MICROMETALLICS CORPORATION
1695 MONTEREY HIGHWAY
SAN JOSE, CA 95112
ATTENTION: MR. JIM QUINTAL

Reference: TMA/Norcal C.N. 5328-2,3

March 22-24, 1988

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TMA
Thermo Analytical Inc.

TMA/Norcal
2030 Wright Avenue
P.O. Box 4040
Richmond, CA 94804-0040

(415) 235-2633

April 27, 1988

Micrometallics Corporation
1695 Monterey Highway
San Jose, CA 95112

Attention: Mr. Jim Quintal

Subject: Sampling and analysis of three units (Ball Mill, Shredder, Incinerator) for particulate, beryllium, silver, gold, lead, copper and chrome. The incinerator unit was also tested for nonmethane organic hydrocarbons.

Sampling Date: March 22-24, 1988.

Sampling Location: Micrometallics Corporation, 1695 Monterey Highway, San Jose, CA 95112.

Sampling Personnel: Guy Worthington and Juan Rios of TMA/Norcal.

Sampling Procedures: Sampling methods are described in the California Air Resources Board's Stationary Source Test Methods, Volume I & III.

Method 1	Sample and Velocity Traverse
Method 2	Velocity and Volumetric Flow Rate
Method 4	Moisture Content
Method 5	Particulate Matter Emissions
Method 12	Inorganic Lead Emissions
Method 104	Beryllium
Method 425	Total Chromium
Method 100	Continuous Sampling

Monitoring Equipment: The following continuous monitoring equipment was used:

Carbon Dioxide and Carbon Monoxide (Infrared Industries Model 7752/7020; CO/CO_2 NDIR)

Oxygen (TAI Series 326A)

Ratfish 55S Hydrocarbon Analyzer

Comments: The incinerator unit had no meter that would monitor the gas flow rate. However, since the material burned contained almost no carbon, it was assumed that the CO_2 content was due to the burning gas. This method of 2-

Micrometallics Corporation April 27, 1988

correction was used after consulting with Tim Underwood of the Bay Area Air Management District. Therefore, the 12% CO_2 correction factor was calculated based on the following formula:

$$\text{Correction factor} = \frac{(12/100)\ (Q_o - 10.24Q_g)}{(Q_o)(CO_2\%/100) - 1.11Q_g}$$

Q_o = Dry Stack Flow Rate, SDCFM

Q_g = Natural Gas Flow Rate, SCFM

CO_2 = % CO_2 in Stack

$$\text{New correction factor} = \frac{(12/100)(Q_o)}{(Q_o)(CO_2\%/100)}$$

The gold analyses has been delayed by the laboratory but the results will be sent under an addendum to the report.

If you have any questions, please do not hesitate to call.

Sincerely,

Juan J. Rios
Technical Director
Air Source Testing

JJR/aer

TABLE I

CLIENT: MICROMETALLICS
UNIT: BALL MILL
DATE TESTED: MARCH 22, 1988

TEST	1	2	3
Time of Test	1127-1230	1247-1408	1524-1627
Stack Temperature, °F	87	90	91
Volume Flow, SDCFM	8852	9417	9250
Sampled Volume, SDCF	43.7	43.0	42.8
Oxygen, Vol % (dry)	21.0	21.0	21.0
Carbon Dioxide, Vol % (dry)	0.0	0.0	0.0
Particulate Wt., grams	0.0008	0.0034	0.0093
Particulate Conc., grains/SDCF	0.0003	0.0012	0.0034
Particulate Emissions, lbs/hr	0.02	0.1	0.3
Isokinetic Sampling, %	109	101	102
Beryllium Wt., grams	ND	ND	ND
Beryllium Conc., grains/SDCF	ND	ND	ND
Beryllium Emissions, lb/hr	ND	ND	ND
Chromium Wt, grams	5.1×10^{-6}	5.1×10^{-6}	7.2×10^{-6}
Chromium Conc., grains/SDCF	1.8×10^{-6}	1.8×10^{-6}	2.6×10^{-6}
Chromium Emissions, lbs/hr	1.4×10^{-4}	1.5×10^{-4}	2.0×10^{-4}
Copper Wt., grams	4.8×10^{-5}	2.1×10^{-4}	2.5×10^{-4}
Copper Conc., grains/SDCF	1.7×10^{-5}	0.8×10^{-4}	0.9×10^{-4}
Copper Emissions, lbs/hr	1.3×10^{-3}	6.5×10^{-3}	7.1×10^{-3}
Lead Wt., grams	3.9×10^{-5}	1.2×10^{-4}	1.9×10^{-4}
Lead Conc., grains/SDCF	1.4×10^{-5}	0.4×10^{-4}	0.7×10^{-4}
Lead Emissions, lbs/hr	1.1×10^{-3}	3.2×10^{-3}	5.6×10^{-3}
Nickel Wt., grams	3.4×10^{-6}	6.3×10^{-6}	1.6×10^{-6}
Nickel Conc., grains/SDCF	1.2×10^{-6}	2.3×10^{-6}	0.6×10^{-6}
Nickel Emissions, lbs/hr	9.1×10^{-5}	1.9×10^{-4}	4.8×10^{-5}
Silver Wt., grams	1.0×10^{-6}	1.0×10^{-6}	5.8×10^{-6}
Silver Conc., grains/SDCF	0.4×10^{-6}	0.4×10^{-6}	2.1×10^{-6}
Silver Emissions, lbs/hr	3.0×10^{-5}	3.2×10^{-5}	1.7×10^{-4}

All weights are filter plus impinger catches except for particulate which is filter and probe wash.

TABLE II

CLIENT: MICROMETALLICS
UNIT: SHREDDER
DATE TESTED: MARCH 23, 1988

TEST	1	2	3
Time of Test	1147-1252	1445-1550	1605-1710
Stack Temperature, °F	91	96	94
Volume Flow, SDCFM	6367	8083	6952
Sampled Volume, SDCF	42.4	53.7	46.2
Oxygen, Vol % (dry)	21.0	21.0	21.0
Carbon Dioxide, Vol % (dry)	0.0	0.0	0.0
Particulate Wt., grams	0.0004	0.0007	0.0009
Particulate Conc., grains/SDCF	0.0001	0.0002	0.0003
Particulate Emissions, lbs/hr	0.01	0.01	0.02
Isokinetic Sampling, %	101	101	101
Beryllium Wt., grams	ND	ND	ND
Beryllium Conc., grains/SDCF	ND	ND	ND
Beryllium Emissions, lb/hr	ND	ND	ND
Chromium Wt, grams	8.9×10^{-5}	7.9×10^{-6}	4.0×10^{-6}
Chromium Conc., grains/SDCF	3.2×10^{-5}	2.3×10^{-6}	1.3×10^{-6}
Chromium Emissions, lbs/hr	1.7×10^{-3}	1.6×10^{-4}	7.7×10^{-5}
Copper Wt., grams	2.0×10^{-4}	4.0×10^{-5}	3.1×10^{-5}
Copper Conc., grains/SDCF	0.7×10^{-4}	0.2×10^{-5}	1.0×10^{-5}
Copper Emissions, lbs/hr	3.8×10^{-3}	1.4×10^{-4}	6.0×10^{-4}
Lead Wt., grams	7.2×10^{-5}	7.1×10^{-5}	3.7×10^{-5}
Lead Conc., grains/SDCF	2.6×10^{-5}	2.0×10^{-5}	1.2×10^{-5}
Lead Emissions, lbs/hr	1.4×10^{-3}	1.4×10^{-3}	7.2×10^{-4}
Nickel Wt., grams	1.7×10^{-4}	1.2×10^{-6}	ND
Nickel Conc., grains/SDCF	0.6×10^{-4}	0.3×10^{-6}	ND
Nickel Emissions, lbs/hr	3.3×10^{-3}	2.1×10^{-5}	ND
Silver Wt., grams	0.6×10^{-6}	1.3×10^{-6}	0.8×10^{-6}
Silver Conc., grains/SDCF	0.2×10^{-6}	0.4×10^{-6}	0.3×10^{-6}
Silver Emissions, lbs/hr	1.1×10^{-5}	2.8×10^{-5}	1.8×10^{-5}

All weights are filter plus impinger catches except for particulate which is filter and probe wash.

TABLE III

CLIENT: MICROMETALLICS
UNIT: INCINERATOR
DATE TESTED: MARCH 24, 1988

TEST	1	2	3	4
	PC BOARDS		SLUDGE	
Time of Test	1150-1304	1342-1449	1530-1640	1705-1809
Stack Temperature, °F	657	629	597	586
Volume Flow, SDCFM	4337	4296	4320	4402
Sampled Volume, SDCF	30.2	29.5	33.2	34.1
Water Vapor, vol %	3.8	4.0	3.8	3.5
Oxygen, Vol % (dry)	17.3	17.8	18.1	18.4
Carbon Dioxide, Vol % (dry)	1.8	1.5	1.5	1.4
Particulate Wt., grams	0.0718	0.0621	0.0075	0.0090
Particulate Conc., grains/SDCF	0.0367	0.0325	0.0035	0.0041
Particulate Emissions, lbs/hr	1.36	1.20	0.13	0.15
Isokinetic Sampling, %	93	91	102	103
Grains/SDCF, Corrected*	0.2447	0.2600	0.0280	0.0351
Auxillary Fuel Usage, SCFM	---	---	---	---
Material Burned, lbs	34	27	105	117
Carbon Monoxide Conc., ppm	279	180	ND	ND
Carbon Monoxide, lbs/hr as CO	5.25	3.36	ND	ND
Nonmethane Hydrocarbons, ppm as C_1	6	5	2	2
Nonmethane Hydrocarbons, lbs/hr as C_1	4.8×10^{-2}	4.0×10^{-2}	1.6×10^{-2}	1.6×10^{-2}
Chromium Wt, grams	3.1×10^{-4}	3.1×10^{-4}	2.5×10^{-4}	3.4×10^{-4}
Chromium Conc., grains/SDCF	1.6×10^{-4}	1.6×10^{-4}	1.2×10^{-4}	1.5×10^{-4}
Chromium Emissions, lbs/hr	5.9×10^{-3}	5.9×10^{-3}	4.4×10^{-3}	5.7×10^{-3}
Copper Wt., grams	8.0×10^{-3}	8.7×10^{-3}	6.0×10^{-4}	7.8×10^{-4}
Copper Conc., grains/SDCF	4.1×10^{-3}	4.6×10^{-3}	2.8×10^{-4}	3.5×10^{-4}
Copper Emissions, lbs/hr	0.15	0.17	1.0×10^{-2}	1.3×10^{-2}
Lead Wt., grams	9.9×10^{-3}	1.0×10^{-2}	1.3×10^{-3}	1.7×10^{-3}
Lead Conc., grains/SDCF	5.1×10^{-3}	5.2×10^{-3}	0.6×10^{-3}	0.8×10^{-3}
Lead Emissions, lbs/hr	0.19	0.19	2.2×10^{-2}	3.0×10^{-2}
Nickel Wt., grams	1.3×10^{-4}	1.2×10^{-4}	8.2×10^{-5}	1.3×10^{-4}
Nickel Conc., grains/SDCF	0.7×10^{-4}	0.6×10^{-4}	3.8×10^{-5}	5.9×10^{-5}
Nickel Emissions, lbs/hr	2.6×10^{-3}	2.2×10^{-3}	1.4×10^{-3}	2.2×10^{-3}
Silver Wt., grams	1.7×10^{-5}	1.7×10^{-5}	2.0×10^{-5}	1.0×10^{-5}
Silver Conc., grains/SDCF	0.9×10^{-5}	0.9×10^{-5}	0.9×10^{-5}	0.5×10^{-5}
Silver Emissions, lbs/hr	3.3×10^{-4}	3.3×10^{-4}	3.3×10^{-4}	1.9×10^{-4}

Footnotes on the next page.

Table III (cont'd)

Footnotes:

All weights are filter plus impinger catches except for particulate which is filter and probe wash.

*Particulate concentration corrected to 12% CO_2. Since their was no meter to measure Auxillary Flow Rate, the correction was made by assuming that all CO_2 was a result of the auxillary fuel.

Tests 1 & 2 Burned Printed Circuit Boards.

Tests 3 & 4 Burned Sludge.

APPENDIX I

FLOW AND PARTICULATE CALCULATIONS

THERMO ANALYTICAL

Client : INCINERATER

Date Tested : 3/24/88

Test No. : 1

Time : 1150

GAS FLOW DATA

Sample Points 123456789

Barometric Pressure 30.2

Sample Nozzle Area .000759 ft^2

Duct Pressure 30.2 ''Hg

Condensate 25 ml.

Avg. Gas Meter Pressure 0 in.Hg

Vol. of Gas Samples 30.95 CF

Avg Gas Meter Temp 88 F

Avg Duct Temp 657 F

Wgt. Collected .0718 Gms.

Duration of Test 63 Min.

Avg. Velocity at Sampling Pts 24.6 ft/sec.

Calculations

Condensed Water Vapor:

vw = 0.00267 * 25 * (460 + 70)/29.92 = 1.18 SCF

Corrected Meter Volume:

Vo = 30.95 * 30.2 / 29.92 * 530 / 548 = 30.21 SDCF

Percent Water Vapor:

% H20 = 1.18 / 31.4 * 100 = 3.8 %

Particulate Concentration (Grain Loading):

Go = (.0718 Gms. * 15.43)/ 30.21 SDCF = .0367 Grs/SDCF

Particulate Emission Rate:

(.0367 Grs/SDCF * 4337 SDCFM * 60)/7000 = 1.36 Lbs/Hr.

Percentage of Isokinetic Sampling Attained: %I = 93 %

THERMO ANALYTICAL

Client : INCINERATER Date Tested :3/24/88

Test No. :1 Time :1150

Gas Flow Rate Data

Point	h	T.	Vel.Ft/Sec
1	.09	605	23.9
2	.07	643	21.4
3	.08	650	23
4	.1	660	25.8
5	.1	669	25.9
6	.1	668	25.9
7	.08	670	23.2
8	.1	676	26
9	.1	677	26

Vs = Cp [h *(T + 460)]^.5 [1/M.W. * Ps]^.5 * 85.49

Conc. of CO2 = 1.8 % Conc. of O2 = 17.3 %

Conc. of H2O = 3.8 %

Avg. Gas Velocity; Vs, Avg. 24.6 Ft/Sec

Pitot Tube Correction Factor, Cp .84

Duct Gas Molecular Weight, M.W. 28.68

Duct Pressure, Ps. 30.2 ''Hg Barometric Pressure 30.2 ''Hg

Duct Size Rectangle 36 ''X 25.5 '' Static Pressure -.03 ''H2O

Duct Area 6.38 Sq. Ft Avg. Gas Temp. 657

Gas Flow Rate 24.6 Ft/Sec * 6.38 Sq. Ft * 60 = 9416 CFM

9416 CFM* 530 / 1117 * 30.2 /29.92*(1.00- 3.8 /100%H2O)= 4337 SDCFM

M.W. Factor = .0339 Standard Cond. Temp. 70

THERMO ANALYTICAL

Client : INCINERATER

Date Tested :3/24/88

Test No. :2

Time :1342

Gas Flow Rate Data

Point	h	T.	Vel.Ft/Sec
1	.09	614	24
2	.07	619	21.2
3	.08	616	22.7
4	.07	627	21.3
5	.09	627	24.2
6	.09	640	24.3
7	.1	632	25.5
8	.1	643	25.6
9	.1	643	25.6

Vs = Cp [h *(T + 460)]^.5 [1/M.W. * Ps]^.5 * 85.49

Conc. of CO2 = 1.5 %

Conc. of O2 = 17.8 %

Conc. of H2O = 4 %

Avg. Gas Velocity; Vs, Avg. 23.8 Ft/Sec

Pitot Tube Correction Factor, Cp .84

Duct Gas Molecular Weight, M.W. 28.63

Duct Pressure, Ps. 30.2 ''Hg

Barometric Pressure 30.2 ''Hg

Duct Size Rectangle 36 ''X 25.5 ''

Static Pressure -.03 ''H2O

Duct Area 6.38 Sq. Ft

Avg. Gas Temp. 629

Gas Flow Rate 23.8 Ft/Sec * 6.38 Sq. Ft * 60 = 9110 CFM

9110 CFM* 530 / 1089 * 30.2 /29.92*(1.00- 4 /100%H2O)= 4296 SDCFM

M.W. Factor = .034

Standard Cond. Temp. 70

THERMO ANALYTICAL

Client : INCINERATER

Date Tested : 3/24/88

Test No. : 2

Time : 1342

GAS FLOW DATA

Sample Points 123456789

Barometric Pressure 30.2

Sample Nozzle Area .000759 ft^2

Duct Pressure 30.2 ''Hg

Condensate 26 ml.

Avg. Gas Meter Pressure 0 in.Hg

Vol. of Gas Samples 30.24 CF

Avg Gas Meter Temp 88 F

Avg Duct Temp 629 F

Wgt. Collected .0621 Gms.

Duration of Test 63 Min.

Avg. Velocity at Sampling Pts 23.8 ft/sec.

Calculations

Condensed Water Vapor:

vw = 0.00267 * 26 * (460 + 70)/29.92 = 1.23 SCF

Corrected Meter Volume:

Vo = 30.24 * 30.2 / 29.92 * 530 / 548 = 29.52 SDCF

Percent Water Vapor:

% H2O = 1.23 / 30.75 * 100 = 4 %

Particulate Concentration (Grain Loading):

Go = (.0621 Gms. * 15.43)/ 29.52 SDCF = .0325 Grs/SDCF

Particulate Emission Rate:

(.0325 Grs/SDCF * 4296 SDCFM * 60)/7000 = 1.2 Lbs/Hr.

THERMO ANALYTICAL

Client : INCINERATER

Date Tested : 3/24/88

Test No. : 3

Time : 1530

GAS FLOW DATA

Sample Points 123456789

Barometric Pressure 30.2

Sample Nozzle Area .000759 ft^2

Duct Pressure 30.2 ''Hg

Condensate 28 ml.

Avg. Gas Meter Pressure 0 in.Hg

Vol. of Gas Samples 33.83 CF

Avg Gas Meter Temp 86 F

Avg Duct Temp 597 F

Wgt. Collected .0075 Gms.

Duration of Test 63 Min.

Avg. Velocity at Sampling Pts 23.2 ft/sec.

Calculations

Condensed Water Vapor:

vw = 0.00267 * 28 * (460 + 70)/29.92 = 1.32 SCF

Corrected Meter Volume:

Vo = 33.83 * 30.2 / 29.92 * 530 / 546 = 33.15 SDCF

Percent Water Vapor:

% H20 = 1.32 / 34.47 * 100 = 3.8 %

Particulate Concentration (Grain Loading):

Go = (.0075 Gms. * 15.43)/ 33.15 SDCF = .0035 Grs/SDCF

Particulate Emission Rate:

(.0035 Grs/SDCF * 4320 SDCFM * 60)/7000 = .13 Lbs/Hr.

