarks: "Fluorides"

*= appox. above floor level

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)
port #1		6:00	815.805									
1	5/8	—	—	—	—	—	—	—	—	—	—	—
2	2 1/8	6:05 1/2	818.9	1.05	3.90	1.50	140	87	88	—	75	22.5
3	3 1/4	6:11	823.1	0.65	2.45	2.20		86	87	—		20.5
4	4 3/4	6:16 1/2	827.6	0.57	2.15	2.15		86	87	—		20.5
5	6 1/4	6:22	832.0	0.48	1.85	1.85		86	86	—		10.0
6	8	6:27 1/2	—	0.45	1.75	1.75		86	86	—		10.0
7	9 5/8	6:33	840.0	0.48	1.85	1.85		86	86	—		10.0
8	11 5/8	6:38 1/2	844.2	0.48	1.85	1.85		86	85	—		12.0
9	13 7/8	6:44	848.4	0.48	1.85	1.85		86	85	—		11.5

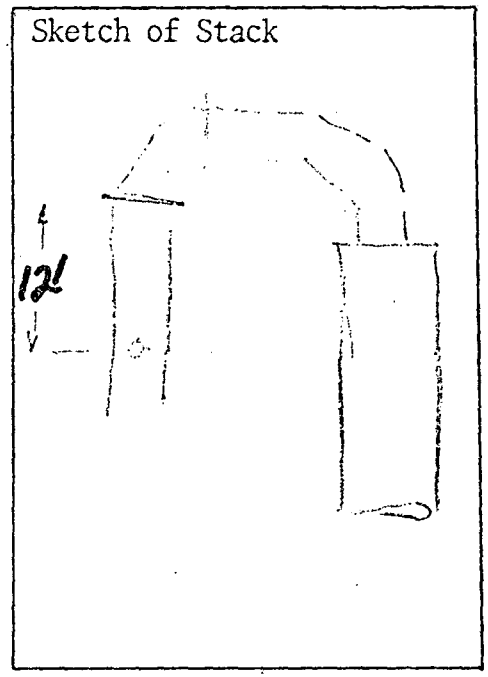
Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train ("Hg)
					Cal.	Actual		In	Out			
10	16 3/8	6:47½	852.6	0.50	1.90	1.90	140	85	85	—	75	14.5
11	19 3/8	6:55	856.1	0.50	1.90	1.90		85	84	—		
12	23 3/8	7:00½	860.3	0.48	1.85	1.85		85	84	—		
13	36 1/8	7:06	864.3	0.48	1.65	1.65		85	84	—		
14	40 3/8	7:11½	868.3	0.40	1.55	1.55		85	84	—		
15	43 5/8	7:17	872.1	0.40	1.55	1.55		85	84	—		
16	46 4/4	7:22½	875.8	0.38	1.45	1.45		85	83	—		
17	48 3/8	7:28	877.5	0.38	1.45	1.45		85	83	—		
18	50 3/8	7:33½	883.3	0.40	1.55	1.53		84	83	—		
19	52	7:39	887.1	0.38	1.45	1.45		84	83	—		
20	53 3/4	7:44½	890.9	0.40	1.55	1.55		84	83	—		
21	55 3/8	7:50	894.8	0.40	1.55	1.55		83	83	—		
22	56 3/4	7:55½	898.6	0.40	1.55	1.55		83	82	—		
23	58	8:01	902.421	0.40	1.55	1.55		82	82	—		
24	59 3/8	—	—	—	—	—	—	—	—	—	—	—

Vacuum Gauge not working properly

SOURCE SAMPLING FIELD DATA SHEET

Plant CF CHEMICALS
Sampling Location "P"
Date 12-16-71 Run No. 1
Time Start 16 4:32 Time End 6:29
Sampling Time/Point 6.5 min @ 18 pt = 117
DB — °F, WB — °F, VF @ DP — "Hg
Moisture 10.5 %, FD 89.5 Gas Density Factor
Barometric Press 30 "Hg, Stack Press 28.7 Hg
Weather Clear
Temp. 80's °F, W/D , W/S
Sample Box No. Meter Box No.
Meter ΔH@ 1.72 Pitot Corr. Factor 0.83
Nozzle Dia. 44 in., Probe Length 6 ft
Probe Heater Setting 40%
Stack Dimensions: Inside Diameter 60 in
Inside Area ft²
Height ft

Sketch of Stack



Mat'l Processing Rate
Final Gas Meter Reading 482.140 ft³
Initial Gas Meter Reading 391.750 ft³
Total Condensate in Impingers 200 ml
Moisture in Silica Gel 221.0 - 193.5 gm 27.5
Silica Gel Container No. 202 Filter No. 72014

Orsat: CO_2
O_2 19.5
CO
N_2
Excess Air

Test Conducted By: Ray Black
Andy Taylor

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) 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)
	3/4		391.750									
#2 1	2 3/8		—	0.25		0.8	126	88	88		81	2.5
2	4		—	0.34		1.1		92	89		84	2.5
3	5 7/8		—	0.22		2.7		94	90		84	2.5
4	7 3/4		399.9	0.85		2.8		102	95		86	2.5
5	9 7/8		303.5	0.85		2.8		104	98		84	8.0
6	12 1/4		409.9	0.88		2.8		106	100		88	8.0
7	15		415.6	0.65		2.1		112	104		90	6.0
8	18 3/8		421.7	0.77		2.5		116	108		88	6.0

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)		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			
			421.7									
9	24 1/4		428.1	0.85		2.8	122	138	110		88	8.0
10	36 3/4		434.6	0.85		2.8	122	140	112		89	8.0
11	41 5/8		441.1	0.88		2.8	125	144	116		89	8.0
12	45		447.7	0.90		2.9	125	146	118		79	8.0
13	47 3/4		454.3	0.85		2.8	131	148	120		76	8.0
14	50 1/8		460.1	0.70		2.3	125	148	122		75	6.5
15	52 1/4		465.8	0.65		2.1	122	148	122		74	6.0
16	54 1/4		471.2	0.60		2.0	121	148	122		74	6.0
17	56		476.7	0.60		2.0	120	148	122		74	6.0
18	57 5/8		482.140	0.60		2.0	120	148	122		74	6.0
		—	—	—	—	—	—	—	—	—	—	—

144 14
115 130
29

SOURCE SAMPLING FIELD DATA SHEET

Plant C.F. Chemical

Sampling Location "P"

Date Dec. 13 1971 Run No. 2.

