United States
Environmental Protection
Agency

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

EMB Report 78-NHF-6
March 1979

Air

EPA

Ammonium Sulfate

Facility C

§8.4 BR Ch.4 #6

Emission Test Report
Valley Nitrogen
Helm, California

SET 2635-01-0179

Final Report

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

EPA Contract No. 68-02-2813
Work Assignment No. 27

Prepared for:

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

May 29, 1979

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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. 27. Three tests were conducted on December 6, 1978 on the Valley Nitrogen Producers, Inc. ammonium sulfate plant No. 3 located in Helm, California.

Three particulate tests were simultaneously conducted at the inlet and outlet of a cyclonic 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 Anderson 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 of the scrubber.

The test arrangements were made through Myrlen Kelly, Manager of Environmental Affairs with Valley Nitrogen. Frank Clay of the EPA was present during the tests, as was Marvin Drabkin of Mitre Corporation, who monitored the plant process.

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2.0 SUMMARY OF RESULTS

The particulate concentration at the outlet of the scrubber ranged from 0.0686 to 0.113 grains/scf and averaged 0.091 gr/scf for the three runs. The average gas flow rate was 3430 dscfm resulting in an average particulate mass flow rate of 2.7 lbs/hr. Inlet particulate concentrations averaged 3.91 gr/scf with an average gas flow rate of 3410 dscfm and particulate mass flow rate of 115.6 lbs/hr. The average collection efficiency of the scrubber was 97.3%. 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 1.08% at the drier inlet and 0.27% at the drier outlet. Complete results are shown in Table 2.3.

The opacity at the outlet averaged 10% during runs 1 and 2. No opacity readings were taken during run number 3 because the run was performed after dark. Opacity results are summarized in Tables 2.4 and 2.5.

The field data sheets are included in Appendix A.

Table 2.1

SET #2635-01-0179 Summary of Method 5 Results

Plant: Valley Nitrogen Producers

Date: 12-6-78

Location	Inlet			Outlet		
Run No.	1	2	3	1	2	3
Time Started	1050	1500	1910	1030	1455	1915
Time Ended	1220	1600	2055	1135	1600	2040
Barometric Pressure: P_{bar} (in. Hg.)	29.89	29.86	29.95	29.89	29.89	29.97
Static Pressure: P_g (in. H_2O)	-0.075	-0.075	-0.075	+0.96	+0.96	+0.96
Area of Stack: A (ft^2)	1.57[1]	1.57[1]	1.57[1]	0.785	0.785	0.785
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	0.0347	0.0347	0.0123
Total Sampling Time: Θ (Min.)	100	30	36	60	60	60
Gas Sample Volume: Vm (ft^3)	80.033	22.879	26.248	52.228	51.548	20.448
Avg. Velocity Head: $(\sqrt{\Delta p})^2_{avg}$. (in. H_2O)	0.62	$0.63^2/0.61^3$	0.60	2.29	2.21	2.27
Avg. Orifice Pressure: ΔH (in H_2O)	1.82	1.82	1.74	3.27	3.08	0.43
Avg. Stack Temperature: T_s (^oR)	644	641	646	600	600	596
Avg. Meter Temperature: T_m (^oR)	567	532	532	524	523[1]	507
Volume of Liquid and Silica Gel Collected: V_{lc} (ml.)	116	75	10	129	161	32
Gas Sample Volume @ Std. Cond.: $Vm(Std)\ (ft^3) = \frac{17.64\ VmY}{Tm}\ (P_{bar}+\Delta H/13.6)$	70.271	21.389	24.607	56.949	56.289	22.945
Volume of Water Vapor: $Vw\ (std)\ (ft^3) = 0.04707\ V_{lc}$	5.46	3.53	0.47	6.07	7.58	1.51
Moisture Content: $B_{ws} = \frac{Vw(Std)}{Vm(Std) + Vw(Std)}$	0.072	0.142	0.019	0.096	0.119	0.062
Molecular Weight of Stack Gas (dry): $M_d = 0.44\ (\%\ CO_2) + 0.32\ (\%\ O_2) + 0.28\ (\%\ N_2 + \%\ CO)$	28.87	28.96	28.96	28.92	28.93	28.93

[1] Area blocked by particulate at bottom of duct excluded
[2] Avg. velocity during sampling
[3] Avg. velocity in entire duct

Table 2.1, Page 2

Location	Inlet			Outlet		
Run Number	1	2	3	1	2	3
Molecular Weight of Stack Gas (wet): $M_s \cong M_d (1-B_{ws}) + 18.0\ B_{ws}$	28.09	27.40	28.75	27.87	27.63	28.25
Stack Pressure: P_s (in. Hg) = $P_{bar} + P_g/13.6$	29.88	29.85	29.94	29.96	29.96	30.04
Stack Gas Velocity: v_s (ft/sec) = $85.49\ C_p\ (\Delta PT_s/P_s M_s)^{1/2}$	49.41	50.34[1] / 49.53[2]	48.07	91.57	90.35	90.13
Stack Gas Volume Flow Rate: Q_{sd} (dscf /min) = $1059\ (1-B_{ws}) v_s\ A\ P_s/T_s$	3537	3290[2]	3634[3]	3436	3304	3542
Actual Stack Gas Volume Flow Rate: Q (acf /min) = $60\ v_s\ A$	4654	4666	4528	4313	4255	4245
Weight of Particulate Collected: m_n (mg.)	22877.4	3882.0	75429.1	253.4	413.4	136.6
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)]	5.020 [11.489	2.799 6.405	47.27[3] 108.18	0.0686 0.1570	0.1132 0.2592	0.0918 0.2101]
Mass Flow Rate of Particulate: Q (lb/hr) = $0.008571\ C_s\ Q_{sd}$	152.2	78.9	1472[3]	2.0	3.2	2.8
Isokinetic Rate: I (%) = $13.61\ T_s\ V_m$ (std)$/P_s\ v_s A_n \Theta (1-B_{ws})$	91.6	98.3	88.2	90.1	92.6	99.3
Control Efficiency, %				98.7	95.9	99.8[3]

[1]Average during sampling.

[2]Average in entire duct.

[3]Not included in average results due to non-isokinetic sampling.

TABLE 2.2

PARTICLE SIZE DISTRIBUTION ANALYSIS

Date: December 6, 1978
Location: Valley Nitrogen
Sampling Location: Inlet
Traverse Point No. Sampled: 7

P_{bar} (in Hg)	29.95
Stack Temp. (^{o}F)	184
Sample Time (Min)	10
Sample Volume (cf)	6.869
Moisture (% H_2O)	10.9
Meter Temp (^{o}F)	73.5
Flow Setting, ΔH (in H_2O)	2.0
Nozzle Diameter (In.)	0.250

Sample Flow Rate (at stack conditions) - 0.77 cfm

Plate No.	Net Wt. (mg)	%	Cumulative %	ECD[1] (Microns)
1	450.4[2]	24.0	100.0	11.80 and larger
2	200.8	10.7	76.0	7.49
3	818.3	43.6	65.3	4.94
4	253.4	13.5	21.7	3.42
5	42.2	2.3	8.2	2.18
6	56.0	3.0	5.9	1.11
7	11.5	0.6	2.9	0.67
8	11.5	0.6	2.3	0.45
Back-up Filter	31.3	1.7	1.7	<0.45
Total	1875.4			

[1] ECD - Effective Cutoff Diameter of preceding plate.

[2] Weight includes particulate collected on Plate No. 0 and in nozzle and head of sampler upstream of the collection plates.

