AP-42 Section Number: 9.9.1

Reference Number: 27

Title: Source Test Report on Measurement Of Emissions From Cargil, Inc.

Environmental Enginering, Inc.

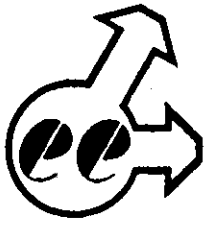
1972

AP-42 Section 9.9.1
Reference 27
Report Sect. ____
Reference ____

FINAL

OK

72-CI-28 (GRN)
SOURCE TEST REPORT
ON MEASUREMENT OF EMISSIONS FROM
CARGILL, INC.
SIOUX CITY, IOWA
FOR
ENVIRONMENTAL PROTECTION AGENCY
UNITED STATES GOVERNMENT
THOMAS E. WARD
PROJECT TEST OFFICER



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FINAL

OK

72-CI-28 (GRN)
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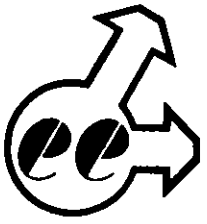

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INTRODUCTION

Particulate emission tests were performed on three separate sources located at the Cargill, Inc. Feed and Grain Mill in Sioux City, Iowa. The testing was performed during the week of June 19, 1972.

The sources tested were the Hammer Mill, the Column Cooler inlet and outlet, and the Pan Cooler inlet and outlet.

All three sources were controlled by cyclonic dry dust collectors. Three, two-hour tests were performed on each of the five points.

SUMMARY OF RESULTS

Summarized results of the particulate emission stack tests performed at Cargill, Inc. are included in Tables 1-5.

The Environmental Protection Agency (EPA) performed the analyses.

Complete particulate emission calculation data are included in Appendix A.

Complete plant operating data collected by the EPA are included in Appendix B.

SOURCE TEST DATA

TABLE 1

TEST NO - EPA 72-CI-28 (GRN) NO OF RUNS - 3
PLANT - CARGILL SIOUX CITY, IOWA
SOURCE - HAMMERMILL OUTLET
TYPE OF PLANT - FEED AND GRAIN MILL
CONTROL EQUIPMENT - DRY CYCLONIC DUST COLLECTOR
POLLUTANTS SAMPLED - PARTICULATES

	1	2	3
1) RUN NUMBER	1	2	3
2) DATE	6/20/72	6/21/72	6/21/72
3) TIME BEGAN	20:30	9:55	12:10
4) TIME END	23:02.5	11:45	13:50
5) BAROMETRIC PRESSURE, IN HG	28.6	28.78	28.78
6) METER ORIFICE PRESSURE DROP, IN HG	1.4	1.67	1.44
7) VOL DRY GAS METER COND, CUBIC FEET	58.645	65.517	51.093
8) AVERAGE GAS METER TEMPERATURE, DEG F	66.8	62.2	72.8
9) VOL DRY GAS, S.T.P. , CUBIC FEET	56.605	60.235	49.066
10) TOTAL H2O COLLECTED, ML	28	32	25
11) VOL H2O VAPOR COLLECTED, S.T.P. , CU FT	NA	NA	NA
12) STACK GAS MOISTURE, PERCENT VOLUME	2.3	2.3	2.4
13) ASSUMED STACK GAS MOISTURE, PCT VOL	2.3	2.3	2.3
14) PERCENT CO2	--	--	--
15) PERCENT O2	--	--	--
16) PERCENT CO	--	--	--
17) PERCENT N2	--	--	--
18) PERCENT EXCESS AIR , STACK GAS WAS AIR	NA	NA	NA
19) MOLECULAR WEIGHT OF STACK GAS, DRY	28.85	28.85	28.85
20) MOLECULAR WEIGHT OF STACK GAS, STK COND	28.6	28.6	28.59
21) STACK GAS SPECIFIC GRAVITY	0.99	0.99	0.99
22) AVG SQUARE ROOT (VEL HEAD), IN H2O	0.25	0.276	0.262
23) AVERAGE STACK GAS TEMPERATURE, DEG F	85.3	85.2	89.1
24) AVG SQUARE ROOT (STK TEMP×VEL HEAD)	5.842	6.45	6.138
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	28.6	28.78	28.78
27) STACK GAS VEL, STACK COND, F.P.M.	868.8	956.3	910
28) STACK AREA, SQ FEET	4.28	4.28	4.28
29) EFFECTIVE STACK AREA, SQUARE FEET	3.38	3.38	2.76
30) STACK GAS FLOW RATE, S.T.P. , SCFMD	2669	2956	2277
31) NET TIME OF TEST, MINUTES	95	95.0	77.
32) SAMPLING NOZZLE DIAMETER, INCHES	0.375	0.375	0.375
33) PERCENT ISOKINETIC	98.5	100.9	100.0
34) PARTICULATE EMISSIONS @ S.T.P., lb/hr			
FRONT HALF	0.06	0.07	0.05
BACK HALF	0.02	0.03	0.03
TOTALS	0.08	0.10	0.09

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

*Based upon wet and dry bulb thermometry

SOURCE TEST DATA

TABLE 2

TEST NO - EPA 72-CI-28 (GRN) NO OF RUNS - 3
PLANT - CARGILL SIOUX CITY, IOWA
SOURCE - COLUMN COOLER INLET
TYPE OF PLANT - FEED AND GRAIN MILL
CONTROL EQUIPMENT - DRY CYCLONIC DUST COLLECTOR
POLLUTANTS SAMPLED - PARTICULATES

	1	2	3
1) RUN NUMBER	1	2	3
2) DATE	6/22/72	6/23/72	6/23/72
3) TIME BEGAN	17:25	07:50	11:00
4) TIME END	19:51	10:00	14:20
5) BAROMETRIC PRESSURE, IN HG	28.91	28.8	28.8
6) METER ORIFICE PRESSURE DROP, IN HG	0.4	0.41	0.4
7) VOL DRY GAS METER COND, CUBIC FEET	46.511	45.928	46.112
8) AVERAGE GAS METER TEMPERATURE, DEG F	89.4	72.4	76
9) VOL DRY GAS, S.T.P. , CUBIC FEET	43.4	44.054	43.935
10) TOTAL H2O COLLECTED, ML	35	35	35
11) VOL H2O VAPOR COLLECTED, S.T.P. , CU FT	NA	NA	NA
12) STACK GAS MOISTURE, PERCENT VOLUME *	3.7	3.6	3.6
13) ASSUMED STACK GAS MOISTURE, PCT VOL	3.5	3.5	3.5
14) PERCENT CO2	--	--	--
15) PERCENT O2	--	--	--
16) PERCENT CO	--	---	--
17) PERCENT N2	--	--	--
18) PERCENT EXCESS AIR , STACK GAS WAS AIR	NA	NA	NA
19) MOLECULAR WEIGHT OF STACK GAS, DRY	28.85	28.85	28.85
20) MOLECULAR WEIGHT OF STACK GAS, STK COND	28.45	28.46	28.46
21) STACK GAS SPECIFIC GRAVITY	0.98	0.98	0.98
22) AVG SQUARE ROOT (VEL HEAD), IN H2O	1.307	1.329	1.308
23) AVERAGE STACK GAS TEMPERATURE, DEG F	111.5	113.9	117
24) AVG SQUARE ROOT (STK TEMP×VEL HEAD)	31.251	31.847	31.414
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	29.2	29	29
27) STACK GAS VEL, STACK COND, F.P.M.	4611.6	4715.3	4651.3
28) STACK AREA, SQ FEET	1.55	1.55	1.55
29) EFFECTIVE STACK AREA, SQUARE FEET	1.55	1.55	1.55
30) STACK GAS FLOW RATE, S.T.P. , SCFMD	6244	6305	6185
31) NET TIME OF TEST, MINUTES	120	120	120
32) SAMPLING NOZZLE DIAMETER, INCHES	0.125	0.125	0.125
33) PERCENT ISOKINETIC	105.6	105.9	107.7
34) PARTICULATE EMISSIONS @ S.T.P., lb/hr			
FRONT HALF	320.41	383.62	210.90
BACK HALF	0.14	0.15	0 08
TOTALS	320.54	383.77	210.98

S.T.P.↔ DRY, 70 DEGREES F, 29.92 INCHES MERCURY
*Based upon wet and dry bulb thermometry

SOURCE TEST DATA
TABLE 3

TEST NO - EPA 72-CI-28 (GRN) NO OF RUNS - 3
PLANT - CARGILL SIOUX CITY, IOWA
SOURCE - COLUMN COOLER OUTLET
TYPE OF PLANT - FEED AND GRAIN MILL
CONTROL EQUIPMENT - DRY CYCLONIC DUST COLLECTOR
POLLUTANTS SAMPLED - PARTICULATES

	1	2	3
1) RUN NUMBER	1	2	3
2) DATE	6/22/72	6/23/72	6/23/72
3) TIME BEGAN	17:20	07:50	11:11
4) TIME END	19:45	09:45	14:06
5) BAROMETRIC PRESSURE, IN HG	28.9	28.8	28.8
6) METER ORIFICE PRESSURE DROP, IN HG	1.65	1.35	1.87
7) VOL DRY GAS METER COND, CUBIC FEET	82.758	70.484	86.51
8) AVERAGE GAS METER TEMPERATURE, DEG F	79.1	68.7	86.1
9) VOL DRY GAS, S.T.P. , CUBIC FEET	78.914	68.247	81.199
10) TOTAL H2O COLLECTED, ML	59	55	63
11) VOL H2O VAPOR COLLECTED, S.T.P. , CU FT	NA	NA	NA
12) STACK GAS MOISTURE, PERCENT VOLUME *	3.4	3.7	3.5
13) ASSUMED STACK GAS MOISTURE, PCT VOL	3.3	3.3	3.3
14) PERCENT CO2	--	--	--
15) PERCENT O2	--	--	--
16) PERCENT CO	--	--	--
17) PERCENT N2	--	--	--
18) PERCENT EXCESS AIR, STACK GAS WAS AIR	NA	NA	NA
19) MOLECULAR WEIGHT OF STACK GAS, DRY	28.85	28.85	28.85
20) MOLECULAR WEIGHT OF STACK GAS, STK COND	28.48	28.45	28.47
21) STACK GAS SPECIFIC GRAVITY	0.98	0.98	0.98
22) AVG SQUARE ROOT (VEL HEAD), IN H2O	0.674	0.604	0.71
23) AVERAGE STACK GAS TEMPERATURE, DEG F	104.6	108.5	114.7
24) AVG SQUARE ROOT (STK TEMP×VEL HEAD)	16.009	14.396	17.012
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	28.9	28.8	28.8
27) STACK GAS VEL, STACK COND, F.P.M.	2373.4	2139.1	2527.2
28) STACK AREA, SQ FEET	4.75	4.75	4.75
29) EFFECTIVE STACK AREA, SQUARE FEET	4.35	4.35	4.35
30) STACK GAS FLOW RATE, S.T.P. , SCFMD	9039	8041	9410
31) NET TIME OF TEST, MINUTES	110	110	110
32) SAMPLING NOZZLE DIAMETER, INCHES	0.25	0.25	0.25
33) PERCENT ISOKINETIC	101.2	98.4	100.1
34) PARTICULATE EMISSIONS @ S.T.P., lb/hr			
FRONT HALF	0.23	0.35	0.22
BACK HALF	0.14	0.29	0.17
TOTALS	0.37	0.63	0.38

S.T.P.↔ DRY, 70 DEGREES F, 29.92 INCHES MERCURY
*Based upon wet and dry bulb thermometry

SOURCE TEST DATA
TABLE 4

TEST NO - EPA 72-CI-28 (GRN) NO OF RUNS - 3
PLANT - CARGILL SIOUX CITY, IOWA
SOURCE - PAN COOLER INLET
TYPE OF PLANT - FEED AND GRAIN MILL
CONTROL EQUIPMENT - DRY CYCLONIC DUST COLLECTOR
POLLUTANTS SAMPLED - PARTICULATES

	1	2	3
1)RUN NUMBER	1	2	3
2)DATE	6/21/72	6/22/72	6/22/72
3)TIME BEGAN	6:50	8:45	12:30
4)TIME END	9:10	11:05	14:35
5)BAROMETRIC PRESSURE, IN HG	28.78	28.9	28.91
6)METER ORIFICE PRESSURE DROP, IN HG	3.04	4.57	4.32
7)VOL DRY GAS METER COND, CUBIC FEET	118.191	140.691	142.783
8)AVERAGE GAS METER TEMPERATURE, DEG F	71.1	69.6	75.9
9)VOL DRY GAS, S.T.P. , CUBIC FEET	114.332	141.484	137.955
10)TOTAL H2O COLLECTED, ML	66	82	80
11)VOL H2O VAPOR COLLECTED, S.T.P. , CU FT	NA	NA	NA
12)STACK GAS MOISTURE, PERCENT VOLUME *	2.7	2.7	2.7
13)ASSUMED STACK GAS MOISTURE, PCT VOL	2.6	2.6	2.6
14)PERCENT CO2	--	--	--
15)PERCENT O2	--	--	--
16)PERCENT CO	--	--	--
17)PERCENT N2	--	--	--
18)PERCENT EXCESS AIR , STACK GAS WAS AIR	NA	NA	NA
19)MOLECULAR WEIGHT OF STACK GAS, DRY	28.85	28.85	28.85
20)MOLECULAR WEIGHT OF STACK GAS, STK COND	28.56	28.56	28.56
21)STACK GAS SPECIFIC GRAVITY	0.99	0.99	0.99
22)AVG SQUARE ROOT (VEL HEAD), IN H2O	0.905	1.095	1.066
23)AVERAGE STACK GAS TEMPERATURE, DEG F	95.9	90	99.3
24)AVG SQUARE ROOT (STK TEMP×VEL HEAD)	21.335	25.675	25.202
25)PITOT CORRECTION FACTOR	0.83	0.83	0.83
26)STACK PRESSURE, IN HG, ABSOLUTE	29	29.1	29.1
27)STACK GAS VEL, STACK COND, F.P.M.	3153.1	3788.1	3718.3
28)STACK AREA, SQ FEET	3.69	3.69	3.69
29)EFFECTIVE STACK AREA, SQUARE FEET	3.69	3.69	3.69
30)STACK GAS FLOW RATE, S.T.P. , SCFMD	10457	12750	12306
31)NET TIME OF TEST, MINUTES	120	120	120
32)SAMPLING NOZZLE DIAMETER, INCHES	0.25	0.25	0.25
33)PERCENT ISOKINETIC	98.5	100.1	101.1
34)PARTICULATE EMISSIONS @ S.T.P., lb/hr			
FRONT HALF	133.65	248.44	242.35
BACK HALF	0.05	0.08	0.11
TOTALS	133.69	248.52	242.47

S.T.P. ↔ DRY, 70 DEGREES F, 29.92 INCHES MERCURY
*Based upon wet and dry bulb thermometry

SOURCE TEST DATA
TABLE 5

TEST NO - EPA 72-CI-28 (GRN) NO OF RUNS - 3
PLANT - CARGILL SIOUX CITY, IOWA
SOURCE - PAN COOLER OUTLET
TYPE OF PLANT - FEED AND GRAIN MILL
CONTROL EQUIPMENT - DRY CYCLONIC COLLECTOR
POLLUTANTS SAMPLED - PARTICULATES

1) RUN NUMBER	1	2	3
2) DATE	6/21/72	6/22/72	6/22/72
3) TIME BEGAN	18:50	8:15	12:32
4) TIME END	21:11	11:05	14:40
5) BAROMETRIC PRESSURE, IN HG	28.78	28.91	28.91
6) METER ORIFICE PRESSURE DROP, IN HG	0.73	1.15	1.17
7) VOL DRY GAS METER COND, CUBIC FEET	62.065	77.225	78.785
8) AVERAGE GAS METER TEMPERATURE, DEG F	78.6	73.7	83.5
9) VOL DRY GAS, S.T.P. , CUBIC FEET	58.859	74.322	74.454
10) TOTAL H2O COLLECTED, ML	26	33	34
11) VOL H2O VAPOR COLLECTED, S.T.P. , CU FT	NA	NA	NA
12) STACK GAS MOISTURE, PERCENT VOLUME *	2.1	2.1	2.1
13) ASSUMED STACK GAS MOISTURE, PCT VOL	2	2	2
14) PERCENT CO2	--	--	--
15) PERCENT O2	--	--	--
16) PERCENT CO	--	--	--
17) PERCENT N2	--	--	--
18) PERCENT EXCESS AIR, STACK GAS WAS AIR	NA	NA	NA
19) MOLECULAR WEIGHT OF STACK GAS, DRY	28.85	28.85	28.85
20) MOLECULAR WEIGHT OF STACK GAS, STK COND	28.63	28.63	28.62
21) STACK GAS SPECIFIC GRAVITY	0.99	0.99	0.99
22) AVG SQUARE ROOT (VEL HEAD), IN H2O	0.447	0.545	0.552
23) AVERAGE STACK GAS TEMPERATURE, DEG F	88.7	89.1	97.2
24) AVG SQUARE ROOT (STK TEMP×VEL HEAD)	10.469	12.769	13.029
25) PITOT CORRECTION FACTOR	0.83	0.83	0.83
26) STACK PRESSURE, IN HG, ABSOLUTE	28.78	28.91	28.91
27) STACK GAS VEL, STACK COND, F.P.M.	1551.4	1887.9	1926.5
28) STACK AREA, SQ FEET	9.51	9.51	9.51
29) EFFECTIVE STACK AREA, SQUARE FEET	9.51	9.51	9.51
30) STACK GAS FLOW RATE, S.T.P. , SCFMD	13421	16393	16477
31) NET TIME OF TEST, MINUTES	117.5	120	120
32) SAMPLING NOZZLE DIAMETER, INCHES	0.25	0.25	0.25
33) PERCENT ISOKINETIC	104.1	105.4	105
34) PARTICULATE EMISSIONS @ S.T.P., lb/hr			
FRONT HALF	15.07	21.86	9.32
BACK HALF	0.29	1.01	0.40
TOTALS	15.36	22.87	9.72

S.T.P. ↔ DRY, 70 DEGREES F, 29.92 INCHES MERCURY
*Based upon wet and dry bulb thermometry

LOCATION OF SAMPLING POINTS

Sampling ports and points were selected by using the guidelines stated in Method 1 of the Federal Register (36. F. R. 24882, 24883, December 23, 1971).

Figures 1-8 are diagrams of the sources sampled.

Table 6 is the location of sampling points for each source.

