AP42 Section: 8.4

Background Chapter: 4

Reference Number: 7

Title: **Emission Test Report Chevron Chemical Richmond, California,**

EPA/EMB Report 79-NHF-12,
U.S. Environmental Protection Agency,
Research Triangle Park, North Carolina,

March 1979.

United States
Environmental Protection
Agency

Office of Air Quality
Planning and Standards
Research Triangle Park NC 27711

EMB Report 79-NHF-12
March 1979

Air

EPA

Ammonium Sulfate

Facility D

Emission Test Report
Chevron Chemical
Richmond, California

SET #2632-01-0179
FINAL REPORT

PARTICULATE EMISSIONS FROM AN AMMONIUM SULFATE PLANT CONTROLLED BY A VENTURI SCRUBBER

EPA Contract No. 68-02-2813
Work Assignment No. 26

Prepared for:

Environmental Protection Agency
Emission Measurement Branch
ESED Mail Drop #13
Research Triangle Park, N.C. 27711

May 29, 1979

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.
2600 Cajon Boulevard
San Bernardino, California 92411

TABLE OF CONTENTS

1.0 INTRODUCTION

Testing to determine particulate emissions from an ammonium sulfate plant was conducted by Scott Environmental Technology, Inc. for the U.S. Environmental Protection Agency under Contract No. 68-02-2813, Work Assignment No. 26. Three tests were conducted on December 12 and 13, 1978 at the Chevron Chemical Company ammonium sulfate plant located in Richmond, California.

Particulate tests were conducted at the inlet and outlet of a venturi scrubber controlling emissions in the exhaust gases from an ammonium sulfate drier using EPA Method #5. One test to determine particle size distribution was also performed at the inlet to the scrubber using an Andersen 2000 Cascade Impactor. Opacity of the gas exiting from the scrubber was recorded during each test by a smoke reader. Samples of the ammonium sulfate crystals were collected at the inlet and outlet of the drier to determine moisture content. Also, samples of the scrubber liquor were collected downstream from the scrubber.

The test arrangements were made through William Moriarty, Manager of Operations, Manufacturing, with Chevron Chemical Company. Dennis Holzschuh of the EPA was present during the tests as was Marvin Drabkin of Mitre Corporation who monitored the plant process.

2.0 SUMMARY OF RESULTS

The particulate concentration at the outlet of the scrubber ranged from 0.0516 to 0.122 grains/scf and averaged 0.084 grains/scf for the three runs. The average gas flow rate was 4038 dscfm resulting in an average particulate mass flow rate of 3.0 lbs/hour. Inlet particulate concentrations averaged 43.8 grains/scf with an average gas flow rate of 3803 dscfm and particulate mass flow rate of 1424 lbs/hour. The collection efficiency of the scrubber was 99.9% for Test Run No. 2. Complete Method #5 results are summarized in Table 2.1.

The results of the particulate size distribution sample are shown in tabular and graphical form in Table 2.2 and Figure 2.1, respectively.

The average moisture content of the ammonium sulfate crystals was 0.54% at the drier inlet and 0.19% at the drier outlet. Complete results are shown in Table 2.3.

The opacity at the outlet averaged 0% during each test. Results of the opacity readings are summarized in Tables 2.4 through 2.7.

The field data sheets are included in Appendix A.

TABLE 2.1
SUMMARY OF METHOD #5 RESULTS

Chevron Chemical Company
Date: 12/12 & 12/13/78

Location	Inlet			Outlet		
Run No.	2	3	4	1	2	3
Date	12/12	12/13	12/13	12/12	12/12	12/13
Time Started	1540	0850	1330	1245	1705	0902
Time Ended	1730	1100	1420	1504	1921	1124
Barometric Pressure: P_{bar} (in. Hg.)	30.31	30.35	30.35	30.26	30.25	30.35
Static Pressure: P_g (in. H_2O)	-0.05	-0.05	-0.05	1.0	1.0	1.0
Area of Stack: A (ft^2)	2.50	2.50	2.50	1.23	1.23	1.23
Pitot Coefficient: C_p	0.838	0.838	0.838	0.835	0.835	0.835
Meter Calibration Factor: Y	0.94	0.94	0.94	1.075	1.075	1.075
Area of Nozzle: A_n (in^2)	0.0491	0.0491	0.0491	0.035	0.035	0.035
Total Sampling Time: Θ (Min.)	90	90	24.75	128	128	128
Gas Sample Volume: Vm (ft^3)	47.225	42.429	12.390	91.509	87.924	98.371
Avg. Velocity Head: $(\sqrt{\Delta p})^2_{avg.}$ (in. H_2O)	0.25	0.20	0.25[1] / 0.30[2]	1.16	1.04	1.30
Avg. Orifice Pressure: ΔH (in H_2O)	0.84	0.70	0.83	1.97	1.76	2.19
Avg. Stack Temperature: T_s (^oR)	638	636	641	574	571	574
Avg. Meter Temperature: T_m (^oR)	550	536	540	537	547	546
Volume of Liquid and Silica Gel Collected: V_{lc} (ml.)	73	56	16	166	151	185
Gas Sample Volume @ Std. Cond.: $Vm(Std)\ (ft^3) = \frac{17.64\ VmY}{Tm}\ (P_{bar}+\Delta H/13.6)$	43.242	39.904	11.570	98.252	92.599	104.241
Volume of Water Vapor: $Vw\ (std)\ (ft^3) = 0.04707\ V_{lc}$	3.44	2.64	0.753	7.81	7.11	8.71
Moisture Content: $B_{ws} = \frac{Vw(Std)}{Vm(Std) + Vw(Std)}$	0.074	0.062	0.061	0.074	0.071	0.077
Molecular Weight of Stack Gas (dry): $M_d = 0.44\ (\%\ CO_2) + 0.32\ (\%\ O_2) + 0.28\ (\%\ N_2 + \%\ CO)$	28.90	28.90	28.90	28.82	28.86	28.86

[1]Average during sampling. [2]Average in entire duct.

Location	Inlet			Outlet		
Run Number	2	3	4	1	2	3
Molecular Weight of Stack Gas (wet): $M_s \cong M_d (1-B_{ws}) + 18.0\ B_{ws}$	28.09	28.22	28.24	28.02	28.09	28.02
Stack Pressure: P_s (in. Hg) = $P_{bar} + P_g/13.6$	30.31	30.35	30.35	30.33	30.32	30.42
Stack Gas Velocity: v_s (ft/sec) = $85.49\ C_p\ (\Delta PT_s/P_s M_s)^{1/2}$	31.01	27.61	30.98[1] 33.93[2]	63.19	59.61	66.79
Stack Gas Volume Flow Rate: Q_{sd} (dscfh/min) = $1059\ (1-B_{ws}) v_s\ A\ P_s/T_s$	3612	3272[3]	3994[2]	4027	3830	4256
Actual Stack Gas Volume Flow Rate: Q (acfh/min) = $60\ v_s\ A$	4652	4142	5090[2]	4663	4399	4929
Weight of Particulate Collected: m_n (mg.)	127541.4	64757.4	31554.2	502.9	310.1	825.1
Concentration of Particulate @ Std.Cond.(dry): C_s (gr/scf) = $0.01542\ m_n/V_m$ (std) [C_s (g/dscm) = $0.03529\ m_n/V_m$ (std)]	45.48 [104.1	25.02[3] 57.27	42.05 96.24	0.0789 0.181	0.0516 0.118	0.122 0.279]
Mass Flow Rate of Particulate: Q (lb/hr) = $0.008571\ C_s\ Q_{sd}$	1408	701.7[3]	1439	2.7	1.7	4.5
Isokinetic Rate: I (%) = $13.61\ T_s\ V_m$ (std)$/P_s\ v_s A_n \Theta (1-B_{ws})$	97.6	99.4	94.1	96.5	95.7	96.9
Control Efficiency, %				----	99.9	99.4[3]

[1]Average during sampling.

[2]Average in entire duct.

[3]Not included in average due to leak in sample train.

TABLE 2.2

PARTICLE SIZE DISTRIBUTION

Date:	December 13, 1978	P_{bar} (in. Hg.)	30.35
Location:	Chevron	Stack Temp (^{o}F)	178
Sampling Location:	Inlet	Sample Time (Min)	2
Traverse Point No. Sampled:	19	Sample Volume (cf)	0.937
		Moisture (% H_2O)	6.1
		Meter Temp (^{o}F)	76
		Flow Setting, ΔH (in. H_2O)	0.67
		Nozzle Diameter (in.)	0.250

Sample Flow Rate (at stack conditions): 0.50 cfm

Plate No.	Net Wt. (mg)	%	Cumulative %	ECD (Microns)
1	157.3	5.8	100.0	14.73 and larger
2	789.5	29.1	94.2	9.28
3	1271.6	46.8	65.1	6.15
4	413.8	15.2	18.3	4.26
5	71.2	2.6	3.1	2.71
6	13.2	0.5	0.5	1.40
7	0.5	0.0	0.0	0.85
8	0.0	0.0	0.0	0.58
Backup Filter	0.3	0.0	0.0	<0.58
TOTAL	2717.4			

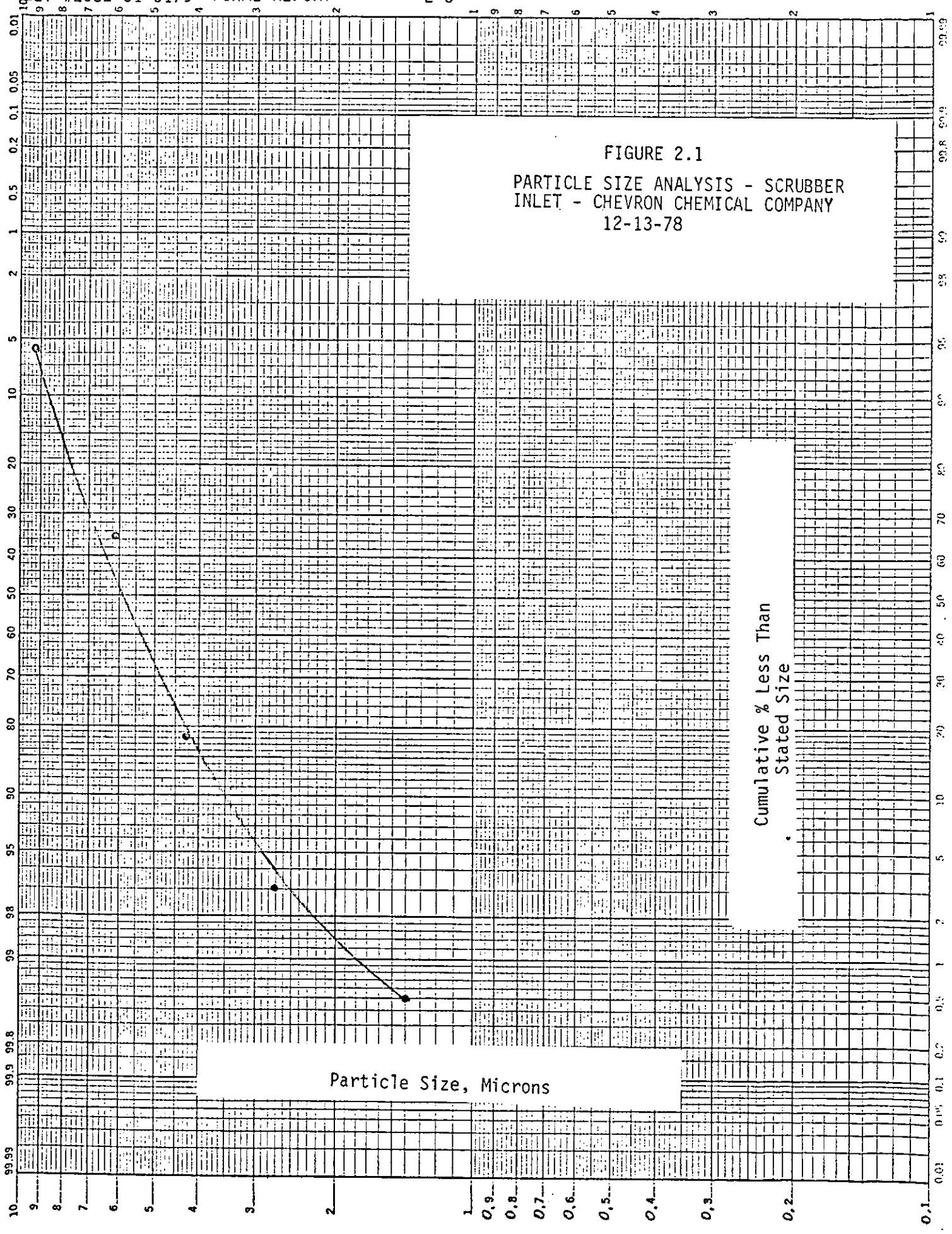


FIGURE 2.1

PARTICLE SIZE ANALYSIS - SCRUBBER INLET - CHEVRON CHEMICAL COMPANY
12-13-78

TABLE 2.3

AMMONIUM SULFATE CRYSTAL
MOISTURE ANALYSIS

Date	Time	Test Run No.	Sample Location	Net Wt. Wet, Gms.	Net Wt. Dry, Gms.	Moisture %
12-12-78	1442	1	Inlet	361.0	358.8	0.61
12-12-78	1440	1	Outlet	344.3	343.7	0.17
12-12-78	1712	2	Inlet	372.1	370.2	0.51
12-12-78	1716	2	Outlet	386.6	385.6	0.26
12-13-78	1119	3	Inlet	409.1	407.0	0.51
12-13-78	1117	3	Outlet	392.3	391.8	0.13

Average at drier inlet - 0.54
Average at drier outlet - 0.19

TABLE 2.4

SUMMARY OF RESULTS OF OPACITY READINGS

Location: Scrubber Outlet
Test Run No.: 1
Date: 12-12-78
Color of Plume: White
Stack Height: 20 feet
Distance to Stack: 150 feet
Wind Direction: South Speed: 0-20 MPH
Sky Description: Gray Clouds - 75%
Note: Readings every 30 seconds; therefore, average opacity = sum/12

Set Number	Time Start	Time End	Opacity Sum	Opacity Average
1	1230	1236	5	0
2	1236	1242	35	5
3	1247	1253	15	0
4	1253	1259	15	0
5	1259	1305	30	0
6	1304	1311	15	0
7	1311	1317	10	0
8	1317	1323	20	0
9	1323	1329	25	0
10	1329	1335	10	0
11	1335	1341	20	0
12	1341	1347	15	0
13	1347	1353	35	5
14	1353	1359	35	5
15	1359	1405	0	0
16	1405	1411	15	0
17	1411	1417	15	0
18	1417	1423	10	0
19	1423	1429	5	0

OVERALL AVERAGE: 0

Set Number	Time Start	Time End	Opacity Sum	Opacity Average

TABLE 2.5

SUMMARY OF RESULTS OF OPACITY READINGS

Location: Scrubber Outlet

Test Run No.: 2

Date: 12-12-78

Color of Plume: White

Stack Height: 20 feet

Distance to Stack: 150 feet

Wind Direction: South Speed: 10-20 MPH

Sky Description: Gray clouds - 75%

Note: Readings taken every 30 seconds; therefore, average opacity = sum/12.