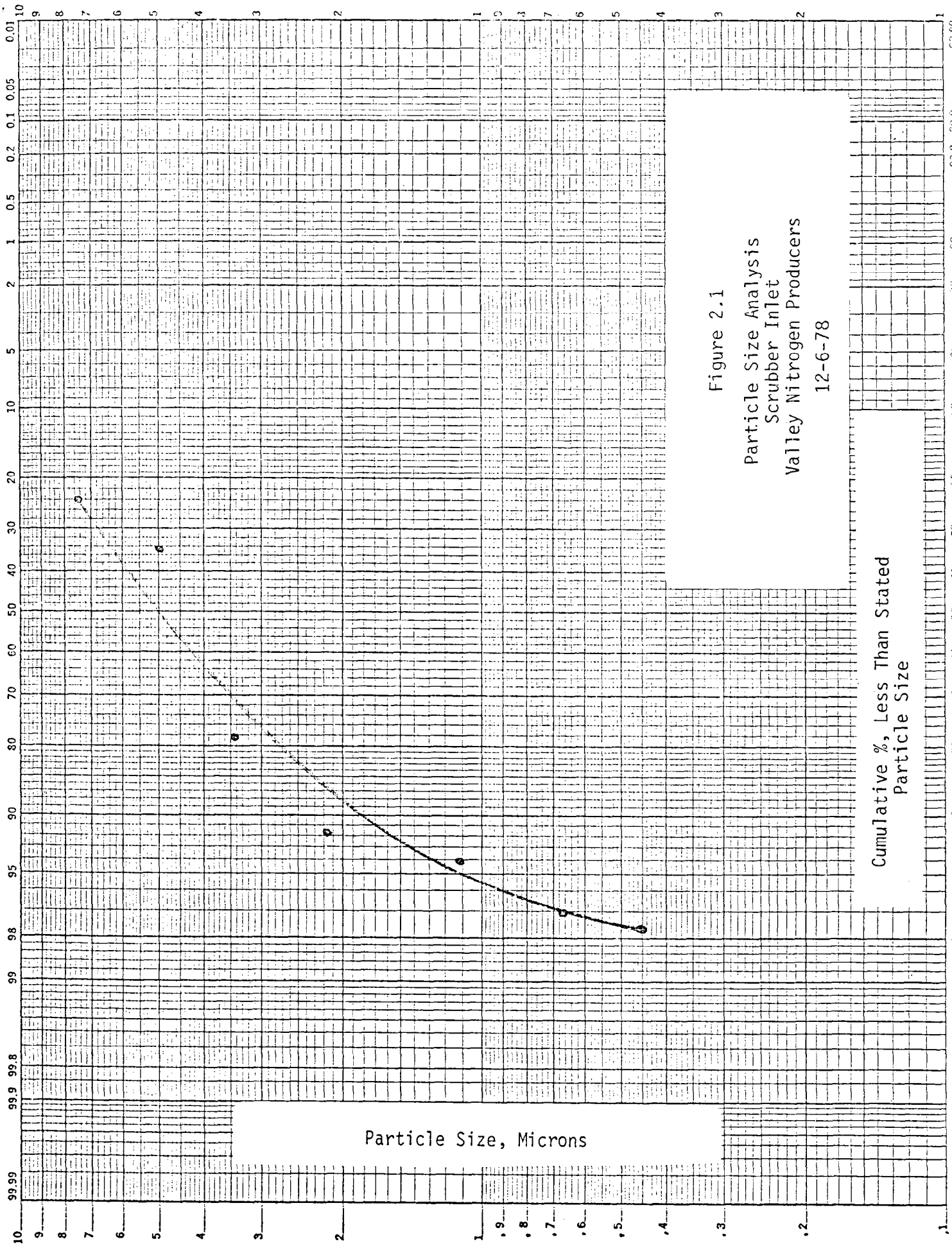

Figure 2.1
Particle Size Analysis
Scrubber Inlet
Valley Nitrogen Producers
12-6-78

TABLE 2.3

AMMONIUM SULFATE CRYSTAL
MOISTURE ANALYSIS

Date	Time	Test Run No.	Sample Location	Net Wt. Wet, gms	Net Wt. Dry, gms	Moisture %
12-5-78	1440	---	Inlet	324.8	320.5	1.32
12-5-78	1435	---	Outlet	359.2	357.2	0.56
12-6-78	1033	1	Inlet	242.4	239.0	1.40
12-6-78	1047	1	Outlet	306.7	306.2	0.16
12-6-78	1448	2	Inlet	377.1	374.6	0.66
12-6-78	1449	2	Outlet	372.5	371.7	0.21
12-6-78	1907	3	Inlet	305.1	302.2	0.95
12-6-78	1905	3	Outlet	395.3	394.7	0.15

Average at dryer inlet - 1.08

Average at dryer outlet - 0.27

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TABLE 2.4

SUMMARY OF RESULTS OF OPACITY READINGS

Location: Scrubber Outlet

Test Run No.: 1

Date: 12-6-78

Color of Plume: White

Stack Height: 50 feet

Distance to Stack: 200 feet

Wind Direction: NW Speed: 10-20 mph

Sky Description: Clear

Note: Readings every 30 seconds. Therefore, average opacity = sum/12.

Set Number	Time Start	Time End	Opacity Sum	Opacity Average
1	10:37	10:43	85	5
2	10:47	10:49	100	10
3	10:49	10:55	110	10
4	10:55	11:01	125	10
5	11:01	11:07	110	10
6	11:07	11:13	110	10
7	11:13	11:19	85	5
8	11:19	11:25	95	10
9	11:25	11:31	105	10
10	11:31	11:37	110	10
Overall Average				10

Set Number	Time Start	Time End	Opacity Sum	Opacity Average

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TABLE 2.5

SUMMARY OF RESULTS OF OPACITY READINGS

Location: Scrubber Outlet

Stack Height: 50 feet

Test Run No.: 2

Distance to Stack: 200 feet

Date: 12-6-78

Wind Direction: NW Speed: 10-25 mph

Color of Plume: White

Sky Description: Clear

Note: Readings 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	14:54	15:00	90	10					
2	15:00	15:06	140	10					
3	15:06	15:12	140	10					
4	15:12	15:18	140	10					
5	15:18	15:24	140	10					
6	15:24	15:30	150	10					
7	15:30	15:36	145	10					
8	15:36	15:42	150	10					
9	15:42	15:48	120	10					
10	15:48	15:54	135	10					
Overall Average				10					

3.0 DISCUSSION OF TEST RESULTS

The concentration of particulate matter at the inlet to the scrubber proved to be much higher than anticipated. This high particulate loading caused some difficulties in sampling due to plugging of the sampling nozzle and probe. At times it was necessary to interrupt sampling to unclog the sampling nozzle. The length of the tests was shortened to reduce the amount of nozzle and probe plugging.

The average results at the inlet were based upon Test Runs #1 and #2. Results from Run No. 3 were not consistent with the first two runs. The run was non-isokinetic due to the low moisture measured during the run. Also, a very large amount of particulate was collected.

The collection filter at the inlet was ruptured during Run No. 1, apparently due to clogging of the sampling nozzle. The ruptured filter was not discovered until after the sampling was completed. However, it is not felt that the results were significantly affected due to the large amount of particulate captured in the sample nozzle and probe. A stainless steel sampling probe was used at the outlet during Run No. 3. The use of this probe did not appear to affect the test results adversely.

The high concentration of relatively large particles at the scrubber inlet also caused the first few collection plates of the particle size sampler to be overloaded with particulate. This overloading combined with the loose nature of the crystals could have caused a slight downward shift in the particle size distribution analysis. The use of a cyclone preseparator for the sampler would have helped prevent overloading of the collection plates. However, due to the small size of the duct, it would have been necessary to locate the sampler outside the duct.

4.0 PROCESS DESCRIPTION AND OPERATION

The Valley Nitrogen Producers (VNP) #3 plant is designed to produce 400 TPD of ammonium sulfate (AS) from ammonia and sulfuric acid. All of the AS produced is sold for use as fertilizer. The #3 plant operates continuously 24 hours a day for periods of up to 5 - 6 weeks between short period of maintenance.. Varying AS market conditions during the year also affect the length of plant shutdown periods.

A. Process Description

Figure 4.1 shows a simplified diagram of the AS process and the sampling locations. Sulfuric acid (98 percent) and anyhydrous 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 centrifugal multi-vane (Ducon) scrubber with a pressure drop of 6" wg and a liquid-to-gas ratio of 4.9 gal/1000 acf is used to control dryer emissions. The AS concentration in the scrubber is fairly low--about 2 percent.