Time Start 1:46 Time End 3:43

Sampling Time/Point 1.5 min @ 12 pts = 117 min

DB ____ °F, WB 114 °F, VF @ DP ____ "Hg

Moisture 11.5 %, FD 88.5 Gas Density Factor

Barometric Press 30 "Hg, Stack Press 28.7 "Hg

Weather Clear

Temp. ____ °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 40%

Stack Dimensions: Inside Diameter 60 in
Inside Area ____ ft²
Height ____ ft

Sketch of Stack

- See Run 1 for sketch

Mat'l Processing Rate ____

Final Gas Meter Reading 597.956 ft³

Initial Gas Meter Reading 492.610 ft³

Total Condensate in Impingers 198 net 221.5

Moisture in Silica Gel 219.5-196 gm (23.5)

Silica Gel Container No. 216 Filter No. 72017

Orsat: CO_2 0
O_2 20.6
CO 0
N_2
Excess Air

Test Conducted By: Ray Black
Eric Johnson

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) 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)
1	3/4	—	492.610	—	—	—	—	—	—	—	—	—
2	2 3/8	6.5	496.1	0.31		1.10	100	68	68	—	59	5
3	4	13.0	500.5	0.45		1.50		80	70	—	58	6
4	5 7/8	19.5	505.6	0.65		2.15		90	71	—	59	8
5	7 3/4	26.0	510.8	0.65		2.15		95	73	—	59	8
6	9 7/8	32.5	516.3	0.75		2.45		104	78	—	60	9
7	12 1/4	39.0	521.4	0.80		2.65		110	80	—	62	10
8	15	45.5	527.4	0.80		2.65		113	84	—	63	10
9	18 3/8	52.0	534.0	0.95		3.15		120	89	—	64	11

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	18 3/8		5409	0.95		3.15	100	126	93		62	11.0
11	23 1/4		541.5	0.70		2.30	100	123	96		61	7.5
12	36 3/4		553.3	0.95		3.15	100	127	97		60	11.0
13	41 5/8		560.2	1.00		3.30	100	131	101		61	11.0
14	45		567.0	0.95		3.15	100	134	105		61	11.0
15	47 3/4		573.9	0.95		3.15	100	135	106		61	11.0
16	50 1/8		580.6	0.90		3.00	100	136	108		61	10.0
17	52 1/4		587.0	0.85		2.80	100	137	110		61	9.5
18	54 1/4		592.6	0.75		2.45	100	139	110		61	8.5
19	56		597.156	0.65		2.15	100	138	112		61	7.5
20	57 5/8	—	—	—	—	—	—	—	—	—	—	—

SOURCE SAMPLING FIELD DATA SHEET

Plant CF Chemicals

Sampling Location 4"

Date Dec. 20, 1971 Run No. 3

Time Start 6:00 Time End 7:57

Sampling Time/Point

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

Moisture 11.5 %, FD 8.85 Gas Density Factor

Barometric Press 30 "Hg, Stack Press 28.7 "Hg

Weather Clear

Temp. 80's °F, W/D ____, W/S ____

Sample Box No. ____ Meter Box No. ____

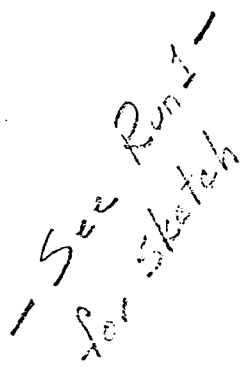
Meter ΔH@ 1.72 Pitot Corr. Factor 0.33

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

Probe Heater Setting

Stack Dimensions: Inside Diameter 60 in
Inside Area ____ ft²
Height ____ ft

Sketch of Stack



Mat'l Processing Rate

Final Gas Meter Reading 728.650 ft³

Initial Gas Meter Reading 605.510 ft³

Total Condensate in Impingers 162 ml

Moisture in Silica Gel 205.5 − 1715 = 34 gm } 96

Silica Gel Container No. 213 Filter No. 72034

Orsat: CO_2 0
O_2 20.3
CO 0
N_2 79.7
Excess Air

Test Conducted By: Ray Black
Tony Arroyo

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. ($"H_2O$) 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)
1	3/4	6:00	605.510	—	—	—	—	—	—	—	—	—
2	2 3/8	6:06½	608.5	0.15		0.50	98	80	80	—	68	3.0
3	4	6:13	613.8	0.75		2.50	98	85	82	—	72	9.0
4	5 7/8	6:19½	620.3	0.95		3.15	98	103	83	—	78	12.5
5	7 3/4	6:26	627.0	0.95		3.15	98	114	86	—	82	12.5
6	9 7/8	6:32½	633.8	1.00		3.30	96	120	90	—	82	13.0
7	12 1/4	6:39	641.0	1.00		3.30	96	126	94	—	82	13.0
8	15	6:45½	648.5	1.20		3.90	94	130	97	—	82	11.0
9	18 7/8	6:52	655.5	1.30		4.30	94	134	102	—	80	12.0