Percentage of isokinetic sampling achieved: 91 %

THERMO ANALYTICAL

Client : INCINERATER

Date Tested :3/24/88

Test No. :3

Time :1530

Gas Flow Rate Data

Point	h	T.	Vel.Ft/Sec
1	.1	567	24.7
2	.1	594	25.1
3	.1	594	25.1
4	.07	586	20.9
5	.09	608	23.9
6	.09	611	24
7	.08	598	22.5
8	.07	614	21.2
9	.07	605	21.1

Vs = Cp [h *(T + 460)]^.5 [1/M.W. * Ps]^.5 * 85.49

Conc. of CO2 = 1.5 %

Conc. of O2 = 18.1 %

Conc. of H20 = 3.8 %

Avg. Gas Velocity; Vs, Avg. 23.2 Ft/Sec

Pitot Tube Correction Factor, Cp .84

Duct Gas Molecular Weight, M.W. 28.66

Duct Pressure, Ps. 30.2 ''Hg

Barometric Pressure 30.2 ''Hg

Duct Size Rectangle 36 ''X 25.5 ''

Static Pressure -.03 ''H20

Duct Area 6.38 Sq. Ft

Avg. Gas Temp. 597

Gas Flow Rate 23.2 Ft/Sec * 6.38 Sq. Ft * 60 = 8880 CFM

8880 CFM* 530 / 1057 * 30.2 /29.92*(1.00- 3.8 /100%H20)= 4320 SDCFM

M.W. Factor = .0339

Standard Cond. Temp. 70

THERMO ANALYTICAL

Client : INCINERATER

Date Tested :3/24/88

Test No. :4

Time :1705

Gas Flow Rate Data

Point	h	T.	Vel.Ft/Sec
1	.1	522	24.2
2	.07	577	20.8
3	.07	592	20.9
4	.07	583	20.8
5	.09	600	23.8
6	.09	607	23.9
7	.1	595	25.1
8	.1	596	25.1
9	.1	604	25.2

Vs = Cp [h *(T + 460)]^.5 [1/M.W. * Ps]^.5 * 85.49

Conc. of CO2 = 1.4 %

Conc. of O2 = 18.4 %

Conc. of H2O = 3.5 %

Avg. Gas Velocity; Vs, Avg. 23.3 Ft/Sec

Pitot Tube Correction Factor, Cp .84

Duct Gas Molecular Weight, M.W. 28.7

Duct Pressure, Ps. 30.2 ''Hg

Barometric Pressure 30.2 ''Hg

Duct Size Rectangle 36 ''X 25.5 ''

Static Pressure -.03 ''H2O

Duct Area 6.38 Sq. Ft

Avg. Gas Temp. 586

Gas Flow Rate 23.3 Ft/Sec * 6.38 Sq. Ft * 60 = 8919 CFM

8919 CFM* 530 / 1046 * 30.2 /29.92*(1.00- 3.5 /100%H2O)= 4402 SDCFM

M.W. Factor = .0339

Standard Cond. Temp. 70

THERMO ANALYTICAL

Client : INCINERATER

Date Tested : 3/24/88

Test No. : 4

Time : 1705

GAS FLOW DATA

Sample Points 123456789

Barometric Pressure 30.2

Sample Nozzle Area .000759 ft^2

Duct Pressure 30.2 ''Hg

Condensate 26 ml.

Avg. Gas Meter Pressure 0 in.Hg

Vol. of Gas Samples 34.52 CF

Avg Gas Meter Temp 81 F

Avg Duct Temp 586 F

Wgt. Collected .009 Gms.

Duration of Test 63 Min.

Avg. Velocity at Sampling Pts 23.3 ft/sec.

Calculations

Condensed Water Vapor:

vw = 0.00267 * 26 * (460 + 70)/29.92 = 1.23 SCF

Corrected Meter Volume:

Vo = 34.52 * 30.2 / 29.92 * 530 / 541 = 34.13 SDCF

Percent Water Vapor:

% H2O = 1.23 / 35.36 * 100 = 3.5 %

Particulate Concentration (Grain Loading):

Go = (.009 Gms. * 15.43)/ 34.13 SDCF = .0041 Grs/SDCF

Particulate Emission Rate:

(.0041 Grs/SDCF * 4402 SDCFM * 60)/7000 = .15 Lbs/Hr.

THERMO ANALYTICAL

Client :SHREDDER

Date Tested :3/23/88

Test No.A,B,C

-- TABULATED RESULTS --

Test	A	B	C	
Velocity,Ft/Sec (avg)	56.2	72	61.7	
Duct temp; 'F	91	96	94	
Volume Flow, CFM	6575	8424	7218	
Volume Flow, SDCFM	6367	8083	6952	
Water Vapor, vol. %	0	0	0	
Oxygen, vol % (dry)	21	21	21	
Carbon Dioxide, vol. % (dry)	0	0	0	
Time of Sampling	1147	1445	1605	
Duration of test; minutes	63	63	63	
Sampled Volume;SDCF	42.38	53.74	46.2	
Wt. of Sample; Grams	.0004	.0007	.0009	
Part. Conc.; grains/SDCF	.0001	.0002	.0003	
Particulate Emissions; Lb/hr	.01	.01	.02	

THERMO ANALYTICAL

Client : SHREDDER

Date Tested :3/23/88

Test No. :1

Time :1147

Gas Flow Rate Data

Point	h	T.	Vel.Ft/Sec
1	.83	91	52
2	.89	91	53.8
3	.89	91	53.8
4	1.1	91	59.9
5	1.2	91	62.5
6	1	91	57.1
7	.93	91	55
8	.97	91	56.2
9	.95	91	55.6

Vs = Cp [h *(T + 460)]^.5 [1/M.W. * Ps]^.5 * 85.49

Conc. of CO2 = 0 %

Conc. of O2 = 21 %

Conc. of H2O = 0 %

Avg. Gas Velocity; Vs, Avg. 56.2 Ft/Sec

Pitot Tube Correction Factor, Cp .84

Duct Gas Molecular Weight, M.W. 28.96

Duct Pressure, Ps. 30.12 ''Hg

Barometric Pressure 30.1 ''Hg

Duct Size Rectangle 16.5 ''X 17 ''

Static Pressure .22 ''H2O

Duct Area 1.95 Sq. Ft

Avg. Gas Temp. 91

Gas Flow Rate 56.2 Ft/Sec * 1.95 Sq. Ft * 60 = 6575 CFM

6575 CFM* 530 / 551 * 30.12 /29.92*(1.00- 0 /100%H2O)= 6367 SCFM

M.W. Factor = .0338

Standard Cond. Temp. 70

THERMO ANALYTICAL

Client : SHREDDER

Date Tested : 3/23/88

Test No. : 1

Time : 1147

GAS FLOW DATA

Sample Points 123456789

Barometric Pressure 30.1

Sample Nozzle Area .000203 ft^2

Duct Pressure 30.12 ''Hg

Condensate 0 ml.

Avg. Gas Meter Pressure .05 in.Hg

Vol. of Gas Samples 42.58 CF

Avg Gas Meter Temp 77 F

Avg Duct Temp 91 F

Wgt. Collected .0004 Gms.

Duration of Test 63 Min.

Avg. Velocity at Sampling Pts 56.2 ft/sec.

Calculations

Condensed Water Vapor:

vw = 0.00267 * 0 * (460 + 70)/29.92 = 0 SCF

Corrected Meter Volume:

Vo = 42.58 * 30.17 / 29.92 * 530 / 537 = 42.38 SCF

Percent Water Vapor:

% H2O = 0 / 42.38 * 100 = 0 %

Particulate Concentration (Grain Loading):

Go = (.0004 Gms. * 15.43)/ 42.38 SCF = .0001 Grs/SCF

Particulate Emission Rate:

(.0001 Grs/SCF * 6367 SDCFM * 60)/7000 = .01 Lbs/Hr.

Percentage of Isokinetic Sampling Attained: %I = 101 %

THERMO ANALYTICAL

Client : SHREDDER | Date Tested : 3/23/88

Test No. : 2 | Time : 1445

GAS FLOW DATA

Sample Points 123456789

Barometric Pressure 30.1 | Sample Nozzle Area .000203 ft^2

Duct Pressure 30.12 ''Hg | Condensate 0 ml.

Avg. Gas Meter Pressure .05 in.Hg | Vol. of Gas Samples 54.9 CF

Avg Gas Meter Temp 86 F | Avg Duct Temp 96 F

Wgt. Collected .0007 Gms. | Duration of Test 63 Min.

Avg. Velocity at Sampling Pts 72 ft/sec.

Calculations

Condensed Water Vapor:

vw = 0.00267 * 0 * (460 + 70)/29.92 = 0 SCF

Corrected Meter Volume:

Vo = 54.9 * 30.17 / 29.92 * 530 / 546 = 53.74 SCF

Percent Water Vapor:

% H2O = 0 / 53.74 * 100 = 0 %

Particulate Concentration (Grain Loading):

Go = (.0007 Gms. * 15.43)/ 53.74 SCF = .0002 Grs/SCF

Particulate Emission Rate:

(.0002 Grs/SCF * 8083 SDCFM * 60)/7000 = .01 Lbs/Hr.

Percentage of Isokinetic Sampling Attained: %I = 101 %

THERMO ANALYTICAL

Client : SHREDDER

Date Tested :3/23/88

Test No. :2

Time :1445

Gas Flow Rate Data

Point	h	T.	Vel.Ft/Sec
1	2.05	96	82.1
2	1.75	96	75.8
3	1.5	96	70.2
4	1.4	96	67.8
5	2.1	96	83.1
6	1.7	96	74.8
7	1.5	96	70.2
8	1.25	96	64.1
9	1.1	96	60.1

Vs = Cp [h *(T + 460)]^.5 [1/M.W. * Ps]^.5 * 85.49

Conc. of CO2 = 0 %

Conc. of O2 = 21 %

Conc. of H20 = 0 %

Avg. Gas Velocity; Vs, Avg. 72 Ft/Sec

Pitot Tube Correction Factor, Cp .84

Duct Gas Molecular Weight, M.W. 28.96

Duct Pressure, Ps. 30.12 ''Hg

Barometric Pressure 30.1 ''Hg

Duct Size Rectangle 16.5 ''X 17 ''

Static Pressure .26 ''H20

Duct Area 1.95 Sq. Ft

Avg. Gas Temp. 96

Gas Flow Rate 72 Ft/Sec * 1.95 Sq. Ft * 60 = 8424 CFM

8424 CFM* 530 / 556 * 30.12 /29.92*(1.00- 0 /100%H20)= 8093 SCFM

M.W. Factor = .0338

Standard Cond. Temp. 70

THERMO ANALYTICAL

Client : SHREDDER

Date Tested : 3/23/88

Test No. : 3

Time : 1605

GAS FLOW DATA

Sample Points 123456789

Barometric Pressure 30.1

Sample Nozzle Area .000203 ft^2

Duct Pressure 30.12 ''Hg

Condensate 0 ml.

Avg. Gas Meter Pressure .05 in.Hg

Vol. of Gas Samples 48.58 CF

Avg Gas Meter Temp 102 F

Avg Duct Temp 94 F

Wgt. Collected .0009 Gms.

Duration of Test 63 Min.

Avg. Velocity at Sampling Pts 61.7 ft/sec.

Calculations

Condensed Water Vapor:

vw = 0.00267 * 0 * (460 + 70)/29.92 = 0 SCF

Corrected Meter Volume:

Vo = 48.58 * 30.17 / 29.92 * 530 / 562 = 46.2 SCF

Percent Water Vapor:

% H2O = 0 / 46.2 * 100 = 0 %

Particulate Concentration (Grain Loading):

Go = (.0009 Gms. * 15.43)/ 46.2 SCF = .0003 Grs/SCF

Particulate Emission Rate:

(.0003 Grs/SCF * 6952 SDCFM * 60)/7000 = .02 Lbs/Hr.

Percentage of Isokinetic Sampling Attained: %I = 101 %

THERMO ANALYTICAL

Client : SHREDDER

Date Tested :3/23/88

Test No. :3

Time :1605

Gas Flow Rate Data

Point	h	T.	Vel.Ft/Sec
1	1.3	94	65.3
2	1.1	94	60
3	1.15	94	61.4
4	1.1	94	60
5	1.5	94	70.1
6	1.2	94	62.7
7	1.05	94	58.6
8	1.05	94	58.6
9	1.05	94	58.6

Vs = Cp [h *(T + 460)]^.5 [1/M.W. * Ps]^.5 * 85.49

Conc. of CO2 = 0 %

Conc. of O2 = 21 %

Conc. of H2O = 0 %

Avg. Gas Velocity; Vs, Avg. 61.7 Ft/Sec

Pitot Tube Correction Factor, Cp .84

Duct Gas Molecular Weight, M.W. 28.96

Duct Pressure, Ps. 30.12 ''Hg

Barometric Pressure 30.1 ''Hg

Duct Size Rectangle 16.5 ''X 17 ''

Static Pressure .24 ''H2O

Duct Area 1.95 Sq. Ft

Avg. Gas Temp. 94

Gas Flow Rate 61.7 Ft/Sec * 1.95 Sq. Ft * 60 = 7218 CFM

7218 CFM* 530 / 554 * 30.12 /29.92*(1.00- 0 /100%H2O)= 6952 SCFM

M.W. Factor = .0338

Standard Cond. Temp. 70

THERMO ANALYTICAL

Client : BALL MILL Date Tested :3/22/88

Test No. :1 Time :1127

Gas Flow Rate Data

Point	h	T.	Vel.Ft/Sec
1	.68	87	46.9
2	.68	87	46.9
3	1	87	56.9
4	1	87	56.9
5	.8	87	50.9
6	.6	87	44.1
7	.8	87	50.9
8	1	87	56.9
9	1.5	87	69.7

Vs = Cp [h *(T + 460)]^.5 [1/M.W. * Ps]^.5 * 85.49

Conc. of CO2 = 0 % Conc. of O2 = 21 %

Conc. of H20 = 0 %

Avg. Gas Velocity; Vs, Avg. 53.3 Ft/Sec

Pitot Tube Correction Factor, Cp .84

Duct Gas Molecular Weight, M.W. 28.96

Duct Pressure, Ps. 30.1 ''Hg Barometric Pressure 30.1 ''Hg

Duct Size Rectangle 21.5 ''X 19 '' Static Pressure 0 ''H20

Duct Area 2.84 Sq. Ft Avg. Gas Temp. 87

Gas Flow Rate 53.3 Ft/Sec * 2.84 Sq. Ft * 60 = 9082 CFM

9082 CFM* 530 / 547 * 30.1 /29.92*(1.00- 0 /100%H20)= 8852 SCFM

M.W. Factor = .0338 Standard Cond. Temp. 70

THERMO ANALYTICAL

Client : BALL MILL

Date Tested : 3/22/88

Test No. : 1

Time : 1127

GAS FLOW DATA

Sample Points 123456789

Barometric Pressure 30.1

Sample Nozzle Area .000203 ft^2

Duct Pressure 30.1 ''Hg

Condensate 0 ml.

Avg. Gas Meter Pressure .05 in.Hg

Vol. of Gas Samples 45.46 CF

Avg Gas Meter Temp 96 F

Avg Duct Temp 87 F

Wgt. Collected .0008 Gms.

Duration of Test 63 Min.

Avg. Velocity at Sampling Pts 53.3 ft/sec.

Calculations

Condensed Water Vapor:

vw = 0.00267 * 0 * (460 + 70)/29.92 = 0 SCF

Corrected Meter Volume:

Vo = 45.46 * 30.15 / 29.92 * 530 / 556 = 43.67 SCF

Percent Water Vapor:

% H2O = 0 / 43.67 * 100 = 0 %

Particulate Concentration (Grain Loading):

Go = (.0008 Gms. * 15.43)/ 43.67 SCF = .0003 Grs/SCF

Particulate Emission Rate:

(.0003 Grs/SCF * 8852 SDCFM * 60)/7000 = .02 Lbs/Hr.

THERMO ANALYTICAL

Client : BALL MILL

Date Tested :3/33/88

Test No. :2

Time :1247

Gas Flow Rate Data

Point	h	T.	Vel.Ft/Sec
1	1.1	87	59.7
2	1.1	87	59.7
3	1.33	87	65.6
4	1	87	56.9
5	.88	87	53.4
6	1	87	56.9
7	1.05	87	58.3
8	.83	87	51.8
9	.7	87	47.6

Vs = Cp [h *(T + 460)]^.5 [1/M.W. * Ps]^.5 * 85.49

Conc. of CO2 = 0 %

Conc. of O2 = 21 %

Conc. of H20 = 0 %

Avg. Gas Velocity; Vs, Avg. 56.7 Ft/Sec

Pitot Tube Correction Factor, Cp .84

Duct Gas Molecular Weight, M.W. 28.96

Duct Pressure, Ps. 30.1 ''Hg

Barometric Pressure 30.1 ''Hg

Duct Size Rectangle 21.5 ''X 19 ''

Static Pressure 0 ''H20

Duct Area 2.84 Sq. Ft

Avg. Gas Temp. 87

Gas Flow Rate 56.7 Ft/Sec * 2.84 Sq. Ft * 60 = 9661 CFM

9661 CFM* 530 / 547 * 30.1 /29.92*(1.00- 0 /100%H20)= 9417 SCFM

M.W. Factor = .0338

Standard Cond. Temp. 70

THERMO ANALYTICAL

Client : BALL MILL

Date Tested : 3/33/88

Test No. : 2

Time : 1247

GAS FLOW DATA

Sample Points 123456789

Barometric Pressure 30.1

Sample Nozzle Area .000203 ft^2

Duct Pressure 30.1 ''Hg

Condensate 0 ml.

Avg. Gas Meter Pressure .05 in.Hg

Vol. of Gas Samples 44.92 CF

Avg Gas Meter Temp 97 F

Avg Duct Temp 87 F

Wgt. Collected .0034 Gms.

Duration of Test 63 Min.

Avg. Velocity at Sampling Pts 56.7 ft/sec.

Calculations

Condensed Water Vapor:

vw = 0.00267 * 0 * (460 + 70)/29.92 = 0 SCF

Corrected Meter Volume:

Vo = 44.82 * 30.15 / 29.92 * 530 / 557 = 42.98 SCF

Percent Water Vapor:

% H2O = 0 / 42.98 * 100 = 0 %

Particulate Concentration (Grain Loading):

Go = (.0034 Gms. * 15.43)/ 42.98 SCF = .0012 Grs/SCF

Particulate Emission Rate:

(.0012 Grs/SCF * 9417 SDCFM * 60)/7000 = .1 Lbs/Hr.

THERMO ANALYTICAL

Client : BALL MILL Date Tested :3/22/88

Test No. :3 Time :1524

Gas Flow Rate Data

Point	h	T.	Vel.Ft/Sec
1	1.1	91	59.9
2	.9	91	54.2
3	.75	91	49.4
4	.75	91	49.4
5	.82	91	51.7
6	.7	91	47.8
7	1	91	57.1
8	1.3	91	65.1
9	1.5	91	69.9

Vs = Cp [h *(T + 460)]^.5 [1/M.W. * Ps]^.5 * 85.49

Conc. of CO2 = 0 % Conc. of O2 = 21 %

Conc. of H2O = 0 %

Avg. Gas Velocity; Vs, Avg. 56.1 Ft/Sec

Pitot Tube Correction Factor, Cp .84

Duct Gas Molecular Weight, M.W. 28.96

Duct Pressure, Ps. 30.1 ''Hg Barometric Pressure 30.1 ''Hg

Duct Size Rectangle 21.5 ''X 19 '' Static Pressure 0 ''H2O

Duct Area 2.84 Sq. Ft Avg. Gas Temp. 91

Gas Flow Rate 56.1 Ft/Sec * 2.84 Sq. Ft * 60 = 9559 CFM

9559 CFM* 530 / 551 * 30.1 /29.92*(1.00- 0 /100%H2O)= 9250 SCFM

M.W. Factor = .0338 Standard Cond. Temp. 70

THERMO ANALYTICAL

Client : BALL MILL

Date Tested : 3/22/88

Test No. : 3

Time : 1524

GAS FLOW DATA

Sample Points 123456789

Barometric Pressure 30.1

Sample Nozzle Area .000203 ft^2

Duct Pressure 30.1 ''Hg

Condensate 0 ml.

Avg. Gas Meter Pressure .05 in.Hg

Vol. of Gas Samples 44.05 CF

Avg Gas Meter Temp 90 F

Avg Duct Temp 91 F

Wgt. Collected .0093 Gms.

Duration of Test 63 Min.

Avg. Velocity at Sampling Pts 56.1 ft/sec.

Calculations

Condensed Water Vapor:

vw = 0.00267 * 0 * (460 + 70)/29.92 = 0 SCF

Corrected Meter Volume:

Vo = 44.05 * 30.15 / 29.92 * 530 / 550 = 42.77 SCF

Percent Water Vapor:

% H2O = 0 / 42.77 * 100 = 0 %

Particulate Concentration (Grain Loading):

Go = (.0093 Gms. * 15.43)/ 42.77 SCF = .0034 Grs/SCF

Particulate Emission Rate:

(.0034 Grs/SCF * 9250 SDCFM * 60)/7000 = .27 Lbs/Hr.

