

TEST NO. 72 - CI - 5A
BORDEN CHEMICAL, INC.
GRANULAR TRIPLE SUPERPHOSPHATE
JANUARY 25 - 26, 1972

ENVIRONMENTAL ENGINEERING, INC.
2324 SOUTHWEST 34 STREET
GAINESVILLE, FLORIDA 32601

TEST NO. 72 CI - 5A
BORDEN CHEMICAL, INC.
GRANULAR TRIPLE SUPERPHOSPHATE
January 25 - 26, 1972

Test Conducted by:
Environmental Engineering, Inc.
Contract No. CPA 70 - 82

TABLE OF CONTENTS

	Page
List of Figures	ii
List of Tables	iii
Introduction	1
Summary of Results	2
Process Description	12
Process Operation	12
Location of Sampling Points	13
Sampling and Analytical Procedures	22
Appendix	
A. Emission Calculations and Results	
B. Field Data	
C. Standard Analytical Procedures	
D. Project Participants	

LIST OF TABLES

	Page
1. Summary of Results - Station I	5
2. Summary of Results - Station J	6
3. Summary of Results - Station K	7
4. Summary of Results - Station L	8
5. Summary of Results - Station M	9
6. Summary of Results - Station U	10
7. Summary of Results - Station W	11
8. Sampling Point Description	14

LIST OF FIGURES

	Page
1. Flow Diagram and Sampling Station Locations	3
2. Port Location - Station I	15
3. Port Location - Station J	16
4. Port Location - Station K	17
5. Port Location - Station L	18
6. Port Location - Station M	19
7. Port Location - Station U	20
8. Port Location - Station W	21
9. Moisture Sampling Train	25
10. Fluoride Sampling Train	26

INTRODUCTION

Under the direction of the Environmental Protection Agency, Environmental Engineering, Inc. conducted emission tests at the Borden Chemical phosphate works located in Piney Point, Florida. On January 25 and 26, 1972, three test runs of approximately two hours each were conducted on Borden's granular triple superphosphate (GTSP) process. The purpose of the tests was to obtain data for the use of both the Industrial Studies Branch and the Performance Standards Branch of the Environmental Protection Agency.

Each unit of the scrubbing system at the Borden Chemical plant consists of a primary scrubber using weak phosphoric acid as the scrubbing medium, followed by a tail gas scrubber using pond water as the scrubbing medium (Figure 1).

In addition to measuring total fluorides at the outlet stack, measurements were made in the inlet ducts of the reactor and dryer, and cooler tail gas scrubbers. The outlet ducts of the reactor and dryer tail gas scrubbers were also tested. The outlet of the cooler tail gas scrubber could not be tested because of the configuration of the duct-work. The plant alternately produces both diammonium phosphate and triple superphosphate using the same equipment. While producing GTSP, some of the off-gases from the dryer are diverted from the dryer tail gas scrubber to the reactor tail gas scrubber. This by-pass stream was also measured for fluorides. Grab samples of the scrubbing liquids,

the process reactants and the process products were analyzed for fluoride and P₂O₅ content. A schematic flow diagram of the process operation and the sampling locations is given in Figure 1.

Pertinent results of the tests are listed in Tables 1 - 7; complete results are given in Appendix A.

SUMMARY OF RESULTS

The plant was operating under normal process conditions during all of the test runs. However, a few deviations from standard procedure occurred during the sampling and should be noted. 1) During the first run at Station "K", the isokinetic sampling rate could not be maintained and the nozzle size was therefore changed after the first 30 minutes of the test run. 2) The physical characteristics of the sampling platform at the outlet stack prevented traversing with the fluoride train. Therefore, the fluoride sample at Station "U" was taken at one point only (a complete velocity traverse was done before each test run). 3) Entrained water caused a sampling problem in the "recycle" duct (station "W"). Due to the entrained water, the moisture content of the gas at this point was taken to be that of a saturated gas at the measured stack temperature. Furthermore, to give more accurate readings, the velocity traverse for this station was not performed at the sample point, but was performed farther downstream.

A few other irregularities should be noted. The stack gas flow rate for Run 1 at the dryer tail gas scrubber inlet (station "K") were extremely high compared to the other two test runs. No explanation is

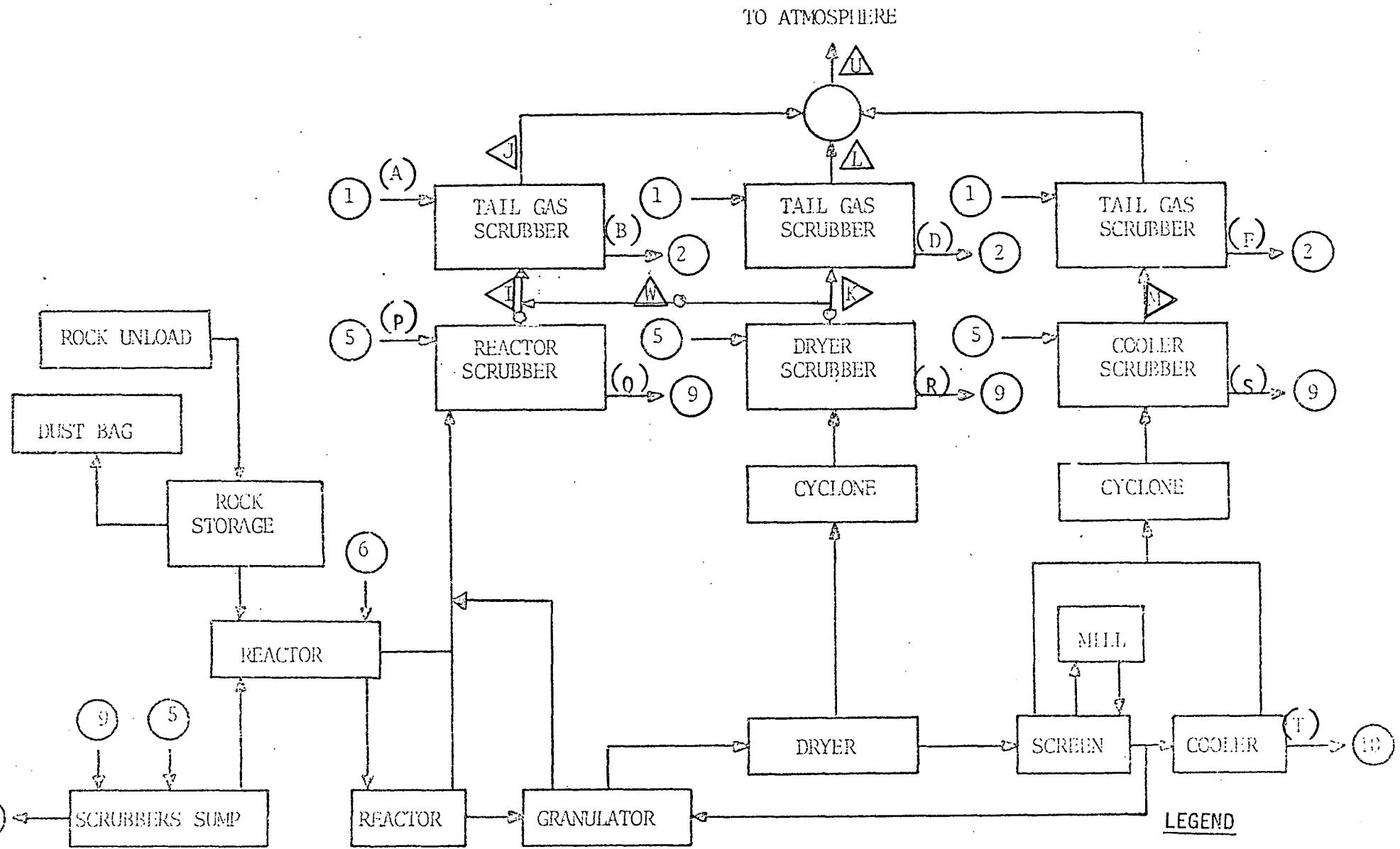


FIGURE 1

GTSP FLOW DIAGRAM, BORDEN, INC.

Stack Sample
() Grab Sample

1. Pond Water
2. To Pond
3. Surge Tank Acid
4. To Surge Tank
5. 30% of P₂O₅
6. 54% of P₂O₅
7. NH₃
8. To DAP Storage
9. To Scrubbers Sump
10. To GTSP Storage

available for this. Furthermore, the plant reports that the cooler scrubber system was designed for a flow of 50,000 ACFM. In light of this fact, the flows reported for the three test runs at the cooler tail gas scrubber inlet (station "M") appear to be high, and may be in error. The effect of high flow readings would be to bias the "lbs/hr" and "lbs/ton P₂O₅ fed" fluoride concentration on the high side.

For a complete summary of the stack conditions and emission levels for each test run, refer to Tables 1 - 7.

TABLE 1
 SUMMARY OF RESULTS
 FLUORIDES
 STATION I
 Reactor Tail Gas Scrubber Inlet

Run No.	1	2	3
Date	1/25/72	1/25/72	1/26/72
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	28.5	28.5	28.5
Stack gas moisture, % volume	9.1	8.6	7.9
Average stack gas temperature, °F.	115	115	110
Stack gas flow rate @ S.T.P., SCFM	14751	14309	14367
Vol. dry gas @ S.T.P. *, SCF	86.584	83.369	82.858
Fluoride, water soluble, mg	97	73	47
Fluoride, total, mg	97.13	73.16	47.032
Fluoride, water soluble, gr/SCF	0.0173	0.0135	0.0087
Fluoride, total, gr/SCF	0.0173	0.0135	0.0087
Fluoride, water soluble, gr/CF stk. cond.	0.0138	0.0107	0.0071
Fluoride, total, gr/CF stk. cond.	0.0138	0.0107	0.0071
Fluoride, water soluble, lb/hour	2.19	1.65	1.07
Fluoride, total, lb/hour	2.19	1.65	1.07
Fluoride, water soluble, lb/ton P ₂ O ₅ Fed.	0.19	0.15	0.097
Fluoride, total, lb/ton P ₂ O ₅ Fed.	0.19	0.15	0.097
Scrubber efficiency, %	-	-	-

* Dry, 70°F., 29.92 inches Hg.

TABLE 2
 SUMMARY OF RESULTS
 FLUORIDES
 STATION J

Reactor Tail Gas Scrubber Outlet

Run No.	1	2	3
Date	1/25/72	1/25/72	1/26/72
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	30	30	30
Stack gas moisture, % volume	4.3	4.9	4.6
Average stack gas temperature, °F.	94	98	92
Stack gas flow rate @ S.T.P., SCFM	21918	21216	21981
Vol. dry gas @ S.T.P. *, SCF	48.364	47.552	46.605
Fluoride, water soluble, mg	3.7	2.6	2.5
Fluoride, total, mg	3.747	2.61	2.535
Fluoride, water soluble, gr/SCF	0.0012	0.0008	0.0008
Fluoride, total, gr/SCF	0.0012	0.0008	0.0008
Fluoride, water soluble, gr/CF stk. cond.	0.0011	0.0008	0.0008
Fluoride, total, gr/CF stk. cond.	0.0011	0.0008	0.0008
Fluoride, water soluble, lb/hour	0.2254	0.1455	0.1507
Fluoride, total, lb/hour	0.2254	0.1455	0.1507
Fluoride, water soluble, lb/ton P ₂ O ₅ Fed.	0.02	0.013	0.014
Fluoride, total, lb/ton P ₂ O ₅ Fed.	0.02	0.013	0.014
Scrubber efficiency, %	89.7	91.2	85.9

* Dry, 70°F., 29.92 inches Hg.

TABLE 3
 SUMMARY OF RESULTS
 FLUORIDES
 STATION K
 Dryer Tail Gas Scrubber Inlet

Run No.	1	2	3
Date	1/25/72	1/25/72	1/26/72
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	28.6	28.6	28.4
Stack gas moisture, % volume	7.3	10.7	4.3
Average stack gas temperature, °F.	115	115	115
Stack gas flow rate @ S.T.P., SCFM	137359	51682	45480
Vol. dry gas @ S.T.P. *, SCF	67.854	26.004	67.162
Fluoride, water soluble, mg	200	62	125
Fluoride, total, mg	200.12	62.05	125
Fluoride, water soluble, gr/SCF	0.0454	0.0367	0.0287
Fluoride, total, gr/SCF	0.0454	0.0367	0.0287
Fluoride, water soluble, gr/CF stk. cond.	0.0371	0.0289	0.024
Fluoride, total, gr/CF stk. cond.	0.0371	0.0289	0.024
Fluoride, water soluble, lb/hour	53.44	16.25	11.19
Fluoride, total, lb/hour	53.44	16.25	11.19
Fluoride, water soluble, lb/ton P ₂ O ₅ Fed.	4.86	1.48	1.02
Fluoride, total, lb/ton P ₂ O ₅ Fed.	4.86	1.48	1.02
Scrubber efficiency, %	-	-	-

* Dry, 70°F., 29.92 inches Hg.

TABLE 4
 SUMMARY OF RESULTS
 FLUORIDES
 STATION L
 Dryer Tail Gas Scrubber Outlet

Run No.	1	2	3
Date	1/25/72	1/25/72	1/26/72
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	30	30	30
Stack gas moisture, % volume	2	3	1.9
Average stack gas temperature, °F.	75	81	72
Stack gas flow rate @ S.T.P., SCFM	54942	49319	38169
Vol. dry gas @ S.T.P. *, SCF	109.926	100.929	88.849
Fluoride, water soluble, mg	37	21.4	20
Fluoride, total, mg	37.04	21.431	20.01
Fluoride, water soluble, gr/SCF	0.0052	0.0033	0.0035
Fluoride, total, gr/SCF	0.0052	0.0033	0.0035
Fluoride, water soluble, gr/CF stk. cond.	0.005	0.0031	0.0034
Fluoride, total, gr/CF stk. cond.	0.005	0.0031	0.0034
Fluoride, water soluble, lb/hour	2.45	1.39	1.44
Fluoride, total, lb/hour	2.45	1.39	1.44
Fluoride, water soluble, lb/ton P ₂ O ₅ Fed.	0.22	0.13	0.13
Fluoride, total, lb/ton P ₂ O ₅ Fed.	0.22	0.13	0.13
Scrubber efficiency, %	95.4	91.5	87.1

* Dry, 70°F., 29.92 inches Hg.

TABLE 5
 SUMMARY OF RESULTS
 FLUORIDES
 Station M

Cooler Tail Gas Scrubber Inlet

Run No.	1	2	3
Date	1/25/72	1/25/72	1/26/72
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	27.97	27.97	27.97
Stack gas moisture, % volume	6.7	5.4	6.1
Average stack gas temperature, °F.	107	108	111
Stack gas flow rate @ S.T.P., SCFM	67510	74755	75660
Vol. dry gas @ S.T.P. *, SCF	116.54	185.355	134.067
Fluoride, water soluble, mg	72	58	70
Fluoride, total, mg	72.14	58.026	70.023
Fluoride, water soluble, gr/SCF	0.0095	0.0048	0.008
Fluoride, total, gr/SCF	0.0095	0.0048	0.008
Fluoride, water soluble, gr/CF stk. cond.	0.0077	0.004	0.007
Fluoride, total, gr/CF stk. cond.	0.0078	0.004	0.007
Fluoride, water soluble, lb/hour	5.50	3.08	5.19
Fluoride, total, lb/hour	5.50	3.08	5.19
Fluoride, water soluble, lb/ton P ₂ O ₅ Fed.	0.50	0.28	0.47
Fluoride, total, lb/ton P ₂ O ₅ Fed.	0.50	0.28	0.47
Scrubber efficiency, %	97.1	-	91.9

* Dry, 70°F., 29.92 inches Hg.

TABLE 6
 SUMMARY OF RESULTS
 FLUORIDES
 STATION U
 OUTLET

Run No.	1	2	3
Date	1/25/72	1/25/72	1/26/72
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg	30	30	30
Stack gas moisture, % volume	2.4	2	2.1
Average stack gas temperature, °F.	88	90	84
Stack gas flow rate @ S.T.P., SCFM	103106	103267	105651
Vol. dry gas @ S.T.P. *, SCF	140.957	141.485	143.775
Fluoride, water soluble, mg	29.2	11.4	20.6
Fluoride, total, mg	29.229	11.424	20.629
Fluoride, water soluble, gr/SCF	0.0032	0.0012	0.0022
Fluoride, total, gr/SCF	0.0032	0.0012	0.0022
Fluoride, water soluble, gr/CF stk. cond.	0.003	0.0012	0.0021
Fluoride, total, gr/CF stk. cond.	0.003	0.0012	0.0021
Fluoride, water soluble, lb/hour	2.83	1.06	2.01
Fluoride, total, lb/hour	2.83	1.06	2.01
Fluoride, water soluble, lb/ton P ₂ O ₅ Fed.	0.26	0.097	0.18
Fluoride, total, lb/ton P ₂ O ₅ Fed.	0.26	0.097	0.18
System efficiency, %	95.4	94.9	88.5

* Dry, 70°F., 29.92 inches Hg.

TABLE 7

SUMMARY OF RESULTS
FLUORIDESSTATION W
By-Pass

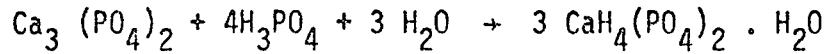
Run No.	1	2	3
Date	1/25/72	1/25/72	1/26/72
Barometric pressure, inches Hg	30	30	30
Stack pressure, inches Hg +	28.9	28.9	28.9
Stack gas moisture, % volume	10.3	10.1	9.0
Average stack gas temperature, °F.	115	115	110
Stack gas flow rate @ S.T.P., SCFM	7407	7419	7730
Vol. dry gas @ S.T.P. *, SCF	129.443	44.089	52.999
Fluoride, water soluble, mg	131000	145000	188000
Fluoride, total, mg	131000	145000	188000
Fluoride, water soluble, gr/SCF	15.6	50.6	54.6
Fluoride, total, gr/SCF	15.6	50.6	54.6
Fluoride, water soluble, gr/CF stk. cond.	12.4	40.5	44.6
Fluoride, total, gr/CF stk. cond.	12.4	40.5	44.6
Fluoride, water soluble, lb/hour	990	3217	3217
Fluoride, total, lb/hour	990	3217	3217
Fluoride, water soluble, lb/ton P ₂ O ₅ Fed.	90	292	329
Fluoride, total, lb/ton P ₂ O ₅ Fed.	90	292	329
Scrubber efficiency, %	-	-	-

* Dry, 70°F., 29.92 inches Hg.

+ Saturated Gas; % moisture determined by wet bulb-dry bulb method.

PROCESS DESCRIPTION

Production of granular triple superphosphate involves the reaction of phosphate rock with phosphoric acid as follows:



The reactor slurry is pumped to the granulator in which it mixes with recycled material. The granules are built up to product size before flowing to a rotary dryer in which hot burner gases reduce the product moisture content. The product is then cooled and screened before being conveyed to the storage pile.

PROCESS OPERATION

Run #1 was conducted on January 25, 1972, from 12:00 to 2:00 p.m. Run #2 was started at 3:40 p.m. and completed at 5:40 p.m. The third run was carried out the next day from 10:00 a.m. to 12:00 p.m. Process conditions were normal for all three runs.