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	18 5/8	6:58½	664.1	1.30		4.30	94	136	104	—	82	12.0
11	23 1/4	7:05	671.8	1.00		3.30	94	138	107	—	60	9.0
12	36 3/4	7:11½	677.3	1.10		3.40	94	140	110	—	78	9.5
13	41 5/8	7:18	686.0	1.20		3.90	94	141	111	—	78	10.5
14	45	7:24½	693.8	1.20		3.90	94	143	113	—	82	10.5
15	47 3/4	7:31	701.2	1.20		3.90	94	144	114	—	86	11.5
16	50 1/8	7:37½	707.0	1.10		3.60	94	142	117	—	82	9.5
17	52 1/4	7:44	715.8	1.10		3.60	94	147	118	—	82	9.5
18	54 1/4	7:50½	722.7	0.75		3.15	94	148	120	—	84	9.0
19	56	7:57	728.65	0.70		2.30	94	146	120	—	88	6.5
20	57 5/8	—	—	—	—	—	—	—	—	—	—	—

SOURCE SAMPLING FIELD DATA SHEET

"R"

Plant CF CHEMICALS

Sampling Location DAP #3 (Between Scrubber #1 & 2 exhaust) (R)

Date 12-16-71 Run No. 1

Time Start _____ Time End _____

Sampling Time/Point 5 min/pt (Total = 110)

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

Moisture 6.4 %, FDA 0.97 Gas Density Factor ____

Barometric Press 30 "Hg, Stack Press ____ "Hg

Weather Clear

Temp. ____ °F, W/D ____, W/S ____

Sample Box No. ____ Meter Box No. ____

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 37.5 in
Inside Area 7.67 ft²
Height ____ ft

Sketch of Stack

Mat'l Processing Rate ____

Final Gas Meter Reading 223.000 ft³

Initial Gas Meter Reading 096.800 ft³

1200 final − 200 initial = 1000 ml net

Total Condensate in Impingers 1000 ml

final wt = 219 g − 175 [illegible] = 37?

Moisture in Silica Gel 39 gm

Silica Gel Container No. 210 Filter No. 72-02

Orsat: CO_2 —
O_2 19.8
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) 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)	Vacu o Samp Trai ("Hg
		1635	096.800									
1	1¼ + ½	1640	—	0.67	1.88	1.88	175	98	96	—	85	
2	2⅛	1645	104.8	0.72	2.00	2.00		98	96	—	85	
3	2⅞	1650	112.1	2.5	7.9	7.9		96	96		85	
4	3⅝	1655	—	2.5	7.9	7.9	160	97	96		85	
5	4⅜	1700	120.5	0.5	1.45	1.45		99	96		85	8.
6	6 ⅛	1705	128.2	0.15	0.34	0.34		99	95		85	2.
7	7 ¼	1710	—	0.60	1.75	1.75	180	99	95		85	5.
8	8 5/8	1715	137.9	0.36	0.96	0.96		99	95			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			
9	10 1/4	1720	137.7	0.32	0.57	0.57	—	93	95	—	85	5.8
10	12 1/2	1725	141.2	0.57	1.6	1.6	—	97	95	—	—	5.8
11	17 1/2	1730	145.8	0.85	2.4	2.4	—	97	95	—	—	6.2
12	22 5/8	1735	152.0	1.70	5.0	5.0	—	95	97	—	—	15.9
13	25 3/4	1740	157.5	1.90	5.8	5.8	—	96	94	—	—	20.5
* 14	27 3/8	1745	161.0	1.70	5.0	5.0	—	102	95	—	—	17.0
15	29 3/8	1755	173.4	1.60	4.7	4.7	—	101	95	—	85	14.0
16	30 1/4	1800	180.6	1.90	5.8	5.8	172	98	95	—	—	19.3
17	31 1/2	1805	187.8	1.90	5.8	5.8	—	111	97	—	85	19.8
18	32 7/8	1810	194.6	1.90	5.8	5.7	—	123	103	—	—	21.5
19	33 7/8	1815	201.9	1.90	5.8	5.7	—	128	110	—	—	21.5
20	34 5/8	1820	209.7	1.90	5.8	5.8	170	130	117	—	—	21.5
21	35 1/2	1825	—	1.90	5.8	5.8	—	135	122	—	—	21.5
22	36 1/4	1830		1.60	4.7	4.7	—	137	127	—	—	21.2

* Stopped and put some condensate into sample bottle

SOURCE SAMPLING FIELD DATA SHEET

Plant C.F. CHEMICALS

Sampling Location DAP #3 [Between Reactor/Scrubber #1 & 2]

Date 12-18-71 Run No. 2

Time Start 1345 Time End 1538

Sampling Time/Point 5 min/pt (total=110)

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

Moisture ____ %, FDA ____, Gas Density Factor ____

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

Weather ____

Temp. 72 °F, W/D ____, W/S ____

Sample Box No. ____ Meter Box No. ____

Meter ΔH@ ____ Pitot Corr. Factor ____

Nozzle Dia. ____ in., Probe Length ____ ft

Probe Heater Setting ____

Stack Dimensions: Inside Diameter 37.5 in
Inside Area ____ ft²
Height ____ ft

Sketch of Stack

Mat'l Processing Rate ____

Final Gas Meter Reading 329.653 ft³

Initial Gas Meter Reading 233.600 ft³

Total Condensate in Impingers 801 ml
FINAL=1001 ml, INITIAL=700 ml, Net=801
Final = 237.6 I = 204.0

Moisture in Silica Gel 33.6 gm

Silica Gel Container No. 23/ Filter No. ____

Orsat: CO_2 0
O_2 20.7
CO 0
N_2
Excess Air

Test Conducted By: DOLLAR
SHORTESS
WILSON

Remarks: Due to duct design- suspect Liquid entrainment especially in late series of points.

