Anthracite Coal Combustion
AP-42 Section Chap 4
Reference Ref 2

Reference 10

Scott
Environmental Technology

SET 1488 01 0475

SOURCE SAMPLING OF ANTHRACITE COAL FIRED BOILERS

RCA - ELECTRONIC COMPONENTS
LANCASTER, PENNSYLVANIA

FINAL REPORT

Prepared for:

Environmental Protection Agency
National Air Data Branch
Research Triangle Park, North Carolina 27711

April 1975

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.
Plumsteadville, Pennsylvania 18949

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1.0 INTRODUCTION

In order to assist in the Compilation of Air Pollution Emission Factors from anthracite coal-fired boilers, the National Air Data Branch of the Environmental Protection Agency contracted Scott Environmental Technology to perform source sampling tests for nitrogen oxides and particulate emissions at the RCA - Electronic Components plant in Lancaster, Pennsylvania.

The power plant at RCA consists of three anthracite coal-fired boilers and one boiler equipped to operate on either gas or oil. The latter is run continuously. In the winter the coal-fired boilers are used intermittently for peak load periods and are otherwise kept banked. They are not in use during the warmer months.

The coal-fired boilers are rated at 12,500 lb/hr (Boiler #1) and 25,000 lb/hr (Boilers #2 and #3), and are fired by Combustion Engineering travelling grate furnaces. The combustion products are ducted through rectangular breechings to a single 150 foot stack. Each duct has a fall-out trap immediately before the stack. In addition, the ducts and the base of the stack are cleaned periodically.

The original task order called for three one-hour (minimum) tests to be performed on Boiler #1 and Boiler #2. However, preliminary traverses conducted on Boiler #1 indicated very low flows ($\Delta P \leq 0.01$ in. H_2O). This raised the problems of suitable nozzle sizes and the possibility of "settling-chamber" effects in the duct (48" x 84"). Hence, in mutual consultation with the EPA Project Officer, it was decided to test Boiler #3 instead.

Three sixty minute tests were conducted in the outlet duct (48" x 84") from Boiler #2 and three one hundred minute tests in the outlet duct (48" x 72") from Boiler #3. The particulate samples were obtained according to the EPA Method 5, "Determination of Particulate Emissions from Stationary Sources". A cyclone assembly was included in the glass train, and water-wash and acetone-wash of the back half of the sampling train was also included in the sample analyses. During each run, two NO_x samples were recovered according to the EPA Method 7, "Determination of Nitrogen Oxide Emissions from Stationary Sources". Also, several grab gas samples were extracted during each test for analysis of carbon dioxide, oxygen, carbon monoxide, excess air and dry molecular weight. The analysis was performed

using an Orsat apparatus. In addition, carbon monoxide levels were determined using an Ecolyzer Model 2800. However, the gas concentration was greater than the maximum detectable range of the instrument (600 ppm) and no results could be obtained with this unit.

During each test run, four coal samples were taken as the coal entered the travelling grate. A proximate analysis and calorific value of the coal was determined from a composite sample of the coal used in each test run. One ultimate analysis on the coal sample used in each boiler was also determined.

Particle sizing on the samples obtained from each boiler were analyzed thus:

1. Particle sizing on the cyclone catch from a composite of three test runs.
2. Particle sizing on the acetone front wash catch from a composite of three test runs.
3. Particle sizing on the cyclone + acetone wash from a composite of three test runs.

The relative differential and cumulative weight percent versus equivalent spherical diameter graphs for these samples are presented in Appendices D1 and D2. The samples were dispersed by Type IIA dispersant in 50/50 Isoton/Glycerine electrolyte and ultrasoniced for 60 seconds. The analysis used a Model TA Coulter Counter.

During each test run, periodic monitoring of the steam flow rate and coal feed rate was also performed.

The test team was comprised of three Scott employees. Three complete tests were performed on Boiler #2 on February 11, 1975. Boiler #3 was tested on March 11 and 12, 1975.

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2.0 SUMMARY AND DISCUSSION OF RESULTS

A summary of test results on Boiler #2 is presented in Table 1 (British Units) and Table 2 (Metric Units). Results on Boiler #3 are summarized in Table 3 (British Units) and Table 4 (Metric Units). Tables 5 and 6 sujmarize the carbon monoxide and nitrogen oxides emissions from Boiler #2 and #3 respectively.

Runs 2 and 3 at Boiler #2 showed reasonable replication. However, the particulate catch in Run #1, especially with the cyclone and acetone wash (see Appendix C) was much higher than the corresponding catches for Runs 2 and 3. Visual inspection of the samples indicated no discrepancy in the nature or type of sample collected from one run to another. No conclusive evidence for this variation in Run 1 could be established.

All three runs on Boiler #3 showed good replication of particulate loading. However, during Run 3, the coal feed rate and the steam flow rate were slightly lower than in Runs 1 and 2. This is also reflected in the lower volumetric flow rate obtained in Run 3.

Although both boilers are normally operated at 40-50 percent excess air, Orsat analysis of gas samples obtained at the test points indicated an average excess air value of 108% for Boiler #2 and 74% for Boiler #3. A probable explanation for this could be due to leaks in the breeching of both boilers. The breeching on Boiler #2 is only partially insulated, while the breeching on Boiler #3 is not insulated at all. Both breechings could very likely have ambient leaks into the gas stream.

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TABLE 1 SUMMARY OF PARTICULATE RESULTS - BOILER #2
(British Units)

Run Number:	1	2	3	Average
Date	2/11/75	2/11/75	2/11/75	
Volume of gas sampled - DSCF	41.85	39.89	39.97	40.57
Percent Moisture by Volume	3.2	3.5	4.7	3.8
Average stack Temp. - °F	362	368	359	363
Average Stack Velocity - fpm	837	816	822	825
Stack Volumetric Flow Rate - DSCFM	14540	14010	14110	14220
Stack Volumetric Flow Rate - ACFM	23444	22842	23016	23101
Percent Isokinetic	98.7	97.4	97.3	97.8
Percent Excess Air	105.5	103.5	114.8	107.9
Coal Feed Rate - ton/hr	1.265	1.382	1.368	1.338
Coal Calorific Value - BTU/lb	12145	12332	12382	12286
Coal Ash Content - weight %	8.18	8.68	8.05	8.30
Particulate - probe, cyclone & filter catch				
mg	333.4	135.7	106.8	192.0
gr/DSCF	0.1227	0.0524	0.0412	0.0727*
gr/ACF	0.0761	0.0322	0.0252	0.0447*
lb/hr	15.28	6.29	4.98	8.85
lb/ton feed	12.08	4.55	3.64	6.76
lb/million BTU	0.497	0.185	0.147	0.276
Emission Factor[(a)] - lb/ton	1.48A	0.524A	0.452A	0.819A
Particulate - total catch				
mg	395.9	173.7	126.2	231.9
gr/DSCF	0.1457	0.0671	0.0486	0.0878*
gr/ACF	0.0903	0.0412	0.0298	0.0540*
lb/hr	18.15	8.05	5.88	10.69
lb/ton feed	14.35	5.82	4.30	8.16
lb/million BTU	0.591	0.236	0.174	0.334
Emission Factor[(a)] - lb/ton	1.75A	0.671A	0.534A	0.985A

Standard conditions: 70°F; 29.92 in.Hg.
(a) 'A' is the ash content expressed as weight percent
* Weighted averages

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TABLE 2 SUMMARY OF PARTICULATE RESULTS - BOILER #2
(Metric Units)

Run Number:	1	2	3	Average
Date	2/11/75	2/11/75	2/11/75	
Volume of gas sampled - Nm^3	1.184	1.129	1.131	1.148
Percent Moisture by Volume	3.2	3.5	4.7	3.8
Average Stack Temp. - °C	183	187	182	184
Average Stack Velocity - m/sec.	4.32	4.21	4.24	4.26
Stack Volumetric Flow Rate - Nm^3/min.	411.5	396.5	399.3	402.4
Stack Volumetric Flow Rate - m^3/min.	663.5	646.4	651.4	653.8
Percent Isokinetic	98.7	97.4	97.3	97.8
Percent Excess Air	105.5	103.5	114.8	107.9
Coal Feed Rate - Mton/hr	1.148	1.253	1.241	1.214
Coal Calorific Value - kcal/kg	6752.6	6856.6	6884.4	6831.2
Coal Ash Content - weight %	8.18	8.68	8.05	8.30
Particulate - probe, cyclone & filter catch				
mg	333.4	135.7	106.8	192.0
mg/Nm^3	280.7	119.9	94.27	166.2*
mg/m^3	174.1	73.67	57.66	102.3*
kg/hr	6.93	2.85	2.26	4.01
kg/Mton feed	6.04	2.27	1.82	3.38
kg/Million kcal	0.895	0.333	0.265	0.498
Emission Factor[(a)] - kg/Mton	0.738A	0.262A	0.226A	0.409A
Particulate - total catch				
mg	395.9	173.7	126.2	231.9
mg/Nm^3	333.4	153.5	111.2	200.8*
mg/m^3	206.6	94.27	68.18	123.6*
kg/hr	8.23	3.65	2.67	4.85
kg/Mton feed	7.17	2.91	2.15	4.08
kg/million kcal	1.062	0.425	0.313	0.600
Emission Factor[(a)] - kg/Mton	0.877A	0.335A	0.267A	0.493A

Standard Conditions: 21.1°C and 76 mm Hg.
(a) 'A' is the ash content expressed as weight percent
* Weighted averages.

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TABLE 3 SUMMARY OF PARTICULATE RESULTS - BOILER #3
(British Units)

Run Number:	1	2	3	Average
Date	3/11/75	3/12/75	3/12/75	
Volume of gas sampled - DSCF	76.27	79.26	59.68	71.74
Percent Moisture by Volume	3.2	3.7	5.0	3.97
Average stack Temp. - °F	454	440	408	434
Average Stack Velocity - fpm	626	650	481	586
Stack Volumetric Flow Rate - DSCFM	8465	8864	6700	8010
Stack Volumetric Flow Rate - ACFM	15017	15593	11544	14051
Percent Isokinetic	101.4	100.4	100.7	100.8
Percent Excess Air	76.3	71.7	73.5	73.8
Coal Feed Rate - ton/hr	1.587	1.599	1.512	1.566
Coal Calorific Value - BTU/lb	12042	11936	12028	12002
Coal Ash Content - weight %	8.69	8.67	8.50	8.62
Particulate - probe, cyclone & filter catch				
mg	876.2	898.0	541.5	771.9
gr/DSCF	0.1769	0.1745	0.1397	0.1656*
gr/ACF	0.0997	0.0992	0.0811	0.0944*
lb/hr	12.84	13.25	8.02	11.37
lb/ton feed	8.09	8.29	5.30	7.23
lb/million BTU	0.336	0.347	0.220	0.301
Emission Factor[(a)] - lb/ton	0.931A	0.956A	0.624A	0.837A
Particulate - total catch				
mg	895.9	925.7	565.3	795.6
gr/DSCF	0.1809	0.1799	0.1459	0.1708*
gr/ACF	0.1020	0.1023	0.0847	0.0974*
lb/hr	13.12	13.66	8.38	11.72
lb/ton feed	8.27	8.54	5.54	7.45
lb/million BTU	0.343	0.358	0.230	0.310
Emission Factor[(a)] - lb/ton	0.952A	0.985A	0.652A	0.863A

Standard conditions: 70°F; 29.92 in.Hg.
(a) 'A' is the ash content expressed as weight percent
* Weighted averages

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TABLE 4 SUMMARY OF PARTICULATE RESULTS - BOILER #3
(Metric Units)

Run Number:	1	2	3	Average
Date	3/11/75	3/12/75	3/12/75	
Volume of gas sampled - Nm^3	2.158	2.243	1.689	2.030
Percent Moisture by Volume	3.2	3.7	5.0	3.97
Average Stack Temp. - °C	234	227	209	223
Average Stack Velocity - m/sec	3.23	3.36	2.48	3.02
Stack Volumetric Flow Rate - Nm^3/min.	239.6	250.9	189.6	226.7
Stack Volumetric Flow Rate - m^3/min.	425.0	441.3	326.7	397.7
Percent Isokinetic	101.4	100.4	100.7	100.8
Percent Excess Air	76.3	71.7	73.5	73.8
Coal Feed Rate - Mton/hr	1.439	1.450	1.372	1.420
Coal Calorific Value - kcal/kg	6695.3	6636.4	6687.6	6673.1
Coal Ash Content - weight %	8.69	8.67	8.50	8.62
Particulate - probe, cyclone & filter catch				
mg	876.2	898.0	541.5	771.9
mg/Nm^3	404.7	399.3	319.6	379.0*
mg/m^3	228.1	227.0	185.6	216.1*
kg/hr	5.82	6.01	3.64	5.16
kg/Mton feed	4.04	4.14	2.65	3.61
kg/Million kcal	0.605	0.625	0.396	0.542
Emission Factor[(a)] - kg/Mton	0.465A	0.478A	0.312A	0.418A
Particulate - total catch				
mg	895.9	925.7	565.3	795.6
mg/Nm^3	413.9	411.6	333.8	390.7*
mg/m^3	233.4	234.1	193.8	222.8*
kg/hr	5.95	6.20	3.80	5.32
kg/Mton feed	4.13	4.28	2.77	3.73
kg/million kcal	0.615	0.644	0.414	0.558
Emission Factor[(a)] - kg/Mton	0.476A	0.493A	0.326A	0.432A

Standard Conditions: 21.1°C and 76 mm Hg.
(a) 'A' is the ash content expressed as weight percent
* Weighted averages.

TABLE 5 SUMMARY OF CARBON MONOXIDE & NITROGEN OXIDES EMISSIONS - BOILER #2

		Nitrogen Oxides					Carbon Monoxide			
Run	Test Time	NO_x Sample@	NO_x ppm	NO_x (as NO_2) lb/hr	NO_x (as NO_2) lb/10^6BTU	NO_x (as NO_2) lb/ton feed	CO %	CO lb/hr	CO lb/10^6BTU	CO lb/ton feed
1	1116-	1150	146.1	15.23	0.496	12.04	0.70	444.0	14.45	351.0
	1245	1225	137.6	14.34	0.467	11.34				
2	1439-	1440	163.7	16.44	0.482	11.90	0.27	165.0	4.84	119.4
	1555	1545	250.8	25.19	0.739	18.23				
3	1654-	1705	161.0	16.28	0.481	11.90	0.15	92.3	2.72	67.5
	1815	1730	224.8	22.74	0.671	16.62				
Average			180.7	18.37	0.556	13.67	0.37	233.8	7.34	179.3

TABLE 6 SUMMARY OF CARBON MONOXIDE & NITROGEN OXIDES EMISSIONS - BOILER #3

		Nitrogen Oxides					Carbon Monoxide			
Run	Test Time	NO_x Sampled@	NO_x ppm	NO_x (as NO_2) lb/hr	NO_x (as NO_2) lb/10^6BTU	NO_x (as NO_2) lb/ton feed	CO %	CO lb/hr	CO lb/10^6BTU	CO lb/ton feed
1	1537-	1643	129.1	7.83	0.205	6.19	0.0	0.0	0.0	0.0
	1732	1721	154.1	9.35	0.245	7.39				
2	0843-	0914	156.4	9.94	0.260	7.19	0.0	0.0	0.0	0.0
	1037	0948	159.3	10.12	0.265	7.32				
3	1307-	1310	159.9	7.68	0.211	5.61	0.0	0.0	0.0	0.0
	1503	1357	156.5	7.52	0.207	5.50				
Average			152.6	8.74	0.232	6.53	0.0	0.0	0.0	0.0

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3.0 PROCESS DESCRIPTION & OPERATION

The power plant at the RCA Electronic Components plant in Lancaster, Pennsylvania is comprised of three anthracite coal-fired boilers and one boiler equipped to operate on either gas or oil. The coal-fied boilers are rated at 12,500 lb/hr (#1) and 25,000 lb/hr (#2 and #3) of steam, and are fired by Combustion Engineering travelling grate furnaces. They are normally operated at 40-50 percent excess air and are typical of heating plant boilers in use throughout the country. No control devices exist on these units and the combustion products are ducted through rectangular breechings to a single 150 foot stack (see Figure 1). Each duct has a fall-out trap immediately before the stack.

During testing, the coal feed rate and steam flow rate were monitored on integrating counters. In addition, the steam flow rate was also monitored on cicular recording charts. Tables 7 and 8 depict the coal feed rates and steam flow rates during the testing of Boilers #2 and #3.

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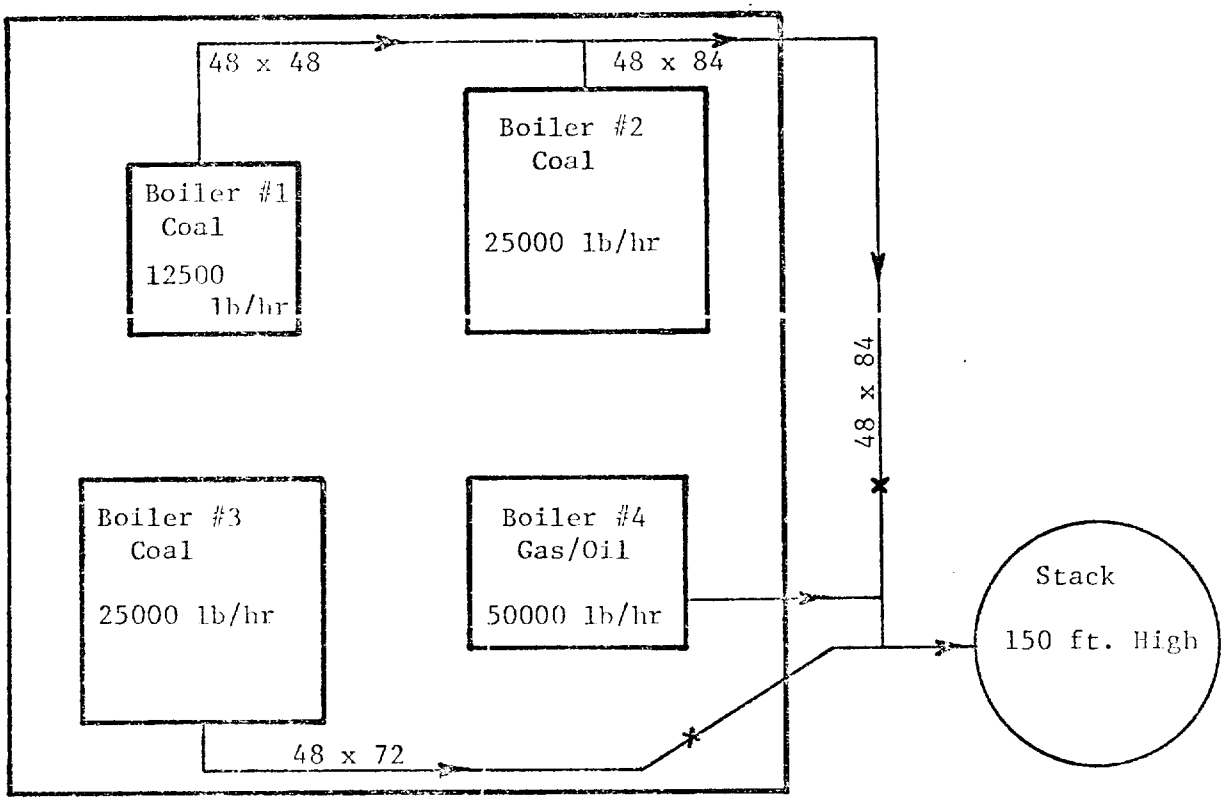
FIGURE 1 BOILER BREECHING LAYOUT

RCA ELECTRONIC COMPONENTS
Lancaster, Pennsylvania



x Test Location

TABLE 7 PROCESS CONDITIONS

RCA Lancaster - Boiler #2 - 2/11/75

Run	Time	Coal Counter(lbs/hr) (Integrating Factor = 6.5)	Steam Flow Counter(lbs/hr) (Integrating Factor = 3500)	Steam Flow Chart (lbs/hr)
	0945	70083		
	1120	70575		22500
1	1212	70990		24000
	1235	71186		23000
	Average:	2530.4 lbs/hr		23166.7 lbs./hr
	1422	72083	747.5	22000
	1458	72314	749.8	20000
2	1525	72530	753.8	23300
	1608	72834	757.5	25500
	Average:	2763.1 lbs/hr	19811.3 lbs/hr	22700 lbs/hr
	1654	73256	762.2	24000
	1715	73422	764.1	22000
3	1739	73577	766.3	22500
	1804	73747	768.6	22000
	Average:	2735.6 lbs/hr	19200.0 lbs/hr	22625 lbs/hr

TABLE 8 PROCESS CONDITIONS

RCA Lancaster - Boiler #3 - 3/11/75 - 3/12/75

Run	Time	Coal Counter (lb/hr) Integrating Factor = 84	Steam Flow Counter (lb/hr) Integrating Factor = 3500	Steam Flow Chart (lbs/hr)
1	1543	7510	9460.4	20000
	1628	7541	9464.8	23000
	1652	7554	9466.2	22000
	1731	7578	9470.0	22000
	Average:	3173.3 lbs/hr	13666.7 lbs/hr	21750
2	0845	8005	9533.1	22000
	0930	8045	9537.5	21000
	0959	8053	9540.3	20000
	1018	8064	9542.1	20000
	Average:	3197.4 lbs/hr	20322.6 lbs/hr	20750
3	1322	8184	9559.7	18000
	1344	8197	9561.6	19000
	1415	8216	9564.2	19000
	1437	8229	9566.1	20000
	Average:	3024.0 lbs/hr	17919.9 lbs/hr	19000

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4.0 LOCATION OF SAMPLING POINTS

The test location for Boiler #2 was located on a 48" x 84" insulated duct which ran outside the heating plant builidng, about 15 feet above ground level. The straight portion of the duct is 35 feet long and the testing plane was chosen about 28 feet from the nearest upstream distrubance. Twenty traverse points (5 ports, 4 points each) were selected for testing. Figure 2 depicts the test plane location and duct cross-section for Boiler #2.