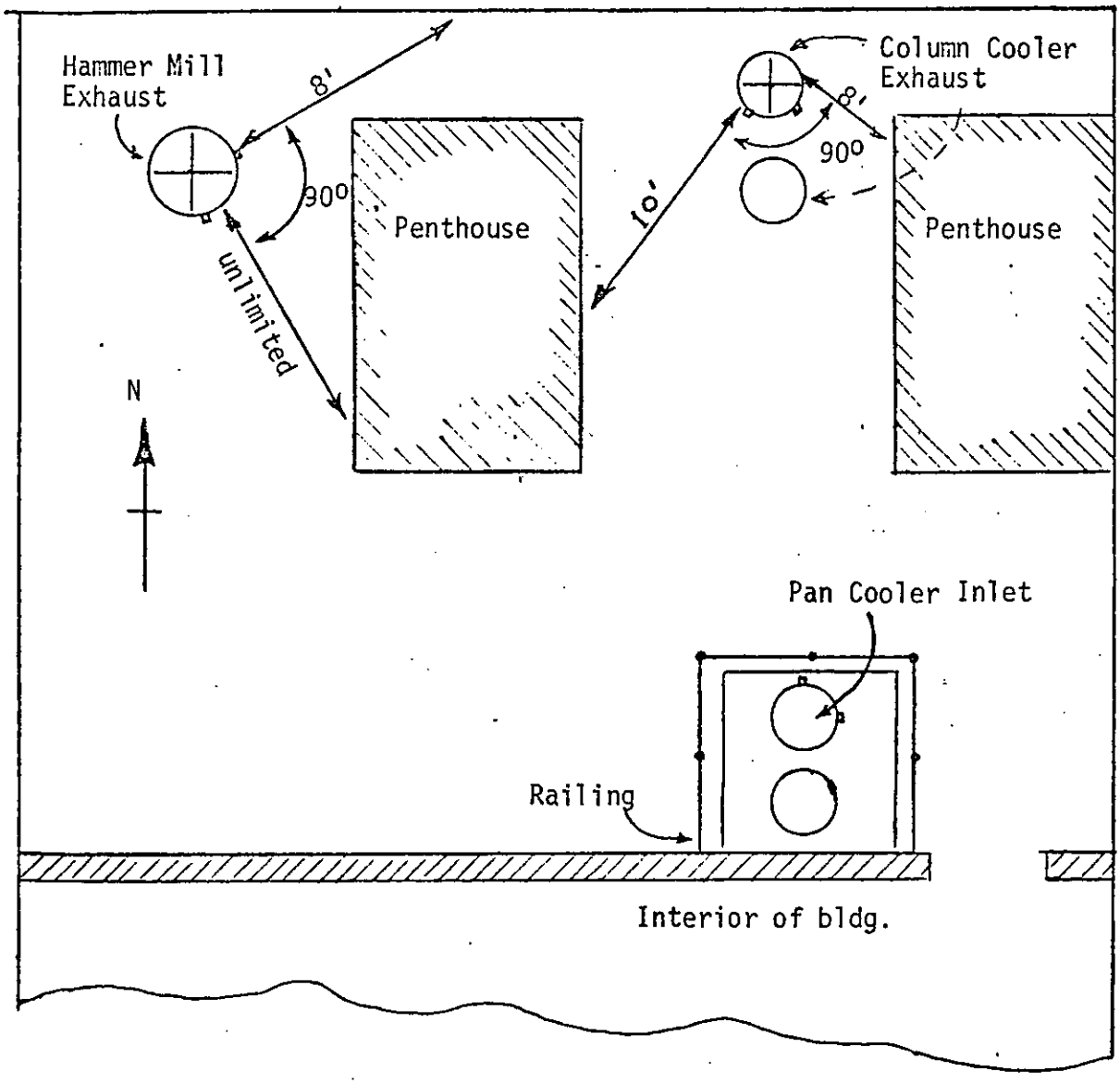

Figure 1. Top View of Roof at 4th Floor Level

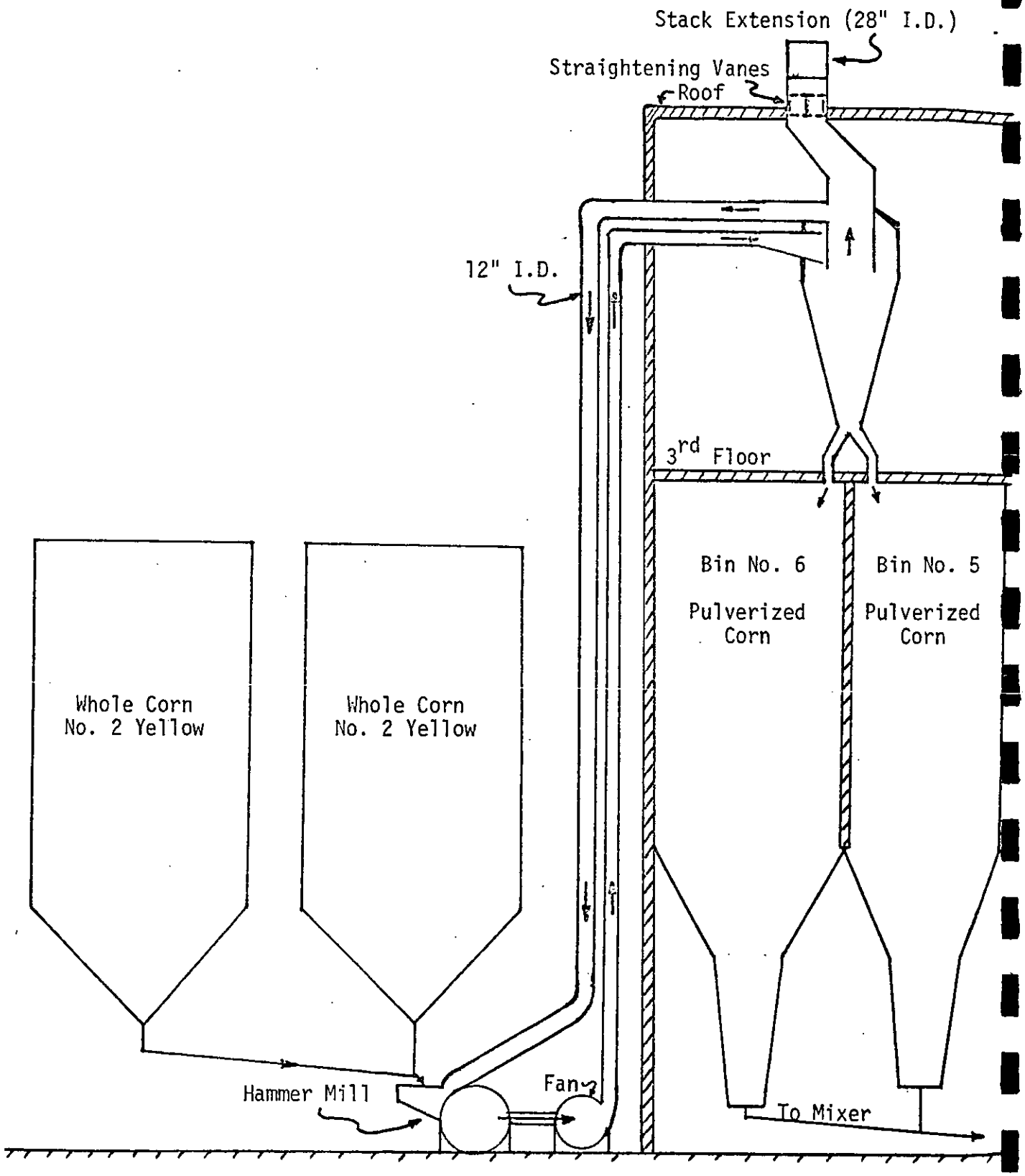

Figure 2. Hammer Mill System

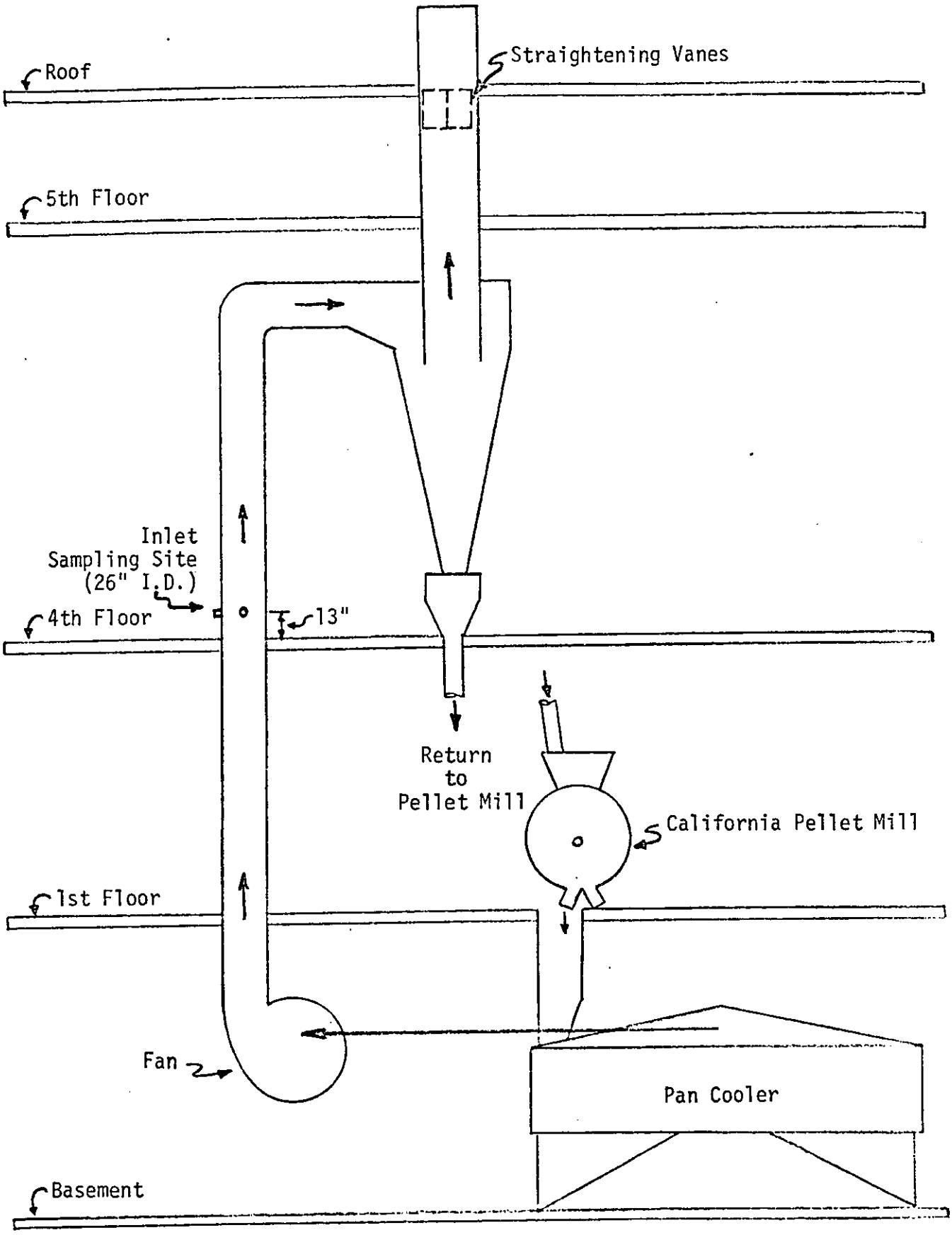

Figure 3. Pan Cooler System

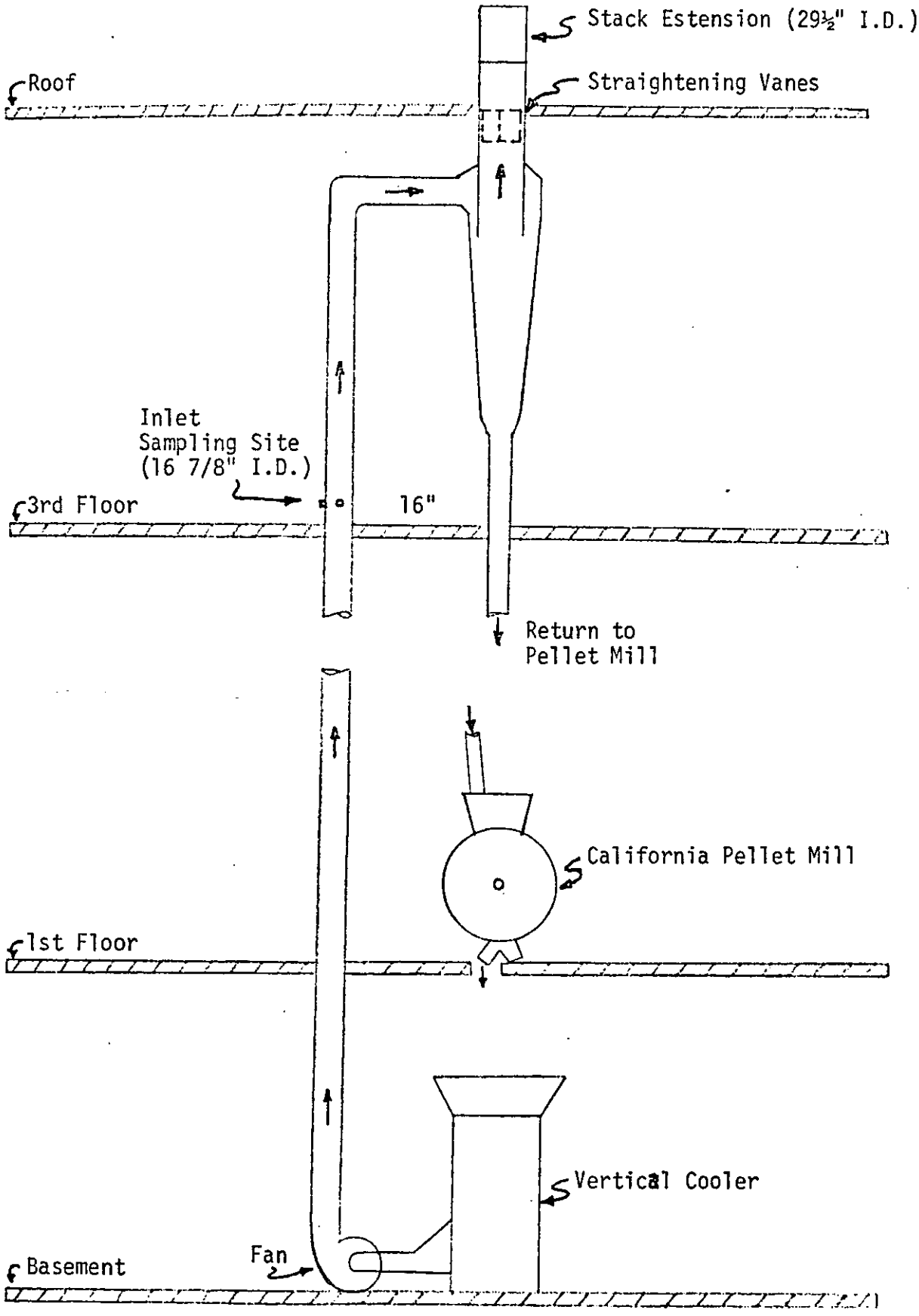

Figure 4. Column Cooler System

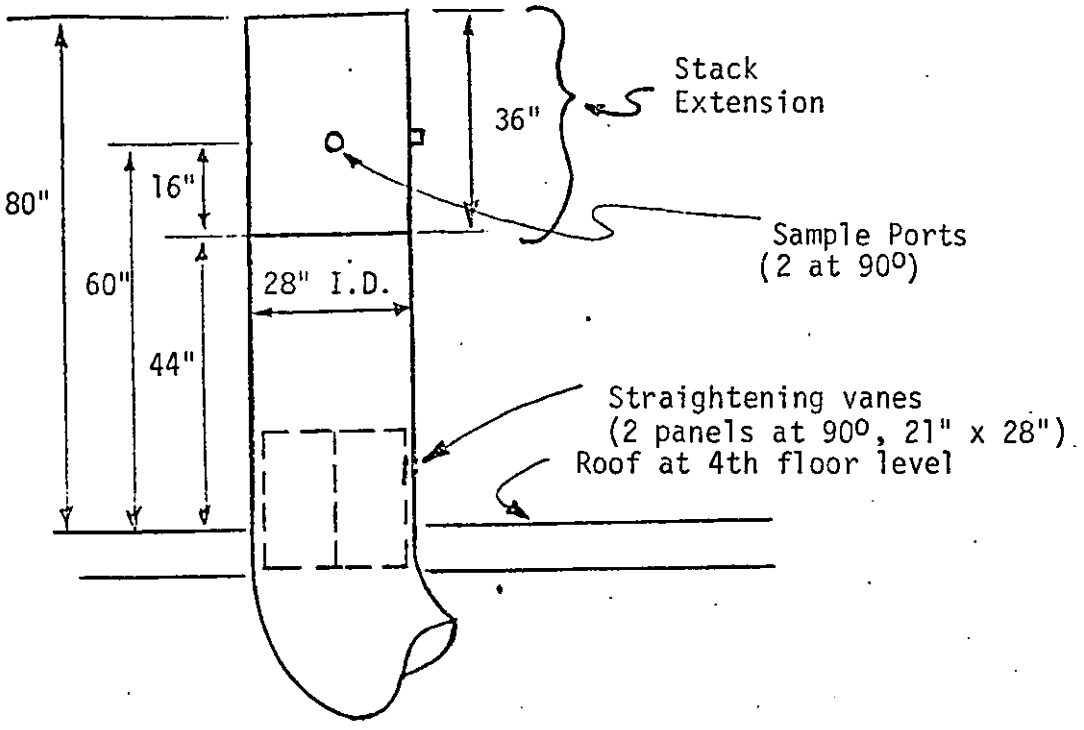

Figure 5. Hammer Mill Exhaust

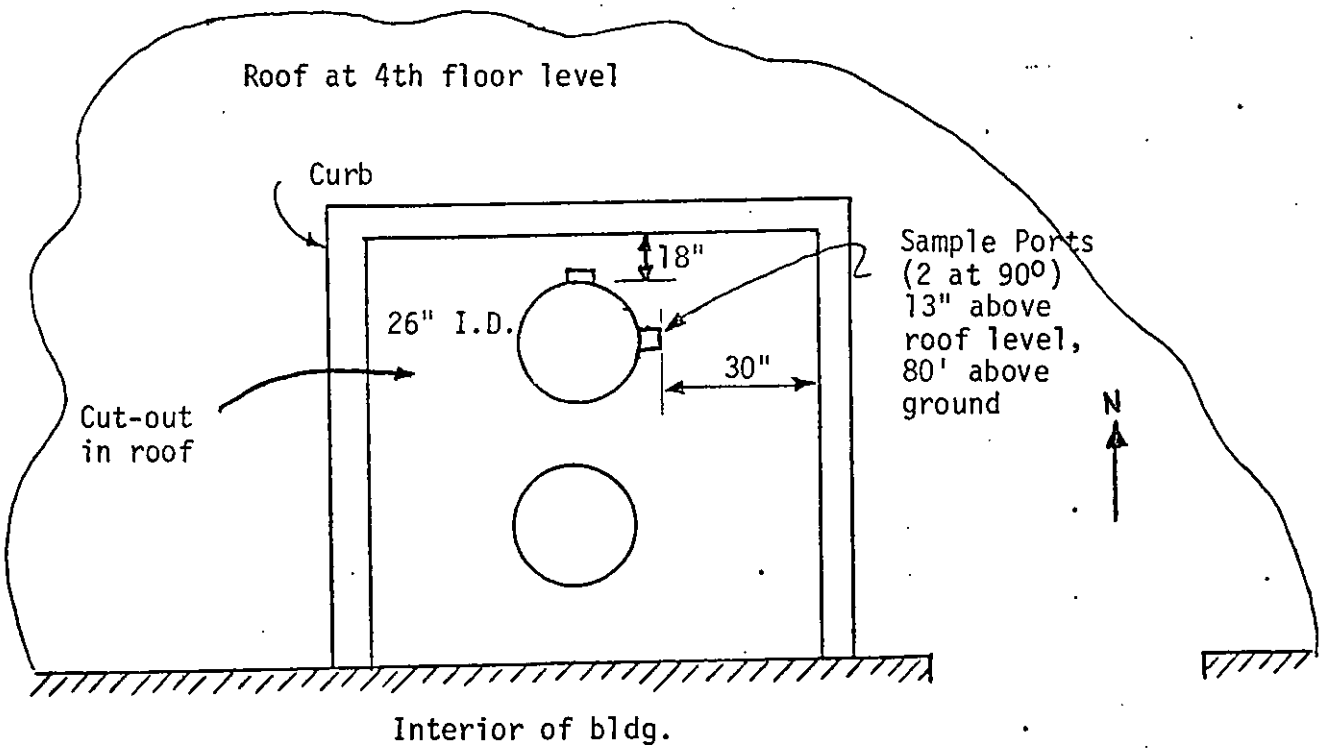

Figure 6. Pan Cooler Inlet

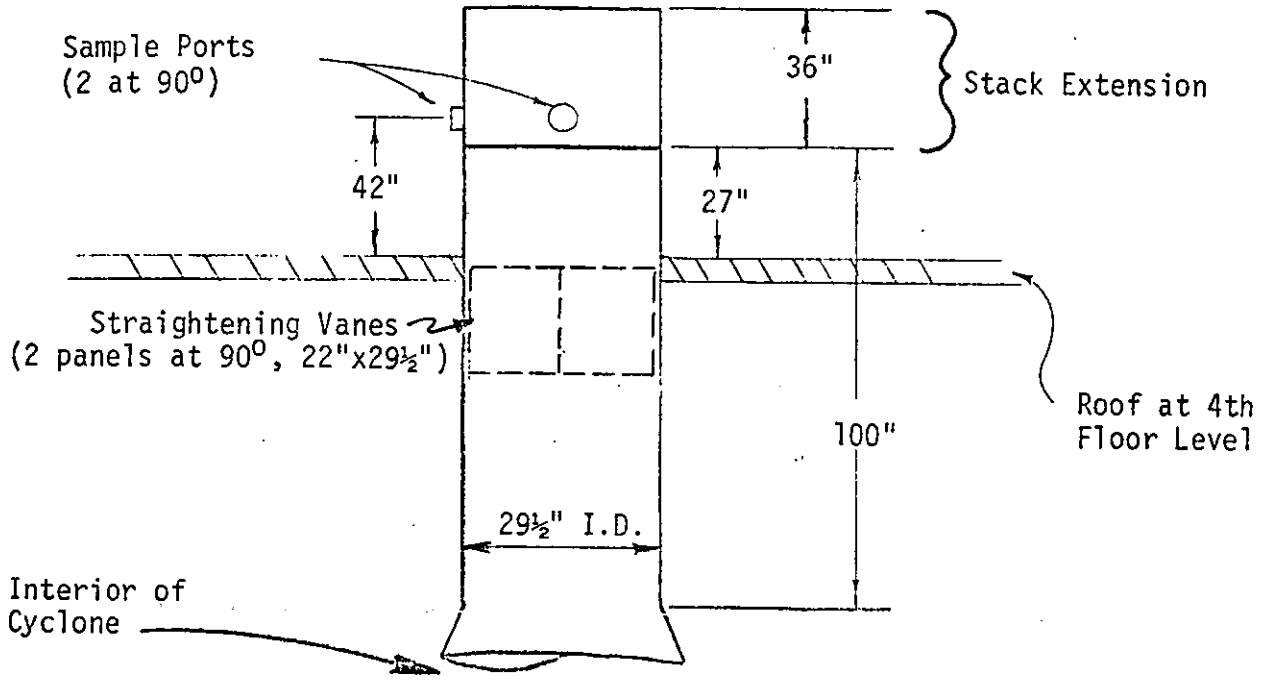

Figure 7. Column Cooler Exhaust (Side View)

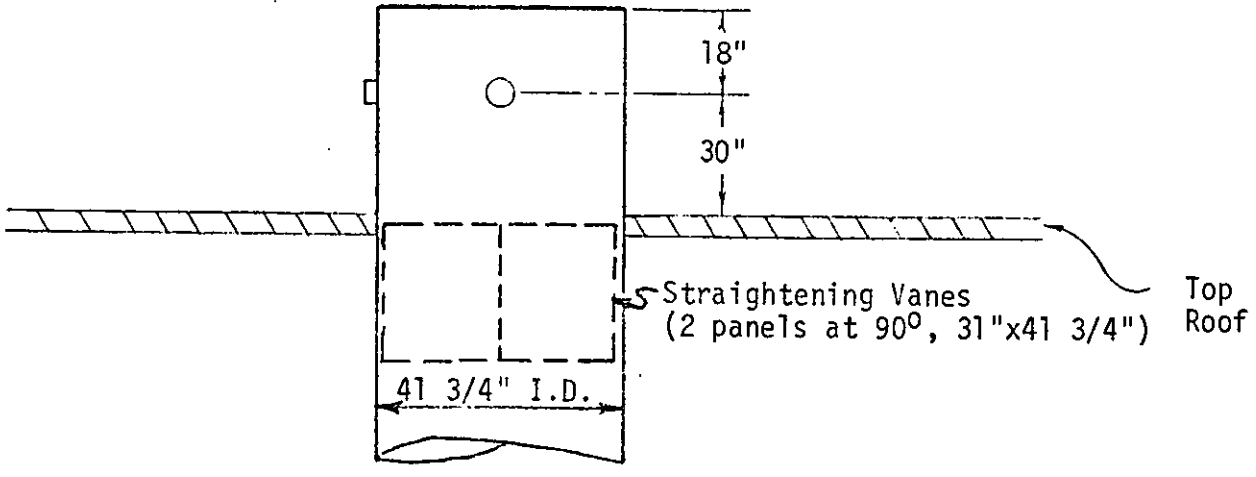

Figure 8. Pan Cooler Exhaust (Side View)

TABLE 6

Location of Sampling Points

Source \ Points	Distance From Inside Stack Wall																							
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Hammer Mill	1 1/2	1 1/2	1 1/2	2 7/32	2 15/16	3 11/16	4 1/2	5 11/32	6 7/16	7 19/32	9 1/16	11 1/8	16 7/8	19	20 13/32	21 19/32	22 19/32	23 1/2	24 11/32	25	25 13/16	26 7/16	26 7/16	26 7/16
Column Cooler (Inlet)	1	2 1/2	5	11 7/8	14 3/8	15 7/8																		
Column Cooler (Outlet)	1 5/8	1 5/8	1 5/8	2 21/64	3 3/32	3 29/32	4 3/4	5 23/32	6 25/32	8 1/32	9 17/32	11 3/4	17 3/4	19 31/32	21 15/32	22 23/32	23 25/32	24 3/4	25 39/64	26 13/32	27 11/64	27 7/8	27 7/8	27 7/8
Pan Cooler (Inlet)	1 5/32	3 13/16	7 11/16	18 15/16	22 3/16	24 27/32																		
Pan Cooler (Outlet)	1 5/16	1 5/16	2 19/64	3 19/64	4 3/8	5 1/2	6 3/4	8 3/32	9 39/64	11 23/64	13 1/2	16 39/64	25 1/8	28 1/4	30 25/64	32 9/64	33 21/32	35	36 15/64	37 3/8	38 29/64	39 29/64	40 13/32	40 13/32

SAMPLING AND ANALYTICAL PROCEDURES FOR PARTICULATE EMISSIONS FROM STATIONARY SOURCES

The method used was Method 5 of the Federal Register (36 F.R., March 31, 1971), Determination of Particulate Emissions From Stationary Sources.

The complete description of the sampling method used is in Appendix D.

The EPA performed the sample analyses.

July 1972

72-CI-28 (GRN)
SOURCE TEST REPORT
ON MEASUREMENT OF EMISSIONS FROM
CARGILL, INC.
SIOUX CITY, IOWA
FOR
ENVIRONMENTAL PROTECTION AGENCY
UNITED STATES GOVERNMENT
THOMAS E. WARD
PROJECT TEST OFFICER

SOURCE TEST REPORT

PLANT TESTED: Cargill, Inc.
Sioux City, Iowa

TESTOR: Environmental Engineering, Inc.
2324 Southwest 34 Street
Gainesville, Florida 32601

CONTRACT NO: 68-02-0232-Task Order 9

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INTRODUCTION

Particulate emission tests were performed on three separate sources located at the Cargill, Inc. Feed and Grain Mill in Sioux City, Iowa. The testing was performed during the week of June 19, 1972.

The sources tested were the Hammer Mill, the Column Cooler inlet and outlet, and the Pan Cooler inlet and outlet.

All three sources were controlled by cyclonic dry dust collectors. Three, two-hour tests were performed on each of the five points.

