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I. INTRODUCTION

During the week of January 8, 1979, an emission source study was conducted at Central Soya vegetable oil extraction facility in Delphos, Ohio. The plant processes soybeans to produce vegetable oil and livestock feed. Vegetable oil is obtained from a solvent extraction process which uses hexane as the extraction solvent. The plant operates two solvent extractors and two desolventizer-toasters (DT). Solvent vapor from the extractors and DT's is vented to a condenser and then through two mineral oil scrubbers (MOS) operated in series. Meal from the DT's is then processed through a dryer and a cooler stage before final preparation for shipment. Air from the meal cooler is vented through a cyclone and back into the dryer. Air from the dryer is vented directly to the atmosphere through an 18 inch duct at a rate of about 11,000 acfm.) ← put details in later

The purpose of this study is to characterize the flow of solvent vapor through the various stages of the process, and to determine the extent of solvent losses from the ~~process~~ plant through fugitive emissions, processed meal, ~~oil from the MOS~~ vegetable oil, and plant waste water. In addition, the emission measurements were obtained using two separate test methods. This was done to determine the best method for use in this type of plant and to provide

data for further development and improvement of the test methods. The data from this study may also be used to establish an emission standard for the vegetable oil processing industry.

Sampling for hexane vapor was conducted at five sites:

1. the inlet to the first mineral oil scrubber (MOS)
2. outlet of first MOS, inlet to second MOS
3. outlet of second MOS (main vent to atmosphere)
4. exhaust duct from meal cooler (inlet air to dryer)
5. dryer exhaust (vented to atmosphere)

At each of these sites, measurements were taken simultaneously, using two test methods. Personnel from PEDCo Environmental, Inc. employed a midget impinger train in which carbon disulfide (CS_2) was used as the collecting media for hexane vapor. These samples were analyzed on site, using a Hewlett Packard model 5830A gas chromatograph with flame ionization detector. The test is specific for hexane and results are reported as n-hexane. Personnel from Pollution Control Science, Inc. used a total carbon analysis method (TCA) in which the sample is collected in a dry ice freeze trap and cylinder. The trap and the evacuated cylinder used to draw the sample are then capped off and returned to the laboratory for analysis. Analysis consists of oxidizing the sample to CO_2, methanating the sample, and determining the total amount of carbon present with a flame ionization detector (FID). Results are reported as total gaseous non-methane organics (TGNMO). Results of both of these tests are included in the report.

During each of the tests at the dryer and cooler sites, meal samples were collected at the following sites:

1. exit point from both desolventizer-toasters (DT-1 and DT-2)
2. exit point from the dryer
3. exit point from the meal coolers before the final preparation area

All meal samples were analyzed at the PEDCo Environmental, Inc., laboratory to determine the hexane concentration.

During each test at the mineral oil scrubber, a sample of the mineral oil exiting the scrubber and a sample of the plant wastewater effluent was obtained. In addition, one sample of vegetable oil from the Central Soya storage tank was obtained. Each of these samples was to be analyzed for residual hexane content. Results of the wastewater analysis are included in this report. At this time, PEDCo Environmental lacks the equipment necessary to analyze the oil samples and this data is not yet available.

II. SUMMARY AND DISCUSSION OF RESULTS

Test results and data relating test procedures and sampling conditions for all trials run with the carbon disulfide bubbler train method are listed in Tables 1-5. Table 1 describes the test procedure used in each trial including the test date, the time and duration of sampling, the volume of gas sampled, and the sample train description. It should be noted that three different procedures are listed under sample train description. Midget bubbler train refers to the standard carbon disulfide bubbler train described in the sampling procedures section of this report. The other two procedures were designed to test the collection efficiency of the sample train. At each test site, one trial was run using a bag sampler behind the bubbler train. This was done by connecting the outlet of the bubbler train to the inlet of a tedlar bag contained in an airtight box. Air is drawn through the bubbler train into the bag by evacuating the box. The bag is then analyzed to determine the amount of hexane lost from the sample train. The second procedure used to test the collection efficiency of the train involved adding an extra impinger with 15 ml of carbon disulfide to the train. This impinger was then recovered and analyzed separately for hexane concentration. Table 2 is a summary of ambient and gas stream

TABLE 1. TEST PROCEDURE

TEST SITE	RUN NUMBER	TEST DATE	CLOCK TIME START	CLOCK TIME FINISH	SAMPLE TRAIN DESCRIPTION	VOLUME OF GAS SAMPLED STD. LITER[a]
Inlet to First Mineral Oil Scrubber	MOS-1-IN-1	1-09-79	11:15	12:15	Midget Bubbler Train with Bag Sample Backup	18.561
	MOS-1-IN-2	1-09-79	17:05	18:05	Midget Bubbler Train	6.800
	MOS-1-IN-3	1-10-79	9:00	9:45	Midget Bubbler Train	5.022
	MOS-1-IN-4	1-10-79	11:00	11:45	Midget Bubbler Train	6.555
Inlet to 2nd Mineral Oil Scrubber	MOS-2-IN-1	1-09-79	10:50	11:50	Midget Bubbler Train with Bag Sampler Backup	16.806
	MOS-2-IN-2	1-09-79	17:05	18:05	Midget Bubbler Train	6.816
	MOS-2-IN-3	1-10-79	9:10	9:45	Midget Bubbler Train	7.009
	MOS-2-IN-4	1-10-79	11:00	11:45	Midget Bubbler Train	4.340
Outlet from 2nd Mineral Oil Scrubber to Atmosphere	MOS-2-OUT-1	1-09-79	11:15	12:15	Midget Bubbler with Bag Sample Backup	17.587
	MOS-2-OUT-2	1-09-79	17:05	18:05	Midget Bubbler Train	9.834
	MOS-2-OUT-3	1-10-79	9:13	10:00	Midget Bubbler Train	4.714
	MOS-2-OUT-4	1-10-79	11:03	11:48	Midget Bubbler Train	4.599
Cooler Vent Outlet of Cooler Inlet to Meal Dryer	CV-1	1-10-79	16:00	16:25	Midget Bubbler Train with Bag Sample Backup	4.776
	CV-2	1-11-79	10:28	11:13	Midget Bubbler Train with Last Impinger Analyzed Separately	7.335
	CV-3	1-11-79	14:30	15:15	Midget Bubbler Train with Last Impinger Analyzed Separately	6.488
	CV-4	1-12-79	12:10	13:53	Midget Bubbler Train with Last Impinger Analyzed Separately	8.212
	CV-5	1-12-79	12:10	13:00	Midget Bubbler Train with Last Impinger Analyzed Separately, High Volume Pump	80.819
Dryer Vent to Atmosphere	DV-1	1-10-79	15:10	16:10	Midget Bubbler Train with Bas Sample Backup	4.927
	DV-2	1-11-79	10:30	11:15	Midget Bubbler Train with Cost Impinger Analyzed Separately	3.967
	DV-3	1-11-79	14:30	15:15	Midget Bubbler Train with Last Impinger Analyzed Separately	4.364
	DV-4	1-12-79	12:10	14:25	Midget Bubbler Train with Last Impinger Analyzed Separately	21.109
	DV-5	1-12-79	12:10	14:25	Midget Bubbler Train with Last Impinger Analyzed Separately High Volume Pump.	72.102

a - Standard Conditions 20°C, 760 MM Hg.

TABLE 2. SUMMARY OF SAMPLING CONDITIONS - CENTRAL SOYA - DELPHOS, OHIO

TEST SITE	RUN NUMBER	AMBIENT CONDITIONS		GAS STREAM CONDITIONS			GAS STREAM FLOW RATE acfm[b]	COMMENTS
		TEMP. °F	PRESSURE IN Hg.	TEMP. OF GAS STREAM °F	STATIC PRESS IN H_2O	% MOISTURE IN GAS STREAM		
Inlet to First MOS.	MOS-1-IN-1	0	29.56	80	- 7.8	3.6[a]	228.2	
	MOS-1-IN-2	0	29.56	80	- 7.7	3.6	249.5	
	MOS-1-IN-3	1	29.75	80	-10.4	3.6	201.1	
	MOS-1-IN-4	7	29.75	77	- 8.4	3.2	227.3	
Inlet to 2nd MOS.	MOS-2-IN-1	0	29.56	64	-11.5	2.1	209.8	
	MOS-2-IN-2	0	29.56	68	-11.5	2.4	233.8	
	MOS-2-IN-3	1	29.75	63	-12.25	2.0	189.1	
	MOS-2-IN-4	7	29.75	63	-11.5	2.0	216.8	
Outlet from 2nd MOS. to ATM.	MOS-2-OUT-1	0	29.56	60	-14.0	1.8	208.6	
	MOS-2-OUT-2	0	29.56	61	-14.0	1.9	231.3	
	MOS-2-OUT-3	1	29.75	60	-14.0	1.8	187.4	
	MOS-2-OUT-4	7	29.75	60	-14.0	1.8	213.8	
Cooler Vent: Outlet from Inlet to Meal Dryer	CV-1	12	29.75	122	+0.05	Not Measured	6967	
	CV-2	0	29.88	122	+0.35	0.15	3488	Cyclone at Inlet Plugged
	CV-3	12	29.88	122	+0.35	2.90	2967	Cyclone at Inlet Plugged
	CV-4	14	29.54	105	+ .05	8.00	6967	
	CV-5	14	29.54	105	+ .05	8.00	6967	
Dryer Vent Dryer Exhaust to Atmos.	DV-1	12	29.75	150	-2.20	Not Measured	11389	
	DV-2	2	29.88	150	-2.20	13.80	11138	
	DV-3	12	29.88	150	-2.20	11.43	10871	
	DV-4	14	29.54	145	-1.00	14.03	10375	
	DV-5	14	29.54	145	-1.00	14.03	10375	

[a] Moisture content in mineral oil scrubber gas stream estimated at saturation based on process data. Due to low sample volume, the amount of water collected in bubbler train was too small to measure accurately.

[b] Wet basis.

conditions measured during each test run. There are two items of note which may have biased the test results. First the ambient temperature varied from 0° to 14°F during the week of testing. This extreme cold not only made sampling difficult, but also may have influenced the gas stream conditions due to the fact the ducts sampled were uninsulated. The second item to note is that the second and third tests on the cooler vent were conducted under non-representative process conditions, i.e., with the cyclone at the inlet plugged. The flow of gas in the duct was reduced to about one half of the normal level and wet meal which had carried over from the cyclone was observed sliding down the inside wall of the duct during these tests. There is no way of knowing how much if any of the hexane present was entrained in the wet meal.

The results of analyses conducted on site are presented in Tables 3A, 3B, and 3C. Data from the collection efficiency runs with the bag sample backup is listed in Table 3A. On all three runs at the mineral oil scrubber sites the amount of hexane in the trap bag was less than 1% of the total hexane collected. Thus, the collection efficiency was better than 99%. Similarly, the cooler duct test showed a collection efficiency of 97%. In the dryer vent test, 15% of the hexane was collected in the trap bag for a collection efficiency of only 85%. However, in the dryer vent sample, the hexane concentration was so low that any trace of contaminant in the carbon disulfide or the bag would

TABLE 3A. ON SITE ANALYSIS: COLLECTION EFFICIENCY RUNS

Test Site	Run Number	Bubbler Train			Trap Bag				
		Hexane Concentration In CS_2 Solution mg/ml	Volume of CS_2 Solution ml	Hexane Collected g	Hexane Concentration mg/ml	Sample Volume Std. Liters[a]	Hexane Collected g	Hexane Concentration In Source g/l	Hexane Concentration In Source ppm[b]
Inlet to First MOS	MOS-1-IN-1	0.993 (Dilution Factor 1: 98.36)	64.82	6.33	2.12	18.561	0.039	0.343	95800
Inlet to Second MOS	MOS-2-IN-1	4.692	96.89	0.455	0.194	16.806	0.0033	0.027	7613
Outlet from Second MOS to ATM	MOS-2-OUT-1	1.584	73.73	0.117	0.0756	17.587	0.0013	0.0067	1877
Dryer Vent	DV-1	1.024×10^{-2}	118.74	1.216×10^{-3}	0.0419	4.927	2.06×10^{-4}	2.89×10^{-4}	80.7
Outlet of Cooler Inlet to Dryer	CV-1	1.168×10^{-2}	106.39	1.243×10^{-3}	0.0087	4.776	4.15×10^{-5}	2.69×10^{-4}	75.1

[a] Standard Conditions: 20°C, 760 mm Hg

[b] ppm: Parts Per Million By Volume

TABLE 3B. ON SITE ANALYSIS: HEXANE CONCENTRATION IN MINERAL OIL SCRUBBER.

Test Site	Run Number	Hexane Concentration In CS_2 Solution mg/ml	Volume of CS_2 Solution ml	Hexane Collected g	Sample Volume Std. Liters[a]	Hexane Concentration in Source	
						g/l	ppm[b]
Inlet to First MOS	MOS-1-IN-2	19.58	100.85	1.975	6.800	0.290	80960
	MOS-1-IN-3	14.05	100.13	1.407	5.022	0.280	78200
	MOS-1-IN-4	14.76	106.98	1.579	6.555	0.241	67300
	Average					0.270	75487
Inlet to Second MOS	MOS-2-IN-2	2.893	109.00	0.315	6.816	0.0462	12900
	MOS-2-IN-3	3.452	104.13	0.359	7.009	0.0512	14300
	MOS-2-IN-4	2.59	108.81	0.282	4.340	0.065	18100
	Average					0.0541	15100
Outlet from Second MOS to ATM	MOS-2-OUT-2	0.749	106.43	0.080	9.834	0.00814	2271
	MOS-2-OUT-3	0.873	99.46	0.087	4.714	0.0185	5152
	MOS-2-OUT-4	0.560	114.55	0.064	4.599	0.014	3885
	Average					0.0135	3769

[a] Standard Conditions: 20°C, 760 mm Hg

[b] ppm: Parts Per Million By Volume

TABLE 3C. ON SITE ANALYSIS: HEXANE CONCENTRATION IN DRYER AND COOLER VENTS

Test Site/ Run Number	Bubbler Train			Impinger Trap					
	Hexane Concentration In CS_2 Solution mg/ml	Volume of CS_2 Solution ml	Hexane Collected mg	Hexane Concentration In CS_2 Solution mg/ml	Volume of CS_2 Solution ml	Hexane Collected mg	Sample Volume Std. Liters[a]	Hexane Concentration In Source mg/l	Hexane Concentration In Source ppm[b]
Dryer Vent									
DV-2	7.22×10^{-3}	113.28	0.818	1.827×10^{-4}	48.94	0.009	3.967	0.208	58.2
DV-3	8.89×10^{-3}	123.10	1.095	2.804×10^{-4}	45.61	0.0128	4.364	0.253	70.9
Outlet of Cooler Vent To Dryer									
CV-2	1.726×10^{-3}	111.74	0.193	Negligible	Negligible	Negligible	7.335	0.026	7.3
CV-3	2.124×10^{-3}	108.05	0.2295	2.576×10^{-4}	47.24	0.0122	6.488	0.037	10.4

BAG SAMPLES 1/12/79

Site	Source Concentration ppm[b]
Cooler Vent	5.3
Dryer Vent	38.3

[a] Standard Conditions: 20°C, 760 mm Hg

[b] ppm: Parts Per Million By Volume

interfere significantly with the analysis. In all tests using an extra impinger, (Table 3C), less than 5% of the hexane collected was found in the last impinger.