Set Number	Time Start	Time End	Opacity Sum	Opacity Average	Set Number	Time Start	Time End	Opacity Sum	Opacity Average
1	1540	1546	15	0					
2	1546	1552	10	0					
3	1552	1558	5	0					
4	1558	1604	15	0					
5	1604	1610	10	0					
6	1610	1616	10	0					
7	1616	1622	20	0					
8	1622	1628	15	0					
9	1628	1634	10	0					
10	1634	1640	10	0					
11	1640	1646	5	0					
12	1646	1652	5	0					
13	1652	1658	20	0					
14	1658	1704	5	0					
15	1704	1710	5	0					

OVERALL AVERAGE: 0

TABLE 2.6

SUMMARY OF RESULTS OF OPACITY READINGS

Location: Scrubber Outlet
Test Run No.: 3
Date: 12-13-78
Color of Plume: White

Stack Height: 20 feet
Distance to Stack: 150 feet
Wind Direction: South Speed: 0-10 MPH
Sky Description: White Clouds - 50%

Note: Readings taken every 30 seconds; therefore, average opacity = sum/12.

Set Number	Time Start	Time End	Opacity Sum	Opacity Average
1	0848	0854	5	0
2	0854	0900	0	0
3	0900	0906	5	0
4	0906	0912	5	0
5	0912	0918	0	0
6	0918	0924	0	0
7	0924	0930	5	0
8	0930	0936	0	0
9	0936	0942	5	0
10	0942	0948	0	0
11	0948	0954	0	0
12	0954	1000	5	0
13	1000	1006	0	0
14	1006	1012	10	0
15	1012	1018	5	0
16	1018	1024	0	0
17	1024	1030	15	0
18	1030	1036	0	0
19	1036	1042	5	0
20	1042	1048	0	0
21	1048	1054	0	0
22	1054	1100	5	0
23	1100	1106	0	0
24	1106	1112	0	0
25	1155	1201	0	0
26	1201	1207	5	0
27	1207	1213	5	0
28	1213	1219	0	0
29	1219	1225	5	0

OVERALL AVERAGE: 0

TABLE 2.7

SUMMARY OF RESULTS OF OPACITY READINGS

Location: Scrubber Outlet
Stack Height: 20 feet
Test Run No.: 4
Distance to Stack: 150 feet
Date: 12-13-78
Wind Direction: South Speed: 0-15 MPH
Color of Plume: White
Sky Description: Clear

Note: Readings taken every 30 seconds; therefore, average opacity = sum/12.

Set Number	Time Start	Time End	Opacity Sum	Opacity Average	Set Number	Time Start	Time End	Opacity Sum	Opacity Average
1	1437	1443	20	0					
2	1443	1449	20	0					
3	1449	1455	10	0					
4	1455	1501	15	0					

OVERALL AVERAGE: 0

3.0 DISCUSSION OF RESULTS

A 40 inch stack extension was installed on the outlet of the dropout chamber in order to provide the necessary length of straight duct. Due to the cyclonic flow leaving the dropout chamber, it was also necessary to install a flow straightener in the duct.

Run No. 1 at the scrubber inlet was aborted due to a ruptured sample filter. The rupture was apparently caused by pressure surges in the sample train due to clogging of the nozzle and probe by the particulate. Clogging of the nozzle and probe was a problem during each test. During Runs No. 2 and 3, sampling was interrupted several times to clean the nozzle and probe. At the completion of sampling during Run No. 3, a leak was detected in the inlet sample train in a fitting in an umbilical line. Therefore, an additional test run (Number 4) was made at the inlet. Sampling was halted during Run No. 4 after the sampling traverse was completed for the center sample port due to the large amount of particulate collected. A velocity traverse only was performed on the remaining sample points.

Particle size sampling was conducted for only two minutes. However, due to the high concentration of large particles in the gas stream, the first few collecting plates were overloaded with particulate. Using a cyclone pre-separator, perhaps in an out-of-stack configuration, may have improved the sampling. Immediately after the sampling was completed, the collection plates were sealed in individual containers to avoid the loss of any sample. Particulate collected in the sample nozzle and sample head was included as part of Plate No. 1.

4.0 PROCESS DESCRIPTION AND OPERATION

The Chevron Chemical plant is designed to produce 220 TPD of ammonium sulfate (AS) from ammonia and sulfuric acid. All of the AS produced is sold for use as fertilizer. The plant operates continuously 24 hours a day for periods up to 5 to 6 weeks between short periods of maintenance. Varying AS market conditions during the year also affect the length of plant shut-down periods.

A. Process Description

Figure 4.1 shows a simplified diagram of the AS process and the sampling locations. Sulfuric acid (98 percent) and anhydrous ammonia are combined in a reactor or "saturator." The heat of reaction provides the energy for evaporation. As the concentration increases, the AS solution becomes saturated. AS crystals then form and are allowed to grow in size. The crystal slurry is fed to a centrifuge, which separates most of the liquid from the crystals. The wet crystals are then passed through a gas-fired rotary drum dryer, screened, and conveyed to a storage warehouse. A venturi scrubber with a liquid-to-gas ratio of 26 gal/1000 acf and a pressure drop of 13 inches of water is used to control dryer emissions.

B. Process Operation

The purpose of the test program was to measure emission levels from the venturi scrubber controlling dryer emissions. Process conditions were carefully observed, and testing was performed only during periods when the plant production rate was normal. During the tests, pertinent operating

conditions were monitored and recorded on process data sheets. These sheets are included in Appendix B.

As shown by Table 1 of Appendix B, the plant operated at a production rate very near the design capacity of 220 TPD during the emission tests. No calibrated weigh belts were used. The ammonium sulfate production rate was calculated from both the sulfuric acid and ammonia flow rates. According to plant personnel, the sulfuric acid flow rate is a more accurate basis for computing the production rate than the ammonia flow rate. The accuracy of the AS production rate based on acid flow is estimated to be within $\pm$ 5 percent.

The following parameters were monitored during the tests to verify that the dryer was operating normally:

1. Sulfuric acid flow rate
2. Ammonia flow rate
3. AS product weigh belt reading (uncalibrated)
4. Dryer operating temperatures
5. Centrifuge amperage
6. Crystallizer liquor level, temperature, vacuum
7. Percent free acid in crystallizer elutriation leg
8. AS slurry surge tank level
9. AS specific gravity of slurry

Process monitoring began approximately 1 hour before the start of emission Test Number 1 on the morning of December 12, 1978. Actual emission testing began at 12:45 p.m. for the scrubber inlet and 1:40 p.m.

for the scrubber outlet. The scrubber inlet test terminated at 3:00 p.m. (120 minutes net); the outlet test ended at 4:10 p.m. (120 minutes net). The process operation appeared to operate at steady state without interruption during this period.

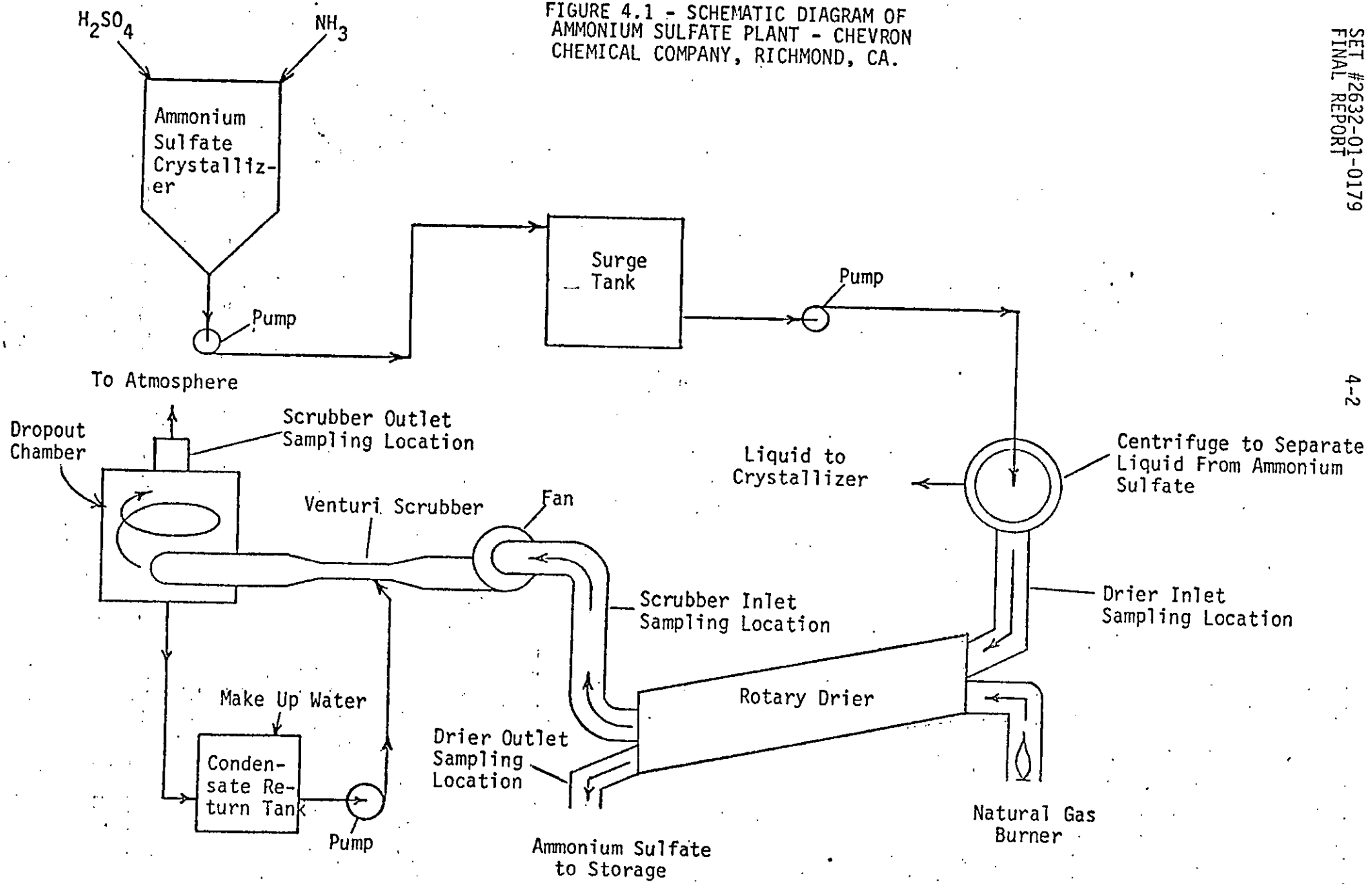
Monitoring for Test Number 2 began at 3:30 p.m. (scrubber inlet) and 4:54 p.m. (scrubber outlet). In this run, the scrubber inlet test terminated at 5:15 p.m., and the outlet test ended at 7:18 p.m.

Approximately half-way through the second test, it became apparent from the weigh belt readings that the AS production rate had dropped off significantly (even though sulfuric acid and ammonia flows remained constant). According to plant personnel, the flow of oxalic acid (a crystal growth promoter) to the crystallizer had been stopped, and the percentage of fines in the AS slurry leaving this unit had increased. In order to decrease the fines percentage in the product, the hold-up time in the crystallizer was increased by reducing the AS slurry flow to the centrifuge. This resulted in about a 10 to 15 percent drop in the rate of AS passing through the dryer during a brief portion of the test period. This drop in AS dryer throughput is not believed to have significantly affected the test results.

Test Number 3 began at 9:00 a.m. (scrubber outlet) and ended at 11:15 a.m. (scrubber outlet) on December 13, 1978. The scrubber inlet portion of the test was aborted due to problems of continual AS blockage in the equipment. It was decided that the 2 scrubber inlet tests completed on December 12 were adequate. A particle size distribution test

was done at the scrubber inlet, however. The AS production rate was normal during the test period although the AS crystal size distribution had not completely returned to normal.

FIGURE 4.1 - SCHEMATIC DIAGRAM OF AMMONIUM SULFATE PLANT - CHEVRON CHEMICAL COMPANY, RICHMOND, CA.



5.0 SAMPLING AND ANALYTICAL PROCEDURES

Gas sampling for total particulate content was conducted at the inlet and outlet of the scrubber in accordance with EPA Reference Method #5. This method involves the isokinetic extraction of a sample from the gas stream and collection of the particulate on a heated out-of-stack filter. A dry gas meter measures the volume of the gas sample. The gas velocity in the duct is measured during the sampling with a Pitot tube and inclined manometer. The stack gas temperature is measured with a chromel-alumel thermocouple. The quantity of particulate collected is determined gravimetrically with results reported as grains of particulate per standard cubic foot of gas and grams per cubic meter.

The sample for particle size distribution was collected using an Andersen 2000 In-Stack Cascade Impactor. The particles are collected by impaction on a series of plates. The plates have increasingly smaller holes so that the velocity of the particles is increased from plate to plate and smaller and smaller particles are impacted. The particulate weight collected on each plate is determined gravimetrically. The particle size distribution is based on the equivalent aerodynamic size of the particles based on spherical particles of 1 gram/cc density.

Opacity readings of the scrubber outlet gases were made in accordance with EPA Method #9. The moisture content of the ammonium sulfate samples from the drier inlet and outlet was determined by weighing the samples before and after drying.