APPENDIX A

Particulate Emission Calculations

E.E.I. SOURCE SAMPLING NOMENCLATURE SHEET

PB - Barometric pressure, inches Hg
PS - Stack pressure, inches Hg
As - Stack area, sq. ft.
AS'- Effective area of positive stack gas flow, sq. ft.
NPTS - Number of traverse points where the pitot velocity head was greater than zer
TS - Stack temperature, °R
TM - Meter temperature, °R
$\overline{H}$ - Average square root of velocity head, $\sqrt{\text{inches } H_2O}$
$\overline{\Delta H}$ - Average meter orifice pressure differential, inches H_2O
AN - Sampling nozzle area, square feet
CP - S-type pitot tube correction factor
VM - Recorded meter volume sample, cubic feet (meter conditions)
VC - Condensate and silica gel increase in impringers, milliliters
Po - Pressure at the dry test meter orifice, $\left[PB + \frac{\overline{\Delta H}}{13.6}\right]$ inches Hg
STP - Standard conditions, dry, 70°F, 29.92 inches Hg

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VWV - Conversion of condensate in milliliters to water vapor in cubic feet (STP)
VSTPD - Volume sampled, cubic feet (STP)
VT - Total water vapor volume and dry gas volume sampled, cubic feet (STP)
W - Moisture fraction of stack gas
FDA - Dry gas fraction
MD - Molecular weight of stack gas, lbs/lb-mole (dry conditions)
MS - Molecular weight of stack gas, lbs/lb-mole (stack conditions)
GS - Specific gravity of stack gas, referred to air
EA - Excess air, %
$\sqrt{\overline{H \times TS}}$ - Average square root of velocity head times stack temperature
$\overline{U}$ - Stack gas velocity, feet per minute
QS - Stack gas flow rate, cubic feet per minute (stack conditions)
QD - Stack gas flow rate, cubic feet per minute (dry conditions)
QSTPD - Stack gas flow rate, cubic feet per minute (STP)
PISO - Percent isokinetic volume sampled (method described in Federal Register)
Y - Particulate Lab Analysis, grams
ESTP - Particulate Concentration, grains per standard cubic feet
EM - Particulate Emission Rate, pounds per hour

ENVIRONMENTAL ENGINEERING, INCORPORATED
SOURCE SAMPLING CALCULATIONS

PLANT- CARGILL SIOUX CITY, IOWA — DATE- 6/20/72
STACK- PALMERMILL OUTLET — RUN 1 FROM 20:30-23:02.5
WEATHER CONDITIONS- CLEAR AND COLD — PR- 28.6 IN.HG — PS- 28.6 IN HG
AS'- 3.38 SQ. FEET — TS- 545.3 DEGREES R — TM- 526.8 DEGREES R — H- 0.25 IN H2O
ΔH- 1.4 IN H2O — AN- 0.000767 SQ. FEET — CP- 0.83 — VM- 58.645 CF — VC- 28 ML
TOTAL TIME- 95 MIN — NPTS- 38 — ORSAT: AIR

1) VWV = (0.0474)×(VC)	1) NA	SCF
2) VSTPD= ((530)×(VM)×(PB+(ΔH÷13.6)))÷(29.92×TM)	2) 56.605	SCF
3) VT = (VWV) + (VSTPD)	3) NA	SCF
4) W = (VWV) ÷ (VT)	4) 0.023	
5) FDA = (1.0 - W)	5) 0.977	
6) ASSUMED MOISTURE FRACTION	6) 0.023	
7) MD = (.44×CO2) + (.32×O2) + (.28×(CO+N2))	7) 28.85	
8) MS = (MD×FDA) + (18×W)	8) 28.6	
9) GS = (MS) ÷ (28.99)	9) 0.98	
10) EA = (100)×(O2-0.5×CO)÷((0.266×N2)-(O2-0.5×CO))	10) NA	%
11) AVG(√(H×TS)) = (1÷H)×SUM(√(H×TS))	11) 5.842	
12) U = (174×CP×(√(29.92÷PS×GS)))×AVG(√(H×TS))	12) 868.8	FPS
13) QS = (U) × (AS')	13) 2940	ACFS
14) QD = (QS) × (FDA)	14) 2873	CFM
15) QSTPD= (QD) × (530÷TS) × (PS÷29.92)	15) 2660	SCFM
16) PISO = ((0.00267×VC×TS)+(PO×TS×VM÷TM)) ÷ (TIME×U×PS×AN)	16) 98.5	%
17) ESTP = (15.43×Y) ÷ (VSTPD) — UNITS : GRAINS/SCF		
18) E12 = (12×ESTP) ÷ (%CO2) — UNITS : GRAINS/SCF		
19) E50 = (ESTP×(100+EA)) ÷ (150) — UNITS : GRAINS/SCF		
20) EM = (0.00857)×(ESTP)×(QSTPD) — UNITS : POUNDS/HOUR		

PARTICULATE LAB ANALYSIS(GM) (Y)			PARTICULATE CONCENTRATIONS(GR/SCF) (ESTP)	(E12)	(E50)	EMISSION RAT (EM) (LBS/H
FRONT HALF	-	.0098	.0027			0.06
BACK HALF	-	.0038	.0010			0.02
TOTALS	-	.0136	.0037			0.08

COMMENTS : MOISTURE WAS DETERMINED BY DRY-BULB & WET BULB THERMOMETRY

TEST CONDUCTED BY : _____

environmental engineering, inc.

ENVIRONMENTAL ENGINEERING, INCORPORATED
SOURCE SAMPLING CALCULATIONS

PLANT- CARGILL SIOUX CITY, IOWA — DATE- 6/21/72
STACK- HAMMERMILL OUTLET — RUN 2 FROM 9:55-11:45
WEATHER CONDITIONS- CLEAR AND COLD — PB- 28.78 IN HG — PS- 28.78 IN HG
AS'- 3.38 SQ. FEET — TS- 545.2 DEGREES R — TM- 522.2 DEGREES R — H- 0.276 IN H2O
ΔH- 1.67 IN H2O — AN- 0.000767 SQ. FEET — CP- 0.83 — VM- 65.517 CF — VC- 32 ML
TOTAL TIME- 95 MIN — NPTS- 38 — ORSAT: AIR

1) VWV = (0.0474)×(VC)	1)	NA SCF
2) VSTPD= ((530)×(VM)×(PB+(ΔH÷13.6)))÷(29.92×TM)	2)	64.235 SCF
3) VT = (VWV) + (VSTPD)	3)	NA SCF
4) W = (VWV) ÷ (VT)	4)	0.023
5) FDA = (1.0 - W)	5)	0.977
6) ASSUMED MOISTURE FRACTION	6)	0.023
7) MD = (.44×CO2) + (.32×O2) + (.28×(CO+N2))	7)	28.85
8) MS = (MD×FDA) + (18×W)	8)	28.6
9) GS = (MS) ÷ (28.99)	9)	0.99
10) EA = (100)×(O2-0.5×CO)÷((0.266×N2)-(O2-0.5×CO))	10)	NA %
11) AVG(√(H×TS)) = (1÷N)×SUM(√(H×TS))	11)	6.45
12) U = (174×CP×(√(29.92÷PS×GS)))×AVG(√(H×TS))	12)	956.3 FPS
13) QS = (U) × (AS')	13)	3236 ACFM
14) QD = (QS) × (FDA)	14)	3161 CFM
15) QSTPD= (QD) × (530÷TS) × (PS÷29.92)	15)	2956 SCFM
16) PISO = ((0.00267×VC×TS)+(PO×TS×VM÷TM)) ÷ (TIME×U×PS×AN)	16)	100.9 %
17) ESTP = (15.43×Y) ÷ (VSTPD) — UNITS : GRAINS/SCF		
18) E12 = (12×ESTP) ÷ (%CO2) — UNITS : GRAINS/SCF		
19) E50 = (ESTP×(100+EA)) ÷ (150) — UNITS : GRAINS/SCF		
20) EM = (0.00857)×(ESTP)×(QSTPD) — UNITS : POUNDS/HOUR		

PARTICULATE LAB ANALYSIS(GM) (Y)			PARTICULATE CONCENTRATIONS(GR/SCF) (ESTP)	(E12)	(E50)	EMISSION RAT (EM) (LBS/H
FRONT HALF	-	.0120	.0029			0.07
BACK HALF	-	.0045	.0011			0.03
TOTALS	-	.0165	.0040			0.10

COMMENTS : SEE RUN #1

TEST CONDUCTED BY : _____

environmental engineering, inc.

ENVIRONMENTAL ENGINEERING, INCORPORATED
SOURCE SAMPLING CALCULATIONS

PLANT- CARGILL SIOUX CITY, IOWA — DATE- 6/21/72
STACK- HAMMERMILL OUTLET — RUN 3 FROM 12:10-13:50
WEATHER CONDITIONS- CLEAR AND COLD — PB- 28.78 IN HG — PS- 28.78 IN HG
AS'- 2.76 SQ. FEET — TS- 549.1 DEGREES R — TM- 532.8 DEGREES R — H- 0.262 IN H2O
ΔH- 1.44 IN H2O — AN- 0.000767 SQ. FEET — CP- 0.83 — VM- 51.093 CF — VC- 25 ML
TOTAL TIME- 77.5 MIN — NPTS- 31 — ORSAT: AIR

1) VWV = (0.0474)×(VC)	1) NA	SCF
2) VSTPD = ((530)×(VM)×(PB+(ΔH÷13.6)))÷(29.92×TM)	2) 40.066	SCF
3) VT = (VWV) + (VSTPD)	3) NA	SCF
4) W = (VWV) ÷ (VT)	4) 0.024	
5) FDA = (1.0 - W)	5) 0.976	
6) ASSUMED MOISTURE FRACTION	6) 0.023	
7) MD = (.44×CO2) + (.32×O2) + (.28×(CO+N2))	7) 28.85	
8) MS = (MD×FDA) + (18×W)	8) 28.59	
9) GS = (MS) ÷ (28.99)	9) 0.99	
10) EA = (100)×(O2-0.5×CO)÷((0.266×N2)-(O2-0.5×CO))	10) NA	%
11) AVG(√(H×TS)) = (1÷N)×SUM(√(H×TS))	11) 6.138	
12) U = (174×CP×(√(29.92÷PS×GS))×AVG(√(H×TS))	12) 910	FEET
13) QS = (U) × (AS')	13) 2512	ACFM
14) QD = (QS) × (FDA)	14) 2452	CFM
15) QSTPD = (QD) × (530÷TS) × (PS÷29.92)	15) 2277	SCFM
16) PISO = ((0.00267×VC×TS)+(PO×TS×VM÷TM)) ÷ (TIME×U×PS×AN)	16) 100.0	%
17) ESTP = (15.43×Y) ÷ (VSTPD) — UNITS : GRAINS/SCF		
18) E12 = (12×ESTP) ÷ (%CO2) — UNITS : GRAINS/SCF		
19) E50 = (ESTP×(100+EA)) ÷ (150) — UNITS : GRAINS/SCF		
20) EM = (0.00857)×(ESTP)×(QSTPD) — UNITS : POUNDS/HOUR		

PARTICULATE LAB ANALYSIS(GM) (Y)			PARTICULATE CONCENTRATIONS(GR/SCF) (ESTP)	(E12)	(E50)	EMISSION RAT (EM) (LBS/H
FRONT HALF	-	.0089	.0028			0.05
BACK HALF	-	.0056	.0018			0.03
TOTALS	-	.0145	.0046			0.09

COMMENTS : SEE RUN #1

TEST CONDUCTED BY : _____

environmental engineering, inc.

ENVIRONMENTAL ENGINEERING, INCORPORATED
SOURCE SAMPLING CALCULATIONS

PLANT- CARGILL SIOUX CITY, IOWA — DATE- 6/22/72
STACK- COLUMN COOLER INLET — RUN 1 FROM 17:25-19:51
WEATHER CONDITIONS- CLEAR — PB- 28.91 IN HG — PS- 29.2 IN HG
AS'- 1.55 SQ. FEET — TS- 571.5 DEGREES R — TM- 549.4 DEGREES R — H- 1.307 IN H2O
ΔH- 0.4 IN H2O — AN- 8.5E-5 SQ. FEET — CP- 0.83 — VM- 46.511 CF — VC- 35 ML
TOTAL TIME- 120 MIN — NPTS- 24 — ORSAT: AIR

1) VWV = (0.0474)×(VC)	1) NA	SCF
2) VSTPD= ((530)×(VM)×(PB+(ΔH÷13.6)))÷(29.92×TM)	2) 43.4	SCF
3) VT = (VWV) + (VSTPD)	3) NA	SCF
4) W = (VWV) ÷ (VT)	4) 0.037	
5) FDA = (1.0 - W)	5) 0.963	
6) ASSUMED MOISTURE FRACTION	6) 0.035	
7) MD = (.44×CO2) + (.32×O2) + (.28×(CO+N2))	7) 28.85	
8) MS = (MD×FDA) + (18×W)	8) 28.45	
9) GS = (MS) ÷ (28.99)	9) 0.99	
10) EA = (100)×(O2-0.5×CO)÷((0.266×N2)-(O2-0.5×CO))	10) N/A	%
11) AVG(√(H×TS)) = (1÷N)×SUM(√(H×TS))	11) 31.251	
12) Q = (174×CP×(√(29.92÷PS×GS))×AVG(√(H×TS))	12) 4611.6	FP
13) QS = (Q) × (AS')	13) 7163	ACF
14) QD = (QS) × (FDA)	14) 6899	CFM
15) QSTPD= (QD) × (530÷TS) × (PS÷29.92)	15) 6240	SCF
16) PISO = ((0.00267×VC×TS)+(PO×TS×VM÷TM)) ÷ (TIME×Q×PS×AN)	16) 105.6	%
17) ESTP = (15.43×Y) ÷ (VSTPD) — UNITS : GRAINS/SCF		
18) E12 = (12×ESTP) ÷ (%CO2) — UNITS : GRAINS/SCF		
19) E50 = (ESTP×(100+EA)) ÷ (150) — UNITS : GRAINS/SCF		
20) EM = (0.00857)×(ESTP)×(QSTPD) — UNITS : POUNDS/HOUR		

PARTICULATE LAB ANALYSIS(GM) (Y)			PARTICULATE CONCENTRATIONS(GR/SCF) (ESTP)	(E12)	(E50)	EMISSION RAT (EM) (LBS/H
FRONT HALF	-	16.8417	5.9877			320.41
BACK HALF	-	.0072	.0026			0.14
TOTALS	-	16.8489	5.9903			320.54

COMMENTS : SEE RUN # 1 (HAMMER MILL OUTLET)

TEST CONDUCTED BY : _____

environmental engineering, inc.

ENVIRONMENTAL ENGINEERING, INCORPORATED
SOURCE SAMPLING CALCULATIONS

PLANT- CARGILL SIOUX CITY, IOWA — DATE- 6/23/72
STACK- COLUMN COOLER INLET — RUN 2 FROM 07:50-10:00
WEATHER CONDITIONS- CLEAR — PB- 28.8 IN HG — PS- 29 IN HG
AS'- 1.55 SQ. FEET — TS- 573.9 DEGREES R — TM- 532.4 DEGREES R — H- 1.329 IN H2O
ΔH- 0.41 IN H2O — AN- 8.5E-5 SQ. FEET — CP- 0.83 — VM- 45.928 CF — VC- 35 ML
TOTAL TIME- 120 MIN — NPTS- 24 — ORSAT: AIR

1) VWV = (0.0474)×(VC)	1)	NA SCF
2) VSTPD= ((530)×(VM)×(PB+(ΔH÷13.6)))÷(29.92×TM)	2)	44.058 SCF
3) VT = (VWV) + (VSTPD)	3)	NA SCF
4) W = (VWV) ÷ (VT)	4)	0.036
5) FDA = (1.0 - W)	5)	0.964
6) ASSUMED MOISTURE FRACTION	6)	0.035
7) MD = (.44×CO2) + (.32×O2) + (.28×(CO+N2))	7)	28.85
8) MS = (MD×FDA) + (18×W)	8)	28.46
9) GS = (MS) ÷ (28.99)	9)	0.98
10) EA = (100)×(O2-0.5×CO)÷((0.266×N2)-(O2-0.5×CO))	10)	0.0 %
11) AVG(√(H×TS)) = (1÷N)×SUM(√(H×TS))	11)	31.847
12) U = (174×CP×(√(29.92÷PS×GS)))×AVG(√(H×TS))	12)	4715.3 FP
13) QS = (U) × (AS')	13)	7309 ACF
14) QD = (QS) × (FDA)	14)	7044 CFM
15) QSTPD= (QD) × (530÷TS) × (PS÷29.92)	15)	6305 SCF
16) PISO = ((0.00267×VC×TS)+(PO×TS×VM÷TM)) ÷ (TIME×U×PS×AN)	16)	105.9 %
17) ESTP = (15.43×Y) ÷ (VSTPD) — UNITS : GRAINS/SCF		
18) E12 = (12×ESTP) ÷ (%CO2) — UNITS : GRAINS/SCF		
19) E50 = (ESTP×(100+EA)) ÷ (150) — UNITS : GRAINS/SCF		
20) EM = (0.00857)×(ESTP)×(QSTPD) — UNITS : POUNDS/HOUR		

PARTICULATE LAB ANALYSIS(GM) (Y)		PARTICULATE CONCENTRATIONS(GR/SCF) (ESTP)	(E12)	(E50)	EMISSION RAT (EM) (LBS/H
FRONT HALF	- 20.2701	7.0996			383.62
BACK HALF	- .0079	.0028			0.15
TOTALS	- 20.2780	7.1023			383.77

COMMENTS : See Run # 1 (Hammer Mill Outlet)

TEST CONDUCTED BY : _____

environmental engineering, inc.

ENVIRONMENTAL ENGINEERING, INCORPORATED
SOURCE SAMPLING CALCULATIONS

PLANT- CARGILL SIOUX CITY, IOWA — DATE- 6/23/72
STACK- COLUMN COOLER INLET — RUN 3 FROM 11:00-14:20
WEATHER CONDITIONS- CLEAR — PB- 28.8 IN HG — PS- 29 IN HG
AS'- 1.55 SQ. FEET — TS- 577 DEGREES R — TM- 536 DEGREES R — H- 1.308 IN H2O
ΔH- 0.4 IN H2O — AN- 8.5E-5 SQ. FEET — CP- 0.83 — VM- 46.112 CF — VC- 35 ML
TOTAL TIME- 120 MIN — NPTS- 24 — ORSAT: AIR

1)VWV = (0.0474)×(VC)	1)	NA SCF
2)VSTPD= ((530)×(VM)×(PB+(ΔH÷13.6)))÷(29.92×TM)	2)	43.935 SCF
3)VT = (VWV) + (VSTPD)	3)	NA SCF
4)W = (VWV) ÷ (VT)	4)	0.036
5)FDA = (1.0 - W)	5)	0.964
6)ASSUMED MOISTURE FRACTION	6)	0.035
7)MD = (.44×CO2) + (.32×O2) + (.28×(CO+N2))	7)	28.85
8)MS = (MD×FDA) + (18×W)	8)	28.46
9)GS = (MS) ÷ (28.99)	9)	0.98
10)EA = (100)×(O2-0.5×CO)÷((0.266×N2)-(O2-0.5×CO))	10)	61.5 %
11)AVG(√(H×TS)) = (1÷N)×SUM(√(H×TS))	11)	31.414
12)U = (174×CP×(√(29.92÷PS×GS)))×AVG(√(H×TS))	12)	4651.3 FPS
13)QS = (U) × (AS')	13)	7209 ACFS
14)QD = (QS) × (FDA)	14)	6947 CFMD
15)QSTPD= (QD) × (530÷TS) × (PS÷29.92)	15)	6185 SCFD
16)PISO = ((0.00267×VC×TS)+(PO×TS×VM÷TM)) ÷ (TIME×U×PS×AN)	16)	107.7 %
17)ESTP = (15.43×Y) ÷ (VSTPD) — UNITS : GRAINS/SCF		
18)E12 = (12×ESTP) ÷ (%CO2) — UNITS : GRAINS/SCF		
19)E50 = (ESTP×(100+EA)) ÷ (150) — UNITS : GRAINS/SCF		
20)EM = (0.00857)×(ESTP)×(QSTPD) — UNITS : POUNDS/HOUR		

PARTICULATE LAB ANALYSIS(GM) (Y)			PARTICULATE CONCENTRATIONS(GR/SCF) (ESTP)	(E12)	(E50)	EMISSION RAT (EM) (LBS/H
FRONT HALF	-	11.3295	3.9789			210.90
BACK HALF	-	.0043	.0015			0.08
TOTALS	-	11.3338	3.9804			210.98

COMMENTS : SEE RUN # 1 (HAMMER MILL OUTLET)

TEST CONDUCTED BY : _____

environmental engineering, inc.

ENVIRONMENTAL ENGINEERING, INCORPORATED
SOURCE SAMPLING CALCULATIONS

PLANT- CARGILL SIOUX CITY, IOWA — DATE- 6/22/72
STACK- COLUMN COOLER OUTLET — RUN 1 FROM 17:20-19:45
WEATHER CONDITIONS- CLEAR — PB- 28.9 IN HG — PS- 28.9 IN HG
AS'- 4.35 SQ. FEET — TS- 564.6 DEGREES R — TM- 539.1 DEGREES R — H- 0.674 IN H2O
ΔH- 1.65 IN H2O — AN- 0.000341 SQ. FEET — CP- 0.83 — VM- 82.758 CF — VC- 59 ML
TOTAL TIME- 110 MIN — NPTS- 44 — ORSAT: AIR

1) VWV = (0.0474)×(VC)	1) KA	SCF
2) VSTPD = ((530)×(VM)×(PB+(ΔH÷13.6)))÷(29.92×TM)	2) 78.814	SCF
3) VT = (VWV) + (VSTPD)	3) KA	SCF
4) W = (VWV) ÷ (VT)	4) 0.034	
5) FDA = (1.0 - W)	5) 0.966	
6) ASSUMED MOISTURE FRACTION	6) 0.033	
7) MD = (.44×CO2) + (.32×O2) + (.28×(CO+N2))	7) 28.85	
8) MS = (MD×FDA) + (18×W)	8) 28.48	
9) GS = (MS) ÷ (28.99)	9) 0.98	
10) EA = (100)×(O2-0.5×CO)÷((0.266×N2)-(O2-0.5×CO))	10) KA	%
11) AVG(√(H×TS)) = (1÷N)×SUM(√(H×TS))	11) 16.009	
12) U = (174×CP×(√(29.92÷PS×GS)))×AVG(√(H×TS))	12) 2373.4	FP
13) QS = (U) × (AS')	13) 10322	ACF
14) QD = (QS) × (FDA)	14) 9969	CFM
15) QSTPD = (QD) × (530÷TS) × (PS÷29.92)	15) 9039	SCF
16) PISO = ((0.00267×VC×TS)+(PO×TS×VM÷TM)) ÷ (TIME×U×PS×AN)	16) 101.2	%
17) ESTP = (15.43×Y) ÷ (VSTPD) — UNITS : GRAINS/SCF		
18) E12 = (12×ESTP) ÷ (%CO2) — UNITS : GRAINS/SCF		
19) E50 = (ESTP×(100+EA)) ÷ (150) — UNITS : GRAINS/SCF		
20) EM = (0.00857)×(ESTP)×(QSTPD) — UNITS : POUNDS/HOUR		

PARTICULATE LAB ANALYSIS(GM) (Y)			PARTICULATE CONCENTRATIONS(GR/SCF) (ESTP)	(E12)	(E50)	EMISSION RAT (EM) (LBS/H
FRONT HALF	-	.0152	.0030			0.23
BACK HALF	-	.0093	.0018			0.14
TOTALS	-	.0245	.0048			0.37

COMMENTS : SEE RUN # 1 (HAMMER MILL OUTLET)

TEST CONDUCTED BY : _____

environmental engineering, inc.

ENVIRONMENTAL ENGINEERING, INCORPORATED
SOURCE SAMPLING CALCULATIONS

PLANT- CARGILL SIOUX CITY, IOWA
STACK- COLUMN COOLER OUTLET
WEATHER CONDITIONS- CLEAR AND COLD
AS'- 4.35 SQ. FEET TS- 568.5 DEGREES R TM- 528.7 DEGREES R H- 0.604 IN H2O
ΔH- 1.35 IN H2O AN- 0.000341 SQ. FEET CP- 0.83 VM- 70.484 CF VC- 55 ML
TOTAL TIME- 110 MIN NPTS- 44 ORSAT: AIR

DATE- 6/23/72
RUN 2 FROM 07:50-09:45
PB- 28.8 IN.HG PS- 28.8 IN HG

1) VWV = (0.0474)×(VC)
2) VSTPD= ((530)×(VM)×(PB+(ΔH÷13.6)))÷(29.92×TM)
3) VT = (VWV) + (VSTPD)
4) W = (VWV) ÷ (VT)
5) FDA = (1.0 - W)
6) ASSUMED MOISTURE FRACTION
7) MD = (.44×CO2) + (.32×O2) + (.28×(CO+N2))
8) MS = (MD×FDA) + (18×W)
9) GS = (MS) ÷ (28.99)
10) EA = (100)×(O2-0.5×CO)÷((0.266×N2)-(O2-0.5×CO))
11) AVG(√(H×TS)) = (1÷N)×SUM(√(H×TS))
12) Q = (174×CP×(√(29.92÷PS×GS))×AVG(√(H×TS)))
13) QS = (Q) × (AS')
14) QD = (QS) × (FDA)
15) QSTPD= (QD) × (530÷TS) × (PS÷29.92)
16) PISO = ((0.00267×VC×TS)+(PO×TS×VM÷TM)) ÷ (TIME×Q×PS×AN)
17) ESTP = (15.43×Y) ÷ (VSTPD) UNITS : GRAINS/SCF
18) E12 = (12×ESTP) ÷ (%CO2). UNITS : GRAINS/SCF
19) E50 = (ESTP×(100+EA)) ÷ (150) UNITS : GRAINS/SCF
20) EM = (0.00857)×(ESTP)×(QSTPD) UNITS : POUNDS/HOUR

1)	NA SCF
2)	68.247 SCF
3)	NA SCF
4)	0.037
5)	0.963
6)	0.033
7)	28.85
8)	28.45
9)	0.98
10)	NA %
11)	14.336
12)	2139.1 EE
13)	9303 ACE
14)	8961 CEM
15)	8041 SCE
16)	98.4 %

	PARTICULATE LAB ANALYSIS(GM) (Y)	PARTICULATE CONCENTRATIONS(GR/SCF) (ESTP)	(E12)	(E50)	EMISSION RA (EM) (LBS/H
FRONT HALF	.0222	.0050			0.35
BACK HALF	.0184	.0042			0.29
TOTALS	.0406	.0092			0.63

COMMENTS : SEE RUN #1 (HAMMER MILL OUTLET)

TEST CONDUCTED BY :

environmental engineering, inc.

