Inlet was performed at single point, avg ΔP because of blockage in the duct

S8.4

BR CH4 #4

EVALUATOR Steve Sharpe EVALUATION DATE 9/10/92

(B)

METHOD 5: SECONDARY EMISSIONS TEST REPORT EVALUATION

STATE: TX FACILITY: Occidental C.O. Houston Tx TEST DATE: 12,13 Sept, 1978

PROCESS(ES) TESTED: Ammonium Sulfate Dryer Baghouse

SAMPLING DURATION 3
must have at least 3 runs, each ≥ 1 hour duration, with sampling ≥ 2 minutes at each traverse point, and total sampling volume ≥ 30 dscf

PRODUCTION RATE 3
is process or production rate during testing representative of normal rates

CONTROL DEVICE(S) 2
are devices described, and their efficiencies given

Baghouse, No eff. given

METHOD 1 3
are calculations accurate, and is figure provided

METHODS 2,3 2
are data and calculations included for gas velocity, cyclonic flow, and molecular weight determination, and is source of barometric pressure noted

METHOD 4 2
are data and calculations included for moisture content determination, and is moisture content realistic [< saturation]

FIELD DATA is field data on standard forms, and does raw data correspond with printout 2

Appendices Missing

BOILER TESTS NA
calculation of F_0 from Orsat accurate

SAMPLING TEMPERATURE 2
both probe and filter must be maintained at 248 ± 25°F or other temperature specified in NSPS

Appendices Missing

BACK-HALF 3
if any, what method was used to catch and recover condensible matter

EQUIPMENT were a borosilicate glass probe liner and a quartz fiber filter used 2

No Doc

CALIBRATION were both pre- and post-test calibrations performed for meter box Appendices Missing 2

pitot tube 2

temperature sensor 2

nozzle (3 #) 2

LEAK CHECKS both pre- and post-test 2

BLANKS were filter and reagent blanks analyzed, and were any problems addressed 2

SAMPLE PREP 2
filter desiccation and tare weights documented

ISOKINETICS within 100±10% for all runs 3

U.S. Environmental Protection Agency
EMB Report 78-NHF-6

Facility A

Test No. 1
Sept. 12 and 13, 1978

SOURCE EMISSIONS TEST REPORT

OCCIDENTAL CHEMICAL COMPANY
Houston, Texas

AMMONIUM SULFATE DRYER BAGHOUSE

Barry L. Jackson
Supervisor
Air Testing

Peter J. Marks
Department Manager
Laboratory Services

for: ROY F. WESTON

RFW W.O. #0300-81-04
Contract No. 68-02-2816
Work Assignment No. 2

Prepared by:

ROY F. WESTON
ENVIRONMENTAL CONSULTANTS-DESIGNERS
Weston Way
West Chester, Pennsylvania 19380
(215) 692-3030

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SUMMARY

The Emission Measurement Branch of the U. S. Environmental Protection Agency contracted Roy F. Weston, Inc. to conduct a source testing and analysis program at Occidental Chemical Company's Houston, Texas Ammonium Sulfate Plant.

The primary objective of the testing program was to quantify the particulate emissions to the atmosphere from the Ammonium Sulfate Dryer Baghouse Stack. This objective was achieved by performing a series of three particulate tests utilizing EPA Method 5[(1)] procedures at the baghouse exhaust stack location. In addition, visual determinations of plume opacities were made simultaneously with each particulate test at the source discharge point according to EPA Method 9[(2)] protocol. Also, EPA Method 5[(3)] particulate tests were executed at the baghouse inlet site simultaneously with the exhaust stack tests to measure the potential uncontrolled emissions and to calculate particulate removal efficiencies. A singular Anderson[R] cascade impactor test was conducted at the baghouse inlet location to determine the particle size distribution of the entering particulate matter.

The particulate matter emission results are summarized below:

Ammonium Sulfate Dryer Baghouse

Test No.	Date	Test Location	Particulate Concentration Grains/DSCF	Pounds/Hour	Particulate Removal Efficiency, Percent
1	9/12/78	Inlet Duct	1.01	8.36	97.2
	9/12/78	Exhaust Stack	0.028	0.24	
2	9/12/78	Inlet Duct	0.96	7.84	91.1
	9/12/78	Exhaust Stack	0.085	0.70	
3	9/13/78	Inlet Duct	3.83	31.2	97.6
	9/13/78	Exhaust Stack	0.093	0.74	

(1) Code of Federal Regulations, Title 40, Part 60, Appendix A, "Standards of Performance for New Stationary Sources," August 18, 1977.

(2) Federal Register, Vol. 39, No. 219, November 12, 1974.

(3) Op. Cit.

No visible emissions were observed emanating from the baghouse exhaust stack during the test program by the certified observer.

Figure 6 illustrates the particle size distribution of the particulate matter at the baghouse inlet location.

Detailed summaries of test data and test results are presented in Tables 1 through 4 of this report.

INTRODUCTION

The Emission Measurement Branch of the U. S. Environmental Protection Agency contracted Roy F. Weston, Inc. to conduct a source testing and analysis program at Occidental Chemical Company's Houston, Texas Ammonium Sulfate Plant. The objective of the testing program was to measure various emission parameters from Oxychem's Ammonium Sulfate Dryer.

The location tested, plus the number and types of tests performed at each site are listed below:

1. Ammonium Sulfate Dryer Baghouse Inlet Duct.
   a. Three particulate tests by EPA Method 5.
   b. One particle size distribution test by cascade impaction (Anderson^{R}).
2. Ammonium Sulfate Dryer Baghouse Exhaust Stack.
   a. Three particulate tests by EPA Method 5. Each particulate test was performed simultaneously with one of the inlet duct tests.
   b. Three opacity tests by EPA Method 9. Visual determinations of plume opacities determined concurrently with the particulate tests.

All tests were conducted during the period 12-13 September 1978 by Weston personnel and were observed by Mr. Dennis P. Holzschuh, EPA Technical Manager.