Also listed in Table 3C are the results of integrated bag samples taken from the cooler and dryer sites. These samples were analyzed directly on the gas chromatograph as soon as the test was completed and are probably most representative of the true source concentration. The values of 5.3 ppm at the cooler site and 38.3 ppm at the dryer should correspond to the results of bubbler train tests four and five. At the dryer, tests DV-4 and DV-5 showed an average concentration of 42 ppm. The analysis on cooler vents tests CV-4 and CV-5 was not sufficiently sensitive to determine the concentration in this low range.

The final results of each test including the calculated hexane concentration and corresponding mass flow rate, are summarized in Table 4. Field data sheets and example calculations for these tests are included in the appendix of this report.

In order to check the stability of the hexane samples in carbon disulfide, all samples analyzed on site were stored for one month and then reanalyzed in the PEDCo Environmental lab. The gross weights of the samples and containers were checked in the lab to determine if any of the sample had been lost due to evaporation or spills. A comparison of the two analyses is presented in Table 5. Laboratory analysis was done with a less sensitive instrument and values less than 0.01 μg/μl are not

TABLE 4. MIDGET BUBBLER TRAIN TEST RESULTS

Test Site	Run Number	Hexane Concentration In Source		Vent Gas Flow Rate		Hexane Mass Flow Rate	
		g/m^3	ppm[a]	m^3/min.	dscfm[b]	kg/h	lb/h
Inlet to First MOS	MOS-1-IN-1	343.14	95,730	5.90	208.4	121.5	267.3
	MOS-1-IN-2	290.44	81,030	6.45	227.9	112.4	247.3
	MOS-1-IN-3	280.17	78,200	5.20	183.7	87.4	192.3
	MOS-1-IN-4	240.88	67,200	5.97	210.7	86.3	189.9
	Average	288.66	80,540	5.88	207.7	101.9	224.2
Inlet to Second MOS	MOS-2-IN-1	27.27	7,610	5.63	198.6	9.2	20.2
	MOS-2-IN-2	46.21	12,900	6.20	219.0	17.2	37.8
	MOS-2-IN-3	51.22	14,300	5.11	180.4	15.7	34.5
	MOS-2-IN-4	64.98	18,130	5.87	207.2	22.9	50.4
	Average	47.42	13,235	5.70	201.3	16.25	35.73
Outlet of Second MOS To ATM	MOS-2-OUT-1	6.73	1,877	5.62	198.4	2.3	5.0/250 = 0.02
	MOS-2-OUT-2	8.13	2,270	6.21	219.3	3.0	6.7/250 = 0.0268
	MOS-2-OUT-3	18.46	5,150	5.08	179.4	5.6	12.3/250 = 0.0492
	MOS-2-OUT-4	13.92	3,885	5.80	204.7	4.8	10.6 0.0424
	Average	11.81	3,296	5.68	200.5	3.9	8.7/250 = 0.035
Dryer Vent To ATM	DV-1	0.29	81	242.24	8555	4.2	9.2/250 = 0.0368
	DV-2	0.21	59	233.30	8239	2.9	6.4/250 = 0.0256
	DV-3	0.25	70	234.46	8280	3.5	7.7/250 = 0.0308
	DV-4	0.16	45	217.13	7668	2.1	4.6/250 = 0.0184
	DV-5	0.14	39	217.13	7668	1.8	4.0/250 = 0.016
	Average	0.21	59	228.85	8082	2.9	6.4/250 = 0.0256
Meal Cooler Exhaust (Inlet air to dryer)	CV-1	0.27	75	167.52	5916	2.7	5.9/250 = 0.0236
	CV-2	0.026	7	89.45	3159	0.1	0.2/250 = 0.00028
	CV-3	0.037	10	74.00	26.13	0.2	0.4/250 = 0.0016
	CV-4	<0.15	<42	167.52	5916	<1.5	<3.3
	CV-5	<0.014	<4	167.52	5916	<0.1	<0.2
	Average[c]						

[a] ppm - part per million by volume

[b] dscfm - dry standard cubic feet per minute - Std conditions - 20°C, 760 mm Hg.

[c] Average values not reported - CV-2 and CV-3 run during non representative conditions; i.e., cyclone plugged. CV-4 and CV-5 - uncertainty in analysis.

TABLE 5. CS_2 BUBBLER TRAIN SAMPLE STABILITY CHECK

Test Site	Run Number	Gross Wt. of Sample and Bottle		Hexane Concentration in Sample	
		On Site 1/8/79 g	In PEI Lab 2/7/79 g	On Site 1/8/79 µg/ml	In PEI Lab[a] 2/79 µg/ml
Inlet to First MOS	MOS-1-IN-1	235.16	234.86	0.993	1.1
	MOS-1-IN-2	239.50	237.89	19.58	19.6
	MOS-1-IN-3	237.15	234.85	14.05	11.5
	MOS-1-IN-4	246.35	244.05	14.76	12.50
Inlet to Second MOS	MOS-2-IN-1	233.70	232.70	4.69	6.5
	MOS-2-IN-2	248.80	244.95	2.893	4.9
	MOS-2-IN-3	243.75	241.69	3.452	2.9
	MOS-2-IN-4	249.80	248.00	2.59	2.6
Outlet of Second MOS	MOS-2-OUT-1	205.65	205.80	1.584	1.9
	MOS-2-OUT-2	246.45	245.64	0.75	0.8
	MOS-2-OUT-3	236.10	233.08	0.87	0.8
	MOS-2-OUT-4	255.95	256.40	0.56	0.5
Meal Cooler Exhaust	CV-1	246.20	246.09	0.012	<0.01
	CV-2	252.60	252.29	0.002	<0.01
	CV-3	249.00	248.58	0.002	<0.01
Dryer Vent	DV-1	262.95	262.58	0.01	<0.01
	DV-2	255.15	254.96	0.007	<0.01
	DV-3	268.35	267.45	0.009	<0.01

[a]Lab analysis done on less sensitive instrument.

reported. With the gas chromatograph used on site, concentrations as low as 0.001 µg/µl were detectable. Since the gross weight of the sample at the test site was determined before portions were taken out for analysis and since the weighings in the laboratory were done on a different scale, small differences in weight (<1g) would not be significant. Given these considerations, agreement between on site and post-test lab analysis was good with only a couple of exceptions. The most significant changes in concentration occured with the last two samples from the inlet of the mineral oil scrubber. Sample number MOS-1-IN-3 showed 2.3 g difference in weight and the concentration changed from 14.05 µg/µl to 11.5 µg/µl. Sample number MOS-1-IN-4 changed 2.3 g in weight and from 14.76 µg/µl on site to 12.50 µg/µl in the lab.

Results of analysis for hexane in meal samples are presented in Table 6. Values for hexane concentration are listed as µg/g or ppm by weight. The data is extremely inconsistent. Values of hexane concentration vary as much as 500 ppm between duplicate samples taken at the dryer and cooler sites. The weight of sample was also inconsistent and this may have effected the analytical results. Also the sample bottles used were smaller than those recommended for the method. A thorough study of the process data taken during the test period may also be of help in understanding these inconsistencies.

TABLE 6. HEXANE ANALYSIS OF MEAL SAMPLES COLLECTED AT CENTRAL SOYA, DELPHOS, OHIO

Test site	Sample No.	Sample taken Date/Time	Sample weight/g	Hexane[a] conentration µg/g
DT[b]-1	001	1-9-79/17:35	1.5225	783
DT-2	002	1-9-79/17:30	3.3094	1047
DT-1	003	1-10-79/ 9:30	1.6836	1189
DT-2	004	1-10-79/ 9:30	1.6005	282
DT-1	005	1-10-79/11:15	1.8572	1399
DT-2	006	1-10-79/11:15	1.3956	1489 – High
DT-1	007	1-11-79/11:05	2.2523	<10 – low
DT-2	008	1-11-79/11:05	1.6147	<10
Dryer	009	1-11-79/11:05	1.9814	1010
Dryer	010	1-11-79/11:05	2.0210	1560
Cooler	011	1-11-79/11:05	2.2906	1257
Cooler	012	1-11-79/11:05	2.1682	1125
DT-1	013	1-11-79/14:55	1.4245	861
DT-2	014	1-11-79/14:55	1.5648	863
Dryer	015	1-11-79/14:55	2.3091	80
Dryer	016	1-11-79/14:55	1.8955	664
Cooler	017	1-11-79/14:55	2.3983	515
Cooler	018	1-11-79/14:55	2.3486	310
DT-1	019	1-12-79/12:45	1.1614	267
DT-2	020	1-12-79/12:45	1.5363	726
Dryer	021	1-12-79/12:45	2.3088	10
Cooler	023	1-12-79/12:45	2.7055	30
Cooler	024	1-12-79/12:45	1.8404	286

[a] Reported as n-Hexane

[b] Desolventizer toaster

Waste water samples taken on January 9, 10, and 12, were found to contain no hexane. The waste water sample from January 11, did contain hexane. The concentration was 0.015 μg/μl.

The results of the total carbon analysis sampling are listed in Table 7. Values are in part per million by volume of carbon in source. In order to make a direct comparison with the results of the carbon disulfide bubbler train, values of concentration are listed as grams of carbon per liter in Table 8. To change the TCA data from ppm, the following formula was used:

$$\text{ppm} \times 10^{-6} \times \frac{12 \text{ g/g mole}}{24.04 \text{ l/g mole}} = \text{g carbon/l}$$

The following was done to adjust the results of the carbon disulfide bubbler tests:

$$\frac{\text{g } C_6H_{14}}{m^3} \times 10^{-3} \frac{m^3}{l} \times \frac{72 \text{ g carbon}}{86 \text{ g } C_6H_{14}} = \frac{\text{g carbon}}{l}$$

TABLE 7. SUMMARY OF TCA DATA FROM CENTRAL SOYA-DELPHOS 1/31/79

Source	Sample	mg C_1 tank	mg C_1 trap	ppm C_1 @ source
MINERAL OIL	2	tank sample lost[1]	240	135000 (trap only)
SCRUBBER #1	3	2.319	189.0	230700
	4	64.43	181.0	272700
MINERAL OIL	2	tank sample lost	50.00	29230
SCRUBBER #2	3	6.590	47.70	91420
	4	7.090	21.91	34140
MAIN VENT	2	4.381	0.530	3060
DISCHARGE	3	6.296	4.226	11280
	4	6.009	14.33	12020
COOLER	2	0.034	0.325	476
	3	0.325	0.384	876
	4	NDL	0.3362	216
	5	0.299	trap sample lost[2]	-
DRYER	2	2.425	1.454	7980
	3	0.387	1.069	1160
	4	NDL	0.1332	470
	5	NDL	trap sample lost[2]	-

NDL - No Detectable Level.

[1] Dirt and/or dried grain had gotten lodged in the tank quick connect, and the sample was contaminated.

[2] These samples were taken by PEDCo personnel. The trap samples were not refrigerated. Nuts on traps from Dryer 5 and Cooler 5 were loose.

NOTE: Due to the extremely high concentrations of hexane and/or water in the traps, analysis of the trap samples from Mineral Oil Scrubber #1 was difficult.

Source	Number	gC_1/l	gC_1/l
Inlet to first MOS	MOS-1-IN-2	0.243	0.0674
	MOS-1-IN-3	0.234	0.115
	MOS-1-IN-4	0.201	0.136
Inlet to second MOS	MOS-2-IN-2	0.0386	0.0146
	MOS-2-IN-3	0.0428	0.0456
	MOS-2-IN-4	0.543	0.017
Outlet of second MOS	MOS-2-OUT-2	0.00679	0.0015
	MOS-2-OUT-3	0.0154	0.0056
	MOS-2-OUT-4	0.0116	0.017
Dryer vent	DV-2	1.75×10^{-4}	3.98×10^{-4}
	DV-3	2.09×10^{-4}	5.79×10^{-4}
	DV-4	1.34×10^{-4}	2.35×10^{-4}
Cooler duct	CV-2	0.22×10^{-4}	2.38×10^{-4}
	CV-3	6.37×10^{-4}	4.37×10^{-4}
	CV-4	1.25×10^{-4}	1.08×10^{-4}

III. PROCESS DESCRIPTION AND LOCATION OF SAMPLING POINTS

The Central Soya plant processes vegetable oil from soybeans through a solvent extraction process employing hexane. Figure 1.1 is a process flow diagram for this plant. Solvent vapor from the extractor and desolventizer units are controlled through the use of a condenser and two mineral scrubbers operated in series. The condenser collects about 89% of the hexane, leaving the gas entering the mineral oil scrubbers with about 10% by volume hexane. Based on the test data, the mineral oil scrubbers are from 80-85% efficient in removing the hexane. The efficiency across both scrubbers is better than 95% with only 0.3% by volume hexane in the exhaust gas from the second scrubber. Temperatures, pressures, and concentrations listed in Figure 1.1 are based on measurements taken during the emission testing. A more detailed study of process flows and conditions was conducted by personnel from Research Triangle Institute during the testing period. This data will be made available at a later date.

Sampling points are indicated on Figure 1.1 by numbers. Sites 2, 9, and 1 were sampling points used in mineral oil scrubber tests. Sites 3 and 4 are the test sites for the dryer and cooler air. These sites are more clearly diagramed in Figure 1.2.

Meal samples were obtained at sites 5, 6, and 7.