LOCATION OF SAMPLING POINTS

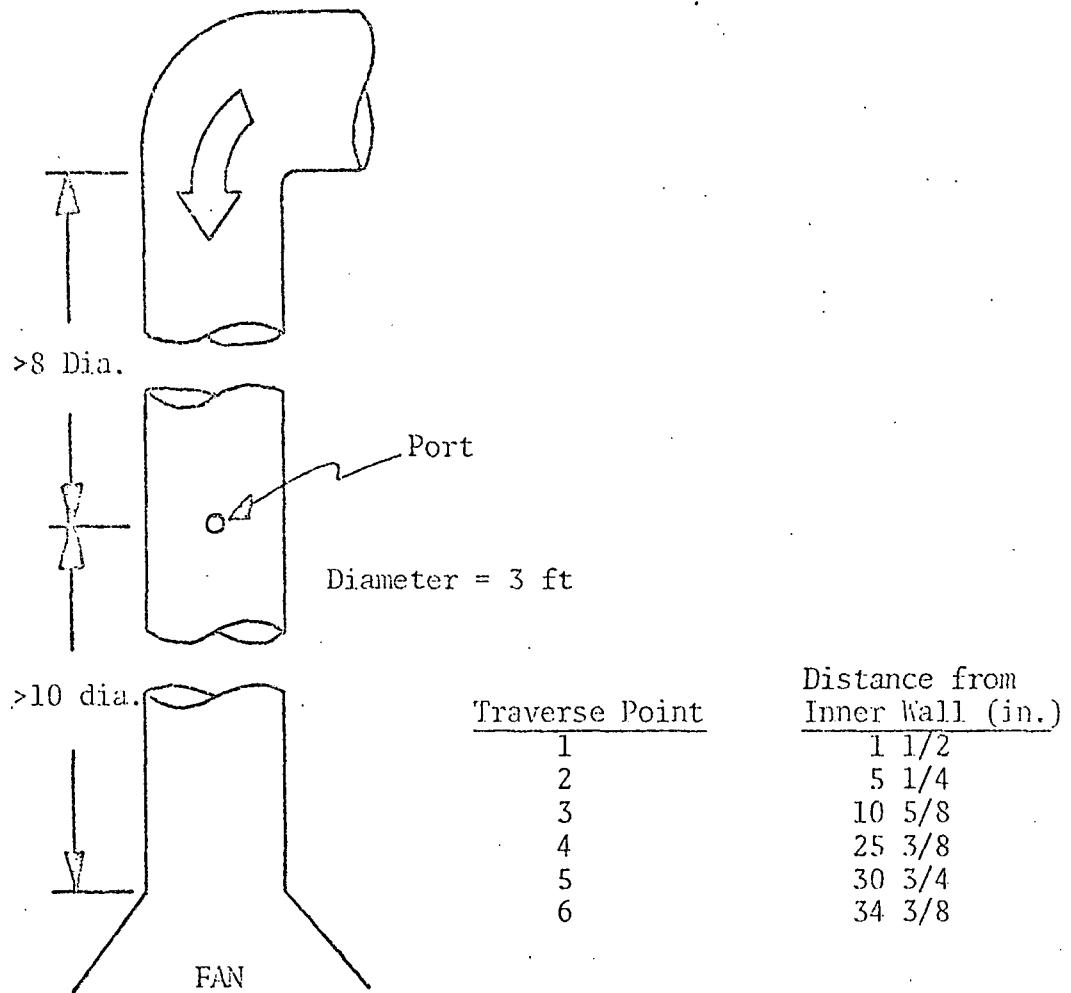
The sampling sites and number of traverse points were selected as per "Method I - Sample and Velocity Traverses for Stationary Sources, Part 60, Subchapter C, Chapter 1, Title 40," Federal Register, No. 247-Pt. II-1.

The above method suggests using two perpendicular diameters of traverse points per sampling station, however, on-site conditions necessitated the use of only one traverse diameter. The suggested number of traverse points per diameter was used where possible without sampling within one inch of the inner wall. Table 8 summarizes the actual number of traverse points for each sampling site.

Figures 2 through 8 are schematic diagrams of the stack configurations near the sampling location, and the sampling points traversed during the emission tests.

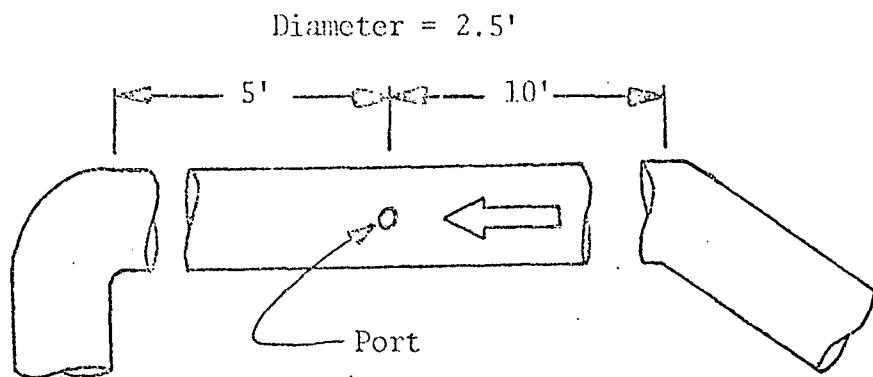
TABLE 8
SAMPLING POINT DESCRIPTION

Sampling Point	Station Identification	Number of Traverse Points	Stack Diameter (ft.)
Reactor Tail Gas Scrubber Inlet	I	6	3.0
Reactor Tail Gas Scrubber Outlet	J	12	2.5
Dryer Tail Gas Scrubber Inlet	K	24	5.5
Dryer Tail Gas Scrubber Outlet	L	8	-
Cooler Tail Gas Scrubber Inlet	M	24	5.5
Stack	U	13	7.2
Recycle	W	14	2.58



LOCATION OF PORT, STATION I, BORDEN CHEMICALS

Figure 2

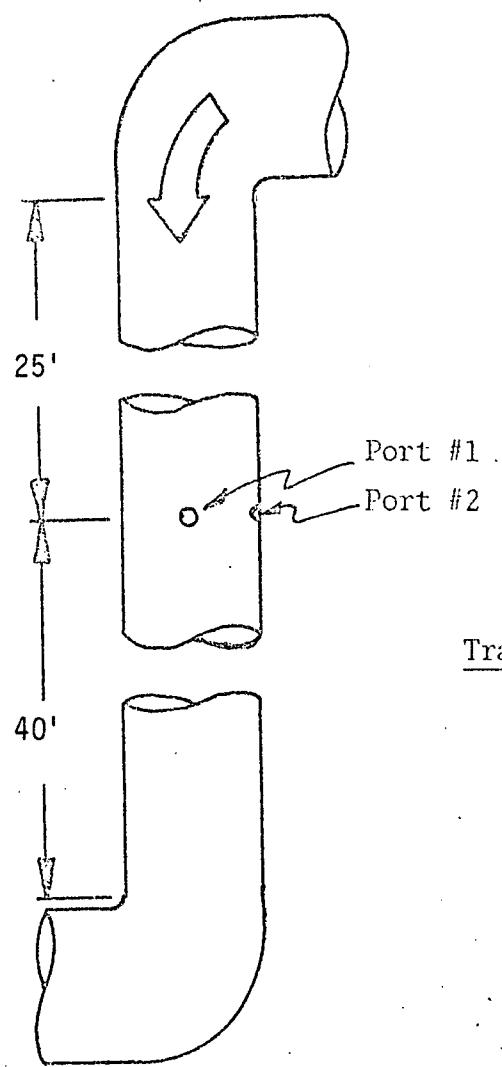


<u>Traverse Point</u>	<u>Distance from Inner Wall (ft)</u>
1	0.14
2	0.25
3	0.37
4	0.50
5	0.67
6	0.92
7	1.59
8	1.83
9	2.00
10	2.14
11	2.25
12	2.36

LOCATION OF PORT, STATION J, BORDEN CHEMICALS

Figure 3

Diameter = 5.5 ft

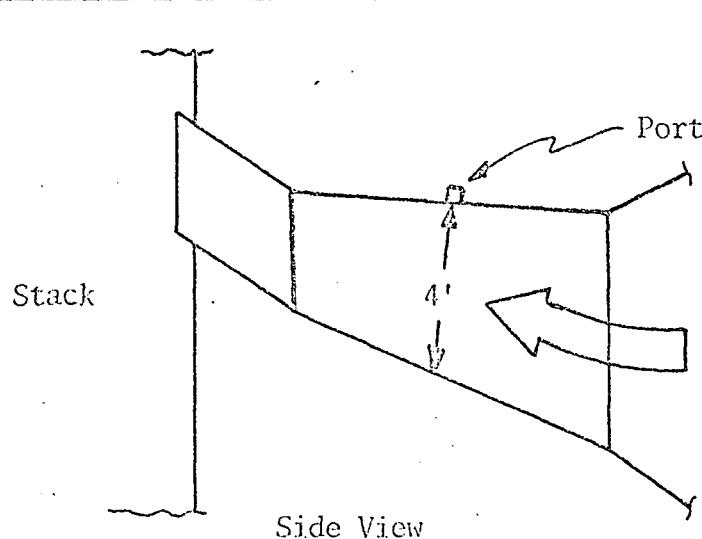
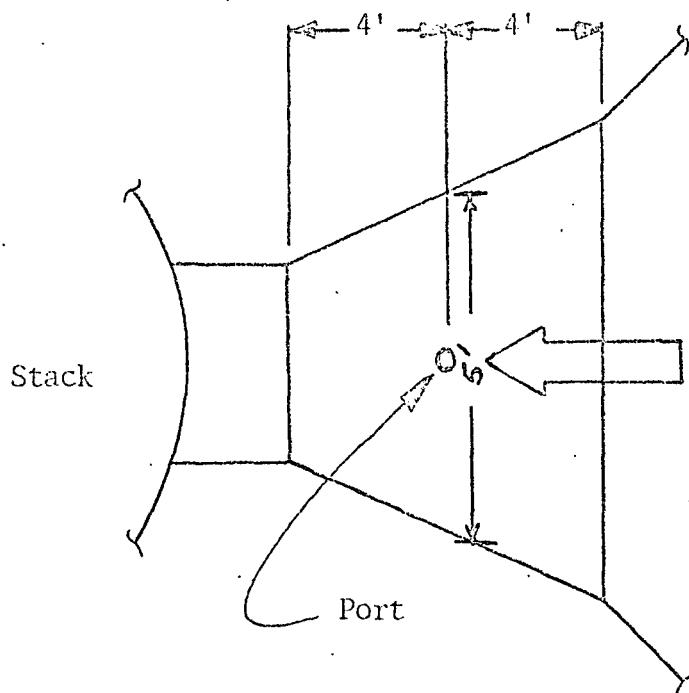


Traverse Point	Distance from Inner Wall (ft.)
1	0.12
2	0.37
3	0.65
4	0.97
5	1.38
6	1.95
7	3.55
8	4.13
9	4.53
10	4.85
11	5.13
12	5.38

LOCATION OF PORT, STATION K, BORDEN CHEMICALS

Figure 4

Top View

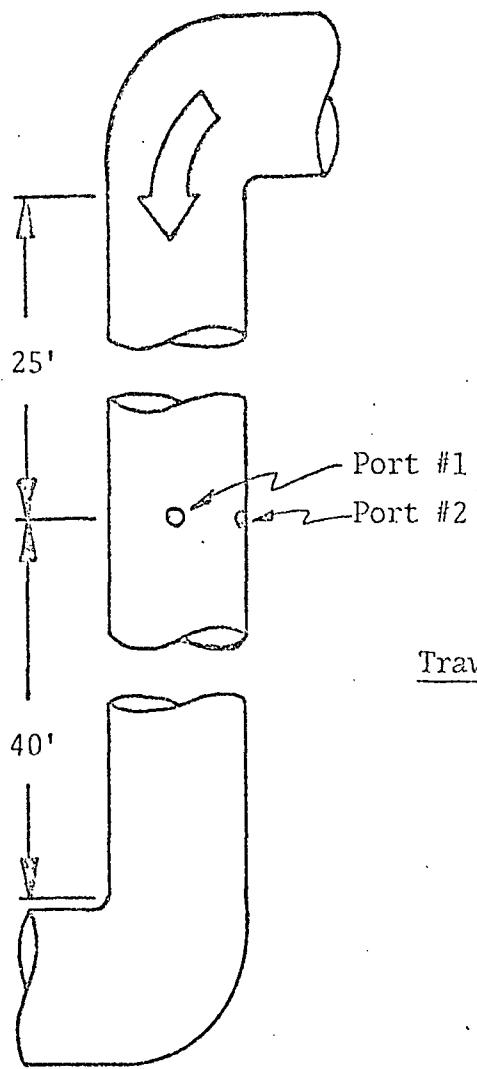


Traverse Point	Distance from Inner Wall (in.)
1	3
2	9
3	15
4	21
5	27
6	33
7	39
8	45

LOCATION OF PORT, STATION L, BORDEN CHEMICALS

Figure 5

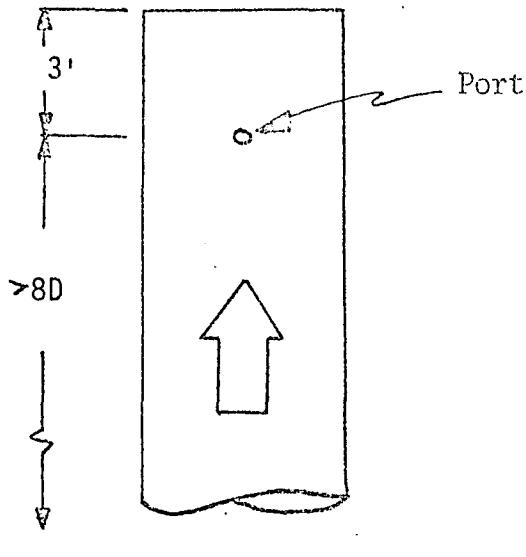
Diameter = 5.5 ft



<u>Traverse Point</u>	<u>Distance from Inner Wall (ft)</u>
1	0.12
2	0.37
3	0.65
4	0.97
5	1.38
6	1.95
7	3.55
8	4.13
9	4.53
10	4.85
11	5.13
12	5.38

LOCATION OF PORT, STATION M, BORDEN CHEMICALS

Figure 6

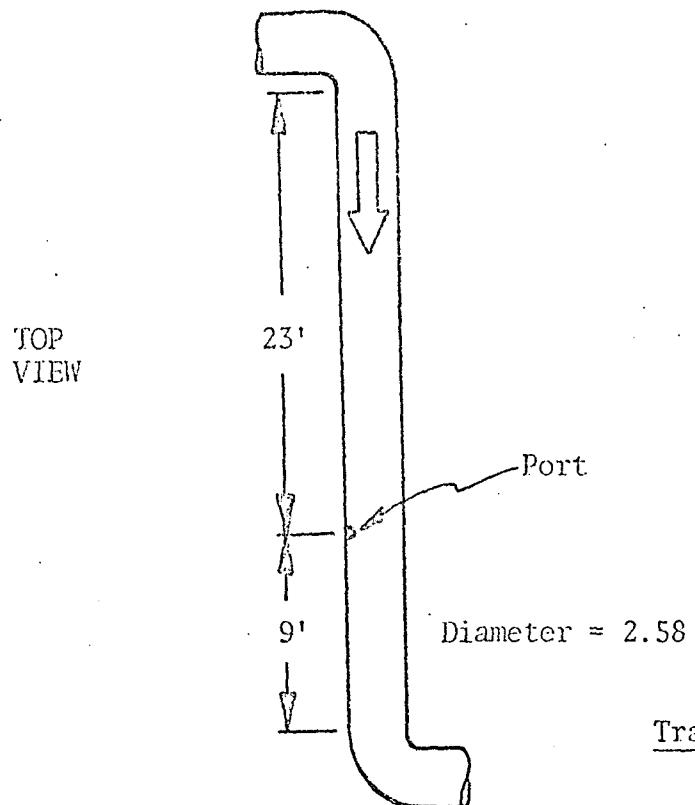


Diameter = 7.2 ft.

Velocity Traverse Point	Distance from Inner Wall (inches)
1	6
2	12
3	18
4	24
5	30
6	36
7	42
8	48
9	54
10	60
11	66
12	72
13	78

LOCATION OF PORT, STATION U, BORDEN CHEMICALS

Figure 7



<u>Traverse Point</u>	<u>Distance from Inner Wall (ft)</u>
1	0.13
2	0.22
3	0.32
4	0.43
5	0.56
6	0.73
7	0.96
8	1.61
9	1.85
10	2.00
11	2.15
12	2.26
13	2.36
14	2.45

LOCATION OF PORT, STATION W, BORDEN CHEMICALS

Figure 8

VII. 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 9). The sampling train used in these tests consisted of the first two midget impingers with 5 grams of distilled-deionized water followed by two dry midget impingers.

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

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

B. Preliminary Velocity Determination

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

*Station W

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 10 is a schematic diagram of the sampling train used.

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

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

After each run, the liquid volume in the first three impingers was measured volumetrically and the silica gel was reweighed. The impinger liquid, the filter, plus the water washings of the probe and other sampling train components up to the silica gel were placed into polyethylene containers. During some runs the different sample fractions were placed in separate containers, while during others, all of the recovered sample was placed into one container.

D. Liquid and Product Grab Samples

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

E. Laboratory Analysis Procedures

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

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

For more details of exact method used see Appendix C.