Test data and test results are presented in Tables 1 through 4 of this report. Particle size distribution results are shown in Figure 6. Also incorporated herein is a description of the test locations, test equipment, test procedures, sample recovery, and analytical methods used during the

test program. Raw test data, laboratory reports, sample calculations, equipment calibration data, baghouse details, and a list of project participants are provided in Appendices A through F, respectively.

Ammonium Sulfate Dryer

Anhydrous ammonia and sulfuric acid are combined to yield granular ammonium sulfate at a rate of 14 to 18 tons/hour. The heat of reaction causes the desired moisture loss in the dryer to produce the final product. The final product drops from the dryer and is then conveyed to storage. The moist hot air from the dryer, which contains ammonium sulfate fines, is drawn through a baghouse to effect additional product recovery while reducing particulate emissions.

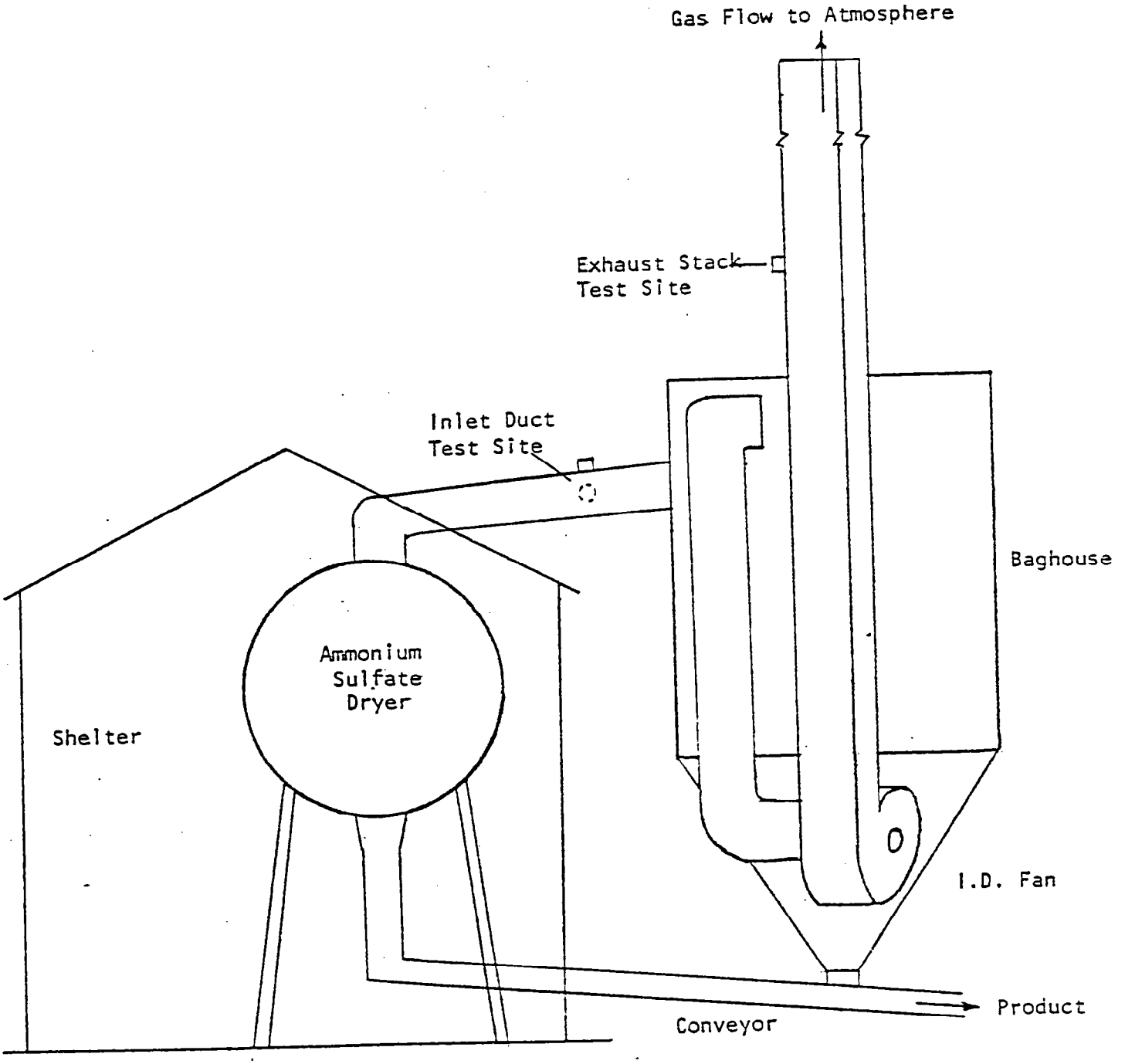
A schematic diagram of the Ammonium Sulfate Dryer and Baghouse is presented in Figure 1.

OCCIDENTAL CHEMICAL COMPANY

Houston, Texas

FIGURE 1

AMMONIUM SULFATE DRYER AND BAGHOUSE



Ammonium Sulfate Dryer Baghouse Inlet Duct

Two 3" I.D. test ports approximately 90° apart were installed on a straight section of the 11" I.D. stack at a location which was 5.0 stack diameters downstream and 2.3 diameters upstream from the nearest gas stream flow disturbances. EPA Method 1[3] criteria for this test location required a minimum of 20 traverse points but due to a heavy build-up of particulate matter covering ~68% of the inside area of the duct the particulate tests were run at a single point of average velocity during each of the three test runs. See Figure 2 for port and sampling point locations.

Ammonium Sulfate Dryer Baghouse Exhaust Stack

Two 3" I.D. test ports were placed on one side of the 7-1/2" x 8-5/8" rectangular exhaust stack serving the baghouse. The ports were located 15 diameters downstream and 10 diameters upstream from the nearest flow disturbances. Since the eight and two diameter criterion were met, a minimum of eight traverse points were required by EPA Method 1 regulations. Figure 3 illustrates duct geometry plus port and sampling point locations.