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)
		1345	233.500									
1		1350	236.9	1.0	1.85	1.85	170	71	71	—	78	
2		1355	240.8	1.0	1.85	1.85	170	72	72	—	74	
3		1400	244.5	0.9	1.70	1.70	170	72	72	—		
4		1405	248.2	0.9	1.70	1.70	170	70	73	—	80	
5		1410	252.0	0.45	0.85	0.85	170	70	73	—	80	
6		1415	253.7	0.15	0.22	0.22	170	71	72	—	80	
7		1420	255.2	0.05	—	—	170	71	72	—	80	
8		1425	256.6	0.15	0.22	0.22	170	71	72	—	85	

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			
9		1430	258.2	0.20	0.33	0.33	170	70	72	—	85	
10		1435	261.1	0.05	1.1	1.1	170	69	72	—	80	
11		1440	264.8	1.0	1.85	1.85	170	70	72	—	80	
12		1445	269.7	2.0	3.9	3.9	170	72	71	—	80	
13		1450	274.6	2.0	3.9	3.9	176	73	70	—	79	
14		1455	280.2	2.2	4.1	4.1	160	73	70	—	83	
15		1500	286.0	2.3	4.4	4.4	176	77	72	—	85	
16		1505	291.8	2.3	4.4	4.4	175	80	72	—	83	
17		1513	297.3	2.1	4.0	4.0	173	80	73	—	82	
18		1518	302.9	2.2	4.1	4.1	172	60	73	—	82	
19		1523	308.4	2.2	4.1	4.1	173	80	73	—	80	
20		1527	313.9	2.1	4.0	4.0	173	81	74	—	83	
21		1533	319.5	2.0	3.9	3.9	175	85	75	—	87	
22		1538	324.655	1.6	3.1	3.1	176	85	76	—	87	

Emptied imp. 5

SOURCE SAMPLING FIELD DATA SHEET

Plant C.F. CHEMICALS

Sampling Location Between Reactor Scrubbers

Date 12-20-71 Run No. 3

Time Start 1805 Time End 1959

Sampling Time/Point 5 min (Total = 110)

DB 169 °F, WB 165 °F, VF @ DP 10.8 "Hg

Moisture 0.35%, FDA 0.64 Gas Density Factor ____

Barometric Press. 30 "Hg, Stack Press. 29 "Hg

Weather Clear

Temp. 78 °F, W/D ____, W/S ____

Sample Box No. 2 Meter Box No. ____

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 325 in
Inside Area ____ ft²
Height ____ ft

Sketch of Stack

Mat'l Processing Rate ____

Final Gas Meter Reading 410.800 ft³

Initial Gas Meter Reading 324.700 ft³

1018 - 200 = 818

Total Condensate in Impingers 818 ml

f = 279 I = 234

Moisture in Silica Gel 38 gm

Silica Gel Container No. 219 Filter No. 72032

Orsat: CO_2 0.7
O_2 19.8
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) 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)
		1805										
1	Start Pt 1 Run No. 2	1810	327.9	0.65	1.20	1.20	168	82	84	—	79	
2		1815	331.7	0.90	1.80	1.80	—	82	82	—	—	
3		1820	334.3	0.50	0.90	0.90	—	82	79	—	—	
4		1825	336.8	0.40	0.76	0.76	173	82	77	—	75	
5		1830	338.5	0.20	0.34	0.34	—	82	77	—	79	
6		1835	340.7	0.35	0.63	0.63	170	81	77	—	79	
7		1840	342.8	0.32	0.57	0.57	—	82	76	—	—	
8		1845	344.7	0.25	0.47	0.42	—	82	76		—	

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			
9		1850	347.0	0.40	0.75	0.75	176	82	75	—	80	
10		1855	350.1	0.62	1.15	1.15	—	82	75	—	—	
11		1900	353.5	0.98	1.90	1.90	—	83	75	—	—	
12		1905	356.4	1.80	3.6	3.6	174	84	75	—	78	
13		1910	359.8	1.85	3.75	3.75	—	87	75	—	—	
14		1915	358.7	1.85	3.75	3.75	—	85	76	—	—	
* 15		1920	367.1	1.85	3.75	3.75	176	86	76	—	81	
16		1925	370.7	1.85	3.75	3.75	—	94	78	—	—	
17		1931	374.1	1.85	3.75	3.75	174	86	77	—	79	
18		1939	379.2	1.85	3.75	3.75	—	88	78	—	—	
19		1944	385.0	1.85	3.75	3.75	176	95	82	—	95	
20		1947	389.9	1.85	3.75	3.75	—	101	85		99	
21		1954	405.0	1.85	3.75	3.75	—	105	89		—	
22		1959	410.900	1.85	3.75	3.75	—	108	91		—	

* Stopped sampling to empty condensed water in first two impingers.