ENVIRONMENTAL ENGINEERING, INCORPORATED
SOURCE SAMPLING CALCULATIONS

PLANT- CARGILL SIOUX CITY, IOWA — DATE- 6/23/72
STACK- COLUMN COOLER OUTLET — RUN 3 FROM 11:11-14:06
WEATHER CONDITIONS- CLEAR AND COLD — PB- 28.8 IN HG — PS- 28.8 IN HG
AS'- 4.35 SQ. FEET — TS- 574.7 DEGREES R — TM- 546.1 DEGREES R — H- 0.71 IN H2O
ΔH- 1.87 IN H2O — AN- 0.000341 SQ. FEET — CP- 0.83 — VM- 86.51 CF — VC- 63 ML
TOTAL TIME- 110 MIN — NPTS- 44 — ORSAT: AIR

1) VWV = (0.0474)×(VC)	1)	NA SCF
2) VSTPD= ((530)×(VM)×(PB+(ΔH÷13.6)))+(29.92×TM)	2)	81.199 SCF
3) VT = (VWV) + (VSTPD)	3)	NA SCF
4) W = (VWV) ÷ (VT)	4)	0.035
5) FDA = (1.0 - W)	5)	0.965
6) ASSUMED MOISTURE FRACTION	6)	0.033
7) MD = (.44×CO2) + (.32×O2) + (.28×(CO+N2))	7)	28.85
8) MS = (MD×FDA) + (18×W)	8)	28.47
9) GS = (MS) ÷ (28.99)	9)	0.99
10) EA = (100)×(O2-0.5×CO)÷((0.266×N2)-(O2-0.5×CO))	10)	NA %
11) AVG(√(H×TS)) = (1÷N)×SUM(√(H×TS))	11)	17.013
12) Q = (174×CP×(√(29.92÷PS×GS))×AVG(√(H×TS))	12)	2527.2 FT³
13) QS = (Q) × (AS')	13)	10991 ACF
14) QD = (QS) × (FDA)	14)	10601 CFM
15) QSTPD= (QD) × (530÷TS) × (PS÷29.92)	15)	9410 SCF
16) PISO = ((0.00267×VC×TS)+(PO×TS×VM÷TM)) ÷ (TIME×Q×PS×AN)	16)	100.1 %
17) ESTP = (15.43×Y) ÷ (VSTPD) — UNITS : GRAINS/SCF		
18) E12 = (12×ESTP) ÷ (%CO2) — UNITS : GRAINS/SCF		
19) E50 = (ESTP×(100+EA)) ÷ (150) — UNITS : GRAINS/SCF		
20) EM = (0.00857)×(ESTP)×(QSTPD) — UNITS : POUNDS/HOUR		

PARTICULATE LAB ANALYSIS(GM) (Y)	PARTICULATE CONCENTRATIONS(GR/SCF) (ESTP)	(E12)	(E50)	EMISSION RAT. (EM) (LBS/H
FRONT HALF - .0141	.0027			0.22
BACK HALF - .0109	.0021			0.17
TOTALS - .0250	.0048			0.38

COMMENTS : SEE RUN #1 (HAMMER MILL OUTLET)

TEST CONDUCTED BY : _____

environmental engineering, inc.

ENVIRONMENTAL ENGINEERING, INCORPORATED
SOURCE SAMPLING CALCULATIONS

PLANT- CARGILL SIOUX CITY, IOWA
STACK- PAN COOLER INLET
WEATHER CONDITIONS- CLEAR AND COOL
AS'- 3.69 SQ. FEET TS- 555.9 DEGREES R TM- 531.1 DEGREES R H- 0.905 IN H2O
ΔH- 3.04 IN H2O AN- 0.000341 SQ. FEET CP- 0.83 VM- 118.191 CF VC- 66 ML
TOTAL TIME- 120 MIN NPTS- 24 ORSAT: AIR

DATE- 6/21/72
RUN 1 FROM 6:50-9:10
PB- 28.78 IN HG PS- 29 IN HG

1)VWV = (0.0474)×(VC)	1) NA	SCF
2)VSTPD= ((530)×(VM)×(PB+(ΔH÷13.6)))÷(29.92×TM)	2) 114.332	SCF
3)VT = (VWV) + (VSTPD)	3) NA	SCF
4)W = (VWV) ÷ (VT)	4) 0.027	
5)FDA = (1.0 - W)	5) 0.973	
6)ASSUMED MOISTURE FRACTION	6) 0.026	
7)MD = (.44×CO2) + (.32×O2) + (.28×(CO+N2))	7) 28.85	
8)MS = (MD×FDA) + (18×W)	8) 28.56	
9)GS = (MS) ÷ (28.99)	9) 0.99	
10)EA = (100)×(O2-0.5×CO)÷((0.266×N2)-(O2-0.5×CO))	10) NA	%
11)AVG(√(H×TS)) = (1÷N)×SUM(√(H×TS))	11) 21.335	
12)U = (174×CP×(√(29.92÷PS×GS))×AVG(√(H×TS))	12) 3153.1	FPS
13)QS = (U) × (AS')	13) 11626	ACFM
14)QD = (QS) × (FDA)	14) 11316	CFM
15)QSTPD= (QD) × (530÷TS) × (PS÷29.92)	15) 10457	SCFM
16)PISO = ((0.00267×VC×TS)+(PO×TS×VM÷TM)) ÷ (TIME×U×PS×AN)	16) 98.5	%
17)ESTP = (15.43×Y) ÷ (VSTPD) UNITS : GRAINS/SCF		
18)E12 = (12×ESTP) ÷ (%CO2) UNITS : GRAINS/SCF		
19)E50 = (ESTP×(100+EA)) ÷ (150) UNITS : GRAINS/SCF		
20)EM = (0.00857)×(ESTP)×(QSTPD) UNITS : POUNDS/HOUR		

PARTICULATE LAB ANALYSIS(GM) (Y)	PARTICULATE CONCENTRATIONS(GR/SCF) (ESTP)	(E12)	(E50)	EMISSION RAT (EM) (LBS/H
FRONT HALF - 11.0507	1.4914			133.65
BACK HALF - .0039	.0005			0.05
TOTALS - 11.0546	1.4919			133.69

COMMENTS : SEE RUN #1 (HAMMER MILL OUTLET)

TEST CONDUCTED BY : _____

environmental engineering, inc.

ENVIRONMENTAL ENGINEERING, INCORPORATED
SOURCE SAMPLING CALCULATIONS

PLANT- CARGILL SIOUX CITY, IOWA — DATE- 6/22/72
STACK- PAN COOLER INLET — RUN 2 FROM 8:45-11:05
WEATHER CONDITIONS- CLEAR AND COLD — PB- 28.9 IN HG — PS- 29.1 IN HG
AS'- 3.69 SQ. FEET — TS- 550 DEGREES R — TM- 529.6 DEGREES R — H- 1.095 IN H2O
ΔH- 4.57 IN H2O — AN- 0.000341 SQ. FEET — CP- 0.83 — VM- 144.691 CF — VC- **82** ML
TOTAL TIME- 120 MIN — NPTS- 24 — ORSAT: AIR

1)VWV = (0.0474)×(VC)	1)	NA SCF
2)VSTPD= ((530)×(VM)×(PB+(ΔH÷13.6)))÷(29.92×TM)	2)	141.484 SCF
3)VT = (VWV) + (VSTPD)	3)	NA SCF
4)W = (VWV) ÷ (VT)	4)	0.027
5)FDA = (1.0 - W)	5)	0.973
6)ASSUMED MOISTURE FRACTION	6)	0.026
7)MD = (.44×CO2) + (.32×O2) + (.28×(CO+N2))	7)	28.85
8)MS = (MD×FDA) + (18×W)	8)	28.56
9)GS = (MS) ÷ (28.99)	9)	0.99
10)EA = (100)×(O2-0.5×CO)÷((0.266×N2)-(O2-0.5×CO))	10)	NA %
11)AVG(√(H×TS)) = (1÷N)×SUM(√(H×TS))	11)	25.675
12)U = (174×CP×(√(29.92÷PS×GS))×AVG(√(H×TS))	12)	3788.1 FPS
13)QS = (U) × (AS')	13)	13978 ACFM
14)QD = (QS) × (FDA)	14)	13604 CFM
15)QSTPD= (QD) × (530÷TS) × (PS÷29.92)	15)	12750 SCFM
16)PISO = ((0.00267×VC×TS)+(PO×TS×VM÷TM)) ÷ (TIME×U×PS×AN)	16)	100.1 %
17)ESTP = (15.43×Y) ÷ (VSTPD) — UNITS : GRAINS/SCF		
18)E12 = (12×ESTP) ÷ (%CO2) — UNITS : GRAINS/SCF		
19)E50 = (ESTP×(100+EA)) ÷ (150) — UNITS : GRAINS/SCF		
20)EM = (0.00857)×(ESTP)×(QSTPD) — UNITS : POUNDS/HOUR		

	PARTICULATE LAB ANALYSIS(GM) (Y)	PARTICULATE CONCENTRATIONS(GR/SCF) (ESTP)	(E12)	(E50)	EMISSION RAT (EM) (LBS/H
FRONT HALF	- 20.8480	2.2737			248.44
BACK HALF	- .0064	.0007			0.08
TOTALS	- 20.8544	2.2743			248.52

COMMENTS : SEE RUN # 1 (HAMMER MILL OUTLET)

TEST CONDUCTED BY : _____

environmental engineering, inc.

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ENVIRONMENTAL ENGINEERING, INCORPORATED
SOURCE SAMPLING CALCULATIONS

PLANT- CARGILL .SIOUX CITY, IOWA — DATE- 6/22/72
STACK- PAN COOLER INLET — RUN 3 FROM 12:30-14:35
WEATHER CONDITIONS- CLEAR AND COLD — PB- 28.91 IN HG — PS- 29.1 IN HG
AS'- 3.69 SQ. FEET — TS- 559.3 DEGREES R — TM- 535.9 DEGREES R — H- 1.066 IN H2O
ΔH- 4.32 IN H2O — AN- 0.000341 SQ. FEET — CP- 0.83 — VM- 142.783 CF — VC- 80 ML
TOTAL TIME- 120 MIN — NPTS- 24 — ORSAT: AIR

1)VWV = (0.0474)×(VC)	1)	NA SCF
2)VSTPD= ((530)×(VM)×(PB+(ΔH÷13.6)))÷(29.92×TM)	2)	137.955 SCF
3)VT = (VWV) + (VSTPD)	3)	NA SCF
4)W = (VWV) ÷ (VT)	4)	0.027
5)FDA = (1.0 - W)	5)	0.973
6)ASSUMED MOISTURE FRACTION	6)	0.026
7)MD = (.44×CO2) + (.32×O2) + (.28×(CO+N2))	7)	28.85
8)MS = (MD×FDA) + (18×W)	8)	28.56
9)GS = (MS) ÷ (28.99)	9)	0.98
10)EA = (100)×(O2-0.5×CO)÷((0.266×N2)-(O2-0.5×CO))	10)	11.1 %
11)AVG(√(H×TS)) = (1÷N)×SUM(√(H×TS))	11)	25.202
12)U = (174×CP×(√(29.92÷PS×GS)))×AVG(√(H×TS))	12)	3710.3 FPS
13)QS = (U) × (AS')	13)	13721 ACFM
14)QD = (QS) × (FDA)	14)	13354 CFM
15)QSTPD= (QD) × (530÷TS) × (PS÷29.92)	15)	12306 SCFM
16)PISO = ((0.00267×VC×TS)+(PO×TS×VM÷TM)) ÷ (TIME×U×PS×AN)	16)	101.1 %
17)ESTP = (15.43×Y) ÷ (VSTPD) — UNITS : GRAINS/SCF		
18)E12 = (12×ESTP) ÷ (%CO2) — UNITS : GRAINS/SCF		
19)E50 = (ESTP×(100+EA)) ÷ (150) — UNITS : GRAINS/SCF		
20)EM = (0.00857)×(ESTP)×(QSTPD) — UNITS : POUNDS/HOUR		

	PARTICULATE LAB ANALYSIS(GM) (Y)	PARTICULATE CONCENTRATIONS(GR/SCF) (ESTP)	(E12)	(E50)	EMISSION RAT (EM) (LBS/H
FRONT HALF	- 20.5451	2.2979			242.35
BACK HALF	- .0095	.0011			0.11
TOTALS	- 20.5546	2.2990			242.47

COMMENTS : SEE RUN #1 (HAMMER MILL OUTLET)

TEST CONDUCTED BY : _____

environmental engineering, inc.

ENVIRONMENTAL ENGINEERING, INCORPORATED
SOURCE SAMPLING CALCULATIONS

PLANT- CARGILL SIOUX CITY, IOWA — DATE- 6/21/72
STACK- PAN COOLER OUTLET — RUN 1 FROM 18:50-21:11
WEATHER CONDITIONS- CLEAR AND COOL — PB- 28.78 IN HG — PS- 28.78 IN HG
AS'- 9.51 SQ. FEET — TS- 548.7 DEGREES R — TM- 538.6 DEGREES R — H- 0.447 IN H2O
ΔH- 0.73 IN H2O — AN- 0.000341 SQ. FEET — CP- 0.83 — VM- 62.065 CF — VC- 26 ML
TOTAL TIME- 117.5 MIN — NPTS- 47 — ORSAT: AIR

1)VWV = (0.0474)×(VC)	1) NA	SCF
2)VSTPD= ((530)×(VM)×(PB+(ΔH÷13.6)))÷(29.92×TM)	2) 58.859	SCF
3)VT = (VWV) + (VSTPD)	3) NA	SCF
4)W = (VWV) ÷ (VT)	4) 0.021	
5)FDA = (1.0 - W)	5) 0.979	
6)ASSUMED MOISTURE FRACTION	6) 0.02	
7)MD = (.44×CO2) + (.32×O2) + (.28×(CO+N2))	7) 28.85	
8)MS = (MD×FDA) + (18×W)	8) 28.63	
9)GS = (MS) ÷ (28.99)	9) 0.99	
10)EA = (100)×(O2-0.5×CO)÷((0.266×N2)-(O2-0.5×CO))	10) NA	%
11)AVG(√(H×TS)) = (1÷N)×SUM(√(H×TS))	11) 10.469	
12)U = (174×CP×(√(29.92÷PS×GS)))×AVG(√(H×TS))	12) 1551.4	FPS
13)QS = (U) × (AS')	13) 14749	ACFS
14)QD = (QS) × (FDA)	14) 14446	CFMD
15)QSTPD= (QD) × (530÷TS) × (PS÷29.92)	15) 13421	SCFD
16)PISO = ((0.00267×VC×TS)+(PO×TS×VM÷TM)) ÷ (TIME×U×PS×AN)	16) 104.1	%
17)ESTP = (15.43×Y) ÷ (VSTPD) — UNITS : GRAINS/SCF		
18)E12 = (12×ESTP) ÷ (%CO2) — UNITS : GRAINS/SCF		
19)E50 = (ESTP×(100+EA)) ÷ (150) — UNITS : GRAINS/SCF		
20)EM = (0.00857)×(ESTP)×(QSTPD) — UNITS : POUNDS/HOUR		

PARTICULATE LAB ANALYSIS(GM) (Y)			PARTICULATE CONCENTRATIONS(GR/SCF) (ESTP)	(E12)	(E50)	EMISSION RAT (EM) (LBS/H
FRONT HALF	-	.4998	.1310			15.07
BACK HALF	-	.0097	.0025			0.29
TOTALS	-	.5095	.1336			15.36

COMMENTS : SEE RUN #1 (HAMMER MILL OUTLET)

TEST CONDUCTED BY : _____

environmental engineering, inc.

ENVIRONMENTAL ENGINEERING, INCORPORATED
SOURCE SAMPLING CALCULATIONS

PLANT- CARGILL SIOUX CITY, IOWA — DATE- 6/22/72
STACK- FAN COOLER OUTLET — RUN 2 FROM 8:45-11:05
WEATHER CONDITIONS- CLEAR — PB- 28.91 IN HG — PS- 28.91 IN HG
AS'- 9.51 SQ. FEET — TS- 549.1 DEGREES R — TM- 533.7 DEGREES R — H- 0.545 IN H2O
ΔH- 1.15 IN H2O — AN- 0.000341 SQ. FEET — CP- 0.83 — VM- 77.225 CF — VC- 33 ML
TOTAL TIME- 120 MIN — NPTS- 48 — ORSAT: AIR

1)VWV = (0.0474)×(VC)	1)	NA SCF
2)VSTPD= ((530)×(VM)×(PB+(ΔH÷13.6)))÷(29.92×TM)	2)	74.222 SCF
3)VT = (VWV) + (VSTPD)	3)	NA SCF
4)W = (VWV) ÷ (VT)	4)	0.021
5)FDA = (1.0 - W)	5)	0.979
6)ASSUMED MOISTURE FRACTION	6)	0.02
7)MD = (.44×CO2) + (.32×O2) + (.28×(CO+N2))	7)	28.85
8)MS = (MD×FDA) + (18×W)	8)	28.63
9)GS = (MS) ÷ (28.99)	9)	0.99
10)EA = (100)×(O2-0.5×CO)÷((0.266×N2)-(O2-0.5×CO))	10)	NA %
11)AVG(√(H×TS)) = (1÷N)×SUM(√(H×TS))	11)	12.769
12)U = (174×CP×(√(29.92÷PS×GS)))×AVG(√(H×TS))	12)	1887.9 FPS
13)QS = (U) × (AS')	13)	17948 ACFM
14)QD = (QS) × (FDA)	14)	17578 CFMD
15)QSTPD= (QD) × (530÷TS) × (PS÷29.92)	15)	16393 SCFM
16)PISO = ((0.00267×VC×TS)+(PO×TS×VM÷TM)) ÷ (TIME×U×PS×AN)	16)	105.4 %
17)ESTP = (15.43×Y) ÷ (VSTPD) — UNITS : GRAINS/SCF		
18)E12 = (12×ESTP) ÷ (%CO2) — UNITS : GRAINS/SCF		
19)E50 = (ESTP×(100+EA)) ÷ (150) — UNITS : GRAINS/SCF		
20)EM = (0.00857)×(ESTP)×(QSTPD) — UNITS : POUNDS/HOUR		

PARTICULATE LAB ANALYSIS(GM) (Y)			PARTICULATE CONCENTRATIONS(GR/SCF) (ESTP)	(E12)	(E50)	EMISSION RATE (EM) (LBS/HR
FRONT HALF	-	.7494	.1556			21.86
BACK HALF	-	.0347	.0072			1.01
TOTALS	-	.7841	.1628			22.87

COMMENTS : SEE RUN # 1 (HAMMER MILL OUTLET)

TEST CONDUCTED BY : _____

environmental engineering, inc.

ENVIRONMENTAL ENGINEERING, INCORPORATED
SOURCE SAMPLING CALCULATIONS

PLANT- CARGILL SIOUX CITY, IOWA — DATE- 6/22/72
STACK- PAN COOLER OUTLET — RUN 3 FROM 12:32-14:40
WEATHER CONDITIONS- CLEAR — PB- 28.91 IN HG — PS- 28.91 IN HG
AS'- 9.51 SQ. FEET — TS- 557.2 DEGREES R — TM- 543.5 DEGREES R — H- 0.552 IN H2O
ΔH- 1.17 IN H2O — AN- 0.000341 SQ. FEET — CP- 0.83 — VM- 78.785 CF — VC- 34 ML
TOTAL TIME- 120 MIN — NPTS- 48 — ORSAT: AIR

1) VWV = (0.0474)×(VC)	1) NA	SCF
2) VSTPD = ((530)×(VM)×(PB+(ΔH÷13.6)))÷(29.92×TM)	2) 74.454	SCF
3) VT = (VWV) + (VSTPD)	3) NA	SCF
4) W = (VWV) ÷ (VT)	4) 0.021	
5) FDA = (1.0 - W)	5) 0.979	
6) ASSUMED MOISTURE FRACTION	6) 0.02	
7) MD = (.44×CO2) + (.32×O2) + (.28×(CO+N2))	7) 28.85	
8) MS = (MD×FDA) + (18×W)	8) 28.62	
9) GS = (MS) ÷ (28.99)	9) 0.99	
10) EA = (100)×(O2-0.5×CO)÷((0.266×N2)-(O2-0.5×CO))	10) NA	%
11) AVG(√(H×TS)) = (1÷N)×SUM(√(H×TS))	11) 13.029	
12) U = (174×CP×(√(29.92÷PS×GS)))×AVG(√(H×TS))	12) 1926.5	FE
13) QS = (U) × (AS')	13) 18315	ACF
14) QD = (QS) × (FDA)	14) 17927	CFM
15) QSTPD = (QD) × (530÷TS) × (PS÷29.92)	15) 16477	SCF
16) PISO = ((0.00267×VC×TS)+(PO×TS×VM÷TM)) ÷ (TIME×U×PS×AN)	16) 105	%
17) ESTP = (15.43×Y) ÷ (VSTPD) — UNITS : GRAINS/SCF		
18) E12 = (12×ESTP) ÷ (%CO2) — UNITS : GRAINS/SCF		
19) E50 = (ESTP×(100+EA)) ÷ (150) — UNITS : GRAINS/SCF		
20) EM = (0.00857)×(ESTP)×(QSTPD) — UNITS : POUNDS/HOUR		

	PARTICULATE LAB ANALYSIS(GM) (Y)	PARTICULATE CONCENTRATIONS(GR/SCF) (ESTP)	(E12)	(E50)	EMISSION RAT (EM) (LBS/H
FRONT HALF	- .3185	.0660			9.32
BACK HALF	- .0138	.0029			0.40
TOTALS	- .3323	.0689			9.72

COMMENTS : SEE RUN # 1 (HAMMERMILL OUTLET)

TEST CONDUCTED BY : _____

environmental engineering, inc.

APPENDIX B

Plant Operating Data

A. Process Description:

The following materials are blended in specific formulas to produce a variety of animal and poultry feeds:

pulverized corn and milo
wheat middlings
soybean meal
cotton seed meal
fish meal
feather meal
meat scraps
molasses
premixes, minerals and drugs

Corn or milo is fed by gravity to a Prator hammermill. The mill forces 6 tons of corn per hour through 7/64" diameter perforations. The pulverized corn is boosted to the third floor by a 50 HP far. A cyclone separates the corn from the air stream and drops it into one of two 2,000 cu. ft. storage bins (#5 and #6). At least 50% of the cyclone exhaust air is returned to the throat of the hammermill, (see Fig. 1).

The mixed feed formula is placed in holding bins which feed it into the California Pellet Mills. Steam is introduced to the feed material at the pellet mill and the material is extruded through a die to form pellets approximately 3/16" diameter and ½" long. Each pellet mill produces 6 to 10 tons of feed per hour. The rate of production depends upon the formula of the feed being processed. Fine, calcium carbonate dust may be applied to the pellets as they drop from the pellet mills into the pellet coolers. Dust is applied to feeds which cause problems by clogging equipment or bridging in storage bins. These problems are related to the ingredients in the feed. The calcium carbonate will pass a 200 mesh sieve and has been died yellow. It is applied at the rate of 30# per ton of feed.

The pellets are cooled in either a column or moving pan type pellet cooler. The rate of pellet flow through the coolers is dependent upon the production rate at the pellet mills. The pellet coolers are located in the basement area. Air is pulled into the coolers from the basement. Dust picked up from the pellet stream is collected in large diameter cyclones located on the third and fourth floors. The dust collected in the cyclones is returned to the pellet mills for reforming.

B. Discussion of Test:

It was originally planned to sample emissions from the pulverized corn storage bin vent. After the rain cap was removed from the vent, it was determined that there is no measurable air flow out of the vent. The calculated velocity of air displaced out the vent by the inflowing corn is 0.1 fps. Meaningful results would not be attained by pulling air and dust up the vent pipe at a rate greater than the natural draft, therefore, the test was cancelled.

Hammermill

The hammermill was grinding #2 yellow corn which by National Grain Standards, contains $\leq$ 5% foreign matter and $\leq$ 15% moisture. A moisture check on a random sample of the corn entering the hammermill indicated 13.2% moisture. The pulverized corn entering the storage bins contained 12.3% moisture. This is a normal moisture loss for a grinding operation according to Mr. Musech. The exhaust air from the cyclone contained approximately 2.3% moisture at 85°F. The rain cap was removed from the cyclone and a short extension was attached to the outlet. A straightening vane consisting of a cross made of ½" plywood, was installed. The vane seemed very effective in distributing the flow more evenly across the exhaust duct. Simultaneous samples were taken at the cyclone exhaust with the EPA train (method #5) and a high volume sampler.