The breeching from Boiler #3 runs vertically upward through the plant building to the roof and then through a horizontal duct (48" x 72") to the stack. The test location for Boiler #3 was selected on the longest straight duct section on the roof, about 117 inches from the nearest downstream distrubance. Twenty traverse points (5 ports, 4 points each) were selected for testing. Figure 3 illustrates the test plane location and duct cross-section for Boiler #3.

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FIGURE 2 SAMPLE PLANE LOCATION - BOILER #2
RCA ELECTRONIC COMPONENTS, Lancaster, Pennsylvania

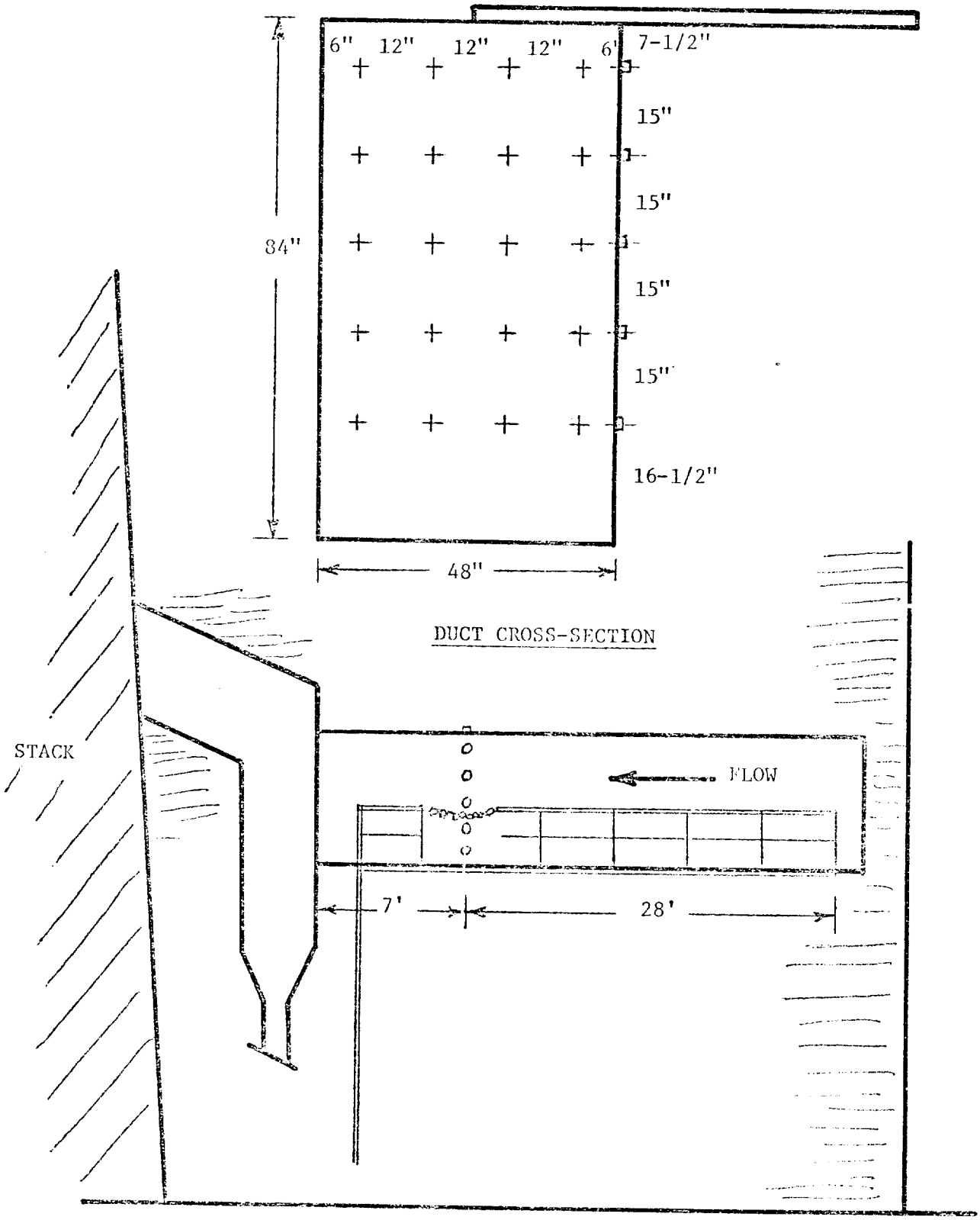

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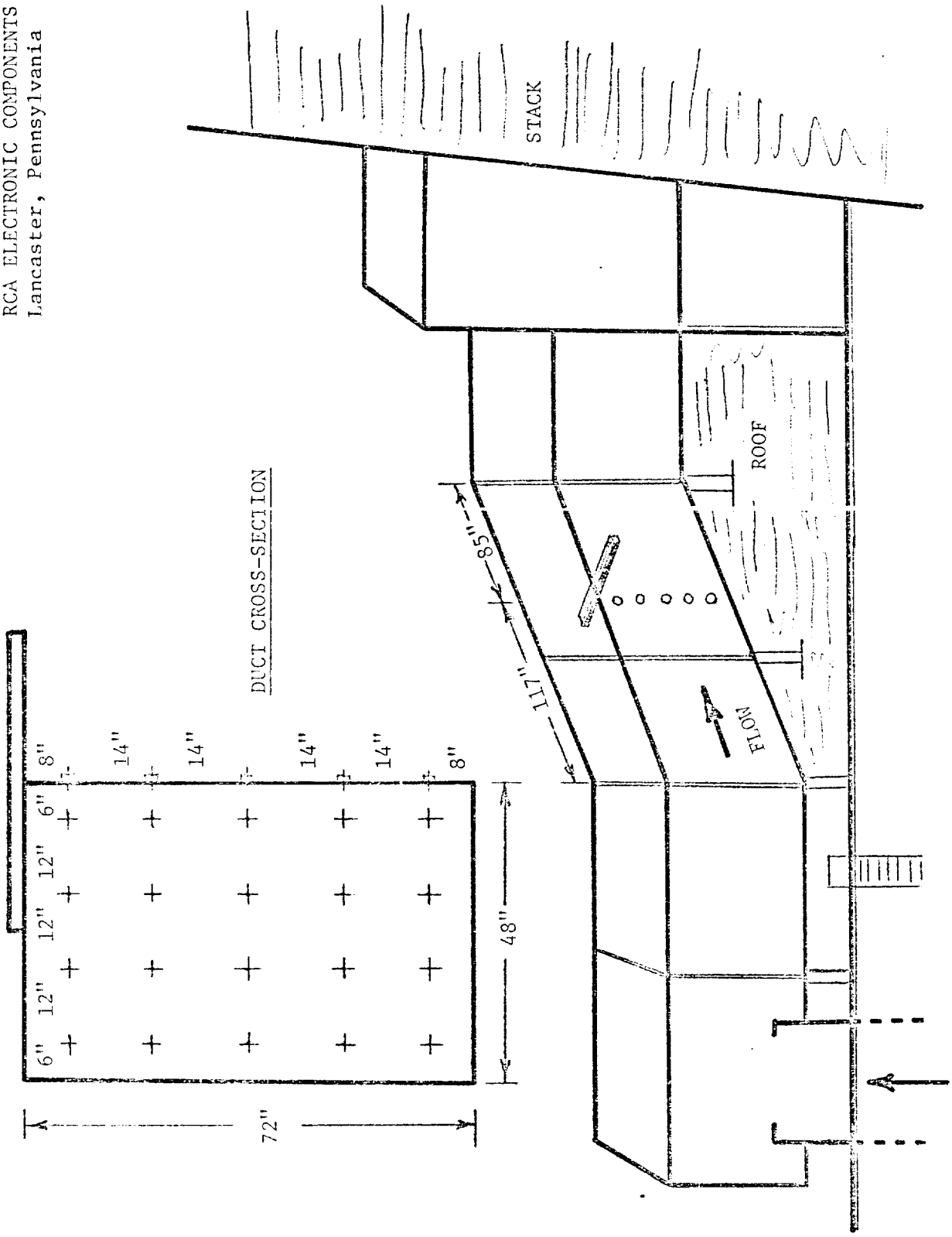
FIGURE 3 SAMPLE PLANE LOCATION - BOILER #3

RCA ELECTRONIC COMPONENTS
Lancaster, Pennsylvania



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5.0 SAMPLING AND ANALYTICAL PROCEDURES

The sampling and analytical procedures for particulate emissions were done in accordance with EPA Method 5, "Determination of Particulate Emissions from Stationary Sources," as published in the Federal Register, Volume 36, No. 247, Tuesday, December 23, 1971. The only modification to this procedure was the retention of impinger catches for particulate gravimetric analysis.

Briefly, the method consisted of withdrawing a sample isokinetically from the stack through a heated probe into a filter and impinger train as shown in Figure 4. The sample volume is measured with a dry gas meter and isokinetic conditions were maintained by monitoring the stack gas velocity. After testing was completed, the train was thoroughly washed including the probe. A water and acetone wash were used and collected in separate containers. These washings were evaporated, dried and weighed along with the filter and summed to obtain the total weight of particulate matter collected.

Nitrogen Oxide emissions were sampled according to EPA Method 7, "Determination of Nitrogen Oxide Emissions from Stationary Sources". A two-liter round bottomed flask was filled with 25 ml of absorbing solution and evacuated to about 28 inches of mercury. The flask was then attached to a heated glass lined probe containing a glass-wool filter, and the lines purged prior to extracting a gas sample for about 15 seconds. After collecting a sample, the flask was shaken for about 5 minutes and set aside for at least 16 hours. Final flask pressure was then monitored and the sample analyzed in the laboratory for NO_x concentration.

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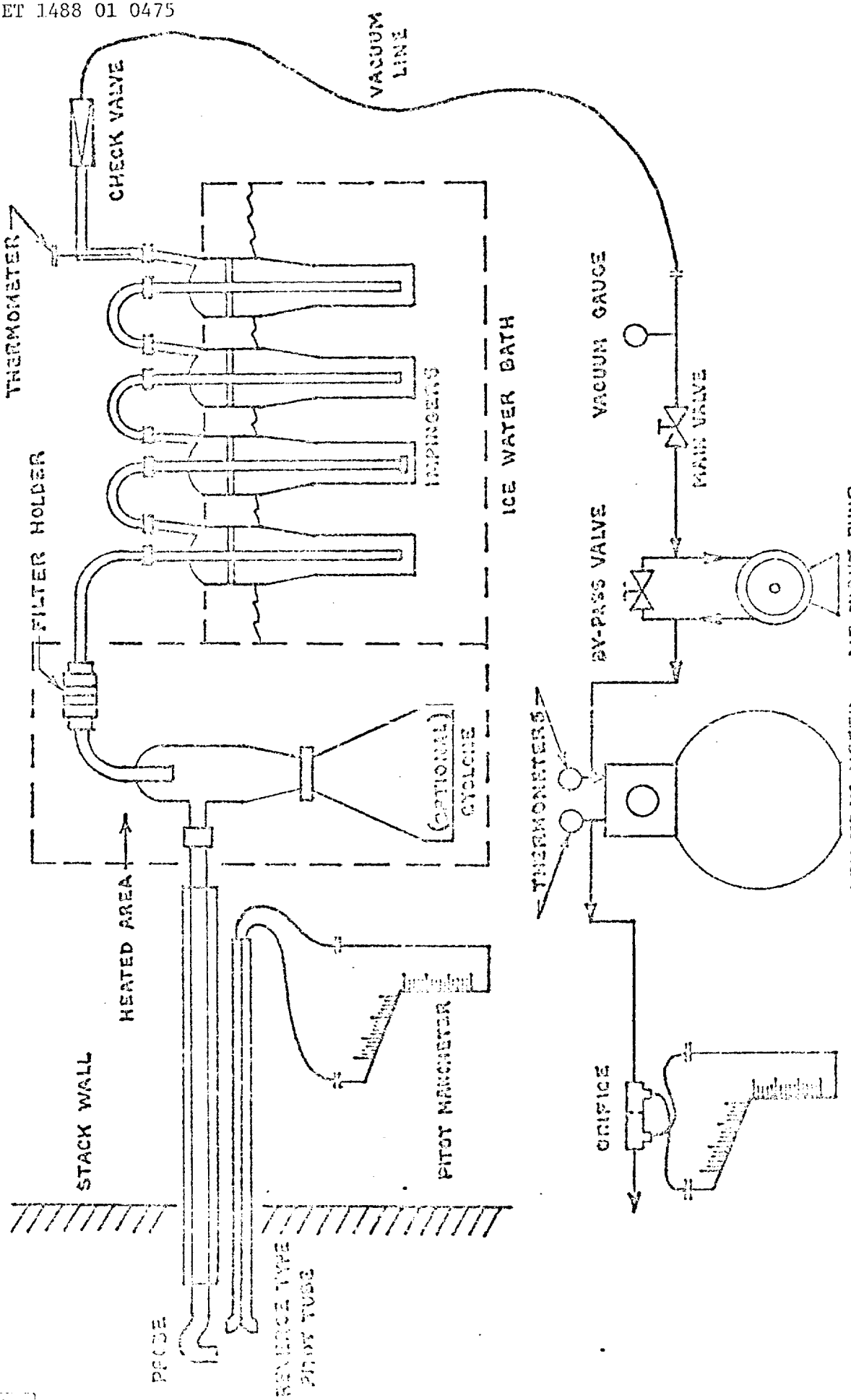

FIG. 4 PARTICULATE SAMPLING TRAIN

APPENDIX A

Complete particulate results with example calculation.

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SAMPLING DATA - BOILER #2

Run No.		1	2	3
Test Date		2/11/75	2/11/75	2/11/75
Sampling Time, 24 hour clock		1116-1245	1439-1555	1654-1815
D_n	Sampling Nozzle Diameter, in.	0.500	0.500	0.500
T_t	Net Time of Test, Min.	60	60	60
P_b	Barometric Pressure, in. Hg Absolute	29.76	29.75	29.80
P_m	Average Orifice Pressure Drop, in. H_2O	1.489	1.387	1.422
V_m	Volume of Dry Gas Sampled at Meter Conditions, DCF	41.02	39.56	39.86
T_m	Average Gas Meter Temperature, °F	58.5	64.5	68.3
$V_{m_{std}}$	Volume of Dry Gas Sampled at Standard Conditions[a], DSCF	41.85	39.89	39.97
V_w	Total H_2O Collected in Impingers and Silica Gel, ml	28.8	30.7	42.0
$V_{w_{gas}}$	Volume of Water Vapor Collected at Standard Conditions[b], SCF	1.36	1.45	1.98
% M	% Moisture in Stack Gas, by Volume	3.15	3.51	4.73
M_d	Mole Fraction of Dry Gas	0.969	0.965	0.953
% CO_2	Volume % Dry	8.57	9.10	8.83
% O_2	Volume % Dry	10.90	10.80	11.33
% CO	Volume % Dry	0.70	0.27	0.15
% N_2	Volume % Dry	79.83	79.83	79.69
MW_d	Molecular Weight of Stack Gas, Dry Basis	29.81	29.89	29.87
MW	Molecular Weight of Stack Gas, Wet Basis	29.44	29.47	29.30
C_p	Pitot Tube Coefficient	0.85	0.85	0.85
T_s	Average Stack Temperature °F	362.2	367.6	359.0
N_p	Net Sampling Points	20	20	20
P_{st}	Static Pressure of Stack Gas, in. H_2O	0.52	0.52	0.52
P_s	Stack Gas Pressure, in. Hg Absolute	29.72	29.71	29.76

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SAMPLING DATA - BOILER #2 (contd)

Run No.		1	2	3
V_s	Stack Gas Velocity at Stack Conditions, fpm	837.3	815.8	822.0
A_s	Stack Area, $in.^2$	4032	4032	4032
Q_s	Dry Stack Gas Volumetric Flow Rate at Standard Conditions[c], DSCFM	14540	14010	14110
Q_a	Stack Gas Volumetric Flow Rate at Stack Conditions, ACFM	23444	22842	23016
% I	Percent Isokinetic	98.7	97.4	97.3
% O	Percent Opacity	-	-	-
T_c	Unit Feed Rate-ton/hr	1.265	1.382	1.368
m_f	Particulate - Probe, Cyclone, and Filter, mg	333.4	135.7	106.8
m_t	Particulate - Total, mg	395.9	173.7	126.2
I_c	% Impinger Catch	15.8	21.9	15.4
C_{an}	Particulate - Probe, Cyclone, and Filter, gr/SCF	0.1227	0.0524	0.0412
C_{ao}	Particulate - Total, gr/SCF	0.1457	0.0671	0.0486
C_{at}	Particulate - Probe, Cyclone, and Filter, gr/ACF	0.0761	0.0322	0.0252
C_{au}	Particulate - Total, gr/ACF	0.0903	0.0412	0.0298
C_{aw}	Particulate - Probe, Cyclone, and Filter, lb/hr	15.28	6.29	4.98
C_{ax}	Particulate - Total, lb/hr	38.15	8.05	5.88
P_{tf}	Particulate - Probe, Cyclone, and Filter, lb/ ton feed	12.08	4.55	3.64
P_{tt}	Particulate - Total, lb/ton feed	14.35	5.82	4.30

---

a Dry standard cubic feet at 70°F, 29.92 in. Hg.

b Standard conditions at 70°F, 29.92 in. Hg.

c Dry standard cubic feet per minute at 70°F, 29.92 in. Hg.

SET 1488 01 0475

SAMPLING DATA - BOILER #3

Run No.		1	2	3
Test Date		3/11/75	3/12/75	3/12/75
Sampling Time, 24 hour clock		1537-1732	0843-1037	1307-1503
D_n	Sampling Nozzle Diameter, in.	0.626	0.626	0.626
T_t	Net Time of Test, Min.	100	100	100
P_b	Barometric Pressure, in. Hg Absolute	30.10	30.03	29.96
P_m	Average Orifice Pressure Drop, in. H_2O	2.078	2.205	1.279
V_m	Volume of Dry Gas Sampled at Meter Conditions, DCF	76.14	78.78	59.99
T_m	Average Gas Meter Temperature, °F	75.0	71.6	75.2
$V_{m_{std}}$	Volume of Dry Gas Sampled at Standard Conditions[a], DSCF	76.27	79.26	59.68
V_w	Total H_2O Collected in Impingers and Silica Gel, ml	53.7	65.2	66.6
$V_{w_{gas}}$	Volume of Water Vapor Collected at Standard Conditions[b], SCF	2.54	3.08	3.14
% H	% Moisture in Stack Gas, by Volume	3.22	3.74	5.00
M_d	Mole Fraction of Dry Gas	0.968	0.963	0.950
% CO_2	Volume % Dry	11.53	11.70	11.43
% O_2	Volume % Dry	9.13	8.83	8.97
% CO	Volume % Dry	0.00	0.00	0.00
% N_2	Volume % Dry	79.34	79.47	79.60
MW_d	Molecular Weight of Stack Gas, Dry Basis	30.21	30.23	30.19
MW	Molecular Weight of Stack Gas, Wet Basis	29.82	29.77	29.58
C_p	Pitot Tube Coefficient	0.85	0.85	0.85
T_s	Average Stack Temperature °F	454.3	439.7	407.6
N_p	Net Sampling Points	20	20	20
P_{st}	Static Pressure of Stack Gas, in. Hg	0.43	0.43	0.43
P_s	Stack Gas Pressure, in. Hg Absolute	30.07	30.00	29.93

SET 1488 01 0475

SAMPLING DATA - BOILER #3 (contd)

Run No.		1	2	3
V_s	Stack Gas Velocity at Stack Conditions, fpm	625.7	649.7	481.0
A_s	Stack Area, $in.^2$	3456	3456	3456
Q_s	Dry Stack Gas Volumetric Flow Rate at Standard Conditions[c], DSCFM	8465	8864	6700
Q_a	Stack Gas Volumetric Flow Rate at Stack Conditions, ACFM	15017	15593	11544
% I	Percent Isokinetic	101.4	100.4	100.7
% O	Percent Opacity	-	-	-
T_c	Unit Feed Rate-ton/hr	1.587	1.599	1.512
m_f	Particulate - Probe, Cyclone, and Filter, mg	876.2	898.0	541.5
m_t	Particulate - Total, mg	895.9	925.7	565.3
I_c	% Impinger Catch	2.2	3.0	4.2
C_{an}	Particulate - Probe, Cyclone, and Filter, gr/SCF	0.1769	0.1745	0.1397
C_{ao}	Particulate - Total, gr/SCF	0.1809	0.1799	0.1459
C_{at}	Particulate - Probe, Cyclone, and Filter, gr/ACF	0.0997	0.0992	0.0811
C_{au}	Particulate - Total, gr/ACF	0.1020	0.1023	0.0847
C_{aw}	Particulate - Probe, Cyclone, and Filter, lb/hr	12.84	13.25	8.02
C_{ax}	Particulate - Total, lb/hr	13.12	13.66	8.38
P_{tf}	Particulate - Probe, Cyclone, and Filter, lb/ ton feed	8.09	8.29	5.30
P_{tt}	Particulate - Total, lb/ton feed	8.27	8.54	5.54

---

a Dry standard cubic feet at 70°F, 29.92 in. Hg.

b Standard conditions at 70°F, 29.92 in. Hg.

c Dry standard cubic feet per minute at 70°F, 29.92 in. Hg.