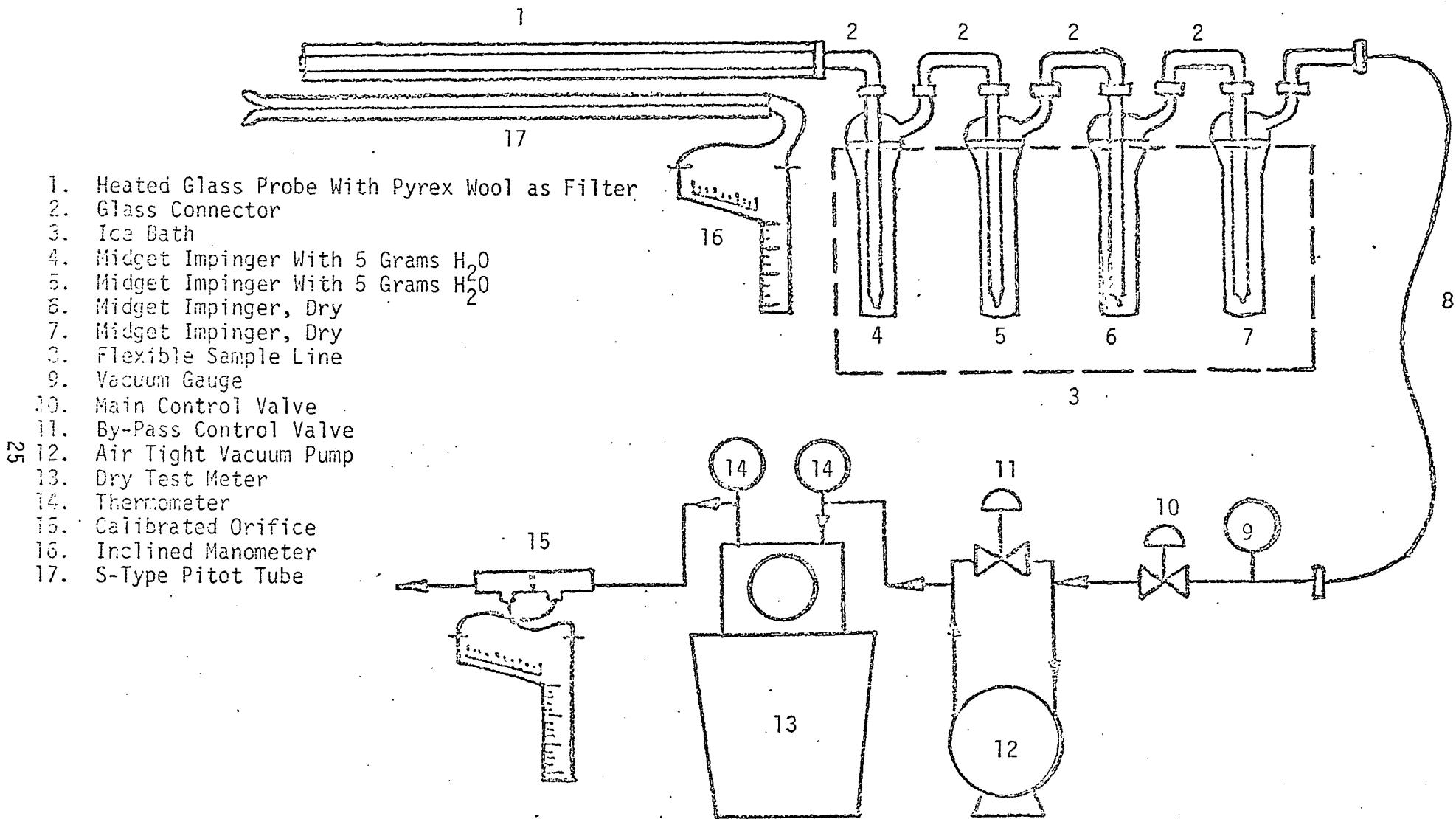


Figure 9

MOISTURE SAMPLING TRAIN

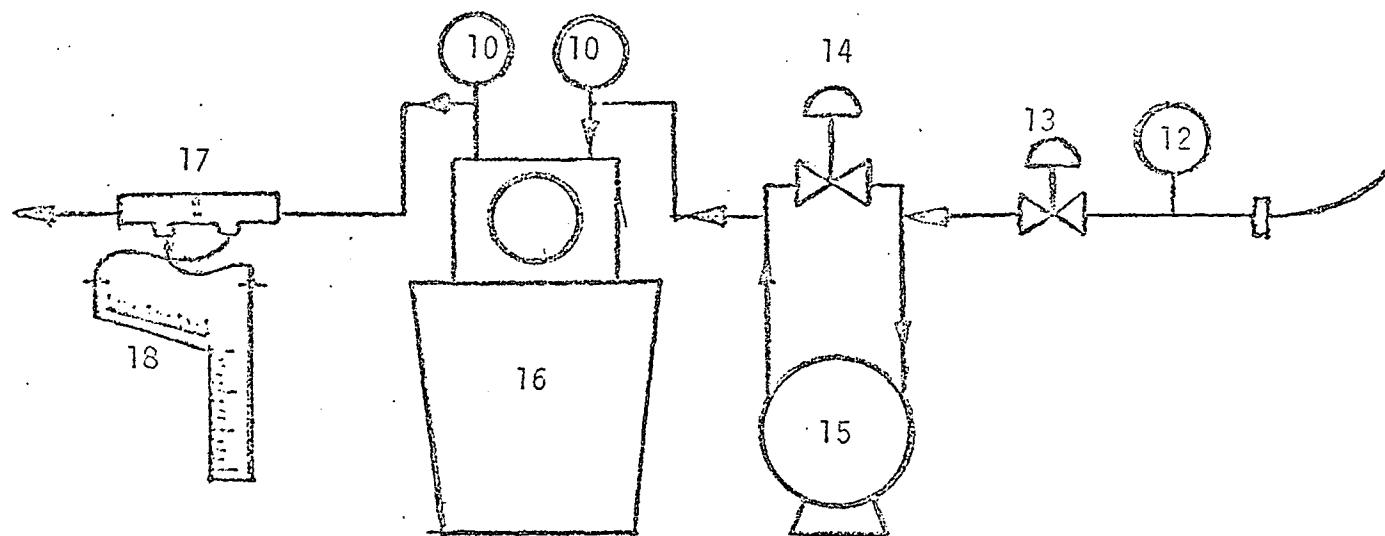
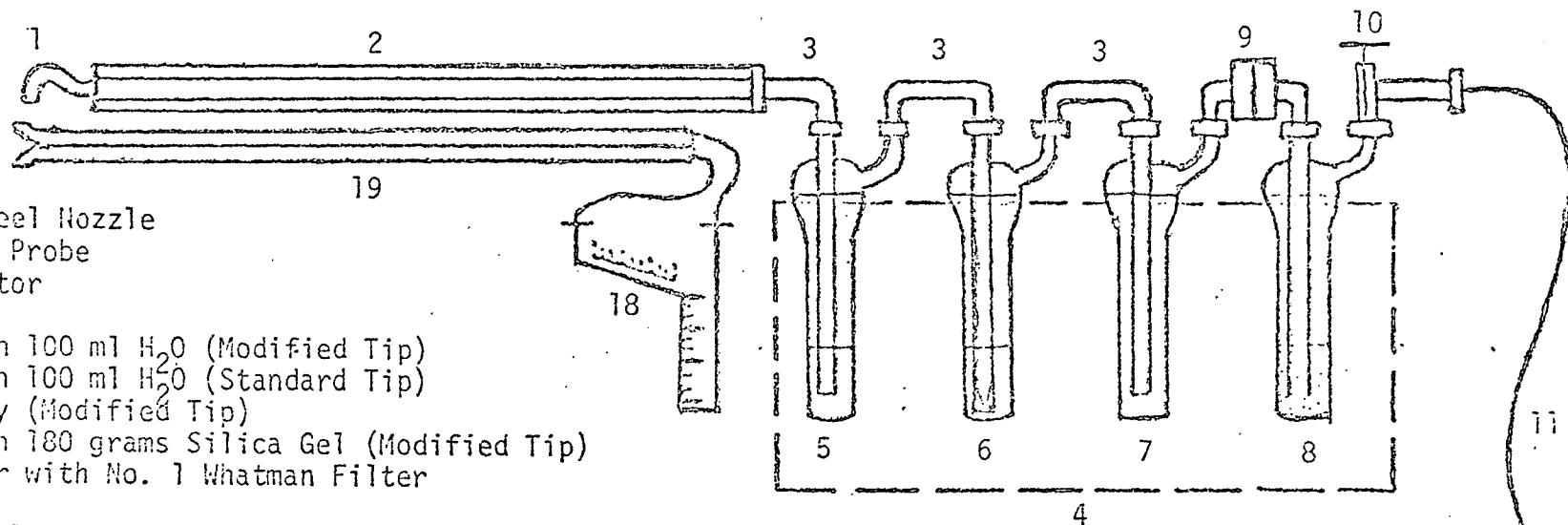


Figure 10

FLUORIDE SAMPLING TRAIN

APPENDIX

APPENDIX A
Emission Calculations & Results

E.E.I. SOURCE SAMPLING NOMENCLATURE SHEET

PB - Barometric pressure, inches Hg

PS - Stack pressure, inches Hg

As - Stack area, sq. ft.

AS' - Effective area of positive stack gas flow, sq. ft.

NPTS - Number of traverse points where the pitot velocity head was greater than zero

TS = Stack temperature, °R

T_M = Meter temperature, °R

H = Average square root of velocity head, $\sqrt{\text{inches H}_2\text{O}}$

ΔH - 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)

VII = Recorded meter volume sample, cubic feet (meter conditions)
 VC = Condensate and silica gel increase in imprimers, milliliters

Po - Pressure at the dry test meter orifice, $\frac{PB + \Delta H}{13.6}$ inches Hg

STP - Standard conditions, dry, 70°F, 29.92 inches Hg

VVV - Conversion of condensate in milliliters to water vapor in cubic feet (STP)

VSTPD - Volume sampled, cubic feet (STP)

VT - Total water vapor volume and dry gas volume sampled, cubic feet (STP)

W - Moisture fraction of stack gas

FDA - Dry gas fraction

MD - Molecular weight of stack gas, lbs/lb-mole (dry conditions)

MS - Molecular weight of stack gas, lbs/lb-mole (stack conditions)

GS - Specific gravity of stack gas, referred to air

EA = Excess air, %

$\sqrt{H_{XTS}}$ - Average square root of velocity head times stack temperature

U = Stack gas velocity, feet per minute

S_0 = Stack gas flow rate, cubic feet per minute (stack conditions)

Q_3 = Stack gas flow rate, cubic feet per minute (stack condition)

Q_D = Stack gas flow rate, cubic feet per minute (dry)
Q_{STPD} = Stack gas flow rate, cubic feet per minute (STP)

PISO = Percent isokinetic volume.

EQUATIONS FOR CALCULATING FLUORIDE EMISSIONS

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

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

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

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

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

FMOIST = Assumed moisture fraction

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

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

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

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

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

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

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

$$QSTPD = (530) \times (QD) \div (TS) \times (PS) \div (29.92)$$

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

Fluoride Emissions:

MG = Milligrams of fluoride from lab analysis

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

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

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

P_2O_5 Fed = Tons/hour, determined from plant data ..

$$\text{Lbs/ton } P_2O_5 \text{ Fed} = (\text{lbs/hour}) \div (\text{Tons/hour } P_2O_5 \text{ Fed})$$

FLUORIDE EMISSIONS

SOURCE TEST DATA

TEST NO -
 PLANT - BORDEN CHEMICAL
 SOURCE - STATION I
 TYPE OF PLANT - G.T.S.P.
 CONTROL EQUIPMENT -
 POLLUTANTS SAMPLED - Fluorides

NO OF RUNS - 3
 PINNEY POINT, FLA.

	1	2	3
1) RUN NUMBER			
2) DATE	1/25/72	1/25/72	1/26/72
3) TIME BEGAN	11:45	15:40	10:00
4) TIME END	13:45	17:40	12:00
5) BAROMETRIC PRESSURE, IN HG	30	30	30
6) METER ORIFICE PRESSURE DROP, IN H2O	1.79	1.71	1.69
7) VOL DRY GAS, METER COND., CUBIC FEET	88.223	85.425	85.268
8) AVERAGE GAS METER TEMPERATURE, DEG F	88.2	87.2	89.1
9) VOL DRY GAS, S.T.P., CUBIC FEET	86.584	83.369	82.858
10) TOTAL H2O COLLECTED, ML	183	165.4	149
11) VOL H2O VAPOR COLLECTED, S.T.P., CU FT	8.67	7.84	7.06
12) STACK GAS MOISTURE, PERCENT VOLUME	2.1	8.6	7.9
13) ASSUMED STACK GAS MOISTURE, PCT VOL	10	10	10
14) PERCENT CO2			0.2
15) PERCENT O2			20.6
16) PERCENT CO			0
17) PERCENT N2			79.2
18) PERCENT EXCESS AIR	0	0	4400
19) MOLECULAR WEIGHT OF STACK GAS, DRY	28.85	28.85	28.86
20) MOLECULAR WEIGHT OF STACK GAS, STK COND	27.86	27.92	28
21) STACK GAS SPECIFIC GRAVITY	0.96	0.96	0.97
22) AVG SQUARE ROOT (VEL HEAD), IN H2O	0.723	0.690	0.693
23) AVERAGE STACK GAS TEMPERATURE, DEG F	115.3	115.2	110.8
24) AVG SQUARE ROOT (STK TEMP×VEL HEAD)	17.333	16.701	16.559
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	28.5	28.5	28.5
27) STACK GAS VEL, STACK COND, F.P.M.	2616.2	2522.9	2493.2
28) STACK AREA, SQ FEET	7.07	7.07	7.07
29) EFFECTIVE STACK AREA, SQUARE FEET	7.07	7.07	7.07
30) STACK GAS FLOW RATE, S.T.P., SCFMD	14751	14309	14367
31) NET TIME OF TEST, MINUTES	120	120	120
32) SAMPLING NOZZLE DIAMETER, INCHES	0.25	0.25	0.25
33) PERCENT ISOKINETIC	101.4	100.6	99.7
34) FLUORIDE - WATER SOLUBLE, MG	97	73	47
35) FLUORIDE - TOTAL, MG	97.13	73.16	47.032
36) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0173	0.0135	0.0087
37) FLUORIDE - TOTAL, GR/SCF	0.0173	0.0135	0.0087
38) FLUORIDE - WATER SOL., GR/CF, STK CHD.	0.0132	0.01078	0.0071
39) FLUORIDE - TOTAL, GR/CF, STK CHD.	0.0132	0.01078	0.0071
40) FLUORIDE - WATER SOLUBLE, LB/HOUR	2.19	1.65	1.07
41) FLUORIDE - TOTAL, LB/HOUR	2.19	1.65	1.07
43) FLUORIDE - WATER SOL., LB/TON P205 FED	0.79	0.150	0.097
44) FLUORIDE - TOTAL, LB/TON P205 FED	0.79	0.150	0.097

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

SOURCE TEST DATA

TEST NO - NO OF RUNS - 3
 PLANT - BORDEN CHEMICAL PINNEY POINT, FLA.
 SOURCE - REACTOR SCRUBBER OUTLET J
 TYPE OF PLANT - G.T.S.P.
 CONTROL EQUIPMENT -
 POLLUTANTS SAMPLED - Fluorides

	1	2	3
1) RUN NUMBER			
2) DATE	1/25/72	1/25/72	1/26/72
3) TIME BEGAN	12:15	15:15	10:00
4) TIME END	14:15	17:15	12:00
5) BAROMETRIC PRESSURE, IN HG	30	30	30
6) METER ORIFICE PRESSURE DROP, IN H2O	0.51	0.42	0.5
7) VOL DRY GAS, METER COND, CUBIC FEET	50.557	49.120	48.3
8) AVERAGE GAS METER TEMPERATURE, DEG F	96.2	90.4	91.4
9) VOL DRY GAS, S.T.P., CUBIC FEET	48.364	47.552	46.605
10) TOTAL H2O COLLECTED, ML	46	51.6	47.4
11) VOL H2O VAPOR COLLECTED, S.T.P., CU FT	2.18	2.45	2.25
12) STACK GAS MOISTURE, PERCENT VOLUME	4.3	4.9	4.6
13) ASSUMED STACK GAS MOISTURE, PCT VOL	4	4	4
14) PERCENT CO2			0
15) PERCENT O2			20.2
16) PERCENT CO			0
17) PERCENT N2			79.8
18) PERCENT EXCESS AIR	0	0	196.7
19) MOLECULAR WEIGHT OF STACK GAS, DRY	28.85	28.85	28.81
20) MOLECULAR WEIGHT OF STACK GAS, STK COND	28.38	28.32	28.31
21) STACK GAS SPECIFIC GRAVITY	0.98	0.98	0.98
22) AVG SQUARE ROOT (VEL HEAD), IN H2O	1.418	1.384	1.421
23) AVERAGE STACK GAS TEMPERATURE, DEG F	94.2	97.8	91.7
24) AVG SQUARE ROOT (STK TEMP×VEL HEAD)	33.384	32.676	33.379
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	30	30	30
27) STACK GAS VEL, STACK COND, F.P.M.	4866.1	4768.3	4871.5
28) STACK AREA, SQ FEET	4.91	4.91	4.91
29) EFFECTIVE STACK AREA, SQUARE FEET	4.91	4.91	4.91
30) STACK GAS FLOW RATE, S.T.P., SCFM	21918	21216	21918
31) NET TIME OF TEST, MINUTES	120	120	120
32) SAMPLING NOZZLE DIAMETER, INCHES	0.125	0.125	0.125
33) PERCENT ISOKINETIC	105.9	107.6	101.3
34) FLUORIDE - WATER SOLUBLE, MG	3.747	2.61	2.535
35) FLUORIDE - TOTAL, MG			
36) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0012	0.0008	0.0008
37) FLUORIDE - TOTAL, GR/SCF	0.0012	0.0008	0.0008
38) FLUORIDE - WATER SOL., GR/CF, STK CHD.	0.0011	0.0008	0.0008
39) FLUORIDE - TOTAL, GR/CF, STK CHD.	0.0011	0.0008	0.0008
40) FLUORIDE - WATER SOLUBLE, LB/HOUR	0.2254	0.1455	0.1507
41) FLUORIDE - TOTAL, LB/HOUR	0.2254	0.1455	0.1507
43) FLUORIDE - WATER SOL., LB/TON P205 FED	0.02	0.013	0.014
44) FLUORIDE - TOTAL, LB/TON P205 FED	0.02	0.013	0.014

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

SOURCE TEST DATA

TEST NO -

NO OF RUNS - 3

PLANT - BORDEU CHEMICAL PINNEY POINT, FLA.

SOURCE - DRYER SCRUBBER INLET K

TYPE OF PLANT - G.T.S.P.

CONTROL EQUIPMENT -

POLLUTANTS SAMPLED - Fluorides

1) RUN NUMBER	1	2	3
2) DATE	1/25/72	1/25/72	1/26/72
3) TIME BEGAN	12:07	16:03	10:09
4) TIME END	15:10	18:15	12:09
5) BAROMETRIC PRESSURE, IN HG	30	30	30
6) METER ORIFICE PRESSURE DROP, IN H2O	2.07	0.13	1.27
7) VOL DRY GAS, METER COND, CUBIC FEET	69.66	26.43	67.7
8) AVERAGE GAS METER TEMPERATURE, DEG F	80.5	80.3	77.3
9) VOL DRY GAS, S.T.P., CUBIC FEET	67.854	26.004	67.152
10) TOTAL H2O COLLECTED, ML	112	65.7	63.9
11) VOL H2O VAPOR COLLECTED, S.T.P., CU FT	5.31	3.11	3.03
12) STACK GAS MOISTURE, PERCENT VOLUME	7.3	10.7	4.3
13) ASSUMED STACK GAS MOISTURE, PCT VOL	10.50	10.5	10.5
14) PERCENT CO2			0.5
15) PERCENT O2			19.8
16) PERCENT CO			0
17) PERCENT N2			79.7
18) PERCENT EXCESS AIR	0	0	141%
19) MOLECULAR WEIGHT OF STACK GAS, DRY	28.85	28.85	28.87
20) MOLECULAR WEIGHT OF STACK GAS, STK COND	28.06	27.69	28.4
21) STACK GAS SPECIFIC GRAVITY	0.97	0.96	0.98
22) AVG SQUARE ROOT (VEL HEAD), IN H2O	1.967	0.763	0.637
23) AVERAGE STACK GAS TEMPERATURE, DEG F	115	115	115
24) AVG SQUARE ROOT (STK TMP×VEL HEAD)	47.162	18.291	15.209
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	28.6	28.6	28.4
27) STACK GAS VEL, STACK COND, F.P.M.	7080.7	2764.6	2236.6
28) STACK AREA, SQ FEET	23.7	123.76	23.76
29) EFFECTIVE STACK AREA, SQUARE FEET	23.7	123.76	23.76
30) STACK GAS FLOW RATE, S.T.P., SCFMD	137359	151682	45480
31) NET TIME OF TEST, MINUTES	100	120	110
32) SAMPLING NOZZLE DIAMETER, INCHES	0.1875	0.125	0.25
33) PERCENT ISOKINETIC	59 & 94.7	116.9	93.6
34) FLUORIDE - WATER SOLUBLE, MG	200	162	125
35) FLUORIDE - TOTAL, MG	200.12	162.05	125
36) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0454	0.0367	0.0287
37) FLUORIDE - TOTAL, GR/SCF	0.0454	0.0367	0.0287
38) FLUORIDE - WATER SOL., GR/CF, STK COND.	0.0371	0.0289	0.024
39) FLUORIDE - TOTAL, GR/CF, STK COND.	0.0371	0.0289	0.024
40) FLUORIDE - WATER SOLUBLE, LB/HOUR	53.44	16.25	11.19
41) FLUORIDE - TOTAL, LB/HOUR	53.44	16.25	11.19
43) FLUORIDE - WATER SOL., LB/TON P205 FED	4.86	1.48	1.02
44) FLUORIDE - TOTAL, LB/TON P205 FED	4.86	1.48	1.02

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

SOURCE TEST DATA

TEST NO -

PLANT - BORDEN CHEMICAL

SOURCE - STATION E

TYPE OF PLANT - G.T.S.P.