The first of three test runs on the hammermill cyclone was conducted on June 20, 1972, from 8:25 p.m. to 11:02 p.m. Storage bins #5 and #6 were measured prior to starting the grinder and were found to have 44 ft. and 11 ft. of free space, respectively. Bin #6 was filled at 9:05 p.m. and the pulverized corn was diverted to bin #5. The grinder was shut off between 9:25 p.m. and 9:40 p.m. while the sample trains were rotated 90° in the stack. There were no visible emissions during the testing.

The second test run was conducted on June 21, 1972, from 9:50 a.m. to 11:45 a.m. Bins #5 and #6 were measured prior to starting the test and were found to have 29 ft. and 9 ft. of free space, respectively. The grinder was started at 9:40 a.m. and run continuously during the test. The grinding rate was steady and was calculated to be 6 tons/hour on the basis of the bin measurements and the operating times. There were no visible emissions during the testing. The third test run was conducted on June 21, 1972, from 12:05 p.m. to 1:50 p.m. The grinding rate was steady at 6 tons/hour throughout the test. Bin #5 was filled at 1:20 p.m., when the pulverized corn was diverted to bin #6. There were no visible emissions during the testing.

Pan Cooler

Pellet mill #3 is serviced by a horizontal (moving pan type) pellet cooler and cyclone #173A. The inlet and outlet of the cyclone were tested simultaneously using EPA method #5 with impingers. The pellet cooler is produced by the California Pellet Mill Company, Model Number 5HRS22. The cooler is 5 ft. wide, 22 ft. long and pellets make a double pass through the cooler riding on moving, perforated metal pans. There is 185 sq. ft. of cooling area. Average pellet bed depth on the moving pans is 7". Cubes may be piled to a depth of 9" in this cooler. Fan #173 pulls air from the basement area (72°F).through the cooler and blows it to the cyclone. The New York Blower Model 452 has a 40 HP motor and rotates 1800 RPM. The blower is capable of pulling 18,500 cfm. with a static pressure of 7" water at 914 RPM.

The cooling air and dust are blown through a 26" diameter duct to the cyclone collector on the fourth floor. Cyclone number 173A is a Longhorn Scroll Type, 79" diameter cyclone. The effective opening at the bottom of the cyclone can be adjusted. The 44" diameter outlet extends through the 5th floor area and ends about 40" above the roof.

The first of three test runs was made on June 21, 1972, from 6:50 p.m. - 9:10 p.m. A 21 ton mixture of beef cattle feed containing the following ingredients was prepared for pelletizing during the test period.

32%	wheat middlings
30%	cottonseed meal
17%	soybean meal
5%	molasses
16%	minerals and premixes
100%	

The feed was pelletized in 160 minutes, giving a production rate of 7.6 tons of pellets/hour. The pellets were dusted with 550 lb. calcium carbonate applied at a steady rate. Visible emissions fluctuated from 15%-50% opacity.

The second test run was made on June 22, 1972, from 8:45 a.m. to 11:05 a.m. An 18 ton mixture of beef cattle feed of the same formula used for run #1 was prepared for pelletizing during the test period. Pellets were produced at the rate of 6.1 tons/hour during the operating time. The pellets were dusted with 500 lb. of calcium carbonate. A grab sample was taken of the dust collected by the cyclone. Visible emissions fluctuated from 15% opacity to 50% opacity during the test. The visible emissions were due to the pellet dusting operation.

The third test run was made on June 22, 1972, from 12:32 p.m. to 2:40 p.m. An 18 ton mixture of cattle feed containing the following ingredients was prepared for pelletizing during the test period.

60.0%	pulverized corn
25.0%	wheat middlings
9.5%	soybean meal
1.5%	cottonseed meal
4.0%	minerals and premixes
100.0%	

The pellet mill was run at a steady rate, producing 9 tons of pellets/hour. The pellets were not dusted.

The stack was observed from a distance of 20 ft. and no visible emissions were seen. The stack was also observed from the ground level 150 ft. below and 150 ft. east. With blue sky as the background the plume appeared to have a constant 5% opacity.

Column Cooler

Pellet mill #1 is served by two verticle column type pellet coolers and two cyclones. Only one of the coolers was used during the test period. The column cooler was manufactured by the California Pellet Mill Company, Model No. 2GA3, Serial No. 203664-2. It has a rated capacity of 7½ tons/hour. A CPM size 40 fan pulls air from the basement area (75°F) through the cooler. The fan is capable of pulling 9325 cfm. with a static pressure of 6" water at 1765 rpm. The cooling air and dust are blown through a 17" diameter duct to the cyclone collector on the third floor. The 10" diameter opening at the bottom of the cyclone does not have an air lock and the collected dust is returned to the pellet mill on the first floor. The 30"

diameter outlet pipe extends 27" above the roof. The cyclone inlet and outlet were tested simultaneously using EPA method #5 with impingers. The rain cap was removed from the cyclone outlet and an extension and straightening vane was installed.

The first of three test runs was made on June 22, 1972, from 5:20 p.m. to 7:45 p.m. A 30 ton mixture of poultry feed containing the following ingredients was prepared for pelletizing during the test period.

75.0%	pulverized corn
15.0%	soybean meal
2.8%	wheat middlings
2.5%	meat scrap
1.9%	feather meal
3.8%	minerals and premixes
100.0%	

The pellet mill was processing a similar poultry feed when testing began at 5:20 p.m. The mill was stopped at 5:35 p.m. and restarted again at 5:50 p.m. and operated until 9:30 p.m. Pellets were produced at the rate of 8 tons/hour. Dust was not applied to these pellets, and there were no visible emissions from the cyclone.

The second test run was made on June 23, 1972, from 7:50 a.m. to 9:45 a.m. An 18 ton mixture of poultry feed containing the following ingredients was prepared for pelletizing during the test period.

57.5%	soybean meal
10.5%	wheat middlings
10.0%	meat scrap
7.0%	feather meal
15.0%	minerals and premixes
100.0%	

The pellet mill was run at a steady rate, producing 6.7 tons of pellets per hour. The pellets were not dusted and there were no visible emissions from the cyclone.

The third test run was made on June 23, 1972, from 11:11 a.m. until 2:06 p.m. Testing was discontinued between 12:00 noon and 1:00 p.m. A 30 ton mixture of poultry feed containing the following ingredients was prepared for pelletizing during the test period.

18.75%	soybean meal
3.50%	wheat middlings
65.00%	pulverized corn
3.25%	meat scrap
2.25%	feather meal
7.25%	minerals and premixes
100.0%	

The pellet mill produced 7.6 tons of pellets per hour during the 3.92 hours of operation. The pellets were not dusted and there were no visible emissions from the cyclone.

C. Process Data:

HAMMERMILL CYCLONE

Test Run	Grinding Rate	Material	Remarks
1	6 T/hr	#2 Yellow Corn	No Visible
2	6 T/hr	#2 Yellow Corn	Emissions
3	6 T/hr	#2 Yellow Corn	

PAN COOLER CYCLONE

Test Run	Pellet Production Rate	Dusting	Visible Emissions
1	7.6 T/hr	26.2 #/T	15%-50%
2	6.1 T/hr	27.8 #/T	15%-50%
3	9.0 T/hr	None	None

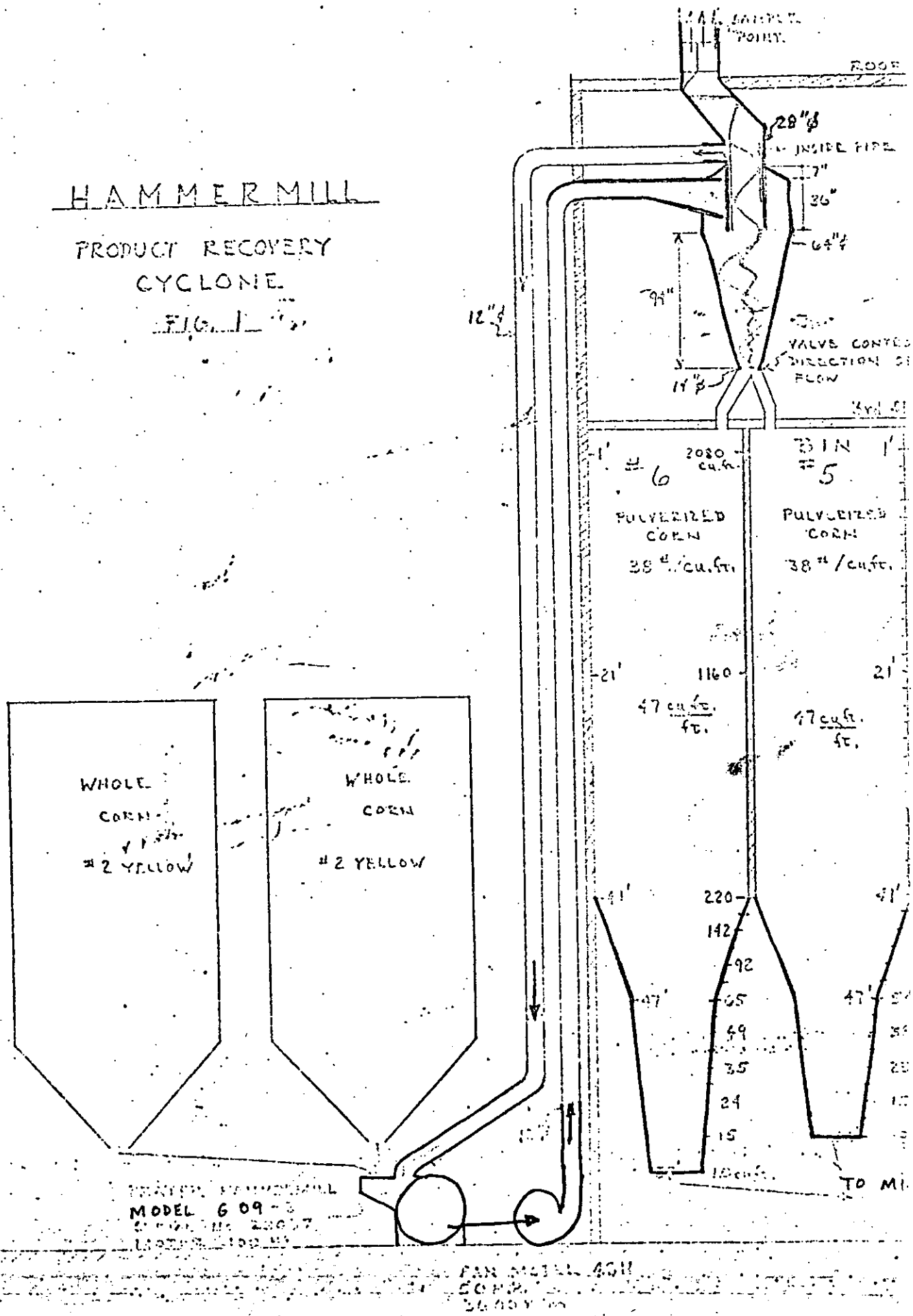
COLUMN COOLER CYCLONE

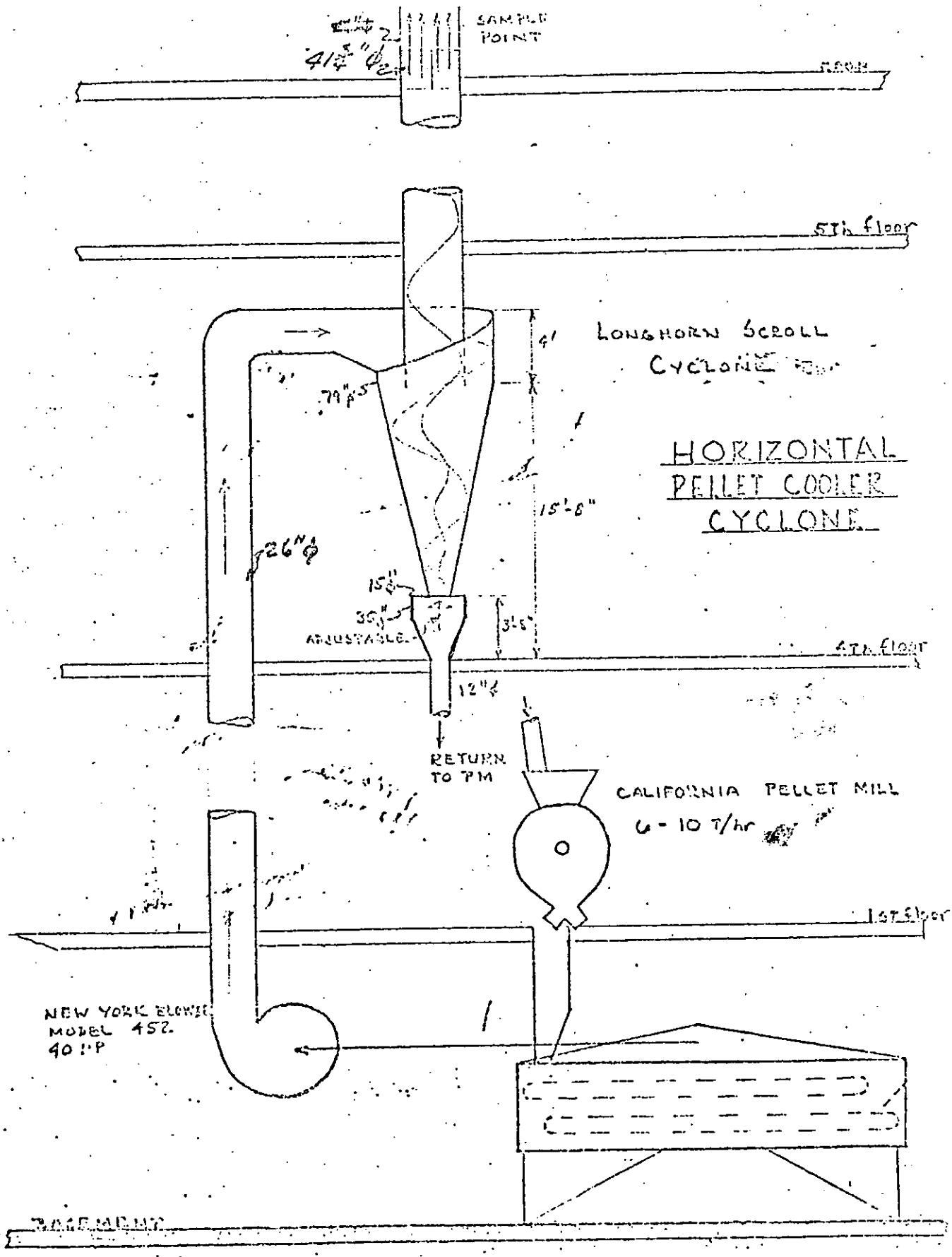
Test Run	Pellet Production Rate	Dusting	Remarks
1	8.0 T/hr	None	No Visible
2	6.7 T/hr	None	Emissions
3	7.6 T/hr	None	

HAMMERMILL

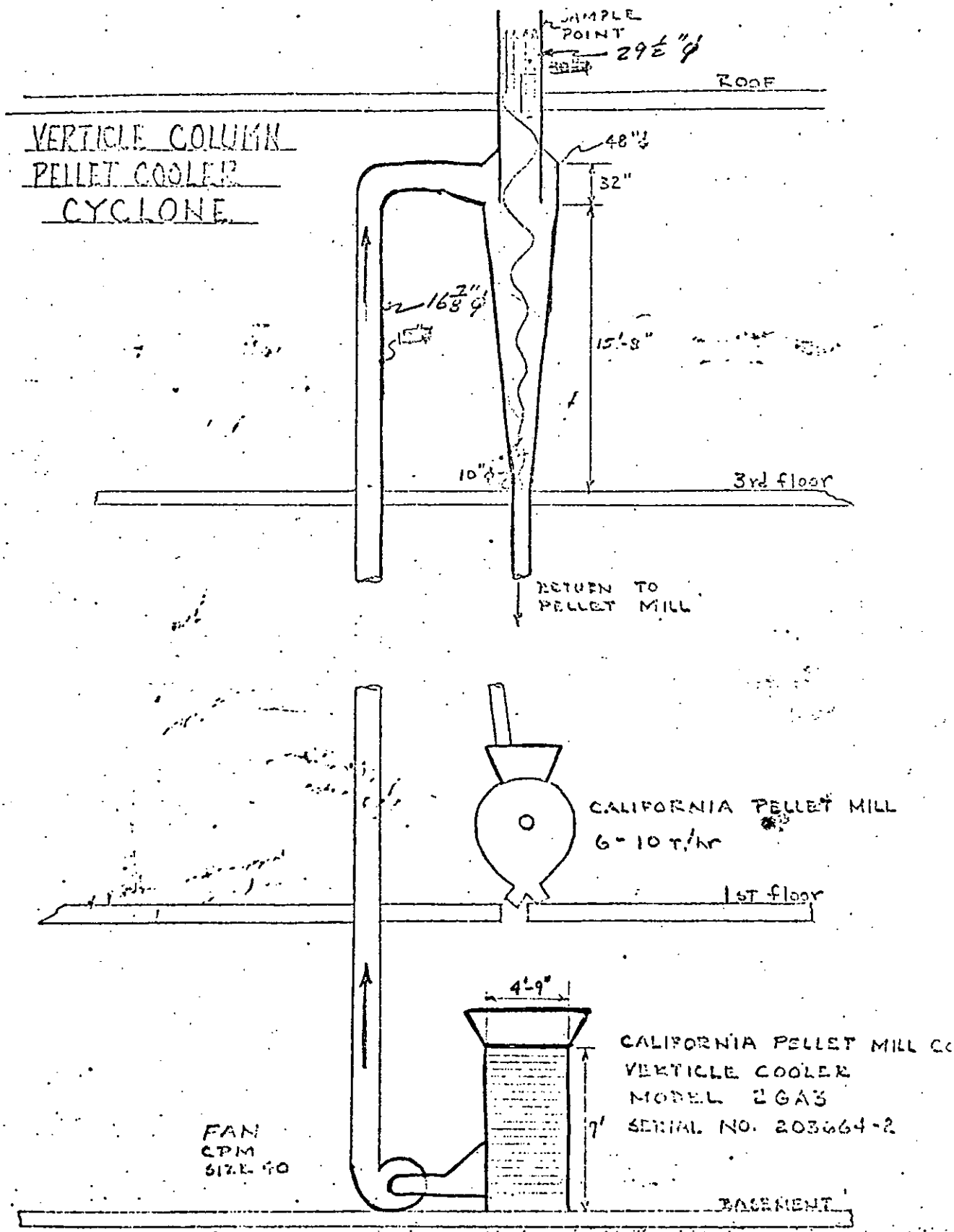
PRODUCT RECOVERY CYCLONE

FIG. 1





CALIFORNIA PELLET MILL CO.
HORIZONTAL PELLET COOLER
MODEL 5 HRS 22
DOUBLE PASS
1575 SQ FT. COOLING AREA


VERTICLE COLUMN
PELLET COOLER
CYCLONE
SAMPLE POINT
29½"ϕ
ROOF
48"ϕ
32"
16⅞"ϕ
15'-8"
10"ϕ
3rd floor
RETURN TO PELLET MILL
CALIFORNIA PELLET MILL
6-10 T./hr
1st floor
4'-9"
9'
CALIFORNIA PELLET MILL Co
VERTICLE COOLER
MODEL 2GA3
SERIAL NO. 203664-2
FAN
CFM
SIZE 40
BASEMENT

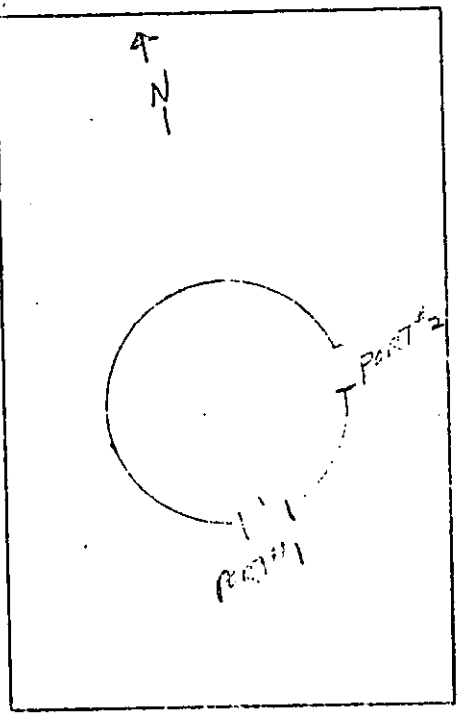
APPENDIX C

Field Data Sheets

[redacted] ENVIRONMENTAL ENGINEERS, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant CARGILL
Sampling Location [illegible]
Date 6-20-72 Run No. 1
Time Start 2040 Time End 2302.5
Sampling Time/Point 2.5 (Table 85.0)
DB 94 °F, WB 72 °F, VF @ DP 0.67 "Hg
Moisture 2.3%, FDA 98, Gas Density Factor —
Barometric Press 28.10 "Hg, Stack Press 28.10 "Hg
Weather Clear - cloudy
Temp. 80 °F, W/D N, W/S 2-5
Sample Box No. 1 Meter Box No. 1
Meter ΔH@ 1.74 Pitot Corr. Factor 0.83
Nozzle Dia. 3/8 in., Probe Length 6 ft
Probe Heater Setting —
Stack Dimensions: Inside Diameter 28 in
Inside Area 427.5 ft²
Height — ft
Eff. Area = 3,304 ft²



Mat'l Processing Rate —
Final Gas Meter Reading 210.730 ft³
Initial Gas Meter Reading 152.015 ft³
Total Condensate in Impingers 1 ml
Moisture in Silica Gel — gm
Silica Gel Container No. — Filter No. —
Orsat: CO_2 —
O_2 —
CO —
N_2 —
Excess Air —
Test Conducted by: R. Duncan
[illegible]
Remarks: First (EE)
(*) Assumed [illegible]

Port and Traverse Point No.	Distance from End of Port (in.) Inside Wall	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O) Calc.	Meter Orifice Press. Diff. ("H_2O) Actual	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F) In	Gas Sample Temp. @ Dry Gas Meter (°F) Out	Sample Box Temp. °(°F) Time (min)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
Port #1												
Point #1	1 3/4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]
2	12 3/4	—	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]
3	11	8:08	157.0	0.07	1.25	1.25	84	73	72	7.5	61	3.5
4	2 1/2	8:19	153.8	0.075	1.40	1.40	—	72	72	10.5	—	3.5
5	2 1/2	8:42	148.5	0.08	1.50	1.50	—	71	72	12.5	—	3.5
6	3 1/2	9:45	142.3	0.08	1.50	1.50	—	71	72	15.0	—	3.5
7	4 1/2	8:47	136.1	0.08	1.50	1.50	—	70	72	2.5	—	3.5

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
Run #1												
Point 8	5 11/32	8:50	—	[illegible]	[illegible]	[illegible]	[illegible]	70	71	[illegible]	61	[illegible]
9	6 7/16	8:[illegible]	167.7	0.08	1.50	1.50	—	70	71	7.5	—	[illegible]
10	7 13/16	8:[illegible]	—	[illegible]	[illegible]	[illegible]	87	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
11	9 1/16	8:[illegible]	171.2	0.07	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
12	11 5/16	9:00	172.7	0.07	[illegible]	[illegible]	—	69	70	[illegible]	—	3.5
13	16 7/16	9:02½	—	0.02	0.30	0.30	—	69	70	2.5	—	3.5
14	19	9:04	174.6	0.02	0.30	0.30	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
15	20 13/32 = 1 1/16	9:07½	175.2	0.01	0.14	0.14	87	69	70	7.5	—	[illegible]
16	21 11/32	9:10	175.8	0.01	0.14	0.14	—	68	70	10.0	—	4.0
17	22 13/32	9:12½	176.2	0.008	0.10	0.10	—	68	70	12.5	—	4.0
18	23 5/32	9:15	—	0.008	0.10	0.10	—	68	70	15.0	—	4.0
19	24 1/32	9:17½	177.1	0.008	0.10	0.10	—	68	70	[illegible]	—	4.0
20	25	[illegible]	—	0		0	—	—	—	[illegible]	—	—
21	[illegible]	[illegible]	—	0		0		—	—	7.5		—
22	26 7/16	[illegible]	177.438	0		0				[illegible]		
23	27 1/4	—	—	0	—	0	—	—	—	—	—	
24	27 3/4	—	—	0	—	0	—	—	—	—	—	
Point 2												
Point 1	1/4	—	—	0	0	0	—	—	—	—	—	—
2	3/4	—	—	0	0	0	—	—	—	—	—	—
3	1 1/2			0	0	0						
4	2 3/32			0	0	0						