PARTICULATE CALCULATIONS
(Example for Run #1 - Boiler #3)

1. Volume of dry gas sampled at standard conditions - 70°F, 29.92" Hg, ft.^{3}

$$V_{m_{std}} = \frac{17.7 \times V_m \left(P_B + \frac{P_m}{13.6} \right)}{(T_m + 460)} = \text{Ft.}^3 = \frac{17.714 \times 76.14 \left(30.10 + \frac{2.078}{13.6} \right)}{(75+460)}$$

$$= 76.27 \text{ cu. ft.}$$

2. Volume of water vapor at 70°F & 29.92" Hg, Ft.^{3}

$$V_{w_{gas}} = 0.0474 \times V_w = \text{Ft.}^3 = 0.0474 \times 53.7 = 2.54 \text{ cu ft}$$

3. % Moisture in stack gas

$$\%M = \frac{100 \times V_{w_{gas}}}{V_{m_{std}} + V_{w_{gas}}} = \% = \frac{100 \times 2.54}{76.27 + 2.54} = 3.22\%$$

4. Mole fraction of dry gas

$$M_d = \frac{100 - \%M}{100} = \frac{100 - 3.22}{100} = 0.9678$$

5. Average molecular weight of dry stack gas

$$MW_d = (\%CO_2 \times \frac{44}{100}) + (\%O_2 \times \frac{32}{100}) + (\%N_2 \times \frac{28}{100}) + (\%CO \times \frac{28}{100})$$

$$= (11.53 \times 0.44) + (9.13 \times 0.32) + (79.34 \times 0.28) + (-0-) = 30.21$$

6. Molecular weight of stack gas

$$MW = MW_d \times M_d + 18 (1 - M_d)$$

$$= 30.21 \times 0.9678 + 18(1-0.9678) = 29.82$$

SET 1488 01 0475

7. Stack velocity & Stack conditions, fpm

$$V_s = 4350 \times \sqrt{\Delta P_s \times (T_s + 460)} \left[\frac{1}{P_s \times M_W}\right]^{1/2} = \text{fpm} = \underline{625.7} \text{ fpm}$$

(Averaged over 20 points)

8. Stack gas volume @ standard conditions, SCFM

$$Q_s = \frac{0.123 \times V_s \times A_s \times M_d \times P_s}{(T_s + 460)} = \text{SCFM} = \frac{0.123 \times 625.7 \times 3456 \times 0.9678 \times 30.01}{914.3}$$

$$= \underline{8485} \text{ SCFM}$$

9. Per cent isokinetic

$$\%I = \frac{1032 \times (T_s + 460) \times V_{m\,std}}{V_s \times T_t \times P_s \times M_d \times (D_n)^2} = \% = \underline{104.4\%} \text{ (Averaged over 20 points)}$$

10. Particulate - probe, cyclone, & filter, gr/SCF

$$C_{an} = 0.0154 \times \frac{M_f}{V_{m\,std}} = \text{gr/SCF} = \frac{0.0154 \times 276.2.2}{76.27} = \underline{0.1769} \text{ gr/SCF}$$

11. Particulate total, gr/SCF

$$C_{ao} = 0.0154 \times \frac{M_t}{V_{m\,std}} = \text{gr/SCF} \quad \frac{0.0154 \times 825.7}{76.27} = \underline{0.1809} \text{ gr/SCF}$$

12. Particulate - probe, cyclone & filter, gr/CF at stack conditions.

$$C_{at} = \frac{17.7 \times C_{au} \times P_s \times M_d}{(T_s + 460)} = \text{gr/CF} = \frac{17.714 \times 0.1769 \times 30.01 \times 0.9678}{914.3}$$

$$= \underline{0.0997} \text{ gr/cf}$$

SET 1488 01 0475

13. Particulate - total, gr/CF @ stack conditions

$$C_{au} = \frac{17.7 \text{ X } C_{ao} \text{ X } P_s \text{ X } M_d}{(T_s + 460)} = \text{gr/CF} = \frac{17.714 \times 0.1809 \times 30.07 \times 0.9678}{914.3}$$

$$= 0.1020 \text{ gr/CF}$$

14. Particulate - probe, cyclone, & filter, lb/hr.

$$C_{aw} = 0.00857 \text{ X } C_{an} \text{ X } Q_s = \text{lb/hr.} = 0.00857 \times 0.1769 \times 8465$$

$$= 12.84 \text{ lb/hr}$$

15. Particulate - total, lb/hr.

$$C_{ax} = 0.00857 \text{ X } C_{ao} \text{ X } Q_s = \text{lb/hr.} = 0.00857 \times 0.1809 \times 8465$$

$$= 13.12 \text{ lb/hr}$$

16. % excess air at sampling point

$$\%\ EA = \frac{100 \text{ X } \%\ O_2}{0.266 \text{ X } \%\ N_2 - \%\ O_2} = \% = \frac{100 \times 9.13}{0.266 \times 79.34 - 9.13} = 76.3\ \%$$

17. Particulate - probe, cyclone, and filter, lb/ton feed.

$$P_{tf} = \frac{C_{aw}}{T_c} = \text{lb/ton feed} = \frac{12.84}{1.587} = 8.09 \text{ lb/ton feed}$$

18. Particulate - total, lb/ton feed.

$$P_{tt} = \frac{C_{ax}}{T_c} = \text{lb/ton feed} = \frac{13.12}{1.587} = 8.27 \text{ lb/ton feed}$$

APPENDIX B1

Field Data - Boiler #2

SET 1488 01 0475

TRAVERSE POINT LOCATION & VELOCITY DATA BY

	TRAVERSE POINT NUMBER	A=FRACTION OF I.D.	B=AxI.D. ID= 102"x04	C=B+NIPPLE NIPPLE= 4	VELOCITY HEAD (Δp_s), in.H_2O	STACK TEMPERATURE (T_s), °F
A	1			10	.03	350
	2			12	.04	360
	3			12	.04	365
	4			12	.04	365
B	5				.04	375
	6				.04	355
	7				.04	365
	8				.05	365
C	9				.02	360
	10				.03	345
	11				.03	330
	12				.04	340
D	13				.02	305
	14				.03	337
	15				.03	350
	16				.04	350
E	17				.02	305
	18				.03	340
	19				.03	345
	20				.03	350
	21					
	22					
	23					3425
	24				.0835	
	25				Ti	
	26					
	27					
	28					
	29					
	30					
	31					
	32					
	33					
	34					
	35					
	36					
	37					
	38					
	39					
	40					
	41					
	42					
	43					
	44					
	45					
	46					
	47					
	48					
	AVERAGE					

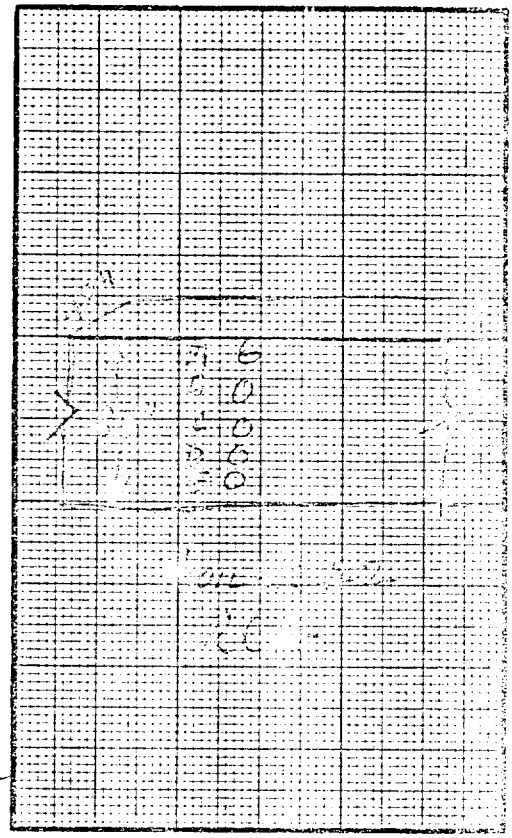


DIAGRAM OF STACK, PORTS, & TRAVERSE POINTS (indicate direction of flow)

INSIDE DIMENSIONS OF SAMPLE PLANE
94" x 48"

STACK GAUGE PRESSURE in. H_2O .52

NEAREST UPSTREAM DISTURBANCE

NEAREST DOWNSTREAM DISTURBANCE

PROCESS & CONTROL EQUIPMENT DESCRIPTION

Dry 330°F
Wet 120°F

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

SIGNED
WITNESS
DATE
DATE

PROJECT NUMBER 1488 TEST NUMBER 1 FIELD DATA SHEET

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

PLANT RCA
DATE 2/11/75
SAMPLING LOCATION Power Plant Outlet #2
SAMPLE TYPE 5
RUN NUMBER 1
OPERATORS JW JE JS
AMBIENT TEMPERATURE 37
BAROMETER 29.76 755.9cl

PROBE LENGTH & TYPE 60" gp
NOZZLE I.D. .50
SAMPLE BOX NUMBER Scott 2
METER BOX NUMBER Scott 3
PROBE HEATER SETTING 5
FILTER HEATER SETTING
REFERENCE ΔP .05
READ AND RECORD ALL DATA EVERY 3 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 #80224
			INITIAL: 670.138		DESIRED	ACTUAL		INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F			
1	3	1114	672.562	.032	1.68	1.85	395	40	40	4		0 gps
2	6		674.652	.040	1.49	1.49	375	40	40	4		
3	9		676.638	.040	1.49	1.49	375	45	40	3.5		
4	12		678.524	.050	1.81	1.81	360	45	41	4.0		
5	15		680.641	.030	1.12	1.12	345	52	44	3.1		
6	18		682.692	.042	1.54	1.54	350	57	45	3.8		
7	21		684.724	.042	1.54	1.54	350	60	46	4.0		
8	24		686.823	.050	1.81	1.81	370	63	46	4.8		
C 9	27		688.856	.032	1.18	1.18	370	65	53	3.5		
10	30		690.934	.040	1.54	1.54	393	66	54	4.0		
11	33		693.093	.045	1.62	1.62	395	68	54	4.2		
12	36		695.396	.052	1.88	1.88	397	72	56	5.0		
D 13	39		697.149	.030	1.12	1.12	363	73	58	3.5		
14	42		698.978	.030	1.12	1.12	380	75	59	4.0		
15	45		701,125	.042	1.54	1.54	373	77	60	5.0		
16	48		703,204	.042	1.54	1.54	373	79	61	5.0		
A 17	51		704.899	.025	.94	.94	225	75	61	3.5		
18	54		706.9215	.040	1.54	1.54	361	76	62	5.0		
19	57		709.038	.042	1.52	1.54	370	78	63	5.0		
20	60	1245	711.154	.042	1.52	1.54	370	80	64	5.0		
			41.016					58.5				

SET 1488 01 0475

B1-2

MOISTURE

IMPINGERS
FINAL VOLUME 218 ml
INITIAL VOLUME 200 ml
NET VOLUME 18 ml

SILICA GEL
FINAL WEIGHT 529.4 g
INITIAL WEIGHT 495.6 g
NET WEIGHT 10.8 g
TOTAL MOISTURE 28.8 g

ANALYTICAL DATA BY _____

ACETONE FRONT WASH
FINAL 80.8318 mg
TARE 80.6266 mg
NET 0.2052 mg

FILTER NUMBER 1
FINAL 0.4408 mg
TARE .4368 mg
NET 0.0580 mg

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

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

CYCLONE
FINAL 1.4375 mg
TARE 1.3673 mg
NET 0.0702 mg

TOTAL FRONT 0.3334 mg

ACETONE BACK WASH
FINAL 105.5086 mg
TARE 105.4687 mg
NET 0.0399 mg

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

WATER EVAPORATION
FINAL 87.4793 mg
TARE 87.4567 mg
NET 0.0226 mg

TOTAL BACK 0.0625 mg
(Total 0.3959)

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.

SIGNED _____ DATE ____

WITNESS _____ DATE ____

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

NOMOGRAPH DATA BY _____

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE, in. H_2O	$\Delta H_@$	1.67
AVERAGE METER TEMPERATURE (AMBIENT + 20°F), °F	$T_{m_{avg.}}$	60
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	4
BAROMETRIC PRESSURE AT METER, in. Hg	P_m	30.05
STATIC PRESSURE IN STACK, in. Hg $P_s = P_m \pm (.073 \times$ STACK GAUGE PRESSURE in in. H_2O)	P_s	.02 30.04 30.08
RATIO OF STATIC PRESSURE TO METER PRESSURE	P_s/P_m	.998
AVERAGE STACK TEMPERATURE, °F	$T_{s_{avg.}}$	342
AVERAGE VELOCITY HEAD, in. H_2O	$\Delta P_{avg.}$	.03
MAXIMUM VELOCITY HEAD, in. H_2O	$\Delta P_{max.}$	.05
C FACTOR		.86
CALCULATED NOZZLE DIAMETER, in.		.58
ACTUAL NOZZLE DIAMETER, in.		.50
REFERENCE Δp, in. H_2O		.05

DRY MOLECULAR WEIGHT DETERMINATION BY _____

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	91.6	8.4	91.3	8.7	91.4 920	8.6	8.57
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	80.2	11.4	80.9	12.4	80.5	10.9	10.90
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	80.1	0.1	80.8	0.1	80.3	2.2	0.13
N_2 (NET IS 100 MINUS ACTUAL CO READING)							0.70

PROJECT NUMBER 1488 TEST NUMBER 1 FIELD DATA SHEET

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

PLANT RCA
DATE 2/11/75
SAMPLING LOCATION Boiler # 2
SAMPLE TYPE 5
RUN NUMBER 2
OPERATORS JW & JL
AMBIENT TEMPERATURE 37°
BAROMETER 29.75 755.65

PROBE LENGTH & TYPE 60 ft
NOZZLE I.D. .50
SAMPLE BOX NUMBER Small 2
METER BOX NUMBER " 3
PROBE HEATER SETTING 4.5
FILTER HEATER SETTING
REFERENCE ΔP .05
READ AND RECORD ALL DATA EVERY 3 MINUTES

FYRITE ANALYSIS

CO_2	O_2	

#30224

TRAVERSE POINT NUMBER	SAMPLING TIME, min	CLOCK TIME (24 hr)	GAS METER READING (V_m), ft^3	VELOCITY HEAD (Δp), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O REQUIRED	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: 716.303									
A 1	3	1434	713.015	.025	.93	.93	350	45	44	R		
2	6		714.944	.032	1.20	1.20	350	48	45	2.5		
3	9		716.924	.040	1.46	1.46	360	52	46	3.0		
4	12		719.083	.040	1.46	1.46	370	56	47	3.0		
B 5	15	1454	720.694	.025	.93	.93	355	62	49	2.0		
6	18		722.710	.040	1.48	1.48	370	65	51	3.0		
7	21		724.739	.040	1.48	1.48	370	69	52	3.0		
8	24		727.007	.050	1.85	1.85	380	72	54	3.5		
C 9	27	1509	728.512	.030	1.12	1.12	367	71	56	2.7		
10	30		730.559	.040	1.48	1.48	386	76	57	3.0		
11	33		733.028	.046	1.70	1.70	400	78	58	3.2		
12	36		735.415	.056	2.06	2.06	405	81	60	3.9		
D 13	39	1528	738.110	.025	.93	.93	385	80	62	2.5		
14	42		738.947	.032	1.20	1.20	370	80	63	3.0		
15	45		740.982	.040	1.48	1.48	385	81	64	3.2		
16	48		743.275	.050	1.85	1.85	390	82	65	4.0		
E 17	51	1543	744.957	.025	.93	.93	385	82	66	2.7		
18	54		746.800	.030	1.12	1.12	365	83	67	3.0		
19	57		748.253	.040	1.48	1.48	360	84	68	3.5		
20	60	1555	750.164	.036	1.32	1.32	360	86	69	3.3		
			33.561					64.5				

MOISTURE

IMPINGERS
FINAL VOLUME 214 ml
INITIAL VOLUME 200 ml
NET VOLUME 14 ml

SILICA GEL
FINAL WEIGHT 520.0 g
INITIAL WEIGHT 503.3 g
NET WEIGHT 16.7 g

TOTAL MOISTURE 30.7 g

ANALYTICAL DATA BY _____

ACETONE FRONT WASH
FINAL 83.9618 mg
TARE 83.8903 mg
NET 0.0715 mg

FILTER NUMBER 1
FINAL 0.5035 mg
TARE .4629 mg
NET 0.0406 mg

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

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

CYCLONE
FINAL 1.3928 mg
TARE 1.3742 mg
NET 0.0186 mg

TOTAL FRONT 0.1357 mg

ACETONE BACK WASH
FINAL 88.4905 mg
TARE 88.4846 mg
NET 0.0059 mg

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

WATER EVAPORATION
FINAL 99.0214 mg
TARE 98.9843 mg
NET 0.0321 mg

TOTAL BACK 0.0380 mg
0.1737

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, MEET UNTIL DELIVERY TO A LABORATORY FOR ANALYSIS.

SIGNED _____ DATE ___

METHODS _____ 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 METHODS OR PROCEDURE.

SIGNED _____ DATE ___

WITNESS _____ DATE ___

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	9.0	9.0	9.9	9.1	9.8	9.2	9.10
O_2 (% BY VOL. ACTUAL O_2 READING minus ACTUAL CO_2 READING)	80.0	11.0	80.2	10.7	80.1	10.7	10.80
CO (% BY VOL. ACTUAL CO READING minus ACTUAL O_2 READING)	7.1	1	3.3	2.0	2.1	1.0	2.27 3.33

PROJECT NUMBER 1488 TEST NUMBER 1 FIELD DATA SHEET

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

PLANT RCA
DATE 2/11/75
SAMPLING LOCATION Boiler #2
SAMPLE TYPE 5
RUN NUMBER 3
OPERATORS GW JL JK
AMBIENT TEMPERATURE 32°
BAROMETER 29.80 in Hg

PROBE LENGTH & TYPE 60' S
NOZZLE I.D. .250
SAMPLE BOX NUMBER Scott #2
METER BOX NUMBER " #3
PROBE HEATER SETTING 425
FILTER HEATER SETTING
REFERENCE ΔH .05
READ AND RECORD ALL DATA EVERY 3 MINUTES

FYRITE ANALYSIS

	CO_2	O_2	

	POINT NUMBER	CLOCK TIME (MIN)	CLOCK TIME (MIN)	GAS METER READING (V_m), ft³	VELOCITY HEAD (Δp), in. H_2O	ORIFICE PRESSURE DIFFERENTIAL (ΔH), in. H_2O		STACK TEMPERATURE (T_s), °F	DRY GAS METER TEMPERATURE, °F		DRY GAS METER VACUUM, in. Hg	IMPINGER TEMPERATURE, °F	COMMENTS
				INITIAL: 750.922		REQUIRED	ACTUAL		INLET ($T_{m_{in}}$), °F	OUTLET ($T_{m_{out}}$), °F			
A	1	3	1600	752.874	.030	1.12	1.12	365	59	54	2.5		
	2	6		755.911	.041	1.5	1.50	370	62	57	3.0		
	3	9		757.116	.032	1.24	1.24	365	65	59	3.2		
	4	12		759.426	.046	1.69	1.69	380	67	55			
B	5	15	1700	761.186	.030	1.12	1.12	365	70	56	2.7		
	6	18		763.332	.040	1.48	1.48	370	72	57	3.0		
	7	21		765.430	.028	1.04	1.04	365	74	59	3.2		
	8	24		767.684	.046	1.69	1.69	375	77	60	3.2		
C	9	27	1750	769.268	.015	.57	.57	375	76	61	1.0		
	10	30		770.779	.036	1.34	1.34	370	78	61	3.5		
	11	33		773.050	.050	1.84	1.84	380	77	62	3.5		
	12	36		775.358	.050	1.84	1.84	380	80	63	3.7		
D	13	39	1749	776.922	.022	.80	.80	325	79	65			
	14	42		778.731	.030	1.12	1.12	335	79	65	3.2		
	15	45		780.786	.040	1.48	1.48	370	80	65	3.4		
	16	48		783.070	.050	1.84	1.84	375	82	66	4.0		
E	17	51	1803	784.704	.024	.90	.90	350	82	66	3.0		
	18	54		786.737	.040	1.48	1.48	385	83	67	3.7		
	19	57		788.779	.040	1.48	1.48	375	84	67	4.0		
	20	60	1815	790.837	.040	1.48	1.48	375	86	68	4.0		

27.668 68

SET 1488 01 0475

B1-6

MOISTURE

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

SILICA GEL
FINAL WEIGHT 529.5 g
INITIAL WEIGHT 512.5 g
NET WEIGHT 17.0 g

TOTAL MOISTURE 42.0 g

ANALYTICAL DATA BY _____

ACETONE FRONT WASH
FINAL 86.7560 mg
TARE 86.7131 mg
NET 0.0429 mg

FILTER NUMBER 1
FINAL 0.5124 mg
TARE .4605 mg
NET 0.0519 mg

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

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

CYCLONE
FINAL 1.3811 mg
TARE 1.3691 mg
NET 0.0120 mg

TOTAL FRONT 0.1068 mg

ACETONE BACK WASH
FINAL 86.0386 mg
TARE 86.0367 mg
NET 0.0019 mg

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

WATER EVAPORATION
FINAL 92.6460 mg
TARE 92.6285 mg
NET 0.0175 mg

TOTAL BACK 0.0194 mg
Total 0.1262

~~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 NOTED PROCEDURE.