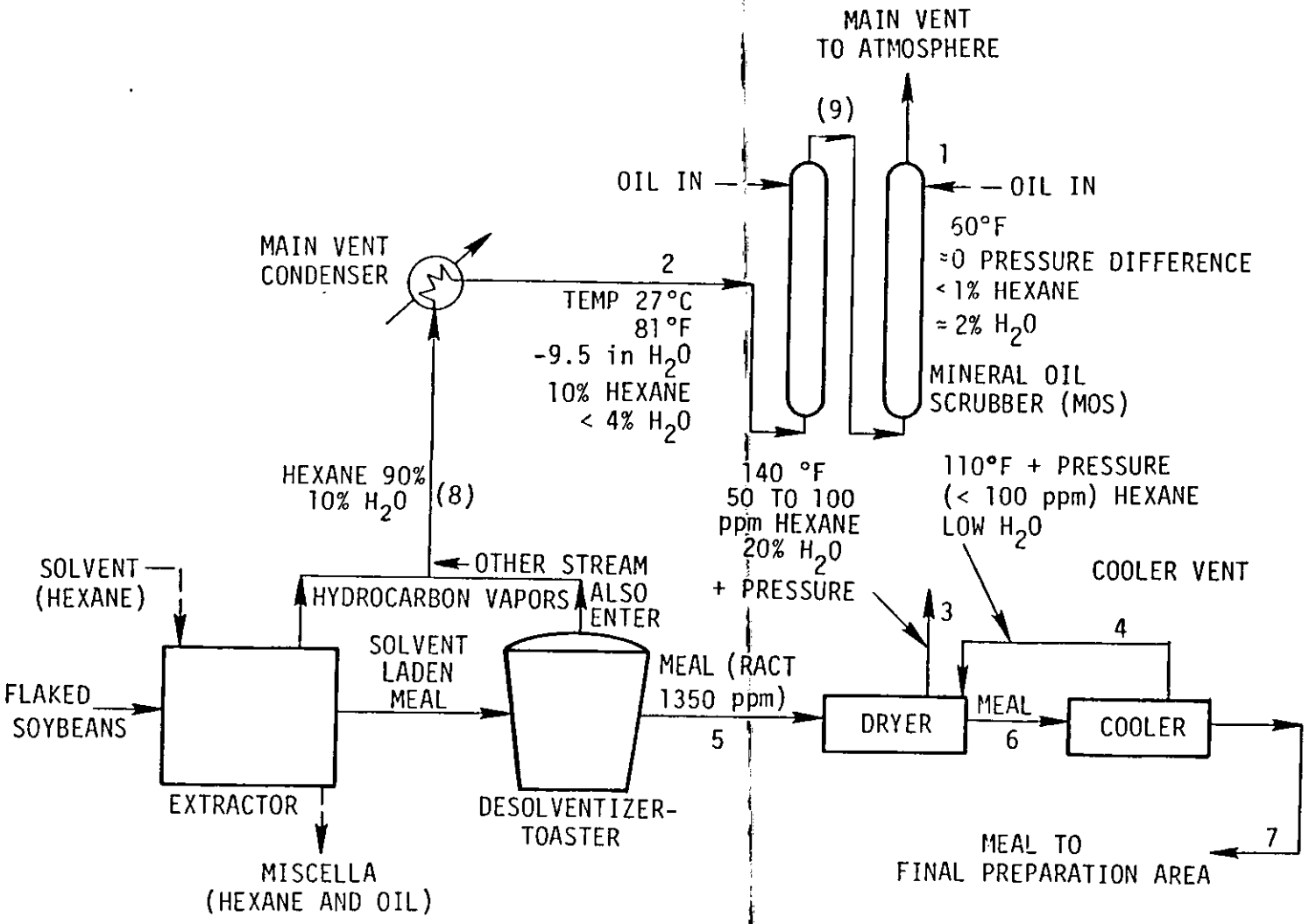

Figure 1.1 - FLOW DIAGRAMS OF CENTRAL SOYA PLANT

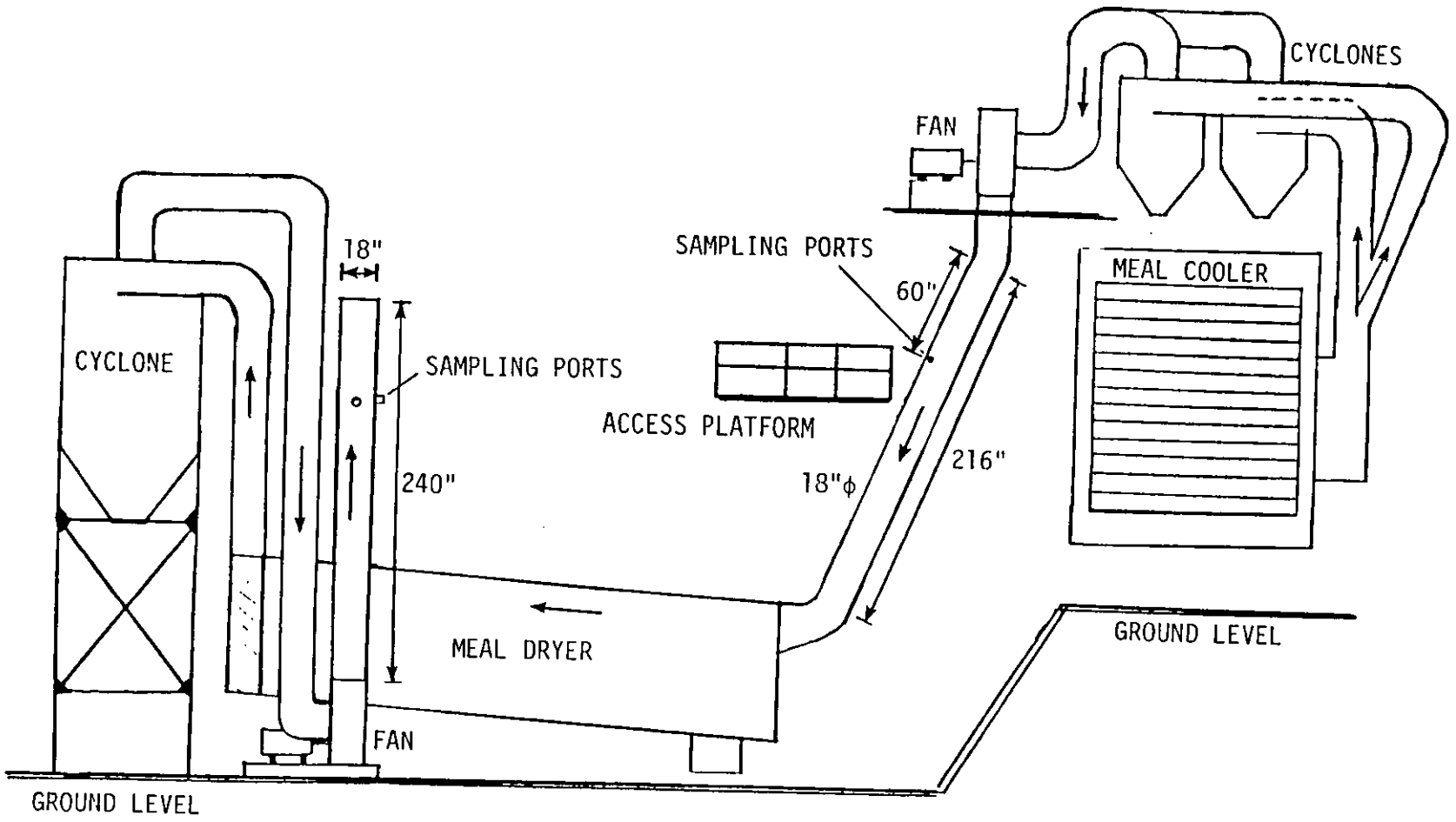

Figure 1.2 - MEAL DRYER AND COOLER DISCHARGE

IV. SAMPLING AND ANALYTICAL PROCEDURES

Figure 1.2 shows the sampling sites used on the dryer and cooler vents. Air flow at both of these sites was measured according to methods 1 and 2 of the Federal Register. Each duct is 18 inches in diameter and 24 traverse points were used at each site.

Flow through the mineral oil scrubbers was measured with a vane anometer, fitted tightly over the end of the four inch exhaust duct. This method was used because there were no sampling ports large enough to accomodate an S-type or standard type pitot tube. Sampling for hexane vapors in the MOS system was done through 1/4-inch pressure taps in the duct work.

Moisture in the dryer and cooler vents was measured with a silica gel tube and a calibrated personnel sampling pump. Moisture in the mineral oil scrubber system was estimated at the saturation level based on previously obtained process data.

The midget impinger hexane sampling train used by personnel from PEDCo Environmental, Inc. is shown in Figure 2.1. Two changes were made in this procedure to accomodate the testing conditions. First distilled water was not added to the first impinger. This was done to prevent the sampling train from

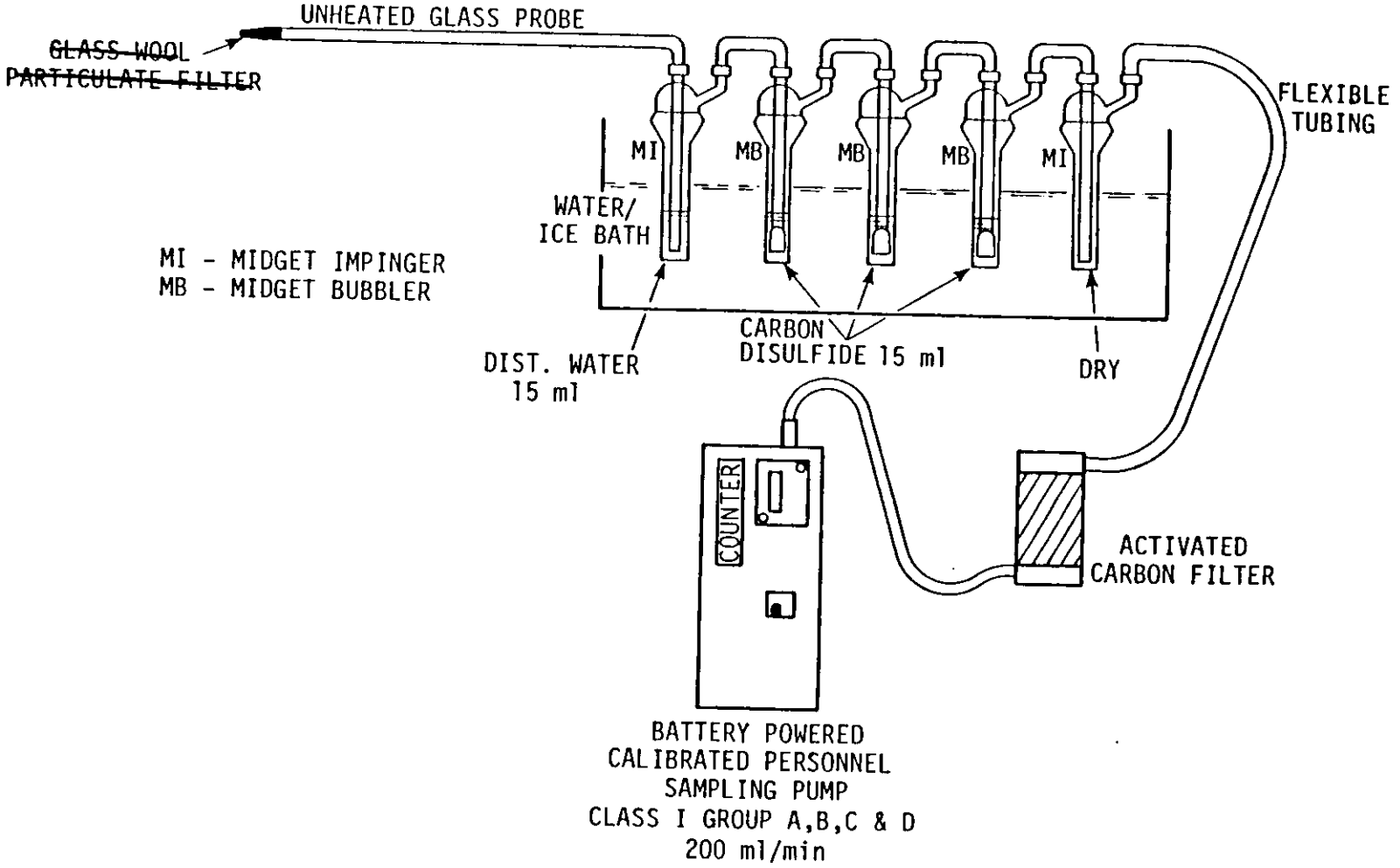

Figure 2.1. HEXANE SAMPLING TRAIN

freezing due to the extremely cold weather. Secondly, a flexible teflon line was substituted for the glass probe to allow access to the mineral oil scrubber sampling ports.

To test the collection efficiency of the sample train the procedure shown in Figure 2.2 was used. Integrated bag samples were obtained with the same apparatus without the impinger train in line.

To insure complete recovery of sample from the impinger train, the probe line was rinsed with 15 ml of carbon disulfide immediately after the test and all train glassware was rinsed with two separate 15 ml portions of carbon disulfide. The recovered sample is then weighed to determine the amount of solution present and analyzed for hexane concentration using a gas chromatograph with flame ionization detector (FID). The instrument used in these tests was a Hewlett-Packard model 5830A gas chromatograph. The column used was a 10 ft x 1/8 inch stainless steel column with 10% SP-1000 packing on 80/100 mesh supelcoport packing. Column temperature was maintained at 70°C, injection temperature was 100°C, and carrier gas flow was set at 20 cc/min. Gas bag samples were injected through a heated 500 µl gas sample loop. Calibration for gas samples was done with 483 ppm and 1450 ppm hexane in hydrocarbon-free air gas standards certified by the supplier to be within $\pm$2% of the stated concentration.