(3) Code of Federal Regulations, Title 40, Part 60, Appendix A, "Standards of Performance for New Stationary Sources" August 18, 1977

FIGURE 2

OCCIDENTAL CHEMICAL COMPANY

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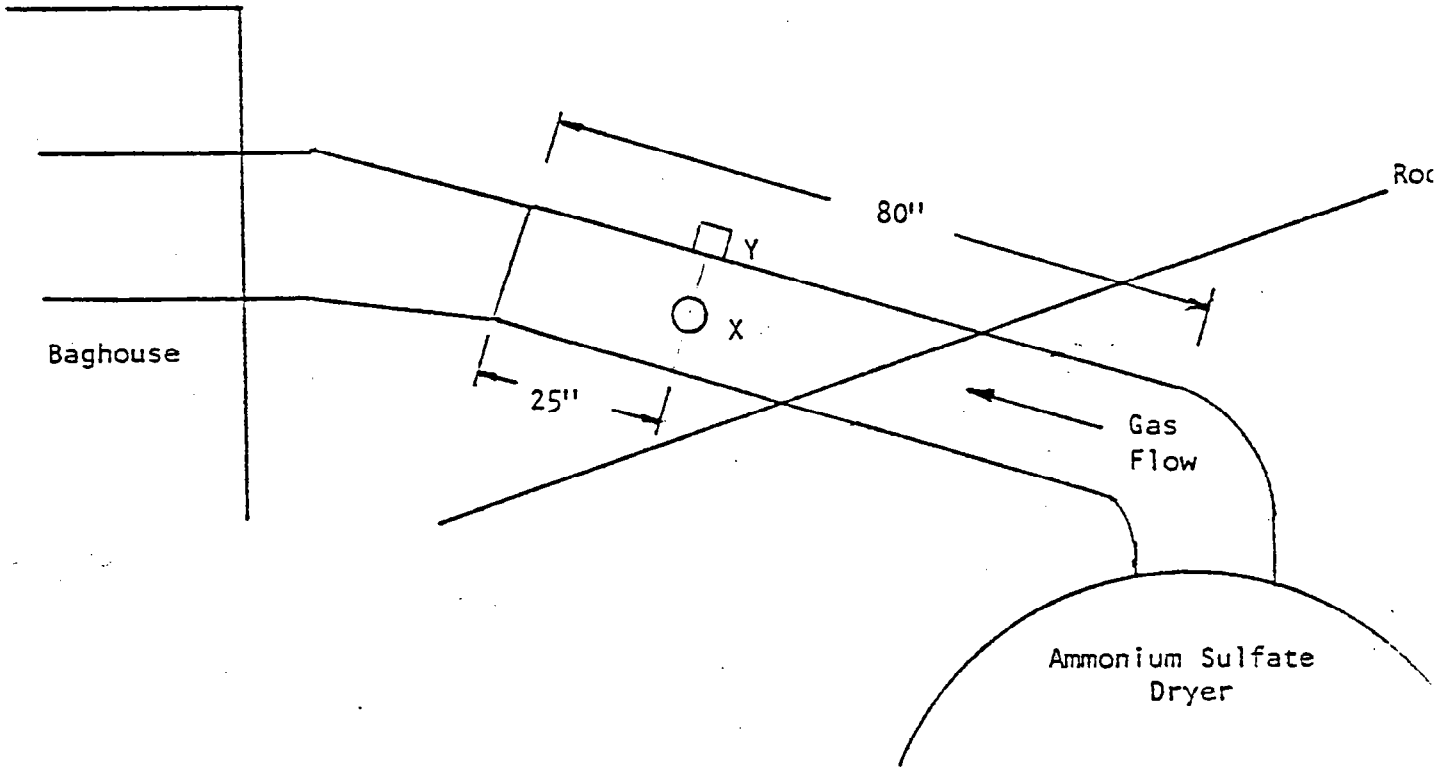
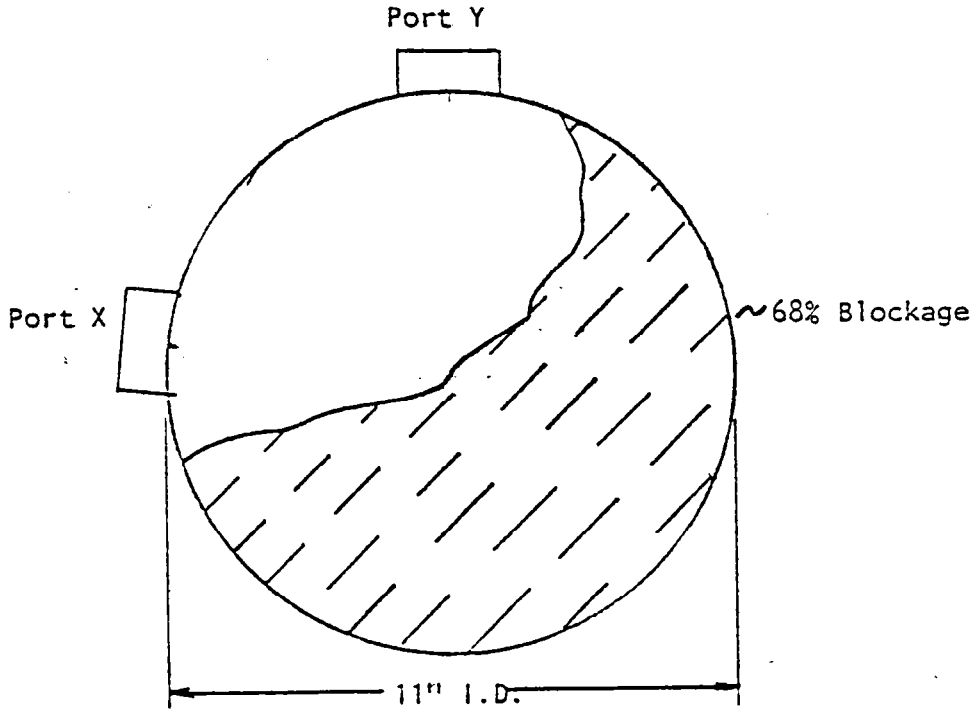
AMMONIUM SULFATE DRYER BAGHOUSE INLET DUCT
PORT AND SAMPLING POINT LOCATIONS