SIGNED _____ DATE ____

WITNESS _____ DATE ____

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

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	$B_{w.o}$	
BAROMETRIC PRESSURE AT METER, in. Hg	P_m	
STATIC PRESSURE IN STACK, in. Hg ($P_m \pm$ (.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	$\Delta p_{s.g.}$	
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	91.2	8.8	91.2	8.8	91.1	8.9	8.83
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	79.8	11.4	79.9	11.3	79.8	11.3	11.33
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	79.8	0.0	79.8	0.1	79.8	0.0	0.03 0.033
[illegible]							

SET 1488 01 0475

FIELD DATA

NO_X FLASK

Project No. 1488 Run # 1a

Location: RCA Boiler #2

Date: 2/4/75 Time: 1150

Initial flask vacuum "Hg 25.6

Initial flask temp. °F 37° F 45

Initial Barometric Pressure 29.76

Flask volume Heat C 2039.2 cc

Final Flask Vacuum "Hg 1.2

Final flask temp. °F 70

Final Barometric Pressure 29.42

Operator JE

SET 1488 01 0475

FIELD DATA

NO_X FLASK

Project No. 1488 Run # 1b

Location: LCA Boiler #2

Date: 2/11/75 Time: 1225

Initial flask vacuum "Hg 24.5

Initial flask temp. °F 39°F 60

Initial Barometric Pressure 29.76

Flask volume D 2049.8

Final Flask Vacuum "Hg 0.7

Final flask temp. °F 70

Final Barometric Pressure 29.42

Operator

SET 1488 01 0475

FIELD DATA

NO_x FLASK

Project No. 1488 Run # 2a

Location: RCA Boiler #2

Date: 2/10/75 Time: 1440

Initial flask vacuum "Hg 25.5

Initial flask temp. °F 37°F 45

Initial Barometric Pressure 29.75

Flask volume E 2033.0 cc

Final Flask Vacuum "Hg 1.1

Final flask temp. °F 70

Final Barometric Pressure 29.42

Operator JG

SET 1488 01 0475

FIELD DATA

NO_X FLASK

Project No. 1488 Run # 2b

Location: RCA Boiler #2

Date: 2/11/75 Time: 1545

Initial flask vacuum "Hq 25.5

Initial flask temp. °F 37 4F

Initial Barometric Pressure 29.75

Flask volume F 2043.0

Final Flask Vacuum "Hq 1.0

Final flask temp. °F 70

Final Barometric Pressure 29.42

Operator [signature]

SET 1488 01 0475

FIELD DATA

NO_X FLASK

Project No. 1488 Run # 3a

Location: RCA Boiler #2

Date: 2/11/75 Time: 1705

Initial flask vacuum "Hg 24.4

Initial flask temp. °F 37 45

Initial Barometric Pressure 29.80

Flask volume 2016.94

Final Flask Vacuum "Hg 0.0

Final flask temp. °F 70

Final Barometric Pressure 29.42

Operator

SET 1488 01 0475

FIELD DATA

NO_X FLASK

Project No. 1488 Run # 36

Location: RCA Meiler #2

Date: 2/11/75 Time: 1730

Initial flask vacuum "Hg 25.3

Initial flask temp. °F 37 45

Initial Barometric Pressure 29.80

Flask volume H 1982.76

Final Flask Vacuum "Hg 0.1

Final flask temp. °F 70

Final Barometric Pressure 29.92

Operator M

APPENDIX B2

Field Data - Boiler #3

SET 1488 01 0475

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

FIELD DATA SHEET

PROJECT NUMBER 1488-23 TEST NUMBER 1 PROBE LENGTH & TYPE 5 ft S

FYRITE ANALYSIS

TRAVERSE POINT LOCATION & VELOCITY DATA BY

TRAVERSE POINT NUMBER	A=FRACTION OF I.D.	B=AxI.D. ID=47.25"	C=B+NIPPLE NIPPLE=	VELOCITY HEAD (Δp_s), in H_2O	STACK TEMPERATURE (T_s), °F
1				.027	425
2				.020	438
3				.010	440
4				.010	440
5				.027	225
6				.020	441
7				.020	445
8				.017	440
9				.030	430
10				.020	431
11				.020	436
12				.015	440
13				.020	430
14				.020	430
15				.012	422
16				.010	420
17				.020	400
18				.020	400
19				.015	400
20				.015	400
21					
22				.0154	426
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					

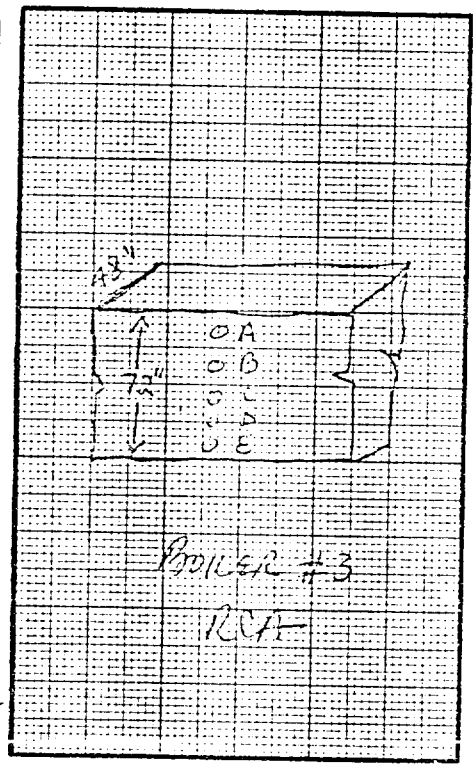


DIAGRAM OF STACK, PORTS, & TRAVERSE POINTS (indicate direction of flow)

INSIDE DIMENSIONS OF SAMPLE PLANE

45 X 72

STACK GAUGE PRESSURE in. H_2O -.43

NEAREST UPSTREAM DISTURBANCE

NEAREST DOWNSTREAM DISTURBANCE

PROCESS & CONTROL EQUIPMENT DESCRIPTION

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

PROJECT NUMBER 1485-23 TEST NUMBER 1 FIELD DATA SHEET

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

PLANT PCA
DATE 3/11/75
SAMPLING LOCATION Bank #3
SAMPLE TYPE 5
RUN NUMBER 1
OPERATORS JCL RLB
AMBIENT TEMPERATURE 42
BAROMETER 30.1 764.54

PROBE LENGTH & TYPE 5' K-gl
NOZZLE I.D. .626
SAMPLE BOX NUMBER Scott 1
METER BOX NUMBER RHC
PROBE HEATER SETTING 37
FILTER HEATER SETTING 250
REFERENCE ΔP .0187
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), ft³	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: 650.912									
1	5	1337	655.931	.030	2.95	2.95	450	51	49	4		
2	10		659.945	.030	2.95	2.95	460	69	50	4		
3	15		664.119	.025	2.45	2.45	475	75	53	3.5		
4	20		667.911	.020	2.00	2.00	470	54	58	3.2		
—	—	—	—	—	—	—	—	—	—	—	—	—
5	25		672.805	.036	3.30	3.50	465	81	60	5.0		
6	30		677.421	.030	2.95	2.95	490	90	63	4.5		
7	35		681.298	.020	2.00	2.00	495	92	65	3.3		
8	40		684.743	.017	1.68	1.68	470	91	67	3.0		
—	—	—	—	—	—	—	—	—	—	—	—	—
9	45		689.182	.028	2.79	2.79	452	86	68	4.1		
10	50		693.326	.024	2.35	2.35	465	90	68	3.8		
11	55		697.084	.020	2.00	2.00	470	92	69	3.1		
12	60		700.300	.014	1.40	1.40	470	92	70			
—	—	—	—	—	—	—	—	—	—	—	—	—
13	65		704.558	.030	2.95	2.95	450	87	70	4.5		
14	70	20 sec	709.045	.020	2.00	2.00	450	92	71	3.2		
15	75	20 sec	711.664	.010	1.00	1.00	440	88	71	2.0		
16	80		713.694	.005	0.50	0.50	415	86	71	2.0		

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 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
17	85		717.519	.020	2.00	2.00	420	80	70	3.2		
18	90		720.974	.017	1.70	1.70	435	88	71	3.0		
19	95		724.226	.014	1.40	1.40	435	89	71	2.5		
20	100	1732	727.051	.010	1.00	1.00	420	89	71	2.0		

SET 1488 01 0475

B2-2

MOISTURE

IMPINGERS
FINAL VOLUME 232 ml
INITIAL VOLUME 200 ml
NET VOLUME 32 ml

SILICA GEL
FINAL WEIGHT 530.2 g
INITIAL WEIGHT 508.5 g
NET WEIGHT 21.7 g
TOTAL MOISTURE 53.7 g

ANALYTICAL DATA BY _____

ACETONE FRONT WASH
FINAL 100.4884 mg
TARE 100.0388 mg
NET 0.4496 mg

FILTER NUMBER 1
FINAL 0.6131 mg
TARE 0.4537 mg
NET 0.1594 mg

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

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

CYCLONE
FINAL 1.6425 mg
TARE 1.3753 mg
NET 0.2672 mg

TOTAL FRONT ~~0.8767~~ 876.7 mg

ACETONE BACK WASH
FINAL 64.3220 mg
TARE 64.3210 mg
NET 0.0010 mg

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

WATER EVAPORATION
FINAL 100.8071 mg
TARE 100.7884 mg
NET 0.0187 mg

TOTAL BACK 19.7 mg
Total 895.9 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.

SIGNED _____ DATE ___

WITNESS _____ DATE ___

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

NOMOGRAPH DATA BY _____

CALIBRATED PRESSURE DIFFERENTIAL ACROSS ORIFICE, In. H_2O	$\Delta H_@$	1.93
AVERAGE METER TEMPERATURE (AMBIENT + 20°F), °F	$T_{m_{avg.}}$	70
PERCENT MOISTURE IN GAS STREAM BY VOLUME	B_{wo}	4
BAROMETRIC PRESSURE AT METER, In. Hg	P_m	30.06
STATIC PRESSURE IN STACK, In. Hg $P_m \pm (0.073 \times$ STACK GAUGE PRESSURE in In. $H_2O)$	P_s	−.143 .03 / 34 30.03
RATIO OF STATIC PRESSURE TO METER PRESSURE	P_s/P_m	.999
AVERAGE STACK TEMPERATURE, °F	$T_{s_{avg.}}$	424
AVERAGE VELOCITY HEAD, In. H_2O	$\Delta P_{avg.}$	.018
MAXIMUM VELOCITY HEAD, In. H_2O	$\Delta P_{max.}$	
C FACTOR		1.05
CALCULATED NOZZLE DIAMETER, In.		~~.615~~ .630
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	88.2	11.8	88.2	11.8	89.0	11.0	11.53
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	79.2	9.0 ~~8.0~~	79.4	8.8	79.4	9.6	9.13
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	79.2	0.0	79.4	0.0	79.4	0.0	0
N_2 (NET IS 100 MINUS ACTUAL CO READING)							

SET 1488 01 0475

B2-3

PROJECT NUMBER 1258-23 TEST NUMBER 1 FIELD DATA SHEET

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

PLANT RCA
DATE 3/12/75
SAMPLING LOCATION Boiler #3
SAMPLE TYPE 5/2
RUN NUMBER
OPERATORS JW RB
AMBIENT TEMPERATURE 40
BAROMETER 30.03 76x, 76x

PROBE LENGTH & TYPE 6 ft. glass
NOZZLE I.D. .626
SAMPLE BOX NUMBER Scott #1
METER BOX NUMBER RAC
PROBE HEATER SETTING
FILTER HEATER SETTING
REFERENCE Δp .0187
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), ft³	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: 727.128									
1	5	0343	732.973	.030	1.95	2.95	450	49	45	5		
2	10		736.471	.031	3.05	3.05	460	63	46	4.5		
3	15		740.535	.021	2.02	2.02	468	72	48	3.5		
4	20		744.230	.020	2.00	2.00	460	76	51	3.0		
				.033	3.25	3.25		76	55	4.5		
5	25		748.928	.033	3.25	3.25	450	76	55	4.5		
6	30		753.485	.030	2.95	2.95	464	54	57	4.5		
7	35		757.429	.023	2.12	2.12	461	87	60	3.5		
8	40		760.916	.017	1.70	1.70	460	87	63	3.0		
9	45		765.549	.031	3.05	3.05	440	79	64	4.5		
10	50		769.636	.021	2.02	2.02	448	86	65	3.0		
11	55		773.316	.020	2.00	2.00	450	88	66	3.0		
12	60		776.995	.020	2.00	2.00	443	86	66			
13	65		781.576	.030	2.95	2.95	430	84	66	4.5		
14	70		785.544	.021	2.02	2.02	435	90	68	3.5		
15	75		789.072	.018	1.80	1.80	430	90	68	3.0		
16	80		791.982	.012	1.20	1.20	420	86	69	2.5		

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 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
17	85		795.687	.021	2.02	2.02	415	86	69	4.0	41	
18	90		799.400	.020	2.00	2.00	420	87	69	4.0	4	
19	95		803.107	.020	2.00	2.00	410	88	69	4.0	7	
20	100	1037	806.909	.010	1.00	1.00	380	86	69		5	

SET 1488 01 0475

B2-4

MOISTURE

IMPINGERS
FINAL VOLUME 245 ml
INITIAL VOLUME 200 ml
NET VOLUME 45 ml

SILICA GEL
FINAL WEIGHT 541.8 g
INITIAL WEIGHT 519.6 g
NET WEIGHT 22.2 g
TOTAL MOISTURE 67.2 g

ANALYTICAL DATA BY _____

ACETONE FRONT WASH
FINAL 106.3798 mg
TARE 105.9060 mg
NET 0.4738 mg = g

FILTER NUMBER 1
FINAL 0.6137 mg
TARE 0.4499 mg
NET 0.1633 mg = g

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

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

CYCLONE
FINAL 1.6925 mg
TARE 1.3816 mg
NET 0.3109 mg = g

TOTAL FRONT 898.0 mg

ACETONE BACK WASH
FINAL 64.5297 mg
TARE 64.5253 mg
NET 0.0044 mg = g

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

WATER EVAPORATION
FINAL 101.3465 mg
TARE 101.3232 mg
NET 0.0233 mg = g

TOTAL BACK 27.7 mg
Total 925.7 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.

SIGNED _____ DATE ____

WITNESS _____ DATE ____

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

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_{ws}	
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 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME
CO_2	88.3	11.7	88.4	11.6	88.3	11.7	11.7
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	79.4	8.9	79.6	8.8	79.5	8.8	8.83
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	79.4	0.0	79.6	0.0	79.5	0.0	
N_2 (NET IS 100 MINUS ACTUAL CO READING)							

PROJECT NUMBER 1485-23 TEST NUMBER 1 FIELD DATA SHEET

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

PLANT RCA
DATE 3/12/75
SAMPLING LOCATION Outlet #3
SAMPLE TYPE S
RUN NUMBER 3
OPERATORS JW RB
AMBIENT TEMPERATURE 45
BAROMETER 29.96 "Hg

PROBE LENGTH & TYPE 6 ft pl
NOZZLE I.D. .626
SAMPLE BOX NUMBER Scott #2
METER BOX NUMBER RAC
PROBE HEATER SETTING 40
FILTER HEATER SETTING
REFERENCE ΔP .015
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), ft³	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: 506.302									
1	5	1307	510.052	.018	1.80	1.80	410	72	53	3.2		
2	10		513.714	.021	2.05	2.08	435	68	54	3.1		
3	15		516.974	.015	1.50	1.50	455	74	55	3.1		
4	20		519.744	.010	1.00	1.00	420	78	57	2.0		
5	25		523.312	.019	1.80	1.80	416	75	60	3.1		
6	30		526.111	.015	1.50	1.50	416	521	63	3.0		
7	35		529.478	.011	1.10	1.10	422	56	65	2.2		
8	40		532.265	.010	1.00	1.00	420	86	67	2.0		
9	45		535.558	.015	1.50	1.50	~~425~~ 400	84	68	3.0		
10	50		538.774	.015	1.50	1.50	410	85	69	3.0		
11	55		541.714	.011	1.10	1.10	425	90	71	3.0		
12	60		544.225	.008	.80	.80	420	89	71	3.0		
13	65		547.709	.020	2.00	2.00	410	86	72	4.0		
14	70		550.951	.018	1.80	1.80	410	90	72	5.		
15	75		553.758	.011	1.00	1.00	390	91	73	1.8		
16	80		555.852	.005	.50	.50	385	91	74	6		

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 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
17	85	~~1403~~ 1443	~~557.600~~ 559.518	.012	1.2	1.2	390	86	74	~~5~~ 2		Replace filter #4548
18	90	1446	561.891	.012	1.2	1.2	398	82	72			
19	95		564.379	.005	.80	.80	380	86	72			
20	100	1503	566.293	.004	.40	.40	350	85	72			

SET 1488 01 0475

B2-6

MOISTURE

IMPINGERS
FINAL VOLUME 749 ml
INITIAL VOLUME 200 ml
NET VOLUME 549 ml

SILICA GEL
FINAL WEIGHT 529.6 g
INITIAL WEIGHT 517.2 g
NET WEIGHT 12.4 g
TOTAL MOISTURE 66.4 g

ANALYTICAL DATA BY _____

ACETONE FRONT WASH
FINAL 90.4583 mg
TARE 90.1814 mg
NET 0.2769 mg g

FILTER NUMBER 1
FINAL 0.5658 mg
TARE 0.4548 mg
NET 0.1110 mg g

FILTER NUMBER 2
FINAL 0.4654 mg
TARE 0.4418 mg
NET 0.0236 mg g

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

CYCLONE
FINAL 1.5062 mg
TARE 1.3762 mg
NET 0.1300 mg g

TOTAL FRONT 541.5 mg

ACETONE BACK WASH
FINAL 64.7427 mg
TARE 64.7418 mg
NET 0.0009 mg g

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

WATER EVAPORATION
FINAL 83.8727 mg
TARE 83.8498 mg
NET 0.0229 mg g

TOTAL BACK 23.8 mg
Total 565.3 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.

SIGNED _____ DATE ____

WITNESS _____ DATE ____

SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

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_{ws}	
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 ACTUAL READING	1 NET	2 ACTUAL READING	2 NET	3 ACTUAL READING	3 NET	AVERAGE NET VOLUME
CO_2	88.4	11.6	88.0	12.0	89.3	10.7	11.43
O_2 (NET IS ACTUAL O_2 READING MINUS ACTUAL CO_2 READING)	79.8	8.6	79.4	8.6	79.6	9.7	8.97
CO (NET IS ACTUAL CO READING MINUS ACTUAL O_2 READING)	79.8	0.0	79.4	0.0	79.6	0.0	
N_2 (NET IS 100 MINUS ACTUAL CO READING)							

SET 1488 01 0475

FIELD DATA

NO_X FLASK

Project No. 1488 Run # 1A

Location: RCA #3 LANCASTER, PA.

Date: 3-11-75 Time: 1643

Initial flask vacuum "Hq 25.5

Initial flask temp. °F 55

Initial Barometric Pressure 30.1 "Hg

Flask volume A 2040.4 cc

Final Flask Vacuum "Hq 11.25

Final flask temp. °F 68.5

Final Barometric Pressure 29.44

Operator JOE SPENCER

SET 1488 01 0475

FIELD DATA

NO_X FLASK

Project No. 1488 Run # 1B

Location: RCA #3 LANCASTER PA.