APPENDIX II

FIELD DATA SHEETS

3 - 7
10.75
17.91

19"

3x1 hr
2x2 hr

$R_1 = 0.0375$
$R_2 = 30.1$
$R_3 = 0.1$
$R_7 = .012191$
$R_8 = 30.1$

THERMO-ANALYTICAL NORCAL CO.

AIR POLLUTION ANALYSIS

DATE: 3-22-88
PLANT: Micrometallics
SAMPLE TYPE: Partic. Metals
DUCT LOCATION: BALL MILL
DUCT DIAM: 21½x19"
FITTING SIZE:
WALL THICKNESS:
DUCT STATIC PRESS: -0-

Source Test Field Data Sheet

Filter #1
Test Number
1

	THIMBLE NO.
.000203	NOZZLE DIAM AREA (ft²)
	NOZZLE TYPE
	GAS COLLECTOR
-2140	METER NO.
30.1	BAROMETRIC PRESS.
Red Mag	DRAFT GAGE
	TRAVERSE PITOT TUBE
0.84	MONITORING PITOT TUBE
-5ml	CONDENSATE

PITOT TRAVERSE					PITOT MONITOR			SAMPLING (7 min. ea.)								REMARKS
Point	In from Cent.	Time: Δh "H₂O	Duct Temp °F	Vel FPS	Δh "H₂O	6 Duct Temp °F	Vel FPS	Time	Point	Meter Rate CFM	4 Meter Temp °F	5 Meter Press "Hg	820.9 Vol Ft³	Orif. Sett.	Pump Vac.	
					.68	87	43.9	1127	1	.63	90	.05	816.95	1.16	5	pre test leak ck
					.68	87	43.9	1134	2	.63	90	.05	[illegible]	1.16	5	at 10" Hg
					1.0	87	53.2	1141	3	.77	90	.05	825.2	1.71	7	<0.005 CFM.
				.95	1.0	87	53.2	1148	1	.77	93	.05	830.6	1.72	7	
					0.8	87	47.6	1155	2	.7	95	.05	836.0	1.38	5	(vol = 195 ml)
					0.62	87	41.9	1202	3	.61	96	.05	840.9	1.07	3	
					0.8	87	47.5	1209	1	.7	96	.05	844.9	1.39	5	
					1.0	87	53.2	1216	2	.78	96	.05	850.1	1.73	7	
					1.5	87	65.2	1223	3	.95	96	.05	855.6	2.6	5	
							STOP	1230					862.41			post test leak ck
																at 10" Hg
													45A6			<0.005 CFM.

Gas sampling time: 63 mins
Start:

Team members: GW + JR.

Baghouse - cleaned mud tool
noticeably more particulate on filter.

DATE: 3-22-88
PLANT: MICROMET
SAMPLE TYPE: Partic + Metals
DUCT LOCATION: BALL MILL
DUCT DIAM: 21½ x 19
FITTING SIZE:
WALL THICKNESS:
DUCT STATIC PRESS:

THERMO-ANALYTICAL NORCAL CO.
AIR POLLUTION ANALYSIS

Source Test Field Data Sheet

Filter #2
Test Number
2

	THIMBLE NO.
.000203	NOZZLE ~~DIAM~~ Ft²
SS	NOZZLE TYPE
	GAS COLLECTOR
-2140	METER NO.
30.1	BAROMETRIC PRESS.
Red Mag	DRAFT GAGE
	TRAVERSE PITOT TUBE
.84	MONITORING PITOT TUBE
-2ml	CONDENSATE

-0-

PITOT TRAVERSE					PITOT MONITOR			SAMPLING								REMARKS
Point	In from Cent.	Time: Δh "H₂O	Duct Temp °F	Vel FPS	Δh "H₂O	Duct Temp °F	Vel FPS	Time	Point	Meter Rate CFM	Meter Temp °F	Meter Press "Hg	Vol Ft³	Orif. Sett.	Pump Vac.	
					1.1	87	60.8	1247	1	.75	98	.05	862.57	1.61	3	pre test leak ck
					1.1	87	60.8	1254	2	.75	98	.05	867.7	1.61	3	at 6"Hg
					1.33	87	66.9	1301	3	.83	98	.05	873.0	1.95	4	<0.005 CFM
					1.0	87	58.0	1308	1	.72	100	.05	878.8	1.47	3	
					0.85	90	53.6	13[illegible]33	2	.66	97	.05	883.9	1.235	4	STOP 1314 BAGHOUSE
					1.0	90	58.1	13[illegible]40	3	.71	97	.05	888.4	1.45	5	START 1332 SHUTDOWN
					1.05	90	59.6	13[illegible]47	1	.73	98	.05	894.1	1.53	5	
					0.83	90	52.9	13[illegible]54	2	.65	98	.05	898.0	1.21	4	
					0.7	90	48.6	13[illegible]01	3	.6	98	.05	903.2	1.02		post test leak ck
							STOP	1408					907.39			at 5"Hg
																<0.005 CFM
													44.82			vol 198 ml

Gas sampling time: 7x9 = 63 mins
Start:

Team members: GW + JR.

DATE: 7-22-88
PLANT: MICROMET
SAMPLE TYPE: Particulate-metals
DUCT LOCATION: BALL MILL
DUCT DIAM: 21½ x 19
FITTING SIZE:
WALL THICKNESS:
DUCT STATIC PRESS: -0-

THERMO-ANALYTICAL NORCAL CO.
AIR POLLUTION ANALYSIS

Source Test Field Data Sheet

FILTER #4
Test Number
3

THIMBLE NO.
NOZZLE DIAM
NOZZLE TYPE
GAS COLLECTOR
METER NO.
BAROMETRIC PRESS.
DRAFT GAGE
TRAVERSE PITOT TUBE
MONITORING PITOT TUBE
CONDENSATE
-1mL

PITOT TRAVERSE					PITOT MONITOR			SAMPLING								REMARKS
Point	In from Cent.	Time: Δh "H2O	Duct Temp °F	Vel FPS	Δh "H2O	Duct Temp °F	Vel FPS	Time	Point	Meter Rate CFM	Meter Temp °F	Meter Press "Hg	Vol Ft³	Orif. Sett.	Pump Vac.	
					1.0	91	61.0	1524	1	.75	90	0.05	907.53	1.596	5	Pre test leak chk
					0.9	91	55.2	1531	2	.68	90		912.7	1.31	4	at 6" Hg
					0.75	91	50.4	1538	3	.62	90		917.8	1.09	3	<0.005 CFM
					0.75	91	50.4	1545	1	.62	90		921.9	1.09	3	
					0.82	91	52.7	1552	2	.45	90		925.8	1.19	6	
					0.7	91	48.7	1559	3	.59	90		930.4	1.01	7	199 mL
					1.0	91	56.2	1606	1	.71	90		934.6	1.45	8	
					1.3	91	66.3	1613	2	.81	90		939.6	1.89	5	
					1.5	91	71.3	1620	3	.87	90		945.1	2.18	5	Post test leak chk
								1627					951.58			at 10" Hg
																<0.02 CFM
													44.05			

Gas sampling time: 63 mins
Start:

Team members: DW + JR

7.5P
50%
16.6%

1.25
2.74

17 | 16½

DATE: 3-23-88
PLANT: MICROMET.
SAMPLE TYPE: Partic + metals
DUCT LOCATION: SCHREDDER
DUCT DIAM: ~~[illegible]~~ x ~~[illegible]~~ 16½ x 17
FITTING SIZE:
WALL THICKNESS:
DUCT STATIC PRESS: + 0.22

THERMO-ANALYTICAL NORCAL CO.
AIR POLLUTION ANALYSIS

Source Test Field Data Sheet

FILTER # 5
Test Number

	THIMBLE NO.
.000203	NOZZLE ~~[illegible]~~ ft²
	NOZZLE TYPE
	GAS COLLECTOR
-2140	METER NO.
30.00	BAROMETRIC PRESS.
Red Max	DRAFT GAGE
24" STD	TRAVERSE PITOT TUBE
0.84	MONITORING PITOT TUBE
	CONDENSATE
210ml.	IMPINGER VOLUME.

PITOT TRAVERSE					PITOT MONITOR			SAMPLING								REMARKS
Point	In from Cent.	Time: 1136 Δh "H₂O	Duct Temp °F	Vel FPS	Δh "H₂O	6 Duct Temp °F	Vel FPS	Time	Point	Meter Rate CFM	4 Meter Temp °F	5 Meter Press "Hg	Vol Ft³	Orif. Sett.	Pump Vac.	
		0.7	91		.83	91	53.0	1147	1	.62	70	.05	954.835	1.14	7	pretest leak chk at 15" Hg
		0.75			.89	91	54.9	1154	2	.65	76	.05	959.18	1.24	8	20 02CFM.
		0.75			.89	91	54.9	1201	3	.65	76	.05	963.69	1.24	8	
		0.92			1.10	91	61.0	1209	1	.72	77	.05	968.2	1.54	10	[illegible]
		1.0			1.20	91	63.75	1216	2	.78	77	.05	973.2	1.68	11	vol 210ml
		0.84			1.0	91	58.2	1223	3	.69	78	.05	978.5	1.40	9	
		0.78			.93	91	56.1	1231	1	.67	79	.05	983.3	1.31	9	
		0.82			.97	91	57.3	1238	2	.68	79	.05	988.0	1.36	9	
		0.80			.95	91	56.7	1245	2	.67	79	.05	992.7	1.33	9	
							STOP	1252					997.41			post test, leak chk
																at 12" Hg
													42.575			<0.02CFM.

Gas sampling time: 63 mins.
Start:

Team members: GW + JR.

Cleaning baghouse just before 1.10

DATE: 3-23-88
PLANT: MICROMET
SAMPLE TYPE: Partic- metals
DUCT LOCATION: SHREDDER.
DUCT DIAM:
FITTING SIZE:
WALL THICKNESS:
DUCT STATIC PRESS: +0.26

THERMO-ANALYTICAL NORCAL CO.
AIR POLLUTION ANALYSIS

Source Test Field Data Sheet

Filter #6
Test Number
2

	THIMBLE NO.
	NOZZLE DIAM
	NOZZLE TYPE
	GAS COLLECTOR
	METER NO.
30.00	BAROMETRIC PRESS.
	DRAFT GAGE
.84	TRAVERSE PITOT TUBE
.84	MONITORING PITOT TUBE
-2	CONDENSATE

PITOT TRAVERSE					PITOT MONITOR			SAMPLING								REMARKS
Point	In from Cent.	Time: 1310 Δh "H2O	Duct Temp °F	Vel FPS	Δh "H2O	Duct Temp °F	Vel FPS	Time	Point	Meter Rate CFM	Meter Temp °F	Meter Press "Hg	Vol Ft³	Orif. Sett.	Pump Vac.	
		2.1		2.05	[illegible]	96	83.7	1445	1	.986	80	.05	000.10	2.86	11	pre test leak check at 12"Hg <0.01CFM
		1.7			1.75	96	77.3	1452	2	.91	82	.05	007.0	2.45	10	
		1.6			1.5	96	71.5	1459	3	.85	82		013.4	2.10	9	
		1.5			1.4	96	69.1	1507	1	.82	83		019.3	1.96	9	
		2.0		2.10	[illegible]	96	84.1	1514	2	1.00	85		025.1	2.96	12	vol = 198
		1.8			1.4	96	76.2	1521	3	0.9	87		032.1	2.4	11	
		1.8			1.5	96	71.6	1529	1	0.856	88		038.4	2.1	9	
		1.5			1.25	96	65.3	1536	2	0.78	89		044.4	1.71	8	
		1.2			1.1	96	61.3	1543	3	0.73	89		049.8	1.56	8	post test leak ch at 15"Hg 20.01 CFM
							STOP	1550					055.00			
													54.90			

Gas sampling time:
Start:

Team members: BW + JR

DATE: 3-23-88
PLANT: MICROMET.
SAMPLE TYPE:
DUCT LOCATION:

DUCT DIAM:
FITTING SIZE:
WALL THICKNESS:
DUCT STATIC PRESS: +0.24.

THERMO-ANALYTICAL NORCAL CO.
AIR POLLUTION ANALYSIS

Source Test Field Data Sheet

Filter #7
Test Number
3

THIMBLE NO.
NOZZLE DIAM
NOZZLE TYPE
GAS COLLECTOR
METER NO.
BAROMETRIC PRESS.
DRAFT GAGE
TRAVERSE PITOT TUBE
MONITORING PITOT TUBE
CONDENSATE

PITOT TRAVERSE					PITOT MONITOR			SAMPLING								REMARKS
Point	In from Cent.	Time: Δh "H2O	Time: Duct Temp °F	Time: Vel FPS	Δh "H2O	Duct Temp °F	Vel FPS	Time	Point	Meter Rate CFM	Meter Temp °F	Meter Press "Hg	Vol Ft³	Orif. Sett.	Pump Vac.	
					1.3	94	66.5	1605	1	0.81	100	.05	055.245	1.88	10	pretest leak ck at
					1.1	94	61.2	1612	2	0.75	102	.05	060.9	1.60	9	15"Hg
					1.15	94	62.6	1619	3	0.77	102	.05	066.2	1.67	9	20.015 CFM
					1.1	94	61.2	1627	1	0.75	102	.05	071.5	1.60	9	
					1.5	94	71.5	1634	2	0.88	102		076.7	2.18	11	Vol = 199 m
					1.2	94	63.9	1641	3	0.79	102		082.9	1.75	10	
					1.05	94	59.8	1649	1	0.73	102		088.4	1.53	9	
					1.05	94	59.8	1656	2	0.73	102		093.5	1.53	9	post test leak ck at
					1.05	94	59.8	1703	3	0.73	102		098.6	1.53	9	at 12"Hg
							STOP	1710					103.83			20.01 CFM
													(40.58)			

Gas sampling time:
Start:

Team members: SW + JR

PC is pumping in. 194 #bs
OUT 110 #bs #1 parallel again

DATE: 3-24-88

THERMO-ANALYTICAL NORCAL CO.
AIR POLLUTION ANALYSIS

PLANT: Micro Metallics Incinerator

SAMPLE TYPE: Particulate, Metals

DUCT LOCATION: Outlet Incinerator

Source Test Field Data Sheet

DUCT DIAM: 36+2.5.5"

FITTING SIZE: 10"

WALL THICKNESS:

DUCT STATIC PRESS: -.03

Filter #8
Test Number

Vc=1.0878

VOI-223 mL

THIMBLE NO.	
NOZZLE DIAM	.373
NOZZLE TYPE	#10 0.00075 ft Area
GAS COLLECTOR	
METER NO.	Rockwell
BAROMETRIC PRESS.	30.2
DRAFT GAGE	
TRAVERSE PITOT TUBE	Standard .84
MONITORING PITOT TUBE	.84
CONDENSATE	23+2

PITOT TRAVERSE					PITOT MONITOR			SAMPLING								REMARKS
Point	In from Cent.	Time: Δh	Duct Temp °F	Vel FPS	Δh "H2O	Duct Temp °F	Vel FPS	Time	Point	Meter Rate CFM	Meter Temp °F	Meter Press "Hg	Vol Ft³	Orif. Sett.	Pump Vac.	.010 leak start
1-1		.09			.09	605	24.55	0	1	.498	78	0	104.585	.73	10"	START 11:50
-2					.07	643	21.6	7	2	.44	82		108.12	.57	10"	
-3					.08	650	23.15	14	3	.47	86		111.07	.65	12"	
								21					114.265			STOP
East 3-1					.10	660	25.88	0	1	.53	84		114.265	.81	12"	START
-2					.10	669	25.88	7	2	.53	89		117.87	.81	11"	
3					.10	668	25.88	14	3	.53	90		121.60	.81	11"	
								21					125.04			STOP
Center 2-1					.08	670	23.15	0	1	.47	86		125.04	.65	12"	START
2					.10	676	25.88	7	2	.53	87		128.26	.81	12"	
3					.10	677	25.88	14	3	.53	87		131.86	.81	12"	
								21					135.46			STOP 1:04 pm
													STOP			
																.018 leak end

Gas sampling time:
Start:

Team members: CT & JR

? Cl? on _ Burned In 90 lbs
OUT 71 lbs

DATE: 3-24
PLANT: Micro Metallics

THERMO-ANALYTICAL NORCAL CO.
AIR POLLUTION ANALYSIS

SAMPLE TYPE: Particulate & Metals
DUCT LOCATION: Outlet - Stack Incinerator

Source Test Field Data Sheet

DUCT DIAM: 36 x 25.5
FITTING SIZE:
WALL THICKNESS:
DUCT STATIC PRESS: -.03

Filter #9
Test Number
2
Vol - 284 mL

	THIMBLE NO.
.373	NOZZLE DIAM
.0007958	NOZZLE ~~TYPE~~ Area
	GAS COLLECTOR
	METER NO.
30.2	BAROMETRIC PRESS.
	DRAFT GAGE
	TRAVERSE PITOT TUBE
.89	MONITORING PITOT TUBE
24.12	CONDENSATE

PITOT TRAVERSE					PITOT MONITOR			SAMPLING								REMARKS
Point	In from Cent.	Time: Δh "H2O	Duct Temp °F	Vel FPS	Δh "H2O	Duct Temp °F	Vel FPS	Time	Point	Meter Rate CFM	Meter Temp °F	Meter Press "Hg	Vol Ft³	Orif. Sett.	Pump Vac.	.010 leak @ Start
West					.09	614	24.55	0	1	.54	81	0	135.730	.85	11	1:42 pm Start
					.07	619	21.66	7	2	.47	87		139.52	.66	10	
					.08	616	23.15	14	3	.51	87		142.80	.75	11	
								21					146.10			
~~Bottom~~ Center					.07	627	21.66	0	1	[illegible]	85		146.10	[illegible]	11	
					.09	627	24.6	7	2	.54	85		149.3	.85	11	
					.09	640	24.7	14	3	.53	89		153.44	.84	11	
								21					157.08			
East					.10	632	25.7	0	1	.48	87		157.08	.80	11	
					.10	643	26.04	7	2	.49	89		160.79	.85	12	
					.10	643	26.04	14	3	.57	90		164.75	.95	12	
								~~24~~ 16:13					165.97			~~16:16~~ 2:49 Stop
													30.24			
																.020 leak @ end

Gas sampling time:
Start:

Team members: CATR JR

OUT 52 lbs

DATE: 3-24
PLANT: micro metalics

SAMPLE TYPE: Part & met
DUCT LOCATION: incinerator

DUCT DIAM: 36 x 25.5
FITTING SIZE:
WALL THICKNESS:
DUCT STATIC PRESS: -0.3

THERMO-ANALYTICAL NORCAL CO.
AIR POLLUTION ANALYSIS

Source Test Field Data Sheet

Filter #10
Test Number
3 Total Volume = 226

	THIMBLE NO.
.373	NOZZLE DIAM
0.004758	NOZZLE ~~TYPE~~ Area
	GAS COLLECTOR
	METER NO.
30.2	BAROMETRIC PRESS.
	DRAFT GAGE
	TRAVERSE PITOT TUBE
.84	MONITORING PITOT TUBE
26 + 1	CONDENSATE