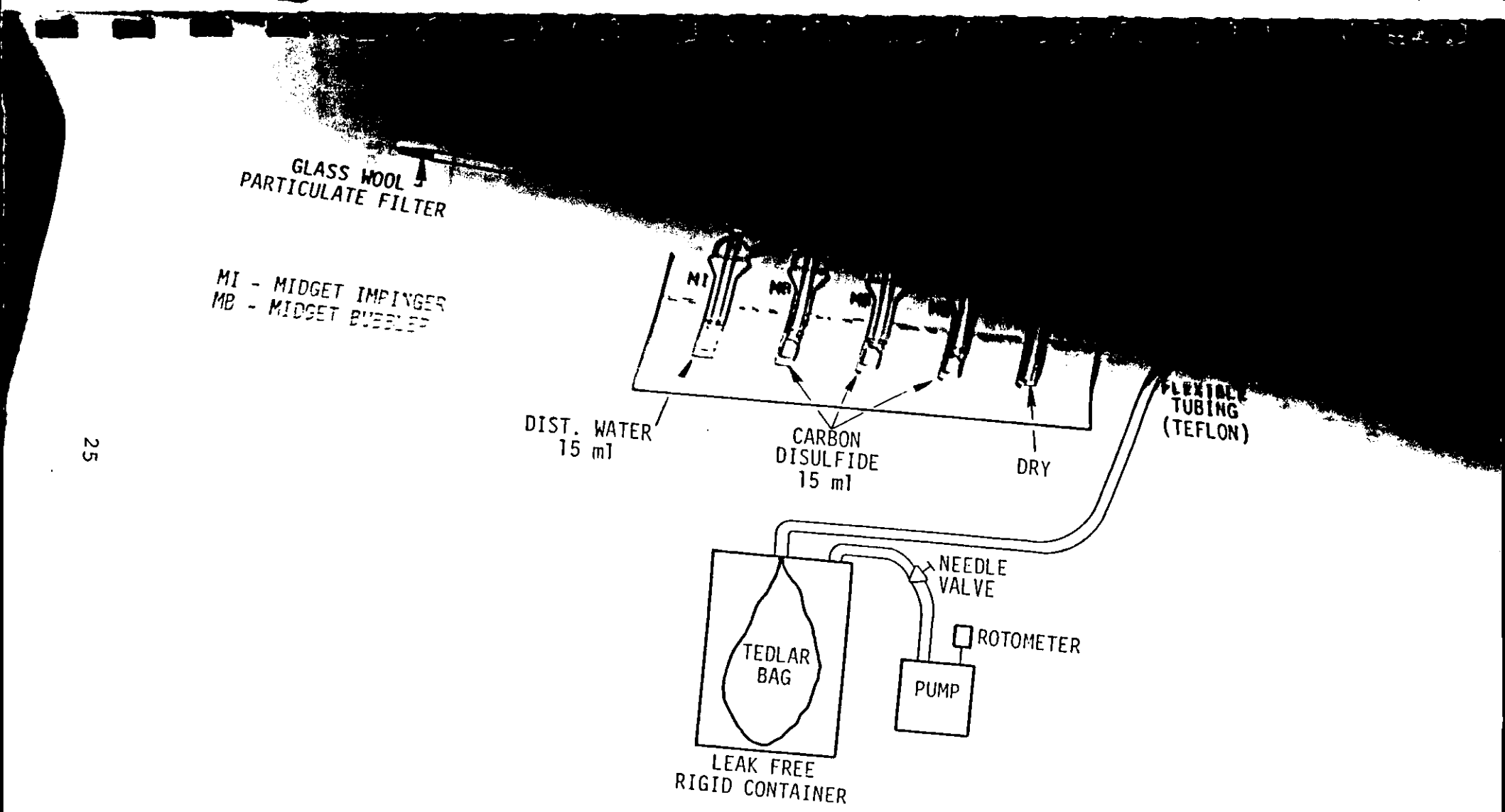

Figure 2.2. COLLECTION EFFICIENCY SAMPLING TRAIN

The procedure used to analyze the meal samples is a volitilization procedure initially introduced by Fore, et.al., in 1973 and modified by Wan, et.al., in 1977.[1] A meal sample is added to a 610 ml serum bottle containing two layers of filter paper that had been wetted down with 0.5 ml of water. The bottle is immediately sealed. Analysis is done by placing the sample into a sand bath at 125°C for 2 hours. The bottle is gradually cooled to room temperature and 1.0 ml of headspace sample is injected into the gas chromatograph. The method is sensitive to at least 10 ppm hexane.

In the analysis for total gaseous nonmethane organics done on the TCA train samples, the sample is injected into a gas chromatographic column to achieve separation of the nonmethane organics from carbon monoxide, carbon dioxide, and methane; the nonmethane organics are oxidized to carbon dioxide, reduced to methane, and measured by an FID. Complete results of and calculations for this analysis are in Appendix A of this report.

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[1] P.J. Wan, M. Chittwood, C.M. Cater, "Determination of residual Hexane in Solvent Extracted Meals," Food Protein R. and D. Center, Texas A&M University.

APPENDIX A

ANALYTICAL DATA

1. GAS CHROMATOGRAPH PRINTOUTS - ON SITE ANALYSIS

CS_2 MIDGET BUBBLER TRAIN

VEGETABLE OIL DELPHOS

1/9/79

483 ppm STD n-hexane Press 29.56 in Hg temp = 28°C

Run No.	R.T.	Area
1	1.81	330,700
2	1.81	320,500
3	1.80	331,600
4	1.81	333,000
5	1.81	334,700
		1,650,500

AVE = 330,100

	Area		
MOS-1-IN-1	AVE = 404,935	=	592 ppm in trap bag
MOS-2-IN-1	37,056	=	54.2 ppm in trap bag
MOS-2-OUT-1	14,410	=	21.1 ppm in trap bag

$$\frac{592 \text{ ppm } (\mu l/l) \times 86.17 \frac{\mu g}{\mu g \text{ mole}} \quad 1 \text{ mg}}{\frac{24.055 \ \mu l}{\mu g \text{ mole}} \qquad 1000 \ \mu g} = \frac{2.12 \text{ mg hexane}}{l}$$ at 20°C 760 mm Hg

$$\frac{54.2 \ \mu l/l \times 86.17 \frac{\mu g}{\mu g \text{ mole}}}{\frac{24.055 \ \mu l}{\mu g \text{ mole}}} \times \frac{1 \text{ mg}}{1000 \ \mu g} = \frac{0.194 \text{ mg hexane}}{l}$$ at 20°C 760 mm Hg

$$\frac{21.1 \ \mu l/l \times 86.17 \frac{\mu g}{\mu g \text{ mole}}}{\frac{24.055 \ \mu l}{\mu g \text{ mole}}} \times \frac{1 \text{ mg}}{1000 \ \mu g} = 0.0756 \text{ mg/l}$$ at 20°C 760 mm Hg

TRAP BAGS

Sample No.	Run No.	R.T.	Area	
MOS-1-IN-1	1	1.49	1,366	
MOS-1-IN-1	1	1.73	387,400	
MOS-1-IN-1	1	1.90	11,240	
MOS-1-IN-1	1	2.06	3,580	
		TOTAL	403,586	ppm = 590
MOS-1-IN-1	2	1.50	1,338	
MOS-1-IN-1	2	1.73	390,000	
MOS-1-IN-1	2	1.91	11,310	
MOS-1-IN-1	2	2.06	3,636	
		TOTAL	406,284	ppm = 594
MOS-2-IN-1	1	1.49	1,327	
MOS-2-IN-1	1	1.66	8,894	
MOS-2-IN-1	1	1.73	26,140	
MOS-2-IN-1	1	1.90	621	
MOS-2-IN-1	1	2.06	114	
		TOTAL	37,096	ppm = 54.2
MOS-2-IN-1		1.49	1,251	
MOS-2-IN-1		1.66	8,828	
MOS-2-IN-1		1.73	26,180	
MOS-2-IN-1		1.90	641	
MOS-2-IN-1		2.06	116	
		TOTAL	37,016	ppm = 54.1
MOS-2-OUT-1	1	1.50	1,661	
MOS-2-OUT-1	1	1.62	5,852	
MOS-2-OUT-1	1	1.73	7,156	
MOS-2-OUT-1	1	1.91	157	
MOS-2-OUT-1	1	2.07	39	
		TOTAL	14,865	ppm = 21.7

Sample No.	Run No.	R.T.	Area	
MOS-2-OUT-1	2	1.50	1,690	
MOS-2-OUT-1	2	1.62	5,830	
MOS-2-OUT-1	2	1.73	6,626	
MOS-2-OUT-1	2	1.91	133	
		TOTAL	14,279	ppm = 20.9
MOS-2-OUT-1	3	1.50	1,678	
MOS-2-OUT-1	3	1.62	5,799	
MOS-2-OUT-1	3	1.73	6,478	
MOS-2-OUT-1	3	1.91	131	
		TOTAL	14,086	ppm = 20.6

LIQUID STD 25µl n-hexane/24.42 ml CS_2 0.676 $\frac{mg}{ml}$ ($\frac{\mu g}{\mu l}$)

Run No.	R.T.	µl inj. size	µg	Area	µg/area Unit
1	1.29	1.00	0.676	322,400	
2	1.29	1.00	0.676	320,300	
3	1.29	1.00	0.676	323,100	
				965,800	
4	1.29	1.00	0.676	270,900	
5	1.29	1.00	0.676	307,400	
6	1.29	1.00	0.676	294,100	
7	1.29	1.00	0.676	284,800	
				2,123,000	
8	1.29	1.00	0.676	266,700	
9	1.29	1.00	0.676	266,400	
10	1.29	1.00	0.676	243,200	
				2,899,300	
				289,930	$2,3316 \times 10^{-6}$

Sample No.	Run No.	R.T.	µl inj. size	Area	µg
MOS-1-IN-1	1	1.21 1.27 1.54	1.00	6,708,000 14,130,000 1,838,000	
		To high of concentration			1.33% under CS_2 peak
MOS-1-IN-1 1:98.36 dilution	1	1.27 1.54	1.00	402,600 41,770 444,370	
	2	1.27 1.54	1.00	371,100 32,320 403,420	
	3	1.27 1.53	1.00	387,400 41,220 428,620	
	4	1.27 1.53	1.00	385,100 41,290 426,390	

AVE = 425,700 = 0.993 µg/µl

0.993 mg/ml

$$\frac{\text{Dilution factor}}{(0.003\ \text{mg/ml})(98.36)(64.82\ \text{ml}\ CS_2)} = 6.33\ \text{gm in}\ CS_2$$
$$100\ \text{mg/g}$$

in bag 592 rpm = 2.12 mg/l

Sample No.	Run No.	R.T.	µl inj. size	Area
MOS-1-IN-1	1	1.21 1.54	1.00	1,873,000 57,040 1,930,040
	2	1.21 1.54	1.00	1,944,000 58,370 2,002,370
	3	1.21 1.54	1.00	2,043,000 61,980 2,104,980

AVE = 2,012,463 4.692 µg/µl
4,692 mg/ml

$$4.692 \text{ mg/ml} \frac{(96.89 \text{ ml})}{1000 \text{ mg.g}} = 0.455 \text{ g } CS_2 \quad 0.194 \text{ mg hexane/l bag}$$

MOS-2-OUT-1	1	1.21 1.54	1.00 1.00	605,200 40,330 645,530
	2	1.21 1.54	1.00	673,000 51,340 724,340
	3	1.21	1.00	625,400 42,260 667,660

AVE = 679,177 mg/ml
1.584 µg/µl

$$\frac{1.584 \text{ mg/ml} \times 73.73 \text{ ml}}{1000 \text{ mg/ml}} = 0.117 \text{ g in } CS_2$$

0.0756 mg hexene/l at 20°C 760 mm Hg

Delphon Test

1-9-79 air 60 psi, 28°C

H_2 16 psi

N_2 50 psi

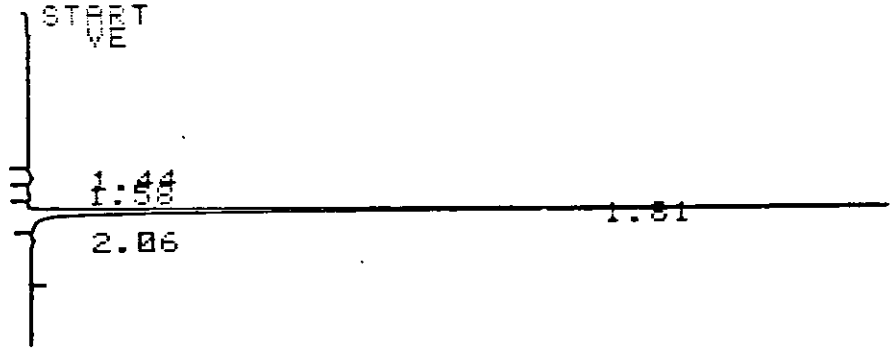
Day 1

Done

TEMP1	70	70
TIME1	3.0	
INJ TEMP	100	100
FID TEMP	250	250
TCD TEMP	0	44
AUX TEMP	0	45
OVEN MAX	280	
CHT SPD	1.50	
ATTN 2↑	10	
FID SGNL	A	
SLP SENS	0.05	
AREA REJ	1	
FLOW A	1	
FLOW B	21	
OPTN	0	
0.2	VLV/EXT	1
B	20	
B	20	

28°C 483 ppm STY

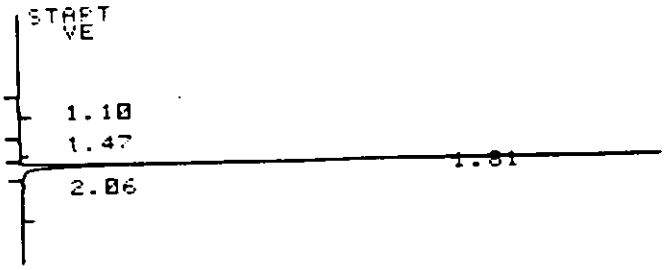
GAS [illegible]



hp 5830A
AREA %

RT	AREA	AREA %
1.44	2693	0.799
1.58	642	0.191
1.81	330700	98.154
2.06	2883	0.856

XF: 1.0000 E+ 0



HP 5830A
AREA %

RT	AREA	AREA %
1.10	154	0.048
1.47	125	0.039
1.81	320500	99.068
2.06	2737	0.846

XF: 1.0000 E+ 0

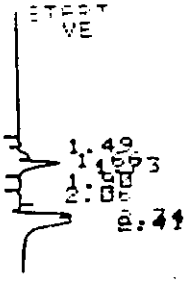
483 ppm Hexane in HC FREE air

HP 5830A
AREA %

RT	AREA	AREA %
0.89	95	0.025
1.47	113	0.034
1.80	331600	98.947
2.06	3332	0.994

XF: 1.0000 E+ 0

MOS-2-IN-1
Bag sample



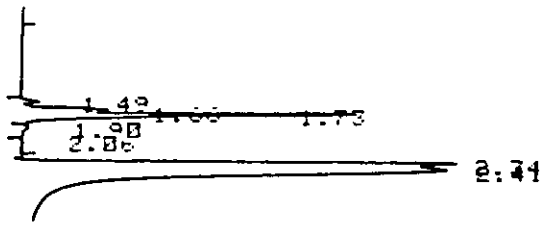
HP 5830A
AREA %

RT	AREA	AREA %
1.49	1327	1.065
1.66	8894	7.137
1.73	26140	20.975
1.90	621	0.498
2.06	114	0.091
2.34	25550	20.501
2.41	61980	49.733