B. Process Operation

The purpose of the test program was to measure emission levels from the centrifugal 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 the Appendix B, the plant operated at a production rate very close to the design capacity of 400 TPD. No calibrated weigh belts were used. The AS production rate was calculated from both the sulfuric acid and ammonia flow rates (with the latter give rates 7-8 percent higher). 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. Dryer operating temperatures
4. Centrifuge operation
5. Crystallizer level
6. AS specific gravity of slurry
7. pH of slurry in elutriation leg
8. Slurry surge tank level
9. Percent solids leaving crystallizer
10. Percent free acid in mother liquor leaving crystallizer

Process monitoring began about one hour before the start of emission Test No. 1. Actual emission testing began at 10:30 a.m. for the scrubber outlet and 10:50 a.m. for the scrubber inlet. The scrubber outlet test was terminated at 11:35 a.m. (60 minutes net); the inlet test was allowed to run for 115 minutes (100 minutes net) ending at 12:45 p.m. The process operation appeared to operate at steady state without interruption during this period.

Monitoring for Test No. 2 began at 2:55 p.m. (scrubber outlet) and 3:00 p.m. (scrubber inlet). The scrubber outlet test ended at 4:00 p.m. (60 minutes net). However, the scrubber inlet test was aborted after the traverses in one test port were completed. The test equipment had become plugged with AS and the test could not be continued. During this test period, the process appeared to operate in steady state fashion.

Test No. 3 began at 7:10 p.m. (scrubber inlet) and at 7:15 p.m. (scrubber outlet). The scrubber inlet portion was again aborted after testing one port due to AS blockage in the equipment. The scrubber outlet was interrupted due to glassware breakage in the test equipment. The outlet test ended at 8:40 p.m. (60 minutes net). No significant process variations were noted during this test period.

Samples of the AS entering and leaving the dryer were obtained during each test as well as samples of the AS liquor leaving the scrubber. The moisture content of the dryer samples and the AS content of the scrubber liquor were determined by the emissions test contractor.

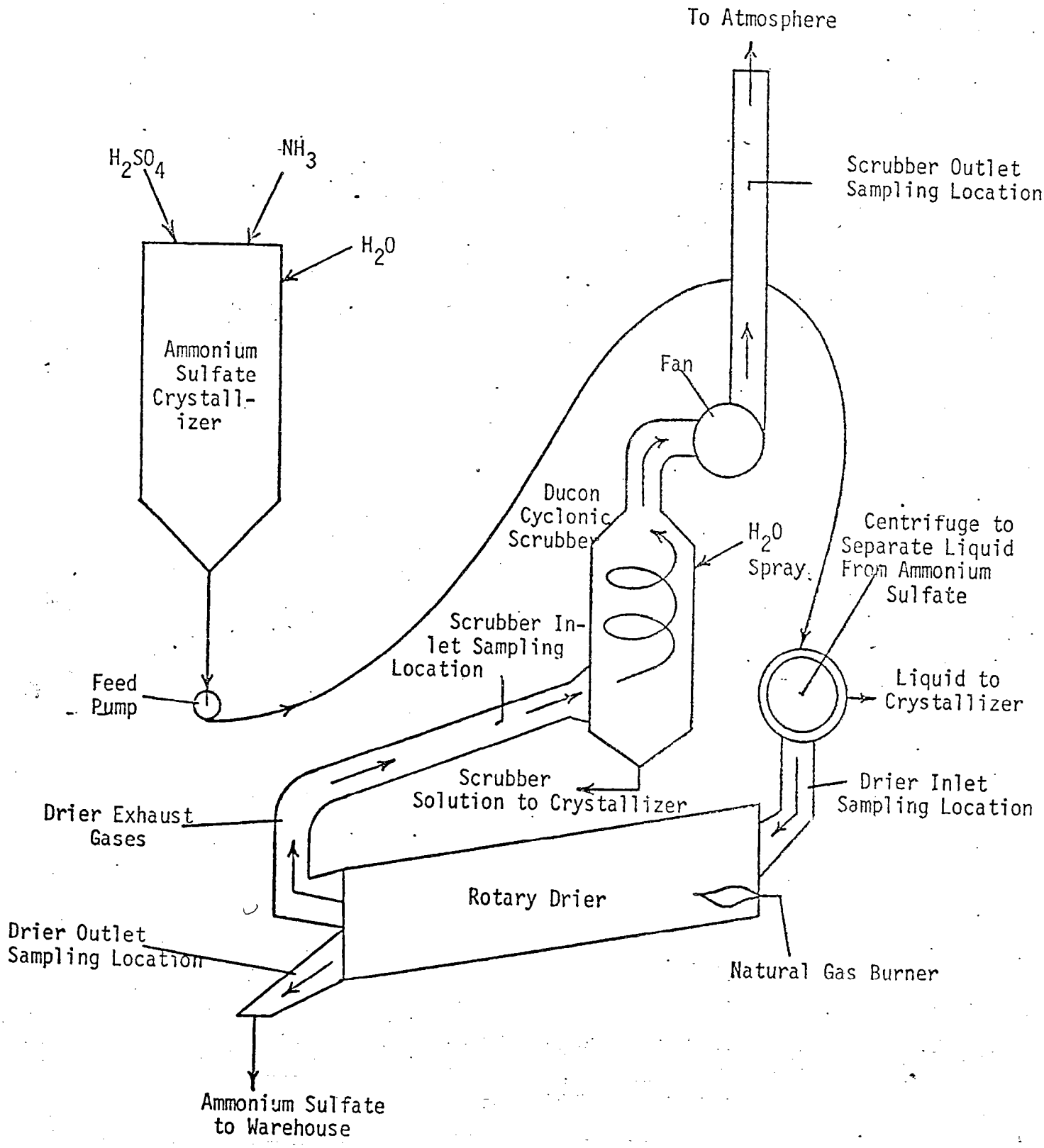

FIGURE 4.1

SCHEMATIC DIAGRAM OF AMMONIUM SULFATE PLANT NO. 3 - VALLEY NITROGEN PRODUCERS, INC. HELM, CALIFORNIA

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 reading of the scrubber outlet gases was 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 Valley Nitrogen Products
DATE 12/6/78
SAMPLING LOCATION Inlet into cyclone
SAMPLE TYPE Method 5
RUN NUMBER Inlet 1
OPERATORS T. & W.N
AMBIENT TEMPERATURE 47°F
BAROMETER 29.89

PROBE LENGTH & TYPE 6' glass
NOZZLE I.D. .250
SAMPLE BOX NUMBER Scott Split Train
METER BOX NUMBER Scott Small
PROBE HEATER SETTING 220°F
FILTER HEATER SETTING Inherent
REFERENCE ΔP .64
READ AND RECORD ALL DATA EVERY 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	Box
	→	1010	INITIAL: 075.122		DESIRED	ACTUAL		INLET $T_{m\,in}$, °F	OUTLET ($T_{m\,out}$), °F				
1	5		78.141	.41	1.25	1.25	175	90	[illegible]	7.0		251°F	Unheated
2	10		82.252	.59	1.70	1.70	181	96	83	[illegible]		225	
3	15		86.27[illegible]	.62	1.78	1.80	186	[illegible]	82	[illegible]		213	
4	20		90.018	.60	[illegible]	[illegible]	189	109	[illegible]	10.0		217	
5	25		93.810	.61	1.77	1.75	187	112	87	10.0		217	
6	30		97.515	.52	1.52	1.50	187	117	90	10.5	48	223	
7	35		101.685	.71	2.07	2.10	184	121	94	15.0		211	
8	40		106.224	.78	2.28	2.30	182	127	96	18.0			
9	45		110.9[illegible]	~~.78~~.80	2.34	2.35	182	132	99	19	47	201	
10	50		115.465	.83	2.45	2.45	182	137	100	21.5		220	
11			120.017	.76	2.20	2.20	181	139	101	21.5			
12			~~[illegible]~~	[illegible]									
13	5		123.495	.55	1.60	1.60	56 (2)	117	98	7.5		Momentary drop in pressure across	
14	10		127.2[illegible]	.50	1.48	1.50	56 (2)	119	100	7.0		[illegible] followed by surge to	
15	15		131.288	.66	1.92	1.90	58 (2)	120	97	10.0		248	
16	20		135.4[illegible]	.65	1.87	1.85	59 (2)	121	98	10.0		246	
17	25		139.782	~~.72~~.75	2.12	2.10	[illegible]	125	100	11.0			
18	30		144.205	.75	2.20	2.05	184	130	103	11.0			

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	Probe temp is from prev. probe COMMENTS
19	35	~~3~~	148.198	.56	1.65	1.65	183	124	102	9.5		
20	40		151.8—	.47	1.38	1.40	184	124	101	9.0		
21	45		155.155	.40	1.18	1.20	185	123	100	10.0		Took the
22	50											opposite cutoff duct
23	55			.62								
24	60			49.71 lbs								
			80.053 ✓		1.82 ✓		184	125 ✓				