PITOT TRAVERSE					PITOT MONITOR			SAMPLING								REMARKS
Point	In from Cent.	Time: Δh "H2O	Duct Temp °F	Vel FPS	Δh "H2O	Duct Temp °F	Vel FPS	Time	Point	Meter Rate CFM	Meter Temp °F	Meter Press "Hg	Vol Ft³	Orif. Sett.	Pump Vac.	.02 @ 1K ✓ Stand.
East					.1	567	25.1	0	1	.54	86	0	166.20	1.0	11"	3:30 PM Start
					.1	579	25.4	7	2	.58	86		170.20	.99	11"	
					.1	594	24.4	14	3	.58	87		174.35	.99	11"	
								21					178.40			
Center					.07	586	21.2	0	1	.49	87		178.40	.70	10"	
					.09	608	24.3	7	2	.55	85		181.87	.87	11"	
					.09	611	24.3	14	3	.55	85.5		185.68	.87	11"	
								21					189.59			
West					.08	588	22.8	0	1	.52	86		189.59	.79	11"	
					.07	619	21.5	7	2	.48	85		193.19	.68	10"	
					.07	605	21.5	14	3	.48	86		196.61	.68	10"	
								21					200.03			PM 4:40 End
													33.85			.012 @ end 1K ✓

Gas sampling time:
Start:

Team members: CT & JR

OUT 53

DATE: 3-24-88
PLANT: Micro Metallics

SAMPLE TYPE: Particle & Metal
DUCT LOCATION: at Hot-Stack

DUCT DIAM:
FITTING SIZE:
WALL THICKNESS:
DUCT STATIC PRESS: .03

THERMO-ANALYTICAL NORCAL CO.
AIR POLLUTION ANALYSIS

Source Test Field Data Sheet

Run #4

Test Number

Filter # 11 Total Volume 224

	THIMBLE NO.
.373	NOZZLE DIAM
.000758	NOZZLE TYPE
	GAS COLLECTOR
	METER NO.
30.2	BAROMETRIC PRESS.
	DRAFT GAGE
	TRAVERSE PITOT TUBE
.84	MONITORING PITOT TUBE
84 +2	CONDENSATE

PITOT TRAVERSE					PITOT MONITOR			SAMPLING								REMARKS
Point	In from Cent.	Time: Δh "H2O	Duct Temp °F	Vel FPS	Δh "H2O	Duct Temp °F	Vel FPS	Time	Point	Meter Rate CFM	Meter Temp °F	Meter Press "Hg	Vol Ft³	Orif. Sett.	Pump Vac.	.016 leak ✓ @ start
	West				.10	522	24.6	0	1	.59	77	0	200.20	1.0	12	5:05 PM Start
					.09	597	24.1	7	2	.49	82		204.33	.70	12	5:12
					.08	592	22.7	14	3	.52	80		207.9	.78	12	5:19
								21					211.43			5:26
	Central				.07	583	21.2	0	1	.49	81		211.43	.69	12	
					.09	600	24.2	7	2	.55	81		214.88	.87	12	
					.09	607	24.2	14	3	.55	83		218.72	.87	12	
								21					222.60			
	East				.10	595	25.5	0	1	.57	78		222.60	.97	12	
					.10	596	25.5	7	2	.57	79		226.78	.97	12	
					.10	604	25.6	14	3	.57	80		230.70	.97	12	.016 leak ✓
								21					234.72			@ end
													34.52			

Gas sampling time:

Team members: M & TR

APPENDIX III

LABORATORY RESULTS

TMA/Richmond Sample Data Sheet
List for Program Manager

MICRO METALLICS CORP.
1695 MONTEREY HIGHWAY
SAN JOSE, CA 95112

Date Recvd 3/28/1988
Logged-In 3/28/1988
Due date 4/18/1988
QA/QC Level 1
P.O. No.

Cust,set 5328 3
Nuc Sci grp 0
Manager .....MP
Juan Rios
Value.....$781.20

Lab areas: MTL
Set Comment:
Sample Receipt Info: Shipped by: _____
Condition: OK/ Not OK
Containers: OK/ Not OK
Temperature: Ice/Cool/Ambient
Split/Preservation: OK/Needed:Completed by_____

Smp	Customer ID	Type	Comment	Volume/aliquot	Ref. time
1	#1 BALL MILL TEST 1	FILT	.....	.....	.....
2	#2 BALL MILL TEST 2	FILT	.....	.....	.....
3	#4 BALL MILL TEST 3	FILT	.....	.....	.....
4	#5 SHREDDER TEST 1	FILT	.....	.....	.....
5	#6 SHREDDER TEST 2	FILT	.....	.....	.....
6	#7 SHREDDER TEST 3	FILT	.....	.....	.....
7	#8 INCINERATOR TEST1	FILT	.....	.....	.....
8	#9 INCINERATOR TEST2	FILT	.....	.....	.....

Analysis-Date-Ref BY ICP		Unit	1	2	3	4	5	6	7	8
BERYLLIUM	BE	ug/F	<0.1	<0.1	0.19	<0.1	<0.1	<0.1	#no#	#no#
Run 614 batch 1011									#no#	#no#
CHROMIUM	CR	ug/F	1.2	1.2	1.8	0.93	<0.5	<0.5	1.2	1.4
Run 618 & 614 batch 1011										
COPPER	CU	ug/F	40	200	240	23	16	23	7700	8600
Run 614 & 617 batch 1011										
LEAD flame	PB	ug/F	39	120	160	15	18	8.8	9800	10,000.
Run 1866 P.B # 1011										
NICKEL	NI	ug/F	3.4	6.3	16	1.9	1.2	<0.8	11	7.8
Run 614 batch 1011										
SILVER	AG	ug/F	0.97	2.3	5.8	0.57	1.3	0.83	24	17
Run 614 batch 1011										

✓ rpc 4/19/88

LABORATORY ID 5328- 3

Smp	Customer ID	Type	Comment	Volume/aliquot	Ref. time
9	10 INCINERATOR TEST3	FILT	.....	.....	.....
10	11 INCINERATOR TEST4	FILT	.....	.....	.....
11	12 BLANK	FILT	.....	.....	.....

Analysis-Date-Ref		Unit	9	10	11
BERYLLIUM	BE		*no* *no* *no*	*no* *no* *no*	<0.1
CHROMIUM Run # 618 P.B # 1011	CR	Total ug/F	0.50 ~~1.0~~	0.59	<0.5
COPPER Run # 618 P.B# 1011	CU	Total ug/F	580.	720	4.8
LEAD Run # 1866 P.B# 1011	PB	Total ug/F	1300	1400	<2
NICKEL Run # 618 P.B # 1011	NI	Total ug/F	2.8	2.7	<0.8
SILVER Run # 618 P.B. # 1011	AG	Total ug/F	20	9.7	≤0.4

LAST PAGE

TMA/NORCAL SAMPLE CONTROL CENTER
REQUEST FOR LOG-IN INFORMATION

PROGRAM MANAGER Michelle Pappe TODAY'S DATE 28 Mar 88

THE FOLLOWING SAMPLES HAVE ARRIVED IN SAMPLE CONTROL WITHOUT ADEQUATE LOG-IN INFORMATION:

DATE RECEIVED 28 Mar 88 DATE DUE

CUSTOMER Microme Talics TELEPHONE

ADDRESS 1675 Monterey Hwy P.O. #
San Jose, CA 95112

CONTACT Jim Quintal

TMA/NORCAL ID

SAMPLE ID	CONTAINER	SAMPLE	TEST CODES*
1 Ball Mill Test 1	Glass	Glass Fiber	AG, BE, CR, CU, PB, N
2 Test 2	Dish	Filter	
4 Test 3			
5 Shredder Test 1			
6 Test 2			
7 Test 3			
8 Incinerator Test 1			AG, CR, CU, PB, N
9 Test 2			
10 Test 3			
11 Test 4			
12 Blank			AG, BE, CR, CU, PB, N

SPECIAL INSTRUCTIONS
Return Glass Filter containers

*Use the space above for the proper TMA/Norcal Test Codes and any special instructions Test codes are listed n the Environmental Sciences Price File. The samples are being he in SAMPLE CONTROL pending receipt of this completed form.

/d25

TMA/Richmond

MTL Sample Data Sheet

MICRO METALLICS CORP.
1695 MONTEREY HIGHWAY
SAN JOSE, CA 95112

Date Recvd 3/25/1988
Logged-In 3/25/1988
Due date 4/15/1988
QA/QC Level 1
P.O. No.

Cust,set 5328 2
Nuc Sci grp 0
Manager .....MP
Value.....$781.20

Lab areas: MTL

Set Comment:

Smp	Customer ID	Type	Comment	Volume/aliquot	Ref. time
1	BALL MILL TEST 1	IMP	195 ML	.....	.....
2	BALL MILL TEST 2	IMP	198	.....	.....
3	BALL MILL TEST 3	IMP	199	.....	.....
4	SHREDDER TEST 1	IMP	210	.....	.....
5	SHREDDER TEST 2	IMP	198	.....	.....
6	SHREDDER TEST 3	IMP	199	.....	.....
7	INCINERATOR TEST 1	IMP	223	.....	.....
8	INCINERATOR TEST 2	IMP	284	.....	.....

Analysis-Date-Ref		Unit	1	2	3	4	5	6	7	8
BERYLLIUM	BE	mg/L	<0.005	<0.005	<0.005	<0.005	<0.005	<0.005	*no*	*no*
Run 614 batch 1011									*no*	*no*
CHROMIUM	CR	mg/L	0.02	0.02	0.02	0.42	0.04	0.02	*oo* 1.4	*oo* 1.1
Run 614 batch 1011										
COPPER	CU	mg/L	0.04	0.04	0.06	0.82	0.12	0.04	1.5	0.47
Run 614 batch 1011										
LEAD	PB	mg/L	<0.07	<0.07	0.14	0.27	0.27	0.14	0.60	0.28
Run 1832 batch 1010										
NICKEL	NI	mg/L	<0.04	<0.04	<0.04	0.81	<0.04	<0.04	0.52	0.38
Run 614 batch 1011										
SILVER	AG	mg/L	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01
Run 614 batch 1011										

✓ rpc 4/19/88

LABORATORY ID 5328 2 List for Metals Lab

Smp	Customer ID	Type	Comment	Volume/aliquot	Ref. time
9	INCINERATOR TEST 3	IMP	226	.....	.....
10	INCINERATOR TEST 4	IMP	224	.....	.....
11	BLANK	IMP	.....	.....	.....

Analysis-Date-Ref		Unit	9	10	11
BERYLLIUM	BE	mg/L	*no* *no* *no*	*no* *no* *no*	<0.005
CHROMIUM	CR	mg/L	1.1	1.5	<0.01
COPPER	CU	mg/L	0.09	0.25	<0.02
LEAD	PB	mg/L	0.15	0.22	<0.07
NICKEL	NI	mg/L	0.35	0.55	<0.04
SILVER	AG	mg/L	≤0.01	<0.01	<0.01

LAST PAGE FOR Metals Lab

APPENDIX IV

PRINTOUT FOR INCINERATOR TEST

SUMMARY OF SETUP PARAMETERS PROGRAM 3- CHART : MICROMET

DATE : 3/24/88 TIME : 11:02:39 CHART SPEED : 1 CM/MIN

CONSTANTS

1 0.0000E+00 2 0.0000E+00 3 0.0000E+00 4 0.0000E+00 5 0.0000E+00 6 0.0000E+00

OPTIONS AVAILABLE ARE
1 PRINT TIME OF DAY
7 DISABLE AUTORANGING

CHAN	TITLE	UNITS	SCALE FACTOR	ZERO	ANALOG SENSITIVITY		ANALOG ZERO
1	-	-	-	-	-		-
2	O2	PCT	4.0000E-05 VOLTS/ PCT	0.0000E+00 PCT	2.5000E+00 PCT	/CM	0.0000E+00 PCT
3	THC	PPM	1.0000E-02 VOLTS/ PPM	0.0000E+00 PPM	1.0000E+02 PPM	/CM	0.0000E+00 PPM
4	CO	PPM	1.0000E-06 VOLTS/ PPM	0.0000E+00 PPM	1.0000E+03 PPM	/CM	0.0000E+00 PPM
5	CO2	PCT	5.0000E-04 VOLTS/ PCT	0.0000E+00 PCT	2.0000E+00 PCT	/CM	0.0000E+00 PCT
6	-	-	-	-	-		-
7	-	-	-	-	-		-
8	-	-	-	-	-		-
9	-	-	-	-	-		-
10	-	-	-	-	-		-
11	-	-	-	-	-		-
12	-	-	-	-	-		-

↑ ↓ INDICATES AUTOMATIC RANGE CHANGE IN FOLLOWING DIGITAL CHANNEL

TO START CHART JUST PRESS RUN
TO STOP CHART JUST PRESS STOP
TO END CHART PRESS SFT THEN END
TO CHANGE PARAMETERS ENTER A NUMBER THEN PRESS ENTR SEE MANUAL

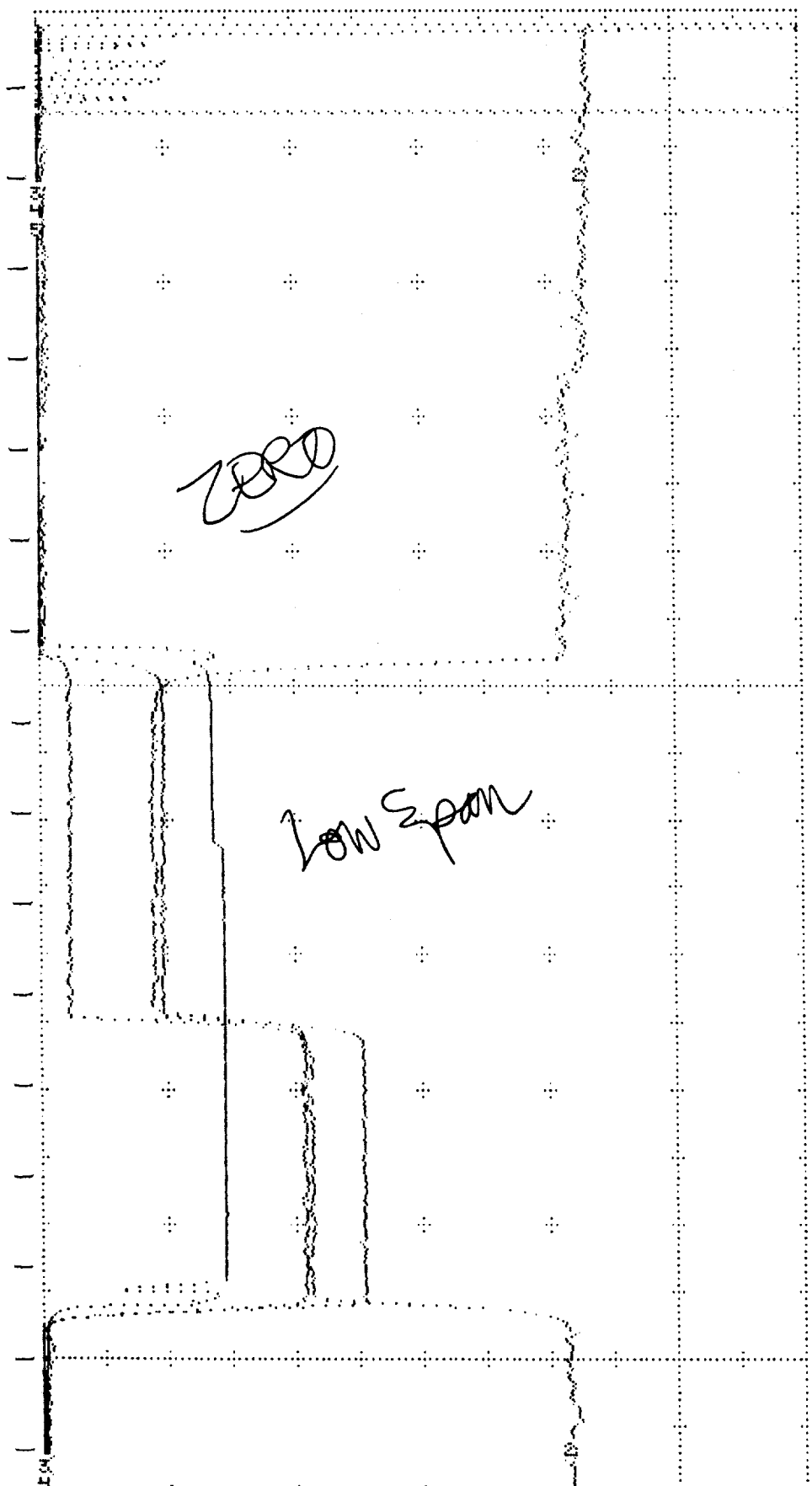
1 CHART SPEED	4 PEN DROP	7 ANALOG ZERO
2 SET CHANNEL	5 DIGITAL ZERO	8 ANALOG SENSITIVITY
3 PEN LIFT	6 CHANNEL SCALE	9 SET CONSTANT

PRESS RUN TO START CHART OR PRESS END TO RETURN TO START

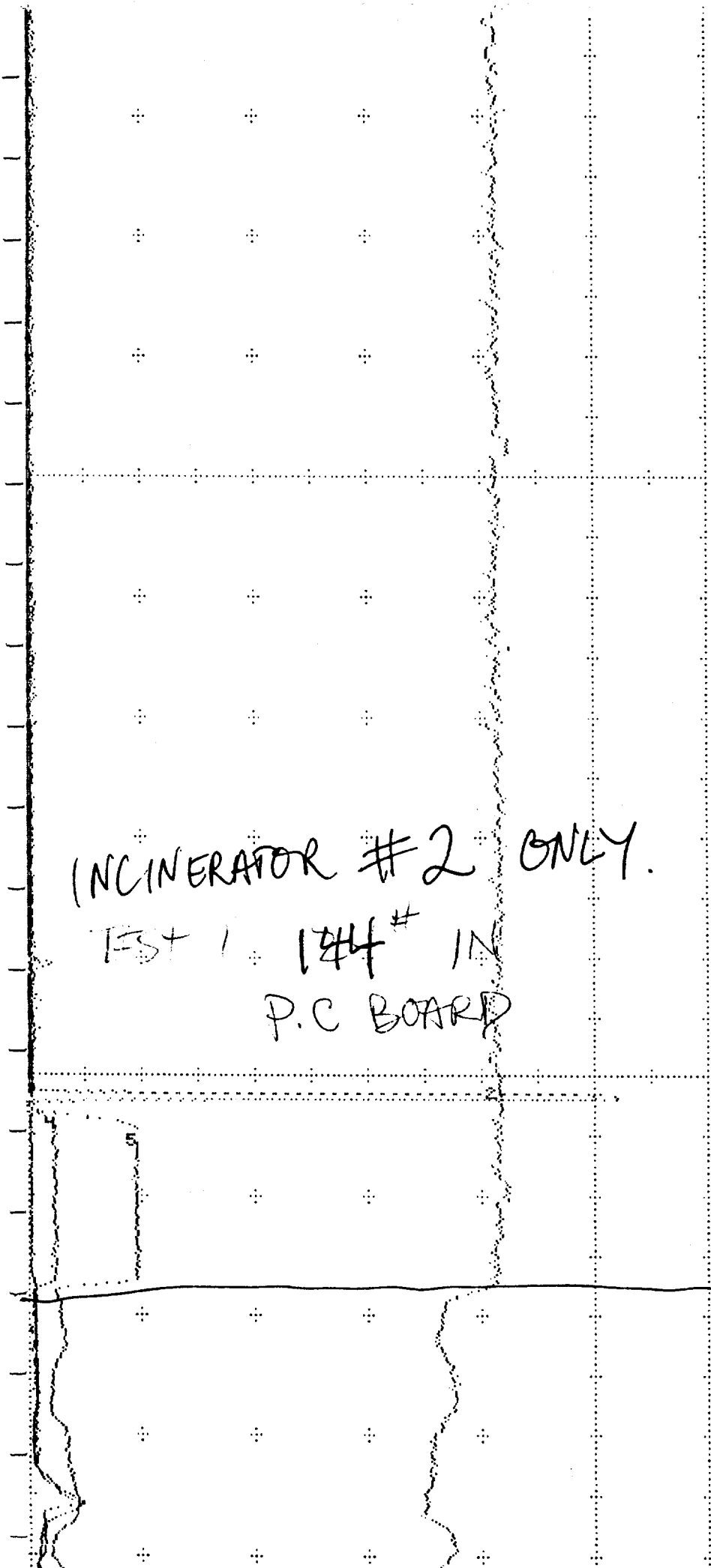
INCINERATOR #2 ONLY
#1 ~~[illegible]~~ DOWN.
normally operate both simultaneously.