XF: 1.0000 E+ 0

ATT

ATTN: [illegible]
[illegible] 2.15

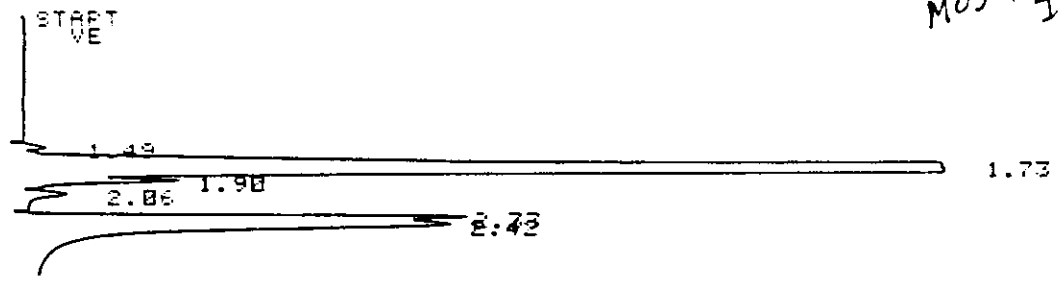


** 5830A
AREA %

RT	AREA	AREA %
0.15	1008	0.795
1.49	1251	0.987
1.66	8828	6.964
1.73	26180	20.651
1.90	641	0.506
2.06	116	0.092
2.34	26850	21.179
2.41	61900	48.827

XF: 1.0000 E+ 0

MOS-1-IN-1



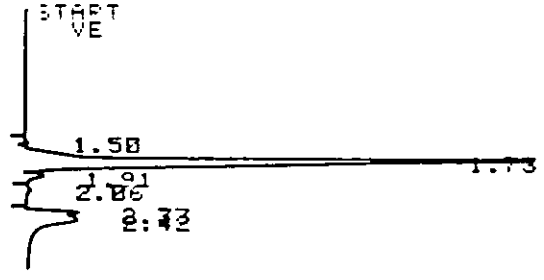
** 5830A
AREA %

RT	AREA	AREA %
1.49	1366	0.276
1.73	387400	78.249
1.90	11240	2.270
2.06	2580	0.723
2.33	26680	5.389
2.42	64820	13.093

XF: 1.0000 E+ 0

ATTN 2↑ 1 ☐ 3
ESCAPE

ATT

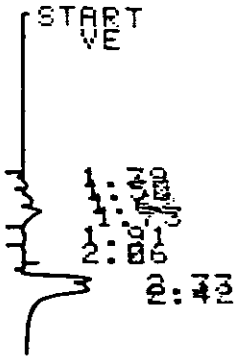


** 5830A
AREA %

RT	AREA	AREA %
1.50	1338	0.269
1.73	390000	78.324
1.91	11310	2.271
2.06	3636	0.730
2.33	26970	5.416
2.42	64680	12.990

XF: 1.0000 E+ 0

MOS-2-OUT-1



ATT

hp 5830A
AREA %

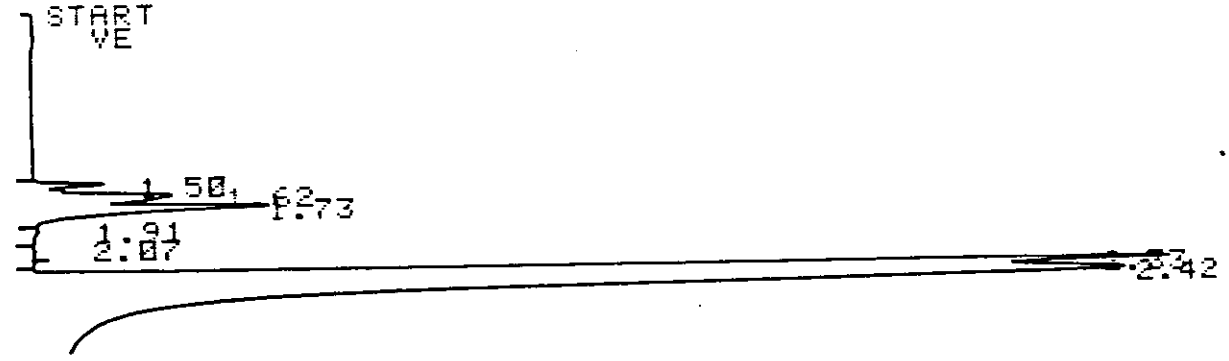
RT	AREA	AREA %
1.39	5	0.005
1.50	1702	1.532
1.62	6029	5.426
1.73	9980	8.982
1.91	265	0.239
2.06	89	0.080
2.33	26980	24.282
2.42	66060	59.455

XF: 1.0000 E+ 0

omit not flushed from previous sample

ATT

ATTN 2↑ 6 @
ESCAPE
START
STOP
hp 5830A

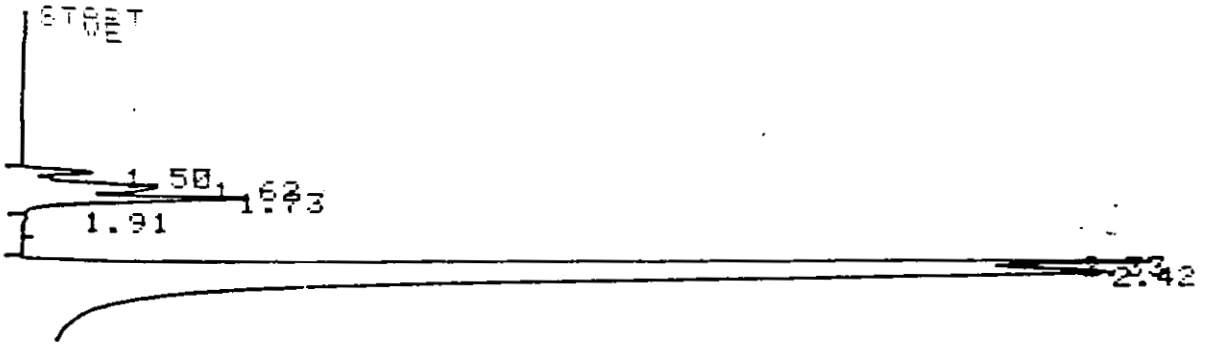


hp 5830A
AREA %

RT	AREA	AREA %
1.50	1661	1.539
1.62	5852	5.423
1.73	7156	6.632
1.91	157	0.145
2.07	39	0.036
2.33	26460	24.522
2.42	66580	61.702

XF: 1.0000 E+ 0

(1)



hp 5830A
AREA %

RT	AREA	AREA %
1.50	1690	1.581
1.62	5830	5.455
1.73	6626	6.200
1.91	133	0.124
2.33	26710	24.993
2.42	65980	61.646

XF: 1.0000 E+ 0

(2)

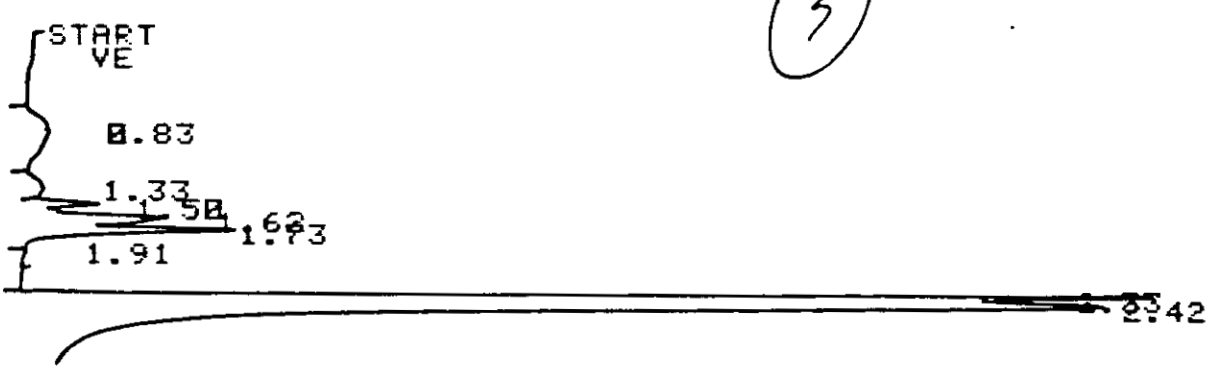
MOS-2-OUT-1

hp 5830A
AREA %

RT	AREA	AREA %
1.50	1678	1.572
1.62	5799	5.432
1.73	6478	6.068
1.91	131	0.123
2.33	26530	24.851
2.42	66140	61.954

XF: 1.0000 E+ 0

(3)

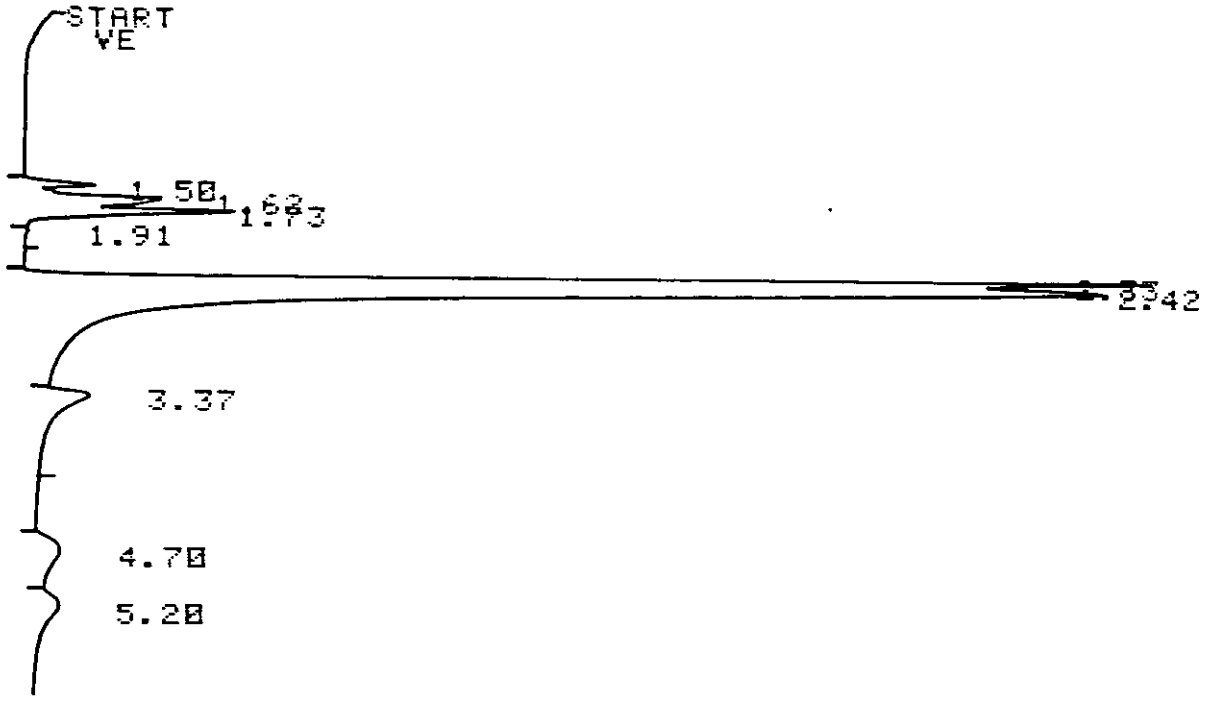


hp 5830A
AREA %

1.50	1954	1.748
1.62	6038	5.402
1.73	6371	5.700
1.91	116	0.104
2.33	26170	23.414
2.42	66220	59.247

XF: 1.0000 E+ 0

TIME1 6 @

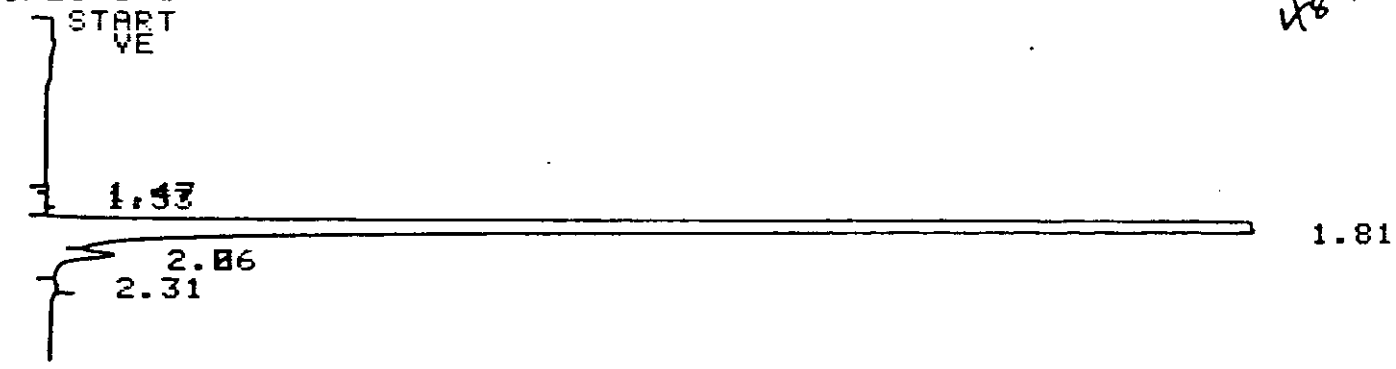


hp 5830A
AREA %

RT	AREA	AREA %
1.50	1646	1.298
1.62	5861	4.623
1.73	6175	4.870
1.91	121	0.095
2.33	26520	20.917
2.42	73980	58.350
3.37	5735	4.523
4.70	3332	2.628
5.20	3417	2.695