APPENDIX A

FIELD DATA SHEETS

PROJECT NUMBER _____ TEST NUMBER _____ FIELD DATA SHEET

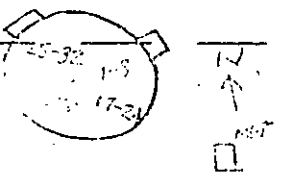
SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

PLANT CHEVRON ORTHO – RICHMOND
DATE 12-12-78
SAMPLING LOCATION OUTLET
SAMPLE TYPE METHOD 5
RUN NUMBER OUTLET #1
OPERATORS JR, JP
AMBIENT TEMPERATURE _____
BAROMETER 30.26

PROBE LENGTH & TYPE 2' GLASS
NOZZLE I.D. .210
SAMPLE BOX NUMBER GREEN
METER BOX NUMBER SAN "B" Δ= 1.015
PROBE HEATER SETTING MANIAC 11
FILTER HEATER SETTING 250
REFERENCE ΔP .90
READ AND RECORD ALL DATA EVERY 4 MINUTES
START TIME 1295

FYRITE ANALYSIS
CO_2 O_2 ____

SAMPLE ORIENTATION



TRAVERSE POINT NUMBER	CLOCK TIME SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	IMPINGER TEMPERATURE, °F	PRELIMINARY LEAK CHECK @ 15 in.
			INITIAL: 267.045		DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			COMMENTS
1	4		270.100	1.2	2.0	2.0	113	62	60	3.2		Box 297 Probe 111
2	8		273.850	1.05	1.8	1.8	112	68	64	3.2		Box 284 Probe 177
3	12		276.508	1.05	1.8	1.8	113	74	64	3.2		Box 365 Probe 155
4	16		278.310	1.1	1.85	1.85	113	76	65	3.5		Box 203 Probe 145
5	20		280.905	1.05	1.8	1.8	113	77	65	3.5		Box 214 Probe 142
6	24		283.740	1.2	2.0	2.0	113	81	68	3.5		Box 286 Probe 167
7	28		286.728	1.3	2.2	2.2	113	82	65	3.6		Box 218 Probe 144
8	32		289.912	1.5	2.5	2.5	114	84	67	3.8		Box 285 Probe 168
9	36		292.740	1.1	1.85	1.85	114	85	66	3.5		
10	40		295.610	1.2	2.0	2.0	114	87	68	3.7		BOX TEMPERATURE IS SET BUT IS CYCLING WIDELY
11	44		298,500	1.2	2.0	2.0	115	88	69	3.8		Probe 177
12	48		301.310	1.1	1.85	1.85	114	89	70	3.7		
13	52		304.130	1.1	1.85	1.85	116	89	70	3.6		
14	56		306,940	1.1	1.85	1.85	114	90	70	3.5		Box 260 Probe 206
15	60		309.740	1.1	1.85	1.85	114	90	70	3.5		Box 213 Probe 169
16	4		312.513	1.05	1.8	1.8	115	91	71	3.5		Box 272 Probe 113
17	8	1400	314.995	1.1	1.85	1.85	116	79	69	3.5		Box 277 Probe 160
18	12		317.965	1.1	1.85	1.85	117	80	70	3.5		Probe Probe 152
19	16		320.[illegible]	1.1	1.85	1.85	115	80	70	3.4		Probe Probe 152

TRAVERSE POINT NUMBER	CLOCK TIME SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL DESIRED	ORIFICE PRESSURE DIFFERENTIAL ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET	DRY GAS METER TEMPERATURE OUTLET	PUMP VACUUM, in. Hg	IMPINGER TEMPERATURE, °F	COMMENTS
20	20		—	1.1	1.85	1.85	114	84	70	3.5		BOX 255 PROBE 149
21	24		326.180	1.1	1.85	1.85	114	85	70	3.5		BOX 286 PROBE 147
22	28		328.990	1.1	1.85	1.85	114	89	71	3.5		
23	32		331.800	1.1	1.85	1.85	114	90	70	3.5		BOX 289 PROBE 147
24	36		334.880	1.3	2.25	2.25	114	90	72	4.0		BOX 301 PROBE 144
25	40		337.995	1.4	2.35	2.35	113	90	70	4.0		
26	44		341.420	1.3	2.25	2.25	112	90	71	4.0		BOX 262 PROBE 160
27	48		344.550	1.3	2.25	2.25	113	91	71	4.0		BOX 300 PROBE 158
28	52		347.665	1.3	2.25	2.25	112	92	71	4.0		BOX 289 PROBE 161
29	56		350.710	1.2	2.05	2.05	113	93	72	3.8		BOX 305 PROBE 160
30	60		353.605	1.1	1.85	1.85	113	94	74	3.8		BOX 263 PROBE 164
31	64		356.450	1.1	1.85	1.85	113	93	74	3.8		
32	68		358.952	1.2	2.05	2.05	112	92	72	3.8		BOX PROBE 160
												STOP 1504
			91.509 ✓	1.01		1.77 ✓	114		77		•	FINAL LEAK CHECK IS TIGHT
				1.14			574		557 ✓			
				1.16								

TRAVERSE POINT LOCATION & VELOCITY DATA BY

TRAVERSE POINT NUMBER	A=FRACTION OF I.D.	B=AxI.D. ID=	C=B+NIPPLE NIPPLE=	VELOCITY HEAD (Δp_s), in.H_2O	STACK TEMPERATURE (T_s), °F
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17				1.1	114
18				1.05	113
19				1.05	113
20				.98	113
21				.98	113
22				1.1	113
23				1.3	113
24				1.5	113
25				1.5	113
26				1.5	113
27				1.3	113
28				1.2	113
29				1.1	114
30				1.1	114
31				1.2	114
32				1.2	114
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
AVERAGE					

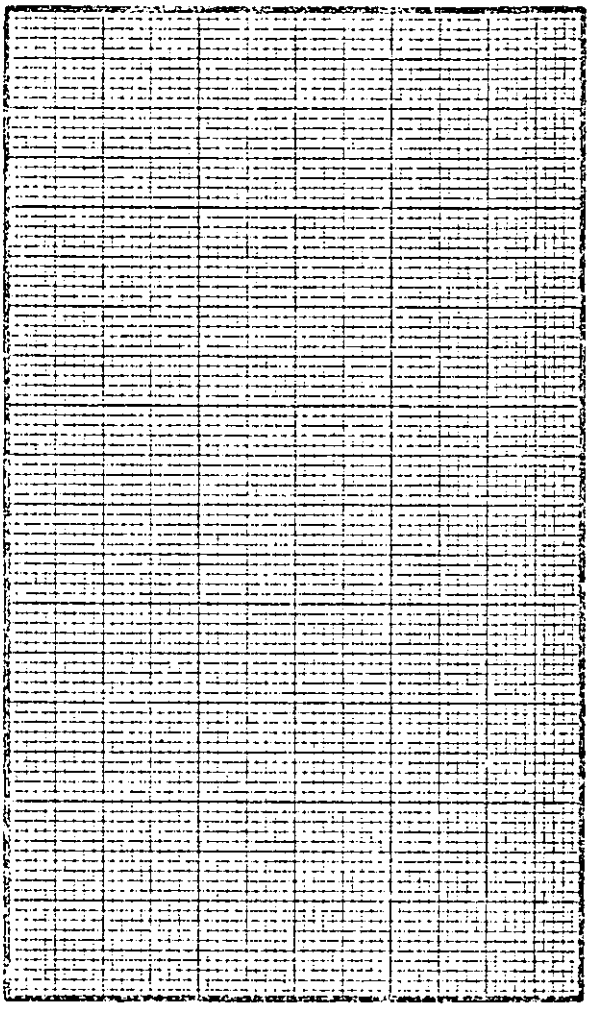


DIAGRAM OF STACK, PORTS, & TRAVERSE POINTS (indicate direction of flow)

INSIDE DIMENSIONS OF SAMPLE PLANE

15" CIRCULAR

STACK GAUGE PRESSURE in. H_2O (+) 1.0

NEAREST UPSTREAM DISTURBANCE

NEAREST DOWNSTREAM DISTURBANCE

PROCESS & CONTROL EQUIPMENT DESCRIPTION

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

MOISTURE

IMPINGERS
FINAL VOLUME 332 ml
INITIAL VOLUME 200 ml
NET VOLUME 132 ml

SILICA GEL
FINAL WEIGHT 501.9 g
INITIAL WEIGHT 468.0 g
NET WEIGHT 33.9 g
TOTAL MOISTURE 166 g

1 — 167
2&3 165

ANALYTICAL DATA BY _____

ACETONE FRONT WASH
FINAL 84.5148 mg
TARE 84.0444 mg
NET 4704 mg

FILTER NUMBER 1
FINAL 1458.9 mg
TARE 1426.4 mg
NET 32.5 mg

FILTER NUMBER 2
FINAL 507.9 total mg
TARE _____ mg
NET _____ mg

FILTER NUMBER 3
FINAL _____ mg
TARE _____ mg
NET _____ mg

CYCLONE
FINAL _____ mg
TARE _____ mg
NET _____ mg

TOTAL FRONT _____ mg

ACETONE BACK WASH
FINAL _____ mg
TARE _____ mg
NET _____ mg

ETHER-CHLOROFORM EXTRACT
FINAL _____ mg
TARE _____ mg
NET _____ mg

WATER EVAPORATION
FINAL _____ mg
TARE _____ mg
NET _____ mg

TOTAL BACK _____ mg

I CERTIFY THAT THE SAMPLES DESCRIBED BY THIS DATA SHEET WERE COLLECTED IN ACCORDANCE WITH METHODS OUTLINED BY

I FURTHER CERTIFY THAT THE SAMPLES WERE IN THE POSSESSION OF, OR SEALED FOR SHIPMENT BY COMMON CARRIER BY, MYSELF UNTIL DELIVERY TO A LABORATORY FOR ANALYSIS.

SIGNED _____ DATE ____

WITNESS _____ DATE ____

I CERTIFY THAT I RECEIVED THE SAMPLES DESCRIBED BY THIS DATA SHEET FROM THE ABOVE NAMED INDIVIDUAL AND ANALYZED THEM IN ACCORDANCE WITH THE ABOVE MA[illegible]

NOMOGRAPH DATA BY JBP

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. H_2O	$\Delta H_@$	1.865
AVERAGE METER TEMPERATURE (AMBIENT + 20°F), °F	$T_{m_{avg.}}$	80
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	10
BAROMETRIC PRESSURE AT METER, in. Hg	P_m	30.26
STATIC PRESSURE IN STACK, in. Hg $P_m \pm$ (0.073 x STACK GAUGE PRESSURE in in. H_2O)	P_s	+.69
RATIO OF STATIC PRESSURE TO METER PRESSURE	P_s/P_m	1.02
AVERAGE STACK TEMPERATURE, °F	$T_{s_{avg.}}$	116
AVERAGE VELOCITY HEAD, in. H_2O	$\Delta p_{avg.}$	[illegible]
MAXIMUM VELOCITY HEAD, in. H_2O	$\Delta p_{max.}$	3.5
C FACTOR		.90
CALCULATED NOZZLE DIAMETER, in.		.20
ACTUAL NOZZLE DIAMETER, in.		~~.196~~ .210
REFERENCE Δp, in. H_2O		1.4 1.10

DRY MOLECULAR WEIGHT DETERMINATION BY _____

SAMPLING TIME (24-hr CLOCK) _____
SAMPLING LOCATION _____
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) _____
ANALYTICAL METHOD _____
AMBIENT TEMPERATURE _____

RUN / GAS	1		2		3		AVERAGE NET VOLUME
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET	
CO_2	100.0	0.0					
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	79.6	20.4					
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)		79.6					

SCOTT ENVIRONMENTAL TECHNOLOGY, INC

PLANT CHEVRON CHEMICAL, RICHMOND
DATE 12/12/78
SAMPLING LOCATION INLET
SAMPLE TYPE METHOD 5
RUN NUMBER 2
OPERATORS T.S. & W.N.
AMBIENT TEMPERATURE 60 @ 1535
BAROMETER 30.31 @ 1535

PROBE LENGTH & TYPE 4' GLASS
NOZZLE I.D. .250
SAMPLE BOX NUMBER 400FT SPLIT BOX
METER BOX NUMBER 400FT SB "A" 1.853
PROBE HEATER SETTING 250°F
FILTER HEATER SETTING 250°F
REFERENCE ΔP .58
READ AND RECORD ALL DATA EVERY 2.5 MINUTES

FYRITE ANALYSIS

CO_2	O_2	

TRAVERSE POINT NUMBER	CLOCK TIME SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	IMPINGER TEMPERATURE, °F	COMMENTS
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
	0	1540	INITIAL: 717.275									
1	2.5		718.982	.42	1.35	1.35	176°	63	69	5.0		
2	5.0		720.140	.33	1.07	1.07	182	68	69	4.6		
3	7.5		722.278	.37	1.2	1.2	181	73	70	4.6		
4	10.0		723.885	.37	1.2	1.2	177	75	71	4.5		TEMP 270°F
5	12.5		725.502	.35	1.13	1.13	176	79	72	4.5	60°	
6	15.0		726.910	.27	.86	.86	173	85	74	3.5		
7	17.5		728.276	.27	.86	.86	171	85	76	3.5		
8	20.0		729.561	.24	.77	.77	171	88	77	3.5		
9	22.5		730.950	.27	.86	.86	169	89	78	3.5		
10	25		732.320	.31	1.0	1.0	174	91	80	4.0		
11	27.5		734.051	.42	1.35	1.35	176	93	81	5.2		
12	30.0		735.779	.42	1.35	1.35	177	95	82	5.2		
13	32.5		736.691	.14	.46	.46	176	95	83	2.8		
14	35		737.530	.07	.235	.234	177	95	83	1.5		
15	37.5		738.237	.09	.285	.285	177	95	84	1.2		
16	40.0		739.050	.10	.33	.33	176	96	86	2.0		
17	42.5		———	.12	.385	.385	181	99	86	2.5		
18	45.0		741.039	.10	.50	.50	181	98	87	3.0		
19	47.5		742.---	.15	.50	.50	180	98	87	3.0		

PORT 2

TRAVERSE POINT NUMBER	CLOCK TIME SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL DESIRED	ORIFICE PRESSURE DIFFERENTIAL ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET	DRY GAS METER TEMPERATURE OUTLET	PUMP VACUUM, in. Hg	IMPINGER TEMPERATURE, °F	COMMENTS
20	52.5		743.738	.30	.96	.96	183	99	89	4.2		.548
21	52.5		745.290	.34	1.1	1.1	185	100	90	4.5	55	.583
22	55		746.802	.20	.96	.96	186	102	90	4.0		.549
23	57.5		748.351	.37	1.16	1.16	186	103	91	4.7		.608
24	60.0		750.107	.43	1.4	1.4	179	104	92	5.5		.656
25	2.5		751.030	.14	.46	.46	172	102	90	2.5		.574
26	5		751.931	.11	.36	.36	174	101	90	2.2		.332
27	7.5		752.864	.11	.36	.36	174	101	90	2.2		.332
28	10		753.720	.10	.33	.33	178	101	91	2.2		.316
29	12.5		754.712	.14	.46	.46	180	101	91	2.7		.374
30	15.0		755.800	.19	.58	.58	180	102	92	3.3		.436
31	17.5		757.126	.30	.96	.96	181	102	92	4.1		.548
32	20.		758.600	.30	.96	.96	180	103	92	4.1		.548
33	22.5		760.050	.30	.96	.96	180	105	93	4.1		.548
34	25		761.460	.28	.90	.90	180	104	93	4.0		.529
35	27.5		762.600	.21	1.0	1.0	179	105	93	4.5		
36	30.0		764.500	.35	1.13	1.13	182	106	94	4.5		
			47.235 ✓	.30 ✓		.84 ✓	178		82.6 ✓			
				.25			638 ✓		550			