NAT GAS FLOW RATE
300CFH per burner. 3 BURNERS
= 900 CFH

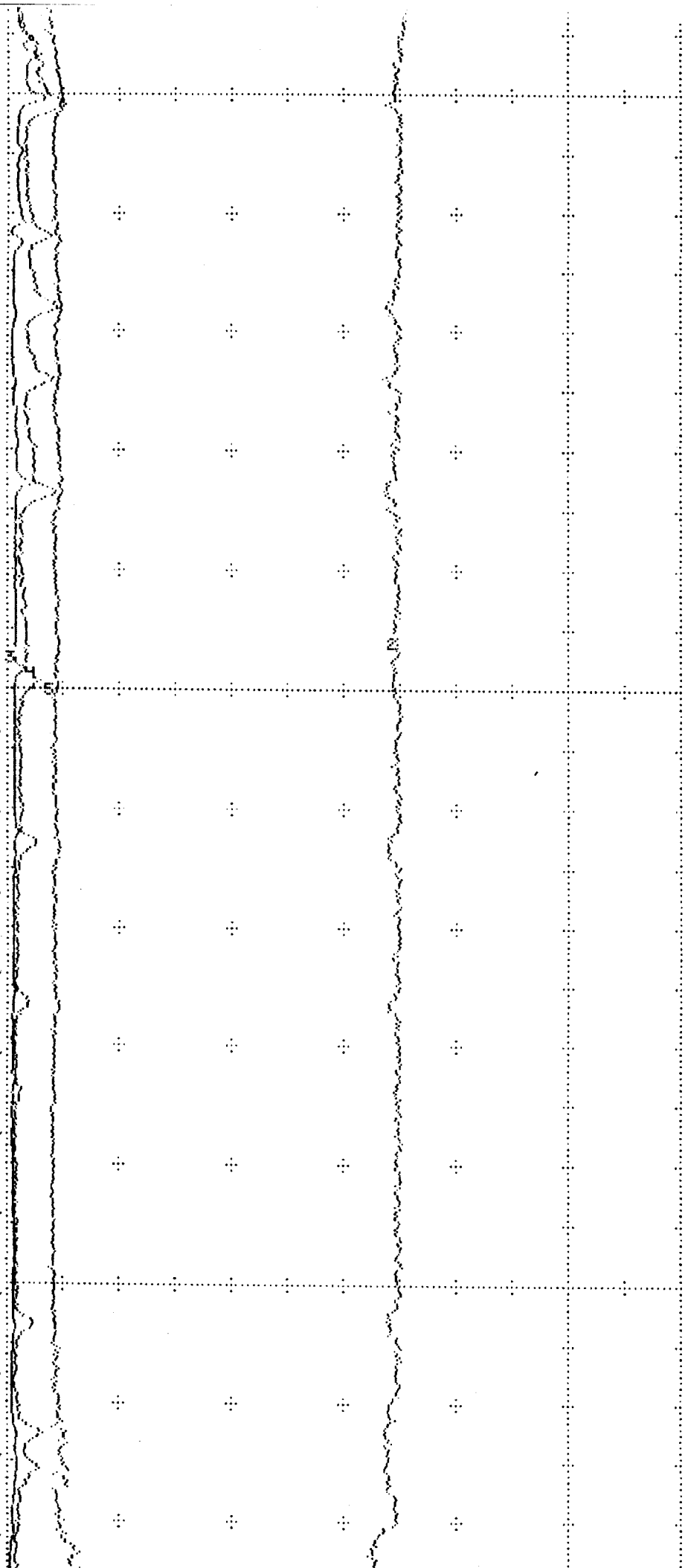
LL97788 O_2-10.22, CO_2-3.93, CO-414 ppm
LL438 O_2 4.22 CO_2 9.69 CO 4555
THC 17-469 PO 96.5 (290 THC)



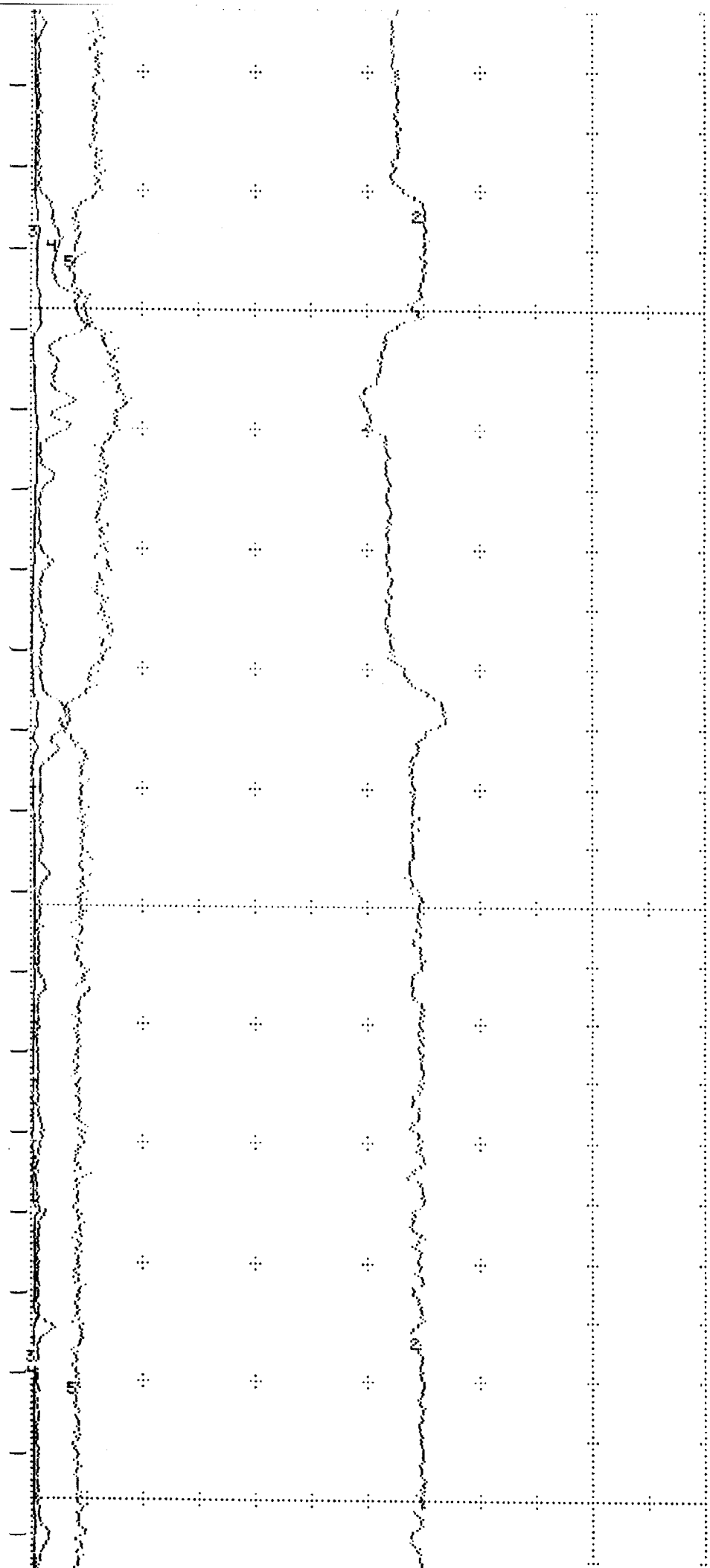
TIME H M S	2 O2 PCT	3 THC PPM	4 CO PPM	5 CO2 PCT
11:04:44	21.740	5.3170	51.860	4.1480
11:05:44	21.450	3.4180	98.050	-11.930
11:06:44	21.460	1.8200	103.70	-13.040
11:07:44	21.630	3.0310	110.20	-.54240
11:08:44	21.310	2.7340	165.10	-.24020
11:09:44	20.660	2.7880	43.510	-.25810
11:10:44	20.720	.38840	-125.10	-.42680
11:11:44	20.800	1.9760	116.50	-.19370
11:12:44	20.670	1.7390	90.010	-.25090
11:13:44	4.9690	268.90	491.70	3.8900
11:14:44	4.4480	271.20	498.00	3.9100
11:15:44	4.4700	272.50	458.30	3.8990
11:16:44	4.5520	289.30	466.10	3.9210
11:17:44	4.5070	290.60	456.90	3.9460
11:18:44	9.0230	290.20	2651.0	7.0730
11:19:44	10.310	290.00	4109.0	10.210
11:20:44	10.720	290.70	4135.0	10.150
11:21:44	10.810	291.10	4139.0	10.160
11:22:44	10.670	260.90	4173.0	10.220
11:23:44	20.630	6.1340	64.670	-.33970
11:24:44	20.880	4.6990	76.590	-.24490



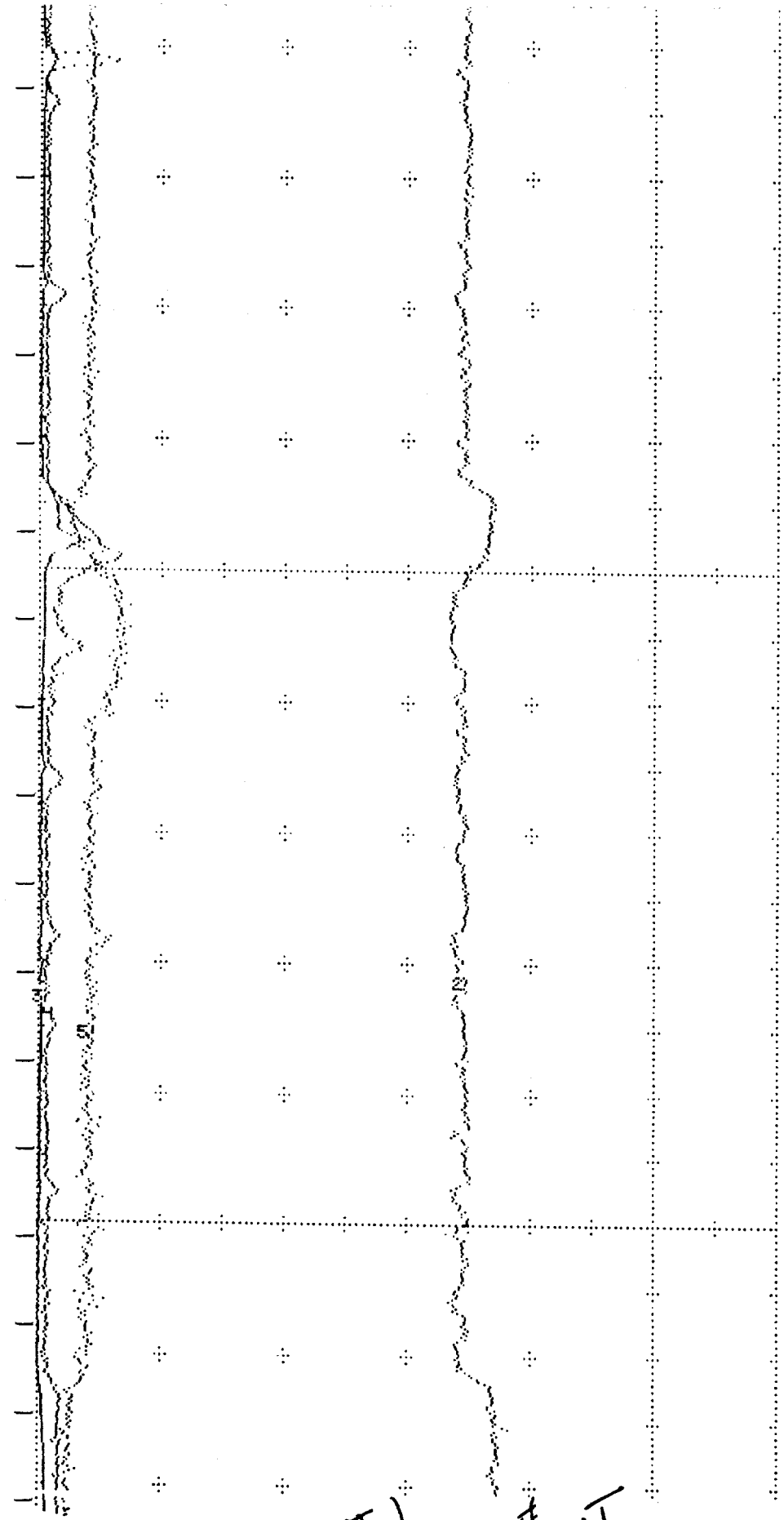
11:26:44	20.370	3.7500	100.70	-.33320
11:27:44	20.250	4.6410	150.80	-.33910
11:28:44	20.600	4.6520	93.280	-.25510
11:29:44	20.640	3.4010	123.30	-.28250
11:30:44	20.810	4.0020	83.750	-.17820
11:31:44	20.750	4.7800	118.30	-.23480
11:32:44	20.820	5.3420	116.20	-.17220
11:33:44	20.660	4.9020	67.650	-.24200
11:34:44	20.870	4.7550	81.660	-.26640
11:35:44	20.680	4.0760	76.000	-.24490
11:36:44	20.720	3.7580	44.700	-.25510
11:37:44	20.790	3.5450	-48.870	-.19790
11:38:44	20.780	4.8870	84.640	-.19250
11:39:44	20.830	4.5190	45.600	-.32900
11:40:44	20.920	4.6820	76.000	-.21750
11:41:44	20.790	3.9380	106.10	-.37370
11:42:44	20.730	4.7450	96.860	-.23000
11:43:44	20.840	4.4660	36.650	-.23780
11:44:44	20.730	3.8800	505.40	3.7790
11:45:44	20.990	5.0890	476.80	3.8220
11:46:44	20.720	4.1090	419.60	3.8960
		THC		
11:47:44	18.260	12.400	77.490	1.1680
11:48:44	18.900	14.890	136.50	.87920
11:49:44	17.930	6.5190	118.60	1.2980
11:50:44	17.520	55.220	712.00	1.6970
11:51:44	18.610	23.740	191.30	.78800



11:52:44	17.660	33.590	356.70	1.5580
11:53:44	17.230	53.380	758.20	1.9580
11:54:44	17.450	23.690	343.30	1.6530
11:55:44	17.430	24.250	433.30	1.7220
		CH4		
11:56:44	17.460	11.040	456.30	1.7830
11:57:44	17.430	10.320	326.90	1.7990
11:58:44	17.450	13.720	492.00	1.8490
		TNC		
11:59:44	17.280	18.600	478.60	1.8390
12:00:44	17.090	15.490	330.50	1.8730
12:01:44	17.340	13.930	265.20	1.6600
12:02:44	17.330	16.560	344.50	1.7530
12:03:44	17.180	13.930	447.30	1.8120
12:04:44	17.350	13.890	246.70	1.5800
12:05:44	17.360	13.810	253.00	1.7510
12:06:44	17.510	13.710	227.40	1.7450
12:07:44	17.460	11.710	207.70	1.6570
12:08:44	17.530	12.900	164.50	1.7240
12:09:44	17.540	11.420	159.70	1.7310
12:10:44	17.490	10.730	163.30	1.7760
12:11:44	17.410	11.730	177.30	1.6880
12:12:44	17.480	12.940	194.00	1.6650
12:13:44	17.520	12.490	156.10	1.7390
12:14:44	17.480	11.310	178.50	1.6530
12:15:44	17.020	10.080	199.30	1.9040
12:16:44	16.920	17.640	410.40	1.9890
12:17:44	17.400	10.290	219.30	2.0540
		CH4		



12:19:44	16.250	7.2880	102.20	2.4040
12:20:44	16.300	8.3110	153.40	2.2140
12:21:44	16.570	6.3770	161.50	2.5700
12:22:44	17.550	12.270	464.90	1.5780
12:23:44	17.190	16.650	849.10	2.0330
12:24:44	15.610	8.2470	478.90	3.0190
12:25:44	14.920	13.280	681.60	3.6600
12:26:44	15.960	10.360	234.20	2.6460
12:27:44	15.990	6.7010	198.40	2.6830
12:28:44	15.980	3.7330	175.50	2.5880
12:29:44	16.660	2.8150	133.50	2.1720
12:30:44	17.840	12.800	614.50	1.1820
12:31:44	17.140	5.0760	188.90	1.8720
12:32:44	17.040	7.5800	199.60	1.9130
12:33:44	17.320	6.4490	109.90	1.6290
12:34:44	17.410	7.0160	139.70	1.8470
12:35:44	17.290	5.0000	115.00	1.8100
12:36:44	17.500	4.6600	139.40	1.7590
12:37:44	17.300	4.8680	173.70	1.9530
12:38:44	17.530	4.8840	115.00	1.7400
12:39:44	17.300	7.2680	156.10	1.7100
12:40:44	17.430	11.260	235.40	1.7050
12:41:44	17.540	5.3610	114.70	1.7090
12:42:44	17.390	5.1910	111.10	1.7030
12:43:44	17.360	5.6260	179.10	1.6850



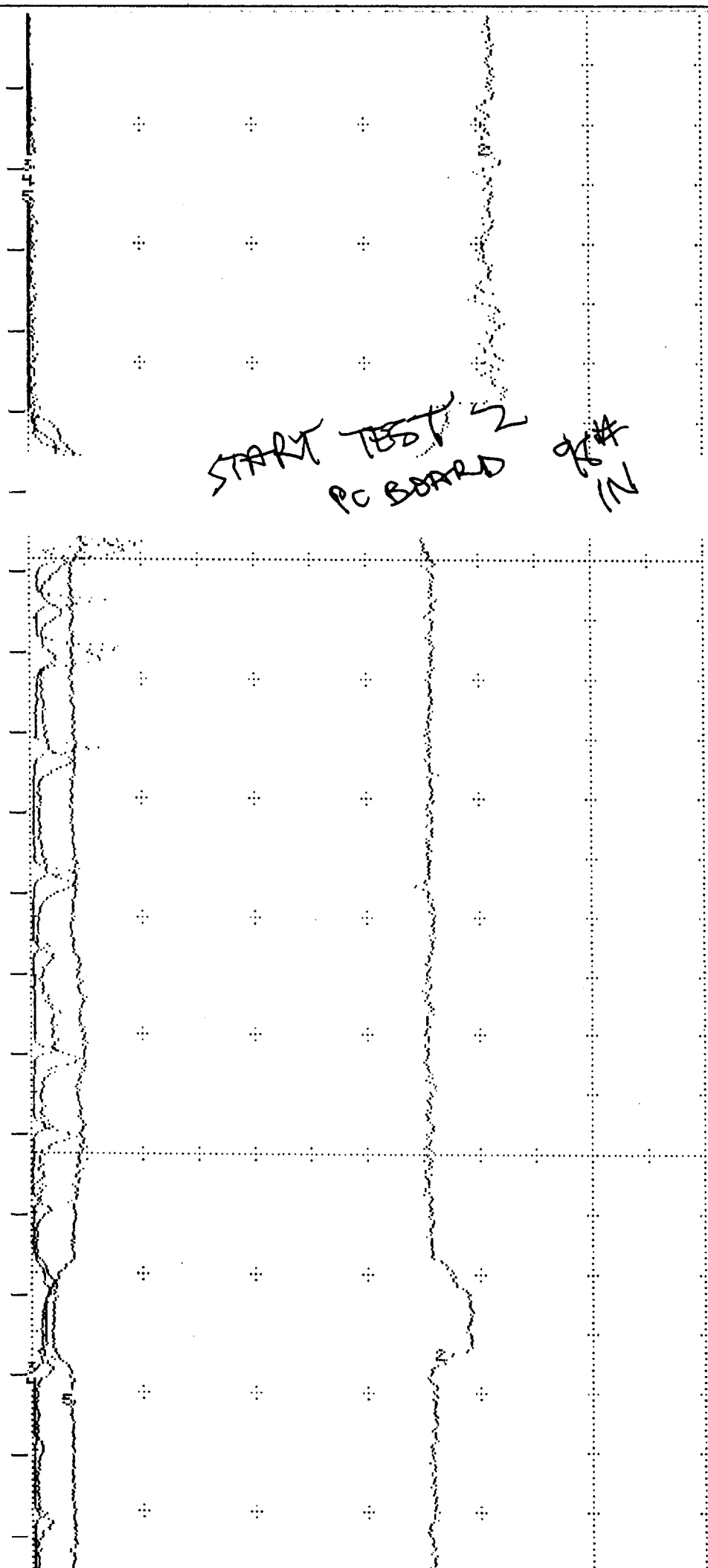
12:45:44	17.360	6.6890	123.60	1.5190
12:46:44	17.310	5.9670	205.90	1.7440
12:47:44	17.440	5.4140	137.40	1.6780
12:48:44	17.090	5.3420	116.80	1.8040
12:49:44	17.250	4.9160	202.30	1.9850
12:50:44	17.160	3.2960	118.30	1.9280
12:51:44	17.020	4.7050	122.40	1.6450
12:52:44	18.380	28.090	369.20	1.1620
12:53:44	17.390	11.360	779.60	1.8990
12:54:44	16.780	9.4470	460.40	2.7310
12:55:44	16.990	5.7710	254.50	2.3130
12:56:44	17.090	9.9420	195.20	1.7620
12:57:44	17.280	4.7430	129.60	1.8590
12:58:44	17.360	3.5400	139.10	1.6990
12:59:44	17.000	~~3.5860~~ GMY	138.20	1.5770
13:00:44	17.270	~~5.7860~~	283.40	1.8190
13:01:44	17.360	4.7680	140.00	1.8220
13:02:44	17.390	3.5200	144.80	1.7970
13:03:44	17.440	2.4650	179.70	1.5640
13:04:44	16.980	1.3950	150.50	1.8470
13:05:44	17.100	1.0800	73.610	1.2830
13:06:44	18.650	8.5840	358.80	.99300
13:07:44	18.760	12.170	332.90	.85770
	17.3	THC-13 CH4-7	279	1.8