CONTROL EQUIPMENT -

POLLUTANTS SAMPLED - Fluorides

NO OF RUNS - 3

PINEX POINT, FLA.

1) RUN NUMBER	1	2	3
2) DATE	1/25/72	1/25/72	1/26/72
3) TIME BEGAN	11:55	15:40	10:00
4) TIME END	13:55	17:40	12:00
5) BAROMETRIC PRESSURE, IN HG	30	30	30
6) METER ORIFICE PRESSURE DROP, IN H2O	3.15	2.6	1.97
7) VOL DRY GAS, METER COHD, CUBIC FEET	115.187	104.858	92.243
8) AVERAGE GAS METER TEMPERATURE, DEG F	101.1	95.8	94.4
9) VOL DRY GAS, S.T.P., CUBIC FEET	102.926	100.922	88.849
10) TOTAL H2O COLLECTED, ML	48	65.3	35.9
11) VOL H2O VAPOR COLLECTED, S.T.P., CU FT	2.28	3.1	1.7
12) STACK GAS MOISTURE, PERCENT VOLUME	2	3	1.9
13) ASSUMED STACK GAS MOISTURE, PCT VOL	3	3	3
14) PERCENT CO2			0
15) PERCENT O2			19.7
16) PERCENT CO			0
17) PERCENT N2			80.3
18) PERCENT EXCESS AIR	0	0	1187
19) MOLECULAR WEIGHT OF STACK GAS, DRY	28.85	28.85	28.72
20) MOLECULAR WEIGHT OF STACK GAS, STK COHD	28.63	28.53	28.59
21) STACK GAS SPECIFIC GRAVITY	0.99	0.98	0.99
22) AVG SQUARE ROOT (VEL HEAD), IN H2O	0.841	0.765	0.581
23) AVERAGE STACK GAS TEMPERATURE, DEG F	75	81	72
24) AVG SQUARE ROOT (STK TEMP×VEL HEAD)	19.45	17.796	13.406
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	30	30	30
27) STACK GAS VEL, STACK COHD, F.P.M.	2822.9	2587.4	1947.2
28) STACK AREA, SQ FEET	20	20	20
29) EFFECTIVE STACK AREA, SQUARE FEET	20	20	20
30) STACK GAS FLOW RATE, S.T.P., SCFMD	54942	49310	38169
31) NET TIME OF TEST, MINUTES	120	120	120
32) SAMPLING NOZZLE DIAMETER, INCHES	0.25	0.25	0.25
33) PERCENT ISOKINETIC	97.8	100	113.8
34) FLUORIDE - WATER SOLUBLE, MG	37	21.4	20
35) FLUORIDE - TOTAL, MG	37.04	21.431	20.01
36) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0052	0.0033	0.0025
37) FLUORIDE - TOTAL, GR/SCF	0.0052	0.0033	0.0035
38) FLUORIDE - WATER SOL., GR/CF, STK COHD.	0.005	0.0031	0.0024
39) FLUORIDE - TOTAL, GR/CF, STK COHD.	0.005	0.0031	0.0034
40) FLUORIDE - WATER SOLUBLE, LB/HOUR	2.45	1.39	1.44
41) FLUORIDE - TOTAL, LB/HOUR	2.45	1.39	1.44
43) FLUORIDE - WATER SOL., LB/TON P205 FED	0.22	0.13	0.13
44) FLUORIDE - TOTAL, LB/TON P205 FED	0.22	0.13	0.13

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

SOURCE TEST DATA

TEST NO - NO OF RUNS - 3
 PLANT - BORDEN CHEMICAL PINNEY POINT, FLA.
 SOURCE - COOLER INLET IN
 TYPE OF PLANT - G.T.S.P
 CONTROL EQUIPMENT -
 POLLUTATES SAMPLED - Fluorides

1) RUN NUMBER	1	2	3
2) DATE	1/25/72	1/25/72	1/26/72
3) TIME BEGAN	11:50	15:55	10:05
4) TIME END	14:00	18:00	12:10
5) BAROMETRIC PRESSURE, IN HG	30	30	30
6) METER ORIFICE PRESSURE DROP, IN H2O	3.02	3.49	3.67
7) VOL DRY GAS, METER COND, CUBIC FEET	117.113	136.412	134.532
8) AVERAGE GAS METER TEMPERATURE, DEG F	78	79	78.1
9) VOL DRY GAS, S.T.P., CUBIC FEET	116.54	135.355	134.067
10) TOTAL H2O COLLECTED, ML	177	221.7	182.2
11) VOL H2O VAPOR COLLECTED, S.T.P., CU FT	8.39	10.51	8.34
12) STACK GAS MOISTURE, PERCENT VOLUME	6.7	5.4	6.1
13) ASSUMED STACK GAS MOISTURE, PCT VOL	7.9	7.9	1
14) PERCENT CO2			0
15) PERCENT O2			20.4
16) PERCENT CO			0
17) PERCENT N2			79.6
18) PERCENT EXCESS AIR	0	0	26.37
19) MOLECULAR WEIGHT OF STACK GAS, DRY	28.85	28.25	28.82
20) MOLECULAR WEIGHT OF STACK GAS, STK COND	28.12	28.27	28.15
21) STACK GAS SPECIFIC GRAVITY	0.97	0.98	0.97
22) AVG SQUARE ROOT (VEL HEAD), IN H2O	0.965	1.057	1.078
23) AVERAGE STACK GAS TEMPERATURE, DEG F	107	107.8	110.7
24) AVG SQUARE ROOT (STK TEMP X VEL HEAD)	22.985	25.182	25.758
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	27.97	27.97	27.97
27) STACK GAS VEL, STACK COND, F.P.M.	3485.9	3810.3	3906.2
28) STACK AREA, SQ FEET	23.76	23.76	23.76
29) EFFECTIVE STACK AREA, SQUARE FEET	23.76	23.76	23.76
30) STACK GAS FLOW RATE, S.T.P., SCFMD	67510	74755	75660
31) NET TIME OF TEST, MINUTES	120	120	120
32) SAMPLING NOZZLE DIAMETER, INCHES	0.25	0.25	0.25
33) PERCENT ISOKINETIC	100.2	144	102.9
34) FLUORIDE - WATER SOLUBLE, MG	72	58	70
35) FLUORIDE - TOTAL, MG	72.14	58.026	70.023
36) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0095	0.0048	0.008
37) FLUORIDE - TOTAL, GR/SCF	0.0095	0.0048	0.008
38) FLUORIDE - WATER SOL., GR/CF, STK CHD.	0.0077	0.004	0.0065
39) FLUORIDE - TOTAL, GR/CF, STK CHD.	0.0078	0.004	0.0065
40) FLUORIDE - WATER SOLUBLE, LB/HOUR	5.50	3.08	5.19
41) FLUORIDE - TOTAL, LB/HOUR	5.50	3.08	5.19
43) FLUORIDE - WATER SOL., LB/TON P205 FED	0.50	0.28	0.47
44) FLUORIDE - TOTAL, LB/TON P205 FED	0.50	0.28	0.47

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

SOURCE TEST DATA

TEST NO -

PLANT - BORDEN CHEMICAL

SOURCE - OUTLET STACK U

TYPE OF PLANT - G.T.S.P.

CONTROL EQUIPMENT -

POLLUTANTS SAMPLED - Fluorides

NO OF RUNS - 3

PINEY POINT, FLA.

	1	2	3
1) RUN NUMBER			
2) DATE	1/25/72	1/25/72	1/26/72
3) TIME BEGAN	11:35	14:00	10:00
4) TIME END	13:35	16:00	12:00
5) BAROMETRIC PRESSURE, IN HG	30	30	30
6) METER ORIFICE PRESSURE DROP, IN H2O	4.03	4.17	4.17
7) VOL DRY GAS, METER COND, CUBIC FEET	142.02	142.24	143.136
8) AVERAGE GAS METER TEMPERATURE, DEG F	80.7	79.9	74.5
9) VOL DRY GAS, S.T.P., CUBIC FEET	140.957	141.485	143.775
10) TOTAL H2O COLLECTED, ML	74	59.7	66.2
11) VOL H2O VAPOR COLLECTED, S.T.P., CU FT	3.51	2.83	3.14
12) STACK GAS MOISTURE, PERCENT VOLUME	2.4	2	2.1
13) ASSUMED STACK GAS MOISTURE, PCT VOL	5	5	5
14) PERCENT CO2			
15) PERCENT O2			
16) PERCENT CO			
17) PERCENT N2			
18) PERCENT EXCESS AIR	0	0	0
19) MOLECULAR WEIGHT OF STACK GAS, DRY	28.85	28.85	28.85
20) MOLECULAR WEIGHT OF STACK GAS, STK COND	28.59	28.64	28.62
21) STACK GAS SPECIFIC GRAVITY	0.99	0.99	0.99
22) AVG SQUARE ROOT (VEL HEAD), IN H2O	0.785	0.785	0.8
23) AVERAGE STACK GAS TEMPERATURE, DEG F	87.8	90.3	83.6
24) AVG SQUARE ROOT (STK TEMP×VEL HEAD)	18.376	18.419	18.641
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	30	30	30
27) STACK GAS VEL, STACK COND, F.P.M.	2669	2672.9	2705.9
28) STACK AREA, SQ FEET	40.81	40.81	40.81
29) EFFECTIVE STACK AREA, SQUARE FEET	40.81	40.81	40.81
30) STACK GAS FLOW RATE, S.T.P., SCFMD	103106	103267	105651
31) NET TIME OF TEST, MINUTES	120	120	120
32) SAMPLING NOZZLE DIAMETER, INCHES	0.25	0.25	0.25
33) PERCENT ISOKINETIC [†]	98.8	97.2	102.8
34) FLUORIDE - WATER SOLUBLE, MG	29.2	11.4	20.6
35) FLUORIDE - TOTAL, MG	29.229	11.424	20.629
36) FLUORIDE - WATER SOLUBLE, GR/SCF	0.0032	0.0012	0.0022
37) FLUORIDE - TOTAL, GR/SCF	0.0032	0.0012	0.0022
38) FLUORIDE - WATER SOL., GR/CF, STK COND.	0.003	0.0012	0.0021
39) FLUORIDE - TOTAL, GR/CF, STK COND.	0.003	0.0012	0.0021
40) FLUORIDE - WATER SOLUBLE, LB/HOUR	2.83	1.06	2.01
41) FLUORIDE - TOTAL, LB/HOUR	2.83	1.06	2.01
43) FLUORIDE - WATER SOL., LB/TON P205 FED	0.26	0.097	0.18
44) FLUORIDE - TOTAL, LB/TON P205 FED	0.26	0.097	0.18

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

[†]% ISOKINETIC DETERMINED USING VELOCITY HEAD READINGS FROM ACTUAL FLUORIDE TEST, NOT VELOCITY HEADS OF COMPLETE STACK TRAVERSE.

SOURCE TEST DATA

TEST NO -

NO OF RUNS - 3

PLANT - BORDEN CHEMICAL

PINEY POINT, FLA.

SOURCE - RECYCLE STATION W

TYPE OF PLANT - G.T.S.P.