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				.44	150
2				.55	148
3				.62	157
4				.67	170
5				.64	174
6				.68	176
7				.69	179
8				.80	183
9				.96	184
10				.83	178
11					
12					
13				.79	150
14				.54	157
15				.61	184
16				.64	180
17				.65	185
18				.65	187
19				.56	189
20				.32	187
21				.15	192
22					
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44					
45					
46					
47					
48					
AVERAGE				.687	170

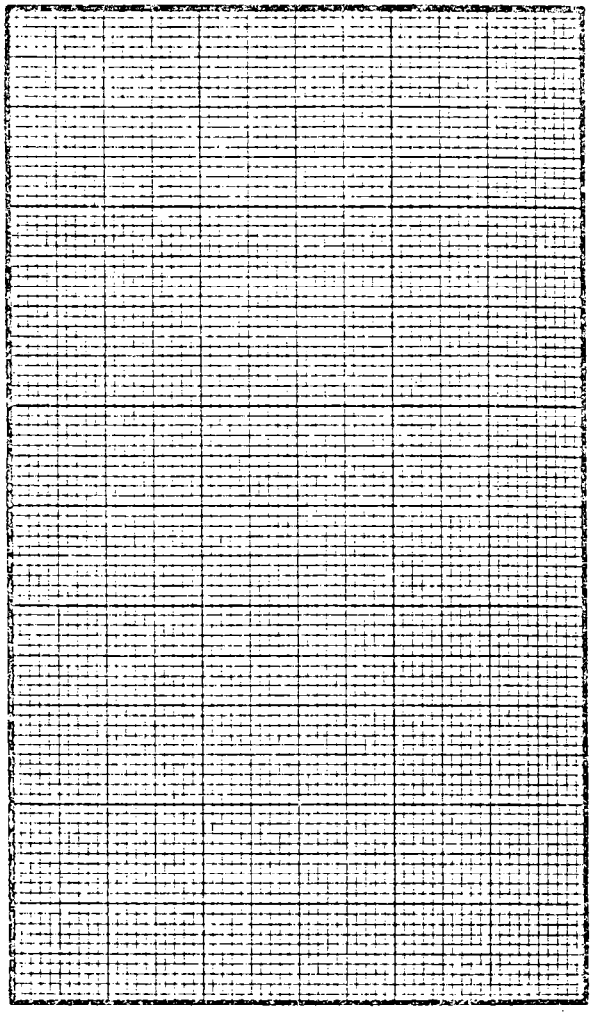

DIAGRAM OF STACK, PORTS, & TRAVERSE POINTS (indicate direction of flow)

INSIDE DIMENSIONS OF SAMPLE PLANE

STACK GAUGE PRESSURE in. H_2O -.075

NEAREST UPSTREAM DISTURBANCE

NEAREST DOWNSTREAM DISTURBANCE

PROCESS & CONTROL EQUIPMENT DESCRIPTION

$\sqrt{\Delta P}$ .64

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

MOISTURE

IMPINGERS

FINAL VOLUME 302 ml

INITIAL VOLUME 200 ml

NET VOLUME 102 ml

SILICA GEL

FINAL WEIGHT 520.0 g

INITIAL WEIGHT [illegible] g

NET WEIGHT [illegible] g

TOTAL MOISTURE 116 g

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		

ANALYTICAL DATA BY ______

ACETONE FRONT WASH

FINAL 108.2035 mg

TARE 86.1225 mg

NET 22081.0 mg

FILTER NUMBER 1

FINAL 1.1896 mg

TARE 0.39315 mg

NET .7964 mg

FILTER NUMBER 2

FINAL ______ mg

TARE Total = 22877.4 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

DRY MOLECULAR WEIGHT DETERMINATION BY ______

SAMPLING TIME (24-hr CLOCK) ______

SAMPLING LOCATION ______

SAMPLE TYPE (BAG, INTEGRATED, CONTINUOUS) ______

ANALYTICAL METHOD ______

AMBIENT TEMPERATURE ______

GAS \ RUN	1 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME
CO_2	99.6	.4					
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	79.4	20.2					
N_2 CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)		79.4					

PROJECT NUMBER _____ TEST NUMBER 4 FIELD DATA SHEET

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

PLANT VALLEY NITROGEN - FRESNO

DATE 12-6-78

SAMPLING LOCATION OUTLET

SAMPLE TYPE METHOD 5

RUN NUMBER OUT #2 of 1

OPERATORS JP — JR

AMBIENT TEMPERATURE 52

BAROMETER 29.85

PROBE LENGTH & TYPE 2' GLASS

NOZZLE I.D. .210

SAMPLE BOX NUMBER SAN B

METER BOX NUMBER SAN B #B

PROBE HEATER SETTING _____

FILTER HEATER SETTING _____

REFERENCE ΔP 1.25

READ AND RECORD ALL DATA EVERY 5 MINUTES

FYRITE ANALYSIS

CO_2	O_2	

START TIME 10:30 END TIME 11:35

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: 135,333		DESIRED	ACTUAL		INLET $T_{m\,in}$, °F	OUTLET $T_{m\,out}$, °F			
1	5		139.410	1.70	2.45	2.45	139	55	53	6.0		
2	10		143.442	1.90	2.70	2.70	141	62	52	7.0		FUZZ BLOWN FROM 57
3	15		146.300	1.90	2.70	2.70	141	67	57	9.5		BOX 135 160
4	20		150.450	2.40	3.40	3.40	140	65	54	14.5		FUZZ 70 IN/OUT BOX 320
5	25		155.424	2.80	3.90	3.90	141	65	55	10.3		
6	30		160.435	2.90	4.10	4.10	140	75	55	11.5	80	FUZZ BLOWN AGAIN ... BOX
7	35		163.600	1.90	2.70	2.70	140	76	56	7.2		BOX 200
8	40		169.730	2.60	3.70	3.70	140	78	55	11.3		BOX 224 - 180
9	45		173.695	2.20	3.10	3.10	140	82	55	11.2		FUZZ THRU 113
10	50		178.080	2.20	3.10	3.10	141	84	57	11.2		FUZZ 111 200 BOX - 121
11	55		182.785	2.60	3.70	3.70	141	83	60	13.5	65	BOX 195
12	60		187.561	2.60	3.70	3.70	141	84	60	14.7		BOX 202 FIN 1135
						3.27	140					
			52.239	2.27			460	64.17		10.7		
				92.82 fps			500	521.				
				94.75								

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				1.75	
2				1.90	
3				2.10	
4				2.40	
5				2.65	
6				3.00	
7					
8					
9					
10					
11					
12					
13					
14					
15					
16					
17					
18					
19					
20					
21					
22					
23					
24					
25					
26					
27					
28		1			
29					
30					
31					
32					
33					
34					
35					
36					
37					
38					
39					
40					
41					
42					
43					
44					
45					
46					
47					
48					
AVERAGE					

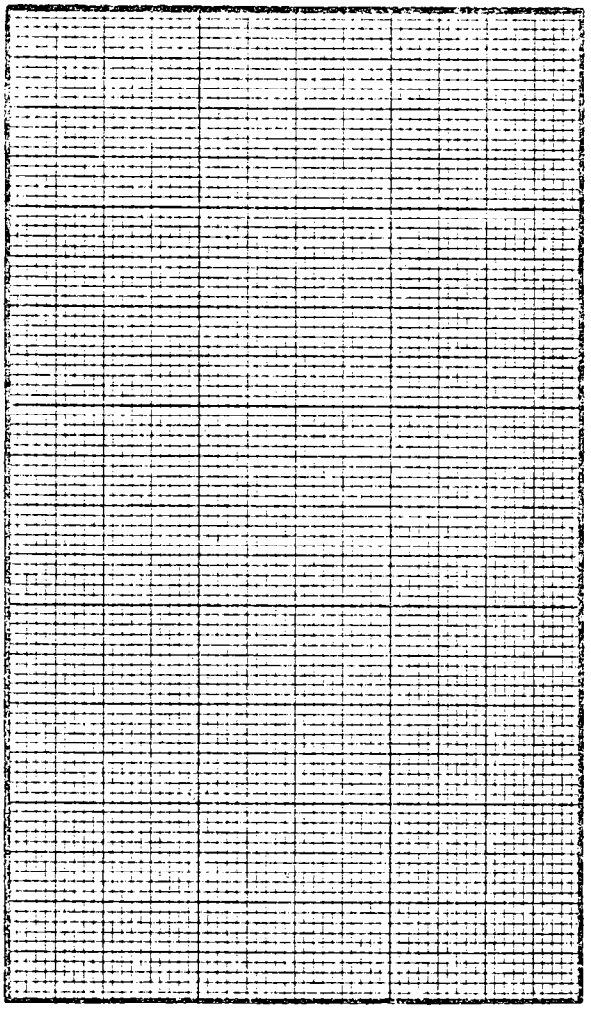

DIAGRAM OF STACK, PORTS, & TRAVERSE POINTS (indicate direction of flow)

INSIDE DIMENSIONS OF SAMPLE PLANE
12" I.D.