TRAVERSE POINT LOCATION & VELOCITY DATA BY_____

TRAVERSE POINT NUMBER	A=FRACTION OF I.D.	B=AxI.D. ID=_____	C=B+NIPPLE NIPPLE=_____	VELOCITY HEAD (Δp_s), in.H_2O	STACK TEMPERATURE (T_s), °F
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
AVERAGE					

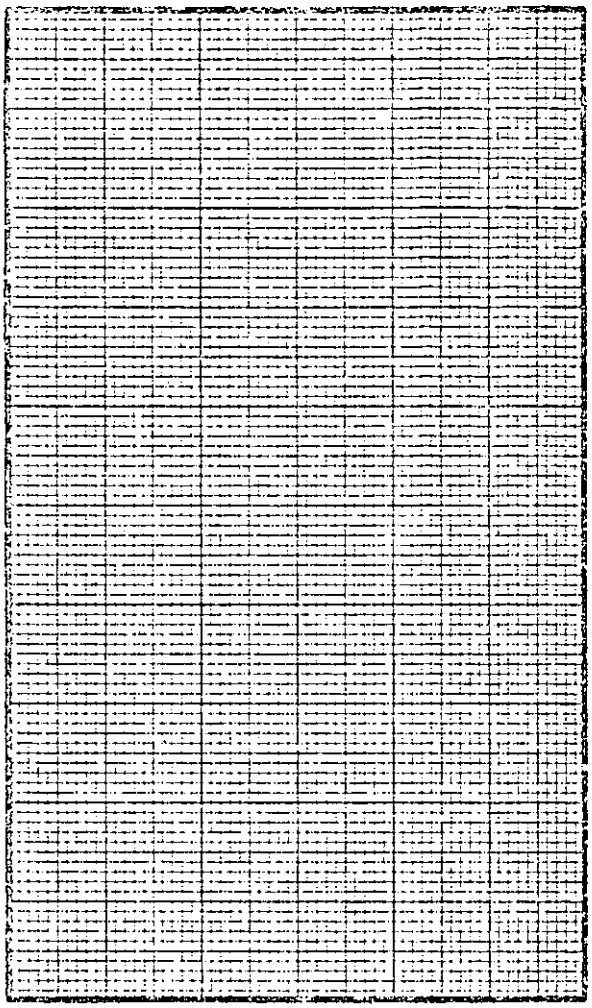


DIAGRAM OF STACK, PORTS, & TRAVERSE POINTS (indicate direction of flow)

INSIDE DIMENSIONS OF SAMPLE PLANE

_____

STACK GAUGE PRESSURE in. H_2O_____

NEAREST UPSTREAM DISTURBANCE_____
NEAREST DOWNSTREAM DISTURBANCE_____

PROCESS & CONTROL EQUIPMENT DESCRIPTION_____

_____

_____

_____

_____

_____

_____

_____

_____

MOISTURE

IMPINGERS
FINAL VOLUME 264 ml
INITIAL VOLUME 200 ml
NET VOLUME 64 ml

SILICA GEL
FINAL WEIGHT 475.9 g
INITIAL WEIGHT 467.1 g
NET WEIGHT 8.8 g
TOTAL MOISTURE 73 g

ANALYTICAL DATA BY _____

ACETONE FRONT WASH
FINAL 155.9637 [illegible] mg
TARE 86.0916 89.0254 mg
NET 69682.1 57338.6 mg

FILTER NUMBER 1
FINAL .7055 mg
TARE .3848 mg
NET .3207 mg

FILTER NUMBER 2
FINAL 1275411.4 total mg
TARE _____ mg
NET _____ mg

FILTER NUMBER 3
FINAL _____ mg
TARE _____ mg
NET _____ mg

CYCLONE
FINAL _____ mg
TARE _____ mg
NET _____ mg
TOTAL FRONT _____ mg

ACETONE BACK WASH
FINAL _____ mg
TARE _____ mg
NET _____ mg

ETHER-CHLOROFORM EXTRACT
FINAL _____ mg
TARE _____ mg
NET _____ mg

WATER EVAPORATION
FINAL _____ mg
TARE _____ mg
NET _____ mg
TOTAL BACK _____ mg

I CERTIFY THAT THE SAMPLES DESCRIBED BY THIS DATA SHEET WERE COLLECTED IN ACCORDANCE WITH METHODS OUTLINED BY

I FURTHER CERTIFY THAT THE SAMPLES WERE IN THE POSSESSION OF, OR SEALED FOR SHIPMENT BY COMMON CARRIER BY, MYSELF UNTIL DELIVERY TO A LABORATORY FOR ANALYSIS.

SIGNED _____ DATE ____

WITNESS _____ DATE ____

I CERTIFY THAT I RECEIVED THE SAMPLES DESCRIBED BY THIS DATA SHEET FROM THE ABOVE NAMED INDIVIDUAL AND ANALYZED THEM IN ACCORDANCE WITH THE ABOVE [illegible]

NOMOGRAPH DATA BY _____

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. H_2O	$\Delta H_@$	
AVERAGE METER TEMPERATURE (AMBIENT + 20°F), °F	$T_{m_{avg.}}$	
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	
BAROMETRIC PRESSURE AT METER, in. Hg	P_m	
STATIC PRESSURE IN STACK, in. Hg $P_m \pm$(0.073 x STACK GAUGE PRESSURE in in. H_2O)	P_s	
RATIO OF STATIC PRESSURE TO METER PRESSURE	P_s/P_m	
AVERAGE STACK TEMPERATURE, °F	$T_{s_{avg.}}$	
AVERAGE VELOCITY HEAD, in. H_2O	$\Delta p_{avg.}$	
MAXIMUM VELOCITY HEAD, in. H_2O	$\Delta p_{max.}$	
C FACTOR		
CALCULATED NOZZLE DIAMETER, in.		
ACTUAL NOZZLE DIAMETER, in.		
REFERENCE Δp, in. H_2O		

DRY MOLECULAR WEIGHT DETERMINATION BY _____

SAMPLING TIME (24-hr CLOCK) _____
SAMPLING LOCATION _____
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) _____
ANALYTICAL METHOD _____
AMBIENT TEMPERATURE _____

RUN / GAS	1		2		3		AVERAGE NET VOLUME
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET	
CO_2	99.6	0.4					
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	78.6	21.0					
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)		78.6					

TEST NUMBER _____ FIELD DATA SHEET

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

PLANT CHEVRON ORTHO — RICHMOND
DATE 12-12-78
SAMPLING LOCATION OUTLET AMMONIUM SULFATE BOILER SCRUBBER
SAMPLE TYPE METHOD 5
RUN NUMBER OUTLET #2
OPERATORS JP — JR
AMBIENT TEMPERATURE 56 @ 1645
BAROMETER 30.25

PROBE LENGTH & TYPE 2' GLASS
NOZZLE I.D. .210
SAMPLE BOX NUMBER
METER BOX NUMBER C SAN "B" 1.465
PROBE HEATER SETTING
FILTER HEATER SETTING
REFERENCE ΔP 1.10
READ AND RECORD ALL DATA EVERY 4 MINUTES
START TIME 1705

FYRITE ANALYSIS

	CO_2	O_2	

SAMP. 1 FT³ IN 2250 @ 15"
O LEAK @ 10"
OK

TRAVERSE POINT NUMBER	CLOCK TIME SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	IMPINGER TEMPERATURE, °F	COMMENTS
					DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
			INITIAL: 359.163									
1	4		361.330	.58	1.0	1.0	111	67	60	2.0		[illegible] ORF BAD
2	8		363.355	.57	.95	.98	111	65	63	2.0		[illegible] 11.2
3	12		365.310	.53	.90	.90	111	70	65	2.0		PROBE 157
4	16		367.210	.53	.90	.90	111	70	65	2.0		WATER [illegible] OUTLET
5	20		369.350	.68	1.17	1.2	112	78	65	2.3		PROBE 157
6	24		371.577	.65	1.00	1.1	113	80	67	2.1		[illegible]
7	28		373.930	.71	1.23	1.23	111	85	78	2.3		[illegible] 153 2ND MIN
8	32		376.235	.91	1.55	1.55	111	85	70	2.8		PROBE 159
9	36		378.690	.79	1.35	1.35	112	92	72	2.7		
10	40		381.510	1.3	2.2	2.2	112	95	75	4.0		BOX 295 PROBE 157
11	44		384.580	1.3	2.2	2.2	112	97	75	4.0		BOX 295 PROBE 156
12	48		387.480	1.1	1.85	1.85	112	100	75	3.5		60 X 390 PROBE 155
13	52		390.353	1.05	1.80	1.80	112	100	75	3.5		[illegible]
14	56		393.120	.98	1.73	1.73	113	100	77	3.0		BOX 297 PROBE 157
15	60		395.948	1.05	1.80	1.80	112	102	78	3.4		[illegible]
16	64		398.599	.88	1.53	1.53	112	101	79	3.7		[illegible]
17	8	1817	401.205	1.2	2.0	2.0	112	93	76	3.3		PM TO OUT MAIN
18	12		403.995	1.05	1.80	1.80	112	94	77	3.3		PROBE 156
19	16		406.935	[illegible]	[illegible]	[illegible]	112	[illegible]	[illegible]	[illegible]		[illegible]

TRAVERSE POINT NUMBER	CLOCK TIME SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL DESIRED	ORIFICE PRESSURE DIFFERENTIAL ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET	DRY GAS METER TEMPERATURE OUTLET	PUMP VACUUM, in. Hg	IMPINGER TEMPERATURE, °F	COMMENTS
20	20		409.890	1.2	2.0	2.0	111	100	80	3.8		BOX 294 PROBE 153
21	24		412.[illegible]05	1.4	2.32	2.30	111	102	81	4.2		BOX 271 PROBE 153
22	28		416.[illegible]20	1.5	2.45	2.45	111	104	[illegible]	[illegible]		[illegible] PROBE 151
23	32		[illegible]	1.3	2.20	2.20	111	[illegible]	84	4.4		
24	36		421.930	1.4	[illegible]	[illegible]	[illegible]	108	[illegible]	[illegible]		BOX 294 PROBE 141
25	40		425.135	1.4	[illegible]	[illegible]	[illegible]	109	[illegible]	[illegible]		[illegible] OK
26	44		429.[illegible]2	1.4	[illegible]	[illegible]	111	[illegible]	[illegible]	[illegible]		[illegible] PROBE 151
27	48		432.265	1.3	2.2	2.2	112	110	87	[illegible]		[illegible] PROBE 151
28	52		435.230	1.1	[illegible]	1.85	111	[illegible]	87	3.6		[illegible] PROBE 151
29	56		438.168	1.2	2.0	2.0	111	110	89	[illegible]		BOX 271 PROBE 150
30	60		441.248	1.3	2.20	2.2	111	110	90	4.0		BOX 294 PROBE 148
31	64		444.154	1.1	1.85	1.85	111	110	90	3.7		ZERO [illegible]
32	68		447.087	1.2	2.0	2.0	111	110	90	3.8		BOX 299 PROBE 145
				1.01		1.76	111	94	87			
			87.924	1.04		1.76	571		547			

TRAVERSE POINT LOCATION & VELOCITY DATA BY

TRAVERSE POINT NUMBER	A=FRACTION OF I.D.	B=A×I.D. ID=	C=B+NIPPLE NIPPLE=	VELOCITY HEAD (Δp_s), in.H_2O	STACK TEMPERATURE (T_s), °F
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
AVERAGE					

DIAGRAM OF STACK, PORTS, & TRAVERSE POINTS (indicate direction of flow)

INSIDE DIMENSIONS OF SAMPLE PLANE

STACK GAUGE PRESSURE in. H_2O +/- 1.0

NEAREST UPSTREAM DISTURBANCE

NEAREST DOWNSTREAM DISTURBANCE

PROCESS & CONTROL EQUIPMENT DESCRIPTION

MOISTURE

IMPINGERS
FINAL VOLUME 314 ml
INITIAL VOLUME 200 ml
NET VOLUME 114 ml

SILICA GEL
FINAL WEIGHT 504.4 g
INITIAL WEIGHT 467.7 g
NET WEIGHT 36.7 g

TOTAL MOISTURE 151 g

#1 — 156
#2 & 3 — 178

ANALYTICAL DATA BY _____

ACETONE FRONT WASH
FINAL 91.5812 mg
TARE 91.3041 mg
NET 277.1 mg

FILTER NUMBER 1
FINAL .4358 mg
TARE .4228 mg
NET .0130 mg

FILTER NUMBER 2
FINAL 310.1 total mg
TARE _____ mg
NET _____ mg

FILTER NUMBER 3
FINAL _____ mg
TARE _____ mg
NET _____ mg

CYCLONE
FINAL _____ mg
TARE _____ mg
NET _____ mg

TOTAL FRONT _____ mg

ACETONE BACK WASH
FINAL _____ mg
TARE _____ mg
NET _____ mg

ETHER-CHLOROFORM EXTRACT
FINAL _____ mg
TARE _____ mg
NET _____ mg

WATER EVAPORATION
FINAL _____ mg
TARE _____ mg
NET _____ mg

TOTAL BACK _____ mg

I CERTIFY THAT THE SAMPLES DESCRIBED BY THIS DATA SHEET WERE COLLECTED IN ACCORDANCE WITH METHODS OUTLINED BY

I FURTHER CERTIFY THAT THE SAMPLES WERE IN THE POSSESSION OF, OR SEALED FOR SHIPMENT BY COMMON CARRIER BY, MYSELF UNTIL DELIVERY TO A LABORATORY FOR ANALYSIS.