END TEST 1

110# OUT

13:08:44	20.250	4.2710	120.40	-.18710

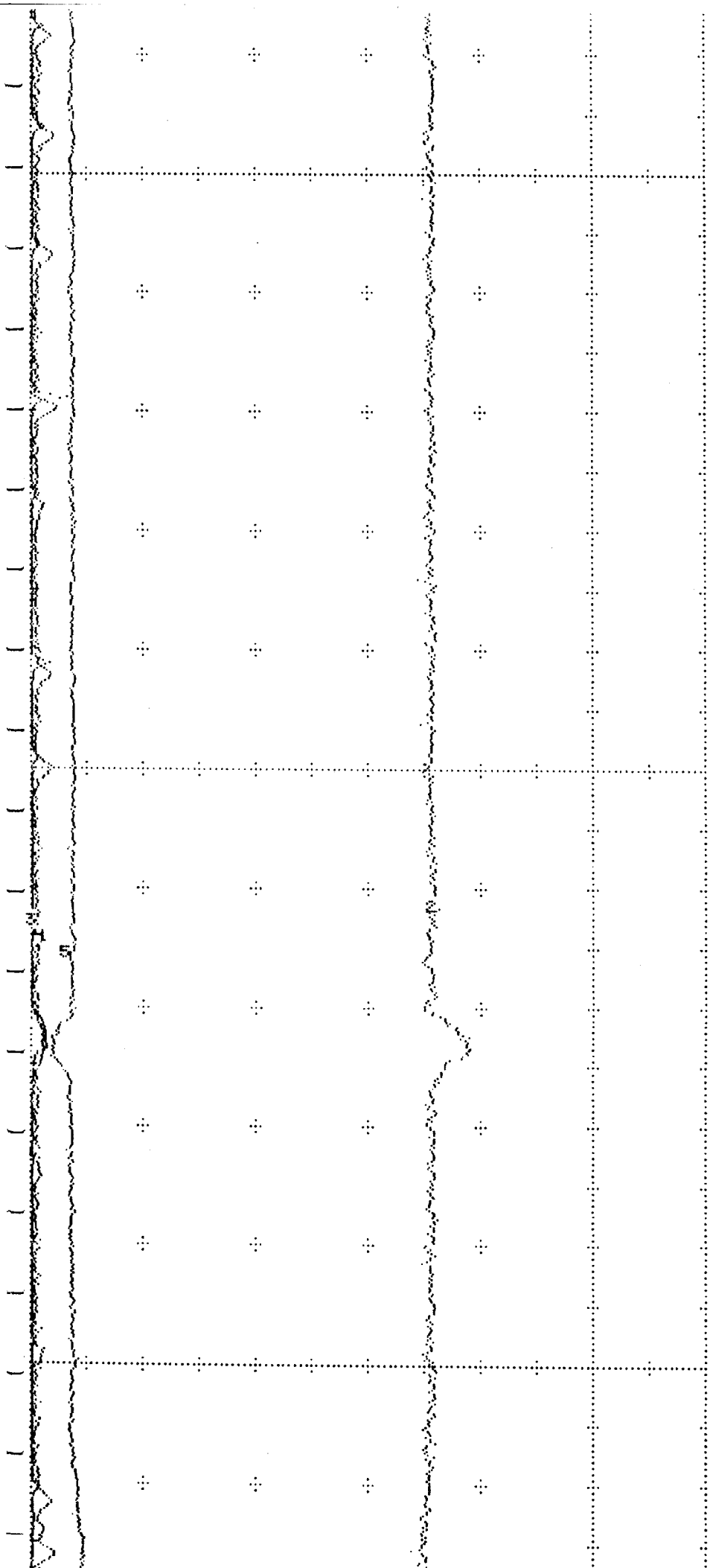
13:09:44	20.210	3.1200	130.80	.18470
13:10:44	20.340	2.4110	108.10	-0.0631
13:11:44	20.350	.55490	121.90	-.72960
13:12:44	20.330	2.6850	130.20	-.40350
13:13:44	20.180	.31150	113.50	-.52930
13:14:44	8.1660	285.60	546.90	3.6230
13:15:44	4.3810	294.80	535.50	3.8080
13:16:44	4.3730	296.90	537.90	3.8870
13:17:44	10.140	297.50	4184.0	10.110
13:18:44	10.050	296.20	4194.0	9.9830
13:19:44	10.110	293.60	104.60	0.0828
13:20:44	10.320	292.10	97.460	-0.0721
13:21:44	10.230	292.30	80.470	-.28370
13:22:44	10.350	292.90	71.230	0.0232
13:23:44	10.430	291.10	46.190	-.18890
13:24:44	10.080	25.150	534.60	.25810
13:25:44	10.140	.10330	118.30	.73730
13:26:44	10.250	-.57160	113.50	-.94180
13:27:44	10.340	-.51580	-244.30	-.58110
			ZERO	
13:28:44	10.380	-.43900	-89.110	-1.2790
13:29:44	10.370	-.13780	-88.220	-.56980
13:30:44	10.100	5.7210	123.00	0.0333
			SPAN	
13:31:44	20.580	5.2450	443.70	3.7000
13:32:44	20.650	2.8070	481.30	3.7960
13:33:44	20.300	1.7030	460.40	3.9490
13:34:44	20.520	6.9310	~~231.20~~	.30220
			ZERO	



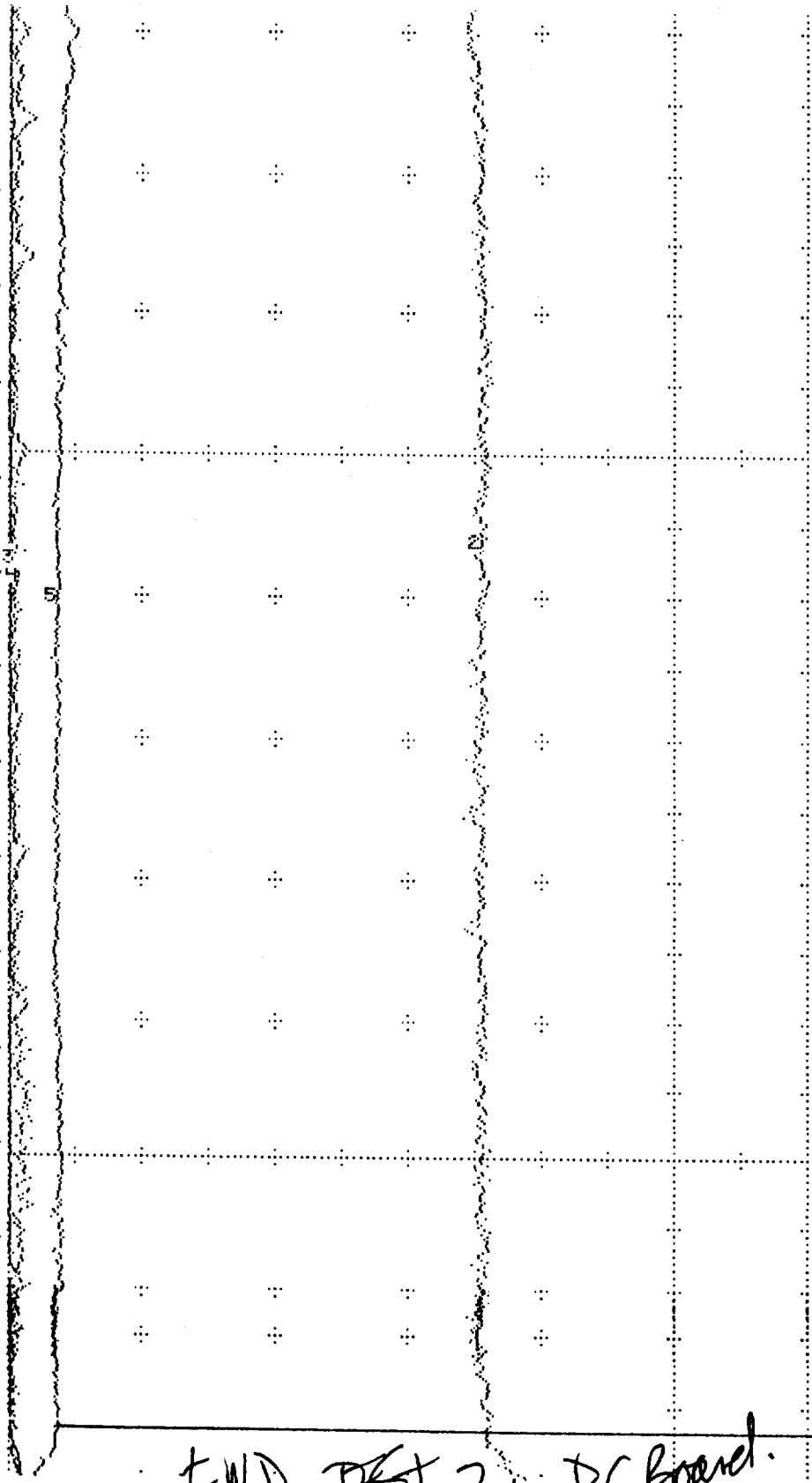
13:36:44	20.540	3.5180	-33.670	-.21280
13:37:44	20.380	4.6760	47.680	-.20740
13:38:44	20.570	3.9680	124.20	-.23780
13:39:44	20.320	3.5540	99.540	-.33500
13:40:44	20.300	2.8580	46.490	-.33260
13:41:44	20.370	1.7710	112.00	-.31170
13:42:44	18.720	7.9110	120.70	.79040

TTC

13:43:44	17.890	71.160	965.60	1.6890
13:44:44	17.910	13.280	475.60	1.5870
13:45:44	17.700	15.640	271.20	1.4370
13:46:44	17.820	11.430	297.10	1.6300
13:47:44	17.850	7.7490	199.30	1.5670
13:48:44	17.760	8.2620	238.40	1.6150
13:49:44	18.000	5.4570	148.40	1.5800
13:50:44	17.770	6.0150	227.40	1.6980
13:51:44	17.580	7.7020	405.60	1.9880
13:52:44	17.840	5.4410	207.40	1.6890
13:53:44	17.630	4.9380	180.60	1.7250
13:54:44	17.820	4.8410	302.50	1.5920
13:55:44	18.670	28.840	220.20	.98830
13:56:44	19.520	26.370	204.70	.75280
13:57:44	17.940	5.8210	100.40	1.4680
13:58:44	17.920	5.8380	192.80	1.5540
13:59:44	18.180	8.6150	129.60	1.5920



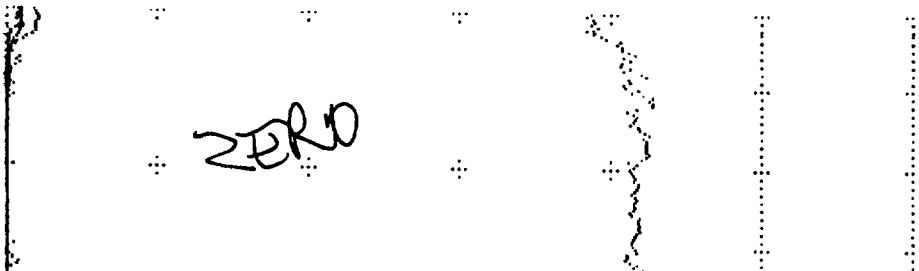
14:01:44	17.560	4.6830	81.960	1.4620
14:02:44	17.850	4.2930	118.60	1.5320
14:03:44	17.770	3.2350	122.10	1.5520
14:04:44	17.770	3.6480	101.30	1.4700
14:05:44	17.900	2.6850	141.80	1.3970
14:06:44	17.830	3.1250	96.860	1.5090
14:07:44	17.760	5.0510	427.60	1.5770
14:08:44	17.780	3.9010	118.30	1.4980
14:09:44	18.000	3.0890	113.50	1.5240
14:10:44	17.920	4.7580	128.10	1.4830
14:11:44	17.890	3.0540	133.50	1.4590
14:12:44	17.850	3.5460	113.80	1.5410
14:13:44	17.560	4.6150	415.70	1.5950
14:14:44	17.840	4.0290	66.460	1.5890
14:15:44	17.990	2.6240	118.30	1.5410
14:16:44	17.790	1.7390	133.20	1.5740
14:17:44	17.500	2.6750	111.70	1.3810
14:18:44	18.440	5.4520	178.80	1.0970
14:19:44	17.780	3.6620	94.180	1.5060
14:20:44	17.780	3.2960	87.030	1.5320
14:21:44	17.590	4.7950	98.050	1.5130
14:22:44	17.940	3.6880	63.480	1.5640
14:23:44	17.910	3.5170	178.50	1.5760
14:24:44	17.740	3.2350	102.20	1.5010
14:25:44	17.750	4.4380	130.50	1.6850
14:26:44	17.420	5.1020	137.10	1.9010



14:27:44	17.270	3.1080	249.70	2.0730
14:28:44	17.770	1.0070	163.90	1.6980
14:29:44	17.860	3.2160	92.090	1.6230
14:30:44	17.770	.56460	141.20	1.5630
14:31:44	17.900	2.4250	59.600	1.5680
14:32:44	17.990	.35720	49.770	1.5050
		THC		
14:33:44	17.910	2.4270	212.50	1.5830
14:34:44	17.940	2.2580	93.280	1.4880
14:35:44	17.740	2.2940	72.120	1.4940
14:36:44	17.560	3.1120	151.10	1.4580
14:37:44	17.520	3.1010	81.960	1.5420
14:38:44	17.380	2.8880	160.30	1.3220
14:39:44	17.670	2.0450	133.20	1.4550
14:40:44	17.720	2.9030	73.610	1.3750
14:41:44	17.780	2.8110	132.00	1.4620
14:42:44	17.880	2.8990	384.40	1.5840
14:43:44	17.840	2.8960	245.20	1.5840
14:44:44	17.690	3.0120	176.40	1.5510
14:45:44	18.040	1.8270	217.50	1.5990
14:46:44	17.680	1.9470	[illegible]	1.4890
14:48:44	17.860	2.8660	60.200	1.4790

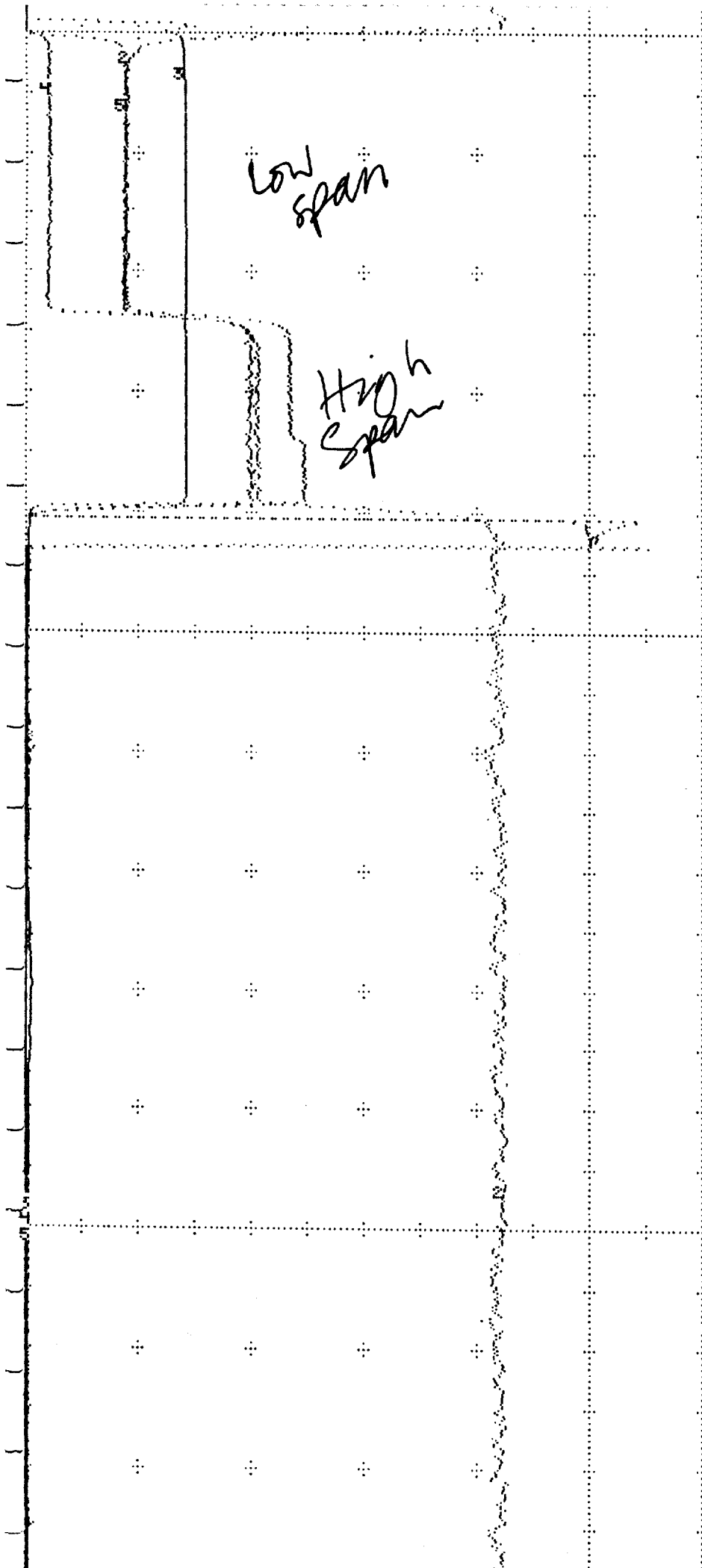
END TEST 2 DC Board.