STACK GAUGE PRESSURE in. H_2O _____

NEAREST UPSTREAM DISTURBANCE 7'
NEAREST DOWNSTREAM DISTURBANCE ~25'

PROCESS & CONTROL EQUIPMENT DESCRIPTION 12 PTS.

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

MOISTURE

IMPINGERS
FINAL VOLUME 294 ml
INITIAL VOLUME 200 ml
NET VOLUME 94 ml

SILICA GEL
FINAL WEIGHT _____ g
INITIAL WEIGHT 502.8 g
NET WEIGHT _____ g

TOTAL MOISTURE _____ g

ANALYTICAL DATA BY _____

677.10
456.45
220.65

ACETONE FRONT WASH
FINAL 82.6022 mg
TARE 82.5695 mg
NET 32.7 mg

FILTER NUMBER 1
FINAL .6771 mg
TARE .456 45 mg
NET 220.65 mg

FILTER NUMBER 2
FINAL _____ mg
TARE Total 253.35 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 PROCEDURE.

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	99.5	0.5	99.5	0.5	0.5
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	79.4	20.2	79.2	20.3	79.2	20.3	20.3
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING) N2	-	79.4		79.2		79.2	79.3

PROJECT NUMBER _____ TEST NUMBER 2 FIELD DATA SHEET

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

PLANT VALLEY NITROGEN PRODUCERS
DATE 12/6/78
SAMPLING LOCATION INLET to absorber
SAMPLE TYPE METHOD 5
RUN NUMBER 2
OPERATORS W.N. + T.S.
AMBIENT TEMPERATURE 52 @ 1015
BAROMETER 29.86 @ "

PROBE LENGTH & TYPE 6' GLASS
NOZZLE I.D. .252
SAMPLE BOX NUMBER SCOTT SPLIT
METER BOX NUMBER SCOTT SPECIAL
PROBE HEATER SETTING Unheated (No Elect. connections available)
FILTER HEATER SETTING
REFERENCE ΔP .63
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
					DESIRED	ACTUAL		INLET $T_{m\,in}$, °F	OUTLET ($T_{m\,out}$), °F			
		1500	INITIAL: 155.240									Probe Temp
1	2		156.610	.5	1.48	1.48	165	56	52	8.0		
2	4		158.091	.54	1.6	1.6	186	62	57	8.2		
3	6		———	.61	1.75	1.75	197	66	58	8.8	146	151 °F
4	8		161.150	.59	1.72	1.73	186	72	57	8.8		
5	10		162.685	.59	1.72	1.73	186	74	59	8.8	146	165 °F
6	12		164.175	.54	1.6	1.6	185	80	63	9.5		
7	14		165.702	.63	1.8	1.8	194	81	66	9.5		
8	16		167.350	.73	2.1	2.1	193	86	70	10.5		
9	18		169.048	.76	2.2	2.2	179	87	72	11.1		177 °F
10	20		170.775	.74	2.18	2.18	176	93	65	12.5		
11	22		172.478	.74	2.18	2.18	175	95	66	13.0		
12	24		174.206	.74	2.18	2.18	175	99	69	13.5		

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
13	26		175.310	.49	1.42	1.43	175	88	68	11.5		
14	28		176.654	.61	1.75	1.70	178	87	69	21.5		
15	30		178.119	.68	2.0	1.70	179	90	69	24.5		END OF TEST
16				.7			185					INCREASED TO
17				.69			186					
18				.64			186					
19				.55			184					
20				.49			184					
21				.38			180					
22						BOTTOMED OUT						
23												
24												
			22.819			1.82			532			
				.793			179 / 641					
				.629								
				.782								
				.612								

MOISTURE

IMPINGERS
- FINAL VOLUME 270 ml
- INITIAL VOLUME 200 ml
- NET VOLUME 70 ml

SILICA GEL
- FINAL WEIGHT 536.5 g
- INITIAL WEIGHT 532.1 g
- NET WEIGHT 4.4 g

TOTAL MOISTURE 75 g

#1 210
#2 40
#3 2
TOTAL 252

~3 ml in
.5 ml in cyclone/dropout
.10 mL in "U" tube to sample head
252

ANALYTICAL DATA BY 270 _____

ACETONE FRONT WASH
FINAL 95.0911 mg
TARE 91.3785 mg
NET 3712.6 mg

FILTER NUMBER 1
FINAL .5575 mg
TARE .3881S mg
NET .1694 mg

FILTER NUMBER 2
FINAL _____ mg
TARE 3882.0 Total 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	99.0	1.0					
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	78.0	20.0					
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)		79.0					

PROJECT NUMBER _____ TEST NUMBER (2) FIELD DATA SHEET

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

PLANT VALLEY NITROGEN — FRESNO
DATE 12-6-78
SAMPLING LOCATION OUTLET
SAMPLE TYPE METHOD 5
RUN NUMBER OUTLET #3 (#2)
OPERATORS TF — JK
AMBIENT TEMPERATURE 55°
BAROMETER _____

PROBE LENGTH & TYPE 2' GLASS
NOZZLE I.D. .210
SAMPLE BOX NUMBER RAC
METER BOX NUMBER SCOTT SAN "B"
PROBE HEATER SETTING N/A
FILTER HEATER SETTING 230
REFERENCE ΔP 1.25
READ AND RECORD ALL DATA EVERY 5 MINUTES
START 1455 END 1600

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 DESIRED	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O ACTUAL	STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE INLET $T_{m\,in}$, °F	DRY GAS METER TEMPERATURE OUTLET $T_{m\,out}$, °F	PUMP VACUUM, in. Hg	IMPINGER TEMPERATURE, °F	COMMENTS
			INITIAL: 192.000									CLEAR CHECK LEAD
1	5		195.300	1.60	2.35	2.35	140	55	50	4.0		Box 267 NO PROBE HEAT
2	10		199.635	1.70	2.45	2.45	140	62	53	5.3		Box 244
3	15		203.633	1.90	2.70	2.70	140	65	53	6.5	58	Box 257
4	20		208.065	2.30	3.30	3.30	140	70	55	8.2		Box 240 CHECK FOR LEAKS
5	25		212.825	2.70	3.80	3.80	141	75	55	10.5		Box 237 CHECK PROBE TO CHECK ANGLE
6	30		217.568	2.50	3.65	3.65	137	76	50	11.2	60	Box AP C=.75
7	35		221.670	2.10	2.50	2.80	140	70	55	9.5		REF ΔP=1.35
8	40		226.002	2.30	3.05	3.05	140	73	55	11.2	65	Box 276
9	45		230.295	2.20	2.90	2.90	140	75	55	12.4		Box 261
10	50		234.650	2.30	3.05	3.05	141	77	55	14.0		
11	55		239.125	2.40	3.20	3.20	139	79	57	15.5	52	Box - 238 CHECK PROBE TEMP 1555
12	60		243.548	2.40	3.20	3.20	138	80	57	16.0		
			51.548	2.23		3.05	140	63	.8			
				2.31			600					
				1.89					91.8			