CONTROL EQUIPMENT -

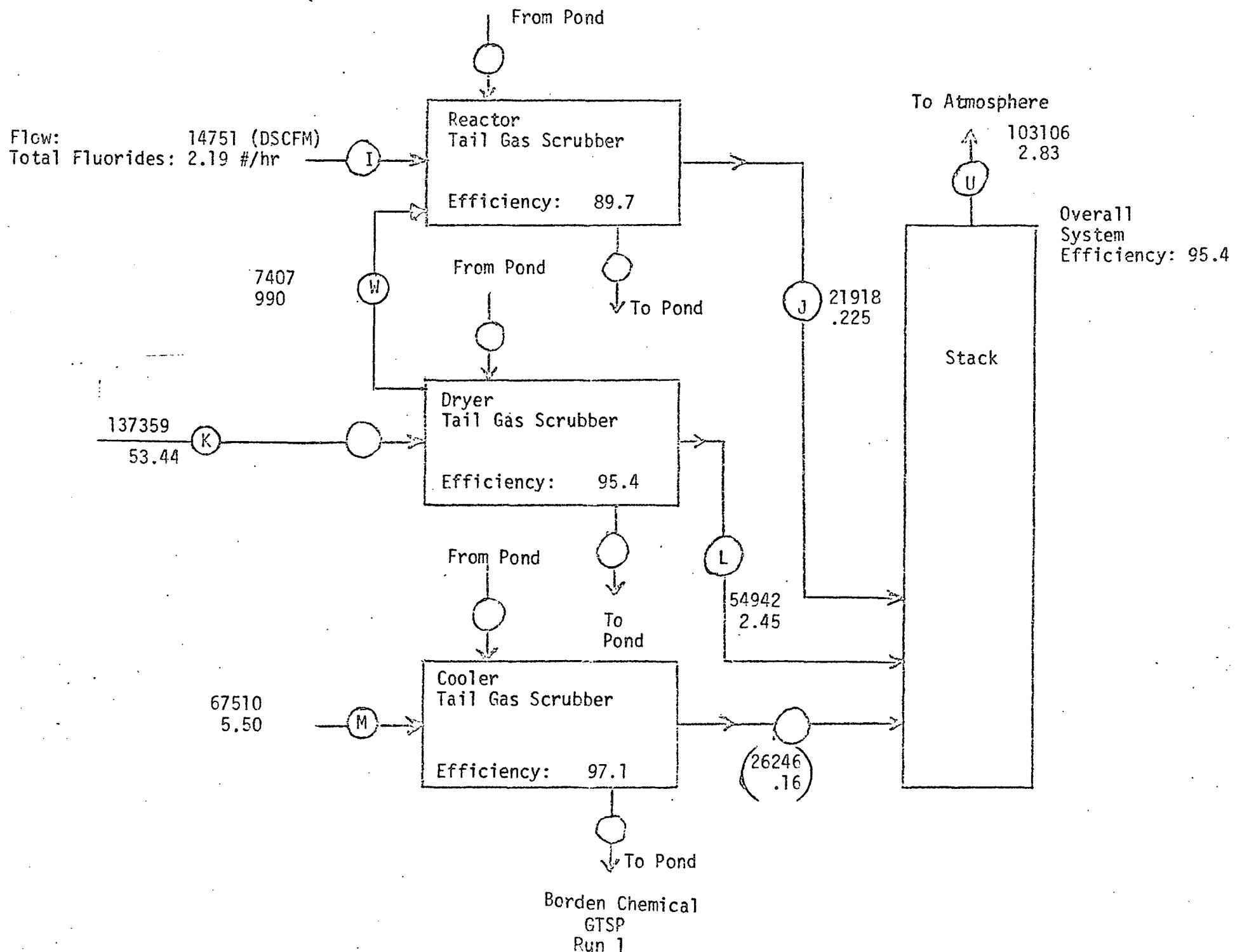
POLLUTANTS SAMPLED - Fluorides

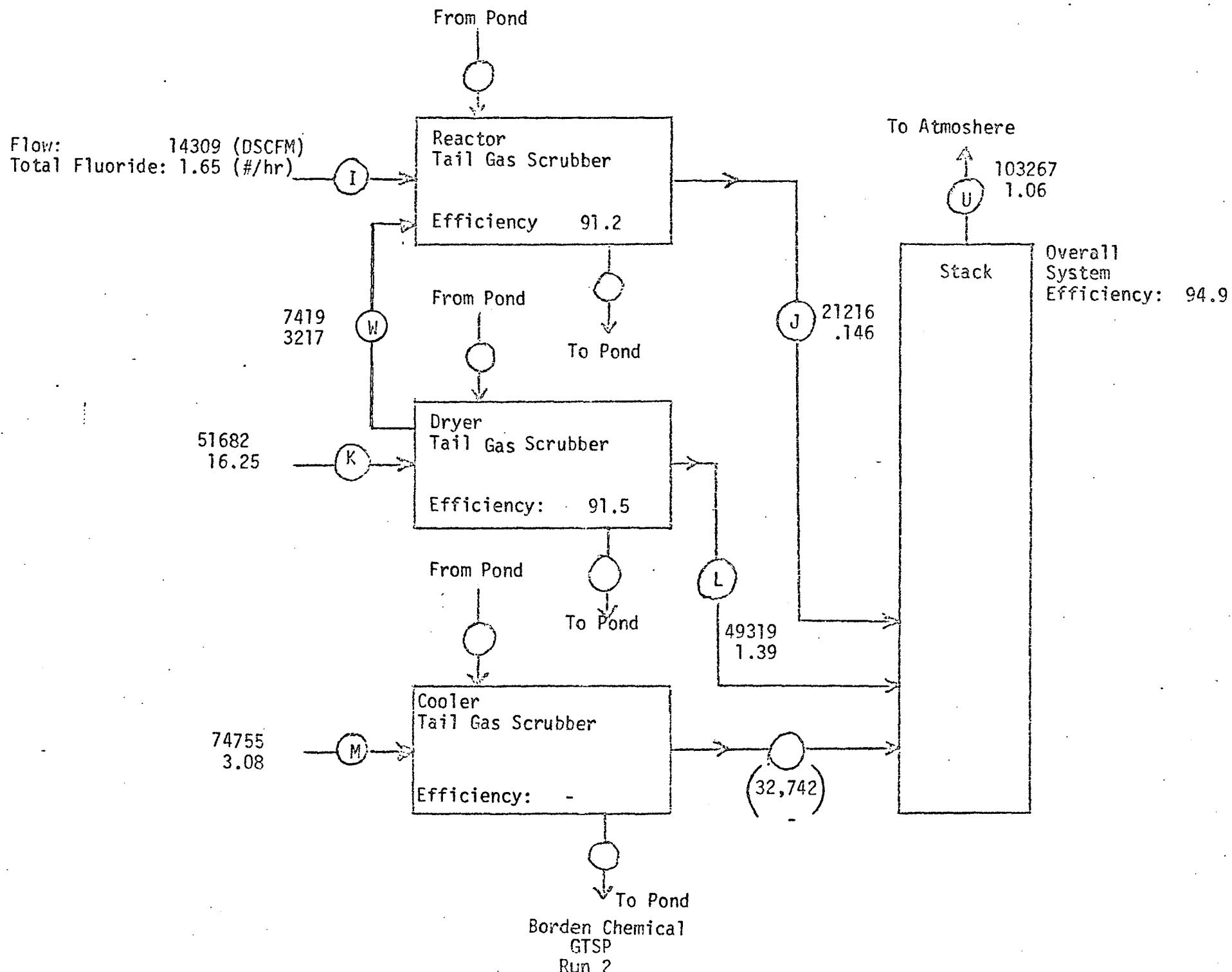
1) RUN NUMBER	1	2	3
2) DATE	1/25/72	1/25/72	1/26/72
3) TIME BEGAN	12:00	16:10	10:00
4) TIME END	14:03	18:02	12:03
5) BAROMETRIC PRESSURE, IN HG	30	30	30
6) METER ORIFICE PRESSURE DROP, IN H2O	4.5	0.41	0.66
7) VOL DRY GAS, METER COND, CUBIC FEET	131.5144	44.745	53.284
8) AVERAGE GAS METER TEMPERATURE, DEG F	86	79.9	75.1
9) VOL DRY GAS, S.T.P., CUBIC FEET	129.443	44.089	52.999
10) TOTAL H2O COLLECTED, ML	1639	136.8	3588.5
11) VOL H2O VAPOR COLLECTED, S.T.P., CU FT	14.88	4.98	5.24
12) STACK GAS MOISTURE, PERCENT VOLUME *	10.3	10.1	9.0
13) ASSUMED STACK GAS MOISTURE, PCT VOL	10.5	10.5	10.5
14) PERCENT CO2			
15) PERCENT O2			
16) PERCENT CO			
17) PERCENT N2			
18) PERCENT EXCESS AIR	0	0	0
19) MOLECULAR WEIGHT OF STACK GAS, DRY	28.85	28.85	28.85
20) MOLECULAR WEIGHT OF STACK GAS, STK COND	27.73	27.75	27.87
21) STACK GAS SPECIFIC GRAVITY	0.96	0.96	0.96
22) AVG SQUARE ROOT (VEL HEAD), IN H2O	0.491	0.491	0.504
23) AVERAGE STACK GAS TEMPERATURE, DEG F	115	115	110
24) AVG SQUARE ROOT (STK TMP×VEL HEAD)	11.779	11.779	12.033
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	28.9	28.9	28.9
27) STACK GAS VEL, STACK COND, F.P.M.	1769.8	1769.2	1804.9
28) STACK AREA, SQ FEET	5.24	5.24	5.24
29) EFFECTIVE STACK AREA, SQUARE FEET	5.24	5.24	5.24
30) STACK GAS FLOW RATE, S.T.P., SCFMD	7407	7419	7730
31) NET TIME OF TEST, MINUTES	112	112	112
32) SAMPLING NOZZLE DIAMETER, INCHES	0.25	0.25	0.25
33) PERCENT ISOKINETIC	239.9	81.5	94.1
34) FLUORIDE - WATER SOLUBLE, MG	131000	145000	198000
35) FLUORIDE - TOTAL, MG	131000	145000	188000
36) FLUORIDE - WATER SOLUBLE, GR/SCF	15.6	50.6	54.6
37) FLUORIDE - TOTAL, GR/SCF	15.6	50.6	54.6
38) FLUORIDE - WATER SOL., GR/CF, STK COND.	12.4	40.5	44.6
39) FLUORIDE - TOTAL, GR/CF, STK COND.	12.4	40.5	44.6
40) FLUORIDE - WATER SOLUBLE, LB/HOUR	990.	3217	3617
41) FLUORIDE - TOTAL, LB/HOUR	990.	3217	3617
43) FLUORIDE - WATER SOL., LB/TON P205 FED	90	292	329
44) FLUORIDE - TOTAL, LB/TON P205 FED	90	292	329

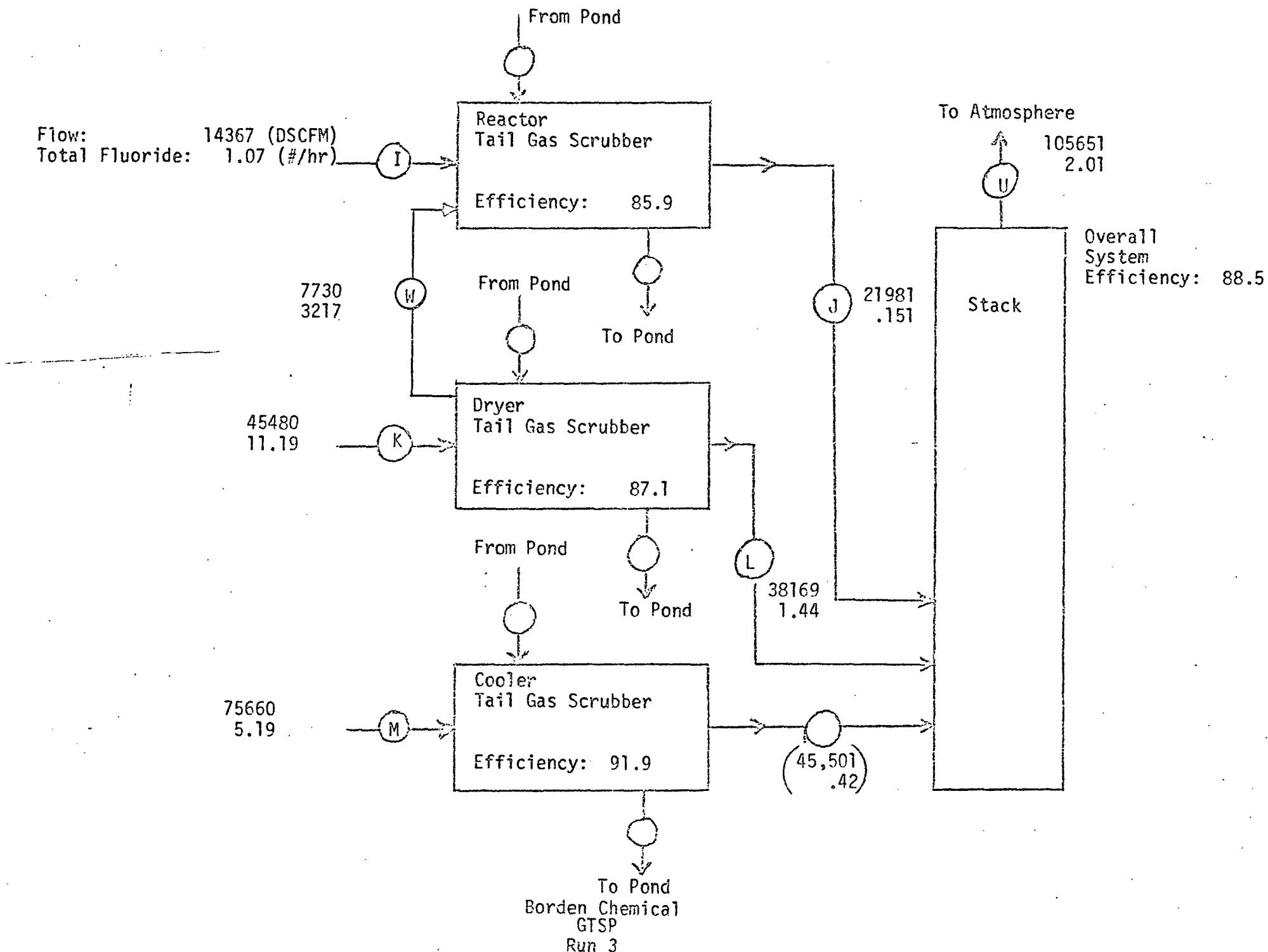
S.T.P.↔DRY, 70 DEGREES F, 29.92 INCHES MERCURY

* Calculated from Dry Bulb - Wet Bulb Temp; Saturated Gas

SCRUBBER EFFICIENCY







APPENDIX B
FIELD DATA

PRELIMINARY MOISTURE DETERMINATION

PRELIMINARY CHECK FOR STACK GAS
MOISTURE CONTENT AND SPECIFIC GRAVITY

Plant Brown Chemicals Stack Stack "T"-Coker Unit
 Date 10-26-52 Sample Time 1600-1810 Barometric Pressure 30 "Hg
(G.T.S.P.)

Moisture Content -- Method 1

Final Dry Test Meter Reading	<u>110.835</u>	Ft ³
Initial Dry Test Meter Reading	<u>109.835</u>	Ft ³
Dry Test Meter Volume Sampled	<u>1.000</u>	Ft ³
Average Meter Temperature	<u>73</u>	°F
Average Meter Vacuum	<u>-</u>	"Hg
Average Meter Orifice Δ H	<u>0.02</u>	"H ₂ O
Sampling Rate	<u>-</u>	LPM
Barometric Pressure @ Meter Orifice	<u>30</u>	"Hg
Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg	<u>0.997</u>	Ft ³
Condensate Volume	<u>0.4</u>	ml
Water Vapor Volume @ 70 °F, 29.92 "Hg	<u>0.019</u>	Ft ³
Moisture Fraction, H ₂ O <u>0.02</u>	Fraction Of Dry Air, FDA <u>0.98</u>	

Moisture Content -- Method 2

Dry Bulb Temp. <u>113 °F</u>	Wet Bulb Temp. <u>113 °F</u>	Dew Point Temp. <u>-</u> °F
Vapor Pressure Of H ₂ O @ DP <u>2.627</u> "Hg	Stack Pressure <u>2.805</u> "Hg	
Moisture Fraction, H ₂ O <u>0.029</u>	Fraction Of Dry Air, FDA <u>0.971</u>	

Specific Gravity

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

PRELIMINARY CHECK FOR STACK GAS
MOISTURE CONTENT AND SPECIFIC GRAVITY

Plant Pearl Chemicals Stack 56, "F" - Reactor - Offgas
 Date 1-26-72 Sample Time 1035 - 1035 Barometric Pressure 30 "Hg
(G.T.S.R.)

Moisture Content -- Method 1

Final Dry Test Meter Reading 33.060 Ft³

Initial Dry Test Meter Reading 33.120 Ft³

Dry Test Meter Volume Sampled 2.940 Ft³

Average Meter Temperature 75 °F

Average Meter Vacuum - "Hg

Average Meter Orifice ΔH 0.06 "H₂O

Sampling Rate - LPM

Barometric Pressure @ Meter Crifice 30 "Hg

Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg 2.913 Ft³

Condensate Volume 2.6 ml

Water Vapor Volume @ 70 °F, 29.92 "Hg 0.123 Ft³

Moisture Fraction, H₂O 0.04 Fraction Of Dry Air, FDA 0.96

Moisture Content -- Method 2

Dry Bulb Temp. 70 °F Wet Bulb Temp. - °F Dew Point Temp. - °F

Vapor Pressure Of H₂O @ DP 1.422 "Hg Stack Pressure 30 "Hg

Moisture Fraction, H₂O 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 = $[(M_d) \times (FDA)] + [(18) \times (H_2O)] =$ _____

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

PRELIMINARY CHECK FOR STACK GAS
MOISTURE CONTENT AND SPECIFIC GRAVITY

Plant BONNEY CHEMICAL'S Stack 6' "K" Duct - Take 1
 Date 1-26-78 Sample Time 11:12 - 10:45 Barometric Pressure 30 "Hg
(6.753.8?)

Moisture Content -- Method 1

Final Dry Test Meter Reading	<u>39.620</u>	Ft ³
Initial Dry Test Meter Reading	<u>35.500</u>	Ft ³
Dry Test Meter Volume Sampled	<u>3.12.0</u>	Ft ³
Average Meter Temperature	<u>74</u>	°F
Average Meter Vacuum	<u>-</u>	"Hg
Average Meter Orifice Δ H	<u>-</u>	"H ₂ O
Sampling Rate	<u>-</u>	LPM
Barometric Pressure @ Meter Orifice	<u>30</u>	"Hg
Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg	<u>3.093</u>	Ft ³
Condensate Volume	<u>6.4</u>	ml
Water Vapor Volume @ 70 °F, 29.92 "Hg	<u>0.503</u>	Ft ³
Moisture Fraction, H ₂ O	<u>0.09</u>	
Fraction Of Dry Air, FDA	<u>0.91</u>	

Moisture Content -- Method 2

Dry Bulb Temp.	<u>71.5</u> °F	Wet Bulb Temp.	<u>-</u> °F	Dew Point Temp.	<u>-</u> °F
Vapor Pressure Of H ₂ O @ DP	<u>2.925</u>	"Hg	Stack Pressure	<u>2.516</u>	"Hg
Moisture Fraction, H ₂ O	<u>0.10</u>		Fraction Of Dry Air, FDA	<u>0.90</u>	

Specific Gravity

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

PRELIMINARY CHECK FOR STACK GAS
MOISTURE CONTENT AND SPECIFIC GRAVITY

Plant Petroleum Chemicals Stack Stack 1 - Dryer - Distill
 Date 1-25-73 Sample Time 1030-1130 Barometric Pressure 30 "Hg
(G.T.S.P.)

Moisture Content -- Method 1

Final Dry Test Meter Reading	<u>868.660</u>	Ft ³
Initial Dry Test Meter Reading	<u>867.631</u>	Ft ³
Dry Test Meter Volume Sampled	<u>1.009</u>	Ft ³
Average Meter Temperature	<u>60</u>	°F
Average Meter Vacuum	<u>-</u>	"Hg
Average Meter Orifice ΔH	<u>0.06</u>	"H ₂ O
Sampling Rate	<u>-</u>	LPM
Barometric Pressure @ Meter Orifice	<u>30</u>	"Hg
Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg	<u>1.023</u>	Ft ³
Condensate Volume <u>170.0 - 169.9</u> = <u>1.0</u>		ml
Water Vapor Volume @ 70 °F, 29.92 "Hg	<u>0.047</u>	Ft ³
Moisture Fraction, H ₂ O <u>0.04</u>	Fraction Of Dry Air, FDA <u>0.96</u>	

Moisture Content -- Method 2

Dry Bulb Temp.	<u>75</u> °F	Wet Bulb Temp.	<u>-</u> °F	Dew Point Temp.	<u>-</u> °F
Vapor Pressure Of H ₂ O @ DP	<u>0.83</u>	"Hg	Stack Pressure	<u>30</u>	"Hg
Moisture Fraction, H ₂ O	<u>0.03</u>	Fraction Of Dry Air, FDA	<u>0.97</u>		

Specific Gravity

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

PRELIMINARY CHECK FOR STACK GAS
MOISTURE CONTENT AND SPECIFIC GRAVITY

Plant Brown & Root Stack Stack "M" - Cooker - Inlet

Date 4-25-38 Sample Time 10:15 Barometric Pressure 30 "Hg

(6.7 S.P.)

Moisture Content -- Method 1

Final Dry Test Meter Reading 19.150 ft³

Initial Dry Test Meter Reading 14.060 ft³

Dry Test Meter Volume Sampled 3.150 ft³

Average Meter Temperature 75 °F

Average Meter Vacuum - "Hg

Average Meter Orifice ΔH - "H₂O

Sampling Rate - LPM

Barometric Pressure @ Meter Orifice 30 "Hg

Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg 3.079 ft³

Condensate Volume 2.3 ml

Water Vapor Volume @ 70 °F, 29.92 "Hg 0.109 ft³

Moisture Fraction, H₂O 0.03 Fraction Of Dry Air, FDA 0.77

Moisture Content -- Method 2

Dry Bulb Temp. 107 °F Wet Bulb Temp. - °F Dew Point Temp. - °F

Vapor Pressure Of H₂O @ DP 2.78 "Hg Stack Pressure 27.97 "Hg

Moisture Fraction, H₂O 0.09 Fraction Of Dry Air, FDA 0.91

Specific Gravity

Dry Molecular Weight, M_d = $[0.44(\%CO_2)] + [0.32(\%O_2)] + [0.28(\%N_2 + CO)]$ = _____

Molecular Weight @ Stack Conditions, M_s = $[(M_d) \times (FDA)] + [(18) \times (\%H_2O)]$ = _____

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

PRELIMINARY CHECK FOR STACK GAS
MOISTURE CONTENT AND SPECIFIC GRAVITY

Plant Pocono Generating Stack Sch. "A" - Flue Gas

Date 10/25/72 Sample Time 10:10 Barometric Pressure 29.92 "Hg

(G.T.S.P.)

Moisture Content -- Method 1

Final Dry Test Meter Reading 998.35A Ft³

Initial Dry Test Meter Reading 925.941 Ft³

Dry Test Meter Volume Sampled 2.417 Ft³

Average Meter Temperature 90 °F

Average Meter Vacuum -2.00 "Hg

Average Meter Orifice Δ H 0.08 "H₂O

Sampling Rate — LPM

Barometric Pressure @ Meter Orifice 30 "Hg

Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg 2.335 Ft³

Condensate Volume 1.0 ml

Water Vapor Volume @ 70 °F, 29.92 "Hg 0.037 Ft³

Moisture Fraction, H₂O 0.32 Fraction Of Dry Air, FDA 0.72

Moisture Content -- Method 2

Dry Bulb Temp. 89 °F Wet Bulb Temp. 87 °F Dew Point Temp. 86 °F

Vapor Pressure Of H₂O @ DP 1.253 "Hg Stack Pressure 30 "Hg

Moisture Fraction, H₂O 0.04 Fraction Of Dry Air, FDA 0.96

Specific Gravity

Dry Molecular Weight, M_d = $[0.44(\%CO_2)] + [0.32(\%O_2)] + [0.28(\%N_2 + CO)] =$ _____

Molecular Weight @ Stack Conditions, M_s = $[(M_d) \times (FDA)] + [(18) \times (\%H_2O)] =$ _____

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

PRELIMINARY CHECK FOR STACK GAS
MOISTURE CONTENT AND SPECIFIC GRAVITY

Plant BORDEN COMPANIES Stack 6' "H" Pipe, between burner
was in burner
 Date 1-25-52 Sample Time 10:30 - 10:37 Barometric Pressure 29.92 "Hg
 (G.T.S.P.)