Date: 3-11-75 Time: 1741

Initial flask vacuum "Hg 28.5

Initial flask temp. °F 55

Initial Barometric Pressure 30.95" Hg

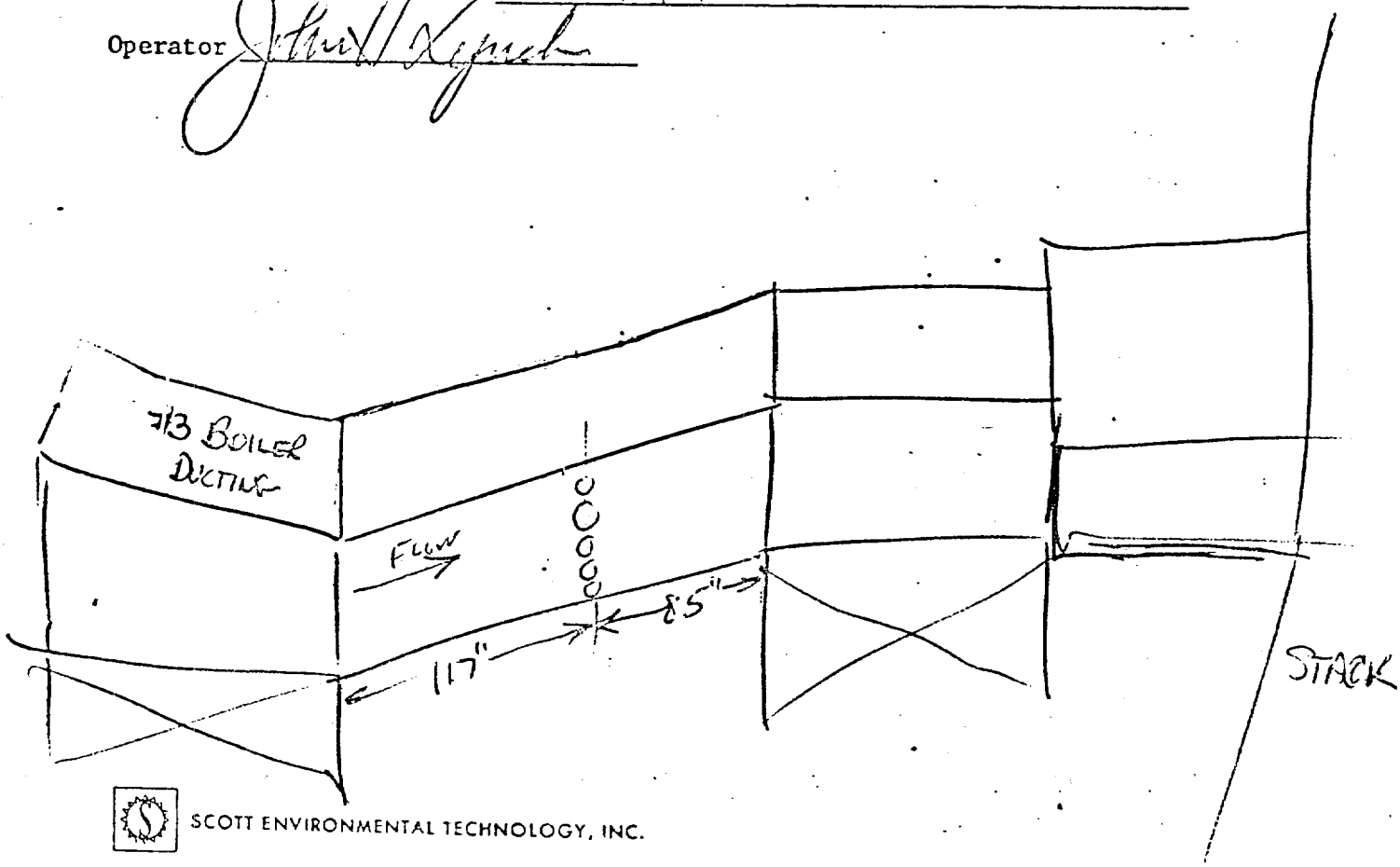
Flask volume 8B 2042.5 cc

Final Flask Vacuum "Hg .30

Final flask temp. °F 70.

Final Barometric Pressure 29.45

Operator J. Hurd / K. Lynch



SCOTT ENVIRONMENTAL TECHNOLOGY, INC.

SET 1488 01 0475

FIELD DATA

NO_X FLASK

Project No. 1488 Run # 2 A

Location: RCA #3 LANCASTER Pa.

Date: 3-12-75 Time: 0914

Initial flask vacuum "Hq 27

Initial flask temp. °F 48

Initial Barometric Pressure 30.03 "Hg

Flask volume G 2016.94 cc

Final Flask Vacuum "Hq .15

Final flask temp. °F 10

Final Barometric Pressure 29.47

Operator John V. Lynch

SET 1488 01 0475

FIELD DATA

NO_X FLASK

Project No. 1488 Run # 2 B

Location: RCA #3 Lancaster, Pa.

Date: 3-12-75 Time: 0948

Initial flask vacuum "Hq 28

Initial flask temp. °F 50

Initial Barometric Pressure 30.05 "Hg

Flask volume # 1982.76 cc

Final Flask Vacuum "Hq .075

Final flask temp. °F 70

Final Barometric Pressure 29.45

Operator John W. Lynch

SET 1488 01 0475

FIELD DATA

NO_X FLASK

Project No. 1488 Run # 3A

Location: RCA #3 LANCASTER, PA.

Date: 3-12-75 Time: 1310

Initial flask vacuum "Hq 27.5"

Initial flask temp. °F 48

Initial Barometric Pressure 29.94" Hg

Flask volume C 2039.2 cc

Final Flask Vacuum "Hq .66

Final flask temp. °F 70°

Final Barometric Pressure 29.214

Operator John W. Kynuk

SET 1488 01 0475

FIELD DATA

NO_X FLASK

Project No. 1488 Run # 3B

Location: RCA #3 LANCASTER, PA.

Date: 3-12-75 Time: 1357

Initial flask vacuum "Hq 27.5

Initial flask temp. °F 55

Initial Barometric Pressure 29.85

Flask volume D 2049.8 cc

Final Flask Vacuum "Hq .25

Final flask temp. °F 70.00

Final Barometric Pressure 29.44

Operator John W. Kynard

APPENDIX C

Laboratory Report

SET 1488 01 0475

TABLE C1

PARTICULATE WEIGHTS SUMMARY (milligrams)

RCA Lancaster - Boiler #2 - 2/11/75

	Run 1			Run 2			Run 3		
	Catch	Front %	Total %	Catch	Front %	Total %	Catch	Front %	Total %
Cyclone	70.2	21.1	17.7	18.6	13.7	10.7	12.0	11.2	9.5
Acetone Front	205.2	61.5	51.8	71.5	52.7	41.2	42.9	40.2	34.0
Filter	58.0	17.4	14.7	45.6	33.6	26.3	51.9	48.6	41.1
Front Total	333.4	100.0	84.2	135.7	100.0	78.1	106.8	100.0	84.6
		Back %			Back %			Back %	
Acetone Back	39.9	63.8	10.1	5.9	15.5	3.4	1.9	9.8	1.5
Water Back	22.6	36.2	5.7	32.1	84.5	18.5	17.5	90.2	13.9
Back Total	62.5	100.0	15.8	38.0	100.0	21.9	19.4	100.0	15.4
Total	395.9		100.0	173.7		100.0	126.2		100.0

SET 1488 01 0475

TABLE C2

PARTICULATE WEIGHTS SUMMARY (milligrams)

RCA Lancaster - Boiler #3 - 3/11/75 - 3/12/75

	Run #1			Run #2			Run #3		
	Catch	Front %	Total %	Catch	Front %	Total %	Catch	Front %	Total %
Cyclone	267.2	30.5	29.8	310.9	34.6	33.6	130.0	24.0	23.0
Acetone Front	449.6	51.3	50.2	423.8	47.2	45.8	276.9	51.1	49.0
Filter	159.4	18.2	17.8	163.3	18.2	17.6	134.6	24.9	23.8
Front Total	876.2	100.0	97.8	898.0	100.0	97.0	541.5	100.0	95.8
		Back %			Back %			Back %	
Acetone Back	1.0	5.1	0.1	4.4	15.9	0.5	0.9	3.8	0.2
Water Back	18.7	94.9	2.1	23.3	84.1	2.5	22.9	96.2	4.0
Back Total	19.7	100.0	2.2	27.7	100.0	3.0	23.8	100.0	4.2
Total	895.9		100.0	925.7		100.0	565.3		100.0

SET 1488 01 0475

TABLE C3 COAL SAMPLE PROXIMATE ANALYSIS
BOILER #2

Run No:	1		2		3	
	Wet %	Dry %	Wet %	Dry %	Wet %	Dry %
Moisture	9.40	-	7.60	-	8.10	-
Vol. Comb. Matter	4.57	5.04	4.61	4.99	4.58	4.98
Fixed Carbon	77.85	85.93	79.11	85.62	79.27	86.26
Ash	8.18	9.03	8.68	9.39	8.05	8.76
Sulfur	0.57	0.63	0.59	0.64	0.58	0.63
BTU/lb	12145	13405	12332	13346	12382	13473

SET 1488 01 0475

TABLE C4 COAL SAMPLE ULTIMATE ANALYSIS

BOILER #2

(Analysis Performed on Composite of Samples from Runs 1, 2 & 3).

	As Received (%)	Dry Basis (%)
Moisture	8.30	-
Carbon	77.72	84.75
Hydrogen	1.86	2.03
Oxygen	2.45	2.68
Nitrogen	0.77	0.84
Sulfur	0.59	0.64
Ash	8.31	9.06
BTU/lb	12313	13428

SET 1488 01 0475

TABLE C5 COAL SAMPLE PROXIMATE ANALYSIS
BOILER #3

Run No:	1		2		3	
	Wet %	Dry %	Wet %	Dry %	Wet %	Dry %
Moisture	9.60	-	9.70	-	9.30	-
Vol. Comb. Matter	4.42	4.89	4.73	5.24	4.64	5.12
Fixed Carbon	77.29	85.50	76.90	85.16	77.56	85.51
Ash	8.69	9.61	8.67	9.60	8.50	9.37
Sulfur	0.58	0.64	0.56	0.62	0.56	0.62
BTU/lb	12042	13321	11936	13218	12028	13261

SET 1488 01 0475

TABLE C6 COAL SAMPLE ULTIMATE ANALYSIS

BOILER # 3

(Analysis Performed on Composite of Samples from Runs 1, 2 & 3).

	As Received (%)	Dry Basis (%)
Moisture	9.50	-
Carbon	76.54	84.57
Hydrogen	1.86	2.05
Oxygen	2.13	2.36
Nitrogen	0.77	0.85
Sulfur	0.57	0.63
Ash	8.63	9.54
BTU/lb	12013	13274

APPENDIX D1

Particle Sizing Analysis - Boiler #2

SET 1488 01 0475

CE# 2133 A

COULTER COUNTER® Model T & T_A Worksheet

SAMPLE #1488-021 Acetone Wash

ELECTROLYTE Isoton

DISPERSANT IIA

EQUIPMENT / SERIAL		Aper. Dia.	Ser. No.	CALIBRATION DATA	Part. Dia.	W	± IA	A
TA	1180							
ORGANIZATION	Scott Res. Labs							
OPERATOR / DATE	E.H. 3/10/75	400	21382	Micros.	18.04	6	3.2	143
Boiler #2 - Composite of Acetone Wash		100	22105	Micros.	9.53	10	3.2	190
catches from Runs 1, 2 & 3								

$$k = d\sqrt[3]{\frac{2^W}{A}}$$ FOR MODEL T

± IA	3.2	3.2		
CALIB. A	105	160.5		
APERTURE DIA.	400	100		

$\frac{A_2}{A_1} = \left(\frac{d_2}{d_1}\right)^3 2^{(W_2 - W_1)}$ For Model T

$\frac{A_2}{A_1} = \left(\frac{d_1}{d_2}\right)^3 2^{(W_2 - W_1)}$ For Model T_A

SAMPLE DATA

Geometric Mean μ^3	Volume μ^3	Diameter μ	Channel (W)							Cum.%	Dif.%
.00575	.004091	.198									
.0115	.008181	.250									
.0231	.01636	.315									
.0462	.03272	.397									
.0925	.06545	.500									
.1851	.1309	.630									
.3702	.2618	.794									
.7405	.5236	1.00									
1.481	1.047	1.26								100.0	.06
2.962	2.094	1.59								99.9	.09
5.924	4.189	2.00								99.8	.3
11.85	8.378	2.52								99.6	.5
23.70	16.76	3.17								99.1	.8
47.39	33.51	4.00								98.3	1.2
94.78	67.02	5.04								97.1	1.7
189.6	134.0	6.35								95.4	2.3
379.1	268.1	8.00								93.1	3.2
758.3	536.2	10.08								89.9	5.1
1516.	1072.	12.7								84.8	7.1
3033.	2145.	16.0								77.7	10.0
6066.	4289.	20.2								67.7	11.5
12.13×10^3	8579.	25.4								56.2	12.1
24.27×10^3	17.16×10^3	32.0								44.0	10.5
48.54×10^3	34.31×10^3	40.3								33.6	8.8
97.18×10^3	68.63×10^3	50.8								24.7	7.0
194.4×10^3	137.3×10^3	64.0								17.7	4.9
388.7×10^3	274.5×10^3	80.6								12.8	4.9
777.4×10^3	549.0×10^3	101.6								7.8	2.1
1.555×10^6	1.098×10^6	128.								5.7	3.6
3.109×10^6	2.196×10^6	161.								2.1	2.1
6.219×10^6	4.392×10^6	203.									
12.44×10^6	8.784×10^6	256.									
24.88×10^6	17.57×10^6	322.									
49.75×10^6	35.14×10^6	406.									
99.50×10^6	70.27×10^6	512.									
199.0×10^6	140.6×10^6	645.									
398.0×10^6	281.1×10^6	812.									
796.0×10^6	562.2×10^6	1024.									

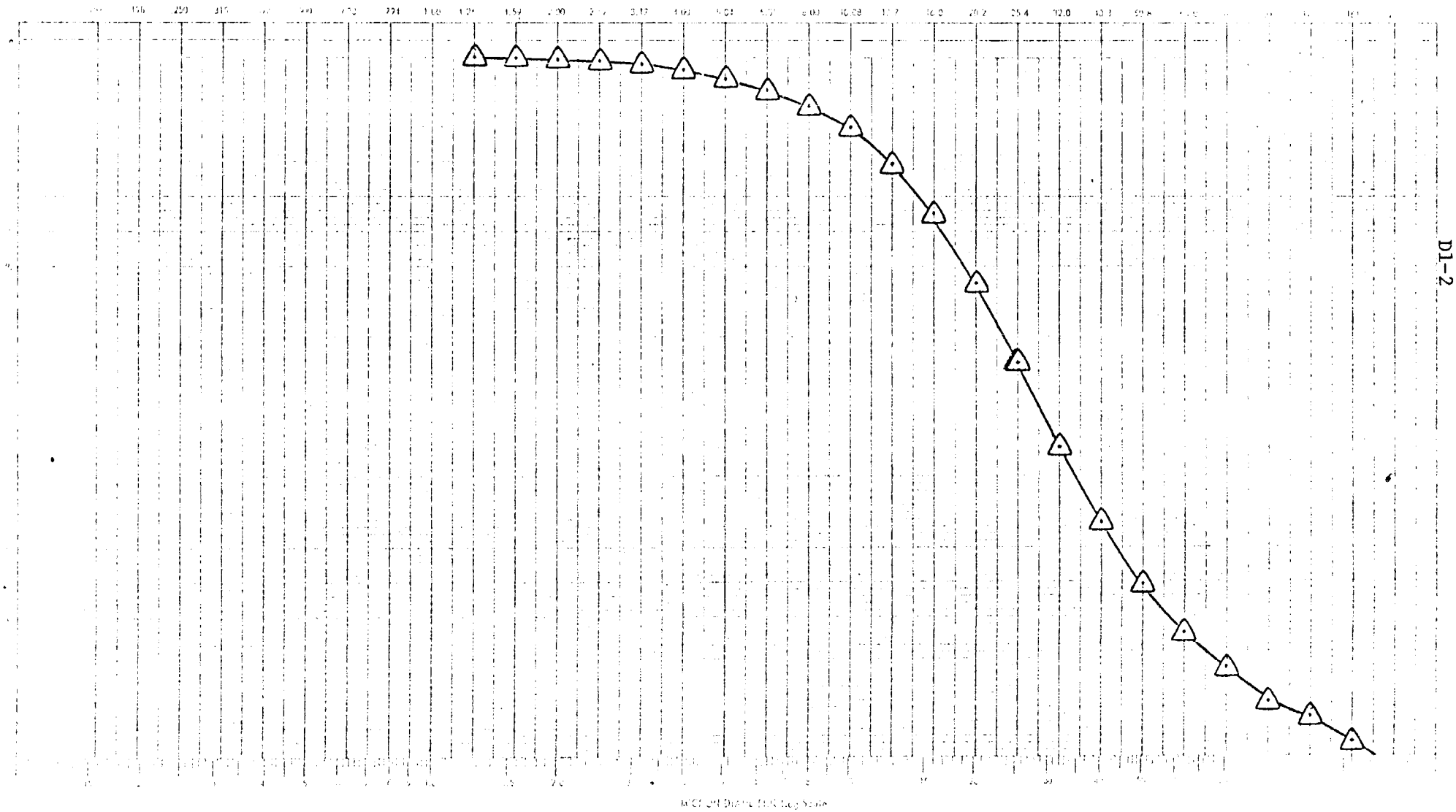
CE# 2133 A

COULTER COUNTER® Model T&TA PARTICLE SIZE ANALYSIS

Scott Res. Labs
Ed Hoff
TA
#1488-021 Acetone Wash Isoton IIA
Boiler # 2 - Composite of Acetone wash catches
from Runs 1, 2 & 3

400	21382	Microspheres	18.04	6	3.2148	20.2	6	3.2105		
100	22105	Microspheres	9.53	10	3.2190	10.08	10	3.2160		

SET 1488 01 0475

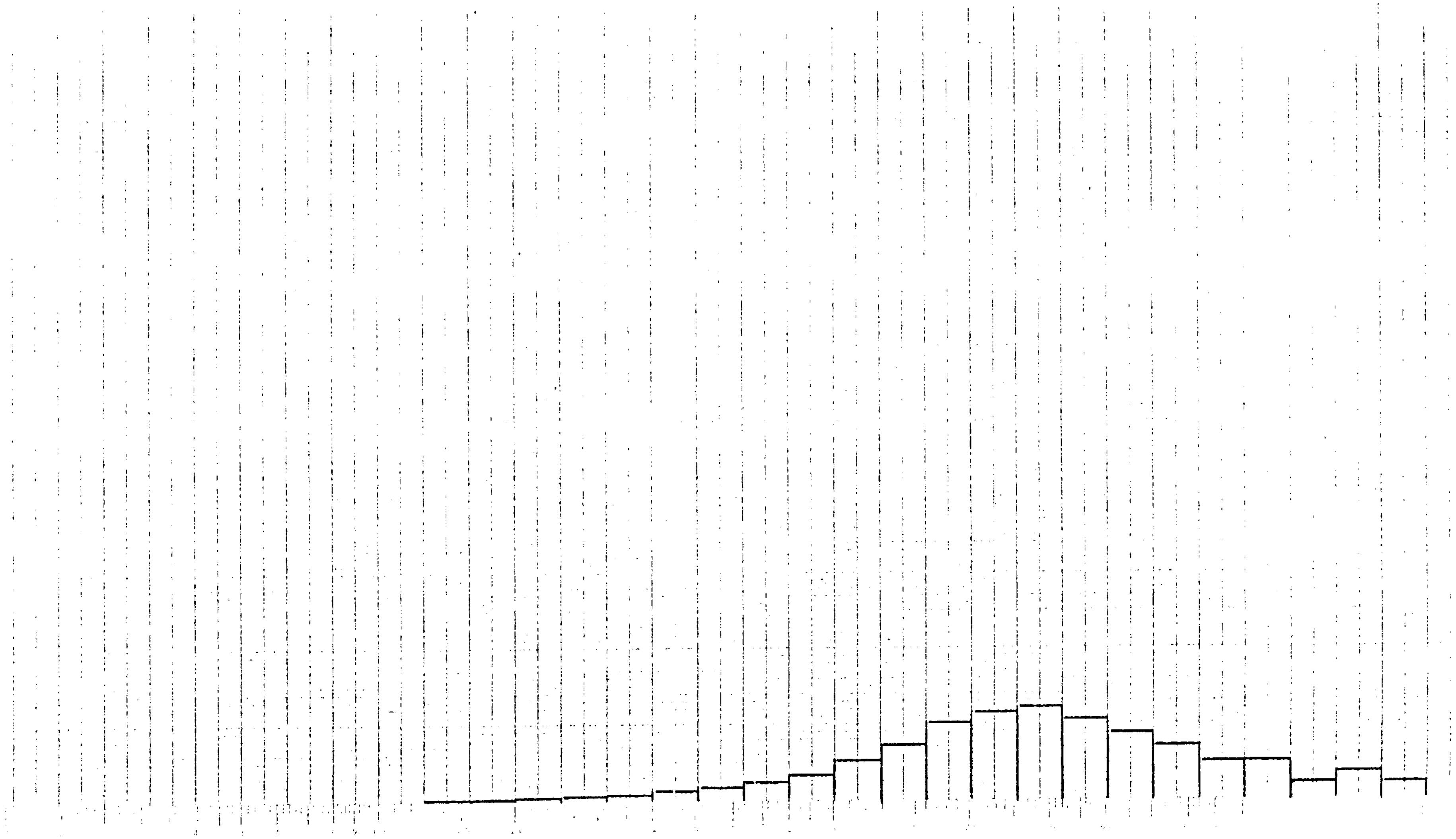


D1-2

COULTER COUNTER Model TA PARTICLE SIZE ANALYSIS

Scott Res. Labs
Ed Hoff
TA
#1488-021 Acetone Wash Isoton IIA

Boiler # 2 - Composite of Acetone wash catches	400	21382	Microspheres	18.04	6	3.2148	20.2	6	3.2105
from Runs 1, 2 & 3	100	22105	Microspheres	9.53	10	3.2190	10.03	10	3.2160.5



SET 1488 01 0475
CE# 2133 B

COULTER COUNTER® Model T & T_A Worksheet

SAMPLE #1488-02 Cyclone

ELECTROLYTE Isoton/Glycerine DISPERSANT IIA

EQUIPMENT	SERIAL	Aper. Dia.	Ser. No.	CALIBRATION DATA	Part. Dia.	W	± I A	A
TA	1180							
ORGANIZATION Scott Res. Labs.								
OPERATOR E.H.	DATE 3/10/75	800		Latex	89	10	3.2	125.5
Boiler # 2 - Composite of cyclone dry								
catches from Runs 1, 2 & 3								

$$k = d\sqrt[3]{\frac{2^W}{A}}$$ FOR MODEL T

± I A	3.2				
CALIB. A	169				
APERTURE DIA.	800				

$\frac{A_2}{A_1} = \left(\frac{d_2}{d_1}\right)^3 2^{(W_2 - W_1)}$ For Model T

$\frac{A_2}{A_1} = \left(\frac{d_1}{d_2}\right)^3 2^{(W_2 - W_1)}$ For Model T_A

SAMPLE DATA

Geometric Mean μ^3	Volume μ^3	Diameter μ	Channel (W)							Cum.%	Dif.%
.00575	.004091	.158									
.0115	.008181	.250									
.0231	.01636	.315									
.0462	.03272	.397									
.0925	.06545	.500									
.1851	.1309	.630									
.3702	.2618	.794									
.7405	.5236	1.00									
1.481	1.047	1.26									
2.962	2.094	1.59									
5.924	4.189	2.00									
11.85	8.378	2.52									
23.70	16.76	3.17									
47.39	33.51	4.00									
94.78	67.02	5.04									
189.6	134.0	6.35									
379.1	268.1	8.00									
758.3	536.2	10.08									
1516.	1072.	12.7									
3033.	2145.	16.0								100.0	.9
6066.	4289.	20.2								99.1	2.2
12.13×10^3	8579.	25.4								97.0	3.7
24.27×10^3	17.16×10^3	32.0								93.3	9.8
48.54×10^3	34.31×10^3	40.3								83.5	16.8
97.18×10^3	68.63×10^3	50.8								66.7	19.7
194.4×10^3	137.3×10^3	64.0								46.9	16.1
388.7×10^3	274.5×10^3	80.6								30.8	11.5
777.4×10^3	549.0×10^3	101.6								19.3	9.2
1.555×10^6	1.098×10^6	128.								10.1	6.8
3.109×10^6	2.196×10^6	161.								3.2	3.2
6.219×10^6	4.392×10^6	203.									
12.44×10^6	8.784×10^6	256.									
24.88×10^6	17.57×10^6	322.									
49.75×10^6	35.14×10^6	406.									
99.50×10^6	70.27×10^6	512.									
199.0×10^6	140.6×10^6	645.									
398.0×10^6	281.1×10^6	812.									
796.0×10^6	562.2×10^6	1024.									