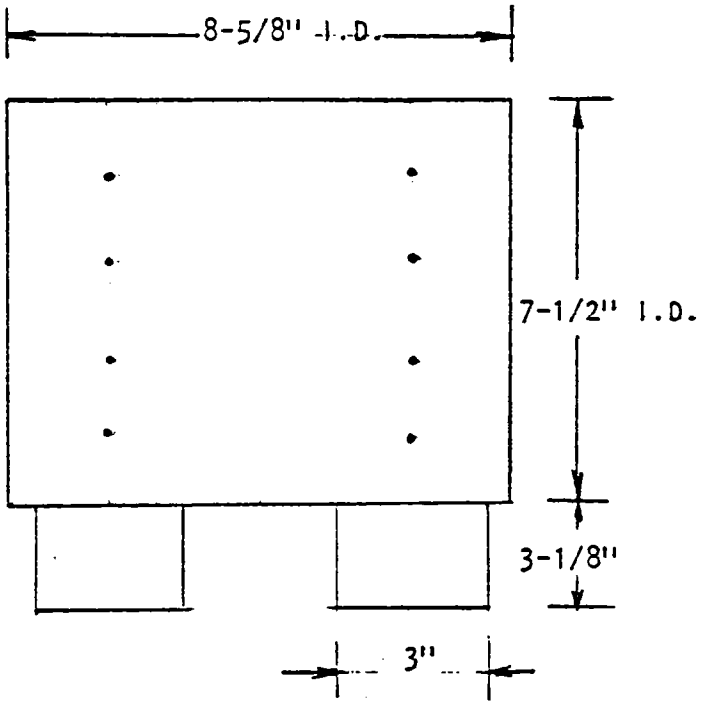
Duct Cross-Sectional View

OCCIDENTAL CHEMICAL COMPANY

Houston, Texas

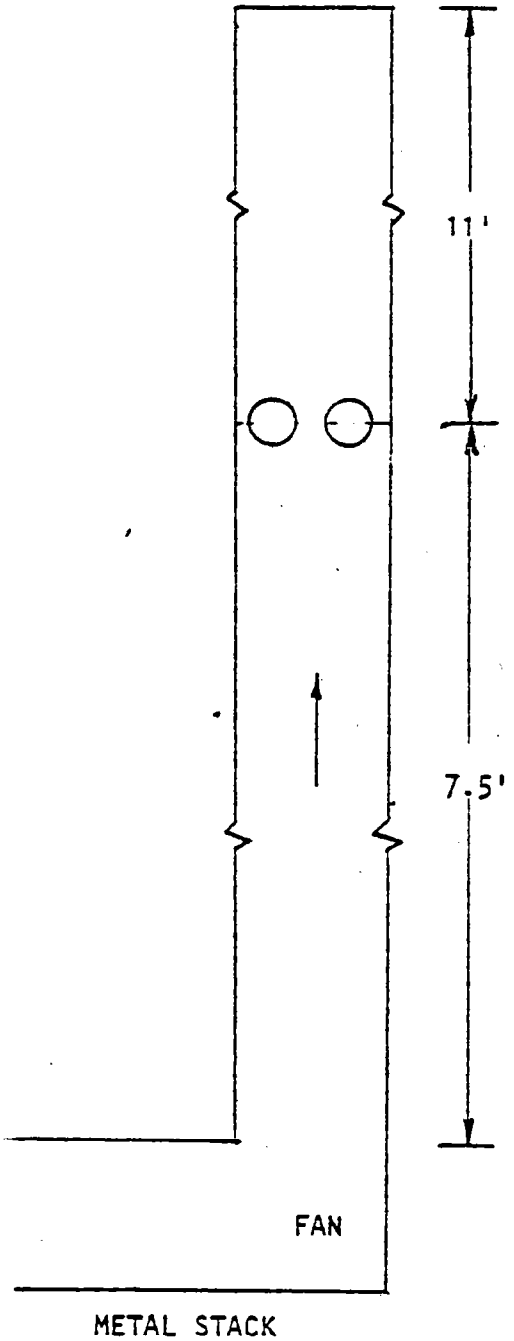
FIGURE 3

AMMONIUM SULFATE DRYER BAGHOUSE EXHAUST STACK



Duct Cross-Sectional View

Traverse Point Number	Distance From Inside Near Wall, Inches
1	1
2	2-3/4
3	4-5/8
4	6-1/2



DESCRIPTION OF SAMPLING TRAINS

Particulate Sampling Trains

The test train utilized for particulate sampling at the baghouse inlet duct location was the standard EPA Method Five Train (see Figure 4).

A stainless steel nozzle was attached to a heated ($\sim 250^{\circ}F$) 3' borosilicate glass probe which was connected directly to a borosilicate filter holder containing a 4" Reeve Angel 900 AF glass fiber filter. The filter holder was maintained at approximately $250^{\circ}F$ in a heated chamber, and was connected by Tygon^{R} vacuum tubing to the first of four Greenburg-Smith impingers which were included in the train to condense the moisture in the gas stream. Each of the first two impingers contained 100 ml of distilled water, the third was dry and the final impinger contained 200 grams of dry pre-weighed silica gel. The first, third, and fourth impingers were modified Greenburg-Smith type; the second was a standard Greenburg-Smith impinger. All impingers were maintained in a crushed ice bath. A RAC control console with vacuum pump, dry gas meter, a calibrated orifice, and inclined manometers completed the sampling train.

Flue gas temperature was measured by means of a Type K thermocouple which was connected to a direct readout pyrometer. The thermocouple sensor was positioned adjacent to the sampling nozzle.