Port and Traverse Point No. Port #2	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
Point #5	2 11/16	—	—	0	[illegible]	[illegible]	—	—	—	—	—	—
6	3 11/16	1017.5	[illegible]	0.[illegible]	[illegible]	[illegible]	85	[illegible]	[illegible]	2.5	[illegible]	[illegible]
7	4 1/2	1020	[illegible]	0.010	0.14	0.14	85	[illegible]	[illegible]	5.0		[illegible]
8	5 [illegible]	1022.5	[illegible]	0.[illegible]	0.20	[illegible]	[illegible]	[illegible]	[illegible]	7.5		[illegible]
9	6 7/16	1025	[illegible]	0.[illegible]	0.[illegible]	[illegible]	85	[illegible]	[illegible]	10.0		[illegible]
10	7 11/16	1027.5	[illegible]	0.[illegible]	0.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	12.5		[illegible]
11	9 1/16	1030	[illegible]	0.[illegible]	[illegible]	[illegible]	[illegible]	62	64	15.0		[illegible]
12	11 1/8	1032.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.5		[illegible]
13	16 7/8	1035	[illegible]	0.12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5.0		[illegible]
14	19	1037.5	[illegible]	0.16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.5		[illegible]
15	20 1/16	1040	[illegible]	0.17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10.0		[illegible]
16	21 1/2	1042.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	12.5		[illegible]
17	22 15/16	1045	[illegible]	0.17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	15.0		[illegible]
18	23 1/2	1047.5	[illegible]	0.14	2.75	2.75	[illegible]	[illegible]	[illegible]	2.5		[illegible]
19	24 15/16	1050	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5.0		[illegible]
20	25	1052.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.5		[illegible]
21	25 1/16	1055	[illegible]	0.13	[illegible]	[illegible]	[illegible]	62	63	10.0		[illegible]
22	26 7/16	1102.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
23	26 [illegible]	—	—	0.23	[illegible]	[illegible]	[illegible]	—	—	[illegible]	—	[illegible]
24	26 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft³)	Stack Velocity Head ("H₂O)	Meter Orifice Press. Diff. ("H₂O) Calc.	Actual	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F) In	Out	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
A-[illegible]	[illegible]	11:26	266.1	0.11	2.10	2.10	—	71	65	5.0	—	4.0
[illegible]	5 [illegible]	11:28½	268.1	0.11	2.10	2.10	—	71	64	7.5	—	4.0
[illegible]	6 [illegible]	11:31	—	0.10	1.95	1.95	—	72	64	10.0	—	4.0
10	7 [illegible]	11:33½	272.1	0.085	1.66	1.66	—	72	64	12.5	—	4.0
[illegible]	9 [illegible]	11:36	273.9	0.06[illegible]	1.60	1.60	—	72	64	15.0	—	4.0
[illegible]	11⅞	11:38½	—	0.04	0.65	0.65		73	65	2.5	61	4.0
[illegible]	16 [illegible]	11:41	276.0	0.02	0.38	0.38	—	73	65	5.0	—	4.0
[illegible]	19	11:43½		No	FLOW		—	—	—	7.5	—	4.0
[illegible]	[illegible]	11:45	STOP 276.634	No	FLOW		—	—	—	10.0	—	4.0
[illegible]	[illegible]	—	—	No	FLOW		—	—	—	12.5	—	
17	[illegible]	—	—	No	[illegible]		—	—	—	15.0	—	—
[illegible]	[illegible]	—	—	No	[illegible]		—	—	—	2.5	—	—
[illegible]	[illegible]	—	—	No	[illegible]		—	—	—	5.0	—	—
20	[illegible]	—	—	No	[illegible]		—	—	—	[illegible]	—	—
[illegible]	[illegible]	—	—	No	[illegible]		—	—	—	15.0	—	—
[illegible]	[illegible]	—	—	No	[illegible]		—	—	—	—	—	—
[illegible]	[illegible]	—	—	—	—	—	—	—	—	—	—	—
[illegible]	[illegible] 27¾	—	—	—	—	—						
[illegible]	[illegible]											
[illegible]	[illegible]											
[illegible]		START 9:55	211.117					57	55	—	—	—
[illegible]	1½ [illegible]	0957.5	—	0.02	0.3	0.3	81	57	55	—	—	—
[illegible]	1½ [illegible]	1000	—	0.02	0.3	0.3	81	57	55	7.5	60	[illegible]
[illegible]	[illegible]	[illegible]	21[illegible]	0.02[illegible]	[illegible]	0.[illegible]	[illegible]	57	56	[illegible]		4.0
[illegible]	[illegible]	[illegible]	21[illegible]	0.015	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
Port 2				0.015						12.5		
Point 5		10:27					—			15.0	—	4.0
6		10:[illegible]					—			2.5	—	4.0
7	Same	10:[illegible]	216.6	0.02			85			5.0		4.0
8		10:15					—	59	57	7.5	—	4.0
9	as	10:[illegible]	218.3	0.03			—	59	57	10.0	—	4.0
10		10:2[illegible]	219.8	0.03			—	60	[illegible]	12.5	—	4.0
11	Port	10:[illegible]	220.3	0.02	0.41	0.41	—	60	57	15.0	—	4.0
12		10:[illegible]	221.11	0.04	0.65	0.65	—	60	57	2.5	—	4.0
13	#1	[illegible]	222.7	0.04	[illegible]	[illegible]	[illegible]	60	57	5.0	—	4.5
14		[illegible]	225.1	0.11	3.70	3.70	—	60	57	7.5	—	4.5
15		[illegible]	226.1	0.11	4.00	4.00	—	60	56	10.0	—	4.5
16		[illegible]	231.1	0.19	4.00	4.00	—	60	57	12.5	—	4.5
17		10:37½	234.7	0.17	3.50	3.50	—	60	57	15.0	—	4.5
18		10:40	236.3	0.17	3.50	3.50	—	60	57	2.5	—	4.5
19		10:42	238.7	0.16	3.40	3.40	—	60	57	5.0	—	4.5
20		10:[illegible]	—	0.16	3.40	3.40	—	60	60	7.5	—	4.5
21		10:47	242.8	0.11	2.70	2.70	85	60	60	10.0	57	4.0
22		10:55	244.4	0.14	2.70	2.70		60	60	12.5		4.0
23	—	1052.5	—	0.14	2.7	2.7		60	60	15.0	—	4.0
24	—	1100	246.245	0.14	2.7	2.7						

ENVIRONMENTAL ENGINEERING, INC.

[redacted]

SOURCE SAMPLING FIELD DATA SHEET

Plant [redacted]
Sampling Location [redacted]
Date 6-21-79 Run No. 3
Time Start 12:10 Time End 1:50
Sampling Time/Point 2.5 (Total = 177.5 Min)
DB [redacted] °F, WB [redacted] °F, VF @ DP [redacted] "Hg
Moisture 2.3 %, FDA [redacted], Gas Density Factor [redacted]
Barometric Press 28.7 "Hg, Stack Press 28.76 "Hg
Weather [redacted]
Temp. [redacted] °F, W/D [redacted], W/S [redacted]
Sample Box No. 1 Meter Box No. 1
Meter ΔH@ 1.71 Pitot Corr. Factor 0.83
Nozzle Dia. 1/2 in., Probe Length 6 ft
Probe Heater Setting [redacted]
Stack Dimensions: Inside Diameter 24 in
Inside Area [redacted] ft2
Height [redacted] ft

Mat'l Processing Rate [redacted]
Final Gas Meter Reading 328.362 ft3
Initial Gas Meter Reading 277.270 ft3
Total Condensate in Impingers 14 ml
Moisture in Silica Gel [redacted] gm
Silica Gel Container No. [redacted] Filter No. [redacted]
Orsat: CO_2 [redacted]
O_2 [redacted]
CO [redacted]
N_2 [redacted]
Excess Air [redacted]
Test Conducted by: R. Duncan
E. Dawson
Remarks: (25)

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
1	1½	12:10	277.270	0.04	0.09	0.07	57	71	69	25	-	4.0
2	1½	12:15	-	0.06	0.09	0.07	57	71	69	25	-	4.0
3	1½	12:17	281.6	0.06	0.09	0.11	57	71	71	25	68	4.0
4	9½	12:30	286.2	0.06	0.09	0.09	-	75	69	25	-	4.0
5	9½	12:32	291.2	0.07	0.10	0.10	-	74	71	25	-	4.0
6	9½	12:35	296.6	0.07	0.10	0.10	-	74	71	25	-	4.0
7	9½	12:37	301.2	0.07	0.10	0.10	-	74	71	25	68	4.0

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
1	[illegible]	12:20	290.2	0.0[illegible]	1.50	1.50	88	75	70	5.0	63	4.0
2	6 1/16	12:[illegible]	291.8	0.07	1.2[illegible]	1.2[illegible]	—	[illegible]	[illegible]	7.[illegible]	—	[illegible]
3	7[illegible]	12:[illegible]	293.2	0.06	0.19	0.19	—	[illegible]	[illegible]	[illegible]	—	[illegible]
4	9 1/16	12:[illegible]	294.7	0.05	0.[illegible]	0.[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5	11 1/16	[illegible]	296.0	0.0[illegible]	0.[illegible]	0.[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	16 1/16	[illegible]	[illegible]	0.02	0.[illegible]	0.[illegible]	85	[illegible]	71	[illegible]	62	[illegible]
7	19	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	1 1/16	[illegible]	[illegible]	1/16 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6	[illegible]	1:05	297.343	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
7	[illegible]	1:07½	298.0	0.01	0.14	0.14	88	75	74	2.5	62	4.0
8	[illegible]	1:10	298.5	0.01	0.14	0.14	—	76	74	5.0	—	4.0
[illegible]	[illegible]	1:12½	299.1	0.01	0.14	0.14	—	76	74	7.5	—	11.0
10	[illegible]	1:15	299.7	0.01	0.14	0.14	—	76	74	10.0	—	11.0
11	9 1/16	1:17½	300.3	0.01	0.14	0.14	88	76	74	12.5	64	11
12	11 1/16	1:20	301.0	0.02	0.[illegible]	0.[illegible]	—	77	74	15.0	—	11.0
13	16 1/16	1:[illegible]	[illegible]	0.11	0.[illegible]	2.10	90	77	75	2.5	65	11
14	[illegible]	1:[illegible]	—	0.11	2.10	2.10	—	76	75	5.0	—	11.0
15	20 1/16	1:27½	308.2	0.17	[illegible]	[illegible]	—	77	75	7.5	—	11.5
16	[illegible]	1:[illegible]	[illegible]	0.[illegible]	[illegible]	[illegible]	—	77	75	10.0	—	11.5
17	[illegible]	1:[illegible]	[illegible]	0.11	2.70	2.70	—	[illegible]	[illegible]	[illegible]	64	[illegible]

ENVIRONMENTAL ENGINEERING, INC.
[redacted]

SOURCE SAMPLING FIELD DATA SHEET

Plant [illegible]
Sampling Location [illegible]
Date [illegible] Run No. 3
Time Start 12:10 Time End 1:50
Sampling Time/Point _____
DB ____ °F, WB ____ °F, VF @ DP _____ "Hg
Moisture ____ %, FDA ____, Gas Density Factor _____
Barometric Press ____ "Hg, Stack Press _____ "Hg
Weather _____
Temp. ____ °F, W/D _____, W/S _____
Sample Box No. _____ Meter Box No. _____
Meter ΔH@ ____ Pitot Corr. Factor _____
Nozzle Dia. ____ in., Probe Length _____ ft
Probe Heater Setting _____
Stack Dimensions: Inside Diameter _____ in
Inside Area _____ ft²
Height _____ ft

Mat'l Processing Rate _____
Final Gas Meter Reading _____ ft³
Initial Gas Meter Reading _____ ft³
Total Condensate in Impingers _____ ml
Moisture in Silica Gel _____ gm
Silica Gel Container No. _____ Filter No. _____
Orsat: CO_2 _____
O_2 _____
CO _____
N_2 _____
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_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
[illegible]	23½	1:35	315.6	0.14	2.70	2.70	92	79	76	150	64	4.0
[illegible]	[illegible]	1:37	317.9	0.13	[illegible]	[illegible]	—	[illegible]	76	[illegible]	—	[illegible]
[illegible]	[illegible]	1:40	[illegible]	0.13	[illegible]	[illegible]	—	81	76	[illegible]	—	[illegible]
[illegible]	[illegible]	1:42	[illegible]	0.11	[illegible]	2.10	—	[illegible]	77	[illegible]	—	4.0
[illegible]	[illegible]	1:50	[illegible]	0.11	[illegible]	2.10	92	[illegible]	77	[illegible]	[illegible]	4.0
[illegible]	[illegible]	[illegible]	—	0.11	2.1	2.1	—	[illegible]	78	[illegible]	—	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	0.11	[illegible]	2.1	—	[illegible]	77	[illegible]	—	[illegible]

[redacted] ENVIRONMENTAL ENGINEERING, Inc.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant Cargill, Inc
Sampling Location Column cell (EN/KT)
Date 6/22/72 Run No. 1
Time Start 1725 Time End 1451
Sampling Time/Point 10 (120 Total)
DB [redacted] °F, WB [redacted] °F, VF @ DP 0.80 "Hg
Moisture 3.5 %, FDA [redacted], Gas Density Factor [redacted]
Barometric Press [redacted] "Hg, Stack Press 29.2 "Hg
Weather Clear
Temp. 70 °F, W/D [redacted], W/S [redacted]
Sample Box No. 2 Meter Box No. [redacted]
Meter ΔH@ 1.98 Pitot Corr. Factor [redacted]
Nozzle Dia. [redacted] in., Probe Length [redacted] ft
Probe Heater Setting [redacted]
Stack Dimensions: Inside Diameter 16 ½ in
Inside Area [redacted] ft2
Height [redacted] ft

Mat'l Processing Rate [redacted]
Final Gas Meter Reading 61.920
Initial Gas Meter Reading [redacted] ft3
Total Condensate in Impingers 24 ml
Moisture in Silica Gel [redacted] gm
Silica Gel Container No. [redacted] Filter No. 6817
Orsat: CO_2 [redacted]
O_2 [redacted]
CO [redacted]
N_2 [redacted]
Excess Air [redacted]
Test Conducted by: [redacted]

Remarks: ~~plant Shut Down~~

2 ~~

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
Port 1			15.109									
Pt. 1	1	17:25	17.1	1 [illegible]	0.31	0.31	[illegible]	[illegible]	[illegible]	—	70	2.5
" 1		17:30	8.8	[illegible]	0.31	[illegible]	[illegible]	88	88	—	70	3.0
" 2	2½	17:35	[illegible]	1.50 [illegible]	0.35	0.35	86	87	86	—	70	3.2
" 2		18:02	19.6	1.60	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	72	3.2
" 3	5	[illegible]	21.5	1.65	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	74	[illegible]
" 3		18:12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	71	[illegible]

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
4	11 3/8	18:17	29.4	[illegible]	[illegible]	0.43	112	89	[illegible]	—	72	3.0
4	[illegible]	18:22	30.6	2.1	[illegible]	[illegible]	113	[illegible]	[illegible]	—	70	3.0
5	14 3/8	18:27	32.5	1.60	[illegible]	[illegible]	113	[illegible]	[illegible]	—	64	[illegible]
5	[illegible]	[illegible]	311.5	2.0	0.46	0.46	113	89	89	—	64	2.5
6	15 3/8	18 [illegible]	36.4	1.55	[illegible]	[illegible]	113	91	89	—	69	2.5
6	[illegible]	18:42	[illegible]	1.65	[illegible]	0.385	113	[illegible]	[illegible]	—	69	2.5
2	[illegible]	18:47	END.									
1	1	18:51	39.1	1.20	0.28	0.28	113	91	89	—	73	3.0
1	[illegible]	18:56	41.6	1.50	0.35	[illegible]	112	91	89	—	73	4.0
2	2 1/2	19:01	43.2	1.25	[illegible]	0.285	112	91	89	—	72	3.0
2	[illegible]	19:06	44.8	1.15	0.33	[illegible]	112	91	89	—	71	3.2
3	5	19:11	[illegible]	[illegible]	[illegible]	[illegible]	113	92	[illegible]	—	70	3.2
3	[illegible]	19:16	48.8	[illegible]	[illegible]	[illegible]	112	91	89	—	70	3.2
4	11 7/8	19:21	50.8	1.80	0.42	0.42	112	91	89	—	70	3.2
4	[illegible]	19:26	53.0	2.25	0.515	0.515	113	91	89	—	70	3.0
5	[illegible]	19:31	55.2	2.1	[illegible]	[illegible]	112	91	89	—	70	3.0
5	[illegible]	19:36	57.3	2.25	[illegible]	0.46	112	91	89	—	70	3.0
6	15 7/8	19:41	59.5	1.90	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	70	3.0
6	[illegible]	19:46	61.920	2.0	0.46	0.46	112	91	89	—	70	3.0
6	[illegible]	19:51	END									

ENVIRONMENTAL ENGINEERING, INC.

[redacted]

SOURCE SAMPLING FIELD DATA SHEET

Plant Cargill Inc. Sour c[illegible]

Sampling Location Column Cooler Outlet

Date [illegible] Run No. 2

Time Start 0750 Time End [illegible]

Sampling Time/Point 10 (120 total)

DB [illegible] °F, WB [illegible] °F, VF @ DP [illegible] "Hg

Moisture 3.5 %, FDA [illegible], Gas Density Factor [illegible]

Barometric Press 28.6 "Hg, Stack Press 29.0 "Hg

Weather [illegible]

Temp. [illegible] °F, W/D [illegible], W/S [illegible]

Sample Box No. 2 Meter Box No. [illegible]

Meter ΔH@ 1.[illegible] Pitot Corr. Factor [illegible]

Nozzle Dia. [illegible] in., Probe Length [illegible] ft

Probe Heater Setting —

Stack Dimensions: Inside Diameter [illegible] in
Inside Area [illegible] ft²
Height [illegible] ft

Mat'l Processing Rate [illegible]

Final Gas Meter Reading [illegible] ft³

Initial Gas Meter Reading [illegible] ft³

Total Condensate in Impingers 2.5 ml

Moisture in Silica Gel [illegible] gm

Silica Gel Container No. [illegible] Filter No. 13

Orsat: CO_2 [illegible]
O_2 [illegible]
CO [illegible]
N_2 [illegible]
Excess Air [illegible]

Test Conducted by: [illegible]

Remarks: [illegible] (55)

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
PITT			[illegible]									
1	1	7:50	[illegible]	1.65	[illegible]		112	73	74	—	73	[illegible]
1		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	73	74	—	[illegible]	[illegible]
1	2	[illegible]	[illegible]	1.10	[illegible]	0.32	112	73	74	—	72	[illegible]
2		[illegible]	[illegible]	1.10	[illegible]		[illegible]	73	74	—	70	5.2
2		[illegible]	[illegible]	2.1	[illegible]		[illegible]	73	74	—	[illegible]	[illegible]
3		[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	73	74	—	67	[illegible]

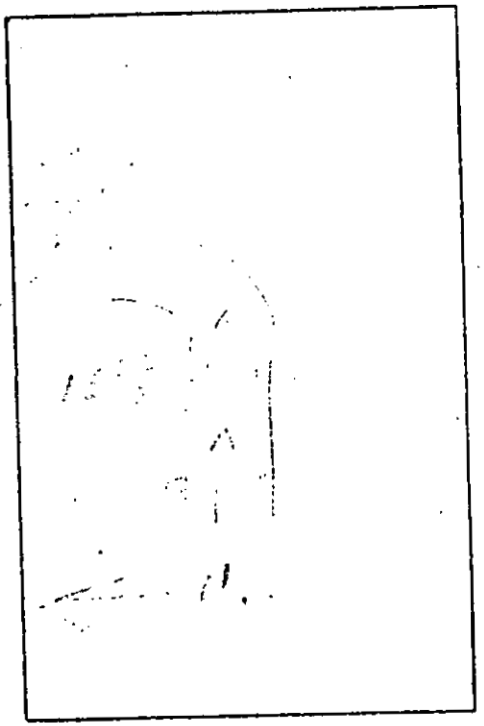
30 Sec

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
4	11 7/8	8:20	74.4	2.10	0.49	0.49	112	73	74	—	67	2.0
4		8:25	76.6	2.40	0.55	0.55	112	73	73	—	67	6.1
5	14 3/8	8:30	78.7	1.90	0.44	0.44	112	73	73	—	65	4.2
5		8:35	80.9	2.0	0.46	0.46	115	74	73	—	65	4.3
6	15 7/8	8:40	82.7	1.70	0.395	0.395	115	74	73	—	65	3.0
6		8:45	84.804	1.80	0.42	0.42	115	74	73	—	65	3.3
		8:50	END									
Port 2												
1	1	8:55	86.5	11.50	035	0.35	115	74	73	—	65	2.0
1		9:05:30	88.0	1.30	0.3	0.30	115	72	72	—	65	2.2
2	2 1/2	9:10	89.9	1.50	0.35	0.35	115	71	71		67	2.7
2		9:15	91.7	1.60	0.375	0.375	115	71	71		67	3.1
3	5	9:20	93.8	1.80	0.42	0.42	115	71	71		67	4.6
3		9:25	96.1	2.0	0.46	0.46	115	71	71		66	5.1
4	11 7/8	9:30	97.8	2.0	0.46	0.46	115	71	71		66	3.1
4		9:35	100.0	2.1	0.49	0.49	115	71	71		66	3.4
5	14 3/8	9:40	102.0	1.80	0.42	0.42	115	71	71		66	2.4
5		9:45	104.0	2.0	0.46	0.46	115	71	71		66	3.0
6	15 7/8	9:50	105.9	1.60	0375	0.375	115	72	71		66	2.5
6		9:55	107.848	1.60	0375	0.375	115	73	71		66	2.5
		10:00	END									

[redacted] ENVIRONMENTAL ENGINEERING, INC. [redacted]

SOURCE SAMPLING FIELD DATA SHEET

Plant [redacted]
Sampling Location Column cooler INLET
Date 6/27/92 Run No. 2
Time Start 11:00 Time End _____
Sampling Time/Point 1.0 (120 total)
DB ____ °F, WB ____ °F, VF @ DP _____ "Hg
Moisture 3.5%, FDA ____, Gas Density Factor _____
Barometric Press 28.6 "Hg, Stack Press 29.0 "Hg
Weather Clear
Temp. 70 °F, W/D _____, W/S _____
Sample Box No. ____ Meter Box No. _____
Meter ΔH@ ____ Pitot Corr. Factor ____
Nozzle Dia. ____ in., Probe Length ____ ft
Probe Heater Setting —
Stack Dimensions: Inside Diameter ____ in
Inside Area _____ ft2
Height _____ ft



Mat'l Processing Rate _____
Final Gas Meter Reading 150.740 ft3
Initial Gas Meter Reading 120.240 ft3
Total Condensate in Impingers 25 ml
Moisture in Silica Gel _____ gm
Silica Gel Container No. ____ Filter No. 11
Orsat: CO_2 _____
O_2 _____
CO _____
N_2 _____
Excess Air _____
Test Conducted by: G Pilot
T Oakley

Remarks: _____

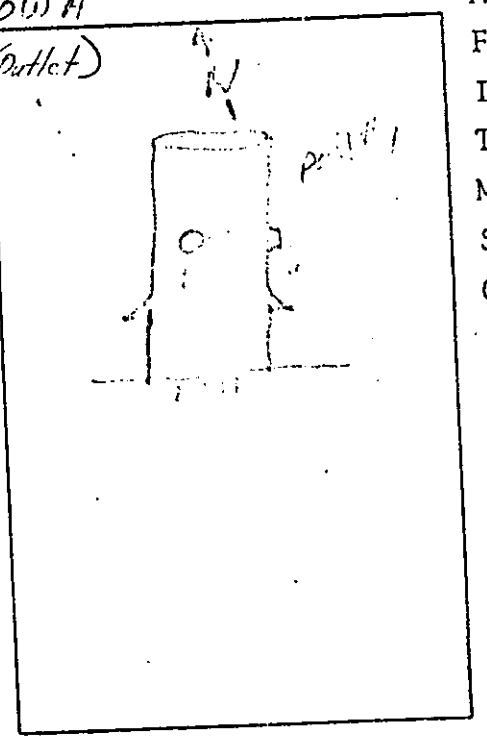
Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
Port 1			107.848									
1	1	11:00	110.0	1.80	0.42	0.42	110	71	71	—	75	3.0
1		11:05	111.4	1.40	0.324	0.324	115	71	71	—	71	3.8
2	2½	11:10	113.2	1.50	0345	0.345	115	71	71	—	74	4.0
2		11:15	115.0	1.60	0375		"	72	72	—	74	5.0
3	5	11:20	116.8	1.60	0375	"	115	"	"	—	74	5.0
3		11:25	119.0	1.90	0.405	"	115	71	72	—	74	5.0