AMMONIA EMISSIONS

SAMPLING DATA SHEET FOR Ammonia

Plant C.F. Chemicals, Inc. Stack DAP #3, Station "K"

Remarks Sampled by George Allen

Run No.	1	2	3
Date	12-16-71	12-18-71	12-20-71
Time of Sample	1855-1925	1605-1635	2015-2045
Barometric Pressure, "Hg	30	30	30
Stack Pressure, "Hg	29	29	29
Final Dry Test Meter Reading, Ft^3	011.711	014.824	017.751
Initial Dry Test Meter Reading, Ft^3	008.439	011.725	014.824
Meter Volume Sampled @ Meter Cond., Ft^3	3.272	3.099	2.927
Average Meter Temperature, °F	95	83	85
Average Stack Temperature, °F	164	170	170
Average Meter Vacuum, "Hg	—	—	—
Average Meter Orifice ΔH, "H_2O	—	—	—
Observed Sampling Rate, LPM	3.1	2.9	2.8
Gas Volume Sampled, Ft^3, Dry, 70°F, 29.92 "Hg	3.132	3.032	2.853

Calculations:

SAMPLING DATA SHEET FOR Ammonia

Plant C.F. Chemicals, Inc. Stack DAP #3, Station "L"

Remarks Sampled by Tommy Tucker

Run No.	1	2	3
Date	12-16-71	12-18-71	12-20-71
Time of Sample	1900-1930	1630-1700	2040-2110
Barometric Pressure, "Hg	30	30	30
Stack Pressure, "Hg	29.7	29.7	29.7
Final Dry Test Meter Reading, Ft^3	158.440	258.098	353.565
Initial Dry Test Meter Reading, Ft^3	155.470	255.109	350.565
Meter Volume Sampled @ Meter Cond., Ft^3	2.970	2.989	3.000
Average Meter Temperature, °F	118	102	118
Average Stack Temperature, °F	160	150	151
Average Meter Vacuum, "Hg	—	—	—
Average Meter Orifice ΔH, "H_2O	0.07	0.06	0.06
Observed Sampling Rate, LPM	2.8	2.8	2.8
Gas Volume Sampled, Ft^3, Dry, 70°F, 29.92 "Hg	2.730	2.826	2.758

Calculations:

SAMPLING DATA SHEET FOR Ammonia

Plant C.F. Chemicals, Inc. Stack DAP #3, Station "M"

Remarks Sampled by John Chadbourne

Run No.	1	2	3
Date	12-16-71	12-18-71	12-20-71
Time of Sample	1900-1930	1600-1630	2000-2030
Barometric Pressure, "Hg	30	30	30
Stack Pressure, "Hg	28.1	28.1	28.1
Final Dry Test Meter Reading, Ft^3	96.437	100.530	103.580
Initial Dry Test Meter Reading, Ft^3	93.253	97.400	100.566
Meter Volume Sampled @ Meter Cond., Ft^3	3.184	3.130	3.014
Average Meter Temperature, °F	95	76	83
Average Stack Temperature, °F	132	111	111
Average Meter Vacuum, "Hg	—	—	—
Average Meter Orifice ΔH, "H_2O	—	—	—
Observed Sampling Rate, LPM	3.0	3.0	2.8
Gas Volume Sampled, Ft^3, Dry, 70°F, 29.92 "Hg	3.048	3.103	2.949

Calculations:

SAMPLING DATA SHEET FOR Ammonia

Plant C.F. Chemicals, Inc. Stack DAP# 3, Station "N"

Remarks Sampled by Bob Durgan

Run No.	1	2	3
Date	12-16-71	12-18-71	12-20-71
Time of Sample	1900-1930	1603-1633	2005-2035
Barometric Pressure, "Hg	30	30	30
Stack Pressure, "Hg	29.7	29.7	29.7
Final Dry Test Meter Reading, Ft^3	003.520	007.159	10.291
Initial Dry Test Meter Reading, Ft^3	000.610	003.543	7.170
Meter Volume Sampled @ Meter Cond., Ft^3	2.910	3.616	3.121
Average Meter Temperature, °F	90	86	88
Average Stack Temperature, °F	140	140	140
Average Meter Vacuum, "Hg	—	—	—
Average Meter Orifice ΔH, "H_2O	—	—	—
Observed Sampling Rate, LPM	2.7	3.4	2.9
Gas Volume Sampled, Ft^3, Dry, 70°F, 29.92 "Hg	2.811	3.519	3.026

Calculations:

SAMPLING DATA SHEET FOR Ammonia

Plant C.F. Chemicals, Inc. Stack DAP #3, Station "P"

Remarks Sampled by Ray Black

Run No.	1	2	3
Date	12-16-71	12-18-71	12-20-71
Time of Sample	1985-2015	1615-1695	2020-2050
Barometric Pressure, "Hg	30	30	30
Stack Pressure, "Hg	28.7	28.7	28.7
Final Dry Test Meter Reading, Ft^3	486.878	605.365	732.716
Initial Dry Test Meter Reading, Ft^3	483.540	601.318	728.814
Meter Volume Sampled @ Meter Cond., Ft^3	3.338	4.047	3.902
Average Meter Temperature, °F	98	110	123
Average Stack Temperature, °F	124	100	95
Average Meter Vacuum, "Hg	—	—	—
Average Meter Orifice ΔH, "H_2O	0.06	0.06	0.06
Observed Sampling Rate, LPM	3.2	3.8	3.7
Gas Volume Sampled, Ft^3, Dry, 70°F, 29.92 "Hg	3.178	3.772	3.556

Calculations:

SAMPLING DATA SHEET FOR Ammonia

Plant C.F. Chemicals, Inc. Stack DAP #3, Station "R"

Remarks Sampled by John Dollar

Run No.	1	2	3
Date	12-16-71	12-18-71	12-20-71
Time of Sample	1856-1927	1551-1621	1912-1943
Barometric Pressure, "Hg	30	30	30
Stack Pressure, "Hg	29	29	29
Final Dry Test Meter Reading, Ft^3	010.400	014.050	016.900
Initial Dry Test Meter Reading, Ft^3	007.400	010.500	014.100
Meter Volume Sampled @ Meter Cond., Ft^3	3.000	3.550	2.800
Average Meter Temperature, °F	98	88	98
Average Stack Temperature, °F	174	171	173
Average Meter Vacuum, "Hg	—	—	—
Average Meter Orifice ΔH, "H_2O	—	—	—
Observed Sampling Rate, LPM	2.7	3.3	2.6
Gas Volume Sampled, Ft^3, Dry, 70°F, 29.92 "Hg	2.856	3.442	2.666

Calculations:

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

Ammonia Determination Summary by Modified Kjeldahl Distillation

An aliquot of sample containing no more than 10 mg ammonia is added to a Kjeldahl distillation assembly that has been cleaned out by distillation of ammonia-free distilled water for thirty minutes. Additional water is added, if necessary, to bring the volume in the flask to 150 ml. Phenolphthalein indicator is added and a solution of sodium hydroxide-sodium thiosulfate is added dropwise until the sample is basic to phenolphthalein. A phosphate buffer is then added to maintain a pH of 7.4.