SIGNED _____ DATE ____

WITNESS _____ DATE ____

I CERTIFY THAT I RECEIVED THE SAMPLES DESCRIBED BY THIS DATA SHEET FROM THE ABOVE NAMED INDIVIDUAL AND ANALYZED THEM IN ACCORDANCE WITH THE ABOVE

NOMOGRAPH DATA BY JP

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. H_2O	$\Delta H_@$	1.865
AVERAGE METER TEMPERATURE (AMBIENT + 20°F), °F	$T_{m_{avg.}}$	80
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	10
BAROMETRIC PRESSURE AT METER, in. Hg	P_m	30.25
STATIC PRESSURE IN STACK, in. Hg ($P_m \pm 0.073$ x STACK GAUGE PRESSURE in in. H_2O)	P_s	+1.00
RATIO OF STATIC PRESSURE TO METER PRESSURE	P_s/P_m	>1
AVERAGE STACK TEMPERATURE, °F	$T_{s_{avg.}}$	116
AVERAGE VELOCITY HEAD, in. H_2O	$\Delta p_{avg.}$	
MAXIMUM VELOCITY HEAD, in. H_2O	$\Delta p_{max.}$	
C FACTOR		.9
CALCULATED NOZZLE DIAMETER, in.		
ACTUAL NOZZLE DIAMETER, in.		
REFERENCE Δp, in. H_2O		1.1

DRY MOLECULAR WEIGHT DETERMINATION BY MM

SAMPLING TIME (24-hr CLOCK) _____
SAMPLING LOCATION _____
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) _____
ANALYTICAL METHOD _____
AMBIENT TEMPERATURE _____

RUN / GAS	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME
CO_2	99.8						12
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	79.2						20.6
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)						N_2	79.2

PROJECT NUMBER ________ TEST NUMBER ____ FIELD DATA SHEET

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

PLANT Chevron [illegible]
DATE 12/13/7[illegible]
SAMPLING LOCATION Inlet [illegible]
SAMPLE TYPE Method 5
RUN NUMBER 3
OPERATORS T.[illegible] M.I.N
AMBIENT TEMPERATURE [illegible] @ [illegible]
BAROMETER 30.85 @ [illegible]

PROBE LENGTH & TYPE [illegible]
NOZZLE I.D. .250
SAMPLE BOX NUMBER [illegible]
METER BOX NUMBER [illegible] "A" 1.92 ΔH
PROBE HEATER SETTING [illegible]
FILTER HEATER SETTING ≈ 250°F
REFERENCE ΔP .53
READ AND RECORD ALL DATA EVERY 2.5 MINUTES

FYRITE ANALYSIS

CO_2	O_2	

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	IMPINGER TEMPERATURE, °F	COMMENTS
	0	0850	INITIAL: 791.100									
1	2.5		793.081	.15	[illegible]	[illegible]	178	71	69	[illegible]	50	Probe 220°F
2	5.0		794.258	.23	.73	.73	178	71	68	1.0	[illegible]	
3	7.5		795.[illegible]	.21	.67	.67	178	72	68	[illegible]	[illegible]	
4	10.0		796.722	.25	.8	.8	178	71	70	[illegible]	49	
5	12.5		798.110	.20	[illegible]	[illegible]	174	71	71	5.0	49	
6	15.0		799.215	.15	.49	.49	170	72	71	[illegible]	[illegible]	
7	17.5		800.102	.10	.32	.33	169	81	71	2.5	48	
8	20.0		800.[illegible]	.08	.27	.27	[illegible]	82	71	[illegible]	48	
9	22.5		801.735	.13	.48	.48	166	[illegible]	[illegible]	[illegible]	[illegible]	
10	25.0		802.766	.15	.49	.49	168	[illegible]	[illegible]	[illegible]	[illegible]	
11	27.5		803.[illegible]	.20	.65	.65	171	[illegible]	71	4.0	50	
12	30.0	31.5 stop. 805.323	805.147	.23	.78	.78	175	87	73	4.1	[illegible]	Stop 805.323 Restart 806.121 Resume 806.852
13	32.5		80[illegible]	.08	.10	.10	[illegible]	[illegible]	[illegible]	11.0	[illegible]	
14	35.0		80[illegible].785	.05	.17	.17	174	[illegible]	70	1.0	54	[illegible]
15	37.5		80[illegible].[illegible]27	.15	.40	[illegible]	172	[illegible]	[illegible]	[illegible]	[illegible]	
16	40.0		809.[illegible] —	.10	.33	.33	[illegible]	72	70	2.8	53	
17	42.5		810.—	.10	.30	[illegible]	[illegible]	72	72	[illegible]	[illegible]	
18	45.0		811.547	[illegible]	.49	[illegible]	170	75	72	[illegible]	[illegible]	
[illegible]	[illegible]		[illegible]									

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL DESIRED	ORIFICE PRESSURE DIFFERENTIAL ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET	DRY GAS METER TEMPERATURE OUTLET	PUMP VACUUM, in. Hg	IMPINGER TEMPERATURE, °F	COMMENTS
20	50.0		814.000	.28	.80	.80	178	80	74	4.5	54	
21	52.5		815.580	.37	1.2	1.2	178	82	76	5.6	54	
22	55.0		817.274	.40	1.3	1.3	178	85	77	6.0	54	
23	57.5		818.950	.38	1.23	1.25	182	88	78	5.8	54	
24	60.0		820.803	.38	1.22	1.25	184	90	79	5.8	51	15 [illegible] OVER
25	2.5		822.030	.13	.43	.43	171	70	70	3.0	60	[illegible]
26	5.0		822.954	.13	.43	.43	171	70	70	3.0	60	Stop 821.129 [illegible] AIR [illegible] 821.[illegible]
27	7.5		823.875	.10	.33	.33	174	72	71	3.5	60	PROBE 220 °F
28	10.0		824.681	.10	.33	.33	176	74	72	3.5	60	
29	12.5		825.625	.13	.43	.43	179	75	72	3.0	60	
30	15.0		826.780	.23	.73	.73	181	78	74	4.0	60	
31	17.5		828.188	.30	.95	.95	183	80	76	4.8	60	
32	20.0		829.745	.35	1.13	1.15	183	82	75	5.6	58	
33	22.5		831.375	.35	1.13	1.15	182	84	76	5.6	58	
34	25.0		833.011	.36	1.16	1.15	181	88	77	5.8	58	
35	27.5		834.632	.38	1.23	1.25	181	90	77	6.0	58	
36	30.0		836.404	.40	1.3	1.3	183	92	79	6.2	58	
	90 min		42.338	.45		.70	176	76.4				
				.20			636		536			
			42.429									

Leak rate @ end of test

Vol.	ΔH	Rate, cfm
6.2	.61	.10 / 11.9 sec.
		13.1
		11.9
		12.5
10	1.0	.10 / 9.8 sec.
		9.5 sec.
		10.1
		10.0
15	1.55	.10/ 7.5 sec.
5	.46	.10/ 15 sec
		15 sec
		15.6 sec
3	.20	.10/ 22.9
		20.9
		22.7
		21.2

TRAVERSE POINT LOCATION & VELOCITY DATA BY_____

TRAVERSE POINT NUMBER	A=FRACTION OF I.D.	B=AxI.D. ID=	C=B+NIPPLE NIPPLE=	VELOCITY HEAD (Δp_s), in.H_2O	STACK TEMPERATURE (T_s), °F
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
AVERAGE					

DIAGRAM OF STACK, PORTS, & TRAVERSE POINTS (indicate direction of flow)

INSIDE DIMENSIONS OF SAMPLE PLANE

_____

STACK GAUGE PRESSURE in. H_2O_____

NEAREST UPSTREAM DISTURBANCE_____
NEAREST DOWNSTREAM DISTURBANCE_____

PROCESS & CONTROL EQUIPMENT DESCRIPTION_____

_____

_____

_____

_____

_____

_____

_____

_____

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

MOISTURE

IMPINGERS
FINAL VOLUME 241 ml
INITIAL VOLUME 230 ml
NET VOLUME 11 ml

SILICA GEL
FINAL WEIGHT 4912 g
INITIAL WEIGHT 4863.5 g
NET WEIGHT 48.9 g

TOTAL MOISTURE 56 g

IMPINGER
#1 225 mL
18
2
3 — A SMALL AMOUNT OF SILICA GEL

ANALYTICAL DATA BY _____

ACETONE FRONT WASH
FINAL [illegible] mg
TARE [illegible] mg
NET [illegible] mg

FILTER NUMBER 1
FINAL .6078 mg
TARE .4251 mg
NET .1827 mg

FILTER NUMBER 2
FINAL [illegible] mg
TARE _____ mg
NET _____ mg

FILTER NUMBER 3
FINAL _____ mg
TARE _____ mg
NET _____ mg

CYCLONE
FINAL _____ mg
TARE _____ mg
NET _____ mg

TOTAL FRONT _____ mg

ACETONE BACK WASH
FINAL _____ mg
TARE _____ mg
NET _____ mg

ETHER-CHLOROFORM EXTRACT
FINAL _____ mg
TARE _____ mg
NET _____ mg

WATER EVAPORATION
FINAL _____ mg
TARE _____ mg
NET _____ mg

TOTAL BACK _____ mg

I CERTIFY THAT THE SAMPLES DESCRIBED BY THIS DATA SHEET WERE COLLECTED IN ACCORDANCE WITH METHODS OUTLINED BY

I FURTHER CERTIFY THAT THE SAMPLES WERE IN THE POSSESSION OF, OR SEALED FOR SHIPMENT BY COMMON CARRIER BY, MYSELF UNTIL DELIVERY TO A LABORATORY FOR ANALYSIS.

SIGNED _____ DATE ____

WITNESS _____ DATE ____

I CERTIFY THAT I RECEIVED THE SAMPLES DESCRIBED BY THIS DATA SHEET FROM THE ABOVE NAMED INDIVIDUAL AND ANALYZED THEM IN ACCORDANCE WITH THE ABOVE

NOMOGRAPH DATA BY _____

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. H_2O	$\Delta H_@$	
AVERAGE METER TEMPERATURE (AMBIENT + 20°F), °F	$T_{m_{avg.}}$	
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	
BAROMETRIC PRESSURE AT METER, in. Hg	P_m	
STATIC PRESSURE IN STACK, in. Hg $P_m \pm$ (0.073 x STACK GAUGE PRESSURE in in. H_2O)	P_s	
RATIO OF STATIC PRESSURE TO METER PRESSURE	P_s/P_m	
AVERAGE STACK TEMPERATURE, °F	$T_{s_{avg.}}$	
AVERAGE VELOCITY HEAD, in. H_2O	$\Delta p_{avg.}$	
MAXIMUM VELOCITY HEAD, in. H_2O	$\Delta p_{max.}$	
C FACTOR		
CALCULATED NOZZLE DIAMETER, in.		
ACTUAL NOZZLE DIAMETER, in.		
REFERENCE Δp, in. H_2O		

DRY MOLECULAR WEIGHT DETERMINATION BY _____

SAMPLING TIME (24-hr CLOCK) _____
SAMPLING LOCATION _____
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) _____
ANALYTICAL METHOD _____
AMBIENT TEMPERATURE _____

RUN / GAS	1		2		3		AVERAGE NET VOLUME
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET	
CO_2							
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)							
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)							

PROJECT NUMBER ________ TEST NUMBER 1

FIELD DATA SHEET

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

PLANT Anthony Ortho Richmond
DATE 12-13-78
SAMPLING LOCATION Outlet
SAMPLE TYPE Method 5
RUN NUMBER Outlet #3
OPERATORS [illegible]
AMBIENT TEMPERATURE ________
BAROMETER ________

PROBE LENGTH & TYPE 2' Glass
NOZZLE I.D. .210
SAMPLE BOX NUMBER Green
METER BOX NUMBER Sani "B" 1.865 λ=1.075
PROBE HEATER SETTING Variac @ 11%
FILTER HEATER SETTING #1200
REFERENCE ΔP 1.1
READ AND RECORD ALL DATA EVERY 4 MINUTES

FYRITE ANALYSIS
CO_2 O_2

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O DESIRED	ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F	PUMP VACUUM, in. Hg	IMPINGER TEMPERATURE, °F	COMMENTS
			INITIAL: 455.111									
1	4		457.768	1.1	1.85	1.85	114	67	64	7.0		[illegible] Probe 157
2	8		460.495	1.1	1.85	1.85	114	[illegible]	[illegible]	[illegible]		[illegible] Probe [illegible]
3	12		463.210	1.1	1.85	1.85	114	[illegible]	70	6.5		Box 147 Probe 157
4	16		465.927	1.1	1.85	1.85	114	[illegible]	[illegible]	7.2		Box 152 Probe 164
5	20		468.847	1.2	2.0	2.0	115	87	70	8.0		Box 185 Probe 164
6	24		471.848	1.2	2.0	2.0	114	93	71	8.0		Box 183 Probe 165
7	28		474.656	1.05	1.8	1.8	114	96	74	7.4		Box 185 Probe [illegible]
8	32		477.754	1.5	2.5	2.5	113	98	74	10.0		*Think pitot clogged @ last point
9	36		481.003	1.5	2.5	2.5	113	100	74	10.0		Leak OK Box 183 Probe 165
10	40		484.206	1.4	2.35	2.35	114	101	74	9.5		Box 152 Probe 165
11	44		487.475	1.6	2.65	2.65	113	103	75	10.8		Box 155 Probe 165
12	48		490.640	1.3	2.2	2.2	114	105	76	9.2		Box 143 Probe 166
13	52		493.775	1.4	2.35	2.35	113	105	78	9.5		Box 141 Probe 166
14	56		498.000	1.2	2.0	2.0	113	105	78	8.2		Box 153 Probe 165
15	60	OFF	500.892	1.2	2.0	2.0	113	106	79	8.0		Box 145 Probe 165
16	61	1008	503.814	1.2	2.0	2.0	114	106	80	8.0		Zero is OK
17	8	1020	506.535	1.05	1.8	1.8	115	85	72	7.0		Box 143 Probe 182
18	12	START	509.322	1.1	1.85	1.85	115	86	72	7.5		Box 141 Probe 165
[illegible]	[illegible]		[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		[illegible]

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL DESIRED	ORIFICE PRESSURE DIFFERENTIAL ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET	DRY GAS METER TEMPERATURE OUTLET	PUMP VACUUM, in. Hg	IMPINGER TEMPERATURE, °F	COMMENTS
20	20		————	1.1	1.85	1.85	115	92	74	7.6		[illegible]
21	24		517.735	1.1	1.85	1.85	115	94	74	7.6		BOX 169 PROBE 156
22	28		520.604	1.2	2.0	2.0	115	96	78	8.0		BOX 187 PROBE 156
23	32		523.630	1.3	2.2	2.2	115	100	76	9.2		BOX 186 PROBE 157
24	36		526.850	1.5	2.5	2.5	114	102	80	10.5		BOX 177 PROBE 157
25	40		530.375	1.9	3.2	3.2	115	105	80	12.2		BOX 165 PROBE 157
26	44		533.982	1.8	2.95	2.95	114	106	80	13.5	100°C	S8ZERO IS OK
27	48		537.370	1.5	2.5	2.5	114	107	80	10.5		BOX 144 PROBE 133
28	52		540.560	1.3	2.2	2.2	114	107	80	9.5		BOX 150 PROBE 130
29	56		543.788	1.5	2.5	2.5	114	104	78	10.1		BOX 145 PROBE 126
30	60		547.050	1.4	2.35	2.35	113	104	79	10.0		
31	64		550.275	1.4	2.35	2.35	113	104	78	9.9		BOX 178 PROBE 125
32	68		553.482	1.4	2.35	2.35	113	104	78	9.9		BOX 178 PROBE 125
			98.371	1.13	2.19		114		96			END TIME 1123
				1.30					546			[illegible]
												1 FT3 IN 82 SEC @ 15"
												WITH [illegible]
												0 LEAK @ 10"