CE# 2133 B

COULTER COUNTER® Model T&TA PARTICLE SIZE ANALYSIS

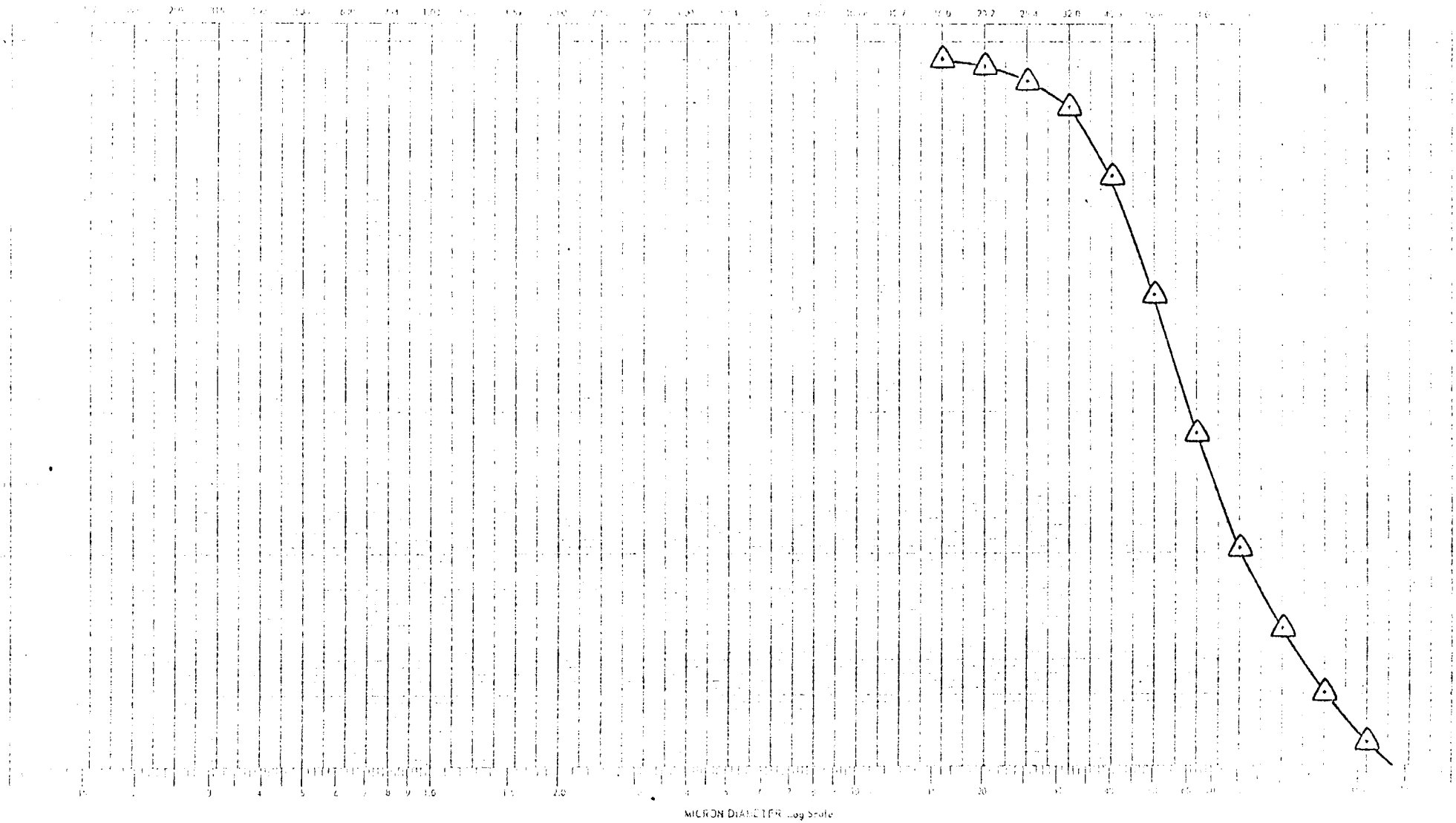
Scott Res. Labs
Edward Hoff

TA

#1488-02 Isoton/Glycerine IIA

Boiler #2 - Composite of cyclone dry catches
from Runs 1, 2 & 3

800		Latex	89	10	3.21	25.5	806	103.2	169



SET 1488 01 0475

D1-5

CE# 2133 B

COULTER COUNTER® Model T&TA PARTICLE SIZE ANALYSIS

Scott Res. Labs
Edward Hoff

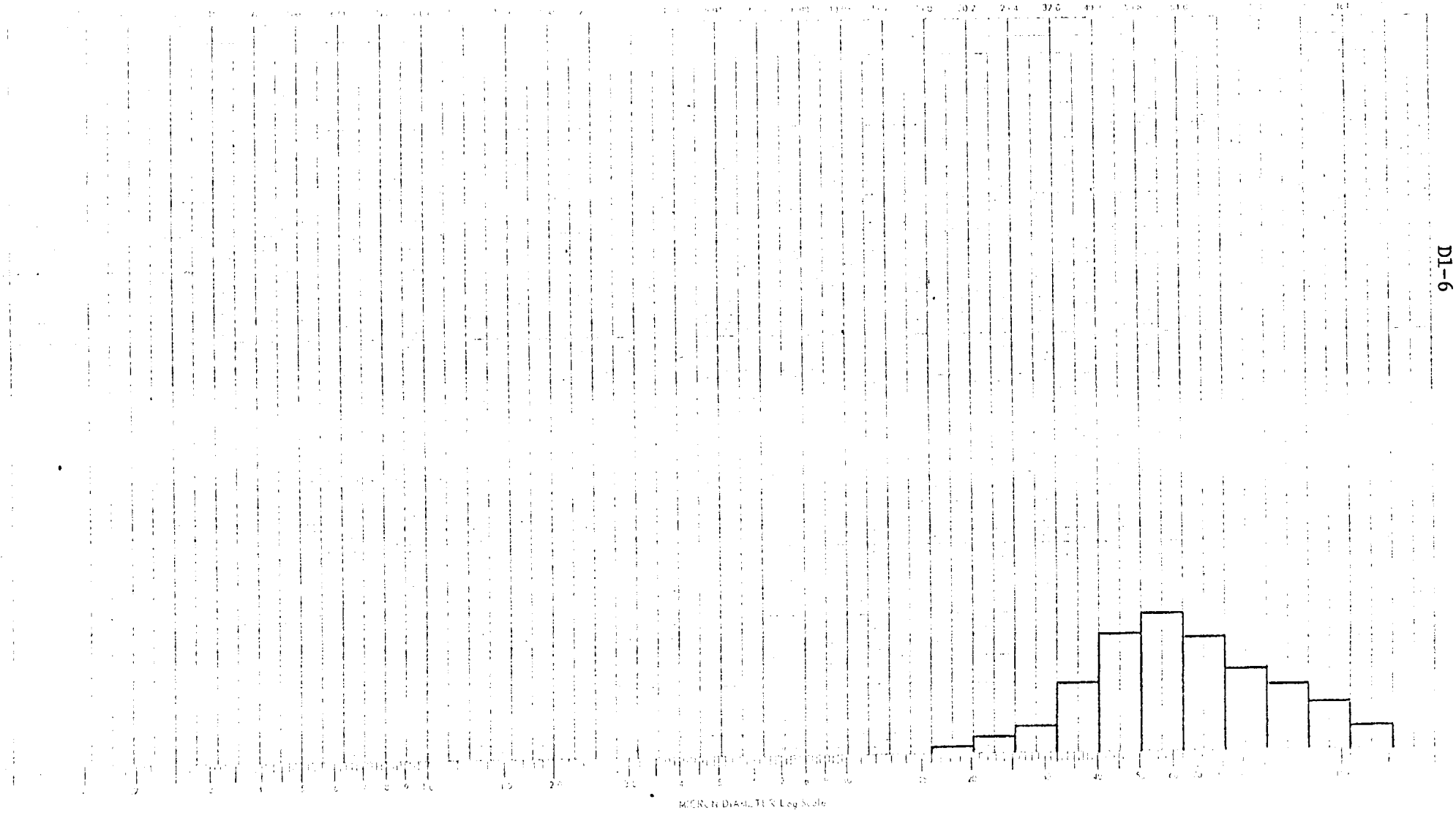
TA

#1488-02 Isoton/Glycerine IIA

Boiler #2 - Composite of cyclone dry catches from Runs 1, 2 & 3

800		Latex	89	10	3.2	12	5.5	8.6	10	3.2	16

SET 1488 01 0475



D1-6

SET 1488 01 0475
CE# 2133C

COULTER COUNTER® Model T & T_A Worksheet

SAMPLE Mixture (1-1)

ELECTROLYTE Isoton/Glycerine DISPERSANT IIA

		Aper. Dia.	Ser. No.	CALIBRATION DATA	Part. Dia.	W	± I A	A
EQUIPMENT TA SERIAL 1180								
ORGANIZATION Scott Res. Labs.								
OPERATOR E.H. DATE 3/10/75		800		Latex	89	10	3.2	125.5
Boiler #2 - Composite of acetone wash		140	23856	Micros.	18.04	11	3.2	158
& cyclone catches from Runs 1, 2 & 3								

$$k = d\sqrt[3]{\frac{2^W}{A}}$$ FOR MODEL T

± I A	3.2	3.2		
CALIB. A	169	112.5		
APERTURE DIA.	800	140		

$\frac{A_2}{A_1} = \left(\frac{d_2}{d_1}\right)^3 2^{(W_2 - W_1)}$ For Model T

$\frac{A_2}{A_1} = \left(\frac{d_1}{d_2}\right)^3 2^{(W_2 - W_1)}$ For Model T_A

SAMPLE DATA

Geometric Mean μ^3	Volume μ^3	Diameter μ	Channel (W)							Cum.%	Dif.%
.00575	.004091	.198									
.0115	.008181	.250									
.0231	.01636	.315									
.0462	.03272	.397									
.0925	.06545	.500									
.1851	.1309	.630									
.3702	.2618	.794									
.7405	.5236	1.00									
1.481	1.047	1.26									
2.962	2.094	1.59									
5.924	4.189	2.00								100.0	.3
11.85	8.378	2.52								99.7	.6
23.70	16.76	3.17								99.1	1.1
47.39	33.51	4.00								97.9	1.5
94.78	67.02	5.04								96.4	2.2
189.6	134.0	6.35								94.2	2.8
379.1	268.1	8.00								91.4	3.6
758.3	536.2	10.08								87.7	4.5
1516.	1072.	12.7								83.2	4.9
3033.	2145.	16.0								78.3	5.7
6066.	4289.	20.2								72.6	6.6
12.13×10^3	8579.	25.4								66.0	6.6
24.27×10^3	17.16×10^3	32.0								59.3	8.7
48.54×10^3	34.31×10^3	40.3								50.7	11.6
97.18×10^3	68.63×10^3	50.8								39.1	12.9
194.4×10^3	137.3×10^3	64.0								26.2	11.9
388.7×10^3	274.5×10^3	80.6								14.3	8.0
777.4×10^3	549.0×10^3	101.6								6.3	3.9
1.555×10^6	1.098×10^6	128.								2.4	2.1
3.109×10^6	2.196×10^6	161.								.3	.3
6.219×10^6	4.392×10^6	203.									
12.44×10^6	8.784×10^6	256.									
24.88×10^6	17.57×10^6	322.									
49.75×10^6	35.14×10^6	406.									
99.50×10^6	70.27×10^6	512.									
199.0×10^6	140.6×10^6	645.									
398.0×10^6	281.1×10^6	812.									
796.0×10^6	562.2×10^6	1024.									

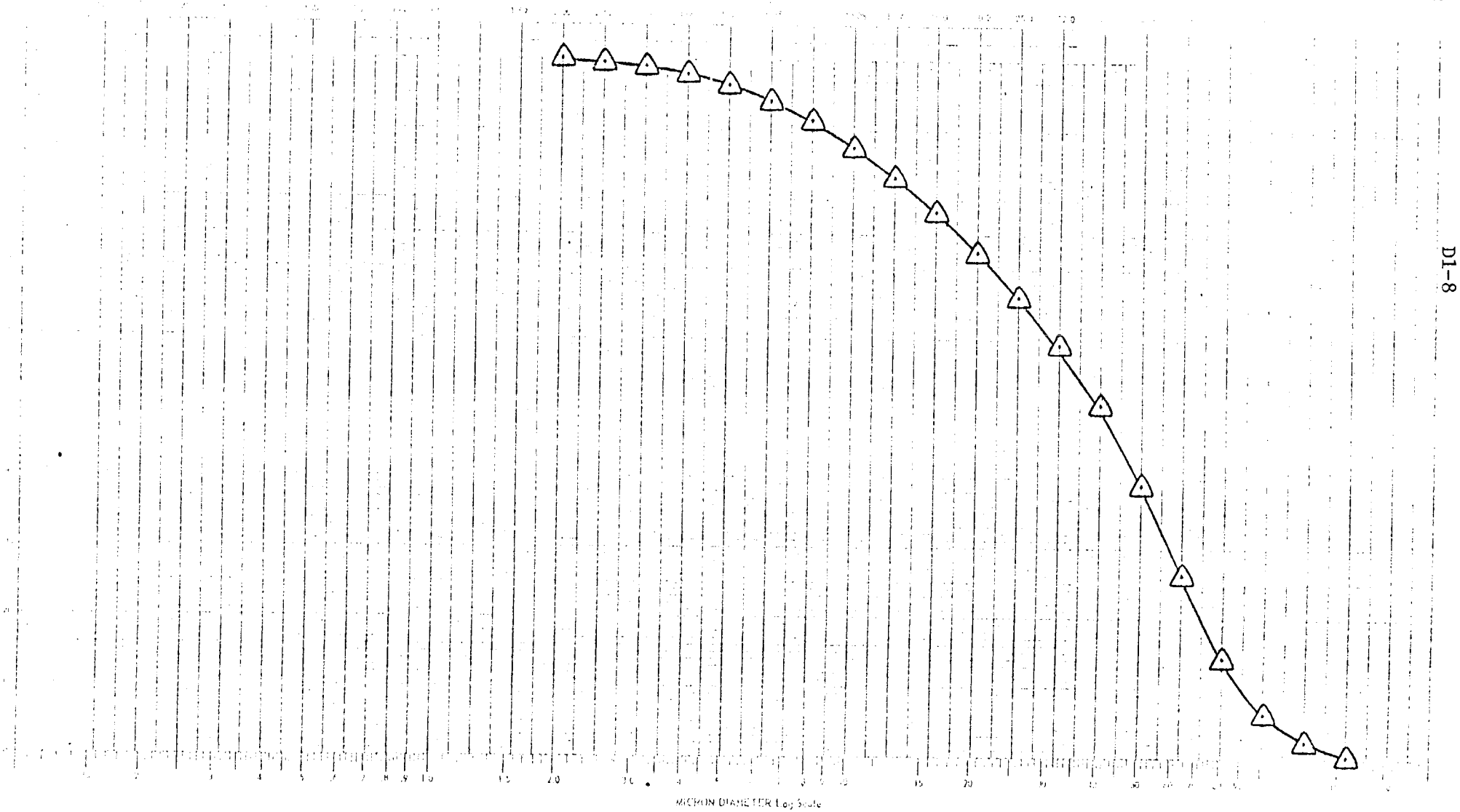
CE#2133 C

COULTER COUNTER Model T & TA PARTICLE SIZE ANALYSIS

Scott Res. Labs.
E. Hoff
TA

Mixture (1-1) Isoton/Glycerine IIA
Boiler #2 - Composite of acetone wash & cyclone catches from Runs 1, 2 & 3

APER. SIZE	SERIAL		FOR MODEL T PART DIA	W	FOR MODEL TA				
800		Latex	89	10	3.2125	80.6	10	3.2169	
140	23856	Microspheres	18.04	11	3.2158	20.211		3.2112	.5



SET 1488 01 0475

D1-8

CE-433 C

COULTER COUNTER® Model T&TA PARTICLE SIZE ANALYSIS

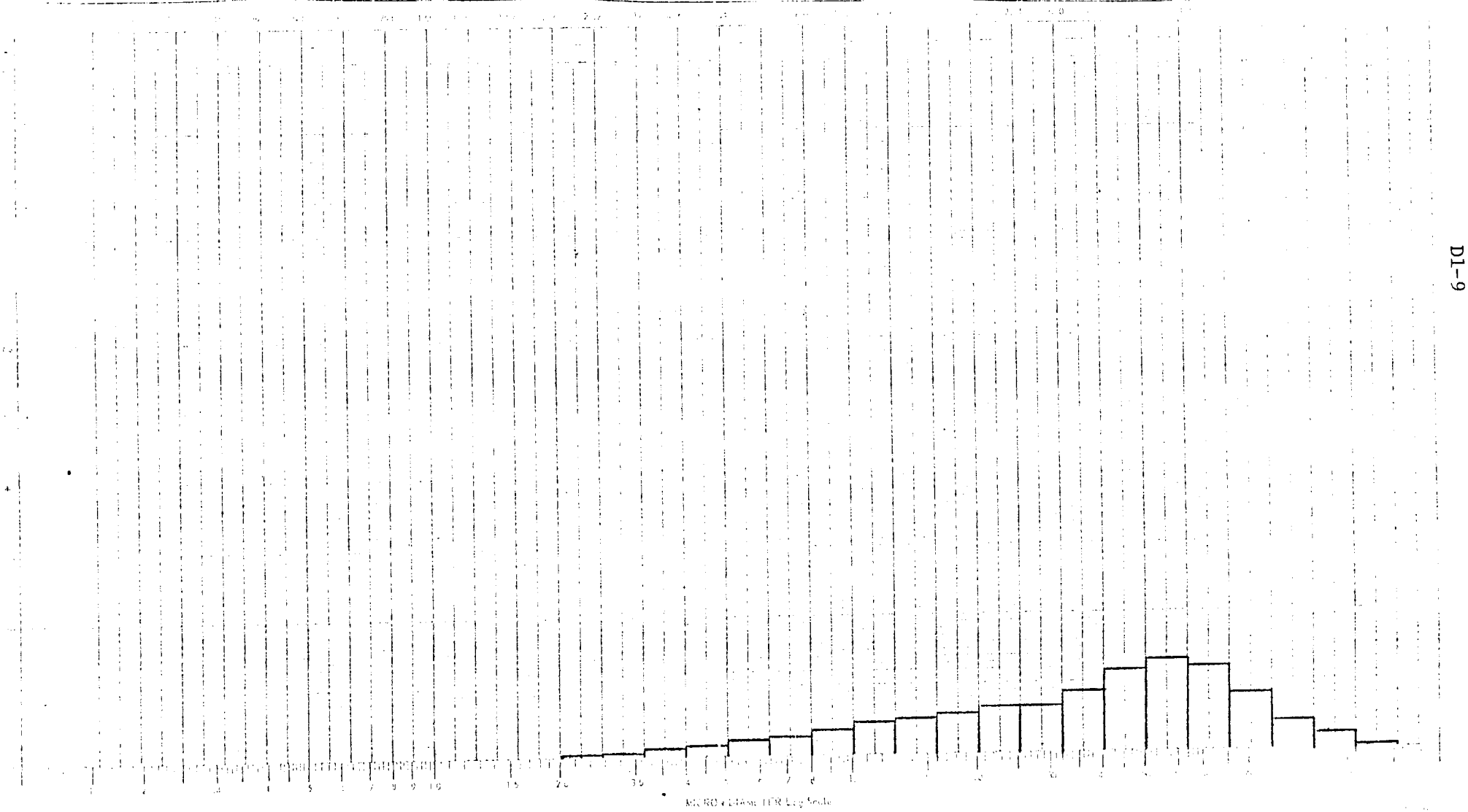
Scott Res. Labs.
E.Hoff
TA

Mixture (1-1) Isoton/Glycerine IIA

Boiler #2 - Composite of acetone wash & cyclone catches from Runs 1, 2 & 3

800
140 23856

Latex	89	10	3.2125	580.6	10	3.2169		
Microspheres	18.04	11	3.2158	20.211	3.2112	.5		