XF: 1.0000 E+ 0

TIME1 3 @



hp 5830A
AREA %

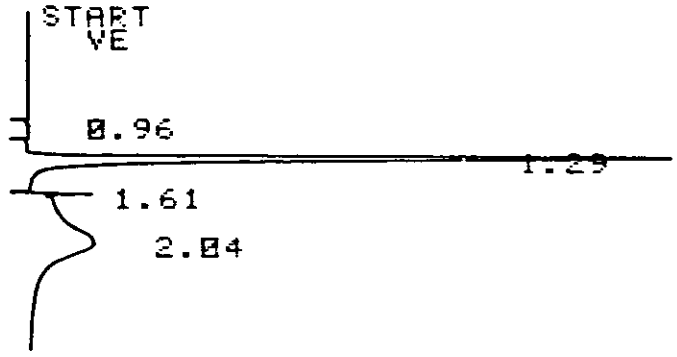
RT	AREA	AREA %
1.47	47	0.014

1.49	52820	99.885
1.80	41	0.078
2.38	20	0.038

XF: 1.0000 E+ 0

25 ml / 25 ml Std

1.09 ml

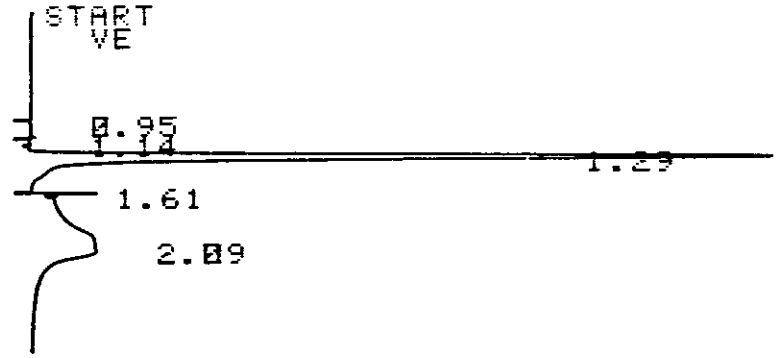


hp 5830A
AREA %

RT	AREA	AREA %
0.96	175	0.037
1.29	270900	56.650
1.61	6424	1.343
2.04	200700	41.970

(4)

XF: 1.0000 E+ 0

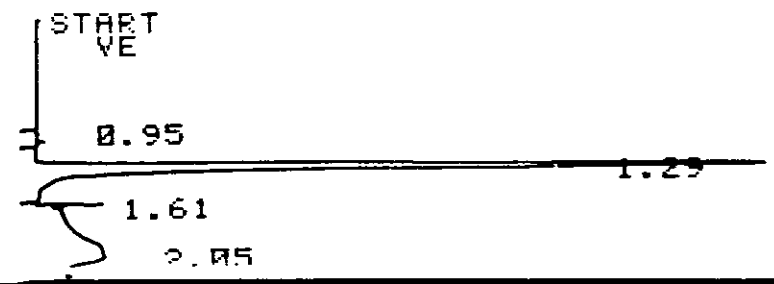


hp 5830A
AREA %

RT	AREA	AREA %
0.95	130	0.025
1.14	13	0.003
1.29	307400	59.648
1.61	5914	1.148
2.09	201900	39.177

(5)

XF: 1.0000 E+ 0

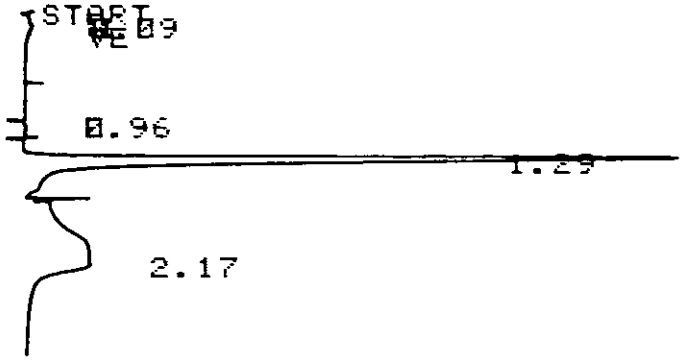


hp 5830A
AREA %

RT	AREA	AREA %
0.95	45	0.009
1.29	294100	59.900
1.61	5843	1.190
2.05	191000	38.901

XF: 1.0000 E+ 0

6



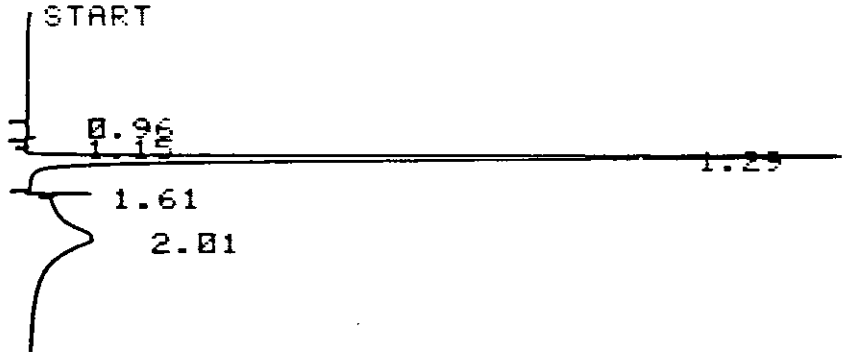
hp 5830A
AREA %

RT	AREA	AREA %
0.09	2471	0.475
0.96	73	0.014
1.29	284800	54.786
2.17	232500	44.725

XF: 1.0000 E+ 0

5

DELETE TIME TBL

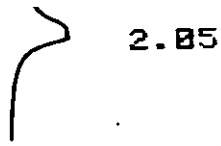


hp 5830A
AREA %

RT	AREA	AREA %
0.96	119	0.023
1.15	12	0.002
1.29	322400	61.866
1.61	6294	1.208
2.01	192300	36.901

XF: 1.0000 E+ 0

1

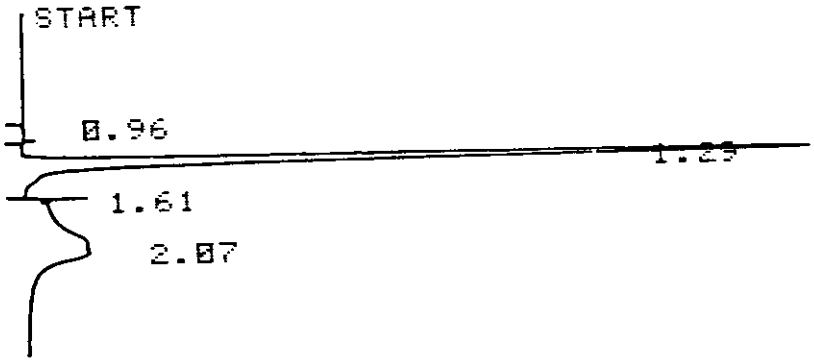


hp 5830A
AREA %

RT	AREA	AREA %
0.97	60	0.012
1.29	320300	61.476
1.61	6858	1.316
2.05	193800	37.196

XF: 1.0000 E+ 0

(2)



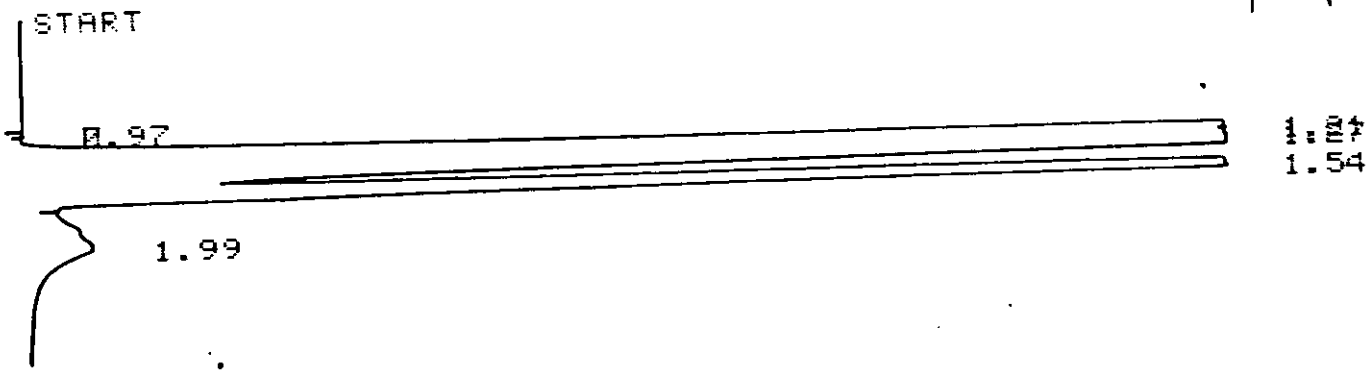
hp 5830A
AREA %

RT	AREA	AREA %
0.96	83	0.016
1.29	323100	61.866
1.61	6572	1.258
2.07	192500	36.859

XF: 1.0000 E+ 0

(3)

1Wd MOS-1 IN-1

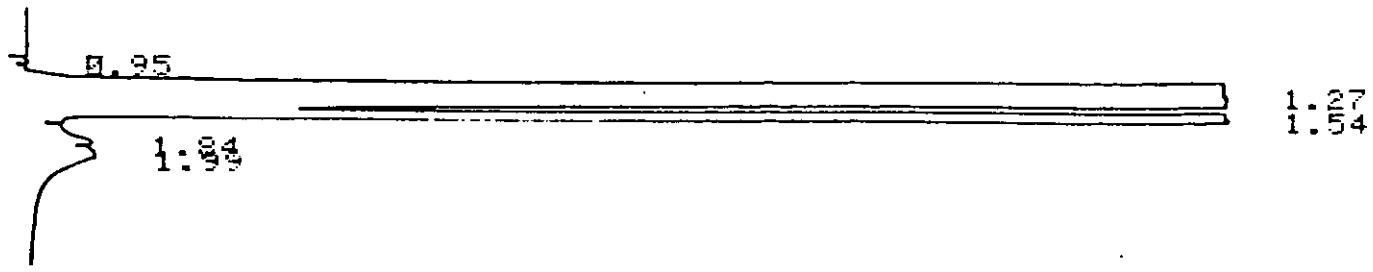


hp 5830A
AREA %

RT	AREA	AREA %
0.97	13	0.000
1.21	67080000	29.319
1.27	141300000	61.760
1.54	18380000	8.034
1.99	2030000	0.887

XF: 1.0000 E+ 0

START



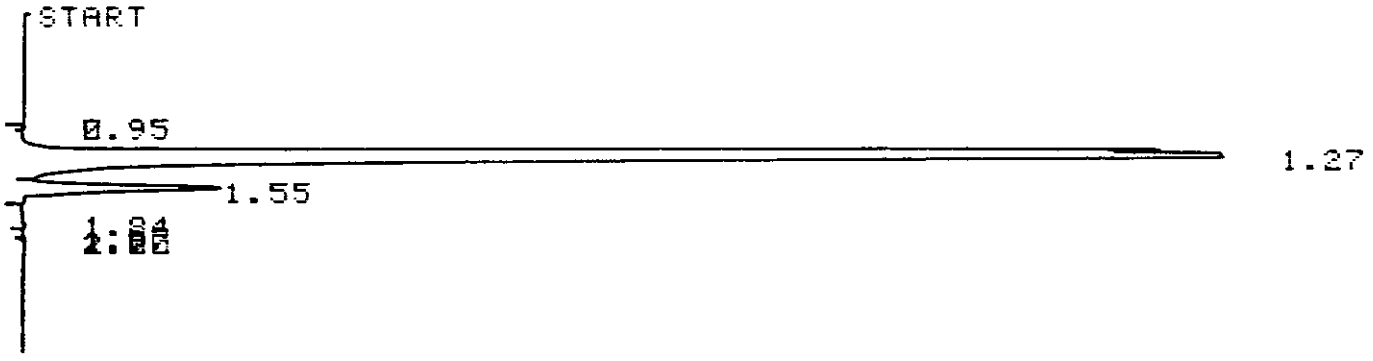
hp 5830A
AREA %

RT	AREA	AREA %
0.95	37	0.000
1.27	287000000	91.356
1.54	25050000	7.974
1.84	723200	0.230
1.99	1383000	0.440

XF: 1.0000 E+ 0

MOS-1-IN-1

ATTN 2↑ 1 5 @



hp 5830A
AREA %

RT	AREA	AREA %
0.95	9	0.000
1.27	352100000	91.418
1.55	30820000	8.002
1.84	821800	0.213
1.97	381900	0.099
2.00	1030000	0.267

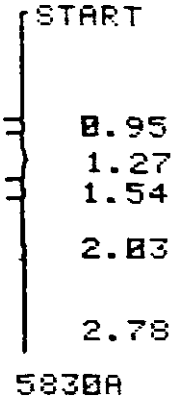
XF: 1.0000 E+ 0

ATTN 2↑ 1 7 @

hp 5830A
AREA %

1.83	74560	0.185
1.97	137200	0.341

XF: 1.0000 E+ 0

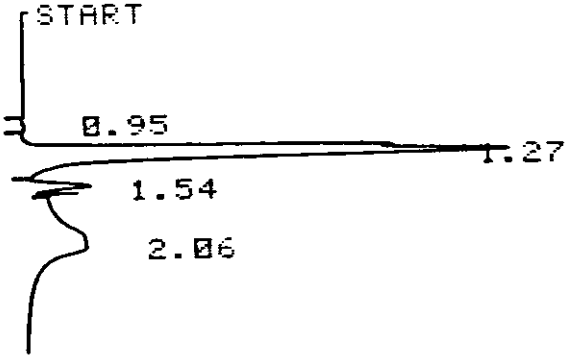


hp 5830A
AREA %

RT	AREA	AREA %
0.95	93	0.015
1.27	402600	63.236
1.54	41770	6.561
2.03	192200	30.189

XF: 1.0000 E+ 0

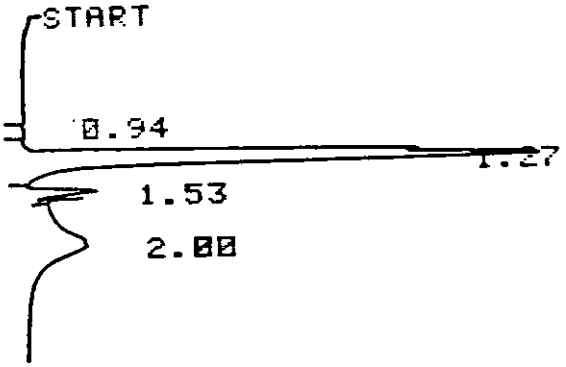
ATTN 2↑ 1 0 @



hp 5830A
AREA %

RT	AREA	AREA %
0.95	99	0.016
1.27	371100	61.115
1.54	32320	5.323
2.06	203700	33.546

XF: 1.0000 E+ 0

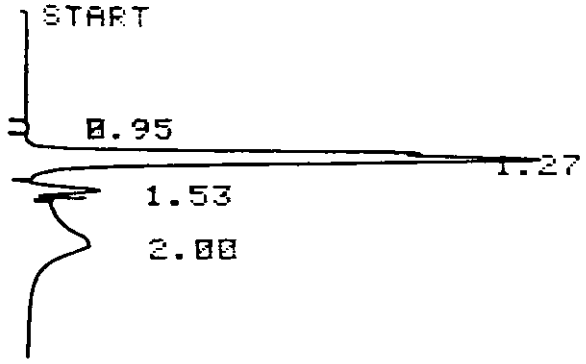


hp 5830A
AREA %

RT	AREA	AREA %
0.94	37	0.006
1.27	387400	64.261
1.53	41220	6.837
2.00	174200	28.896

XF: 1.0000 E+ 0

(3)