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ($"H_2O$)	Meter Orifice Press. Diff. ($"H_2O$)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
4	11 7/8	11:30	120.9	1.70	2.495	[illegible]	118	[illegible]	[illegible]	—	[illegible]	[illegible]
4		11:35	123.1	[illegible]	[illegible]	[illegible]	118	[illegible]	[illegible]	—	[illegible]	
5	11 3/8	11:40	[illegible]	1.70	[illegible]	[illegible]	118	[illegible]	[illegible]	—	[illegible]	2.2
5		[illegible]	127.2	[illegible]	[illegible]	[illegible]	118	[illegible]	[illegible]	—	72	[illegible]
6	15 7/8	11:50	129.0	1.70	2.895	2.90	118	101	103	—	70	2.2
6		11:55	131.008	[illegible]	[illegible]	[illegible]	118	98	99	—	[illegible]	2.1
[illegible]		[illegible]	[illegible]									
[illegible]		[illegible]										
Port 2												
11	1	[illegible]	[illegible]	[illegible]	2.5	2.50	116	[illegible]	[illegible]	—	[illegible]	3.5
1		[illegible]	[illegible]	[illegible]			116	[illegible]		—	[illegible]	3.7
2	2 1/2	[illegible]	135.8	[illegible]			116					5.0
2		[illegible]	137.8	[illegible]	[illegible]	[illegible]	116	92	[illegible]	—	[illegible]	2.1
3	5	[illegible]	[illegible]	1.70	2.895	[illegible]	116	[illegible]	[illegible]	—	[illegible]	2.1
3		[illegible]	[illegible]	1.90	[illegible]	[illegible]	116	97	99	—	[illegible]	2.3
4	11 3/8	[illegible]	[illegible]	[illegible]	[illegible]	0.41	116	93	94	—	[illegible]	2.1
4		[illegible]	145.8	[illegible]	[illegible]	[illegible]	116	[illegible]	[illegible]	—	73	[illegible]
5	14 3/8	14:00	147.9	1.90	[illegible]	[illegible]	116	[illegible]	[illegible]	—	73	[illegible]
5		[illegible]	[illegible]	1.80	[illegible]	[illegible]	116	[illegible]	[illegible]	—	[illegible]	[illegible]
6	15 3/8	[illegible]	151.7	1.7	[illegible]	[illegible]	116	[illegible]	[illegible]	—	[illegible]	[illegible]
6		[illegible]	153.960	1.80	[illegible]	[illegible]	116	95	99	—	70	2.1
[illegible]		[illegible]	END									
[illegible]												
[illegible]												
[illegible]												

[redacted] ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant CARGILL SIOUX CITY, IOWA
Sampling Location [illegible] Cooler (Outlet)
Date 6-20-82 Run No. 1
Time Start 6:20 Time End 7:41
Sampling Time/Point 2.4 (120)
DB 104 °F, WB — °F, VF @ DP 0.7-1.2 "Hg
Moisture 3.3%, FDA —, Gas Density Factor —
Barometric Press [illegible] "Hg, Stack Press 28.9 "Hg
Weather —
Temp. [illegible] °F, W/D —, W/S —
Sample Box No. 1 Meter Box No. 1
Meter ΔH@ [illegible] Pitot Corr. Factor 0.8[illegible]
Nozzle Dia. [illegible] in., Probe Length — ft
Probe Heater Setting —
Stack Dimensions: Inside Diameter [illegible].5 in
Inside Area [illegible] ft2
Height — ft
Eff. Area = [illegible]



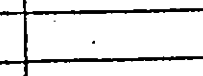
Mat'l Processing Rate —
Final Gas Meter Reading [illegible] ft3
Initial Gas Meter Reading [illegible] ft3
Total Condensate in Impingers [illegible] ml
Moisture in Silica Gel — gm
Silica Gel Container No. — Filter No. —
Orsat: CO_2 —
O_2 —
CO —
N_2 —
Excess Air —
Test Conducted by: [illegible]

Remarks: —

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
Port #1		6:20	[illegible]									
Port #1												
2												
3												
4												
5												

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O) Calc.	Meter Orifice Press. Diff. ("H_2O) Actual	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F) In	Gas Sample Temp. @ Dry Gas Meter (°F) Out	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.60	1.60	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	75	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.25	[illegible]	[illegible]	[illegible]	100	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	108	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	1.90	1.90	[illegible]	[illegible]	[illegible]	[illegible]	65	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	146	[illegible]	[illegible]	[illegible]	—	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible]	[illegible]	6:27	[illegible]	[illegible]	2.05	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
[illegible]	27 [illegible]	6:50	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	27 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
[illegible]												
[illegible]		[illegible]										
[illegible]	[illegible]	—	—	0	0	0						
[illegible]	[illegible]	—	—	0	0	0						
[illegible]	[illegible]	—		0	0	0				—		
[illegible]	[illegible]	—		0	0	0				—		
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

t and verse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@Dry Gas Meter (°F)		Sample <Box> Temp. (°F)>	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
2												
2,4,6	3 3/32											
7	4 3/4											
8	5 9/32											
9	6 25/32											
10	8 1/32											
11	9 1/32											
12	11 3/4											
13	17 3/4											
14	19 3/32	1350	802.4									
15	21 1/32											
16	23											
17	25 3/32											
18	27 3/4											
19	29 1/32											
20	31 1/32											
21	32 11/32											
2												
2,4,6												
1												



[redacted] ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant [redacted]
Sampling Location [redacted] (Outlet)
Date 6-28 Run No. 2
Time Start [redacted] Time End [redacted]
Sampling Time/Point [redacted] (12)
DB 89 °F, WB — °F, VF @ DP — "Hg
Moisture 33%, FDA —, Gas Density Factor —
Barometric Press 29.6 "Hg, Stack Press 29.8 "Hg
Weather [redacted]
Temp. 80 °F, W/D —, W/S —
Sample Box No. 1 Meter Box No. 1
Meter ΔH@ 1.71 Pitot Corr. Factor 0.85
Nozzle Dia. .24 in., Probe Length 6 ft
Probe Heater Setting —
Stack Dimensions: Inside Diameter 27.5 in
Inside Area 4.27 ft²
Height [redacted] ft
Eff. Area = 3.849 ft²

Mat'l Processing Rate —
Final Gas Meter Reading 891.0 ft³
Initial Gas Meter Reading 821.218 ft³
Total Condensate in Impingers 69 ml
Moisture in Silica Gel — gm
Silica Gel Container No. — Filter No. 0004

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

Test Conducted by: [redacted]

Remarks: [redacted] (55)

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ($"H_2O$)	Meter Orifice Press. Diff. ($"H_2O$)		Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
Port #1		08:45	847.785									
Point 1	1-7/8	—	—	0.[illegible]	[illegible]	[illegible]	109	[illegible]	[illegible]	250	—	[illegible]
" 2	1-7/8	—	—	0.[illegible]	[illegible]	[illegible]	109	[illegible]	[illegible]	250	—	[illegible]
" 3	1-7/8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
" 4	2-7/8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
" 5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
" 6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O) Calc.	Meter Orifice Press. Diff. ("H_2O) Actual	Stack Gas Temp. (°F)	Gas Sample Temp. @Dry Gas Meter (°F) In	Gas Sample Temp. @Dry Gas Meter (°F) Out	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
Port # 1										[illegible]		
[illegible] 9	5 [illegible]	[illegible]	[illegible]	[illegible]		[illegible]	110			[illegible]	[illegible]	
[illegible] 9	6 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	110	[illegible]				[illegible]
[illegible] 10	8 [illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]					
[illegible] 11	9 [illegible]	[illegible]	8871	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		
[illegible] 12	11 [illegible]	[illegible]	8885	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible] 13	17 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]		[illegible]	[illegible]		[illegible]
[illegible] 14	19 [illegible]	[illegible]	[illegible]			[illegible]	110	[illegible]	[illegible]	[illegible]		[illegible]
[illegible] 15	21 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	110	[illegible]	[illegible]	[illegible]	61	[illegible]
[illegible] 16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	110		[illegible]	[illegible]	—	[illegible]
[illegible] 17	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	
[illegible] 18	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible] 19	25 [illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
[illegible] 20	[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]
[illegible] 21	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		
[illegible] 22	[illegible]	[illegible]	8944 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	74	160	65	[illegible]
[illegible] 23	27 [illegible]	0952 [illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	155	[illegible]	[illegible]
[illegible] 24	27 [illegible]	0955	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	150		[illegible]
[illegible]												
Port # 2												
Point 1		—	—	0	[illegible]	0		[illegible]	—			
[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]	—	[illegible]	[illegible]	
[illegible]	[illegible]	[illegible]	[illegible]	0		0						
[illegible]	[illegible]	[illegible]	[illegible]	0		0			[illegible]			
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
Port 1/2												
Point 6												
7												
5												
4												
10												
11												
12												
1												
11												
2												
16												
17												
15												
19												
20												
21												
22												
23												
24												

[redacted] ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant Cargill Sour [illegible]
Sampling Location [illegible] (Outlet)
Date [illegible] Run No. [illegible]
Time Start 11:11 Time End 2:16
Sampling Time/Point [illegible] (Q10)
DB 69 °F, WB — °F, VF @ DP [illegible] "Hg
Moisture 3.3%, FDA [illegible], Gas Density Factor —
Barometric Press 28.6 "Hg, Stack Press 28.8 "Hg
Weather [illegible]
Temp. 60 °F, W/D —, W/S [illegible]
Sample Box No. 1 Meter Box No. 1
Meter ΔH@ 1.7" Pitot Corr. Factor [illegible]
Nozzle Dia. [illegible] in., Probe Length [illegible] ft
Probe Heater Setting —
Stack Dimensions: Inside Diameter [illegible] in
Inside Area [illegible] ft2
Height [illegible] ft
Eff. Area = 8.329 ft²

Mat'l Processing Rate [illegible]
Final Gas Meter Reading [illegible] ft3
Initial Gas Meter Reading [illegible] ft3
Total Condensate in Impingers 60 ml
Moisture in Silica Gel — gm
Silica Gel Container No. — Filter No. [illegible]
Orsat: CO_2 [illegible]
O_2 [illegible]
CO [illegible]
N_2 [illegible]
Excess Air [illegible]
Test Conducted by: R. Duncan
[illegible]
[illegible]
[illegible]
Remarks: [illegible] (65)

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
[illegible]	[illegible]	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	114	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	116	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

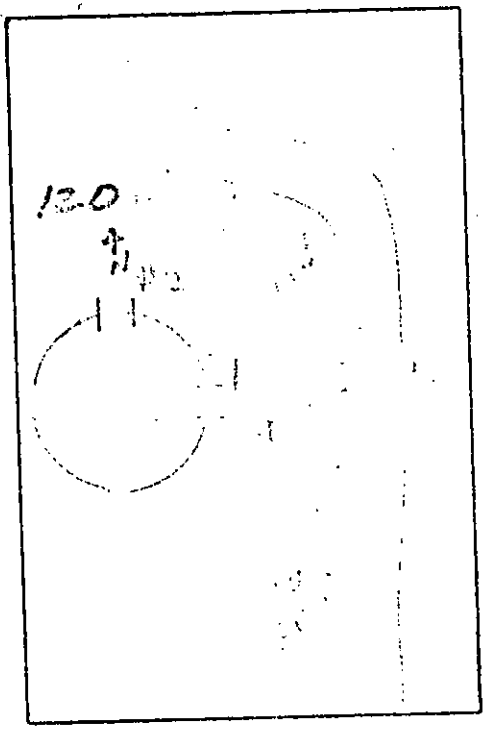
Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O) Calc.	Meter Orifice Press. Diff. ("H_2O) Actual	Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F) In	Gas Sample Temp. @ Dry Gas Meter (°F) Out	Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
[illegible]					[illegible]		111	[illegible]	[illegible]		[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]				—	[illegible]
[illegible] 9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]			[illegible]	[illegible]	
[illegible] 10	[illegible]	11:[illegible]	9160.0	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]		
[illegible] 11	[illegible]	[illegible]	9116.7	[illegible]	[illegible]	[illegible]	116					
[illegible] 12	11 [illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					
[illegible] 13	[illegible]	[illegible]	[illegible]	[illegible]					[illegible]	[illegible]		[illegible]
[illegible] 14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]							[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]						
[illegible] 15	[illegible]				[illegible]	[illegible]	[illegible]					
[illegible] 16	[illegible]	11:[illegible]	[illegible]		[illegible]	[illegible]	[illegible]					
[illegible]	[illegible]	[illegible]	[illegible]				[illegible]			[illegible]	—	
[illegible] 18	24 [illegible]	[illegible]	[illegible]		[illegible]		116				—	[illegible]
[illegible] 19	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]					
Stop 20	[illegible]	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		[illegible]
[illegible] 21	27 [illegible]	11:[illegible]	[illegible]		[illegible]	[illegible]	119	[illegible]	[illegible]	[illegible]	67	
[illegible]	27 [illegible]	11:[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		—	[illegible]
[illegible]	27 [illegible]	11:[illegible]		[illegible]	[illegible]	[illegible]		[illegible]	[illegible]		—	[illegible]
[illegible] 24	27 [illegible]	11:[illegible]	9[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					
[illegible]												
[illegible]												
[illegible]		—	—	[illegible]	0	[illegible]	—			—		
[illegible]		—	—	[illegible]	0	[illegible]	—					
[illegible] 2	[illegible]	—	—		0						—	
[illegible] 3				[illegible]	0	[illegible]						
[illegible] 4	[illegible]	[illegible]		[illegible]	0	0						
[illegible]		[illegible]	[illegible]				[illegible]		[illegible]	[illegible]	[illegible]	[illegible]
[illegible]		[illegible]	[illegible]									

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
Port #2										5.0		
Point #6		1:21	—							7.5		
7			—							10.0		
8										12.5		
9										15.0		
10			969.9							2.5		
11										5.0		
12										7.5		
13										10.0		
14										12.5		
15			969							15.0		
16										2.5		
17										5.0		
18										7.5		
19										10.0		
20			970.0							12.5		
21			—							5.0		
22		2:16										
23		2:03										
24		2:04	970.132									

[redacted] ENVIRONMENTAL ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant [redacted]
Sampling Location [redacted]
Date 6-2 Run No. 1
Time Start 6:50 Time End [redacted]
Sampling Time/Point 12 [redacted]
DB 90 °F, WB 76 °F, VF @ DP [redacted] "Hg
Moisture 2.6%, FDA 97.4, Gas Density Factor —
Barometric Press [redacted] "Hg, Stack Press 29.0 "Hg
Weather [redacted]
Temp. 70 °F, W/D —, W/S —
Sample Box No. 1 Meter Box No. 1
Meter ΔH@ 1.71 Pitot Corr. Factor [redacted]
Nozzle Dia. .41 in., Probe Length [redacted] ft
Probe Heater Setting —
Stack Dimensions: Inside Diameter [redacted] in
Inside Area [redacted] ft²
Height [redacted] ft



Mat'l Processing Rate [redacted]
Final Gas Meter Reading [redacted] ft³
Initial Gas Meter Reading [redacted] ft³
Total Condensate in Impingers [redacted] ml
Moisture in Silica Gel — gm
Silica Gel Container No. — Filter No. —
Orsat: CO_2 [redacted]
O_2 [redacted]
CO [redacted]
N_2 [redacted]
Excess Air [redacted]
Test Conducted by: [redacted]

Remarks: [redacted]

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
Port #1		6:50	330.425									
Point #1	1 [redacted]	6:55	335.6	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	—	[redacted]	[redacted]
		7:00	—	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	—	—	[redacted]
[redacted] 2	3 [redacted]	7:05	346.2	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	—	—	[redacted]
		7:10	—	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	—	[redacted]	[redacted]
3		7:15	358.3	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	—	—	[redacted]
		7:20	362.4	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	[redacted]	—	—	[redacted]
		7:25	367.7									

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
Port #1												
Point #												
5												
6												
Port # 2												
Point # 1												
2												
3												
4												
5												
6												

[redacted]/IRONMENTAL ENGINEERING, INC
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant [redacted]
Sampling Location [redacted]
Date [redacted] Run No. [redacted]
Time Start [redacted] Time End 11:[redacted]
Sampling Time/Point [redacted]
WB [redacted] °F, WB [redacted] °F, VF @ DP [redacted] "Hg
Moisture 2.6 %, FDA 97.4, Gas Density Factor [redacted]
Barometric Press 28.9 "Hg, Stack Press 29.1 "Hg
Weather [redacted]
Temp. [redacted] °F, W/D [redacted], W/S [redacted]
Sample Box No. [redacted] Meter Box No. [redacted]
Meter ΔH@ [redacted] Pitot Corr. Factor [redacted]
Nozzle Dia. [redacted] in., Probe Length [redacted] ft
Probe Heater Setting [redacted]
Stack Dimensions: Inside Diameter 2.6 in
Inside Area [redacted] ft²
Height [redacted] ft

Mat'l Processing Rate [redacted]
Final Gas Meter Reading [redacted] ft³
Initial Gas Meter Reading [redacted] ft³
Total Condensate in Impingers [redacted] ml
Moisture in Silica Gel [redacted] gm
Silica Gel Container No. [redacted] Filter No. [redacted]
Orsat: CO_2 [redacted]
O_2 [redacted]
CO [redacted]
N_2 [redacted]
Excess Air [redacted]
Test Conducted by: [redacted]

Remarks: [redacted]

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
Port #1		8:45	949.362									
Port #1		8:50										
		8:55										
2		9:00										
		9:05										
3		9:10	—									
		9:15										
4		9:20										

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
Port #1										—	—	
Point #1		9:25	—							—	—	
5		9:30		1.10			71			—	—	
		9:35		1.60			71			—	.50	
6		9:40					71			—	—	
		9:45										
										—		
		10:05										
Port #2												
Point 1								70	71	—	—	
		10:11		0.80	2.90	2.90	71	70	71	—	.50	
										—		
2			—	1.10						—		
										—		
3			—							—	—	
										—		
4										—		
										—		
5			—							—		
										—		
6										—		

(20) Changed orifice manometer to 10 inch manometer.

[redacted] ENGINEERING, INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant _____
Sampling Location _____
Date _____ Run No. _____
Time Start _____ Time End _____
Sampling Time/Point _____
DB _____ °F, WB _____ °F, VF @ DP _____ "Hg
Moisture 2.6 %, FDA 97.4 Gas Density Factor _____
Barometric Press _____ "Hg, Stack Press 27.1 "Hg
Weather _____
Temp. _____ °F, W/D _____, W/S _____
Sample Box No. _____ Meter Box No. _____
Meter ΔH@ _____ Pitot Corr. Factor _____
Nozzle Dia. _____ in., Probe Length _____ ft
Probe Heater Setting _____
Stack Dimensions: Inside Diameter _____ in
Inside Area _____ ft2
Height _____ ft

120 mm

Mat'l Processing Rate _____
Final Gas Meter Reading _____ ft3
Initial Gas Meter Reading _____ ft3
Total Condensate in Impingers _____ ml
Moisture in Silica Gel _____ gm
Silica Gel Container No. _____ Filter No. _____
Orsat: CO_2 _____
O_2 _____
CO _____
N_2 _____
Excess Air _____
Test Conducted by: _____

Remarks: _____ (80)

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
Port #1		12:30	591.775									
Point #1		12:35		1.00			74					
		12:40		0.95	3.60	3.60						
		12:45		1.30	11.90	11.90						
2		12:50		1.30								
		12:55		1.10								
3		1:00										
		1:05										
4												

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
Port A1												
Point #		1:10	45.2				104			—		5.5
5	22 5/16	1115			4.1	4.1	—			—	—	5.5
		1:20					—			—	—	5.0
6	24 27/32	1:25	—				105			—	58	5.0
		1:30					—	7	7	—	—	5.0
										—		
										—		
Port #2		1:35										
Point #1	1 5/32	1:40					105			—		4.5
		1:45					105			—		4.5
2	3 13/16	1:50	—	0.70	3.		—			—	—	4.5
		1:55	—	1.10	4.10	4.1	—	7	76	—	—	5.0
3	7 11/16	2:00					105			—		5.0
		2:05					—			—	—	5.0
4	18 5/16	2:10					105			—	57	5.0
		2:15		1.30	4.90	4.90	—			—	—	5.0
5	22 5/16	2:20		1.30	4.90	4.90	—	76	76	—	—	5.0
		2:25	725.9	1.30	4.9	4.9	—			—	—	5.0
6	24 27/32	2:30	731.7	1.10	4.10	4.10	105	76	75	—	54	5.0
		2:35	737.5	1.10	4.10	4.10	—	76	75	—	—	5.0

[redacted] ENVIRONMENTAL ENGINEERING INC.
Gainesville, Florida

SOURCE SAMPLING FIELD DATA SHEET

Plant Cargill, Inc.
Sampling Location [illegible]
Date 6-21-77 Run No. 1
Time Start 1850 Time End [illegible]
Sampling Time/Point 2.5 (Traverse: 117.5)
DB 91 °F, WB 71 °F, VF @ DP 0.56 "Hg
Moisture 2 %, FDA [illegible], Gas Density Factor ____
Barometric Press 28.1 "Hg, Stack Press 28.78 "Hg
Weather Clear - Cool
Temp. ____ °F, W/D ____, W/S ____
Sample Box No. ____ Meter Box No. 5
Meter ΔH@ 1.63 Pitot Corr. Factor 0.83
Nozzle Dia. 0.25 in., Probe Length 6 ft
Probe Heater Setting —
Stack Dimensions: Inside Diameter 41.75 in
Inside Area ____ ft2
Height ____ ft

Mat'l Processing Rate ____
Final Gas Meter Reading 828.945 ft3
Initial Gas Meter Reading 720.300 ft3
Total Condensate in Impingers 11 ml
Moisture in Silica Gel — gm
Silica Gel Container No. ____ Filter No. ____
Orsat: CO_2 ____
O_2 ____
CO ____
N_2 ____
Excess Air ____
Test Conducted by: [illegible]

Remarks: (26)

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time 1850	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O) Calc.	Meter Orifice Press. Diff. ("H_2O) Actual	Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F) In	Gas Sample Temp.@ Dry Gas Meter (°F) Out	~~Sample Box Temp. (°F)~~ TIME	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
1		1850	720.300	—	—	—	—	—	—	—	—	—
2		1855	725.0	0.22	0.68	0.68	90	72	73	—	71	3
3		1900	729.5	0.22	0.68	0.68	90	73	74	—	71	4
4		1905	734.0	0.30	1.15	1.15	90	77	77	—	71	6
5		1910	[illegible]	0.30	1.15	[illegible]	90	77	77	—	71	6
6		1915	[illegible]	0.20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	12.5	71	7
7		1920	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	13	71	[illegible]

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out	TIME		
8		1951.5	807.4	0.21	1.0	1.0	85	81	77	2.5	71	4.5
9		1910	809.1	0.22	1.0	1.0	86	81	77	5.0	71	6.5
10		1915.5	810.5	0.22	1.0	1.0	87	82	78	7.5	71	
11		1933	813.8	0.17	1.0	1.0	93	81	79	10.0	71	5.5
12		1936.5	815.4	0.23	1.0	1.0	93	79	79	12.5	71	5.5
13		1938	—	0.21	1.0	1.0	86	78	78	15.0	71	5.5
14		1940.4	816.9	0.27	1.0	1.0	86	79	79	2.5	72	5
15		1943	818.3	0.24	1.0	1.0	87	79	79	5.0	71	5
16		1945.5	819.6	0.21	1.0	1.0	85	79	79	7.5	72	4
17		1948	—	0.21	0.76	0.76	84	81	79	10.0	72	
18		1950.5	821.1	0.22	0.81	0.81	84	82	79	12.5	72	4.5
19		1953	822.8	0.23	0.81	0.81	84	82	79	15.0	72	5.5
20		1955.5	824.2	0.21	0.81	0.81	84	82	79	2.5	71	4.5
21		1958	826.6	0.22	0.81	0.81	86	81	79	5.0	70	4.5
22		2000.4	827.9	0.22	0.81	0.81	87	82	80	7.5	69	4.5
23		2003	829.4	0.24	0.81	0.81	87	82	80	10.0	69	5
24		2005.5	830.9	0.24	0.81	0.81	87	82	80	12.5	69	5
		2011										
1	—	—	—	0.07	0.24	0.24	87	82	80	2.5	69	4
2		2016	832.4	0.07	0.24	0.24	87	83	80	5.0	68	4
3		2018.5	833.2	0.08	0.24	0.24	90	83	80	7.5	62	4
4		2021	834.9	0.07	0.24	0.24	91	84	80	10		3.5
5		2023.5	836.3	0.08	0.24	0.24	92	79	80	12.5	57	5.5
6		2026	837.7	0.09	0.24	0.24	93	79	80	15	63	5.5