Gas velocity was measured using a calibrated "S" type pitot tube provided with extensions and fastened alongside the sampling probe. Gas stream composition (carbon dioxide, oxygen, and carbon monoxide content) was determined utilizing Orsat apparatus to analyze stack gas samples. Gas stream composition proved to be ambient air since no combustion products were found in any of the stack gas effluent samples.

The test train used for particulate sampling at the baghouse exhaust stack location was identical to the train described above except for a rigid borosilicate connection in place of flexible tubing between the filter

between the filter holder and the first impinger. See Figure 5 for train schematic.

Particle Size Distribution Sampling Apparatus

A stainless steel nozzle was connected directly to an 8-stage Anderson® cascade impaction device which separated the particles according to their effective aerodynamic particle diameters. A glass fiber filter was used to capture any particles that passed through the impactor substrates to permit the measurement of total particulate. The filter holder was maintained at stack temperature and was connected by Tygon® vacuum tubing to the first of four Greenburg-Smith impingers which were included in the train to condense the moisture in the gas stream. All impingers were maintained in a crushed ice bath. A RAC control console with vacuum pump, dry gas meter, a calibrated orifice, and inclined manometers completed the sampling train.

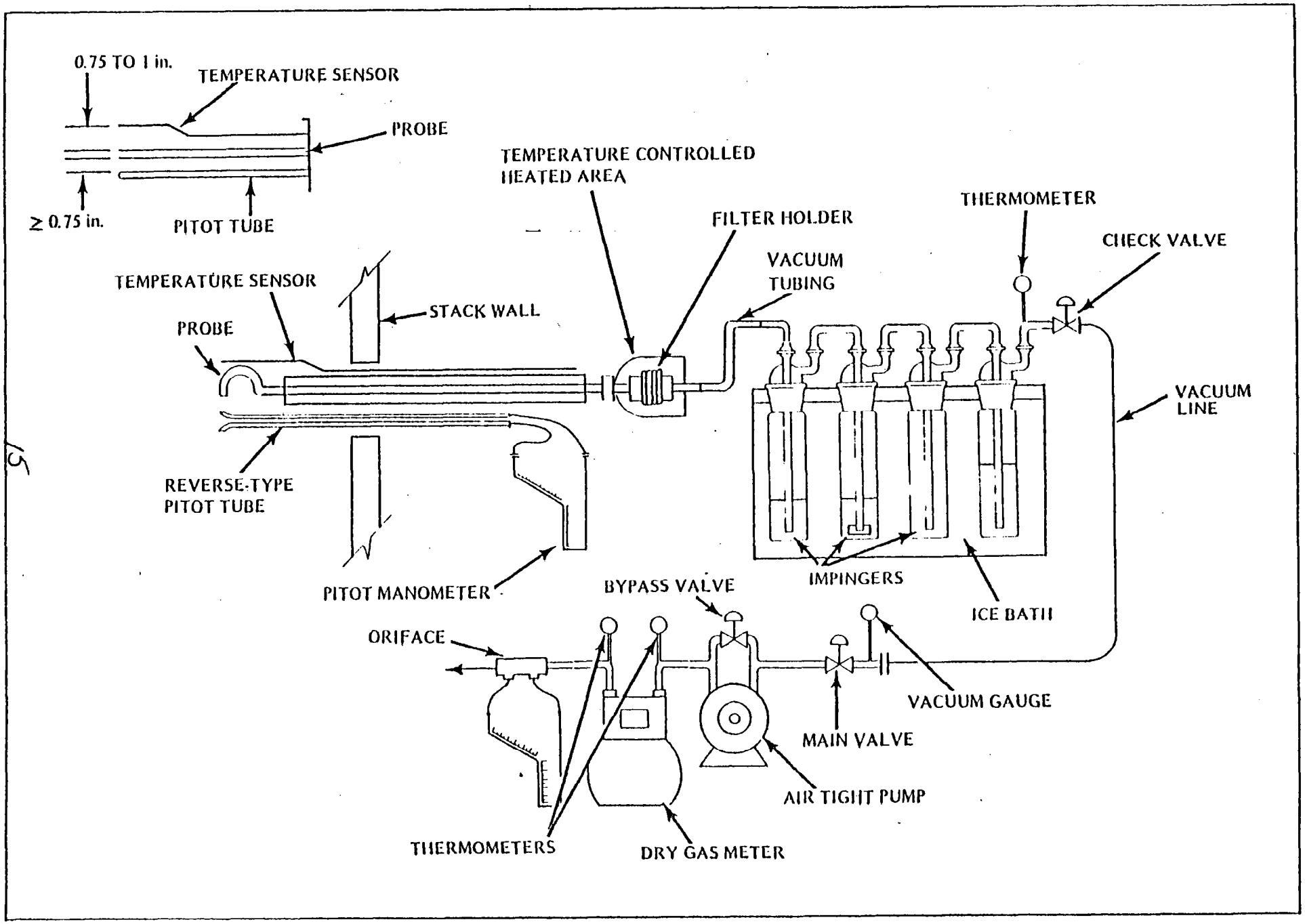


FIGURE 4 PARTICULATE SAMPLING TRAIN
EPA METHOD 5
BAGHOUSE INLET DUCT

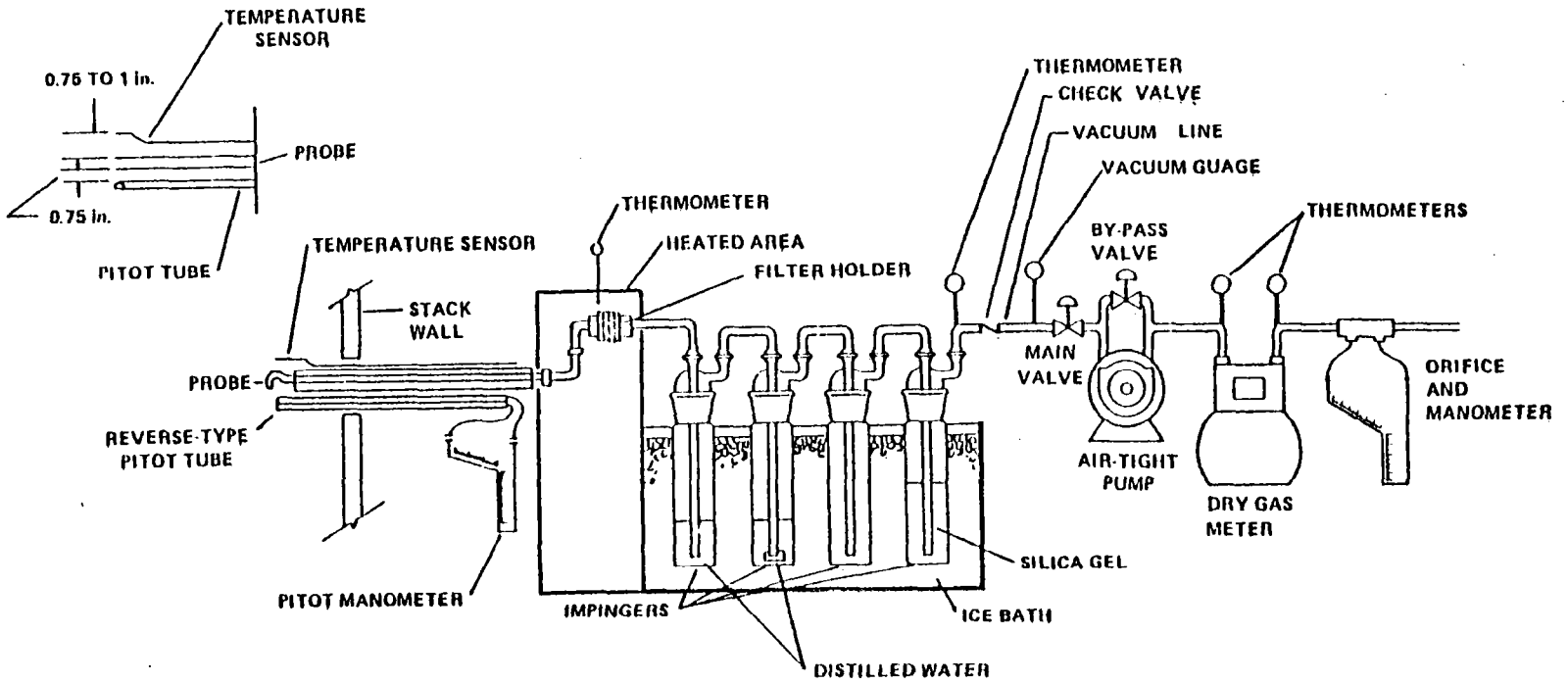


FIGURE 5 PARTICULATE SAMPLING TRAIN—EPA METHOD 5

EPA METHOD 5

BAGHOUSE EXHAUST STACK

TEST PROCEDURES

Preliminary Tests

Preliminary test data was obtained at each sampling location. Stack geometry measurements were recorded and sampling point distances calculated. A preliminary velocity traverse was performed at each test location utilizing a calibrated "S" type pitot tube and a Dwyer inclined manometer to determine velocity profiles. Stack gas temperatures were observed with a direct read-out pyrometer equipped with a chromel-alumel thermocouple. Gas stream composition and moisture content values were estimated from information supplied by Oxychem.

Preliminary test data was used for nozzle sizing and nomagraph set-up for isokinetic sampling procedures.

Calibration of the probe nozzles, pitot tubes, metering systems, probe heaters, temperature gauges and barometer were performed as specified in Section 5 of EPA Method 5 test procedures (see Appendix E for calibration data).