TRAVERSE POINT LOCATION & VELOCITY DATA BY_____

TRAVERSE POINT NUMBER	A=FRACTION OF I.D.	B=AxI.D. ID=_____	C=B+NIPPLE NIPPLE=_____	VELOCITY HEAD (Δp_s), in.H_2O	STACK TEMPERATURE (T_s), °F
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
AVERAGE					

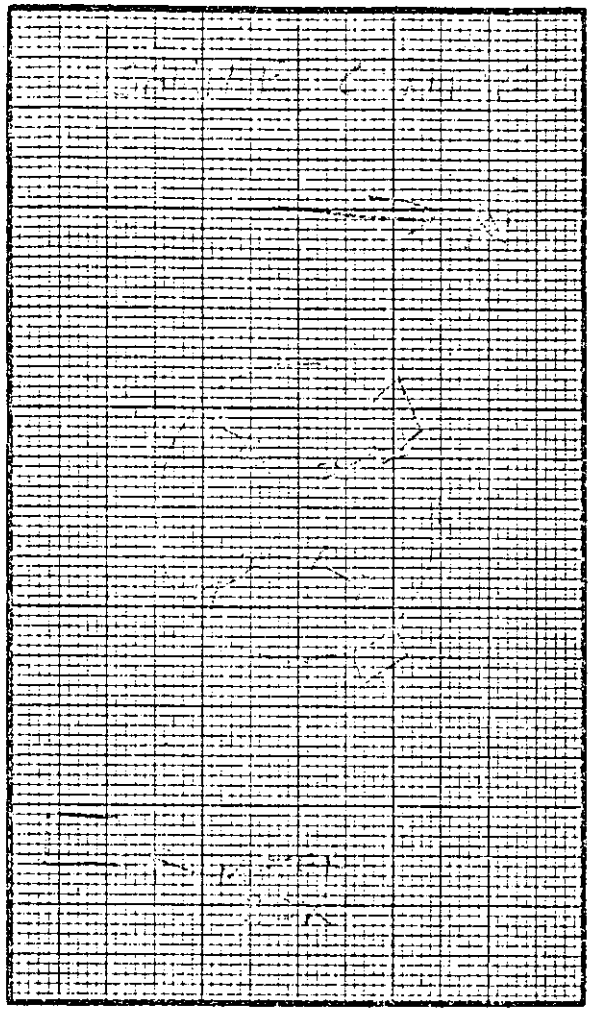


DIAGRAM OF STACK, PORTS, & TRAVERSE POINTS (indicate direction of flow)

INSIDE DIMENSIONS OF SAMPLE PLANE

_____

STACK GAUGE PRESSURE in. H_2O_____

NEAREST UPSTREAM DISTURBANCE_____
NEAREST DOWNSTREAM DISTURBANCE_____

PROCESS & CONTROL EQUIPMENT DESCRIPTION_____

MOISTURE

IMPINGERS
FINAL VOLUME 352 ml
INITIAL VOLUME 200 ml
NET VOLUME 152 ml

SILICA GEL
FINAL WEIGHT 499.6 g
INITIAL WEIGHT [illegible] g
NET WEIGHT 32.0 g

TOTAL MOISTURE 184 g

#1 — 187
#3 — 165
352

ANALYTICAL DATA BY _____

ACETONE FRONT WASH
FINAL 90.4474 mg
TARE 89.6571 mg
NET 790.3 mg

FILTER NUMBER 1
FINAL [illegible] mg
TARE 412.74 mg
NET 314.8 mg

FILTER NUMBER 2
FINAL 825.1 to 826 mg
TARE _____ mg
NET _____ mg

FILTER NUMBER 3
FINAL _____ mg
TARE _____ mg
NET _____ mg

CYCLONE
FINAL _____ mg
TARE _____ mg
NET _____ mg

TOTAL FRONT _____ mg

ACETONE BACK WASH
FINAL _____ mg
TARE _____ mg
NET _____ mg

ETHER-CHLOROFORM EXTRACT
FINAL _____ mg
TARE _____ mg
NET _____ mg

WATER EVAPORATION
FINAL _____ mg
TARE _____ mg
NET _____ mg

TOTAL BACK _____ mg

I CERTIFY THAT THE SAMPLES DESCRIBED BY THIS DATA SHEET WERE COLLECTED IN ACCORDANCE WITH METHODS OUTLINED BY

I FURTHER CERTIFY THAT THE SAMPLES WERE IN THE POSSESSION OF, OR SEALED FOR SHIPMENT BY COMMON CARRIER BY, MYSELF UNTIL DELIVERY TO A LABORATORY FOR ANALYSIS.

SIGNED _____ DATE ____

WITNESS _____ DATE ____

I CERTIFY THAT I RECEIVED THE SAMPLES DESCRIBED BY THIS DATA SHEET FROM THE ABOVE NAMED INDIVIDUAL AND ANALYZED THEM IN ACCORDANCE WITH THE ABOVE

NOMOGRAPH DATA BY _____

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. H_2O	$\Delta H_@$	
AVERAGE METER TEMPERATURE (AMBIENT + 20°F), °F	$T_{m_{avg.}}$	
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	
BAROMETRIC PRESSURE AT METER, In. Hg	P_m	
STATIC PRESSURE IN STACK, in. Hg $P_m \pm$(0.073 x STACK GAUGE PRESSURE in in. H_2O)	P_s	
RATIO OF STATIC PRESSURE TO METER PRESSURE	P_s/P_m	
AVERAGE STACK TEMPERATURE, °F	$T_{s_{avg.}}$	
AVERAGE VELOCITY HEAD, in. H_2O	$\Delta p_{avg.}$	
MAXIMUM VELOCITY HEAD, in. H_2O	$\Delta p_{max.}$	
C FACTOR		
CALCULATED NOZZLE DIAMETER, in.		
ACTUAL NOZZLE DIAMETER, in.		
REFERENCE Δp, in. H_2O		

DRY MOLECULAR WEIGHT DETERMINATION BY _____

SAMPLING TIME (24-hr CLOCK) _____
SAMPLING LOCATION _____
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) _____
ANALYTICAL METHOD _____
AMBIENT TEMPERATURE _____

RUN / GAS	1		2		3		AVERAGE NET VOLUME
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET	
CO_2							
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)							
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)							

PROJECT NUMBER _____ TEST NUMBER 4 FIELD DATA SHEET

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

PLANT CHEVRON ORTHO

DATE 12/13/78

SAMPLING LOCATION INLET AFTER DRYER

SAMPLE TYPE METHOD 5

RUN NUMBER 4

OPERATORS T.S. & W.N

AMBIENT TEMPERATURE 60°F @

BAROMETER _____

PROBE LENGTH & TYPE 6' GLASS

NOZZLE I.D. .250

SAMPLE BOX NUMBER [illegible]

METER BOX NUMBER SCOTT S.B. #1 1.83

PROBE HEATER SETTING 250°F

FILTER HEATER SETTING 250°F

REFERENCE ΔP .58

READ AND RECORD ALL DATA EVERY 2 MINUTES

FYRITE ANALYSIS

CO_2	O_2	

TRAVERSE POINT NUMBER	CLOCK TIME SAMPLING TIME, min	CLOCK TIME (24 hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE		PUMP VACUUM, in. Hg	IMPINGER TEMPERATURE, °F	COMMENTS
			INITIAL: 852.203		DESIRED	ACTUAL		INLET ($T_{m\,in}$), °F	OUTLET ($T_{m\,out}$), °F			
1	2		———	.50	.66	.65	173	71	73	3.5		
2	4		853.030	.19	.58	.58	173	75	75	2.8		
3	6		854.728	.12	.39	.39	173	75	74	1.5		
4	8		855.450	.12	.39	.39	174	76	75	1.9		
5	10		856.192	.12	.39	.39	174	79	76	1.9		
6	12		856.989	.15	.49	.49	175	80	77	2.2		
7	14		857.958	.24	.77	.77	177	82	77	2.9		
8	16		859.062	.30	.95	.95	178	81	79	3.2		
9	18		860.281	.38	1.2	1.2	177	88	80	4.0		
10	20		861.632	.40	1.28	1.3	179	88	80	4.2		
11	22		863.070	.45	1.43	1.4	182	91	81	4.5		
12	24		864.487	.49	1.57	1.5	184	93	82	4.5		Start 12:00 24.75 min 864.693
13	26		Traverse out	.50 .41	1.63	1.4	180					Nozzle plugged w/ Port Pt 1
14	28			.41			182					
15	30		12-24	.35		0.83	182		540			
16	32		12.390	.38			184	177				
17	34			40			183	181				
18	36			.35			184					
				.4			183					

PORT 4

PORT 1

TRAVERSE POINT NUMBER	CLOCK TIME SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp_s), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL DESIRED	ORIFICE PRESSURE DIFFERENTIAL ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET	DRY GAS METER TEMPERATURE OUTLET	PUMP VACUUM, in. Hg	IMPINGER TEMPERATURE, °F	COMMENTS
20	40			.44			182					
21	42			.44			183					
22	44			.43			185					
23	46			.42			188					
24	48			.50			188					
25	50			.15			175					
26	52			.12			176					
27	54			.10			176					
28	56			.13			180					
29	58			.20			181					
30	60			.27			182					
31	2			.33			184					
32	4			.38			184					
33	6			.39			185					
34	8			.35			185					
35	10			.34			184					
36	12			40			184					
				.50								
				.25								
				0.25/.30								

TRAVERSE POINT LOCATION & VELOCITY DATA BY

TRAVERSE POINT NUMBER	A=FRACTION OF I.D.	B=AxI.D. ID=	C=B+NIPPLE NIPPLE=	VELOCITY HEAD (Δp_s), in.H_2O	STACK TEMPERATURE (T_s), °F
1					
2					
3					
4					
5					
6					
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28					
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
AVERAGE					

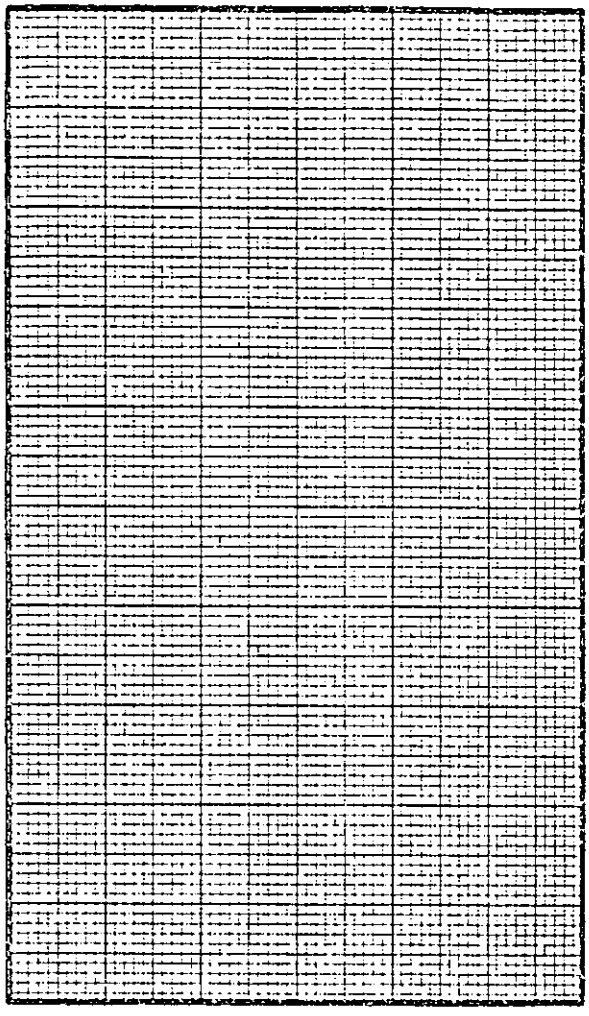


DIAGRAM OF STACK, PORTS, & TRAVERSE POINTS (indicate direction of flow)

INSIDE DIMENSIONS OF SAMPLE PLANE

STACK GAUGE PRESSURE in. H_2O

NEAREST UPSTREAM DISTURBANCE

NEAREST DOWNSTREAM DISTURBANCE

PROCESS & CONTROL EQUIPMENT DESCRIPTION

MOISTURE

IMPINGERS
FINAL VOLUME 212 ml
INITIAL VOLUME 200 ml
NET VOLUME 12 ml

SILICA GEL
FINAL WEIGHT 471.9 g
INITIAL WEIGHT 467.7 g
NET WEIGHT 4.2 g

TOTAL MOISTURE 16 g

ANALYTICAL DATA BY _____

ACETONE FRONT WASH
FINAL 114.1274 mg
TARE 82.6000 mg
NET 31.5274 mg

FILTER NUMBER 1
FINAL .4567 mg
TARE .4299 mg
NET 26.7 mg

FILTER NUMBER 2
FINAL 31.354.2 mg
TARE _____ mg
NET _____ mg

FILTER NUMBER 3
FINAL _____ mg
TARE _____ mg
NET _____ mg

CYCLONE
FINAL _____ mg
TARE _____ mg
NET _____ mg

TOTAL FRONT _____ mg

ACETONE BACK WASH
FINAL _____ mg
TARE _____ mg
NET _____ mg

ETHER-CHLOROFORM EXTRACT
FINAL _____ mg
TARE _____ mg
NET _____ mg

WATER EVAPORATION
FINAL _____ mg
TARE _____ mg
NET _____ mg

TOTAL BACK _____ mg

I CERTIFY THAT THE SAMPLES DESCRIBED BY THIS DATA SHEET WERE COLLECTED IN ACCORDANCE WITH METHODS OUTLINED BY

I FURTHER CERTIFY THAT THE SAMPLES WERE IN THE POSSESSION OF, OR SEALED FOR SHIPMENT BY COMMON CARRIER BY, MYSELF UNTIL DELIVERY TO A LABORATORY FOR ANALYSIS.

SIGNED _____ DATE ____

WITNESS _____ DATE

I CERTIFY THAT I RECEIVED THE SAMPLES DESCRIBED BY THIS DATA SHEET FROM THE ABOVE NAMED INDIVIDUAL AND ANALYZED THEM IN ACCORDANCE WITH THE ABOVE NAMED METHODS.