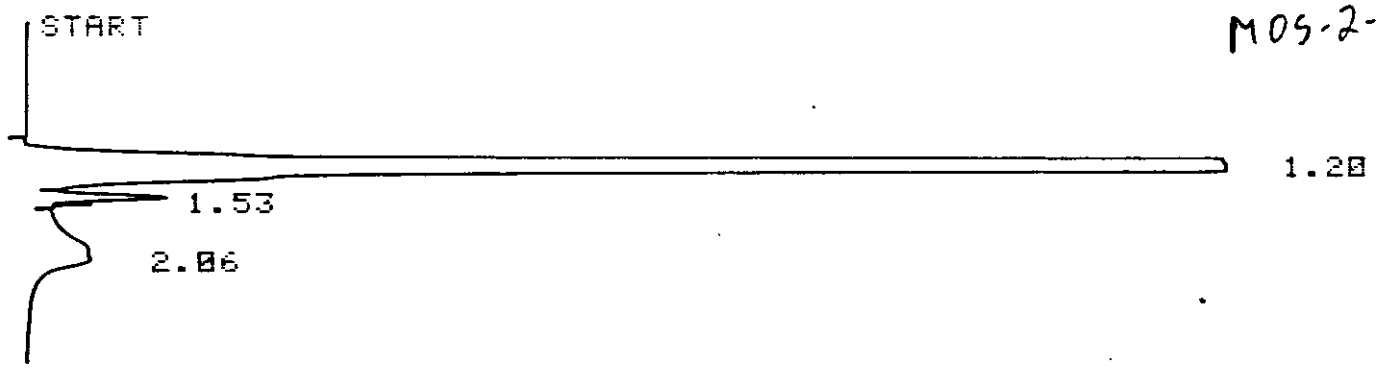
hp 5830A
AREA %

RT	AREA	AREA %
0.95	49	0.008
1.27	385100	64.286
1.53	41290	6.893
2.00	172600	28.813

XF: 1.0000 E+ 0

(4)

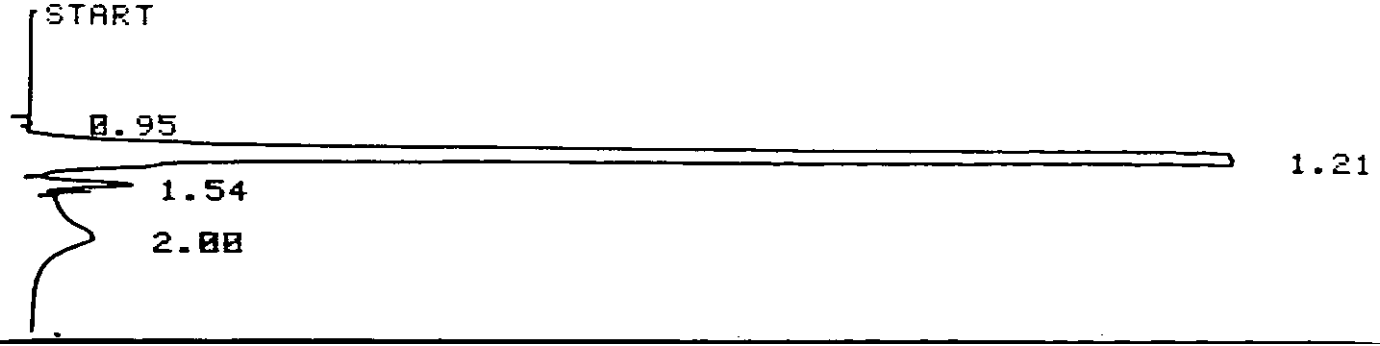
MOS-2-INT



hp 5830A
AREA %

RT	AREA	AREA %
1.20	2565000	90.346
1.53	76880	2.708
2.06	197200	6.946

XF: 1.0000 E+ 0



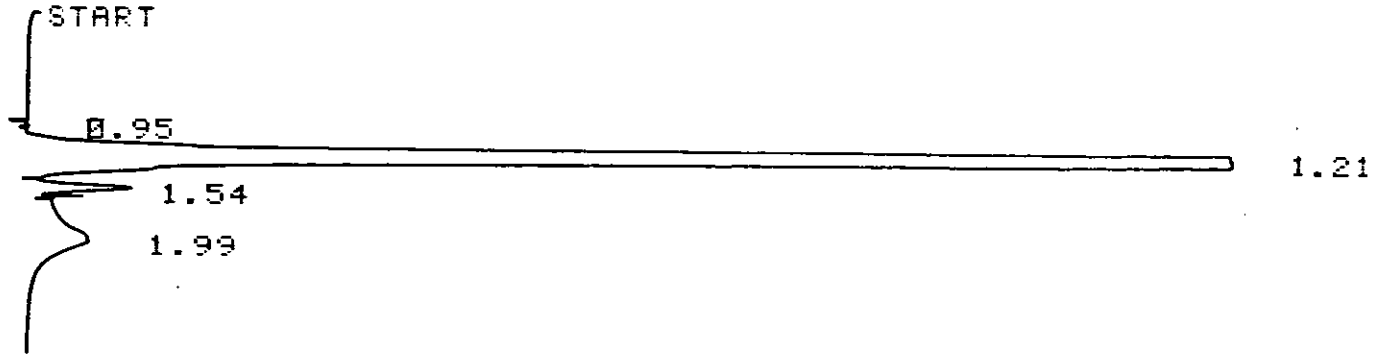
hp 5830A
AREA %

RT	AREA	AREA %
0.95	113	0.005
1.21	1,873,000	88.989
1.54	57040	2.708
2.00	176500	8.378

XF: 1.0000 E+ 0

(1)

MOS-2-INJ-1

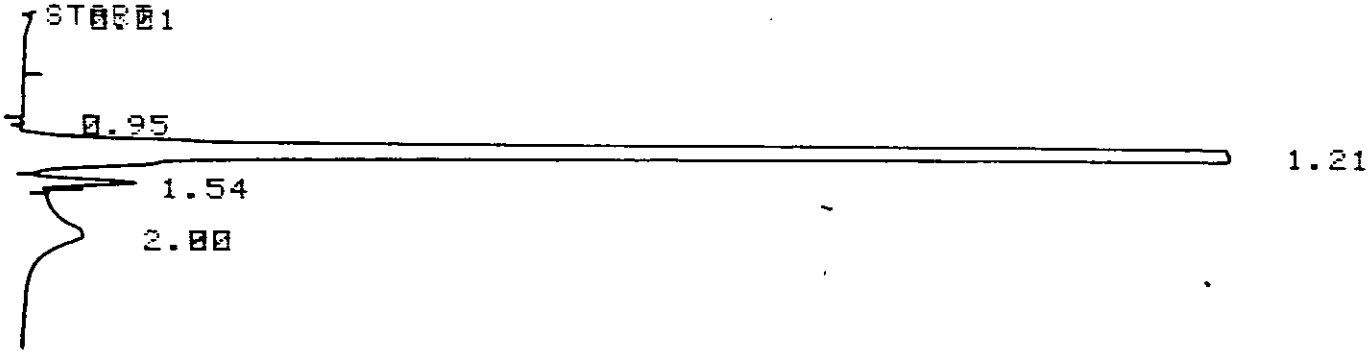


hp 5830A
AREA %

RT	AREA	AREA %
0.95	28	0.001
1.21	1,944,000	89.429
1.54	58370	2.685
1.99	171400	7.885

XF: 1.0000 E+ 0

(2)



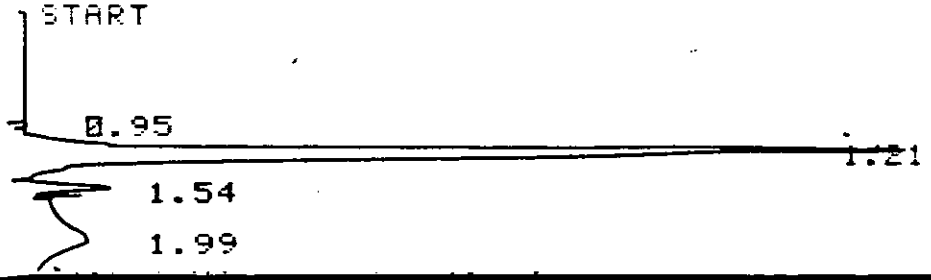
hp 5830A
AREA %

RT	AREA	AREA %
0.95	48	0.002
1.21	2,043,000	89.592
1.54	61980	2.718
2.00	175300	7.687

XF: 1.0000 E+ 0

(3)

INJ MOS-2-00



1

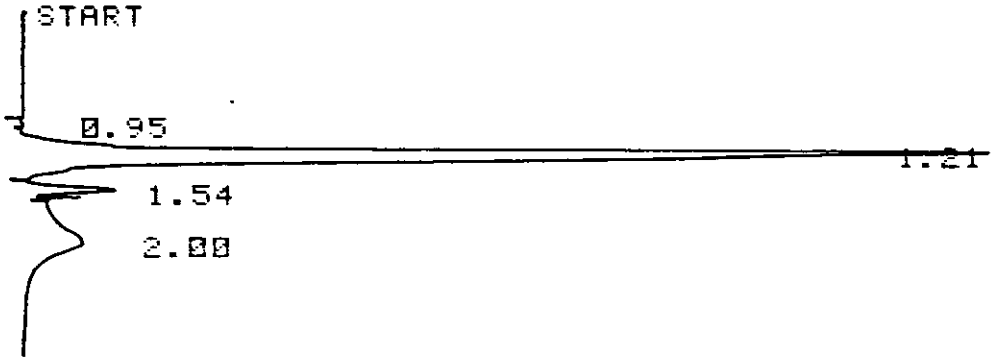
hp 5830A
AREA %

RT	AREA	AREA %
0.95	11	0.001
1.21	605200	73.354
1.54	40330	4.888
1.99	179500	21.757

XF: 1.0000 E+ 0

(1)

MOS-2 -OV- 1

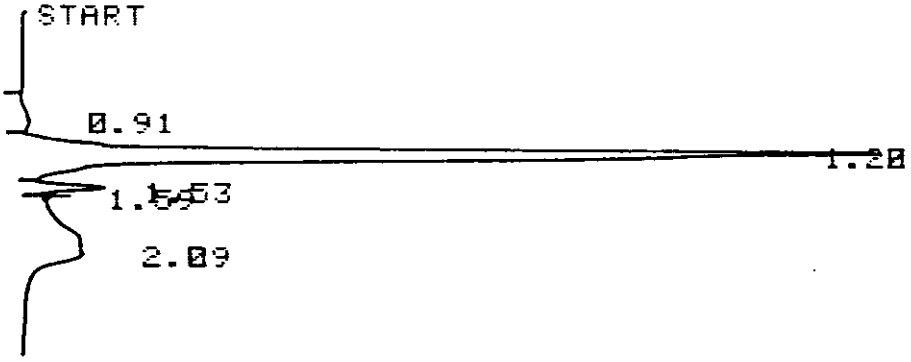


hp 5830A
AREA %

RT	AREA	AREA %
0.95	62	0.007
1.21	673000	75.095
1.54	51340	5.729
2.00	171800	19.170

XF: 1.0000 E+ 0

(2)



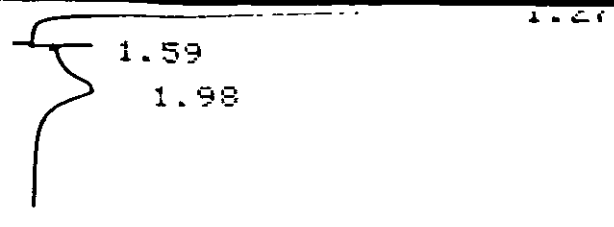
hp 5830A
AREA %

RT	AREA	AREA %
0.91	9354	1.058
1.20	625400	70.735
1.53	42260	4.780
1.59	7332	0.829
2.09	199800	22.598

XF: 1.0000 E+ 0

(3)

1H STD

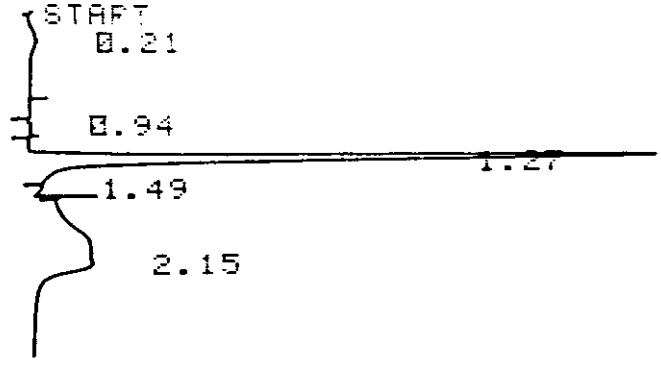


hp 5830A
AREA %

RT	AREA	AREA %
0.94	85	0.019
1.27	266700	60.638
1.59	7036	1.600
1.98	166000	37.743

XF: 1.0000 E+ 0

(1)