Ammonium Sulfate Dryer Baghouse Inlet Duct

A series of three tests were conducted at the inlet to the Ammonium Sulfate Dryer Baghouse simultaneous with particulate test runs at the exhaust stack. The sampling was performed at one point of average velocity for a total test time of 120 minutes. This point was chosen before each test by running a rough velocity traverse across the open area of the duct. Test data was recorded every five minutes during all test periods.

Table 1 presents a summary of test data for each of the three runs. Test result summarization appears on Table 3.

One particle size distribution test was performed following the completion of test run 3.

One sampling point located at a site of average velocity was selected from velocity traverse data for particle size distribution testing. The gas stream was sampled isokinetically at that point for 4 minutes which permitted collection of sufficient sample for analysis without overloading the filter substrates. Sample volume, temperature, and pressure data was recorded before and after the test. See Figure 6 for a distribution plot.

Ammonium Sulfate Dryer Baghouse Exhaust Stack

A series of three EPA Method 5 tests were performed at the Ammonium Sulfate Dryer Baghouse exhaust stack simultaneous with the inlet test runs. Eight points were traversed, 4 per port axis, for 15 minutes each yielding a test period 120 minutes in length.

During particulate sampling, gas stream velocities were measured by inserting a calibrated "S" type pitot tube into the stream adjacent to the sampling nozzle. The velocity pressure differential was observed immediately after positioning the nozzle at each point, and sampling rates were adjusted to maintain isokinetic sampling. Stack gas temperatures were also monitored at each point with the pyrometer and thermocouple. Additional temperature measurements were made at the final impinger and at the inlet and outlet of the dry gas meter.

Test data was recorded every five minutes during all test periods. Table 2 presents a summary of test data for each of the three runs. Test result summarization appears on Table 4.

Visible emissions observations were recorded concurrently with each particulate test repetition by a certified observer according to EPA Method 9 procedures. See Table 4 for result summary.

Particulate Sample Recovery

At the conclusion of each test, the sampling trains were dismantled, openings sealed, and the components transported to the field laboratory. Sample integrity was assured by maintaining chain of custody records which will be supplied upon request.