The sample is heated until 100 ml of distillate is collected in 2 percent boric acid containing an indicator.

The distillation is continued using fresh 2 percent boric solution and distillate is collected until there is no color change of the boric acid.

The boric acid containing the ammonia is then titrated with standard sulfuric acid.

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

Laboratory Results

E IRONMENTAL PROTECTION AC NCY
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 uith NaOH followed by sulfuric acid distillation then by the SPADNS-ZIRCOMIUM 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

			STATION	PH	
239	PF	Gaseous F^-	K		7.0 mg/Sample
240	PF	Gaseous F^-	L		5.8 mg/Sample
241	"	" "	M		8.8 mg/Sample
242	"	" "	N		0.77 Mg/Sample
243	"	" "	P		0.20 mg/Sample
244	"	" "	R		0.38 mg/Sample
245	"	Total Sample	R		143 mg/Sample
328	"	Filter			
248	"	Total Sample	K		67 mg/Sample
329	"	Filter			
249	"	Total Sample	L		154 mg/Sample
330	"	Filter			
250	"	Total Sample	M		2.4 mg/Sample
331	"	Filter			
251	"	Total Sample	N		34 mg/Sample
332	"	Filter			
252	"	Total Sample	P		2.8 mg/Sample
333	"	Filter			
253	"	Reactor Scrubber # 2 H_2O Inlet		2.5	20.3 g/L
254	"	" " "	#1	3.3	19.7 g/L
255	"	30% Phos. Acid			28.4 g/L
263	"	54% Phos. Acid			13.6 g/L
256	"	DAP Product			22.7 mg/g
298	"	H_2O Blank			19 µg/120 ml
270	"	Probe Wash			
271	"	Impinger	R		71 mg/Sample
272	"	Filter			
273	"	Total Sample	K		147 mg/Sample
339	"	Filter			
274	"	Total Sample	L		91. mg/Sample
338	"	Filter			

PF Moisture Run

" Run #1

" Run #2

FLUORIDE DATA

Central Farmer Chemical

			STATION	PH	
275	PF	Total Sample	M		8.1 mg/ Sample
342	"	Filter			
276	"	Total Sample	N		25 mg/ Sample
337	"	Filter			
277	"	Total Sample	P		4.6 mg/Sample
341	"	Filter 1			
278	"	Reactor Scrubber #2 H_2O Inlet		2.8	20.7 g/L
279	"	" " # 1 H_2O Inlet		3.3	21.6 g/L
280	"	30 % Phos. Acid			
281	"	54 % " "			15.5 g/L
282	"	DAP-Product			22.0 mg/g
299	"	H_2O Blank			25. µg/187 ml
300	"	Total Sample	R		319 mg/Sample
346	"	Filter			
301	"	Total Sample	K		57 mg/Sample
345	"	Filter			
302	"	Total Sample	L		22.6 mg/Sample
347	"	Filter			
303	"	Total Sample	M		1.2 mg/Sample
348	"	Filter			
336	"	Probe Wash			
304	"	1st. Impinger			
305	"	2nd. Impinger	N		31 mg/Sample
306	"	3rd. Impinger			
307	"	Filter			
308	"	Total Sample	P		2.7 mg/sample
349	"	Filter			
309	"	Reactor Scrubber #2 H_2O Inlet		3.4	15.6 g/L
310	"	" " #1 H_2O Inlet		5.2	9.6 g/L

Run #2 (275 PF – 299 ")

Run #3 (300 " – 310 ")

FLUORIDE DATA

Central Farmer Chemical

311	gone	30% Phos. Acid	
312		54 % " "	14.7 g/L
313		DAP-Product	22.0 mg/g
326		H_2O Blank	18 µg/240 ml

ENVIRONMENTAL PROTECTION AGENCY

Research Triangle Park, North Carolina 27711

(2)

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
SSAS, 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	
250, 331	PF	66	µg/Sample
251, 332	PF	30.2	mg/Sample
252, 333	PF	0	
270, 271, 272	PF	20.3	mg/Sample
273, 339	PF	0.77	mg/Sample
274, 338	PF	50	mg/Sample
275, 342	PF	0.42	mg/Sample
276, 337	PF	18.5	mg/Sample
277, 341	PF	71	µg/Sample
300, 346	PF	54	mg/Sample
302, 347	PF	15.3	mg/Sample
303, 348	PF	0.21	mg/Sample
336, 304, 305		17.6	mg/Sample
306, 307	PF	51	µg/Sample
308, 349	PF	21.4	mg/Sample
245, 328	PF	0.67	mg/Sample
248, 329	PF	62	mg/Sample
249, 330	PF	7.3	mg/Sample
301, 345	PF		

ENVIRONMENTAL PROTECTION AGENCY
Research Triangle Park, North Carolina 27711

Reply to Attn of:

Date: 4/4/72

Subject: Determination of Ammonia in Stack Gas

To: Mr. Jerome J. Rom
Emission Testing Branch
Division of Applied Technology

Thru: Mr. Howard Crist, Chief,
Source Sample Analysis Section

Attached is the Ammonia Data for Central Farmer Chemical Inc. The modified Kjeldahl distillation method was used.