MOISTURE

IMPINGERS
FINAL VOLUME 331 ml
INITIAL VOLUME 200 ml
NET VOLUME 131 ml

SILICA GEL
FINAL WEIGHT _____ g
INITIAL WEIGHT 539.5 g
NET WEIGHT _____ g

TOTAL MOISTURE _____ g

ANALYTICAL DATA BY _____

ACETONE FRONT WASH
FINAL 87.0070 mg
TARE 86.9911 mg
NET 15.9 mg

FILTER NUMBER 1
FINAL .7800 mg
TARE .382455 mg
NET .397,55 mg

FILTER NUMBER 2
FINAL _____ mg
TARE Total 413.9 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	19.2	0.0					9.6
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	19.2	20.0					20.0
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)							79.2

PROJECT NUMBER ________ TEST NUMBER ______

FIELD DATA SHEET

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

PLANT ______

DATE Dec [illegible] 1978

SAMPLING LOCATION INLET

SAMPLE TYPE [illegible] NH[illegible]

RUN NUMBER 3

OPERATORS [illegible] WN

AMBIENT TEMPERATURE 48, 43

BAROMETER 29.95

PROBE LENGTH & TYPE [illegible]

NOZZLE I.D. .25[illegible]

SAMPLE BOX NUMBER ______

METER BOX NUMBER ______

PROBE HEATER SETTING ______

FILTER HEATER SETTING ______

REFERENCE ΔP ______

READ AND RECORD ALL DATA EVERY 2 MINUTES

FYRITE ANALYSIS

CO_2	O_2	

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 (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
		1910	INITIAL: 190.800									
1	2		STOP 191.6[illegible] / 193.0[illegible]	.44	1.3	.36		64	61			[illegible] 35[illegible] = .1083
2	4		1 —	.55	1.4	1.4		62	58	7.5		
3	6		195.235	.62	1.8	1.8	186	65	58	8.2		
4	8		196.900	.71	2.1	2.1		71	[illegible]	9.2		
5	10		198.[illegible]	.74	2.15	2.15		76	59	9.2		
6	12		200.380	.74	2.15	2.15		80	59	9.2		
7	14		202.000	.59	1.75	1.75		84	60	8.[illegible]		
8	16		203.642	.50	1.45	1.45		85	60	7.2		
9	18		205.101	.31	.91	.91		86	61	6.25		Bottomed out
10	[illegible]											
11	[illegible]											
12	[illegible]											
13	[illegible]											
14	[illegible]											
15	[illegible]											
1.	32											

TEST (handwritten vertically beside gas meter readings)

2035

TRAVERSE POINT NUMBER	CLOCK TIME SAMPLING TIME, min	CLOCK TIME (24-hr CLOCK)	GAS METER READING (V_m), ft^3 206.957	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
1	2		207.505	.32	.91	.94	186	80	65	4.0		
2	4		208.511	.52	1.52	1.52		80	66	7.5		
3	6		210.306	.62	1.8	1.8		82	67	9.0		
4	8		211.972	.62	1.8	1.8		85	69	9.2		
5	10			.58	1.65	1.65		88	69	9.2		
6	12			.8	2.3	2.3		92	69	10.0		
7	14		217.045	.72	2.1	2.1		94	69	9.6		
8	16		218.705	.82	2.4	2.4		96	69	9.2		
9	18		220.675	.86	2.5	2.5		99	69	11.0		
10	20											BOTTOM'D OUT
11	22											
12	24		11.274	0.58		1.74						
			11.156						552			
			.538	0.60			646					
			26.248									

1 of 2

MOISTURE

TOTAL IMPINGERS 205
FINAL VOLUME _____ ml
INITIAL VOLUME 700 ml
NET VOLUME _____ ml

SILICA GEL
FINAL WEIGHT 546.0 g
INITIAL WEIGHT 541.9 g
NET WEIGHT 5.1 g
TOTAL MOISTURE 10 g

ANALYTICAL DATA BY _____

ACETONE FRONT WASH
FINAL 142.9353 106.3452 mg
TARE 87.6641 86.1863 mg
NET 55712 20156.9 mg

FILTER NUMBER 1
FINAL .3837 mg
TARE .3827 mg
NET .001.0 mg

FILTER NUMBER 2
FINAL _____ mg
TARE Total - 75439.1 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 (3) FIELD DATA SHEET

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

PLANT VALLEY NITROGEN - FRESNO
DATE 12-6-78
SAMPLING LOCATION OUTLET
SAMPLE TYPE METHOD 5
RUN NUMBER JOHN'S 3rd run 3
OPERATORS JP, JR
AMBIENT TEMPERATURE 48
BAROMETER 29.97

PROBE LENGTH & TYPE 2' GLASS
NOZZLE I.D. ~~.125~~ .125
SAMPLE BOX NUMBER RAC
METER BOX NUMBER SAN R
PROBE HEATER SETTING _____
FILTER HEATER SETTING _____
REFERENCE ΔP 1.35 1cc
READ AND RECORD ALL DATA EVERY 5 MINUTES
START TIME 1915 END 2040

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: 244.100		DESIRED	ACTUAL		INLET $T_{m\,in}$, °F	OUTLET ($T_{m\,out}$), °F			
1	5		245.188	1.10	.21	.21	130	40	40	1.4		
2	10		246.725	2.0	.39	.39	131	45	42	1.6		BCK - 231
3	15		248.700	1.90	.37	.37	137	45	42	1.6	55	STOP - BACK PRESS
4	20		250.650	2.40	.44	.44	135	50	45	1.6		BCK - 218
5	25		252.480	2.50	.53	.53	136	50	45	1.5		
6	30		254.308	2.80	.51	.51	137	52	45	1.5		
7	35	2112	255.960	2.40	.45	.45	137	50	45	1.5	55	STOP
8	40		257.675	2.40	.45	.45	137	50	45	1.5		BCK - 230 STOP
9	45		259.363	2.20	.43	.43	136	53	45	1.6		
10	50		261.005	2.20	.46	.46	137	55	45			
11	55		262.733	2.50	.47	.47	138	55	45	1.6		
12	60		264.518	2.70	.50	.50	137	55	45	1.6		
			268.448	2.37		.43						

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					
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41					
42					
43					
44					
45					
46					
47					
48					
AVERAGE					

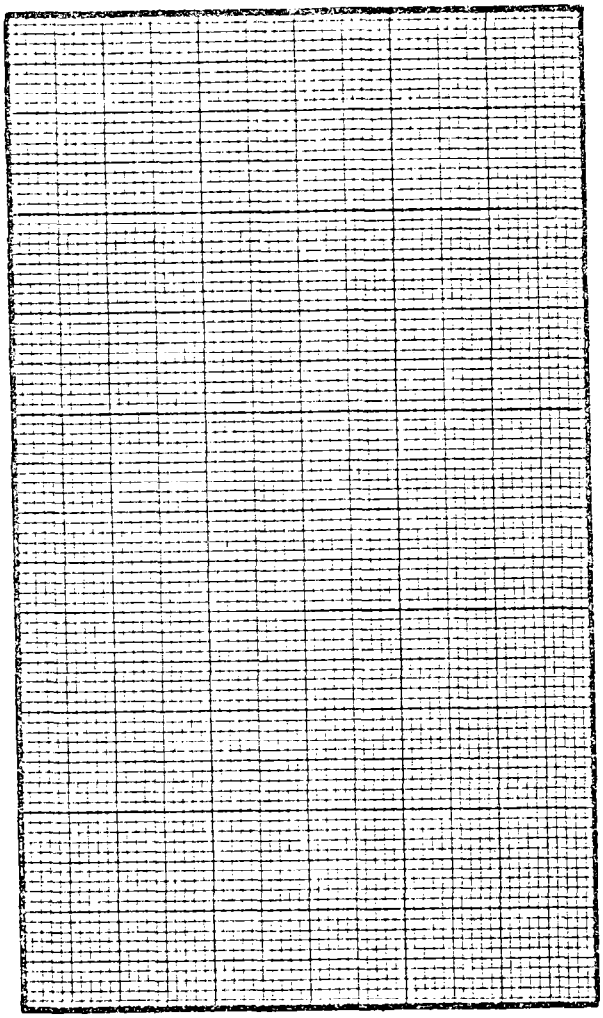

DIAGRAM OF STACK, PORTS, & TRAVERSE POINTS (indicate direction of flow)

INSIDE DIMENSIONS OF SAMPLE PLANE

1_____

STACK GAUGE PRESSURE in. H_2O ±0.96

NEAREST UPSTREAM DISTURBANCE_____

NEAREST DOWNSTREAM DISTURBANCE_____

PROCESS & CONTROL EQUIPMENT DESCRIPTION_____

MOISTURE

IMPINGERS
FINAL VOLUME 225 ml
INITIAL VOLUME 200 ml
NET VOLUME 25 ml

SILICA GEL
FINAL WEIGHT _____ g
INITIAL WEIGHT 518.8 g
NET WEIGHT _____ g

TOTAL MOISTURE _____ g

ANALYTICAL DATA BY _____

ACETONE FRONT WASH
FINAL 90.6658 mg
TARE 90.6124 mg
NET 53.4 mg

FILTER NUMBER 1
FINAL 5516 mg
TARE .46845 mg
NET .10832 mg

FILTER NUMBER 2
FINAL Tabl 136.6 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)							

VNP FRESNO

ANDERSEN STACK SAMPLER DATA

Date: Dec 6-15, 1978 Test/Run Number: [illegible]

Operator: WN Meter Box No. [illegible] &ΔHa [illegible] Andersen No. 1

Nozzle Size .270

Grain Loading From ¶ 5 _____ gr/dscf Est. Sampling Time 10 min.