71 # 17.8 THC-7 Out, CH4-2 | 180 1.5

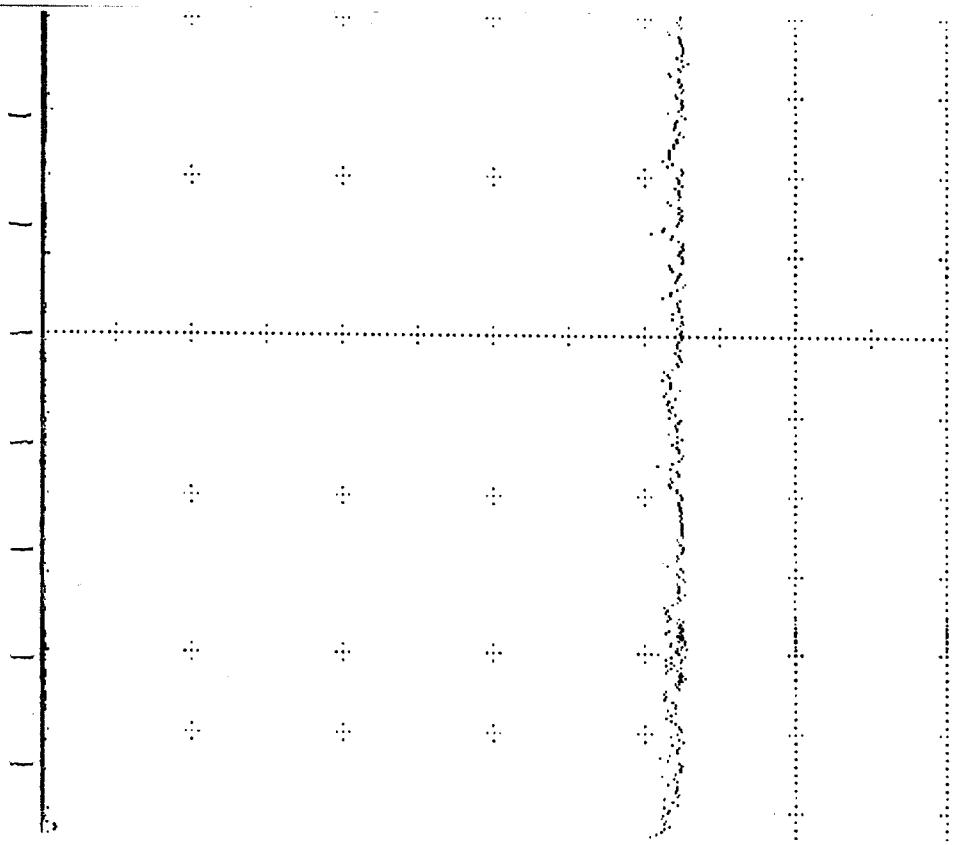


ZERO

14:49:44	19.380	19.540	162.40	.74570
14:50:44	20.910	1.9900	35.460	-.14900
14:51:44	20.640	-0.0211	-37.550	-.46190
14:52:44	20.830	-.18750	-109.90	-.36360

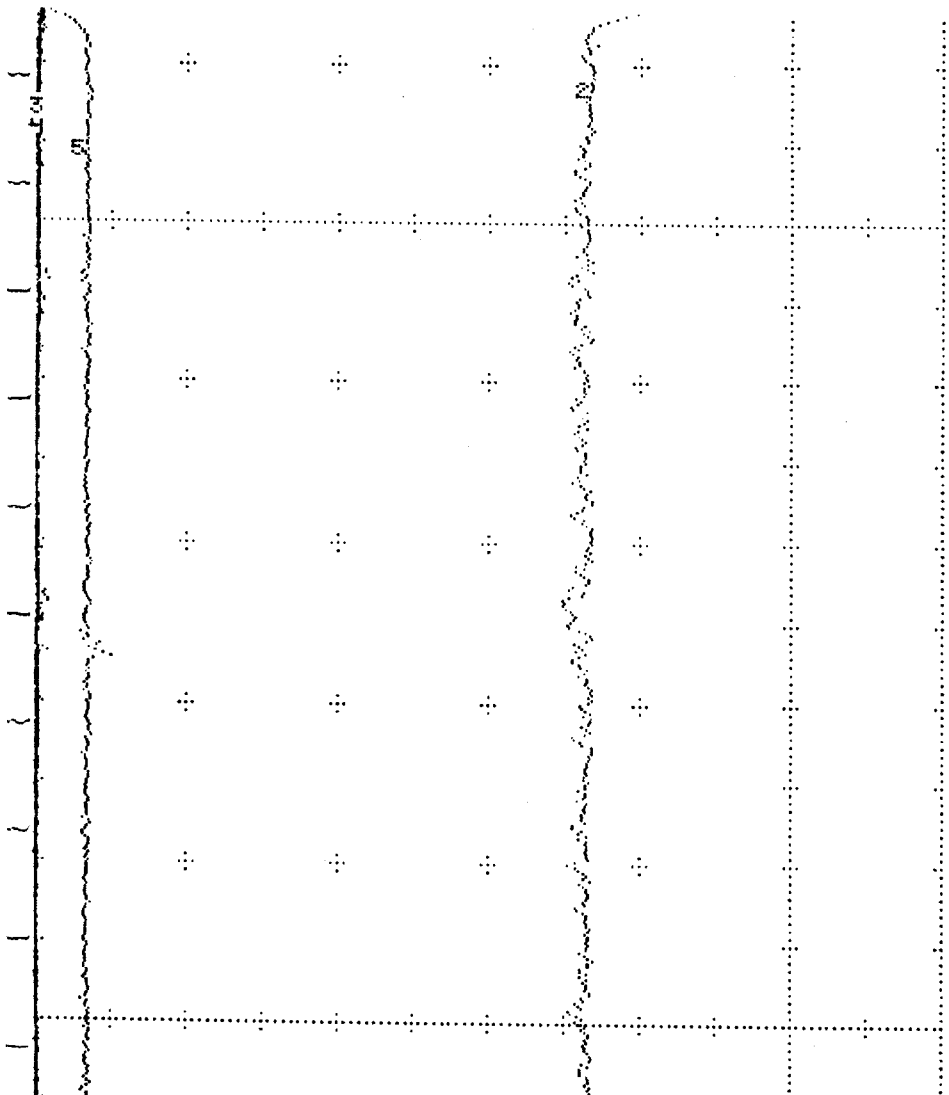


14:53:44	12.220	258.60	-23.240	.15550
14:54:44	4.5450	283.30	407.70	3.6030
14:55:44	4.4700	283.80	429.40	3.5820
14:56:44	4.4030	284.60	427.30	3.5650
14:57:44	4.4330	286.40	421.40	3.5700
14:58:44	9.9320	285.20	3916.0	9.3090
14:59:44	10.370	286.20	3982.0	9.3440
15:00:44	10.270	286.20	4004.0	9.9280
15:01:44	18.400	11.430	491.40	1.0960
15:02:44	20.930	5.0490	-51.260	-.15140
15:03:44	20.660	4.0600	-78.380	-.18240
15:04:44	21.000	4.7540	-82.560	-.26280
15:05:44	20.780	4.9260	26.220	-.24730
15:06:44	20.990	4.5780	-76.890	-.20680
15:07:44	20.980	3.6260	-80.770	-.30690
15:08:44	20.860	6.7950	10.130	-.21810
15:09:44	21.040	10.090	-46.190	-.24970
15:10:44	21.160	10.440	-58.110	-.36000
15:11:44	21.030	5.0170	-48.870	-.32960
15:12:44	20.860	4.8410	-70.030	-.19550
15:13:44	21.160	4.7670	-110.20	-.22940
15:14:44	20.770	3.4080	-115.00	-.25390
15:15:44	20.910	3.4530	-104.60	-.40530
15:16:44	20.980	3.5590	-119.80	-.34450
15:17:44	20.930	3.1720	-109.90	-.22770
15:18:44	20.550	3.8680	47.380	-.24490

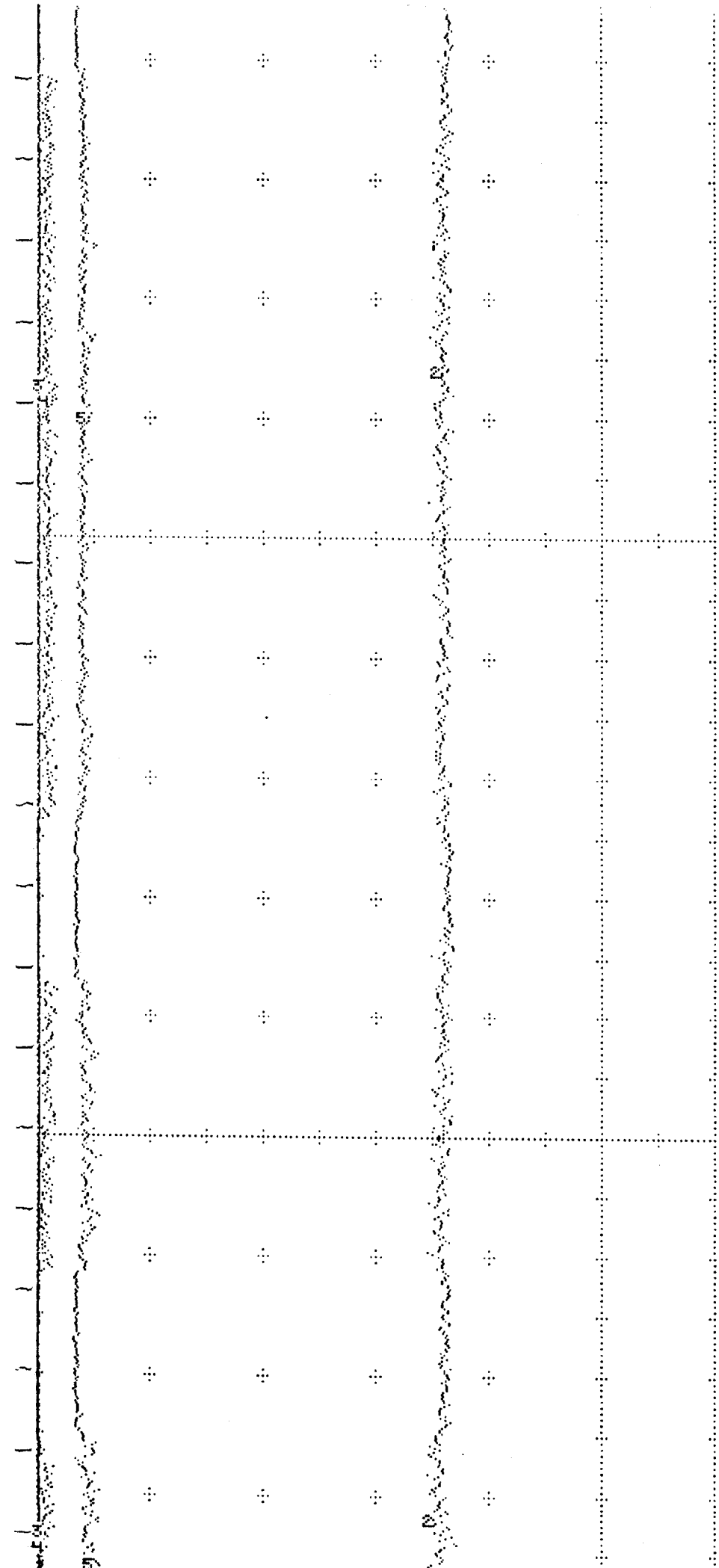


15:19:44	21.210	4.5300	-77.190	-.23480
15:20:44	21.110	5.2210	-67.650	-.20320
15:21:44	21.100	2.9140	-101.30	-.18470
15:22:44	21.250	4.8970	-45.600	-.23360
15:23:44	21.290	4.0600	-66.160	-.31590
15:24:44	20.840	4.1590	-61.690	-.33730
15:25:44	21.230	2.9900	-159.10	-.36950
15:26:44	21.160	3.7020	-91.500	-.23420
15:27:44	21.150	3.4550	-140.30	-.39400
15:28:44	20.480	4.8560	-98.560	-.31990
15:29:44	21.060	2.8280	-103.10	-.18350
15:30:44	20.780	3.4550	-118.30	-.21750

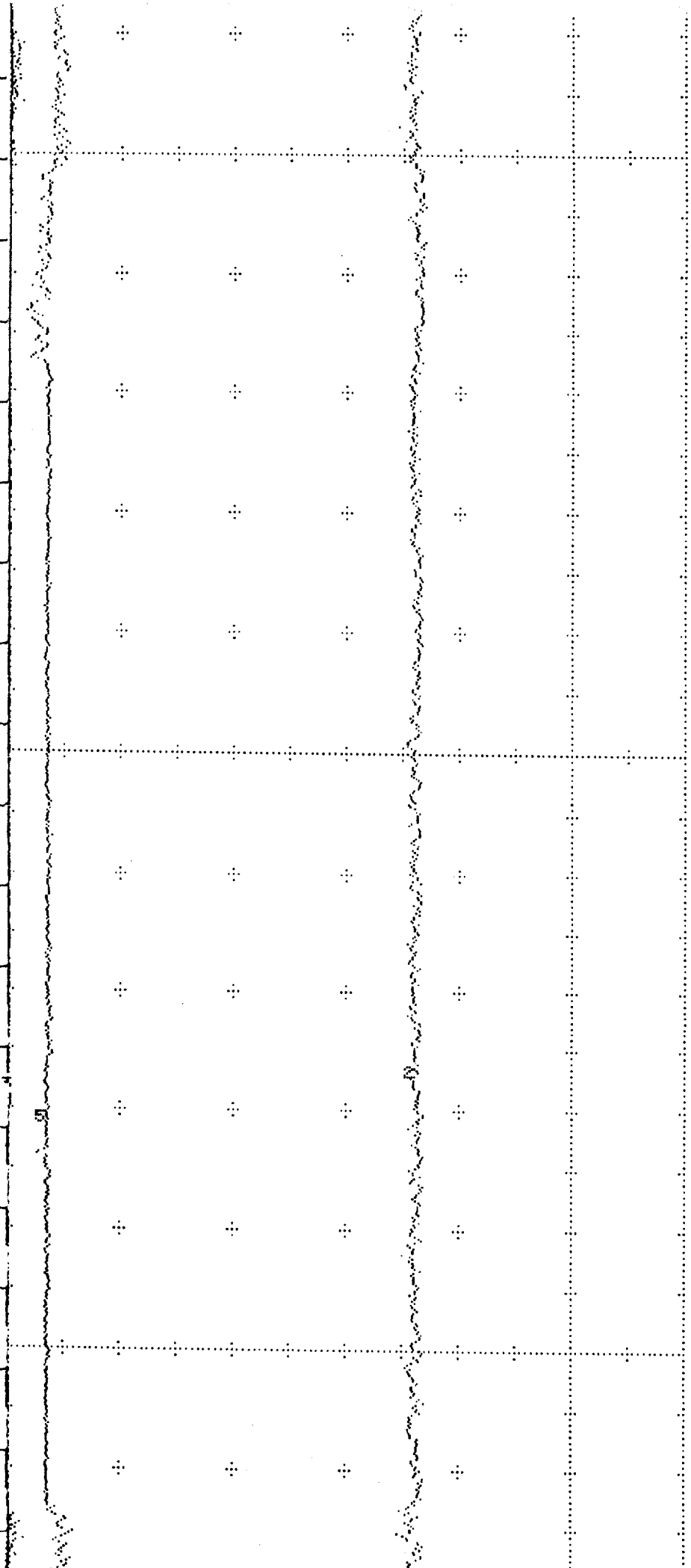
START TEST 1 SLUDGE IN AT 157#



15:31:44	18.440	2.6890	40.230	1.3870
15:32:44	17.970	1.7610	-105.50	1.3560
15:33:44	18.270	3.1640	-101.00	1.3870
15:34:44	17.950	2.0970	29.800	1.3090
15:35:44	18.150	1.7980	-81.360	1.3550
15:36:44	18.220	1.4280	-61.690	1.3130
15:37:44	18.430	1.9530	-47.980	1.3510
15:38:44	17.640	2.8910	70.930	1.2890
15:39:44	18.050	2.8340	-89.710	1.3940
15:40:44	18.190	1.7090	-63.780	1.3910
15:41:44	17.640	2.6850	-87.320	1.4370
15:42:44	18.320	1.2120	-172.50	1.2940
15:43:44	18.120	2.9450	-63.480	1.3440



15:45:44	17.780	1.1030	-92.090	1.3510
15:46:44	17.900	3.3280	183.00	1.5710
15:47:44	17.990	2.0840	186.80	1.5220
15:48:44	18.080	2.6850	306.60	1.6510
15:49:44	17.910	2.9020	-41.420	1.4860
15:50:44	17.970	1.7040	174.60	1.6200
15:51:44	17.690	3.3340	161.50	1.8300
15:52:44	18.340	2.4080	183.20	1.6140
15:53:44	18.040	3.2650	170.10	1.5760
15:54:44	17.790	1.4640	173.10	1.6110
15:55:44	18.000	.91270	175.80	1.5960
15:56:44	18.000	3.2610	374.00	1.5090
15:57:44	17.870	3.3590	255.40	1.5920
15:58:44	18.120	1.9530	-91.790	1.3720
15:59:44	18.270	1.4320	-132.00	1.3590
16:00:44	17.980	2.0310	-110.20	1.4570
16:01:44	18.230	2.8530	206.50	1.5790
16:02:44	18.110	2.9330	140.30	1.7260
16:03:44	17.860	3.1280	119.20	1.6210
16:04:44	17.780	3.0830	150.80	1.8040
16:05:44	17.770	2.8180	143.90	1.6290
16:06:44	17.970	2.3350	-139.10	1.4600
16:07:44	18.230	2.9290	-37.850	1.3380
16:08:44	17.680	2.9300	-42.020	1.6020
16:09:44	18.100	2.9630	87.320	1.8060
16:10:44	17.740	2.9730	30.100	1.9630



16:11:44	18.210	~~3.6980~~	-28.010	1.5870
16:12:44	17.910	~~5.0540~~	112.30	1.7210
16:13:44	17.890	1.9850	19.070	1.7730
16:14:44	18.060	0.0212	-114.10	1.4890
16:15:44	18.350	-0.0201	-67.950	.98350
16:16:44	18.110	-0.0220	-60.500	1.3760
16:17:44	18.030	3.1380	-148.40	1.4480
16:18:44	17.950	1.1680	-131.70	1.3790
16:19:44	18.210	.93920	-102.80	1.3940
16:20:44	18.060	1.4560	-161.80	1.4380
16:21:44	18.190	1.1160	-191.60	1.3930
16:22:44	18.050	1.7630	-129.30	1.4080
16:23:44	17.970	3.4010	-68.250	1.4470
16:24:44	18.160	1.1820	-124.20	1.4770
16:25:44	17.940	3.0160	-128.10	1.4790
16:26:44	18.220	3.3850	-94.770	1.4440
16:27:44	17.990	1.2200	-100.10	1.4440
16:28:44	18.040	.97630	-92.090	1.4830
16:29:44	18.160	2.8700	-104.90	1.5030
16:30:44	17.850	.78520	-87.620	1.3640
16:31:44	17.990	1.9830	-46.790	1.4690
16:32:44	18.120	3.3200	-59.600	1.5090
16:33:44	18.320	3.4020	-79.280	1.4720
16:34:44	18.160	3.1350	-96.260	1.4710
16:35:44	18.320	.67930	-135.30	1.4240
16:36:44	17.890	2.8800	69.140	1.8560