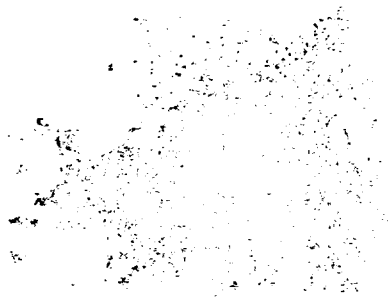
SET 1488 01 0475

D1-9

SET 1488 01 0475

APPENDIX D2

Particle Sizing Analysis - Boiler #3



SET 1488 01 0475

CB# 2143 B

COULTER COUNTER® Model T & T_A Worksheet

SAMPLE 1488-031

ELECTROLYTE 70% Isoton/30% Glycerol

DISPERSANT Type IIA, 1 min. ultrasonics

EQUIPMENT TA SERIAL 1180

ORGANIZATION Scott Research

OPERATOR M.B. DATE 3/25/75

Boiler #3 - Composite of acetone wash

catches from Runs 1, 2 & 3

Aper. Dia.	Ser. No.	CALIBRATION DATA	Part. Dia.	W	± I A	A
560		Micros.	18.04	6	3.2	345
200	34921	Micros.	18.04	10	3.2	231

$$k = d\sqrt[3]{\frac{2^W}{A}}$$

FOR MODEL T

± I A	3.2	3.2		
CALIB. A	124	164.5		
APERTURE DIA.	560	200		

$$\frac{A_2}{A_1} = \left(\frac{d_2}{d_1}\right)^3 2^{(W_2 - W_1)}$$ For Model T

$$\frac{A_2}{A_1} = \left(\frac{d_1}{d_2}\right)^3 2^{(W_2 - W_1)}$$ For Model T_A

SAMPLE DATA

Geometric Mean μ^3	Volume μ^3	Diameter μ	Channel (W)							Cum.%	Dif.%
.00575	.004091	.198									
.0115	.008181	.250									
.0231	.01636	.315									
.0462	.03272	.397									
.0925	.06545	.500									
.1851	.1309	.630									
.3702	.2618	.794									
.7405	.5236	1.00									
1.481	1.047	1.26									
2.962	2.094	1.59									
5.924	4.189	2.00									
11.85	8.378	2.52									
23.70	16.76	3.17								100.0	.9
47.39	33.51	4.00								99.1	1.7
94.78	67.02	5.04								97.4	2.6
189.6	134.0	6.35								94.8	4.1
379.1	268.1	8.00								90.7	5.4
758.3	536.2	10.08								85.3	6.4
1516.	1072.	12.7								78.9	7.1
3033.	2145.	16.0								71.9	7.3
6066.	4289.	20.2								64.6	7.5
12.13×10^3	8579.	25.4								57.0	7.8
24.27×10^3	17.16×10^3	32.0								49.2	8.3
48.54×10^3	34.31×10^3	40.3								40.9	7.8
97.18×10^3	68.63×10^3	50.8								33.1	7.3
194.4×10^3	137.3×10^3	64.0								25.8	6.6
388.7×10^3	274.5×10^3	80.6								19.2	5.9
777.4×10^3	549.0×10^3	101.6								13.3	5.1
1.555×10^6	1.098×10^6	128.								8.3	4.9
3.109×10^6	2.196×10^6	161.								3.4	2.3
6.219×10^6	4.392×10^6	203.								1.0	1.0
12.44×10^6	8.784×10^6	256.								0	0
24.88×10^6	17.57×10^6	322.									
49.75×10^6	35.14×10^6	406.									
99.50×10^6	70.27×10^6	512.									
199.0×10^6	140.6×10^6	645.									
398.0×10^6	281.1×10^6	812.									
796.0×10^6	562.2×10^6	1024.									

2143 B

COULTER COUNTER® Model T&TA — PARTICLE SIZE ANALYSIS — .15 - 200 μm X PERCENT

COULTER ELECTRONICS INC.
590 W 20 ST.
HIALEAH, FLA. 33010

ORGANIZATION: Scott Research
OPERATOR: Mayra Bisnow
EQUIPMENT: TA

SAMPLE: 1488-031 — 70% ELECTROLYTE Isoton/30% Glycerol DISPERSANT
Dispersant: IIA, 1 min. U.S.
Boiler #3 - Composite of acetone wash catches
from Runs 1, 2 & 3

$k = d\sqrt[3]{2^w}$ FOR MODEL T

$\frac{A2}{A1} = \left(\frac{d2}{d1}\right)^3$ when W2 = W1 FOR MODEL TA

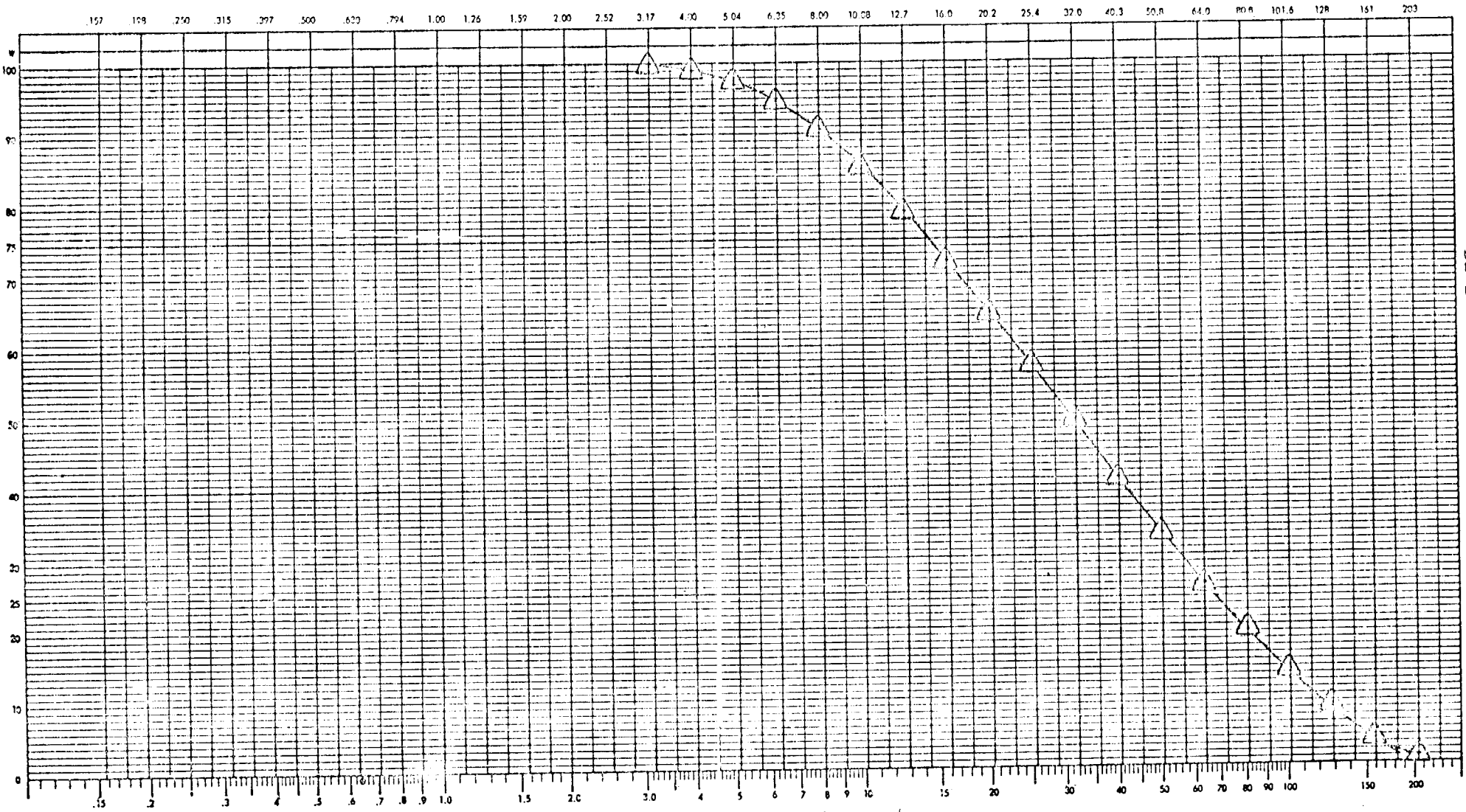
APER. SIZE	SERIAL		PART DIA.	W	± IA	A
560		Microspheres	18.04	6	3.2345	
200	34921	Microspheres	18.04	10	3.2231	

SAMPLE SETTINGS

DIA.	W	± IA	A
25.1	6	3.2124	
20.2	10	3.2164.5	

SET 1488 01 [illegible]

D2-2



4221010

2143 B

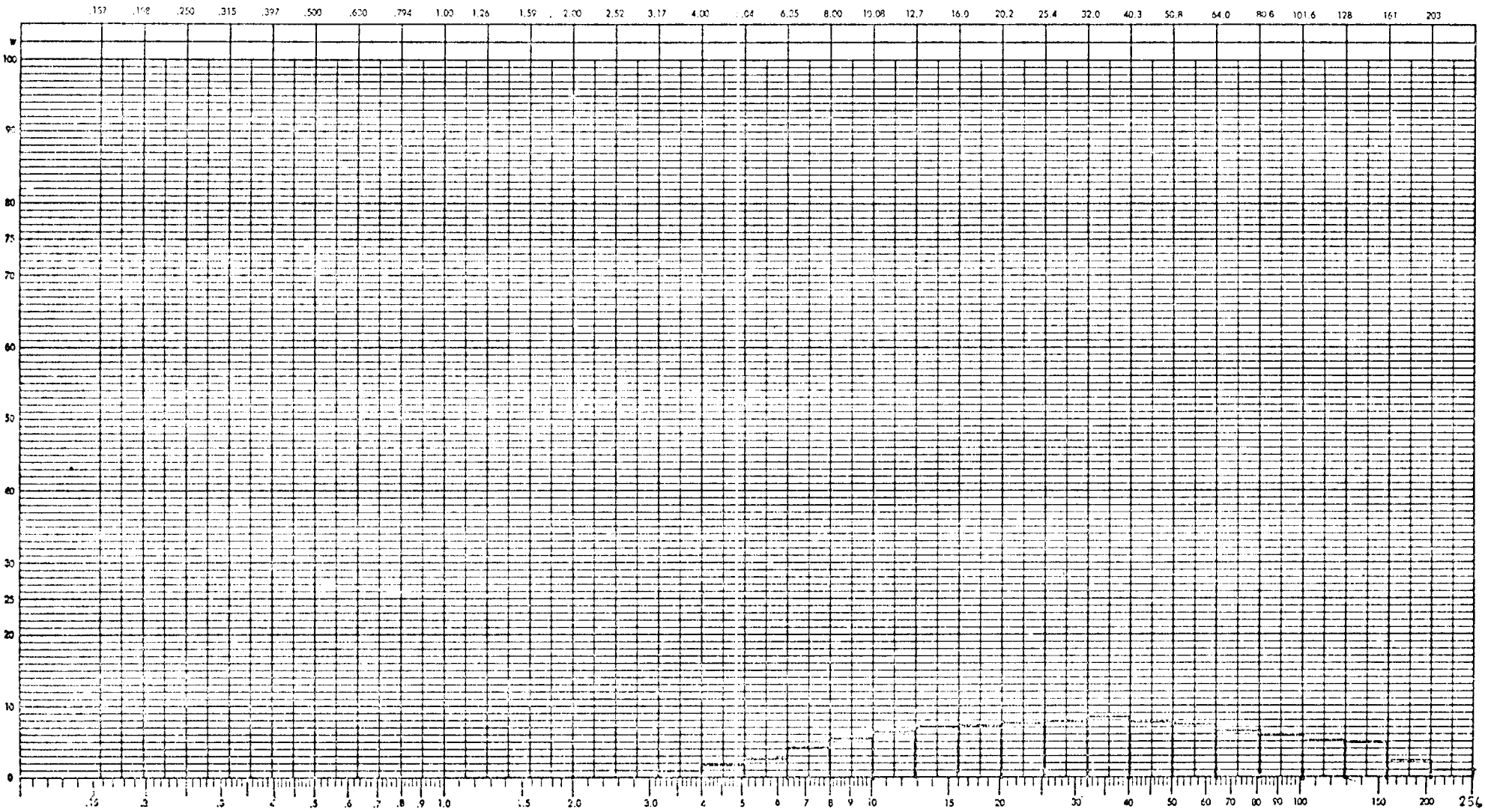
COULTER COUNTER® Model T&TA — PARTICLE SIZE ANALYSIS — .15 – 203 µm X PERCENT

COULTER ELECTRONICS INC.
590 W 20 ST.
HIALEAH, FLA. 33010

ORGANIZATION: Scott Research
OPERATOR: Mayra Bisnow
INSTRUMENT: TA

$k = d\sqrt[3]{2\pi}$ FOR MODEL T; $\frac{A2}{A1} = \left(\frac{d2}{d1}\right)^3$ when W2 = W1 FOR MODEL TA; $\frac{A2}{A1} = \left(\frac{d1}{d2}\right)^3$ when W2 = W1

SAMPLE	APER SIZE	SERIAL		PART DIA.	W	±DA	A	SAMPLE SETTINGS DIA.	W	±DA	A
1488-031 70% ELECTROLYTE Isoton/30% Glycerol DISPERSANT	560		Microspheres	18.04	6	3.2	345	25.4	6	3.2	124
Dispersant: IIA, 1 min. U.S.	200	34921	Microspheres	18.04	10	3.2	231	20.2	10	3.2	164.5
Boiler #3 - Composite of acetone wash catches											
from Runs 1, 2 & 3											



4271010

SET 1488 01 0475

D2-3

SET 1488 01 0475
CE# 2143 A

D2-4

COULTER COUNTER® Model T & T_A Worksheet

SAMPLE 1488-03

ELECTROLYTE 50% Isoton/50% Glycerol

DISPERSANT Type IIA, 1 min. ultrasonics

EQUIPMENT	SERIAL	Aper. Dia.	Ser. No.	CALIBRATION DATA	Part. Dia.	W	± I A	A
TA	1180							
ORGANIZATION Scott Research		800		Latex	89	10	3.2	139
OPERATOR Mayra Bisnow	DATE 3/25/75							
Boiler #3 - Composite of cyclone dry								
catches from Runs 1, 2 & 3								

$$k = d\sqrt[3]{\frac{2^W}{A}}$$

FOR MODEL T

± I A	3.2			
CALIB. A	187			
APERTURE DIA.	800			

$\frac{A_2}{A_1} = \left(\frac{d_2}{d_1}\right)^3 2^{(W_2 - W_1)}$ For Model T

$\frac{A_2}{A_1} = \left(\frac{d_1}{d_2}\right)^3 2^{(W_2 - W_1)}$ For Model T_A

SAMPLE DATA

Geometric Mean μ^3	Volume μ^3	Diameter μ	Channel (W)							Cum.%	Dif.%
.00575	.004091	.198									
.0115	.008181	.250									
.0231	.01636	.315									
.0462	.03272	.397									
.0925	.06545	.500									
.1851	.1309	.630									
.3702	.2618	.794									
.7405	.5236	1.00									
1.481	1.047	1.26									
2.962	2.094	1.59									
5.924	4.189	2.00									
11.85	8.378	2.52									
23.70	16.76	3.17									
47.39	33.51	4.00									
94.78	67.02	5.04									
189.6	134.0	6.35									
379.1	268.1	8.00									
758.3	536.2	10.08									
1516.	1072.	12.7								100.0	.8
3033.	2145.	16.0								99.2	1.8
6066.	4289.	20.2								97.4	1.9
12.13×10^3	8579.	25.4								95.4	1.9
24.27×10^3	17.16×10^3	32.0								93.5	3.9
48.54×10^3	34.31×10^3	40.3								89.7	6.9
97.18×10^3	68.63×10^3	50.8								82.8	10.7
194.4×10^3	137.3×10^3	64.0								72.1	11.9
388.7×10^3	274.5×10^3	80.6								60.2	17.9
777.4×10^3	549.0×10^3	101.6								42.2	18.8
1.555×10^6	1.098×10^6	128.								23.5	15.2
3.109×10^6	2.196×10^6	161.								8.3	5.8
6.219×10^6	4.392×10^6	203.								2.5	2.5
12.44×10^6	8.784×10^6	256.								0	0
24.88×10^6	17.57×10^6	322.									
49.75×10^6	35.14×10^6	406.									
99.50×10^6	70.27×10^6	512.									
199.0×10^6	140.6×10^6	645.									
398.0×10^6	281.1×10^6	812.									
796.0×10^6	562.2×10^6	1024.									