NOMOGRAPH DATA BY _____

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. H_2O	$\Delta H_@$	
AVERAGE METER TEMPERATURE (AMBIENT + 20°F), °F	$T_{m_{avg.}}$	
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	
BAROMETRIC PRESSURE AT METER, in. Hg	P_m	
STATIC PRESSURE IN STACK, in. Hg $P_m \pm$ (0.073 x STACK GAUGE PRESSURE in in. H_2O)	P_s	
RATIO OF STATIC PRESSURE TO METER PRESSURE	P_s/P_m	
AVERAGE STACK TEMPERATURE, °F	$T_{s_{avg.}}$	
AVERAGE VELOCITY HEAD, in. H_2O	$\Delta p_{avg.}$	
MAXIMUM VELOCITY HEAD, in. H_2O	$\Delta p_{max.}$	
C FACTOR		
CALCULATED NOZZLE DIAMETER, in.		
ACTUAL NOZZLE DIAMETER, in.		
REFERENCE Δp, in. H_2O		

DRY MOLECULAR WEIGHT DETERMINATION BY _____

SAMPLING TIME (24-hr CLOCK) _____
SAMPLING LOCATION _____
SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) _____
ANALYTICAL METHOD _____
AMBIENT TEMPERATURE _____

RUN / GAS	1		2		3		AVERAGE NET VOLUME
	ACTUAL READING	NET	ACTUAL READING	NET	ACTUAL READING	NET	
CO_2							
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)							
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)							

CHEVRON ORTHO RICHMOND

ANDERSEN STACK SAMPLER DATA

Date: Dec 13th 1978 Test/Run Number: Chevron Ortho Inlet, Anderson

Operator: W/ Nunes Meter Box No. Scott Ser. B. ΔHa 1.83 Andersen No. Set 2

Nozzle Size .250

Grain Loading From ¶ 5 _____ gr/dscf Est. Sampling Time 2.5 min.

Sampling Location & Point Number: Outlet/(Inlet) Point 19 (7 of 12 in center part of 3 ports)

Average Velocity Head From ¶2 Traverse, ΔP_s .25 Average Stack Temp. From ¶2 Traverse, T_s 178

Flow Setting From Nomograph, ΔH _____ Reference ΔP .58

	Start	Stop	Elapsed
Time:			2.0 min.

		In	Out	Avg.
Gas Volume: Final	852.182 cf.	Meter Temp: Final	78	76
Initial	851.185 cf.	Initial	77	74
Total	.997 cf. x.94 = .937		155	150

76.25

Stack Velocity Head, ΔP_s .25 Flow Rate, ΔH .~~8~~.67 Stack Temp, T_s 179°F

Moisture From ¶4 (%) ≃ 8.4% Gas Density From ¶3 M_d _____ lb/lb-mole

Corrected Volume _____ dscf Corrected Flow Rate _____ dscf/min

Temperature Correction Factor for Aerodynamic Size of Particles Taken From Andersen Manual, Figure 3 _____

Plate	Tare (g)	Final (g)	Net (mg)	%	Cum. %	ECD (Microns)
0	31.1632	31.1907	TOTAL PLATE & ALUMINUM Net 7.5 mg.			
1	20.9620	20.9710	.127 *	127.	+ 7.5 + 22.8 = 157.3	
2	21.8752	21.8983	.7895*	789.5		
3	22.42235	22.4331	1.27155*	1271.55		
4	15.36675	15.3711	.41385*	413.85		
5	11.0634	11.0657	.0712 *	71.2		
6	11.21995	11.2215	.01315*	13.15		
7	11.2990	11.2995	.0005	0.5		
8	22.2182	22.2182	0.0000	0.0		
Back-Up Filter	.18685	.18715	0.0003	0.3		
Probe + Head Wash	88.1506	88.1734	22.8			

Probe & Head Wash

* Includes particulate impacted on plate and loose particulate collected on plate and weighed separately in aluminum dish. See next page.

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

ANDERSEN PARTICLE SIZE ANALYSIS

Total weight for each plate includes particulate impacted on plate and loose particulate collected on plates, but weighed separately in aluminum dishes.

SAMPLE WEIGHTS

CHEVRON ORTHO
RICHMOND

SET 2

PLATE NO	TARE	AL. DISH TARE	FINAL	SAMPLE WT. (DISH)	+ (PLATE)	TOTAL
0						
1	20.9620	1.3255	1.4435	.118.	.009	.127
2	21.8752	1.3206	2.0870	.7664	.0231	.7895
3	22.42235	1.3210	2.5848	1.2608	.01075	1.27155
4	15.36675	1.3205	1.7300	.4095	.00435	.41385
5	11.0634	1.3108	1.3797	.0689	.0023	.0712
6	11.21995	1.3191	1.3307	.0116	.00155	.01315
7	11.2990				.0005	.0005
8	22.2182				0.0	0.0
9						

Ammonium Sulfate Moisture Analysis

Plant: Chevron Chemical Company

Sample Location	DATE	TIME	Tare Wt gms	Total Wt Wet gms	Total Wt. Dry gms	Net Wt Wet gms	Net Wt Dry, gms
INLET	12/12	1442	268.2	629.2	627.0	361.0	358.8
OUTLET	12/12	1440	267.3	611.6	611.0	344.3	343.7
INLET	12/12	1712	267.9	640.0	638.1	372.1	370.2
OUTLET	12/12	1711	267.9	654.5	653.5	386.6	385.6
INLET	12/13	1119	267.6	676.7	671.6	409.1	407.0
OUTLET	12/13	1117	268.1	660.4	659.9	392.3	391.8

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE 1 of 3

COMPANY CHEVRON ORTHO
LOCATION OUTLET
TEST NUMBER 1
DATE 12/12 '78
TYPE FACILITY $(NH_4)_2SO_4$ Production
CONTROL DEVICE VENTURI

HOURS OF OBSERVATION
OBSERVER DE
OBSERVER CERTIFICATION DATE 6/11/78
OBSERVER AFFILIATION Scott
POINT OF EMISSIONS
HEIGHT OF DISCHARGE POINT 20'

	Initial			Final
CLOCK TIME				
OBSERVER LOCATION Distance to Discharge	150'			150'
Direction from Discharge	SE			SE
Height of Observation Point	0'			0'
BACKGROUND DESCRIPTION	gray clouds			gray clouds
WEATHER CONDITIONS Wind Direction	out of S			out of S
Wind Speed	0-5			10-20
Ambient Temperature	50			55
SKY CONDITIONS (clear, overcast, % clouds, etc.)	75% clouds			75% clouds
PLUME DESCRIPTION Color	white			white
Distance Visible	50'			50'
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	13:30 - 14:30		0%

Readings ranged from 0 to 10 % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD

PAGE 2 OF 3

COMPANY Chevron Oil Co
LOCATION Ouach
TEST NUMBER 1
DATE 12/12/74

OBSERVER DK
TYPE FACILITY [illegible]
POINT OF EMISSIONS

2 hr test

Start 12:00 PM

Stop 12:12 →
Start 12:47 →

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
	0	0		0		✓		[illegible]
	1	0		0				
	2	0		0				
	3	0		0				
	4	0		0				
	5	5		0				
	6	5		5				
	7	5		0				
	8	5		5				
	9	0		5				
	10	0		0				
	11	0		5				
	12	0		0				
	13	0		0				
	14	5		0				
	15	0		0				
	16	0		0				
	17	5		5				
	18	5		0				
	19	0		5				
	20	5		0				
	21	0		0				
	22	5		0				
	23	0		0				
	24	0		0				
	25	5		5				
	26	0		5				
	27	0		0				
	28	0		0				
	29	0		5		✓		

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE 2 OF 3

COMPANY Chevron Oil Co
LOCATION [illegible]
TEST NUMBER 1
DATE [illegible]

OBSERVER DK
TYPE FACILITY
POINT OF EMISSIONS

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
	30	0		0		✓		
	31	0		5				
	32	0		0				
	33	0		0				
	34	0		0				
	35	0		0				
	36	0		0				
	37	0		0				
	38	0		0				
	39	0		0				
	40	0		0				
	41	0		0				
	42	0		0				
	43	0		0				
	44	0		0				
	45	0		0				
	46	0		0				
	47	0		0				
	48	0		0				
	49	0		0				
	50	0		0				
	51	0		0				
	52	0		0				
	53	0		0				
	54	0		0				
	55	0		0				
	56	0		0				
	57	0		0				
	58	0		0				
	59	0		0		✓		

[FR Doc.74-26150 Filed 11-11-74;8:45 am]

FIGURE 9-2 OBSERVATION RECORD PAGE 3 OF 3

COMPANY Chevron Oil Co
LOCATION Outlet
TEST NUMBER 1
DATE 12-17-73

OBSERVER DK
TYPE FACILITY
POINT OF EMISSIONS

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
	0	0		0				
	1	0		0				
	2	0		0				
	3	0		0				
	4	0		0				
	5	0		0				
	6	0		0				
	7	0		0				
	8	0		0				
	9	0		0				
	10	0		0				
	11	0		0				
	12	0		0				
	13	0		0				
	14	0		0				
	15	0		0				
	16	0		0				
	17	0		0				
	18	0		0				
	19	0		0				
	20	0		0				
	21	0		0				
	22	0		0				
	23	0		0				
	24	0		0				
	25	0		0				
	26	0		0				
	27	0		0				
	28	0		0				
	29	0		0				

Avg = 0%

FIGURE 9-2 OBSERVATION RECORD (Continued) PAGE 3 OF 3

COMPANY Chevron Oil Co
LOCATION
TEST NUMBER
DATE

OBSERVER DK
TYPE FACILITY
POINT OF EMISSIONS

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
	30	0		0				
	31	0		0				
	32	0		0				
	33	0		0				
	34	0		0				
	35	0		0				
	36	0		0				
	37	0		0				
	38	0		0				
	39	0		0				
	40	0		0				
	41	0		0				
	42	0		0				
	43	0		0				
	44	0		0				
	45	0		0				
	46	0		0				
	47	0		0				
	48	0		0				
	49	0		0				
	50	0		0				
	51	0		0				
	52	0		0				
	53	0		0				
	54	0		0				
	55	0		0				
	56	0		0				
	57	0		0				
	58	0		0				
	59	0		0				

[FR Doc.74-26160 Filed 11-11-74;8:45 am]

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE 1 of 3

COMPANY CHEVRON ORTHO
LOCATION OUTLET
TEST NUMBER 2
DATE 12/12/79
TYPE FACILITY HNO3 Solution
CONTROL DEVICE Scrubber

HOURS OF OBSERVATION
OBSERVER DK
OBSERVER CERTIFICATION DATE
OBSERVER AFFILIATION
POINT OF EMISSIONS
HEIGHT OF DISCHARGE POINT 30'

	Initial			Final
CLOCK TIME				
OBSERVER LOCATION Distance to Discharge	150'			150'
Direction from Discharge	SE			SE
Height of Observation Point	0'			0'
BACKGROUND DESCRIPTION	[illegible] clouds			[illegible] clouds
WEATHER CONDITIONS Wind Direction	[illegible]			[illegible]
Wind Speed	10-20			
Ambient Temperature	55			50
SKY CONDITIONS (clear, overcast, % clouds, etc.)	[illegible]			[illegible]
PLUME DESCRIPTION Color	white			white
Distance Visible	50'			50'
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
2	1540 - 1640		0%

Readings ranged from ____ to ____ % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD

PAGE 2 OF 3

COMPANY CHEVRON ORTHO
LOCATION [illegible]
TEST NUMBER 2
DATE 12/12/72

OBSERVER DK
TYPE FACILITY [illegible]
POINT OF EMISSIONS

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
	0	0		0		✓		
	1	0		0		✓		
	2	0		0		✓		
	3	0		0		✓		
	4	0		0		✓		
	5	0		0		✓		
	6	0		0		✓		
	7	0		0		✓		
	8	0		0		✓		
	9	0		0		✓		
	10	0		0		✓		
	11	0		0		✓		
	12	0		0		✓		
	13	0		0		✓		
	14	0		0		✓		
	15	0		0		✓		
	16	0		0		✓		
	17	0		0		✓		
	18	0		0		✓		
	19	0		0		✓		
	20	0		0		✓		
	21	0		0		✓		
	22	0		0		✓		
	23	0		0		✓		
	24	0		0		✓		
	25	0		0		✓		
	26	0		0		✓		
	27	0		0		✓		
	28	0		0		✓		
	29	0		0		✓		

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE 2 OF 3

COMPANY CHEVRON ORTHO
LOCATION [illegible]
TEST NUMBER 2
DATE 12/12/72

OBSERVER DK
TYPE FACILITY
POINT OF EMISSIONS

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
	30	0		0		✓		
	31	0		0		✓		
	32	0		0		✓		
	33	0		0		✓		
	34	0		0		✓		
	35	0		0		✓		
	36	0		0		✓		
	37	0		0		✓		
	38	0		0		✓		
	39	0		0		✓		
	40	0		0		✓		
	41	0		0		✓		
	42	0		0		✓		
	43	0		0		✓		
	44	0		0		✓		
	45	0		0		✓		
	46	0		0		✓		
	47	0		0		✓		
	48	0		0		✓		
	49	0		0		✓		
	50	0		0		✓		
	51	0		0		✓		
	52	0		0		✓		
	53	0		0		✓		
	54	0		0		✓		
	55	0		0		✓		
	56	0		0		✓		
	57							
	58	0		0		✓		
	59	0		0		✓		

[FR Doc.74-23150 Filed 11-11-74;8:45 am]

FIGURE 9-2 OBSERVATION RECORD

PAGE 3 OF 3

COMPANY CHEVRON ORTHO
LOCATION OUTLET
TEST NUMBER 2
DATE 12/12/74

OBSERVER DK
TYPE FACILITY
POINT OF EMISSIONS

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
	0	0		0				
	1	0		0				
	2	0		0				
	3	0		0				
	4	0		0				
	5	0		0				
	6	0		0				
	7	0		0				
	8	0		0				
	9	0		0				
	10	0		0				
	11	0		0				
	12	0		0				
	13	0		0				
	14	0		0				
	15	0		0				
	16	0		0				
	17	0		0				
	18	0		0				
	19	0		0				
	20	0		0				
	21	0		0				
	22	0		0				
	23	0		0				
	24	0		0				
	25	0		0				
	26	0		0				
	27	0		0				
	28	0		0				
	29	0		0				

2nd hour

start numbers outlet

Avg = 0%

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE 3 OF 3

COMPANY CHEVRON ORTHO
LOCATION
TEST NUMBER 2
DATE 12/12/74

OBSERVER DK
TYPE FACILITY
POINT OF EMISSIONS

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
	30							
	31							
	32							
	33							
	34							
	35							
	36							
	37							
	38							
	39							
	40							
	41							
	42							
	43							
	44							
	45							
	46							
	47							
	48							
	49							
	50							
	51							
	52							
	53							
	54							
	55							
	56							
	57							
	58							
	59							

[FR Doc.74-28150 Filed 11-11-74;8:45 am]

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE 1 of 4

COMPANY CHEVRON ORTHO
LOCATION OUTLET
TEST NUMBER 3
DATE 12/13/91
TYPE FACILITY Nitric Sol. process
CONTROL DEVICE Venturi