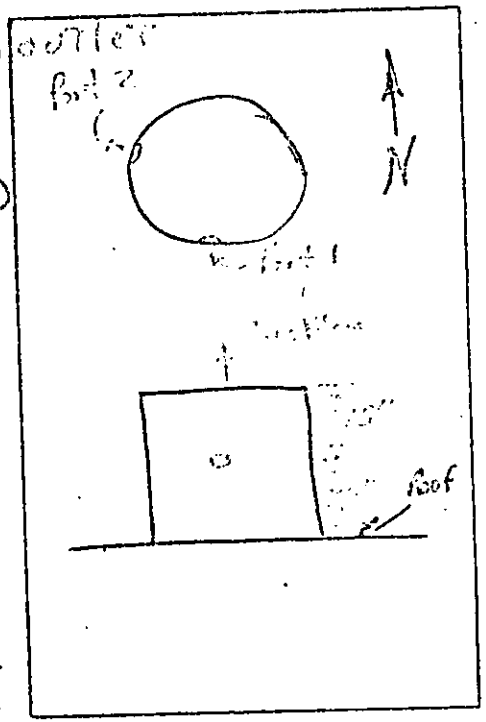
* Stopped and replaced filter holder and filter. (filter was in bad shape)

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press.Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out	TIME		
17		[illegible]	[illegible]	0.0[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.5	[illegible]	[illegible]
18		2021	822.5	0.10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5.0	[illegible]	[illegible]
19		[illegible]	825.4	0.10	[illegible]	[illegible]	[illegible]			2.5		
20		2026	828.4	0.11	0.42	0.42	[illegible]	[illegible]	[illegible]	10	[illegible]	[illegible]
111		[illegible]	[illegible]	0.12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	12.5	[illegible]	[illegible]
12		2031	[illegible]	0.14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	15	[illegible]	[illegible]
13		[illegible]	[illegible]	0.30	1.10	1.10	[illegible]	[illegible]	[illegible]	2.5	[illegible]	[illegible]
14		[illegible]	845.0	0.25	0.91	0.91	[illegible]	[illegible]	[illegible]	5.0	[illegible]	[illegible]
15		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.5	[illegible]	[illegible]
16		[illegible]	[illegible]	0.27	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10	[illegible]	[illegible]
17		2038	849.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	12.5	[illegible]	[illegible]
18		2042	853.6	0.25	0.82	0.8[illegible]	[illegible]	[illegible]	[illegible]	15	[illegible]	[illegible]
19		[illegible]	[illegible]	0.24	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.5	[illegible]	[illegible]
20		2101	858.7	0.23	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5	[illegible]	[illegible]
21		2103.5	860.0	0.21	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.5	[illegible]	[illegible]
22		2106	863.3	0.20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10	[illegible]	[illegible]
23		2110	[illegible]	0.17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
24	—	2111	[illegible]	0.17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

ENVIRONMENTAL ENGINEERING, INC.
[redacted]

SOURCE SAMPLING FIELD DATA SHEET

Plant CARGILL, INC.
Sampling Location PAN COOLER (INLET)
Date 6-22-72 Run No. 2
Time Start [illegible] Time End 1105
Sampling Time/Point 2.5 (TOTAL = 120)
DB [illegible] °F, WB [illegible] °F, VF @ DP [illegible] "Hg
Moisture 2 %, FDA [illegible], Gas Density Factor [illegible]
Barometric Press [illegible] "Hg, Stack Press 28.11 "Hg
Weather [illegible]
Temp. [illegible] °F, W/D [illegible], W/S [illegible]
Sample Box No. [illegible] Meter Box No. 5
Meter ΔH@ 1.68 Pitot Corr. Factor 0.83
Nozzle Dia. 0.25 in., Probe Length 6 ft
Probe Heater Setting —
Stack Dimensions: Inside Diameter 41.75 in
Inside Area [illegible] ft2
Height [illegible] ft



Mat'l Processing Rate [illegible]
Final Gas Meter Reading 936.260 ft3
Initial Gas Meter Reading [illegible] ft3
Total Condensate in Impingers 10 ml
Moisture in Silica Gel — gm
Silica Gel Container No. — Filter No. 0002/
Orsat: CO_2 [illegible]
O_2 [illegible]
CO [illegible]
N_2 [illegible]
Excess Air [illegible]
Test Conducted by: [illegible]

Remarks: [illegible]

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out			
[illegible]		0845	899.035									
1	—	—	—	0.80	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	—	[illegible]
2		0850	[illegible]	[illegible]	[illegible]	[illegible]	70	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3		0855	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
4		0900	[illegible]	0.82	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
5		0905	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6		0910	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
1		0901.5	883.1	0.31	1.8	1.8	90	72	66	2.5	52	4
8		0904.1	885.5	0.32	1.9	1.9	91	73	67	5.0	53	4
7		0907.1	888.3	0.37	1.85	1.9	90	74	68	7.5	54	4
10		0910	891.0	0.37	1.9	1.9	89	75	69	10	55	4
11		0912.5	893.3	0.38	1.9	1.9	90	76	70	12.5	56	4
12		0915	895.6	0.37	1.9	1.9	91	77	71	15	57	4
13		0917.4	898.0	0.36	1.8	1.8	91	77	70	12.5	57	4
14		0920	900.4	0.36	1.8	1.8	91	77	70	10	57	4
15		0922.5	902.8	0.36	1.8	1.8	91	77	70	7.5	57	4
16		0925	905.1	0.36	1.8	1.8	91	77	70	5	57	4
17		0927.5	907.5	0.36	1.8	1.8	91	77	70	2.5	57	4
18		0930	909.8	0.36	1.8	1.8	91	77	70	5	57	4
19		0932.5	912.2	0.36	1.8	1.8	91	77	70	7.5	57	4
20		0935	914.5	0.36	1.8	1.8	91	77	70	10	57	4
21		0937.5	916.9	0.36	1.8	1.8	91	77	70	12.5	57	4
22		0940	919.3	0.36	1.8	1.8	91	77	70	15	57	4
23		0942.5	921.6	0.36	1.8	1.8	91	77	70	12.5	57	4
24		0945	924.0	0.36	1.8	1.8	91	77	70	10	57	4
Port 2		1005										
1				0.10	0.37	0.37	91	74	71	5	56	3
2		1010	905.0	0.10	0.37	0.37	90	74	71	5	56	3
3		1012.5	906.1	0.11	0.42	0.42	90	74	72	25	56	3
4		1015	906.9	0.10	0.38	0.38	92	74	74	10	57	3
5		1017.5	908.0	0.12	0.45	0.45	92	75	74	12.5	57	3

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
6		1030	907.1	0.1[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	15	[illegible]	[illegible]
7		1032.5	910.3	0.[illegible]	[illegible]	0.[illegible]	92	[illegible]	[illegible]	8.5	[illegible]	[illegible]
8		1035	911.5	0.11	[illegible]	[illegible]	92	[illegible]	[illegible]	5	[illegible]	[illegible]
9		1037.5	912.7	0.18	0.[illegible]	0.[illegible]	92	[illegible]	[illegible]	2.5	[illegible]	[illegible]
10		1040	914.2	0.[illegible]	0.94	0.[illegible]	[illegible]	[illegible]	[illegible]	10	[illegible]	[illegible]
11		1042.5	915.8	0.[illegible]	1.05	1.[illegible]	93	73	74	12.5	[illegible]	[illegible]
12		1045	—	0.[illegible]	1.10	1.[illegible]	92	[illegible]	[illegible]	15	[illegible]	[illegible]
13		1047.5	919.6	0.[illegible]	1.[illegible]	1.[illegible]	[illegible]	78	[illegible]	2.5	[illegible]	[illegible]
14		1050	921.1	0.[illegible]	1.[illegible]	1.[illegible]	[illegible]	[illegible]	[illegible]	5	72	[illegible]
15		1052.5	922.6	0.[illegible]	1.[illegible]	1.[illegible]	[illegible]	[illegible]	[illegible]	7.5	72	[illegible]
16		1054.5	924.2	0.[illegible]	1.[illegible]	1.[illegible]	[illegible]	[illegible]	[illegible]	10	[illegible]	[illegible]
17		1047.5	925.8	0.26	0.95	0.95	[illegible]	78	[illegible]	12.5	73	[illegible]
18		1100	927.3	0.[illegible]	1.[illegible]	1.[illegible]	[illegible]	[illegible]	74	15	73	[illegible]
19		1052.5	929.0	0.[illegible]	1.[illegible]	1.[illegible]	[illegible]	[illegible]	[illegible]	2.5	[illegible]	[illegible]
20		1055	930.6	0.31	1.15	1.15	91	78	75	5	73	[illegible]
21		1057.5	932.1	0.27	1.00	1.[illegible]	[illegible]	79	75	2.5	73	[illegible]
22		1100	933.6	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	[illegible]	[illegible]	10	[illegible]	[illegible]
23		1102.5	[illegible]	0.[illegible]	0.[illegible]	0.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
24	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	

[redacted]

SOURCE SAMPLING FIELD DATA SHEET

Plant [illegible]
Sampling Location [illegible]
Date [illegible] Run No. [illegible]
Time Start [illegible] Time End 1440
Sampling Time/Point [illegible]
DB ____ °F, WB ____ °F, VF @ DP ____ "Hg
Moisture 2 %, FDA ____, Gas Density Factor ____
Barometric Press [illegible] "Hg, Stack Press 28.91 "Hg
Weather ____
Temp. ____ °F, W/D ____, W/S ____
Sample Box No. ____ Meter Box No. ____
Meter ΔH@ 1.68 Pitot Corr. Factor 0.83
Nozzle Dia. [illegible] in., Probe Length 6 ft
Probe Heater Setting ____
Stack Dimensions: Inside Diameter [illegible] in
Inside Area ____ ft²
Height ____ ft

Mat'l Processing Rate ____
Final Gas Meter Reading [illegible] ft³
Initial Gas Meter Reading [illegible] ft³
Total Condensate in Impingers 20 ml
Moisture in Silica Gel ____ gm
Silica Gel Container No. [illegible] Filter No. [illegible]
Orsat: CO_2 ____
O_2 ____
CO ____
N_2 ____
Excess Air ____
Test Conducted by: ____

Remarks: [illegible]

Port and Traverse Point No.	Distance from End of Port (in.)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ("H_2O)	Meter Orifice Press. Diff. ("H_2O)		Stack Gas Temp. (°F)	Gas Sample Temp.@ Dry Gas Meter (°F)		Sample-Box-Temp. (°F)	Last Impinger Test (°F)	Vacuum on Sample Train ("Hg)
					Calc.	Actual		In	Out	TIME		
[illegible]		[illegible]										
[illegible]		—	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible] 2		1231.5	[illegible]	0.33	1.4	1.4	80	76	76	5.5	77	[illegible]
[illegible] 3		1237	941.8	0.37	1.55	1.55	80	78	76	7.5	74	2.5
[illegible] 4		[illegible]	943.7	0.39	[illegible]	[illegible]	[illegible]	79	76	10	74	3
[illegible] 5		1248	[illegible]	0.40	1.5	[illegible]	[illegible]	80	76	12.5	[illegible]	[illegible]
[illegible] 6		1254	[illegible]	0.45	1.65	1.65	[illegible]	[illegible]	77	15	[illegible]	[illegible]

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ($"H_2O$)	Meter Orifice Press. Diff. ($"H_2O$)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
7		1247	949.5	0.50	1.5	1.6	[illegible]	[illegible]	72	2.5	75	[illegible]
8		[illegible]	[illegible]	0.[illegible]	1.[illegible]	1.[illegible]	86	[illegible]	[illegible]	5	75	[illegible]
9		1252	953.4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.5	75	[illegible]
10		[illegible]	955.1	0.[illegible]	1.4	1.4	[illegible]	[illegible]	[illegible]	10	[illegible]	3
11		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	68	70	12.5	75	[illegible]
12		[illegible]	[illegible]	0.[illegible]	[illegible]	[illegible]	150	[illegible]	78	15	77	[illegible]
13		1302	960.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.5	80	[illegible]
14		[illegible]	962.3	0.40	1.5	1.5	[illegible]	82	77	5	80	3
15		1307	964.2	0.[illegible]	1.4	1.[illegible]	[illegible]	87	77	2.5	80	3
16		[illegible]	[illegible]	0.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10	80	3
17		1312	967.7	0.[illegible]	[illegible]	[illegible]	102	[illegible]	[illegible]	12.5	[illegible]	3
18		[illegible]	[illegible]	0.37	1.4	1.[illegible]	[illegible]	88	80	15	80	3
19		[illegible]	971.8	[illegible]	1.[illegible]	[illegible]	102	[illegible]	[illegible]	2.5	80	2
20		1319	973.2	0.40	1.6	1.[illegible]	[illegible]	[illegible]	[illegible]	5	[illegible]	[illegible]
21		1322	975.1	0.39	1.45	1.45	102	81	71	2.5	80	[illegible]
22		[illegible]	[illegible]	0.[illegible]	1.[illegible]	1.[illegible]	[illegible]	[illegible]	[illegible]	10	[illegible]	[illegible]
23		1327	980.6	0.37	1.4	1.4	[illegible]	[illegible]	[illegible]	[illegible]	80	[illegible]
24	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Post 2		1340										
Pt. 1		-	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2		1346	989.5	[illegible]	[illegible]	0.47	[illegible]	85	82	5	[illegible]	[illegible]
3		1347.5	983.5	0.[illegible]	0.41	0.41	102	92	82	7.5	80	2
4		[illegible]	984.7	0.19	0.[illegible]	0.[illegible]	100	[illegible]	[illegible]	10	80	4

Add 2.5 min to each Port

Port and Traverse Point No.	Distance from End of Port (in)	Clock Time	Gas Meter Reading (ft^3)	Stack Velocity Head ($"H_2O$)	Meter Orifice Press. Diff. ($"H_2O$)		Stack Gas Temp. (°F)	Gas Sample Temp. @ Dry Gas Meter (°F)		Sample Box Temp. (°F)	Last Impinger Temp. (°F)	Vacuum on Sample Train
					Calc.	Actual		In	Out			
5		1352.5	916.7	0.21	0.[illegible]	0.[illegible]	78	[illegible]	[illegible]	12.5	[illegible]	5
6		1355	936.9	0.15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	15	[illegible]	[illegible]
7		1357.5	956.2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.5	[illegible]	[illegible]
8		1400	977.6	0.18	0.67	[illegible]	[illegible]	[illegible]	[illegible]	5	[illegible]	[illegible]
9		1402.5	996.0	0.21	[illegible]	[illegible]	180	[illegible]	[illegible]	2.5	[illegible]	[illegible]
10		1405	996.5	[illegible]	[illegible]	[illegible]	180	[illegible]	[illegible]	10	[illegible]	[illegible]
11		1407.5	997.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	12.5	[illegible]	5
12		1410	998.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	15	[illegible]	[illegible]
13		1412.5	998.[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.5	[illegible]	[illegible]
14		[illegible]	999.8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	5	[illegible]	[illegible]
15		[illegible]	1001.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.5	[illegible]	[illegible]
16		1420	1003.1	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	10	[illegible]	[illegible]
17		1422.5	—	[illegible]	1.18	1.18	[illegible]	[illegible]	[illegible]	12.5	[illegible]	[illegible]
18		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	15	[illegible]	[illegible]
19		1427.5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	2.5	[illegible]	[illegible]
20		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	90	[illegible]	5	[illegible]	[illegible]
21		1432.5	1011.3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	7.5	[illegible]	[illegible]
22		1435	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
23		1437.5	[illegible]	0.20	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
24	—	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

APPENDIX D

Complete Sampling Procedures

COMPLETE SAMPLING PROCEDURES FOR PARTICULATE STACK EMISSIONS

Sampling Procedure

Prior to performing the actual particulate emission tests, certain preliminary stack parameters had to be estimated or determined for the source. This preliminary data included the average temperature, velocity head, moisture content, stack diameter, and number of sampling points.

The stack gas temperature was determined by using bimetallic thermometers and mercury bulb thermometers.

Velocity head measurements were determined across the stack diameter by using a calibrated S-type pitot tube with an inclined manometer. This data was used to select the sampling nozzle diameter.

The approximate moisture content of the stack gas was determined by the wet bulb and dry bulb thermometer technique.

The sampling traverse points were selected according to Method 1 of the Federal Register (Volume 36, Number 247, Part II, December 23, 1971).

The stack emissions were sampled by using the following sample train: a stainless steel nozzle; a glass-lined probe; a Gelman Type A glass fiber filter; two impingers with 100 ml of distilled water; two dry impingers (the second impinger had a standard tip, while the first, third and fourth impingers had modified tips with 1/2-inch ID openings);

a thermometer on the last impinger; a flexible sample line; an air-tight pump; a dry test meter; and finally, a calibrated orifice with an inclined manometer. Figure 6 shows a schematic arrangement of the sampling train.

Silica gel was not used in the fourth impinger because it did not arrive with the equipment, and there was none available in the area. After discussion with the Project Officer it was decided to test without silica gel since the moisture was near ambient. The moisture for calculations was determined by the use of the wet and dry bulb method.

Because the stack temperature was less than 100°F and the moisture content was low, the probe and the filter holder portions of the sampling train were not heated.

The impinger portion of the sampling train was iced down to collect the condensable moisture in the stack gas.

Each point sampled across the stack diameter was sampled at an isokinetic sampling rate.

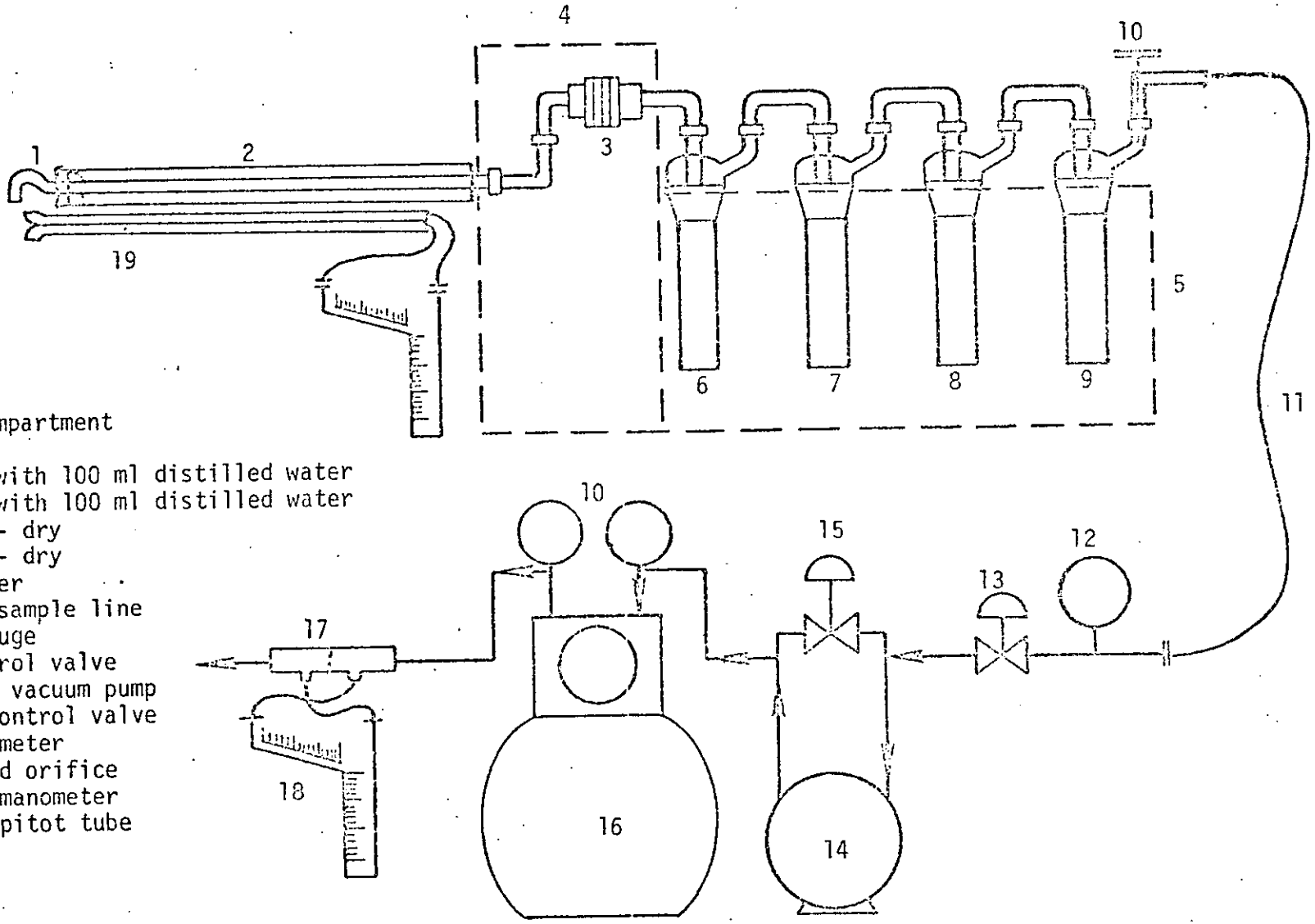
Sample Recovery

Samples were recovered in accordance with procedures outlined in Method 5 of the Federal Register (36 F.R., March 31, 1971), Determination of Particulate Emissions from Stationary Sources.

The sampling train glassware, exclusive of the glass lined probe and the fritted disc filter, were soaked in chromic acid cleaning solution for two hours previous to the preparation of sample blanks. The probes were thoroughly washed in chromic acid solution prior to testing

but were not soaked due to their cumbersome length. All sampling glassware was rinsed extensively with distilled water following the acid wash.

All samples were turned over to the Project Officer for additional labeling and analysis.



1. Nozzle
2. Probe
3. Filter
4. Heated Compartment
5. Ice Bath
6. Impinger with 100 ml distilled water
7. Impinger with 100 ml distilled water
8. Impinger - dry
9. Impinger - dry
10. Thermometer
11. Flexible sample line
12. Vacuum gauge
13. Main control valve
14. Air tight vacuum pump
15. By-pass control valve
16. Dry test meter
17. Calibrated orifice
18. Inclined manometer
19. "S" type pitot tube

Figure 6.

APPENDIX E

Field Test Log

FIELD TEST LOG

6/18/72 Left Orlando at 1530 EDST, arrived in Sioux City at 2230 CDST.

6/19/72 Went by to pick up equipment. Nine of the twelve boxes made it. Probes, silica gel, tools, and umbilical cord did not make it.

We met with Tom Ward and plant officials to discuss sampling program. Unloaded equipment and proceeded to get material for building stack extensions and straightening vanes.

Called office and requested additional probes.

6/20/72 Finished setting up sampling equipment and building stack extensions.

Probes arrived at 1015. We were ready to sample the Hammer Mill Outlet after noon. We were requested to wait until two EPA engineers arrived so that comparative tests could be made with the EPA train and a modified hi-vol sampler.

After the EPA sampler was set up and we leak tested our train, we began testing at 2030. No silica gel was used.

Because the flow rate from the storage bin was not detectable with the velometer (less than 10 f.p.m.), EPA did not request any tests using a hi-vol sampler.

Test ended at 2302.

6/21/72 Second test on the Hammer Mill began at 0955, and ended at 1145. Third test began at 1210 and ended at 1350.

We had to wait on plant process before sampling.

The first run (inlet and outlet) on the Pan Cooler began at 1850 and ended at 2110.

6/22/72 Second run on Pan Cooler began at 0845, ended at 1105. Third run began at 1232, and ended at 1440.

We began first test on the Column Cooler (Inlet and Outlet) at 1725, and plant shut down 1735 and was down until 1802. We continued sampling and finished at 1951.

6/23/72 Second test on Column Cooler began at 0750 and ended at 1000. Third run began at 1100 and shut down at 1200 because of plant shutdown. We resumed sampling at 1320 and ended at 1420.

After cleanup and packing equipment, we gave the EPA Project Officer the samples.

6/24/72 We left Sioux City at 0730, and arrived in Gainesville at 1530.

APPENDIX F

Project Participants

PROJECT PARTICIPANTS

Environmental Engineering, Inc.

Name	Title
John Koogler, Ph.D., P.E.	Project Director
John Dollar, EIT, M.S.	Project Manager
George Allen, Sr. Technician	Environmental Specialist
Robert Durgan, Sr. Technician	Environmental Specialist
Eric Johnson, Sr. Technician	Environmental Specialist

Environmental Protection Agency

Name	Title
Thomas E. Ward	Project Test Officer
Ken Woodard	Project Engineer