A consistent procedure was employed for sample recovery:

- The glass fiber filter(s) was removed from its holder with tweezers and placed in its original container (petri dish), along with any loose particulate and filter fragments (Sample 1).
- The probe and nozzle were separated and the internal particulate rinsed with acetone or distilled water into a borosilicate container while brushing a minimum of three times until no visible particles remained. Particulate adhering to the brush was rinsed with acetone or water into the same container. The front half of the filter holder was rinsed with acetone or water while brushing a minimum of three times. The rinses were combined (Sample 2) and the container sealed with a Teflon lined closure.
- The total liquid in impingers one, two and three was measured, the value recorded, and the liquid discarded.
- The silica gel was removed from the last impinger and immediately weighed.
- Acetone and distilled water samples were retained for blank analysis.

Particulate Analyses

The filters (Sample 1) and any loose fragments were desiccated for 24 hours and weighed to the nearest 0.1 milligram to a constant weight.

The acetone and distilled water wash samples (Sample 2) were evaporated (acetone at ambient temperature and pressure; water at 105°C and ambient pressure) in tared beakers, and desiccated to constant weight. All sample residue weights were adjusted by the acetone or water blank values.

The weight of the material collected on the glass fiber filter(s) plus the weight of the residue of the nozzle/probe/front-half filter holder washes represents the "total" EPA Method 5 catch. Complete laboratory results are presented in Appendix B of this report.

Particle Size Sample Recovery and Analyses

The cascade impactor substrates and any loose fragments were carefully removed from their support plates with tweezers and placed in individual containers (petri dishes) for shipment to Weston Laboratory.

Each cascade impactor filter was fired at 525°C and pre-weighed to the nearest 0.1 milligram to constant weight at Weston's Laboratory prior to on-site application. Subsequent to emissions exposure, the cascade impactor substrates, back-up filters and any loose fragments (Sample 4) were desiccated for 24 hours in the Laboratory, and weighed to the nearest 0.1 milligram to constant weight.

DISCUSSION OF TEST RESULTS

Particulate test data and test result summaries are presented in Tables 1 through 4 of this report. Figure 6 illustrates the particle size distribution of the particulate matter at the baghouse inlet location.

No unusual process operating conditions were encountered during any of the test periods.

A heavy build up of particulate matter covered approximately 68% of the inside area of the baghouse inlet duct at the test port location and therefore precluded particulate/velocity traversing of the duct cross-sectional area as specified in EPA testing methodology (see Figure 2). Sampling at a single point of average velocity proved to be the most feasible testing alternative (the blockage could not be easily removed) and was the procedure followed for all three inlet tests. Therefore, since no particulate/velocity traversing could be performed as required to insure representative sampling, the inlet test results should only be viewed as a rough guide when evaluating the performance efficiency of the bag collector.

The amount of particulate matter discharged to the atmosphere from the baghouse was moderately low ($\leq$ 0.093 grains/dscf and $\leq$ 0.74 pounds/hour). The certified observer further corroborated the particulate test findings since no visible emissions were recorded emanating from the stack during the test program. However, water droplets containing dissolved particulate matter were frequently observed dripping from the stack during the test periods. This phenomenon was due to water vapor condensation on the inside walls of the stack due to cooling the gas stream below the saturation temperature.

The particulate removal efficiency of the baghouse was mediocre averaging roughly 95.3%.

Results of the Anderson[R] cascade impaction particle size distribution test conducted at the baghouse inlet site showed a perponderance of relatively large particles entering the collector (90% of the particles, by weight, were $\geq$2.2 μ in diameter). Visual inspection of a sample collected from the baghouse indicated the presence of many large product granules.

OCCIDENTAL CHEMICAL COMPANY
Houston, Texas

TABLE 1

AMMONIUM SULFATE DRYER BAGHOUSE INLET DUCT

Summary of Test Data

	1	2	3
Test Data			
Test Number	1	2	3
Test Date	9/12/78	9/12/78	9/13/78
Test Period	0940-1230	1350-1620	0915-1225
Sampling Data			
Sampling Duration, minutes	120.0	120.0	106.0
Nozzle Diameter, inches	0.125	0.125	0.125
Barometric Pressure, inches mercury	29.77	29.77	29.79
Average Orifice Pressure Differential, inches water	0.55	0.55	0.55
Average Dry Gas Temperature at Meter, ^{o}F	86.	89.	89.
Sample Volume at Meter Conditions, cubic feet	50.33	48.37	42.40
Sample Volume at Standard Conditions, [1] cubic feet	49.37	47.27	41.39
Gas Stream Moisture Content			
Total Water Collected by Train, ml	156.	141.5	131.
Standard Volume of Water Collected, cubic feet	7.34	6.66	6.17
Moisture in Gas Stream, percent by volume	12.9	12.4	13.0
Mole Fraction of Dry Gas	0.871	0.876	0.870
Gas Stream Composition			
CO_2, percent by volume	0.0	0.0	0.0
O_2, percent by volume	20.9	20.9	20.9
CO, percent by volume	0.0	0.0	0.0
N_2, percent by volume	79.1	79.1	79.1
Molecular Weight of Wet Gas	27.55	27.62	27.55
Molecular Weight of Dry Gas	28.97	28.97	28.97
Gas Stream Velocity			
Static Pressure, inches water	- 2.4	- 2.8	- 2.4
Absolute Pressure, inches mercury	29.59	29.56	29.61
Average Temperature, ^{o}F	153.	176.	170.
Pitot Tube Calibration Coefficient	0.831	0.831	0.831
Total Number of Sampling Points	1.0	1.0	1.0
Velocity at Actual Conditions, feet/second	103.	105.	104.
Gas Stream Volumetric Flow[2]			
Stack Cross-Sectional Area, square feet	0.21	0.21	0.21
Volumetric Flow at Actual Conditions, cubic feet/minute	1,300.	1,320.	1,320.
Volumetric Flow at Standard Conditions, cubic feet/minute	960.	950.	950.
Percent Isokinetic	105.2	102.1	101.3
Process Operations Data			
Ammonium Sulfate Production Rate, tons/hour	17.	17.	17.
Average Pressure Drop across Baghouse, inches water	1.5	1.6	1.8

[1] Standard Conditions = $68^{o}F$, 29.92 inches mercury, dry basis.