HOURS OF OBSERVATION
OBSERVER DK
OBSERVER CERTIFICATION DATE 12/1/90
OBSERVER AFFILIATION SCAQMD
POINT OF EMISSIONS
HEIGHT OF DISCHARGE POINT 20'

	Initial			Final
CLOCK TIME				
OBSERVER LOCATION Distance to Discharge	150'			150'
Direction from Discharge	SE			SE
Height of Observation Point	0'			0'
BACKGROUND DESCRIPTION	blue sky w/clouds			blue sky w/clouds
WEATHER CONDITIONS Wind Direction	0-5			0-10
Wind Speed	over 5			over 5
Ambient Temperature	50			55
SKY CONDITIONS (clear, overcast, % clouds, etc.)	50% clouds			50% clouds
PLUME DESCRIPTION Color	white			white
Distance Visible	50'			50'
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
			0%
		a	

Readings ranged from ____ to ____ % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD

PAGE 1 OF 4

COMPANY CHEVRON ORTHO
LOCATION [illegible]
TEST NUMBER 2
DATE 12/13/78

OBSERVER DK
TYPE FACILITY
POINT OF EMISSIONS

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
	0	0		0		✓		
	1	0		0				
	2	0		0				
	3	0		0				
	4	0		0				
	5	5		0				
	6	0		0				
	7	0		0				
	8	0		0				
	9	0		0				
	10	0		0				
	11	0		0				
	12	0		0				
	13	0		0				
	14	5		0				
	15	0		0				
	16	0		0				
	17	0		0				
	18	0		0				
	19	0		5				
	20	0		0				
	21	0		0				
	22	0		0				
	23	0		0				
	24	0		0				
	25	0		0				
	26	0		0				
	27	0		0				
	28	0		0				
	29	0		0				

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE 2 OF 4

COMPANY CHEVRON ORTHO
LOCATION [illegible]
TEST NUMBER 3
DATE 12/15/78

OBSERVER DK
TYPE FACILITY
POINT OF EMISSIONS

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
	30	0		0		✓		
	31	0		0				
	32	0		0				
	33	0		0				
	34	0		0				
	35	0		0				
	36	0		0				
	37	0		0				
	38	0		0				
	39	0		0				
	40	0		0				
	41	0		0				
	42	0		0				
	43	0		0				
	44	0		0				
	45	0		0				
	46	0		0				
	47	0		0				
	48	0		0				
	49	0		0				
	50	0		0				
	51	0		0				
	52	0		0				
	53	0		0				
	54	0		0				
	55	0		0				
	56	0		0				
	57	0		0				
	58	0		0				
	59	0		0		✓		

[FR Doc.74-26150 Filed 11-11-74;8:45 am]

FIGURE 9-2 OBSERVATION RECORD PAGE 3 OF 4

COMPANY CHEVRON ORTHO
LOCATION [illegible]
TEST NUMBER 2
DATE 12/13/74

OBSERVER DK
TYPE FACILITY
POINT OF EMISSIONS

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
	0	0		0		✓		
	1	0		0		✓		
	2	0		0		✓		
	3	0		0		✓		
	4	0		0		✓		
	5	0		0		✓		
	6	0		0		✓		
	7	0		5				
	8	0		0				
	9	0		0				
	10	0		0		✓		
	11	0		0		✓		
	12	0		0				
	13	0		0				
	14	0		0				
	15	0		0		✓		
	16	0		0		✓		
	17	0		0				
	18	0		0				
	19	0		0				
	20	0		0				
	21	0		0				
	22	0		0				
	23	0		0				
	24	0		0		✓		
	25	0		0		✓		
	26	0		0				
	27	0		0				
	28	0		0		✓		
	29	0		0		✓		

FIGURE 9-2 OBSERVATION RECORD (Continued) PAGE 3 OF 4

COMPANY CHEVRON ORTHO
LOCATION [illegible]
TEST NUMBER 3
DATE 12/13/74

OBSERVER DK
TYPE FACILITY
POINT OF EMISSIONS

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
	30	0		0		✓		
	31	0		0		✓		
	32	0		0		✓		
	33	0		0		✓		
	34	0		0		✓		
	35	0		0		✓		
	36	0		0		✓		
	37	0		0		✓		
	38	0		0		✓		
	39	0		0		✓		
	40	0		0		✓		
	41	0		0		✓		
	42	0		0		✓		
	43	0		0		✓		
	44	0		0		✓		
	45	0		0		✓		
	46	0		0		✓		
	47	0		0		✓		
	48	0		0		✓		
	49	0		0		✓		
	50	0		0		✓		
	51	0		0		✓		
	52	0		0		✓		
	53	0		0		✓		
	54	0		0		✓		
	55	0		0		✓		
	56	0		0		✓		
	57	0		0		✓		
	58	0		0		✓		
	59	0		0		✓		

[FR Doc.74-26150 Filed 11-11-74;8:45 am]

FIGURE 9-2 OBSERVATION RECORD

COMPANY CHEVRON ORTHO
LOCATION [illegible]
TEST NUMBER 3
DATE 12/13/75

OBSERVER DK
TYPE FACILITY [illegible]
POINT OF EMISSIONS

3rd hour

Hr.	Min.	Seconds 0	15	30	45	Steam Plume (check if applicable) Attached	Detached	Comments
	0	0		0		✓		
	1	0		0				
	2	0		0				
	3	0		0				
	4	0		0				
	5	0		0				
	6	0		0				
	7	0		0				
	8	0		0				
	9	0		0				
	10	0		0				
	11	0		0				
	12	0						
	13	0		0				
	14	0		0				
	15	0		0				
	16	0		0				
	17	0		0				
	18	0		0				
	19	0		0				
	20	0		0				
	21	0		0				
	22	0		0				
	23	0		0				
	24							
	25							
	26							
	27							
	28							
	29					↓		

stopped outlet [illegible] → inlet [illegible]

Avg = 0%

FIGURE 9-2 OBSERVATION RECORD (Continued)

COMPANY CHEVRON ORTHO
LOCATION [illegible]
TEST NUMBER 3
DATE 12/13/75

OBSERVER DK
TYPE FACILITY
POINT OF EMISSIONS

Start 11:55AM (to finish [illegible])

Hr.	Min.	Seconds 0	15	30	45	Steam Plume (check if applicable) Attached	Detached	Comments
	30	0		0		✓		
	31	0		0				
	32	0		0				
	33	0		0				
	34	0		0				
	35	0		0				
	36	0		0				
	37	0		0				
	38	0		0				
	39	0		0				
	40	0		0				
	41	0		0				
	42	0		0				
	43	0		0				
	44	0		0				
	45	0		0				
	46	0		0				
	47	0		0				
	48	0		0				
	49	0		0				
	50	0		0				
	51	0		0				
	52	0		0				
	53	0		0				
	54	0		0				
	55	0		0				
	56	0		0				
	57	0		0				
	58	0		0				
	59	0		0		↓		

[FR Doc.74-26150 Filed 11-11-74;8:45 am]

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE 1 of 2

COMPANY CHEVRON ORTHO
LOCATION OXNARD
TEST NUMBER 4
DATE 12/3/75
TYPE FACILITY NH3 L SOx
CONTROL DEVICE

HOURS OF OBSERVATION
OBSERVER DE
OBSERVER CERTIFICATION DATE 12/1/78
OBSERVER AFFILIATION SCAQMD
POINT OF EMISSIONS
HEIGHT OF DISCHARGE POINT 20'

	Initial			Final
CLOCK TIME				
OBSERVER LOCATION Distance to Discharge	150'	—		
Direction from Discharge	SE			
Height of Observation Point	0'			
BACKGROUND DESCRIPTION	sky/bldg			
WEATHER CONDITIONS Wind Direction	S			
Wind Speed	0-15			
Ambient Temperature	55			
SKY CONDITIONS (clear, overcast, % clouds, etc.)	clear			
PLUME DESCRIPTION Color	white			
Distance Visible	5'			
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
	1733 - 1753		0%

Readings ranged from ____ to ____ % opacity

The source was/was not in compliance with ____ at the time evaluation was made.

FIGURE 9-2 OBSERVATION RECORD PAGE 2 OF 2

COMPANY Chevron USA
LOCATION Duke
TEST NUMBER 4
DATE 12/13/74

OBSERVER DK
TYPE FACILITY Wellhead
POINT OF EMISSIONS

Start 2:37 (INLET RERUN OF #2)

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
	0	0		0				Gas Rate = Pressure
	1	0		0				Fuel Gas Rate
	2	0		0				10 Sec. Mode
	3	0		0				Visual Method
	4	0		0				
	5	0		0				
	6	0		0				
	7	0		0				
	8	0		0				
	9	0		0				
	10	0		0				
	11	0		0				
	12	0		0				
	13	0		0				
	14	0		0				
	15	0		0				
	16	0		0				
	17	0		0				
	18	0		0				
	19	0		0				
	20	0		0				
	21	0		0				
	22	0		0				
	23	0		0				
	24	0		0				
	25	0		0				
	26							
	27							
	28							
	29							

Stop (Purge) →

Avg. = 0%

FIGURE 9-2 OBSERVATION RECORD (Continued) PAGE 2 OF 2

COMPANY Chevron USA
LOCATION Duke
TEST NUMBER 4
DATE 12/13/74

OBSERVER DK
TYPE FACILITY
POINT OF EMISSIONS

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
	30							
	31							
	32							
	33							
	34							
	35							
	36							
	37							
	38							
	39							
	40							
	41							
	42							
	43							
	44							
	45							
	46							
	47							
	48							
	49							
	50							
	51							
	52							
	53							
	54							
	55							
	56							
	57							
	58							
	59							

[FR Doc.74-26150 Filed 11-11-74;8:45 am]

APPENDIX B

FIELD DATA SHEETS

TABLE 1

SUMMARY OF AMMONIUM SULFATE PRODUCTION RATE DATA

	Test No.		
	1	2	3
Average Sulfuric Acid Consumption gpm	15.1	15.1	15
Average Ammonia Consumption Lb/Hr	3950	3900	3850
AS Production Based on Sulfuric Acid Consumption, TPD (gpm x 14.7)	222	222	222
AS Production Based on Ammonia Consumption, TPD (Lb/Hr x .0465)	184	181	177
Nominal Plant AS Capacity, TPD	220	220	220

TABLE 2

PROCESS PARAMETERS MONITORED DURING TEST NO. 1

Elapsed Time, Min	0	30	60	90	120	150
Sulfuric Acid Flow, gpm	15.1	15.3	15.0	15.0	15.0	15.0
Ammonia Flow, Lb/Hr	4000	4000	4000	4000	3900	3900
Centrifuge Amperes	21	21	21	20.5	20.2	20.0
Crystallizer Operation:						
Magma Level (scale reading)	5	5	5	5	5	5
Vacuum, psia	7	7	7	7	7	7
Magma temperature (°F)	143	142	140	136	136	136
AS Slurry Sp. Gr. Leaving Crystallizer (meter)	1.445	1.443	1.442	1.440	1.440	1.440
Percent Free Acid in Crystallizer Elutriation Leg	.285	.257	.190	.190	.100	.119
Rotary Dryer Temperatures:						
Inlet Gas (°F)	515	510	520	500	500	500
Outlet Gas (°F)	187	187	187	185	188	189
AS Product (°F)	185	185	185	184	185	186
Slurry Surge Tank Level, ft.	5.8	5.6	5.6	5.4	5.6	5.8
AS Product Weigh Belt Rate TPH	5.8	5.8	5.8	5.5	5.0	4.3

TABLE 3

PROCESS PARAMETERS MONITORED DURING TEST NO. 2

Elapsed Time, Min	0	30	60	90	120	150	180	210
Sulfuric Acid Flow, gpm	15.0	15.2	15.1	15.1	15.1	15.1	15.1	15.2
Ammonia Flow, Lb/Hr.	3900	3900	3900	3900	3900	3900	3900	4000
Centrifuge Amperes	20.2	19	19	19.5	20	20	20	20
Crystallizer Operation:								
Magma Level (scale reading)	5	5	5	5	5	5	5	5
Vacuum, psia	7	7	7	7	7	7	7	7
Magma Temperature, °F	136	140	143	144	145	146	146	148
AS Slurry Sp. Gr. Leaving Crystallizer (meter)	1.440	1.440	1.440	1.440	1.437	1.443	1.444	1.442
Percent Free Acid in Crystallizer Elutriation Leg	.138	.152	.171	.200	.200	.228	.209	.242
Rotary Dryer Temperatures:								
Inlet Gas (°F)	500	500	490	490	490	490	500	510
Outlet Gas (°F)	190	190	190	187	188	188	188	188
AS Product (°F)	187	187	189	185	188	188	188	188
Slurry Surge Tank Level, ft.	6.1	6.4	6.9	7.4	7.7	7.8	7.8	8.6
AS Product Weigh Belt Rate, TPH	4.0	3.1	3.0	2.8	2.9	3.0	3.0	3.0
AS Slurry Feed to Centrifuge Pump Speed RPM*	700	550	550	550	550	550	550	490

*This was recorded to show effect on AS product rate - the latter indicated by weigh belt reading. Normal slurry pump speed is 800 RPM.

TABLE 4

PROCESS PARAMETERS MONITORED DURING TEST NO. 3

Elapsed Time, Min	0	30	60	90	120	150
Sulfuric Acid Flow, gpm	15	15	15	15	15	15
Ammonia Flow, Lb/hr	3700	3800	3800	3800	3700	3700
Centrifuge Amperes	21	21	20.5	20.5	20.5	20.5
Crystallizer Operation:						
Magma Level (scale reading)	5	5	5	5	5	5
Vacuum, psia	7	7	7	7	7	7
Magma Temperature, °F	148	148	149	150	152	147
AS Slurry Sp. Gr. Leaving Crystallizer (meter)	1.470	1.465	1.462	1.460	1.457	1.445
Percent Free Acid in Crystallizer Elutriation Leg	.138	.162	.142	.119	.190	.190
Rotary Dryer Temperatures:						
Inlet Gas (°F)	510	520	515	510	500	490
Outlet Gas (°F)	185	185	190	188	185	187
AS Product (°F)	185	185	190	187	185	186
Slurry Surge Tank Level Ft.	8.9	8.8	8.6	8.2	7.7	7.1
AS Product Weigh Belt Rate, TPH	5.6	5.7	5.7	5.7	5.7	5.3

United States
Environmental Protection
Agency

Office of Air, Noise, and Radiation
Office of Air Quality Planning and Standards
Research Triangle Park, NC 27711

Official Business
Penalty for Private Use
$300

Publication No. EMB Report 79 NHF 12

Postage and
Fees Paid
Environmental
Protection
Agency
EPA 335

If your address is incorrect, please change on the above label,
tear off, and return to the above address.
If you do not desire to continue receiving this technical report
series, CHECK HERE [ ]; tear off label, and return it to the
above address.