Moisture Content -- Method 1

Final Dry Test Meter Reading 1.834 Ft³
 Initial Dry Test Meter Reading 1.000 Ft³
 Dry Test Meter Volume Sampled 0.834 Ft³
 Average Meter Temperature 72 °F
 Average Meter Vacuum _____ "Hg
 Average Meter Orifice Δ H _____ "H₂O
 Sampling Rate _____ LPM
 Barometric Pressure @ Meter Orifice 29.92 "Hg
 Dry Gas Volume Sampled @ 70 °F, 29.92 "Hg 0.83 Ft³
 Condensate Volume 50.4 ml
 Water Vapor Volume @ 70 °F, 29.92 "Hg 2.82 Ft³
 Moisture Fraction, H₂O 0.22 Fraction Of Dry Air, FDA 0.78

Moisture Content -- Method 2

Dry Bulb Temp. 116 °F Wet Bulb Temp. 70 °F Dew Point Temp. 70 °F
 Vapor Pressure Of H₂O @ DP 3.03 "Hg Stack Pressure 2.92 "Hg
 Moisture Fraction, H₂O 0.11 Fraction Of Dry Air, FDA 0.89

Specific Gravity

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

entrained water

FLUORIDE EMISSIONS

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant BORDEN CHEMICAL

Sampling Location DRYER S DISCHARGE (K)

Date 1/26/71 Run No. 3

Time Start 11:52 Time End 12:02

Sampling Time/Point 5 min

DB 115 °F, WB 115 °F, VF @ DP 11 Hg

Moisture 0.5%, FRA 89.5, Gas Density Factor .96

Bare Static Press 30 Hg, Stack Press 28.4 Hg

Weather Clear

Temp. 65 °F, W/D W/S

Sample Box No. 1 Meter Box No. 174

Meter dN 0 Hitot Corr. Factor .83

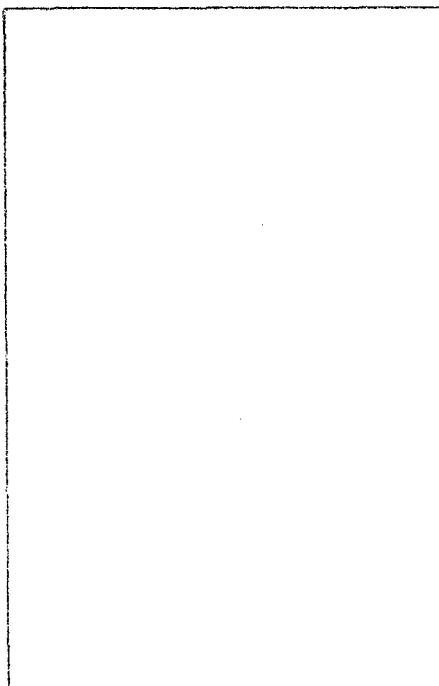
Nozzle Dia. 1/4 in., Probe Length 8 ft

Probe Heater Setting 0

Stack Dimensions: Inside Diameter 66 in

Inside Area 3.14 ft²

Height 10 ft



Mat'l Processing Rate

Final Gas Meter Reading 965.9 ft³

Initial Gas Meter Reading 898.2 ft³

Total Condensate in Impingers 51.0 ml

Moisture in Silica Gel 12.90 gm

Silica Gel Container No. 625 Filter No. 720398

Orsat: CO₂ 0.5

O₂ 19.8

CO _____

N₂ _____

Excess Air _____

Test Conducted by: Hendipas & Helper

Remarks: Sampled 22 points of 24

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head (H ₂ O)	Meter Orifice Press. Diff. (H ₂ O)	Stack Gas Temp. (°F)	Gas Sample		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train (Hg)
							Calc.	Actual			
				0.0							
				-0.1							
				-0.1							
3	10:09		898.20	.20	.60	.60			73	72	72.0 4.0
4	10:14			.20	.60	.60			74	73	
5	10:19		903.0	.19	.56	.56			74	73	72.0 4.0

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant **PARDEN CHEMICAL**

Sampling Location Fayer Scrubber INLET

Date 1/25/72 Run No. 2

Time Start 11:00 Time End 6:15

Sampling Time/Point 5 minutes

DB 115 °F, WB 115 °F, VF @ DP

Moisture 10.5%, F.D.A. 89.5, Gas Density Factor

Hemometric Press 30 "Hg, Stack Press 28.6 "Hg

Heather Clear

Temp. - °F, W/D , W/S

Sample Box No. Meter Box No.

Veter 410 ~~1.74~~ Pitot Corr. Factor .83

Nozzle Dia. $\frac{1}{8}$ in., Probe Length 8 ft

Probe Heater Setting

Stack Dimensions: Inside Diameter 66 mm

Inside Diameter 10 in
Inside Area 78.54 ft²

Height ft

Mat'l Processing Rate _____
Final Gas Meter Reading 898.20 ft³
Initial Gas Meter Reading 871.77 ft³
Total Condensate in Impingers 2.62 ml 65
Moisture in Silica Gel 3.7 gm
Silica Gel Container No. 615 Filter No. 7204
Orsat: CO₂ _____
O₂ _____
CO _____
N₂ _____
Excess
Air

Test Conducted by: Henderson
anderson

Remarks: 1" NOZZLE TOO LARGE - 1/2"

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)	Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
									In	Out
1	1	6:10	898.20	.55	.11	.11	115	79	79	71 4.8
2	2	6:05	897.21	.55	.11	.18	115	79	79	71 4.8
3	3	6:00	896.26	.55	.11	.11	115	80	79	72 4.8
4	4	5:55	894.29	.55	.11	.11	115	80	79	72 4.8
5	5	5:50	893.34	.55	.11	.11	115	80	79	70 4.8
6	6	5:45	892.38	.55	.11	.11	115	80	79	72 4.5
7	7	5:40	891.37	.55	.11	.18	115	80	79	72 4.5
8	8	5:35	890.10	.75	.16	.16	115	80	79.5	72 5.5

SOURCE SAMPLING FIELD DATA SHEET

Plant BORDEN CHEMICALSampling Location P. YER SCRUBBER INLETDate 1/25/72 Run No. 1Time Start 12:07 PM Time End 3:10 PMSampling Time/Point 100T_g 115 °F, WB 115 °F, VF @ DP _____ "HgHumidity 100 %, P 69.5, Gas Density Factor _____Barometric Press 29.9 "Hg, Stack Press 25.6 "HgWeather clearTemp. 75 °F, W/D _____, W/S _____

Sample Box No. _____ Meter Box No. _____

Meter ΔH_p 174 Pitot Corr. Factor 0.83Nozzle Dia. 1/8 in., Probe Length 8 ft

Probe Heater Setting _____

Stack Dimensions: Inside Diameter 66 in
Inside Area _____ ft²
Height _____ ft

Mat'l Processing Rate _____

Final Gas Meter Reading 876.77 ft³Initial Gas Meter Reading 803.11 ft³Total Condensate in Impingers 1103 mlMoisture in Silica Gel 2 gmSilica Gel Container No. 613 Filter No. 720410Orsat: CO₂ _____O₂ _____

CO _____

N₂ _____

Excess Air _____

Test Conducted by: Gibert HendersonRemarks: Changed to 1/8" nozzle at point #70 - 30 min

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
							Calc.	Actual			
1		12 ⁰¹	803.11	3.8	10± 5.0	115	76	76		61	14.5
2	5"	12 ¹²		3.3	10± 5.0		77	76		64	15.5
3	10	12 ¹²		3.5	10± 5.0		80	76		66	17.5
4	15	12 ²²	820.00	3.5	10± 5.0		82	76		65	22.0
5	20	12 ²²	826.50	3.3	9.8 5.0	115°	85	77		67	21.0
6	25	12 ³²	832.5	4.6	10± 5.0		85	77		75	21.0
7	31	12 ⁴²	833.39	4.0	10± 5.0		81	79		83	7.0

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant Fordham Chemical, Piney Point, Fla.

Sampling Location Station "I"

Date 1-25-77, Run No. 2

Time Start 3:40 Time End 5:40

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

DB °F, WB °F, VF @ DP "Hg

Temperature 10 %, FWD 90, Gas Density Factor

Barometric Press 29 "Hg, Stack Press 18.5 "Hg

Weather Clear

Temp. °F, W/D , W/S

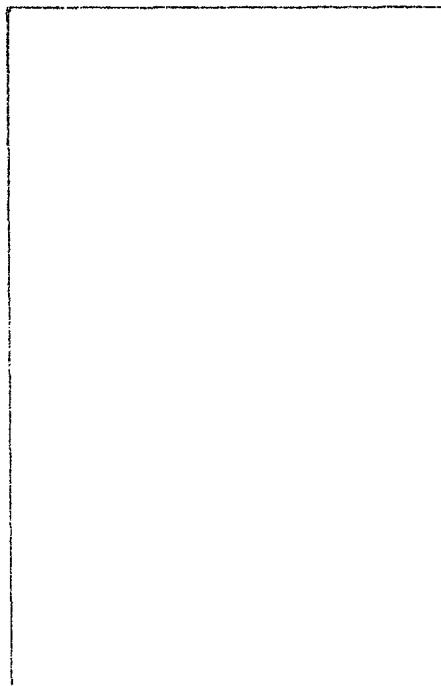
Sample Box No. Meter Box No.

Meter ΔH 1.80 Pitot Corr. Factor 0.83

Nozzle Dia. .250 in., Probe Length 6 ft

Probe Heater Setting

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



Mat'l Processing Rate

Final Gas Meter Reading 285.276 ft³

Initial Gas Meter Reading 199.811 ft³

Total Condensate in Impingers 343 - 200 = 143 ml 185

Moisture in Silica Gel 2.4 gm

Silica Gel Container No. 611 Filter No. 120508

Orsat: CO₂

O₂

CO

N₂

Excess
Air

Test Conducted by: R. Black
J. Smith

Remarks: _____

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
							In	Out			
			199.811								
1		3:40	204.1	0.60	2.10	115	73	78	1	60	6.0
1		45	208.1	0.60	2.10	115	82	78	1	60	6.0
1		50	212.1	0.60	2.10	115	87	73	1	60	6.0
1		55	216.2	0.60	2.10	115	90	79	1	60	6.0
2		4:00	219.7	0.42	1.50	115	93	79	1	60	5.0
2		45	223.0	0.42	1.5	115	93	79	1	60	5.0

Litter 1

E. ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant Borden Chemical, Piney Point, Fla.

Sampling Location Station "I"

Date 1-26-72 Run No. 3

Time Start _____ Time End _____

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

DB °F, WB °F, VF @ DP "Hg

Moisture 10 %, FDR 70, Gas Density Factor _____

Barometric Press 30 "Hg, Stack Press 28.5 "Hg

Weather Clear

Temp. °F, W/D , W/S _____

Sample Box No. _____ Meter Box No. _____

Meter 1.80 Pitot Corr. Factor 0.83

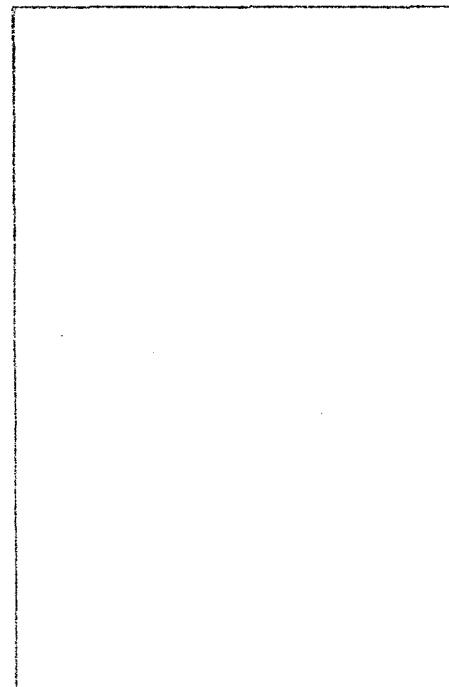
Nozzle Dia. .250 in., Probe Length 6 ft

Probe Heater Setting _____

Stack Dimensions: Inside Diameter 3.6 in

Inside Area ft²

Height ft



Mat'l Processing Rate _____

Final Gas Meter Reading 579.620 ft³

Initial Gas Meter Reading 294.352 ft³

Total Condensate in Impingers 5.35 - 7.00 / 3.8 ml

Moisture in Silica Gel 327.9 - 216.9 = 11.0 gm

Silica Gel Container No. 619 Filter No. 720383

Orsat: CO₂ 0.2

O₂ 20.6

CO _____

N₂ _____

Excess

Air _____

Test Conducted by: R. Black
J. Smith

Remarks: _____

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
							In	Out			
			<u>294.352</u>								
1		10:00	297.9	0.48	1.70	109	74	70		58	5
1		05	301.6	0.54	1.85	109	76	70		58	6
1		10	305.4	0.54	1.85	109	83	71		58	6
1		15	309.1	0.54	1.85	109	86	72		58	6.5
2		20	312.7	0.48	1.70	109	91	72		58	6.5
2		25	313.4	0.48	1.70	110	94	74		60	7.0

EN. INMENAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant Betzen Chem. Co.

Sampling Location Bigfoot Scrubber outlet

Date 1-15-72 Run No. 2

Fire Start 1:15 P.M. Time End 1:45 P.M.

Sampling Time/Point 10 min. x 12 = 120 sec

DB 75 °F, WB 70 °F, VF @ DP 20 "Hg

Moisture 4%, FDR 1.0, Gas Density Factor

Atmospheric Press 30 "Hg, Stack Press 30 "Hg

Weather Clear

Temp. 75 °F, W/D N/S

Supply Box No. Meter Box No.

Meter SHG .72 Pitot Corr. Factor 0.83

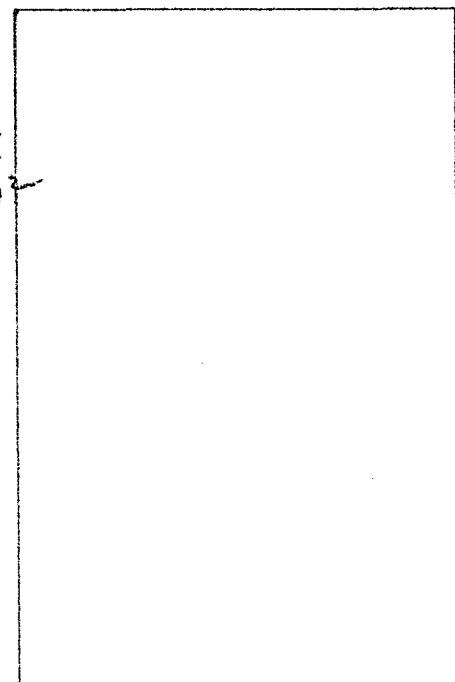
Nozzle Dia. 1/2 in., Probe Length 4'-0" ft

Probe Heater Setting

Stack Dimensions: Inside Diameter 30 in

Inside Area ft²

Height 240 ft



Mat'l Processing Rate

Final Gas Meter Reading 438,867 ft³

Initial Gas Meter Reading 319,618 ft³

Total Condensate in Impingers 247.200-247.41 ml 218.2

Moisture in Silica Gel 7.6 gm

Silica Gel Container No. 66 Filter No. 72-386

Orsat: CO₂

O₂

CO

N₂

Excess

Air

Test Conducted by: J. Duncan

J. Cutts

Remarks: Points 1 & 10 do not agree
to stack wall (-1') - Not sampled

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time Elapsed Time minutes	Gas Meter Reading (ft ³)	Stack Velocity Head ('H ₂ O)	Meter Orifice Press. Diff. ('H ₂ O)	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
							Calc.	Actual			
1	—										
2	0.14	10	393.7	2.1	0.53	0.53	97	82	82	66	2.4
3	0.25	20	397.5	2.1	0.53	0.53	97	85	83	65	2.5
4	0.37	30	401.3	2.3	0.56	0.58	97	90	84	65	2.8
5	0.50	40	406.3	2.3	0.58	0.58	98	92	86	65	3.0
6	0.67	50	411.4	2.3	0.56	0.58	98	94	87	65	3.2
7	0.92	65	415.7	2.1	0.53	0.53	98	95	86	65	3.3

"J"

E. ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant BORDEN CHEM. CO.

Sampling Location Reactor Scrubbe Outlet

Date 1/26/73 Run No. 3

Time Start 10:00 Time End 12:00

Sampling Time/Point 10 min 120

T₁ 75 °F, W₃ 75 °F, VF 3 DP "Hg

Moisture 1 % H₂O, Gas Density Factor

Barometric Press 30 "Hg, Stack Press 30 "Hg

Weather CLEAR - MILD

It p. n 75 °F, W/D 75, W/S 75

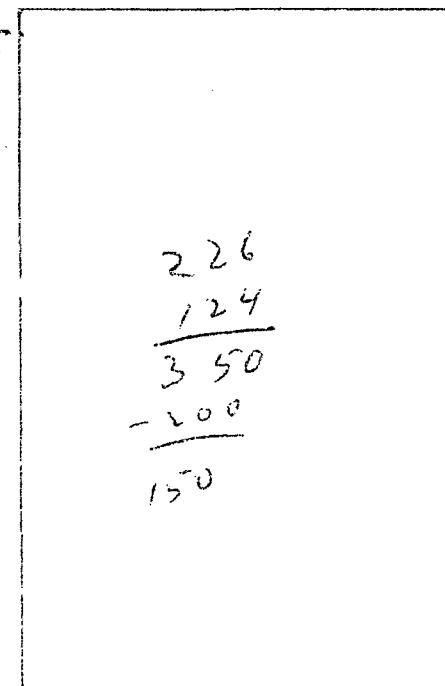
Sample Box No. Meter Box No.

Meter ΔH_g 1.72 Pitot Corr. Factor 0.83

Nozzle Dia. 1/2 in., Probe Length ~4' ft

Probe Heater Setting

Stack Dimensions: Inside Diameter 30 in
Inside Area ft²
Height ~40 ft



Mat'l Processing Rate

Final Gas Meter Reading 487.108 ft³

Initial Gas Meter Reading 438.608 ft³

Total Condensate in Impingers 244.200-47 ml

Moisture in Silica Gel 219.7-216.3 = 3.4 gm

Silica Gel Container No. 6/2 Filter No. 720381

Orsat: CO₂ 0

O₂ 20.2

CO

N₂

Excess
Air

Test Conducted by: L. DUNCAN
J. CUTTS

Remarks: POINTS 1 & 4
NOT USED - TOO CLOSE
TO STACK WALL (<1")

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time <u>LAPSED</u> <u>ft.</u>	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)	Stack Gas Temp. (°F)	Gas Sample Temp., @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
							Calc.	Actual			
1	-	--	—	—	—	—	—	—	—	—	—
2	0.17	10	443.1	2.4	0.59	0.59	90	73	70	63	2.1
3	0.25	20	447.2	2.3	0.56	0.56	91	80	73	65	2.2
4	0.37	30	451.5	2.4	0.59	0.59	91	87	77	64	2.4
5	0.50	40	455.9	2.4	0.59	0.59	91	92	80	65	2.6
6	0.47	50	447.5	2.4	0.57	0.59	92	98	83	65	2.9
7	0.77	65	454.5	2.2	0.54	0.54	91	100	85	67	3.0

ENVIRONMENTAL ENGINEERING, Inc.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant Borden Chemicals, Piney Pt.