Allen E. Riley
Source Sample Analysis Section
SSFAB, DAS

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

AMMONIA DATA FOR CENTRAL FARMER CHEMICAL INC.*

Run	Sample Number	Station	EPA Sample ML	EPA Mg/Sample	Total Sample ML	Total mg/Sample
1	257 PF	R	110	46.8	136	57.9
	258 "	K	80	1.0	107	1.3
	259 "	L	110	135.9	138	170.5
	260 "	M	110	<0.03	135	<.04
	261 "	N	68	16.8	94	23.2
	262 "	P	91	1.2	118	1.6
2	283 "	R	118	1010.9	148	1267.9
	284 "	K	64	1.2	95	1.8
	285 "	L	108	99.9	137	126.7
	286 "	M	81	1.3	122	2.0
	287 "	N	47	<0.03	77	<.05
	288 "	P	203	0.9	231	1.0
3	314 "	R	210	230.0	235	257.4
	315 "	K	79	0.2	105	0.3
	316 "	L	99	128.0	124	160.3
	317 "	M	70	0.7	97	1.0
	318 "	N	72	0.1	98	0.1
	319 "	P	123	0.2	149	0.2

*Samples were split with company

ENVIRONMENTAL PROTECTION AGENCY
Research Triangle Park, North Carolina 27711

File

Reply to Attn of:

Date: 2/29/72

Subject: Density at 76°F

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

Attached is the Density of the scrubber water samples from Central Farmer Chemical Inc., which completes the analysis of all samples.

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

Attachment

cc: Mr. R. Lampe
Mr. J. McGinnity
Mr. J. Reynolds
Mr. D. von Lehmden
Mr. H. Crist

FLUORIDE DATA

Central Farmer Chemical

Number	Description	Density at 76°F
156 PF	Scrubber H_2O Inlet	1.030
157 PF	Scrubber H_2O Outlet	1.026
158 PF	Flask cooler H_2O	1.020
159 PF	Hotwell Evap. H_2O	1.024
178 PF	Scrubber H_2O Inlet	1.028
179 PF	Scrubber H_2O Outlet	1.031
180 PF	Flask Cooler H_2O	1.026
181 PF	Hotwell Evap. H_2O	1.031
200 PF	Scrubber H_2O Inlet	1.029
201 PF	Scrubber H_2O Outlet	1.021
202 PF	Flask Cooler H_2O	1.026
203 PF	Hotwell Evap. H_2O	1.028
253 PF	Reactor Scrubber # 2 H_2O Inlet	1.269
254 PF	Reactor Scrubber # 1 H_2O Inlet	1.212
278 PF	Reactor Scrubber # 2 H_2O Inlet	1.067
279 PF	Reactor Scrubber # 1 H_2O Inlet	1.188
309 PF	Reactor Scrubber # 2 H_2O Inlet	1.193
310 PF	Reactor Scrubber # 1 H_2O Inlet	1.202

(Must be filled out for each test run)

mpling Date 71 | 12 | Yr. | Mo. | Day

First Ident. No. Used 172PF

Last Ident. No. Used 301PF

Test No. 72-C-136

Run No.

RECD.

RCRD. 9-19-72

.DUSTRY Phosphate Fertilizer (Use Table A)

UNIT PROCESS/OPERATION WPPA, DAP

)MPANY C.F. Chemicals

AIR POLLUTION CONTROL

COPIES TO

FUEL USED

)DRESS

INLET ☐

T. O.

LAB.

)MPLING)THOD EPA

OUTLET ☐

GAS VOLUME SAMPLED (METER VOL. IN FT^3)

FILED

Ident. No.	Description of Sample or Sample Fraction	Sample Wt. (Solid) mg	Sample Vol. (Liquid) ml	Analysis Requested - General Comments (approx. concentrations-possible interferences etc.) (Indicate specific analysis on backside)
172PF				P_2O_5
194PF				"
218PF				"
245PF				"
245PF				"
271PF				"
273PF				"
300PF				"
301PF				"

COMMENTS:

SAMPLING CONTRACTOR (if applicable)

PROJECT OFFICER Roy Neulicht

REQUEST REVIEWED BY

DATE ANALYSIS REQUESTED

[redacted]REQ[redacted]T & [redacted]ORT[redacted]

(Must be filled out for each test run)

Sampling Date 71 12 (Yr. | Mo. | Day)

First Ident. No. Used 172PF

Last Ident. No. Used 301PF

Test No. 72C136 72C137

Run No.

RECD.

RCHD. 9-19-72

INDUSTRY Phosphate Fertilizer (Use Table A)

UNIT PROCESS/OPERATION WPPA, DAP

COMPANY C.F. Chemicals

AIR POLLUTION CONTROL

COPIES TO

FUEL USED

P. O.

ADDRESS

INLET ☐

LAB.