CH_4

END TEST 1 Sludge

WEIGHT OUT = 52#

2010

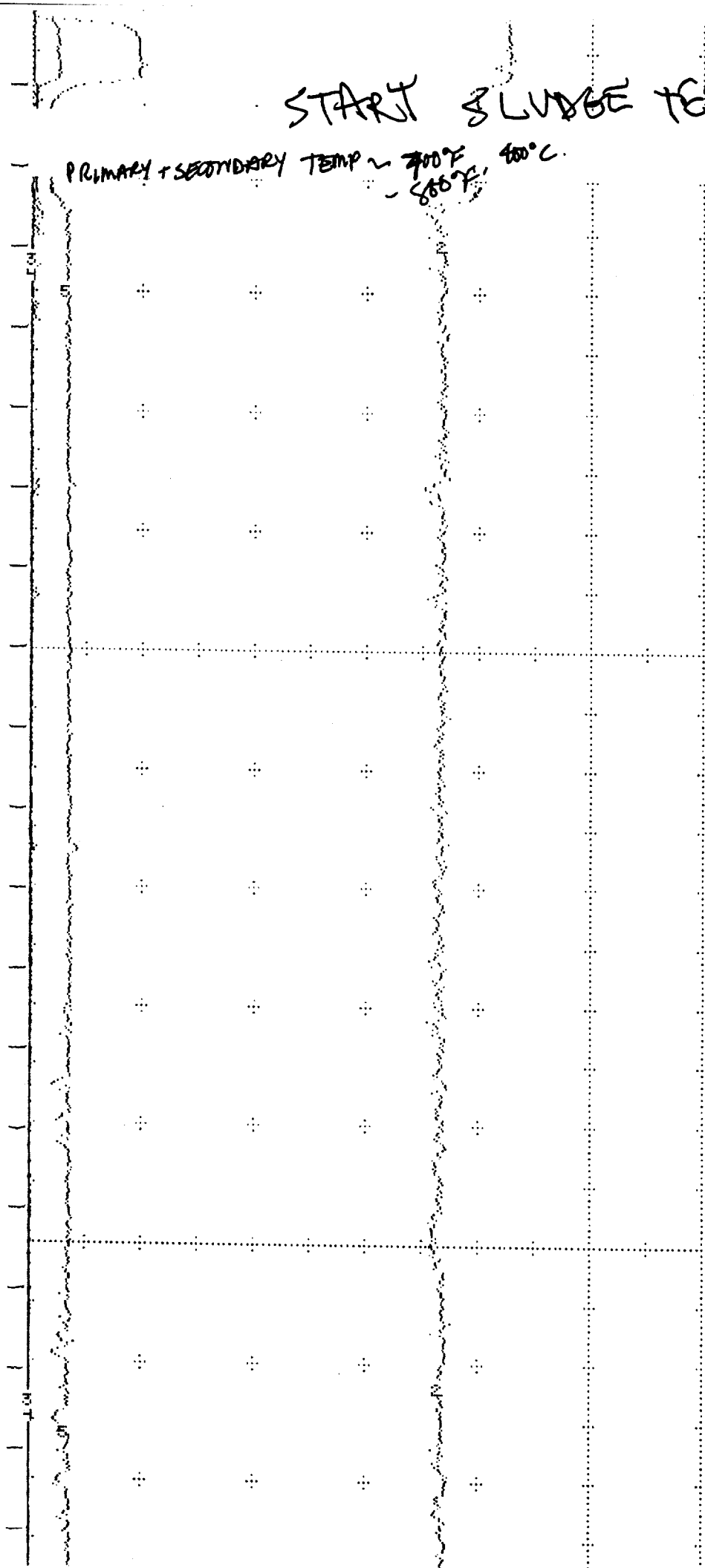
low span

high span

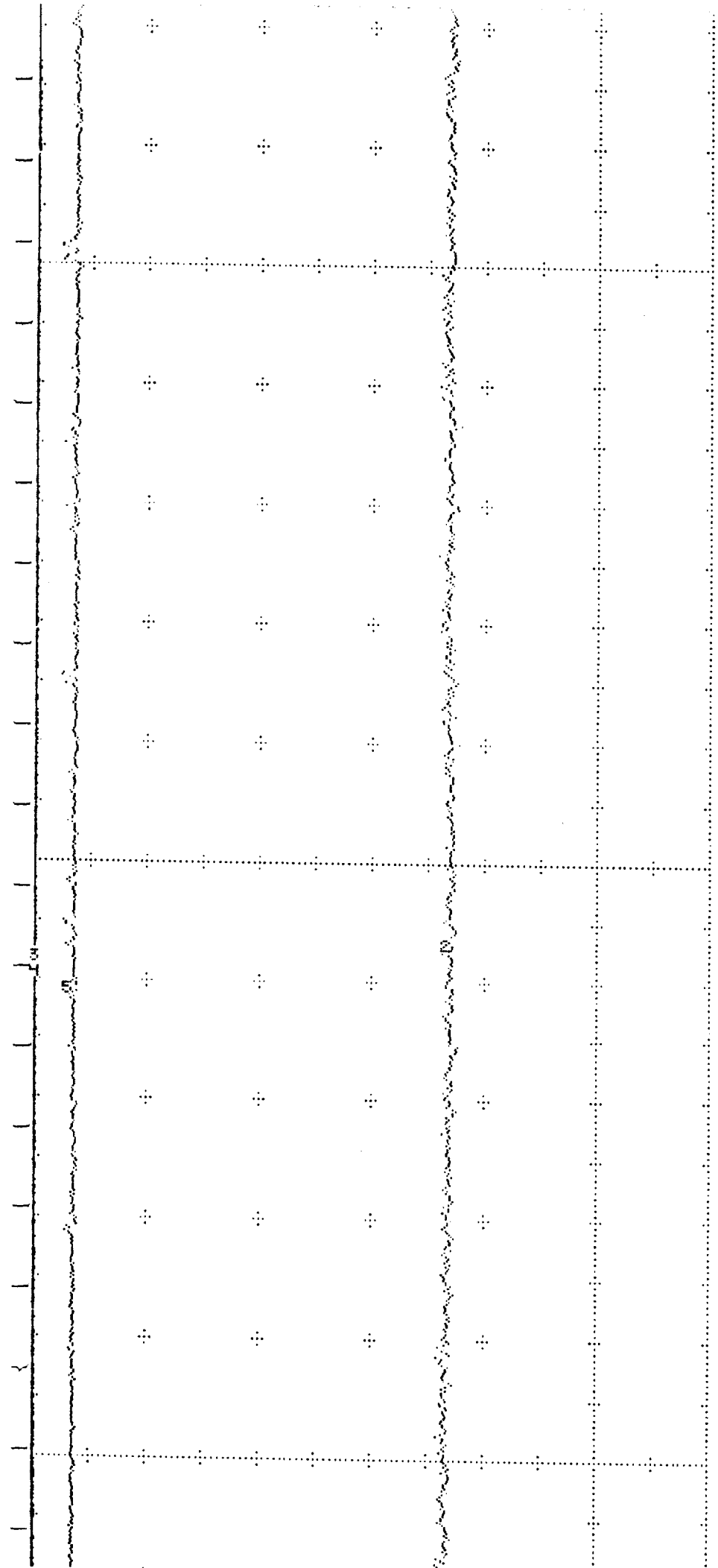
16:37:44	18.160	2.8640	-53.050	1.6270
16:38:44	17.770	2.8080	-67.950	1.7290
16:39:44	18.240	3.1430	-53.350	1.5830
16:40:44	18.090	1.8300	-57.520	1.7320
	18.01	THE=2	0	1.5
16:41:44	21.330	-.30740	-69.440	.61030
16:42:44	21.380	-.86720	-156.40	1.3310
16:43:44	21.220	-.78660	-180.60	1.0300
16:44:44	21.210	-.24790	-31.890	.70510
16:45:44	21.460	-.32970	-57.220	.65030
16:46:44	20.190	.21900	-94.770	.44400
~~16:47:44~~	~~10.260~~	~~263.30~~	~~216.60~~	~~1.9520~~
16:48:44	4.4780	281.70	390.40	3.9130
16:49:44	4.3430	282.40	599.30	3.7640
16:50:44	4.4250	283.30	442.00	3.8990
16:51:44	4.2470	283.80	494.10	3.9090
16:52:44	10.310	283.30	3913.0	9.8960
16:53:44	10.360	285.90	3999.0	9.9700
16:54:44	10.300	286.50	-54.840	.14840
16:55:44	10.330	286.50	-122.70	-.17640
16:56:44	10.400	287.10	EEEEE	19.620
16:57:44	10.260	287.00	449.10	3.6380
16:58:44	10.250	287.40	460.40	3.8720
16:59:44	10.400	287.90	4704.0	10.040
17:00:44	10.450	287.60	4689.0	10.050
17:01:44	10.570	288.10	EEEEE	20.160
			CERO	
17:02:44	19.380	7.4540	-91.500	-.16920
17:03:44	21.480	4.8110	-61.880	-.17340

START SLUDGE TEST 2 WT=170

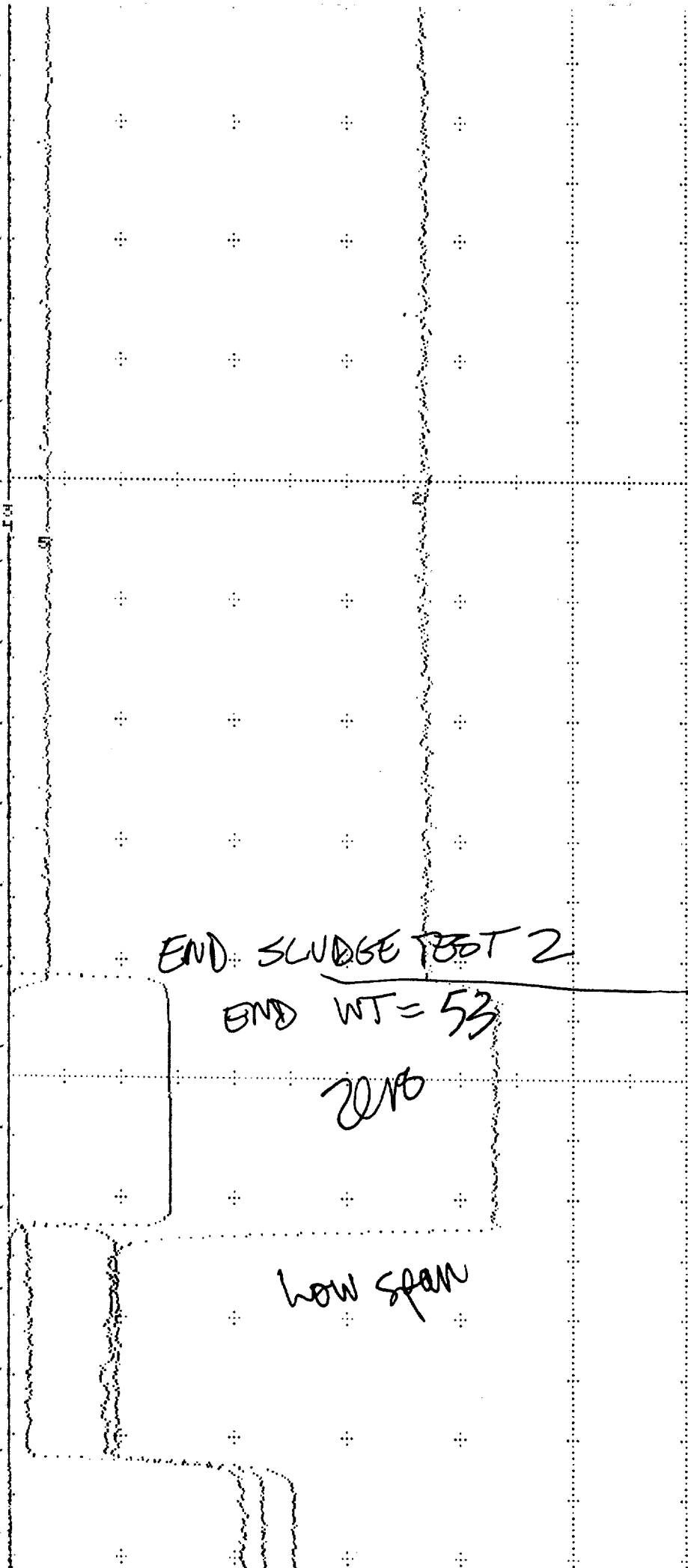
PRIMARY + SECONDARY TEMP ~ 700°F, 400°C.
~ 800°F



17:04:44	21.390	2.5210	431.50	3.8640
17:05:44	19.840	8.1730	54.540	.70570
17:06:44	18.370	1.9830	95.970	1.2930
17:07:44	18.440	3.1100	-47.980	1.3650
17:08:44	18.320	3.1130	-105.20	1.2890
17:09:44	18.520	.94600	-51.260	1.3650
17:10:44	18.500	1.9660	-121.60	1.3780
17:11:44	18.410	2.7770	-73.020	1.4390
17:12:44	18.390	1.4770	-90.300	1.3300
17:13:44	18.350	3.3440	-62.880	1.4480
17:14:44	18.420	.85450	-112.30	1.3540
17:15:44	18.190	1.6630	-61.990	1.4010
17:16:44	18.280	3.1000	-89.110	1.3750
17:17:44	18.270	.78570	-73.610	1.4440
17:18:44	18.240	1.9220	-64.970	1.4650
17:19:44	18.410	.17710	-244.30	1.3370
17:20:44	18.440	.64110	-98.350	1.4190
17:21:44	18.300	.57780	-89.710	1.3900
17:22:44	18.330	2.0960	-93.280	1.3320
17:23:44	17.910	2.9290	-87.620	1.4560
17:24:44	18.470	2.4410	-91.790	1.3590
		OH4		
17:25:44	18.430	0.0408	-73.910	1.3810
17:26:44	18.430	-.32380	-147.80	.90420
17:27:44	18.600	-.30220	-154.60	1.0610
17:28:44	18.520	-.48790	-172.10	1.4800



17:29:44	18.380	-.30100	-118.90	1.2790
17:30:44	18.470	0.0746	-146.60	1.4660
17:31:44	18.410	2.4410	-108.70	1.4120
17:32:44	18.320	.49980	-110.20	1.4360
17:33:44	18.420	2.5590	-76.590	1.4940
17:34:44	18.500	.36630	-79.870	1.4340
17:35:44	17.990	3.0510	-80.170	1.4630
17:36:44	18.580	0.0078	-175.50	1.0630
17:37:44	18.770	.12540	-148.40	1.4920
17:38:44	18.290	1.6970	-98.950	1.4990
17:39:44	18.120	2.9300	-91.200	1.4950
17:40:44	18.700	-0.0389	-220.80	1.4480
17:41:44	18.860	2.3370	-90.600	1.5380
17:42:44	18.380	.15270	-100.70	1.4450
17:43:44	18.490	.71780	-135.60	1.4150
17:44:44	18.490	.10960	-163.30	1.0580
17:45:44	18.350	2.0360	-132.90	1.4910
17:46:44	18.500	0.0259	-182.10	1.4320
17:47:44	18.490	2.4410	-180.90	1.3530
17:48:44	18.510	1.6550	-333.50	1.4420
17:49:44	18.610	2.3430	-111.40	1.4680
17:50:44	18.290	1.1180	-184.70	1.4620
17:51:44	18.420	.52090	-193.70	1.4280
17:52:44	18.370	2.1930	-97.160	1.4500
17:53:44	18.190	.66950	-125.10	1.3810
17:54:44	18.230	2.7180	-106.90	1.4650



17:56:44	18.370	.60480	-186.80	1.3790
17:57:44	18.400	2.4410	-109.30	1.4190
17:58:44	18.270	2.5630	-136.80	1.4250
17:59:44	18.380	1.2320	-109.30	1.4060
18:00:44	18.540	2.6450	-171.00	1.4040
18:01:44	18.600	.17290	-165.70	1.4500
18:02:44	18.530	2.4410	-212.50	1.4530
18:03:44	18.670	.36170	-304.30	1.1490
18:04:44	18.240	2.4410	-143.30	1.4540
18:05:44	18.700	.34030	-227.40	1.3570
18:06:44	18.440	1.8710	-180.00	1.4130
18:07:44	18.630	0.0931	-270.00	1.3140
18:08:44	18.500	.81970	-139.10	1.4480
18:09:44	18.590	.45650	-205.90	1.4760
18:10:44	18.590	2.8760	-180.90	1.4120
18:11:44	18.460	1.8920	-151.10	1.4660
	18.4	1.6 290	0	1.4
18:12:44	21.630	285.00	-267.00	-.36180
18:13:44	21.690	286.50	-167.20	-.29260
18:14:44	21.540	288.20	-205.90	-.25270
18:15:44	21.480	288.60	-202.60	-.28550
18:16:44	~~4.5820~~	~~3.0970~~ 2010	~~369.80~~	~~3.2200~~
18:17:44	4.6490	-.72380	363.00	3.9490
18:18:44	4.1420	-.22140	391.60	3.7460
18:19:44	4.3360	.24600	334.40	3.8190
18:20:44	10.340	3.2350	4511.0	10.140

STOP 18:22:44 10.500 2.7440 4585.0 10.190

APPENDIX V

GAS CALIBRATION SHEETS FOR INSTRUMENT VAN USED IN INCINERATOR TEST

AIRCO Industrial Gases

RARE & SPECIALTY GASES DEPT

ANALYTICAL REPORT

To: Atlas Welding Supply
1224 6th Street
Berkeley Ca. 94710

Date Reported: 5/11/87

Reference: 556722
Test # SCO587048
P.O. #1252

Material Submitted: Oxygen,Carbon Monoxide, Carbon Dioxide, Nitrogen

Information Requested: Ratio Analysis

Method of Analysis: Oxygen Analyzer/ Gas Chromatograph

Result of Investigation: Cyl; LL-9788

Component	Specification	Concentration
Oxygen	9/11%	10.2%
Carbon Monoxide	400/500 ppm	414 ppm
Carbon Dioxide	3/5%	3.93%
Nitrogen	Balance	Balance

By _____
PRINCIPAL GAS ANALYST

This report states accurately the results of the investigation made upon the materials submitted to the Analytical Laboratory. The Laboratory has endeavored to use its resources to determine, and to present, the information requested objectively. HOWEVER, such investigation is undertaken, and this report is rendered, on the condition that, under no circumstances (including negligence), shall The BOC Group, Inc. have any liability in excess of its established charge for such investigation. There is NO WARRANTY OF FITNESS FOR ANY PURPOSE, and any use of this report or the information contained herein shall be at the sole risk of the user.

GA 3099 D 4/84
PRTD IN USA

AIRCO Industrial Gases

RARE & SPECIALTY GASES DEPT

ANALYTICAL REPORT

To: Atlas Welding Supply
1224 6th Street
Berkely, CA. 94710

Date Reported: 9/21/87

Reference: PO#3884
SO#558865-00
Test# SC0987082

Material Submitted: Carbon Monoxide, Carbon Dioxide, Oxygen, Nitrogen Gas Mixture

Information Requested: Ratio Analysis

Method of Analysis: Gas Chromatograph, Oxygen Analyzer

Result of Investigation: Cyl# LL438

Component	Specification	Concentration
Carbon Monoxide	4000-5000 ppm	4555 ppm
Carbon Dioxide	9-11%	9.69%
Oxygen	3-5%	4.22%
Nitrogen	Balance	Balance

By _____
PRINCIPAL GAS ANALYST

This report states accurately the results of the investigation made upon the material submitted to the Analytical Laboratory. The Laboratory has endeavored to use its resources to determine, and to present the information requested objectively, HOWEVER such investigation is undertaken and this report is rendered on the condition that under no circumstances, including negligence, shall The BOC Group Inc. have any liability in excess of its established charge for such investigation. There is NO WARRANTY OF FITNESS FOR ANY PURPOSE and any use of this report or the information contained herein shall be at the sole risk of the user.

GA 3099 D 4 84
PRTD IN USA

A DIVISION OF THE BOC GROUP INC

AIRCO Industrial Gases

ANALYTICAL REPORT

To: Atlas Welding Supply
1224 6th Street
Berkely, CA. 94710

Date Reported: 9/21/87

Reference: PO#3884
SO#558865-00
Test#SC0987084

Material Submitted: Propane, Carbon Dioxide, Nitrogen Gas Mixture

Information Requested: Ratio Analysis

Method of Analysis: Gas Chromatograph

Result of Investigation: Cyl# 17-1469

Component	Specification	Concentration
Propane	89-100 ppm	96.5 ppm
Carbon Dioxide	2000 ppm	2006 ppm
Nitrogen	Balance	Balance

By —