Sampling Location option "L"

Date 1.25.72 Run No. 1

Time Start 11:55 Time End 13:55

Sampling Time/Point 15 min @ 8 = 12.0 min TOTAL

13.75 °F, 19.5% RH, VP 6.5 ft Hg

Altitude 3,111 ft, Gas Density Factor .97

Barometric Press 30 "Hg, Stack Press 30 "Hg

Weather OVERCAST - FOG

Temp. 70 °F, W/D YAW, W/S VPT

Sample Box No. _____ Meter Box No. _____

Meter AHS 1.60 Pitot Corr. Factor 0.83

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

Probe Heater Setting _____

Stack Dimensions: Inside Diameter 48.60 in
Inside Area 20 ft²
Height 4 ft

Run #1

See

Mat'l Processing Rate _____

Final Gas Meter Reading 983.828 ft³

Initial Gas Meter Reading 868.641 ft³

Total Condensate in Impingers .48 ml

Moisture in Silica Gel C.O gm

Silica Gel Container No. 607 Filter No. 72040

Orsat: CO₂ _____

O₂ _____

CO _____

N₂ _____

Excess Air _____

Test Conducted by: T. TUCKER
A. ARREOLA

Remarks: TRIPLE ACID

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
							In	Out			
1		13:50		.21	.83 .83	75	114	104		85	7
1		13:45	980.9	.21	.68 .68	75	115	106		65	7.5
1		13:40	978.7	.21	1.05 1.05	75	116	106		85	9
2		13:35	975.45	.06	.24 .21	75	109	105		85	5
2		13:30	974.1	.05	.2 .2	75	109	105		80	5
2		13:25	973.53	.05	.12 .12	75	109	105		80	5

HORIZONTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant BORDEN Chemicals

Sampling Location SECTION 1

Date 1/25/72 Run No. 2

Time Start 15:40 Time End 17:40

Sampling Time/Point 15@8 = 120 min total

Alt 75°F, WB 75°F, VP @ IP .775" Hg

Moisture 3%, FDR 97, Gas Density Factor

Barometric Press 30" Hg, Stack Press 30" Hg

Weather clear & warm

Temp. 75°F, W/D -, W/S -

Sample Box No. Meter Box No.

Meter Afa 1.6 Pitot Corr. Factor .83

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

Probe Meter Setting -

Stack Dimensions: Inside Diameter 6" x 60" in
Inside Area 20 Ft²
Height 40 ft

See Run 2

Mat'l Processing Rate

Final Gas Meter Reading 1088.686 ft³

Initial Gas Meter Reading 953.828 ft³

Total Condensate in Impingers 55 ml

Moisture in Silica Gel 10.3 gm

Silica Gel Container No. 173 Filter No. 72-0391

Orsat: CO₂

O₂

CO

N₂

Excess
Air

Test Conducted by: T. TUCKER
A. Hroyo

Remarks: TRIP-Acid

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ('H ₂ O)	Meter Orifice Press. Diff. ('H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)	Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual					
1		17:25	1088.686	.28	1.05	1.05	81	106.94		85	7
2		17:10	1079.4	.17	.66	.66	81	106.94		82	7
3		16:55	1072.7	.03	.14	.15	81	106.94		76	6
4		16:40	1068.3	.52	1.95	1.95	81	108.94		70	9.0
5		16:25	1055.6	.55	2.1	2.1	81	108.90		66	9.0
6		16:10	1044.5	1.7	5.5	5.6	81	106.34		66	19
7		15:55	1037.4	1.6	6.1	5.5	81	106.50		66	15.5

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant Borden Chemicals

Sampling Location STATION 1

Date 12/12 Run No. 3

Time Start 10:00 Time End 12:00

Sampling Time/Point 15 min @ 8 pts = 120 min total

Pt. 72 °F, WB 68 °F, VP 3 DP 10 "Hg

Viscous: 3, FOB: 0.97, Gas Density Factor

Barometric Press 30 "Hg, Stack Press 30 "Hg

Weather clear & cool

Sp. Gr. 1.1, W/S 61, W/S —

Sample Box No. — Meter Box No. —

Meter ZH₃ 1.6 Pitot Corr. Factor 0.83

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

Probe Heater Setting On

Stack Dimensions: Inside Diameter 48 X 60 in
Inside Area 20 Ft²
Height 4 ft

See Recd #1

Mat'l Processing Rate

Final Gas Meter Reading 181.748 ft³

Initial Gas Meter Reading 59.505 ft³

Total Condensate in Impingers 3.3 ml

Moisture in Silica Gel 2.9 gm

Silica Gel Container No. 608 Filter No. 720382

Orsat: CO₂ 0

O₂ 19.7

CO —

N₂ —

Excess Air

Test Conducted by: T. TUCKER

A. H. RAYO

Remarks: TRIPLE Acid Process

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)	Stack Gas Temp. (°F)	Gas Sample Temp. & Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
							In	Out			
1		11:45	181.748	0.14	0.72 0.72	72	110	100		80	6
2		11:30	175.1	0.13	0.67 0.67	72	102	98		75	10
3		11:15	172.0	0.02	0.1 0.1	72	103	98		70	3
4		11:00	162.9	0.56	2.75 2.75	72	116	92		60	10
5		10:45	147.9	0.54	2.7 2.7	72	114	98		60	9
6		10:30	132.9	0.72	3.6 3.6	72	102	90		60	10
7		10:15	116.4	0.57	3.7 3.7	72	96	74		60	7

HORIZONTAL TINING, U.S.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant Borden Chem GTSP.

Sampling Location Cooler outlet (M)

Date 1-25-72 Run No. 1

Time Start 11:50am Time End 2:00pm

Sampling Time/Point 5 min @ 24 = 120

$T = 107^{\circ}\text{F}$, $\text{WB} = 57^{\circ}\text{F}$, $\text{VP} = \text{DP} = 2.379 \text{ "Hg}$

Moisture 7.93%, F.A. 921, Gas Density Factor

Barometric Press 30 "Hg, Stack Pres 27.97 "Hg

Weather Cloudy

Temp. 73 °F, W/D N/S

Sample Box No. 1 Meter Box No. 2

Meter $\Delta H = 1.7$ Pitot Corr. Factor .83

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

Probe Heater Setting

Stack Dimensions: Inside Diameter .66 in

Inside Area .2513 Ft²

Height 10 ft

1	2	3	4	5	6	7	8	9
---	---	---	---	---	---	---	---	---

Mat'l Processing Rate

Final Gas Meter Reading 776.015 ft³

Initial Gas Meter Reading 652.987 ft³

Total Condensate in Impingers 16.5 ml

Moisture in Silica Gel 14.0 gm

Silica Gel Container No. 615 Filter No. 73-04

Crst: CO₂

O₂

CO

N₂

Excess

Air

Test Conducted by:

Remarks:

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ('H ₂ O)	Meter Orifice Press. Diff. ('H ₂ O)		Stack Gas Temp. (°F)	Gas Sample Temp. & Dry Gas Meter (°F)	Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual					
East 1		11:50a	659.9	.28	.89	.89	107	74	72	56	9.5
2		11:55	661.7	.28	.89	.89		74	73	56	10
3		12:00N	664.6	.4	1.3	1.3		75	72	56	12.5
4		12:05	668.6	1.0	3.1	3.1		76	73	58	13.5
5		12:10	672.6	.95	3.0	3.0		76	73	55	13
6		12:15	677.3	.90	2.8	2.8		77	73	57	12
7		12:20	677.2	1.2	3.3	3.3		73	72	53	16

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant Boade Chemical
 Sampling Location Cooler Inlet (M)
 Date 1-25-72 Run No. 2
 Time Start 3:55 Time End _____
 Sampling Time/Point 5 min
 DB 107 °F, WB 79 °F, VF @ DP 30 "Hg
 Moisture 7.9 %, FDR 921, Gas Density Factor _____
 Barometric Press 30 "Hg, Stack Press 27.97 "Hg
 Weather Partly Cloudy
 Temp., 55 °F, W/D W/S
 Sample Box No. _____ Meter Box No. _____
 Meter ΔHg _____ Pitot Corr. Factor _____
 Nozzle Dia. 1/4 in., Probe Length ft
 Probe Heater Setting _____
 Stack Dimensions: Inside Diameter 66 in
 Inside Area ft²
 Height ft

Mat'l Processing Rate _____
 Final Gas Meter Reading 902.427 ft³
 Initial Gas Meter Reading 716.015 ft³
 Total Condensate in Impingers 215 ml
 Moisture in Silica Gel 6.7 gm
 Silica Gel Container No. 606 Filter No. 72038
 Orsat: CO₂ _____
 O₂ _____
 CO _____
 N₂ _____
 Excess Air _____

Test Conducted by: Fal/gout

Remarks: _____

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
							In	Out			
S-1		3:55	716.0	1.6	5.0	5.0	108	79	78	58	13.5
2		4:00	782.7	1.0	3.1	3.1	108	80	78	58	8.5
3		4:05	787.6	.97	3.0	3.0	108	80	78	58	8.5
4		4:10	792.4	.97	3.0	3.0	107	80	78	58	8.5
5		4:15	797.2	.90	2.8	2.8	107	80	78	58	8.5
6		4:20	802.0	.90	2.8	2.8	108	80	78	56	8.5
7		4:25	806.6	.97	3.0	3.0	108	80	77	56	9.5

IRON METAL ENGINEERING, INC.

Gainesville, Florida

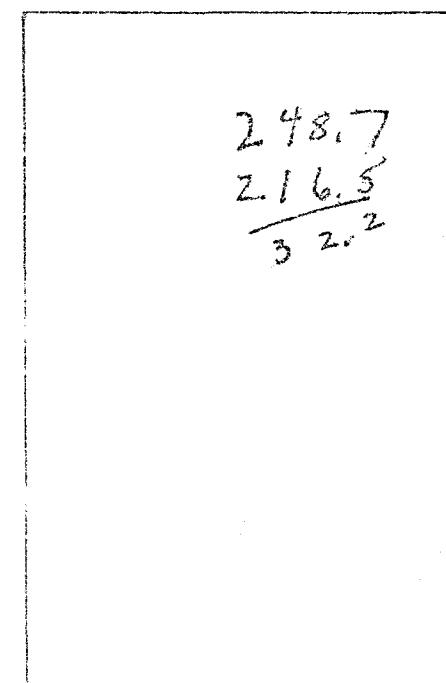
12¹/₂" dia

2.029" Hg v.s.c

SOURCE SAMPLING FIELD DATA SHEET

Plant Borden ChemicalSampling Location Cooler InletDate 1-26-72 Run No. 3Time Start 11:05 A.M. Time End 12:10 P.M.Sampling Time/Point 5 minDT 108 °F, WB 108 °F, VP @ DP "HgMoisture 10.1%, Gas Density Factor 1.000Inlet Press "Hg, Stack Press "Hg

Weather

Temp., 55 °F, W/D W/SSample Box No. — Meter Box No. 2Meter dHl 1.70 Pitot Corr. Factor 0.83Nozzle Dia. .25 in., Probe Length 8 ftProbe Heater Setting OnStack Dimensions: Inside Diameter 6.6 inInside Area 25.1 ft²Height 10 ft

Mat'l Processing Rate

Final Gas Meter Reading 1036.958 ft³Initial Gas Meter Reading 902.430 ft³Total Condensate in Impingers 150 mlMoisture in Silica Gel 32.2 gmSilica Gel Container No. 621 Filter No 720380Orsat: CO₂0O₂ 21.4CO 0N₂ 0

Excess Air

Test Conducted by: Falgout

Remarks:

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
							Calc.	Actual			
5-1		10:05	902.4	1.7	5.2 5.2	108	75	71		65	
2		10:10	914.1	1.2	3.8 3.8	109	75	71		65	10
3		10:15	919.8	1.2	3.8 3.8	109	76	71		63	10
4		10:20	925.2	1.1	3.4 3.4	109	77	71		65	9.5
5		10:25	930.3	1.0	3.2 3.2	109	78	71		65	9.0
6		10:30	935.3	.97	3.0 3.0	110	78	72		65	8.5
7		10:35	940.1	1.0	3.2 3.2	77	72			65	7.5

G 101

IRON... MALL INELING, E.C.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

OUTLET 200'

Plant FORDEN CHEM. FINGER POINT, FLA

Sampling Location OUTLET STACK

Date 1-25-77 Run No. 1

Time Start 11:35 Time End 12:35

Sampling Time/Point 2 Points @ 1 min/23 min

+ 1.25 ft. WB 27 in. Hg 1.253 Hg

Dew Point 64.85 °F Density Factor —

Mat'l Processing Rate 30000 ft³/min, Stack Press 30000 lb

Weather 50°F

Temp. 60°F, W/D —, W/S —

Sample Box No. 14 Meter Box No. 14

Water Gage 1.52 Orifice Factor 0.93

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

Proc. Heater Setting 20%

Stack Dimensions: Inside Diameter 5.5 in
Inside Area 45.611 ft²
Height 300 ft

(Sta# U)

Mat'l Processing Rate

Final Gas Meter Reading 995.64 ft³Initial Gas Meter Reading 853.71 ft³Total Condensate in Impingers 12 m³ (74)

Moisture in Silica Gel 11.0 gm

Silica Gel Container No. 632 Filter No. 7725011

Orsat: CO₂ —O₂ —

CO —

N₂ —

Excess Air —

Test Conducted by: R. DURGA

T. MURTHY

Remarks: FLUORIDE TEST

VELOCITY INVERSE

Dist and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head (H ₂ O)	Meter Orifice Press. Diff. (H ₂ O)	Stack Gas Temp. (°F)	Gas Sample		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train (Hg)
							In	Out			
1	52	11:45	865.4	1.20	4.10	4.10	86	72	71	—	76 13.5
		11:55	877.4	1.20	4.10	4.10	87	74	71	—	84 14.0
		12:05	899.5	1.20	4.10	4.10	87	76	72	—	87 16.0
		12:15	901.0	1.10	3.80	3.80	87	50	73	—	93 16.0
		12:25	917.6	1.10	3.80	3.80	87	92	75	—	83 16.5
		12:35	924.3	1.10	3.90	3.80	87	55	75	—	84 17.5

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train	In	Out
											In	Out
	55"	12:45	936.2	1.20	4.10	4.10	87	61	77	-	86	22.5
		12:55	948.2	1.20	4.10	4.10	87	60	76	-	85	21.0
		1:05	960.1	1.20	4.10	4.10	87	60	81	-	89	21.0
		1:15	972.1	1.20	4.10	4.10	87	62	82	-	89	21.5
		1:25	983.2	1.20	4.10	4.10	87	62	83	-	87	22.0
		1:35	995.6	1.20	4.10	4.10	87	61	86	-	87	22.0

VELOCITY TRAVERSE

Point #1	6"	.63
2	12	.90
3	12	.65
4	24	.45
5	30	.25
6	36	.10
7	42	.10
8	48	.25
9	54	.60
10	60	1.20
11	66	1.30
12	72	1.60
13	78	1.35

HILLMAN IND. ENGINEER, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

outlet 200'

Plant BURDEN CHEM. PINEY POINT, FLA.

Sampling location OUTLET STACK

Date 1-15-57 Run No. 2

Time Start 11:00 Time End 11:00

Sampling Time/Point 2 points @ 60 min = 100 min.

T. 89°, RH — °F, VP & DP — "Hg

Barometric —, DOW — Gas Density Factor —

Electric Press 50 "Hg, Stack Press 50 "Hg

Weather CLOUDY

A. 15° °F, WD —, WS —

Sample Port No. 4 Meter Box No. 6

Meter SH 1.62 Pitot Corr. Factor 0.83

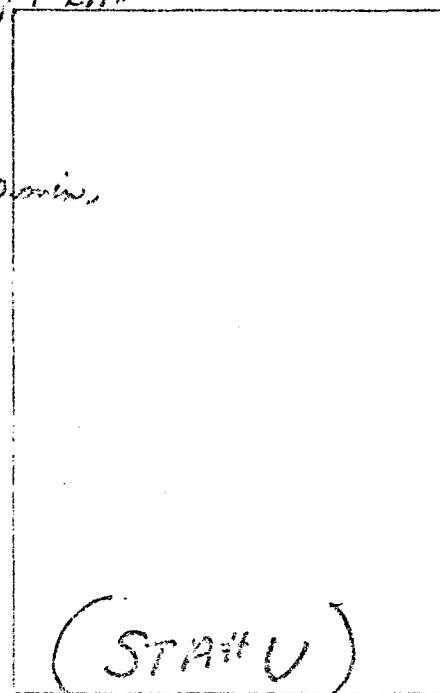
Nozzle Dia. 1/4 in., Probe Length 6 ft

Pitot Heater Setting 2.0%

Stack Dimensions: Inside Diameter 31.5 in

Inside Area 40.31 ft²

Height 200 ft



Mat'l Processing Rate

Final Gas Meter Reading 1110.642 ft³

Initial Gas Meter Reading 1476.258 ft³

Total Condensate in Impingers 3.5 ml 50

Moisture in Silica Gel 21.7 gm

Silica Gel Container No. 62 Filter No. 720158

Orsat: CO₂

O₂

CO

N₂

Excess Air

Test Conducted by: R. Duran, Jr.

L. Hurts

Remarks: FLUORIDE TEST

11/15/57 SAMPLED FROM PREVIOUS DATA:

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head ("H ₂ O)	Meter Orifice Press. Diff. ("H ₂ O)	Stack Gas Temp. (°F)	Gas Sample Temp. & Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
							In	Out			
1	52	4:10	1009.6	1.20	4.10	4.10	89	80	80	—	82 14.0
		4:20	021.5	1.20	4.10	4.10	92	50	50	—	87 14.0
		4:30	033.6	1.20	4.10	4.10	89	79	79	—	83 14.0
		4:40	045.4	1.20	4.10	4.10	76	79	79	—	82 14.0
		4:50	057.3	1.20	4.10	4.10	59	50	79	—	79 14.0
		5:00	069.2	1.20	4.10	4.10	43	50	79	—	77 14.5

ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant BORDEN CHEM. PAINTY POINT, FLA.

Sampling Location OUTLET STACK

Date 1-26-72 Run No. 3

Time Start 10:00 Time End 12:00

Sampling Time/Point 2 points @ 60 min = 120 min.

1.20 ft. "B" = 1.20 ft. VP & DP = 1.0 Hg

1.20 ft. "A" = 1.20 ft. VP & DP = 1.0 Hg

Electric Press 30 Hg, Stack Press 30 Hg

Weather CLEAR

In P. 1.52 ft. Hg — N/S —

Meter Box No. 14 Meter Box No. 14

Meter Lng 1.62 Pitot Corr. Factor 0.63

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

Probe Heater Setting 2.2%

Stack Dimensions: Inside Diameter 8.6.5 in

Inside Area 140.811 ft²

Height 200 ft

Mat'l Processing Rate 253,781 ft³

Final Gas Meter Reading 253,781 ft³

Initial Gas Meter Reading 140,645 ft³

Total Condensate in Impingers 5.5 ml

Moisture in Silica Gel 241.0 - 229.8 = 11.2 gr

Silica Gel Container No. 620 Filter No. 720407

Orsat: CO₂ —

O₂ —

CO —

N₂ —

Excess Air —

Test Conducted by: R. DURGAN

L. WURTS

Remarks: FLUORIDE TEST

VELOCITY TIMERS

Assumed From Previous Data

Port and Transverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head (H ₂ O)	Meter Orifice Press. Diff. (H ₂ O)	Stack Gas Temp., (°F)	Gas Sample		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train (Hg)	
							In	Out				
Point #1	52"	10:10	152.8	1.30	4.50	4.50	73	63	67	—	73	22.0
		10:20	165.3	1.30	4.50	4.50	75	71	68	—	76	22.0
		10:30	176.8	1.20	4.10	4.10	85	74	70	—	80	16.0
		10:40	188.4	1.20	4.10	4.10	85	75	70	—	83	16.0
		10:50	200.1	1.20	4.10	4.10	83	76	70	—	83	16.5
		11:00	212.2	1.20	4.10	4.10	85	77	71	—	87	17.0

Port and Traverse Point No.	Distance frcm End of Port (in)	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head (H ₂ O)	Meter Orifice Press.Diff. (H ₂ O)	Stack Gas Temp. (°F)	Gas Sample Temp.@Dry Gas Meter (°F)	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train	
											Calc.
											Actual
											In
											Out
Point 2	55"	11:10	224.1	1.20	4.10	4.10	85	77	72	-	23
		11:20	236.1	1.20	4.10	4.10	85	80	73	-	81
		11:30	248.1	1.20	4.10	4.10	86	80	75	-	84
		11:40	262.0	1.20	4.10	4.10	86	71	76	-	69
		11:50	272.0	1.20	4.10	4.10	86	81	76	-	85
15	12:00	283.731	1.20	4.10	4.10	87	83	77	-	83	22.0

VELOCITY TRAVERSE

Point 1	6"	.35
2	12	.90
3	18	.82
4	24	.48
5	30	.33
6	36	.10
7	42	.15
8	48	.38
9	54	.92
10	60	1.20
11	66	1.35
12	72	1.20
13	78	1.10

120340
720412

E. L. MOLINEE, INC.
Gainesville, Florida

44.17 Fy 1

SOURCE SAMPLING FIELD DATA SHEET

Plant Hordel Chem. Piggy Point Fla.