Sampling Location & Point Number: Outlet/Inlet; Point 17

Average Velocity Head From ¶2 Traverse, ΔP_s .75 Average Stack Temp. From ¶2 Traverse, T_s 184

Flow Setting From Nomograph, ΔH 2 (1.8 actual) Reference ΔP .63

	Start	Stop	Elapsed
Time:			10 min.

Pre-test Leak Test ... Leak Rate was .1 cfm / 26.7 sec, 27.3 sec @ 15" Hg
" " 28.1 "
" " 26.2 "

Gas Volume: Final 190,538 cf. Initial 182,400 cf. Total 8,138 cf. 6.967 → (constant for units) 57.6" Hg

Meter Temp:	In	Out	Avg.
Final	72	67	
Initial	73	62	73.5
	145	129	

Stack Velocity Head, ΔP_s .70 Flow Rate, ΔH 2.5 Stack Temp, T_s 184

Moisture From ¶4 (%) 10.9% 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		31.2444	31.2306	TOTAL PLATE + DISH Net 16.2 mg			
1		20.30935	20.3109	.12385 *	163.95		
2		21.90035	21.9072	.20075 *	265.75		
3		22.4987	22.5077	.8183 *	818.3		
4		15.43435	15.4424	.25335 *	253.35		
5		11.4205	11.4256	.0422 *	42.2		
6		11.07855	11.0353	.05605 *	56.05		
7		11.2385	11.2500	.0115	11.5		
8		22.0884	22.0999	.0115	11.5		
Back-Up Filter		.1874	.2187	.0313	31.3		
		Acetone wash 80.7966	81.1069	.3103			

Plate 0 — Acetone Wash of Sampling Probe & Head

163.95 + 16.2 + 310.3 = 450.4

* 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

VNP
FRESNO
SET 1

PLATE NO & TARE	AL. DISH	TARE	FINAL	SAMPLE WT. (DISH)	+ PLATE	TOTAL
0						
1 20.30935	7	1.3150	1.3247	.0097	.00155	.12385 *
2 21.90035	8	1.3179	1.5118	.1939	.00685	.20075
3 22.4987	9	1.3226	2.1329	.8093	.009	.8183
4 15.43435	10	1.3130	1.5583	.2453	.00805	.25335
5 11.4205	11	1.3243	1.3614	.0371	.0051	.0422
6 11.07855	12	1.3271	1.3342	.0071	.00675	.05605
7 11.2385					.0115	.0115
8 22.0884					.0115	.0115
9					.0313	.0313
	* 13	1.3305	1.4431	.1126		

* BOTH AL. DISHES 7 & 13 ARE FOR PLATE 1 SET 1 AL. DISH 13 ADDED TO 7 FOR TOTAL WT.

Ammonium sulfate Moisture Analysis

Plant: Valley Nitrogen Fertilizers

Sample Location	Date	Time	Tare wt (grams)	Total Wet wt (grams)	Total Dry Wt (grams)	Net wet wt. (grams)	Net dry wt loss
Drier Inlet	12-5-78	1440	267.3	592.6	588.3	324.8	320.5
Outlet	12-5-78	1456	266.5	626.7	623.7	359.2	357.2
Inlet	12-6-78	1033	266.1	508.5	505.1	242.4	239.0
Outlet	12-6-78	1047	268.4	575.1	574.6	306.7	306.2
Inlet	12-6-78	1418	266.0	643.1	640.6	377.1	374.6
outlet	12-6-78	1449	268.4	640.9	640.1	372.5	371.7
Inlet	12-6-78	1907	268.8	573.9	571.0	305.1	302.2
Outlet	12-6-78	1915	268.0	663.3	662.7	395.3	394.7

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE 1 of 2

COMPANY VALLEY NITROGEN
LOCATION DRYER OUTLET
TEST NUMBER 4
DATE 12/5/78
TYPE FACILITY (NH4)2SO4
CONTROL DEVICE

NOTE: TEST WAS ABORTED AFTER 30 MINUTES AND RE-DONE. (SEE TEST #4, 12-6-78)

HOURS OF OBSERVATION 2:07-2:37 PM
OBSERVER DE
OBSERVER CERTIFICATION DATE
OBSERVER AFFILIATION
POINT OF EMISSIONS outlet
HEIGHT OF DISCHARGE POINT 200'

	Initial			Final
CLOCK TIME				
OBSERVER LOCATION Distance to Discharge	200'			200'
Direction from Discharge	South			South
Height of Observation Point	0'			0'
BACKGROUND DESCRIPTION	clear sky			clear
WEATHER CONDITIONS Wind Direction	out of NW			out of NW
Wind Speed	20-30			20-30 mph
Ambient Temperature	50			55
SKY CONDITIONS (clear, overcast, % clouds, etc.)	clear			clear
PLUME DESCRIPTION Color	white			white
Distance Visible	100-200'			100-200'
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	2:07 - 2:37		5%

Readings ranged from 5 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 2

COMPANY Valley Authority
LOCATION Guthrie
TEST NUMBER 1
DATE 12/5/74

OBSERVER D.K.
TYPE FACILITY Nitric Acid
POINT OF EMISSIONS

Hr.	Min.	Seconds 0	15	30	45	STEAM PLUME (check if applicable) Attached	Detached	COMMENTS
2:07	0	5		5		✓		Steam plume
	1	5		5				10 secs
	2	10		10				
	3	5		5				
	4	10		10				
	5	10		10				
	6	10		10				
	7	10		15				
	8	10		10				
	9	5		10				
	10	5		5				
	11	5		5				
	12	5		5				
	13	5		5				
	14	5		5				
	15	5		5				
	16	5		5				
	17	5		10				
	18	10		5				
	19	5		5				
	20	5		5				
	21	5		5				
	22	5		5				
	23	5		5				
	24	10		5				
	25	5		5				
	26	5		5				
	27	5		10				
	28	10		5				
	29	10		10		✓		

2:37 Stop

Avg = 5%

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE ___ OF ___

COMPANY
LOCATION
TEST NUMBER
DATE

OBSERVER
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]

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE 1 OF 2

COMPANY Valley Nitrogen
LOCATION outlet to Dryer
TEST NUMBER 1
DATE 12/1/78
TYPE FACILITY (illegible)
CONTROL DEVICE

HOURS OF OBSERVATION 10:37 - 11:37 AM
OBSERVER DF
OBSERVER CERTIFICATION DATE 12/1/78
OBSERVER AFFILIATION (illegible)
POINT OF EMISSIONS
HEIGHT OF DISCHARGE POINT 50'

	Initial			Final
CLOCK TIME				
OBSERVER LOCATION Distance to Discharge	200'			200'
Direction from Discharge	South			South
Height of Observation Point	0'			0'
BACKGROUND DESCRIPTION	sky			clear sky
WEATHER CONDITIONS Wind Direction	NW			NW
Wind Speed	10-20			10-20
Ambient Temperature	45			45
SKY CONDITIONS (clear, overcast, % clouds, etc.)	Clear			Clear
PLUME DESCRIPTION Color	white			white
Distance Visible	200'			200'
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
1	10:37 11:37		10%

Readings ranged from 0 to 15 % 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 VNP
LOCATION [illegible]
TEST NUMBER 1A
DATE 12/[illegible]/75