SAMPLING METHOD EPA

OUTLET ☐

GAS VOLUME SAMPLED (METER VOL. IN FT^3)

FILED

Ident. No.	Description of Sample or Sample Fraction	Sample Wt. (Solid) mg	Sample Vol. (Liquid) ml	Analysis Requested - General Comments (approx. concentrations-possible interferences etc.) (Indicate specific analysis on backside)
172PF				P_2O_5
194PF				"
218PF				"
245PF				"
248PF				"
271PF				"
273PF				"
300PF				"
301PF				"

COMMENTS:

SAMPLING CONTRACTOR (if applicable)

PROJECT OFFICER Roy Neulicht

REQUEST REVIEWED BY

DATE ANALYSIS REQUESTED

REPORT OF ANALYSIS

Trace Elements
ppm - for solid samples
μg/ml - for liquid samples

Mark (x) for specific analysis requested
Mark (X) in block to left of Ident. No. when requesting all analysis on that line

Ident. No.	Hg	Be	Cd	As	V	Mn	Ni	Sb	Cr	Zn	Cu	Pb	Se	B	F	Li	Ag	Sn	Fe	Sr	Na	K	Ca	Si	Mg	Be	Analyst's Initial

Analysis Method: 1-NAA, 2-SSMS, 3-OES, 4-AA, 5-ASV, 6-XRF, and 7- other

Comments:

Other Analysis - Use Table B to fill analysis requested (above each column)

Mark (x) for specific analysis requeste

Ident. No.	P_2O_5											
172FF	19.8 mg											
194FF	7.4 mg											
218FF	14.6 mg											
245FF	1620 mg											
248FF	219 mg											
271FF	1000 ug											
273FF	916 ug											
300FF												
301FF	700 mg											
Analyst												
Method												

Comments:

[redacted]

(Must be filled out for each test run)

Sampling Date Yr. 71 | Mo. 12 | Day 17

First Ident. No. Used 328PF

Last Ident. No. Used 346PF

Test No. TBCJ 30

Run No.

RECD.

RCRD. 9/19/72

INDUSTRY Phosphate Fertilizer (Use Table A)

UNIT PROCESS/OPERATION WPA / DAP

COMPANY C. F. Chemical

AIR POLLUTION CONTROL

COPIES TO

ADDRESS

FUEL USED

P. O.

INLET ☐

LAB.

SAMPLING METHOD EPA

OUTLET ☐

GAS VOLUME SAMPLED (METER VOL. IN FT^3)

FILED

Ident. No.	Description of Sample or Sample Fraction	Sample Wt. (Solid) mg	Sample Vol. (Liquid) ml	Analysis Requested - General Comments (approx. concentrations-possible interferences etc.) (Indicate specific analysis on backside)
328PF				P_2O_5
329PF				"
339PF				"
346PF				"
345PF				"

COMMENTS:

SAMPLING CONTRACTOR (if applicable)

PROJECT OFFICER Roy Neulicht

REQUEST REVIEWED BY

DATE ANALYSIS REQUESTED

RE[redacted]ST [redacted]PO[redacted]

(Must be filled out for each test run)

Test No. 72 I 36 / 72 I 37

Sampling Date 71 | 12 | 17 (Yr. | Mo. | Day)

First Ident. No. Used 328PF

Last Ident. No. Used 346PF

Run No. _____

RECD. _____

RCRD. 9/19/72

INDUSTRY Phosphate Fertilizer (Use Table A)

UNIT PROCESS/OPERATION WPPA, DAP

COMPANY C.F. Chemical

AIR POLLUTION CONTROL _____

COPIES TO

P. O. _____

ADDRESS _____

FUEL USED _____

LAB. _____

SAMPLING METHOD EPA

INLET ☐

OUTLET ☐

GAS VOLUME SAMPLED (METER VOL. IN FT^3) _____

FILED _____

Ident. No.	Description of Sample or Sample Fraction	Sample Wt. (Solid) mg	Sample Vol. (Liquid) ml	Analysis Requested - General Comments (approx. concentrations-possible interferences etc.) (Indicate specific analysis on backside)
328PF				P_2O_5
329PF				"
339PF				"
346PF	"			"
345PF				"

COMMENTS: _____

SAMPLING CONTRACTOR _____ (if applicable)

PROJECT OFFICER Roy Neulicht

REQUEST REVIEWED BY _____

DATE ANALYSIS REQUESTED _____

REPORT OF ANALYSIS

Trace Elements

ppm - for solid samples

µg/ml - for liquid samples

Mark (x) for specific analysis requested

Mark (X) in block to left of Ident. No. w
requesting all analysis on that line

Ident. No.	Mg	Be	Cd	As	V	Mn	Ni	Sb	Cr	Zn	Cu	Pb	Se	B	F	Li	Ag	Sn	Fe	Sr	Na	K	Ca	Si	Mg	Ba	Analys Initi

Analysis Method: 1-NAA, 2-SSMS, 3-OES, 4-AA, 5-ASV, 6-XRF, and 7- other

Comments:

Other Analysis - Use Table B to fill analysis requested (above each column)

Mark (x) for specific analysis requ

Ident. No.	La_2O_3												
328PP	50 mg												
329PP													
339PP	10 mg												
346PP	16 mg												
345PP	40 mg												
Analyst													
Method													

Comments:

APPENDIX E

PROJECT PARTICIPANTS

PROJECT PARTICIPANTS AND TITLES

Environmental Engineering, Inc.

Name	Title
Robert Sholtes	Project Director
John Dollar	Project Manager
Dennis Falgout	Project Engineer
John Chadbourne	Environmental Specialist
Tommy Tucker	Environmental Specialist
Ray Black	Environmental Specialist
Robert Durgan	Environmental Specialist
George Allen	Environmental Specialist
A.L. Wilson	Environmental Specialist
Bill Demery	Environmental Specialist
Mike Jackson	Environmental Specialist
Eric Johnson	Environmental Specialist
Larry Wurts	Environmental Specialist
Andy Taylor	Environmental Specialist
Jim Tscherfinger	Chemist
Robert Maxwell	Chemist
Tony Arroyo	Computer Analyst

Environmental Protection Agency

Jerome Rom	EPA
John Reynolds	EPA
Roy Neulicht	EPA