2143A

COULTER COUNTER® Model T&TA — PARTICLE SIZE ANALYSIS

.15 - 200μ X PERCENT

COULTER ELECTRONICS INC.
590 W 20 ST.
HIALEAH, FLA. 33010

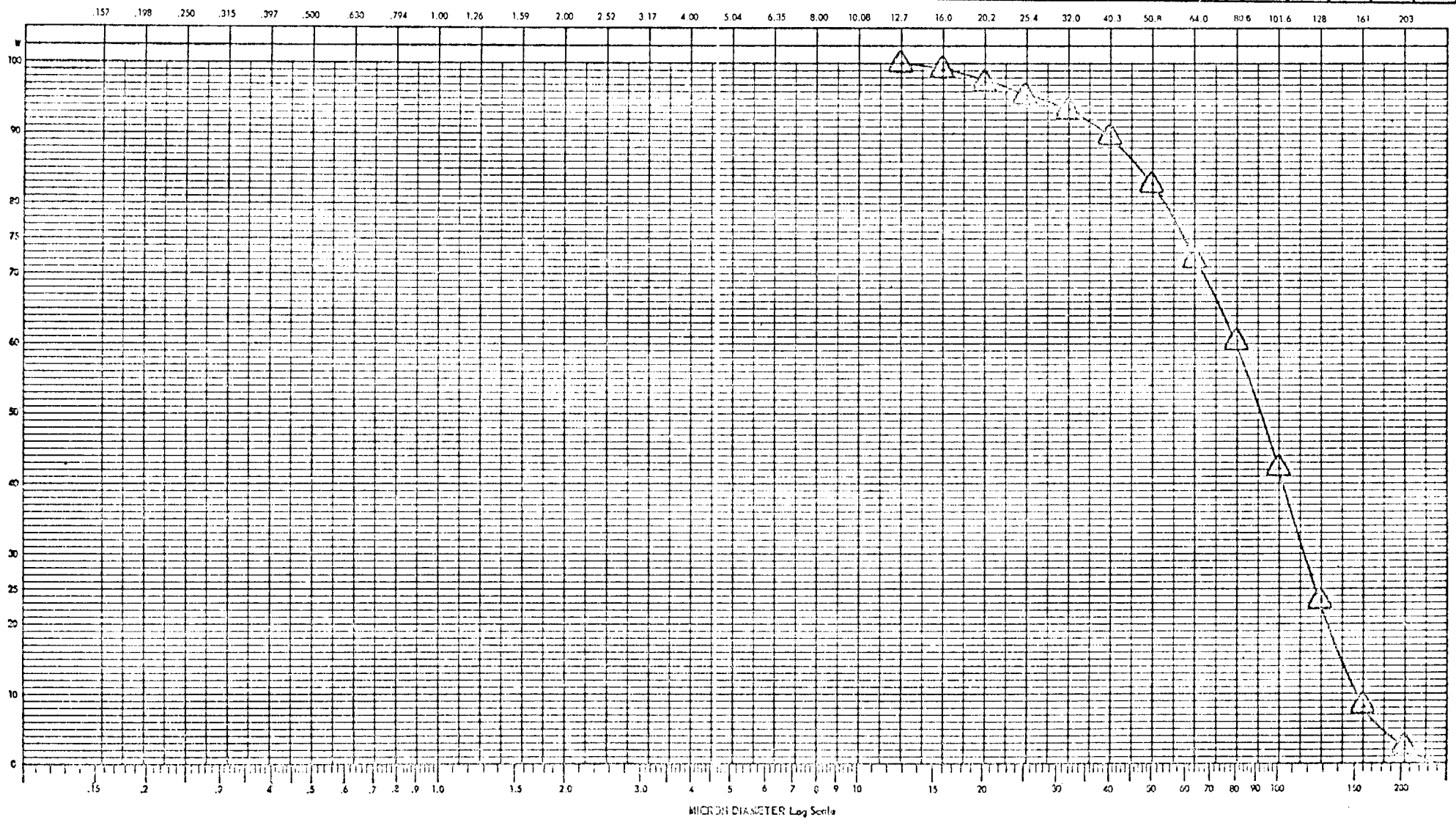
ORGANIZATION: Scott Research
OPERATOR: Mayra Bisnow
EQUIPMENT: TA

$k = d\sqrt[3]{2^n}$ FOR MODEL T

$\frac{A2}{A1} = \left(\frac{d2}{d1}\right)^3$ when W2 = W1 FOR MODEL TA

$\frac{A2}{A1} = \left(\frac{d1}{d2}\right)^3$ when W2 = W1

	SAMPLE	ELECTROLYTE / DISPERSANT	APER. SIZE	SERIAL		PART DIA.	W	±A	A	SAMPLE SETTINGS DIA.	W	±A	A
	1488-03	50% Isoton/50% Glycerol	800		Latex	89	10	3.2	139	80.6	10	3.2	187
		Dispersant: IIA, 1 min. U.S.											
	Boiler #3 - Composite of cyclone dry catches												
	from Runs 1, 2 & 3												



4221010

SET 1488 01 0475

D2-5

2143A

COULTER COUNTER® Model T&TA — PARTICLE SIZE ANALYSIS

.15 – 200μ X PERCENT

COULTER ELECTRONICS INC.
590 W 20 ST.
HIALEAH, FLA. 33010

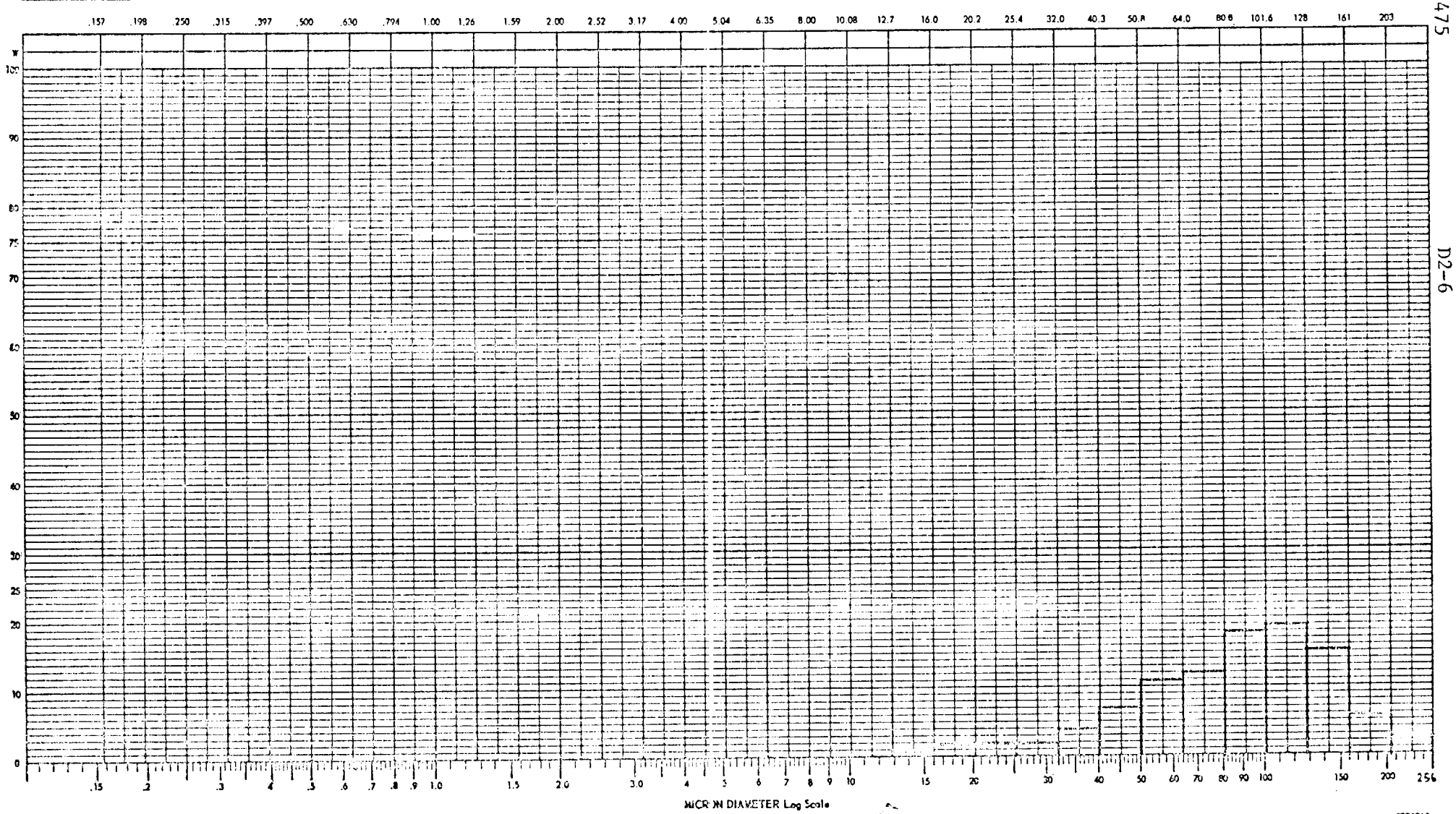
ORGANIZATION: Scott Research
OPERATOR: Mayra Bisnow
EQUIPMENT: TA

$k = d\sqrt[3]{2^w}$ FOR MODEL T

$\frac{A2}{A1} = \left(\frac{d2}{d1}\right)^3$ when $W2 = W1$ FOR MODEL TA

$\frac{A2}{A1} = \left(\frac{d1}{d2}\right)^3$ when $W2 = W1$ FOR MODEL TA

	APER. SIZE	SERIAL		PART DIA.	W	± DA	A	SAMPLE SETTINGS DIA.	W	± DA	A
SAMPLE 1488-03 ELECTROLYTE 50% Isoton/50% Glycerol DISPERSANT	800		Latex	89	10	3.2	139	80.6	10	3.2	187
Dispersant: IIA, 1 min. U.S.											
Boiler #3 - Composite of cyclone dry catches											
from Runs 1, 2 & 3											



SET 1488 01 0475

D2-6

COULTER COUNTER® Model T & T_A Worksheet

SAMPLE: Mixture

ELECTROLYTE: 50% Isoton/50% Glycerol

DISPERSANT: Type IIA, 60 sec. ultrasonics

EQUIPMENT	SERIAL	Aper. Dia.	Ser. No.	CALIBRATION DATA	Part. Dia.	W	± I A	A
TA	1180							
ORGANIZATION: Scott Research		800		Latex	89	10	3.2	139
OPERATOR: M.B.	DATE: 3/26/75	200	34921	Micros.	18.04	10	3.2	231
Boiler #3 -- Composite of acetone wash &								
cyclone catches from Runs 1, 2 & 3								

$k = d\sqrt[3]{\frac{2^W}{A}}$ FOR MODEL T

± I A	3.2	3.2		
CALIB. A	187	164.5		
APERTURE DIA.	800	200		

$\frac{A_2}{A_1} = \left(\frac{d_2}{d_1}\right)^3 2^{(W_2 - W_1)}$ For Model T

$\frac{A_2}{A_1} = \left(\frac{d_1}{d_2}\right)^3 2^{(W_2 - W_1)}$ For Model T_A

SAMPLE DATA

Geometric Mean μ^3	Volume μ^3	Diameter μ	Channel (W)							Cum.%	Dif.%
.00575	.004091	.198									
.0115	.008181	.250									
.0231	.01636	.315									
.0462	.03272	.397									
.0925	.06545	.500									
.1851	.1309	.630									
.3702	.2618	.794									
.7405	.5236	1.00									
1.481	1.047	1.26									
2.962	2.094	1.59									
5.924	4.189	2.00									
11.85	8.378	2.52									
23.70	16.76	3.17								100.0	.6
47.39	33.51	4.00								99.4	1.0
94.78	67.02	5.04								98.4	1.4
189.6	134.0	6.35								97.0	1.9
379.1	268.1	8.00								95.1	2.5
758.3	536.2	10.08								92.6	2.8
1516.	1072.	12.7								89.8	3.1
3033.	2145.	16.0								86.7	3.6
6066.	4289.	20.2								83.1	3.6
12.13×10^3	8579.	25.4								79.5	3.6
24.27×10^3	17.16×10^3	32.0								75.9	5.3
48.54×10^3	34.31×10^3	40.3								70.6	7.5
97.18×10^3	68.63×10^3	50.8								63.1	9.2
194.4×10^3	137.3×10^3	64.0								53.9	8.0
388.7×10^3	274.5×10^3	80.6								45.9	10.9
777.4×10^3	549.0×10^3	101.6								35.0	14.4
1.555×10^6	1.098×10^6	128.								20.6	11.2
3.109×10^6	2.196×10^6	161.								9.4	5.9
6.219×10^6	4.392×10^6	203.								3.5	3.4
12.44×10^6	8.784×10^6	256.								.1	.1
24.88×10^6	17.57×10^6	322.								0	0
49.75×10^6	35.14×10^6	406.									
99.50×10^6	70.27×10^6	512.									
199.0×10^6	140.6×10^6	645.									
398.0×10^6	281.1×10^6	812.									
796.0×10^6	562.2×10^6	1024.									

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COULTER COUNTER® Model T&TA — **PARTICLE SIZE ANALYSIS** — .15 – 200 μ, X PERCENT

COULTER ELECTRONICS INC.
590 W 20 ST.
HIALEAH, FLA. 33010

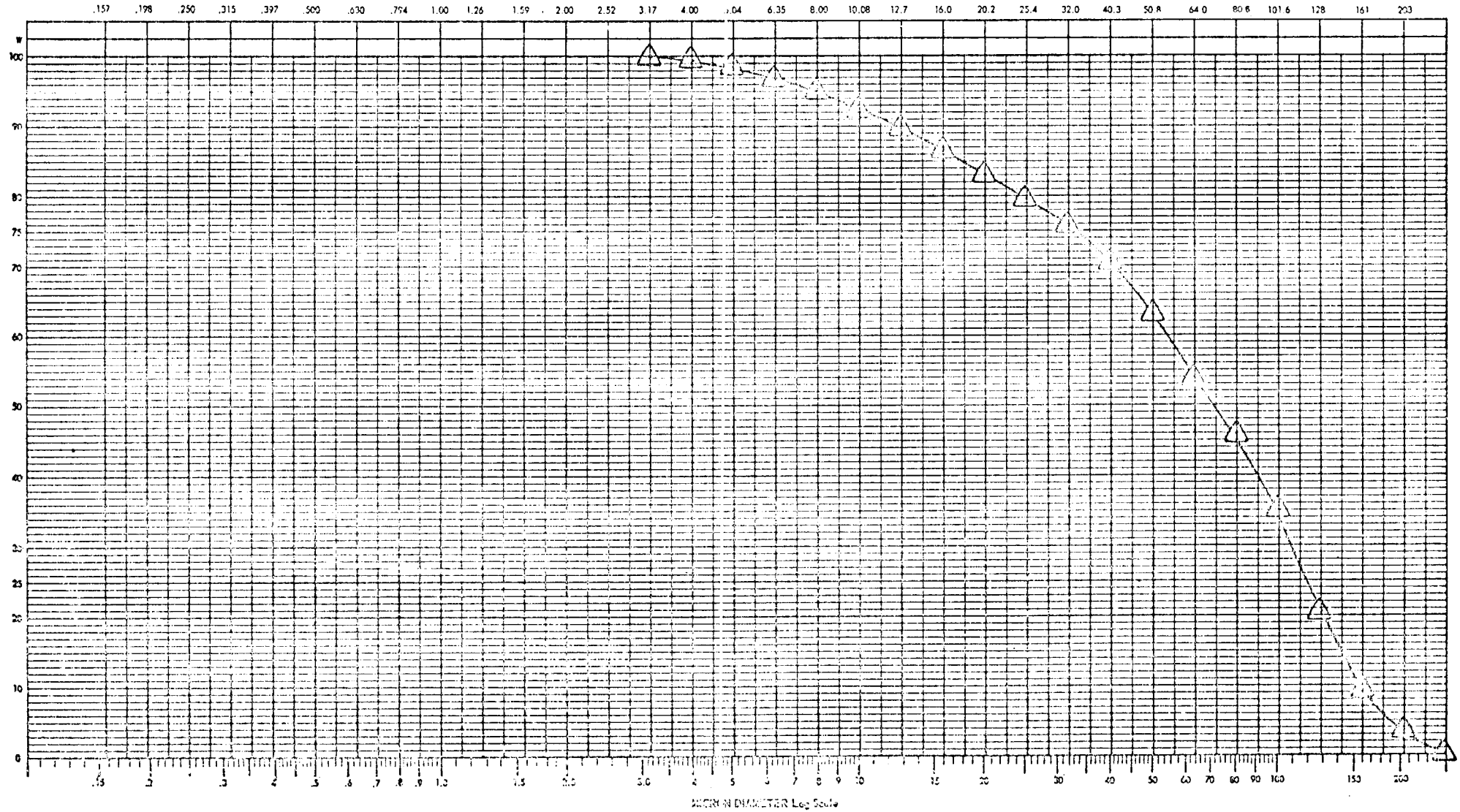
ORGANIZATION: Scott Research
OPERATOR: Mayra Bisnow
EQUIPMENT: TA

$k = d\sqrt[3]{2^w}$ FOR MODEL T

$\frac{A2}{A1} = \left(\frac{d2}{d1}\right)^3$ when $W2 = W1$ FOR MODEL TA

$\frac{A2}{A1} = \left(\frac{d1}{d2}\right)^3$ when $W2 = W1$ FOR MODEL TA

		APER. SIZE	SERIAL		PART DIA.	W	± TA	A	SAMPLE SETTINGS DIA.	W	± TA	A
SAMPLE	Mixture 50% ELECTROLYTE Isoton/50% Glycerol DISPERSANT	800		Latex	89	10	3.2139		806	10	3.2187	
	Dispersant: IIA, 60 sec. U.S.	200	34921	Microspheres	18.04	10	3.2231		802	10	3.2164	
	Boiler #3 - Composite of acetone wash & cyclone catches from Runs 1, 2 & 3											



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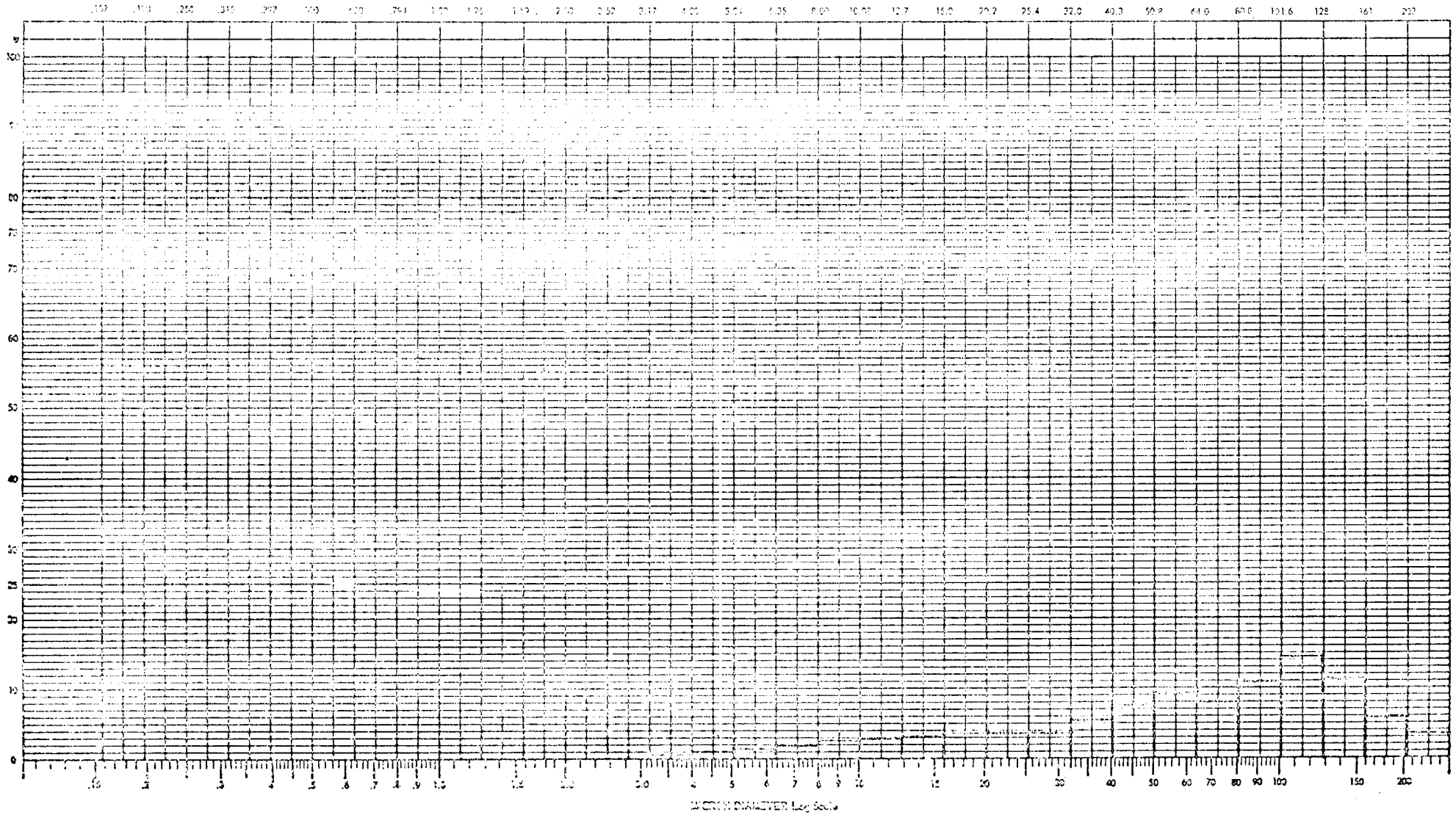
COULTER COUNTER® Model T&TA — PARTICLE SIZE ANALYSIS — .15 - 200μ X PERCENT — COULTER ELECTRONICS INC. 590 W 20 ST. HIALEAM, FLA. 33010

ORGANIZATION: Scott Research

$k = d\sqrt[3]{2^n}$ FOR MODEL T; $\frac{A_2}{A_1} = \left(\frac{d_2}{d_1}\right)^3$ when $W_2 = W_1$; $\frac{A_2}{A_1} = \left(\frac{d_1}{d_2}\right)^3$ when $W_2 = W_1$ FOR MODEL TA

		APER. SIZE	SERIAL		POINT DIA.	W	± TA	A	SAMPLE SETTINGS DIA.	W	± TA	A
	Mixture 50% Isoton/50% Glycerol	800		Latex	89	10	3.2139		96	10	3.2187	
	Dispersant: IIA, 60 sec. U.S.	200	34921	Microspheres	18.0	10	3.2231		92	10	3.2164	S
	Boiler #3 - Composite of acetone wash & cyclone											
	leaches from Runs 1, 2 & 3											



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APPENDIX E

Test Log

SET 1488 01 0475

TEST LOG

On February 10, 1975, the Scott test team arrived at the RCA-Electronic Components plant in Lancaster, Pennsylvania and set up the necessary equipment for EPA Method 5 and Method 7 testing on Boiler #2. No testing could be performed on this day due to some changes that had to be done on the traverse railing. However, an initial traverse of the stack was conducted for stack velocity and temperature conditions.

On February 11, 1975, three EPA Method 5 tests, each for a duration of sixty minutes, were conducted. In addition, NO_x samples, Orsat bag samples and process conditions were obtained. No critical problems were encountered during the three tests. Preparations for testing Boiler #1 the next day were made.

On February 12, 1975, a quick preliminary traverse of Boiler #1 showed negligible or almost undetectable flow in the stack. In addition, a severe snowstorm prevented any testing possible. In mutual consultation with the Project Officer, it was decided to test Boiler #3 instead on a later date. The Scott team returned to Plumsteadville on February 12, 1975.

On March 11, 1975, the Scott team returned to RCA to conduct tests on Boiler #3. Test equipment was set up, a preliminary traverse performed and the first test conducted. On March 12, 1975, two more tests were conducted. No undue problems occurred during these tests, except that a high line vacuum near the end of Run 3 required a filter replacement. The Scott team returned to Plumsteadville on March 12, 1975.

APPENDIX F

Project Participants