OBSERVER DK
TYPE FACILITY [illegible]
POINT OF EMISSIONS 2

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

Start 0:37

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE 2 OF ___

COMPANY VNP
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	[illegible]		[illegible]				
	31	[illegible]		[illegible]				
	32	[illegible]		[illegible]				
	33	[illegible]		[illegible]				
	34	[illegible]		[illegible]				
	35	[illegible]		[illegible]				
	36	[illegible]		[illegible]				
	37	[illegible]		[illegible]				
	38	[illegible]		[illegible]				
	39	[illegible]		[illegible]				
	40	[illegible]		[illegible]				
	41	[illegible]		[illegible]				
	42	[illegible]		[illegible]				
	43	[illegible]		[illegible]				
	44	[illegible]		[illegible]				
	45	[illegible]		[illegible]				
	46	[illegible]		[illegible]				
	47	[illegible]		[illegible]				
	48	[illegible]		[illegible]				
	49	[illegible]		[illegible]				
	50	[illegible]		[illegible]				
	51	[illegible]		[illegible]				
	52	[illegible]		[illegible]				
	53	[illegible]		[illegible]				
	54	[illegible]		[illegible]				
	55	[illegible]		[illegible]				
	56	[illegible]		[illegible]				
	57	[illegible]		[illegible]				
	58	[illegible]		[illegible]				
	59	[illegible]		[illegible]				

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

AVG = 10%

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

PAGE 1 OF 2

COMPANY VNP
LOCATION DEER SITE
TEST NUMBER 2
DATE 12/6/78
TYPE FACILITY (NH)50
CONTROL DEVICE

HOURS OF OBSERVATION 2:54-3:54 PM
OBSERVER DK.
OBSERVER CERTIFICATION DATE 11/1/78
OBSERVER AFFILIATION Scott
POINT OF EMISSIONS
HEIGHT OF DISCHARGE POINT 50'

	Initial			Final
CLOCK TIME				
OBSERVER LOCATION Distance to Discharge	200'			200'
Direction from Discharge	South			South
Height of Observation Point	0'			0'
BACKGROUND DESCRIPTION	clear			clear sky
WEATHER CONDITIONS Wind Direction	NW			NW
Wind Speed	10-25			10
Ambient Temperature	50			50
SKY CONDITIONS (clear, overcast, % clouds, etc.)	Clear			Clear
PLUME DESCRIPTION Color	white			white
Distance Visible	200'			200'
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time Start--End	Opacity Sum	Opacity Average
2	14:54 - 15:54		10%

Readings ranged from 0 to 25 % 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 VNP
LOCATION PEACH OUTLET
TEST NUMBER 2
DATE 12/6/73

OBSERVER DK
TYPE FACILITY NHA 203
POINT OF EMISSIONS

Start 2:54

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

FIGURE 9-2 OBSERVATION RECORD (Continued)

PAGE 2 OF 2

COMPANY VNP
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	15		15				
	31	15		15				
	32	10		10				
	33	15		15				
	34	15		15				
	35	10		10				
	36	10		10				
	37	15		15				
	38	15		15				
	39	10		15				
	40	15		15				
	41	15		15				
	42	15		15				
	43	15		15				
	44	15		15				
	45	15		15				
	46	15		15				
	47	15		15				
	48	15		15				
	49	15		15				
	50	15		15				
	51	15		15				
	52	15		15				
	53	15		15				
	54	15		15				
	55	10		15				
	56	15		15				
	57	15		15				
	58	15		15				
	59	10		10				

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Avg = 1%

FIGURE 9-1
RECORD OF VISUAL DETERMINATION OF OPACITY

COMPANY VNP
LOCATION DRUM OUTLET
TEST NUMBER 3
DATE 12/6/78
TYPE FACILITY NH4, SO4
CONTROL DEVICE SCRUBBER

NOTE: DUE TO TEST BEING RUN AT NIGHT NO OPACITY MEASUREMENTS WERE OBTAINED (PER FRANK CLAY OF EPA)

HOURS OF OBSERVATION
OBSERVER DK
OBSERVER CERTIFICATION DATE 6/6/78
OBSERVER AFFILIATION SCOTT
POINT OF EMISSIONS
HEIGHT OF DISCHARGE POINT 50'

	Initial			Final
CLOCK TIME				
OBSERVER LOCATION Distance to Discharge				
Direction from Discharge				
Height of Observation Point				
BACKGROUND DESCRIPTION				
WEATHER CONDITIONS Wind Direction				
Wind Speed				
Ambient Temperature				
SKY CONDITIONS (clear, overcast, % clouds, etc.)				
PLUME DESCRIPTION Color				
Distance Visible				
OTHER INFORMATION				

SUMMARY OF AVERAGE OPACITY

Set Number	Time	Opacity	
	Start--End	Sum	Average

Readings ranged from ____ to ____ % opacity

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

APPENDIX B

FIELD DATA SHEETS

TABLE 1

SUMMARY OF AMMONIUM SULFATE PRODUCTION RATE DATA

	Test No.		
	1	2	3
Average Sulfuric Acid Consumption gpm	27.5	27.5	27.5
Average Ammonia Consumption Lb/Hr	9250	9360	9170
AS Production Based on Sulfuric Acid Consumption, TPD (gpm x 14.54)	400	400	400
AS Production Based on Ammonia Consumption, TPD (Lb/Hr x .0465)	430	435	425
Nominal Plant AS Capacity, TPD	400	400	400

TABLE 2

PROCESS PARAMETERS MONITORED DURING TEST NO. 1

Elapsed Time, Min	0	30	60	90	120	150
Sulfuric Acid Flow, gpm	27.0	27.5	28.0	27.5	27.5	27.5
Ammonia Flow, Lb/hr	9000	9300	9300	9200	9550	9500
Crystallizer Level (% of full range)	53	51	50	50	50	50
Mother Liquor Sp. Gr. (meter reading)	86	89	90	90	91	93
Elutriation Leg pH	2.7	2.6	2.8	2.8	2.5	2.8
Slurry Sludge Tank Level (% of full range)	58	77	75	97	95	88
Percent Solids Leaving Crystallizer	58	58	62	62	65	65
Rotary Dryer Outlet Gas Temp., °F	180	180	175	180	178	180
%Free Acid in Mother Liquor Leaving Crystallizer	1.67	1.73	1.72	1.72	1.63	1.63

TABLE 3

PROCESS PARAMETERS MONITORED DURING TEST NO. 2

Elapsed Time, Min	0	15	30	45	60	75
Sulfuric Acid Flow, gpm	27.5	27.8	27.5	27.5	27.5	27.5
Ammonia Flow, Lb/hr	9400	9300	9150	9450	9400	9350
Crystallizer Level (% of full range)	50	50	50	50	50	50
Mother Liquor Sp. Gr. (meter reading)	92	92	93	93	93	93
Elutriation Leg pH	3.2	3.2	3.0	3.0	3.0	3.2
Slurry Sludge Tank Level (% of full range)	37	27	16	3	0	24
Percent Solids Leaving Crystallizer	70	70	72	72	72	70
Rotary Dryer Outlet Gas Temp. °F	175	180	175	180	180	180
%Free Acid in Mother Liquor Leaving Crystallizer	.93	.93	.78	.78	.78	.55

TABLE 4

PROCESS PARAMETERS MONITORED DURING TEST NO. 3

Elapsed Time, Min	0	15	30	45	60	75	90	105
Sulfuric Acid Flow, gpm	28.0	28.0	27.8	27.5	27.5	27.5	27.0	27.5
Ammonia Flow Lb/hr	9150	8950	9250	9100	9300	9400	8900	9200
Crystallizer Level (% of full range)	52	52	54	52	50	50	50	50
Mother Liquor Sp. Gr. (meter reading)	87	88	88	89	89	88	88	88
Elutriation Leg pH	3.7	3.5	3.5	3.5	3.2	3.2	3.1	3.1
Slurry Surge Tank Level (% of full range)	24	23	39	42	41	41	41	41
Percent of Solids Leaving Crystalizer	67	67	67	67	65	65	65	65
Rotary Dryer Outlet Gas Temp. °F	180	180	180	180	180	180	180	180
%Free Acid in Mother Liquor Leaving Crystallizer	.25	.25	.25	.25	.55	.55	.55	.55

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