Sampling Location Recycle "W"

Date 1/25/72 Run No. 2

Time Start 4:10 Time End 6:02

Sampling Time/Point 16 min (114 ft)

DR 115 °Hg, BP 115 °F, VF 2 LP "Hg

Velocity 1.10 ft/sec, Gas Density Factor 1.00

Altitude 30 ft, Stack Press. 2.69 Hg

Weather Clear

Temp. 70.5 °F, RH 70 %, W/S N/S

Sample Box No. 52, Filter Box No. 52

Bar. Pt. 1.70 Port corr. Factor 0.83

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

Probe Heater Setting 25%

Stack Dimensions: Inside Diameter 3.2 in.

Inside Area 2.583 ft²

Height 20 ft

Less than 2 hr.

Mat'l Processing Rate

Final Gas Meter Reading 178.124 ft³

Initial Gas Meter Reading 133.327 ft³

Total Condensate in Impingers ml/c5

Moisture in Silica Gel gm

Silica Gel Container No. 602 Filter No. 720378

Orsat: CO₂

O₂

CO

N₂

Excess Air

Test Conducted by: J. Chidlowne

G. Allen

Remarks: 720378

Port end Transverse Point No.	Distance from End of Port <u>1.8</u> <u>Set</u>	Clock Time	Gas Meter Reading (ft ³)	Stack Velocity Head (['] H ₂ O)	Meter Orifice Press. Diff. (['] H ₂ O)	Stack Gas Temp. (°F)	Gas Sample Temp., @ dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train (['] Hg)
							Calc.	Actual			
<u>Geo Short</u>											
2	.13	7)		1.10							
3	.22			0.39							
4	.32	8)	NO Probe	0.30							
5	.43			0.10							
6	.56			0.20							
7	.73			0.25							

STOPPED TO empty H₂O from Tn.p.¹⁵.

GRAB SAMPLE COLLECTION

CRAB SAMPLE DATA SHEET

Plant: Rorden Chem S-T-Acid

1/25/72

EPA Sample No.	523PG	523PG	523PG	523PG
Run No.	1	1	1	1
Date	1/25/72	1/25/72	1/25/72	1/25/72
Time	12:10	1:04	-	-
Sampling Point	Cooler	Cooler	Cooler	Cooler
Temperature, °F	92	86	85	82
pH	1.95	2.00	2.01	2.05
Fluorides				
P ₂ O ₅				
Trace Metals				

Remarks * Combined Sample

(GTSP)

GRAB SAMPLE DATA SHEET

Plant - Broken Chain S-T-Rail

1/25/72

EPA Sample No.	524PG	524PG	524PG	^K 524PG
Run No.	1	1	1	1
Date	1/25/72	1/25/72	1/25/72	1/25/72
Time	12:10	1:04	-	-
Sampling Point	Dryer	Dryer	Dryer	Dryer
Temperature, °F	92	91	91	82
pH	1.98	2.05	2.03	2.05
Fluorides				
PoOs				
Trace Metals				

Remarks * Combined Sample

(G T S P)

GRAB SAMPLE DATA SHEET

Plant Borden Chem S-T-Acid
1/25/72

EPS Sample No.	S22PG	S22PG	S22PG	S22PG
Run No.	1	1	1	1
Date	1/25/72	1/25/72	1/25/72	1/25/72
Time	12:10	1:04	-	-
Sampling Point	Reactor	Reactor	Reactor	Reactor
Temperature, °F	82	88	88	80
pH	2.10	2.20	2.12	2.12
Fluorides				
P ₂ O ₅				
Trace Metals				

Remarks * Combined sample

(GTS P)

CRIB SAMPLE DATA SHEET

Plant Broken Chem S-T-Acid

1/25/72

EPD Sample No.	525P6	525P6	525P6	* 525P6
Run No.	1	1	1	1
Date	1/25/72	1/25/72	1/25/72	1/25/72
Time	12:10	1:04	-	-
Sampling Point	inlet	inlet	inlet	inlet
Temperature, °F	80	76	78	75
pH	2.12	2.28	2.15	2.20
Fluorides				
P. O.s				
Trace Metals				

Remarks * Combined sample

(CT SP)

GRAB SAMPLE DATA SHEET

Plant Borden Chem S-T-and

1/25/72

EPR Sample No.	541PG	541PG	541PG	541PG
Run No.	2	2	2	2
Date	1/25/72	1/25/72	1/25/72	1/25/72
Time	4:00	5:07	5:55	6:05
Sampling Point	Cooler	Cooler	Cooler	Cooler
Temperature, °F	92	94	90	80
pH	2.15	2.11	2.10	2.15
Fluorides				
Po Os				
Trace Metals				

Remarks * Combined Sample

(G T S P)

GRAB SAMPLE DATA SHEET

Plant - Broken Chem S-T-Acid

1/25/72

EPA Sample No.	542 PG	542 PG	542 PG	* 542 PG
Run No.	2	2	2	2
Date	1/25/72	1/25/72	1/25/72	1/25/72
Time	4:00	5:07	5:55	6:05
Sampling Point	Auger	Auger	Auger	Auger
Temperature, °F	92	92	91	79
pH	2.15	2.10	2.10	2.12
Fluorides				
P.Os				
Trace Metals				

Remarks * Combined Sample

(GT SP)

GRAB SAMPLE DATA SHEET

Plant: Barkan Chem S-T-Acid

1/25/72

EPA Sample No.	540P6	540P6	540P6	540P6
Run No.	2	2	2	2
Date	1/25/72	1/25/72	1/25/72	1/25/72
Time	4:00	5:07	5:55	6:05
Sampling Point	Reactor	Reactor	Reactor	Reactor
Temperature, °F	88	88	89	81
pH	2.20	2.20	2.20	2.20
Fluorides				
P ₂ O ₅				
Trace Metals				

Remarks * Combined Sample

(GT SP)

GRAB SAMPLE DATA SHEET

Plant Borden Chem S-T-Rail

1/25/72

EPA Sample No.	543PG	543PG	543PG	*543PG
Run No.	2	2	2	2
Date	1/25/72	1/25/72	1/25/72	1/25/72
Time	4:00	5:07	5:55	6:05
Sampling Point	inlet	inlet	inlet	inlet
Temperature, °F	77	78	78	78
pH	2.25	2.25	2.23	2.22
Fluorides				
P ₂ O ₅				
Trace Metals				

Remarks * ~~1~~ Combined Sample(GTSP)

GRAB SAMPLE DATA SHEET

Plant Borden Chem S-T-Acid

1/26/72

EPA Sample No.	554PG	554PG	554 ¹⁰ G	554PG
Run No.	3	3	3	3
Date	1/26/72	1/26/72	1/26/72	1/26/72
Time	10:20	11:05	11:55	-
Sampling Point	Cooler	Cooler	Cooler	Cooler
Temperature, °F	88	88	89	81
pH	2.29	2.10	2.10	2.10
Fluorides				
PoOs				
Trace Metals				

Remarks * Combined Sample

(GTSF)

CRAB SAMPLE DATA SHEET

Plant Borden Chem S-T-Acid

1/26/72

EPA Sample No.	555PG	555PG	555PG	555PG
Run No.	3	3	3	3
Date	1/26/72	1/26/72	1/26/72	1/26/72
Time	10:20	11:05	11:55	-
Sampling Point	Dugout	Dugout	Dugout	Dugout
Temperature, °F	86	91	88	81
pH	2.23	2.05	2.10	2.10
Fluorides				
Pb Os				
Trace Metals				

Remarks * Combined Sample(GTSF)

GRAB SAMPLE DATA SHEET

Plant: Dorlan Chem S-T-Acid

1/26/72

ERA Sample No.	553PG	553PG	553PG	* 553PG
Run No.	3	3	3	3
Date	1/26/72	1/26/72	1/26/72	1/26/72
Time	10:20	11:05	11:55	-
Sampling Point	Vector	Vector	Vector	Vector
Temperature, °F	83	85	86	80
pH	2.30	2.15	2.13	2.18
Fluorides				
Po Os				
Trace Metals				

Remarks: * Combined Sample

(GTS P)

GENB SAMPLE DATA SHEET

Plant Boron Chem S-T-Area

1/26/72

EPR Sample No.	556PG	556PG	556PG	*556PG
Run No.	3	3	3	3
Date	1/26/72	1/26/72	1/26/72	1/26/72
Time	10:20	11:05	11:55	—
Sampling Point	inlet	inlet	inlet	inlet
Temperature, °F	76	76	75	75
pH	2.42	2.32	2.21	2.20
Fluorides				
Pb/Os				
Trace Metals				

*Remarks Combined Sample

(GTSP)

APPENDIX C
Standard Analytical Procedures

ENVIRONMENTAL PROTECTION AGENCY
Research Triangle Park, North Carolina 27711

Reply to
Attn of:

Date: 12-21-72

Subject: Summary of Fluoride Analysis

To: R. Neulicht, EMB, IRL

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

Samples received in our laboratory are filtered through fluoride free paper filters to yield water soluble and water insoluble portions. The water insoluble particulate collected on the filter is rinsed thoroughly to be sure that all water soluble fluoride is rinsed through. The water soluble fraction is distilled from sulfuric acid to a maximum temperature of 180°C. If chloride is suspected in the sample Ag_2So_4 is added to the still. SPADNS solution is added to an aliquot of the distillate and the absorbance is read at 570 nm. The concentration of the sample is determined from a calibration curve prepared from standard fluoride solutions. It is very important that the temperature of the samples be the same as that of the standards when absorbances are recorded.

The water insoluble fraction of the sample is evaporated to dryness in the presence of a slurry of CAO, and then fused with NaOH. The fusate is dissolved with distilled water, neutralized with dilute H_2So_4 , distilled and analyzed as described for the soluble portion.

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

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

Howard Crist

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

cc: R. E. Lee

Phosphorous Pentoxide Determination

Colorimetric Molybdoavanadophosphate 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 molybdoavanadate 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

<u>Sample</u>	<u>STATION</u>	<u>Type</u>	<u>Temp.</u>	<u>Density</u>	<u>pH</u>	<u>Soluble F</u>	<u>Insoluble F</u>
522 PG	B	Outlet Reactor Scrubber H ₂ O	76° F	1.014	1.80	5.0 g/L	
523 "	F	Outlet Cooler Scrubber H ₂ O	"	1.017	1.70	5.3 g/L	
524 "	D	Scrubber H ₂ O Outlet-Dryer	"	"	"	6.3 g/L	
525 "	A	Scrubber H ₂ O Inlet	"	1.014	1.80	6.2 g/L	
526 "		Moisture				7.0 mg/sample	
527 "		"				4.2 g/sample	6.72 mg/sample
528 "		Moisture		No Sample			
529 "		Moisture				54 µg/sample	
530 "		"				0.18 mg/sample	
531 "		"				0.27 mg/sample	
532 "		"				68 µg/sample	
533 "	U	Stack				29.2 mg/sample	29 µg/sample

ENVIRONMENTAL PROTECTION AGENCY

Research Triangle Park, North Carolina 27711

Reply to
Attn of:

Date: 3/28/72

Subject: Fluoride Analysis Borden Chemical Company

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

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

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

The insoluble fluorides and products were fused with NaOH followed by sulfuric acid distillation then by the SPADNS-ZIRCONIUM Lake Method.

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

Attachment

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

<u>Sample</u>	<u>STATION</u>	<u>Type</u>	<u>Temp.</u>	<u>Density</u>	<u>pH</u>	<u>Soluble F</u>	<u>Insoluble F</u>
534 PG	K	Dryer Inlet				200 mg/sample	0.12 mg/sample
535 "	I	Reactor Outlet				97 mg/sample	0.13 mg/sample
536 "	L	Dryer Scrubber Outlet				37 mg/sample	40 µg/sample
537 " ^{RUN}	W	Dryer Reactor				131 g/sample	
538 "	J	Reactor Scrubber Outlet				3.7 mg/sample	47 µg/sample
539 "	M	Cooler Outlet				72 mg/sample	0.14 mg/sample
540 "	B	Scrubber H ₂ O Outlet Reactor	76° F	1.014	1.80	6.2 g/L	
541 "	F	Scrubber H ₂ O - Outlet Cooler	76° F	1.016	1.65	5.9 g/L	
542 "	D	" " Outlet Dryer	76° F	1.018	1.65	5.3 g/L	
543 "	A	" "	76 °F	1.015	1.80	4.1 g/L	
544 "	U	Stack				11.4 mg/sample	24 µg/sample
545 " ²	K	Dryer Outlet				62 mg/sample	50 µg/sample
546 "	I	Reactor "				73 mg/sample	0.16 mg/sample
547 "	L	Dryer Scrubber Outlet				21.4 mg/sample	31 µg/sample
548 "	W	Dryer - Reactor				145 g/sample	
549 "	J	Reactor Scrubber Outlet				2.6 mg/sample	<10 µg/sample
550 "	M	Cooler Outlet				58 mg/sample	26 µg/sample

<u>Sample</u>	<u>STATION</u>	<u>Type</u>	<u>Temp.</u>	<u>Density</u>	<u>pH</u>	<u>Soluble E</u>	<u>Insoluble E</u>
551 PG		H ₂ O Blank				25 µg/240ml	
552 "		Whatman # 1 Filter Blank					<10µg/sample
553 "	B	Scrubber H ₂ O Outlet Reactor	76° F	1.015	1.80	4.8 g/L	
554 "	F	Scrubber H ₂ O Outlet Cooler	76° F	1.017	1.70	5.4 g/L	
555 "	D	Scrubber H ₂ O Outlet Dryer	76° F	1.017	1.70	4.7 g/L	
556 "	A	Scrubber H ₂ O Inlet	76° F	1.015	1.80	4.8 g/L	
557 "	V	Stack				20.6 mg/sample	29 µg/sample
558 "	K	Dryer Outlet				125 mg/sample	
559 "	I	Reactor Outlet				47 mg/sample	32 µg/sample
560 "	L	Dryer Scrubber Outlet				20 mg/sample	<10 µg/sample
561 "	W	Dryer Reactor				188 g/sample	
562 "	J	Reactor Scrubber Outlet				2.5 mg/sample	35 µg/sample
563 "	M	Cooler Outlet				70 mg/sample	23 µg/sample
564 "		H ₂ O Blank				30 µg/245 ml	
565 "		Whatman # 1 Filter Blank					<10 µg/sample
566 "		40 % Acid				9.3 g/L	
567 "		22 % Acid				23.9 g/L	

<u>Sample</u>	<u>STATION</u>	<u>Type</u>	<u>Temp.</u>	<u>Density</u>	<u>pH</u>	<u>Soluble F</u>	<u>Insoluble F</u>
568 PG	T	GTSP Product				26.9 mg/g	
572 "		54 % Acid				9.2 g/L	
574 "	RUN 2	40 % Acid				10.2 g/L	
575 "		22 % Acid				21.1 g/L	
576 "	T	GTSP Product				22.9 mg/g	
580 "		54 % Acid.				7.4 g/L	
582 "	RUN 3	40 % Acid				9.1 g/L	
583 "		22 % Acid				23.9 g/L	
584 "	T	GTSP Product				21.8 mg/g	
588 "		54 % Acid				6.8 g/L	

Venturi Systems

<u>Sample</u>	<u>SECTION</u>	<u>Type</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Results</u>
5'9 PG	Q	R-G venturi Outlet 22 % Acid	2	76	134	25.0 g/L
5'0 "	P	Inlet to venturi 22% acid	2	76	118	25.0 g/L
5'1 " Run 1	R	Dryer venturi outlet 22% Acid	2	76	120	26.8 g/L
5'3 "	S	Cooler venturi Outlet 22% Acid	2	75	116	27.0 "
5'7 "	Q	R-G venturi outlet 22% Acid	5	75	118	27.3 "
5'8 "	P	Inlet to venturi 22% acid	5	76	114	27.1 "
5'9 " Run 2	R	Dryer venturi Outlet 22% Acid	5	76	116	28.2 "
5'81 "	S	Cooler venturi Outlet 22% Acid	5	76	110	28.0 "

Venturi Systems

<u>Sample</u>	<u>STATION</u>	<u>Type</u>	<u>A</u>	<u>B</u>	<u>C</u>	<u>Results</u>
5-5 PG	Q	R-G Venturi Outlet 22% Acid	5	76	112	25.5 g/L
5-6 "	P	Inlet to venturi 22% Acid	8	76	112	26.2 "
5-7 " ²³	R	Dryer venturi Outlet 22% Acid	8	76	109	27.0 "
5-9 "	S	Cooler Venturi Outlet 22% Acid	8	76	118	25.7 "

A = % Solids

R = Room Temperature °F

C = Heat was applied to the sample until all solids were finely mixed and that temperature was recorded. F

The three Dryer Reactor Samples needed to be filtered again. The dirt of each sample was placed in 1400 ml of water and was stirred for about ten minutes, then it was filtered. This was done three different times for each sample. The filtrate was added together and analyzed for fluorides. The Insoluble Fluoride was run on the dirt the usual way after it was filtered.

	<u>Soluble F</u>	<u>Insoluble F</u>
537	95 mg/sample	120 mg/sample
548	234 mg/sample	159 mg/sample
561	2.4 g/sample	223 mg/sample

APPENDIX E
Project Participants

PROJECT PARTICIPANTS

<u>Name</u>	<u>Title</u>
John Dollar	Project Manager
John Chadbourne	Environmental Specialist
Leon Duncan	Environmental Specialist
A. L. Wilson	Environmental Specialist
Albert Henderson	Environmental Specialist
Harvey Gray	Environmental Specialist
Dennis Falgout	Environmental Specialist
Ray Black	Environmental Specialist
Tommy Tucker	Environmental Specialist
George Allen	Environmental Specialist
Robert Durgan	Environmental Specialist
Larry Wurts	Environmental Specialist
Jerry Smith	Environmental Specialist
John Cutts	Environmental Specialist
Eric Johnson	Environmental Specialist
Tony Arroyo	Computer Analyst
Jerome Rom	EPA, Project Officer
John Reynolds	EPA, Project Engineer
Roy Neulicht	EPA, Chemical Engineer