[2] Reported values are approximate and are calculated based on estimated dryer baghouse inlet duct clear area of 32% = 0.21 ft^2.

OCCIDENTAL CHEMICAL COMPANY
Houston, Texas

TABLE 2

AMMONIUM SULFATE DRYER BAGHOUSE EXHAUST STACK

Summary of Test Data

	1	2	3
Test Data			
Test Number	1	2	3
Test Date	9/12/78	9/12/78	9/13/78
Test Period	0940-1230	1350-1620	0915-1225
Sampling Data			
Sampling Duration, minutes	120.0	120.0	120.0
Nozzle Diameter, inches	0.189	0.189	0.189
Barometric Pressure, inches mercury	29.77	29.77	29.79
Average Orifice Pressure Differential, inches water	0.69	0.60	0.55
Average Dry Gas Temperature at Meter, ^{o}F	85.	89.	87.
Sample Volume at Meter Conditions, cubic feet	56.60	52.08	51.27
Sample Volume at Standard Conditions, [1] cubic feet	54.94	51.08	49.60
Gas Stream Moisture Content			
Total Water Collected by Train, ml	186.	145.	147.5
Standard Volume of Water Collected, cubic feet	8.76	6.83	6.94
Moisture in Gas Stream, percent by volume	13.7	11.8	12.3
Mole Fraction of Dry Gas	0.863	0.882	0.877
Gas Stream Composition			
CO_2, percent by volume	0.0	0.0	0.0
O_2, percent by volume	20.9	20.9	20.9
CO, percent by volume	0.0	0.0	0.0
N_2, percent by volume	79.1	79.1	79.1
Molecular Weight of Wet Gas	27.46	27.68	27.62
Molecular Weight of Dry Gas	28.97	28.97	28.97
Gas Stream Velocity			
Static Pressure, inches water	4.4	4.4	4.3
Absolute Pressure, inches mercury	30.09	30.09	30.11
Average Temperature, ^{o}F	131.	139.	138.
Pitot Tube Calibration Coefficient	0.843	0.843	0.843
Total Number of Sampling Points	8.0	8.0	8.0
Velocity at Actual Conditions, feet/second	46.9	45.2	44.1
Gas Stream Volumetric Flow			
Stack Cross-Sectional Area, square feet	0.45	0.45	0.45
Volumetric Flow at Actual Conditions, cubic feet/minute	1,260.	1,220.	1,190.
Volumetric Flow at Standard Conditions, cubic feet/minute	980.	950.	930.
Percent Isokinetic	107.8	103.0	102.9
Process Operations Data			
Ammonium Sulfate Production Rate, tons/hour	17.	17.	17.
Average Pressure Drop across Baghouse, inches water	1.5	1.6	1.8

[1] Standard Conditions = $68^{o}F$, 29.92 inches mercury, dry basis.

OCCIDENTAL CHEMICAL COMPANY
Houston, Texas

TABLE 3

AMMONIUM SULFATE BAGHOUSE INLET DUCT

Summary of Test Results

	1	2	3
Test Data			
Test Number	1	2	3
Test Date	9/12/78	9/12/78	9/13/78
Test Time	0940-1230	1350-1620	0915-1225
Gas Flow			
Standard Cubic Feet/minute, dry	960.	950.	950.
Actual Cubic Feet/minute, wet	1,300.	1,320.	1,320.
Particulates			
Nozzle, Probe and Front Half Filter Holder Catch Fraction, g	2.7212	2.5637	7.2971
Filter Catch Fraction, g	0.5204	0.3817	2.9921
Total Particulates, g	3.2416	2.9454	10.2892
Particulate Emissions[1]			
Grains/dry standard cubic foot[2]	1.01	0.96	3.83
Pounds/hour	8.36	7.84	31.2
Baghouse Particulate Removal Efficiency, percent	97.2	91.1	97.6
Product Moisture Content			
Moisture content of Dryer Inlet Sample, percent	0.46	0.50	0.54
Moisture content of Dryer Outlet Sample, percent	0.14	0.19	0.03

[1] Based on Total Particulates captured by train.

[2] Standard Conditions = 68°F and 29.92 inches mercury.

OCCIDENTAL CHEMICAL COMPANY
Houston, Texas

TABLE 4

AMMONIUM SULFATE DRYER BAGHOUSE EXHAUST STACK

Summary of Test Results

	1	2	3
Test Data			
Test Number	1	2	3
Test Date	9/12/78	9/12/78	9/13/78
Test Time	0940-1230	1350-1620	0915-1225
Gas Flow			
Standard Cubic Feet/minute, dry	980.	950.	930.
Actual Cubic Feet/minute, wet	1,260.	1,220.	1,190.
Particulates			
Nozzle, Probe and Front Half Filter Holder Catch Fraction, g	0.0594	0.1423	0.2344
Filter Catch Fraction, g	0.0405	0.1405	0.0647
Total Particulates, g	0.0999	0.2828	0.2991
Particulate Emissions[1]			
Grains/dry standard cubic foot[2]	0.028	0.085	0.093
Pounds/hour	0.24	0.70	0.74
Baghouse Particulate Removal Efficiency, percent	97.2	91.1	97.6
Visible Emissions			
≥ 5 percent opacity, minutes observed	0.	0.	0.
0 percent opacity, minutes observed	0.	0.	0.
No visible emission, minutes observed	120.	120.	120.
Product Moisture Content			
Moisture content of Dryer Inlet Sample, percent	0.46	0.50	0.54
Moisture content of Dryer Outlet Sample, percent	0.14	0.19	0.03

[1] Based on Total Particulates captured by train.

[2] Standard Conditions = 68°F and 29.92 inches mercury.

AMMONIUM SULFATE DRYER BAGHOUSE INLET

Particle Size Distribution

FIGURE 6