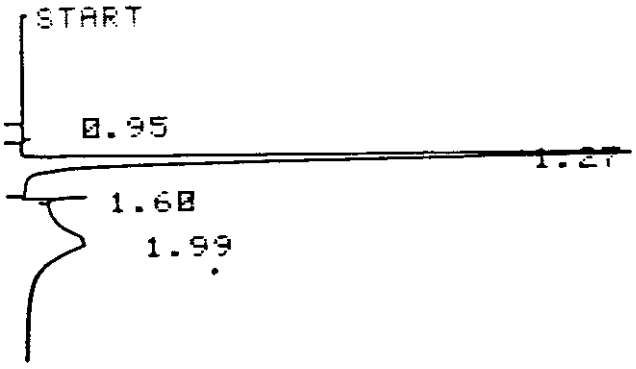


hp 5830A
AREA %

RT	AREA	AREA %
0.21	9380	1.814
0.94	84	0.016
1.27	266400	51.525
1.49	6067	1.173
2.15	235100	45.471

XF: 1.0000 E+ 0

(2)



hp 5830A
AREA %

RT	AREA	AREA %
0.95	48	0.011
1.27	243200	57.898
1.60	6602	1.572
1.99	170200	40.519

XF: 1.0000 E+ 0

(3)

CENTRAL SOYA - DELPHOS

11/10/79

Liquid Std. - 25 µl hexane/24.42 ml CS_2 - 0.676 $\frac{\mu g}{\mu l}$

Concentration, µg/ml	ml injected	R.T.	Area unit	$\frac{\mu g}{AU}$
0.676	0.8	0.29	210,700	2.57×10^{-6}
0.676	1.0	1.30	253,900	2.66×10^{-6}
0.676	1.0	1.29	243,700	2.77×10^{-6}
0.676	0.85	1.30	218,700	2.63×10^{-6}
		Avg.		2.66×10^{-6} $\frac{\mu g}{AU}$

Sample - MOS-1-IN-2

µl injected	Area unit	Concentration µg/µl	Dilution Factor	Actual Concentration	$\frac{\mu g}{\mu l}$
1.00	73,324	0.195	1:100	19.5	$\frac{\mu g}{ml}$
0.90	70,778	0.209	:100	20.9	$\frac{\mu g}{ml}$
1.00	65,464	0.174		17.4	
0.90	71,494	0.211		21.1	$\frac{\mu g}{ml}$
1.00	71,554	0.190		19.0	
		Avg.		19.58 $\frac{\mu g}{\mu l}$	
				19.58 $\frac{mg}{ml}$	

100.85 ml CS_2

$$\frac{19.58 \frac{mg}{ml} \times 100.85 \text{ ml } CS_2}{10^3 \frac{mg}{gm}} = 1.975 \text{ gm hexane}$$

Sample MOS-2-IN-2

µl injected	Area unit	Concentration µg/µl	Dilution factor	Actual concentration, µg/µl
1.00	1,107,004	2.945	1:1	2.945
1.00	1,067,812	2,840	1:1	2.840
		Avg.		2.893 µg/µl

ml CS_2 soln. 109.00 ml = 2.893 mg/ml

0.315 gm hexane collected

Sample MOS-2-OUT-2

µl injected	Area unit	Concentration µg/µl	Dilution factor	Actual concentration, µg/µl
0.8	253,660	0.843	1:1	0.843
0.9	250,604	0.741	1:1	0.741
0.9	248,005	0.733	1:1	0.733
1.0	255,730	0.680	1:1	0.680
		Avg.		0.749 µg/µl

106.43 ml CS_2 soln.

0.080 gm hexane collected

Sample MOS-1-IN-3

µl injected	Area unit	Concentration µg/µl	Dilution factor	Actual concentration, µg/µl
0.90	42,064	0.1243	1:100	12.43
0.90	52,966	0.1565	1:100	15.65
1.05	55,553	0.1407	1:100	14.07
		Avg.		14.05 µg/µl

100.13 ml CS_2 soln. 14.05 mg/ml

1.407 gm hexane collected

Sample MOS-2-IN-3

µl injected	Area unit	Concentration µg/µl	Dilution factor	Actual concentration, µg/µl
0.75	984,132	3.490	1:1	3.490
0.80	1,071,885	3.564	1:1	3.564
0.90	1,096,493	3.241	1:1	3.241
0.85	1,122,741	3.514	1:1	3.514
		Avg.		3.452

104.13 ml CS_2 soln. 3.452 $\frac{mg}{ml}$

0.359 gm hexane collected

Sample MOS-2-OUT-3

µl injected	Area unit	Concentration µg/µl	Dilution factor	Actual concentration, µg/µl
0.90	262,656	0.776	1:1	0.776
0.90	289,935	0.857	1:1	0.857
0.70	241,249	0.917	1:1	0.917
0.80	283,306	0.942	1:1	0.942
		Avg.		0.873

99.46 ml CS_2 soln. $\frac{mg}{ml}$

0.087 gm hexane collected

Sample MOS-1-IN-4

µl injected	Area unit	Concentration µg/µl	Diultion factor	Actual concnetration, µg/µl
1.00	54,585	0.1452	1:100	14.52
1.00	52,044	0.1384	1:100	13.84
0.95	56,850	0.1592	1:100	15.92
		Avg.		14.76 $\frac{\mu g}{\mu l}$

106.98 ml CS_2

1.579 gm hexane collected

Sample MOS-2-IN-4

µl injected	Area unit	Concentration µg/µl	Dilution factor	Actual concentration, µg/µl
0.95	860,231	2.409	1:1	2.409
0.90	910,145	2.69	1:1	2.69
0.80	834,138	2.77	1:1	2.77
0.90	840,984	2.49	1:1	2.49
			Avg.	2.59

108.81 ml CS_2 soln.

0.282 gm hexane collected

2.59 $\frac{mg}{ml}$

Sample MOS-2-OUT-4

µl injected	Area unit	Concentration µg/µl	Dilution factor	Actual concentration, µg/µl
0.80	178,178	0.592	1:1	0.592
0.85	192,734	0.513	1:1	0.513
0.90	194,404	0.575	1:1	0.575
			Avg.	0.560 $\frac{\mu g}{\mu l}$

114.55 ml CS_2 soln.

0.560 $\frac{mg}{ml}$

0.064 gm hexane collected

1-10-79

CV-1
DV-1

483 ppm STD

RUN #	RT.	area
1	1.85	333,000
2	1.84	331,100
3	1.84	330,800
		3)994,900

AVE = 331,600

Bag Trap.

CV-1
DV-1
Bag trap

Dryer vent

Run #	RT	Area
1	1.51	291
	1.68	385
	1.77	7074
	1.95	174
	2.11	105
		8029 ✓
2	1.51	255
	1.69	395
	1.77	7144
	1.95	152
	2.11	85
		8031 ✓

$11.7\ \mu l/l \times \frac{86.17\ mg/mmole}{24.055\ l/mmole} \times \frac{1\ mg}{1000\ \mu g} = 0.0419\ mg/l$ at 20°C 760 mm

AVE = 8030 11.7 ppm ✓

Cobber vent

1	1.51	273
	1.67	759
	1.77	618
	1.95	51
		1701 ✓
2	1.51	265
	1.67	770
	1.77	576
	1.95	43
		1654 ✓
3	1.51	263
	1.67	768
	1.77	575
	1.95	48
		1654 ✓

$2.43\ \mu l/l \times \frac{86.17\ mg/mmole}{24.055\ l/mmole} \times \frac{1\ mg}{1000\ \mu g} = 0.008\ mg/l$ at 20°C 760 mm Hg

AVE = 1670 2.43 ppm ✓

1-10-79

air 60/28

H_2 15.5

N_2 50 psi

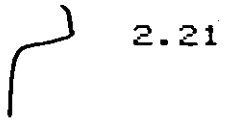
INJ STD

TEMP1	70	70
TIME1	3.0	
INJ TEMP	100	100
FID TEMP	250	250
TCD TEMP	0	44
AUX TEMP	0	45
OVEN MAX	280	
CHT SPD	1.50	
ATTN 2↑	10	
FID SGNL	A	
SLP SENS	0.05	
AREA REJ	1	
FLOW A	1	
FLOW B	20	
OPTN	0	

TEMP1	70	70
TIME1	3.0	
INJ TEMP	100	100
FID TEMP	250	250
TCD TEMP	0	43
AUX TEMP	0	44
OVEN MAX	280	
CHT SPD	1.50	
ATTN 2↑	10	
FID SGNL	A	
SLP SENS	0.05	
AREA REJ	1	
FLOW A	1	
FLOW B	21	
OPTN	0	
B	21	
B	19	

START

0.98



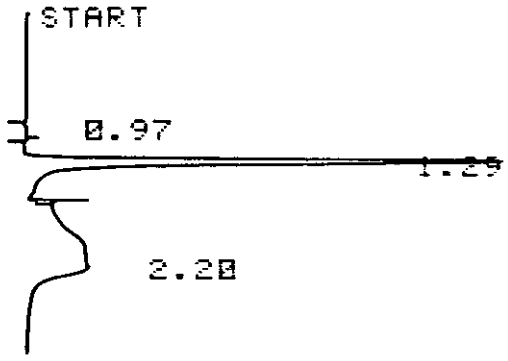
hp 5830A
AREA %

RT	AREA	AREA %
0.98	66	0.012
1.31	298600	54.824
1.64	7484	1.374
2.21	238500	43.790

XF: 1.0000 E+ 0

STD 0.676 mg/mL

0.8 mL

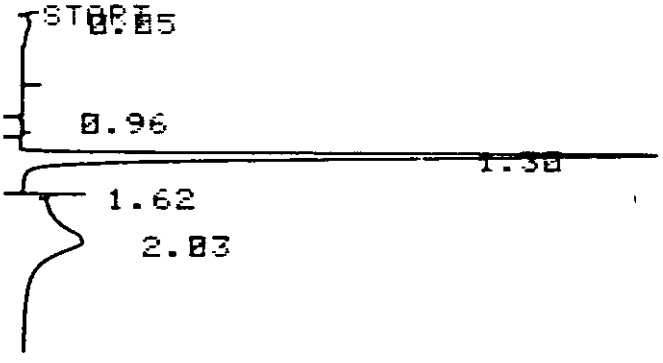


hp 5830A
AREA %

RT	AREA	AREA %
0.97	55	0.012
1.29	210700	46.384
2.20	243500	53.604

XF: 1.0000 E+ 0

1.00 mL

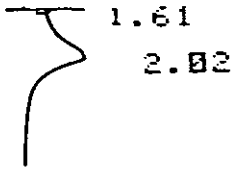


hp 5830A
AREA %

RT	AREA	AREA %
0.96	79	0.018
1.30	253900	58.082
1.62	7262	1.661
2.03	175900	40.239

XF: 1.0000 E+ 0

1.0 mL

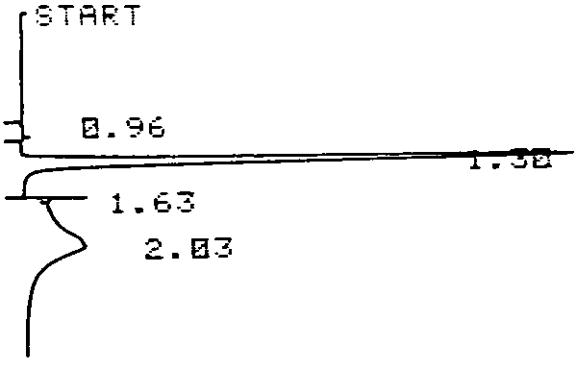


hp 5830A
AREA %

RT	AREA	AREA %
0.96	95	0.023
1.29	243700	57.845
1.61	6402	1.520
2.02	171100	40.613

XF: 1.0000 E+ 0

1.0 ml

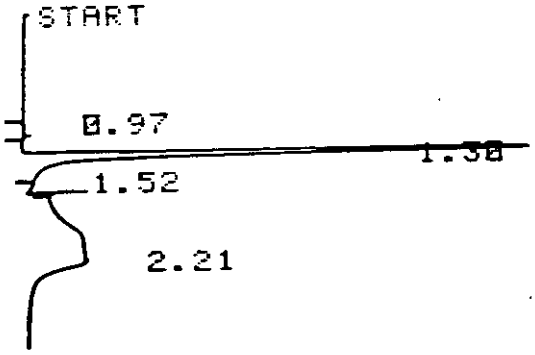


hp 5830A
AREA %

RT	AREA	AREA %
0.96	42	0.010
1.30	223800	54.965
1.63	7030	1.727
2.03	176300	43.299

XF: 1.0000 E+ 0

0.85 ml

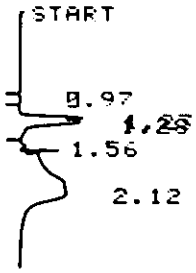


hp 5830A
AREA %

RT	AREA	AREA %
0.97	63	0.014
1.30	218700	47.443
1.52	4609	1.000
2.21	237600	51.543

XF: 1.0000 E+ 0

1.0 µl 1:100 MOS-1-2N-2

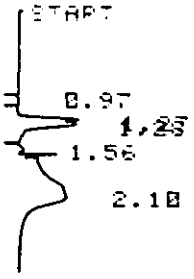


hp 5830A
AREA %

RT	AREA	AREA %
0.97	85	0.030
1.23	27170	9.651
1.28	42150	14.972
1.56	3919	1.392
2.12	208200	73.955

XF: 1.0000 E+ 0

0.90 µl

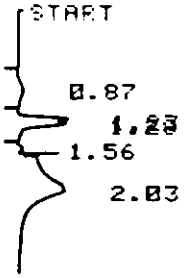


hp 5830A
AREA %

RT	AREA	AREA %
0.97	62	0.023
1.23	26520	9.676
1.28	40520	14.784
1.56	3676	1.341
2.10	203300	74.176

XF: 1.0000 E+ 0

1.0 µl
Had to wait an inch.

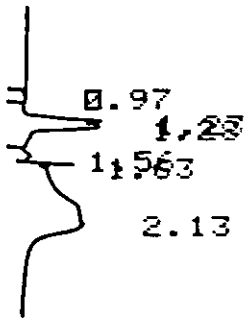


hp 5830A
AREA %

RT	AREA	AREA %
0.87	8936	3.730
1.23	22510	9.396
1.28	31290	13.061
1.56	2728	1.139
2.03	174100	72.674

XF: 1.0000 E+ 0

0.9 µl

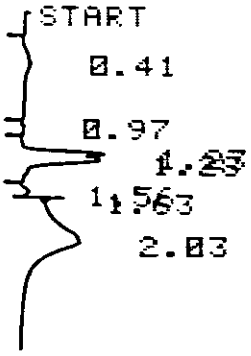


hp 5830A
AREA %

RT	AREA	AREA %
0.97	77	0.027
1.23	26550	9.408
1.28	41050	14.546
1.56	3817	1.353
1.63	6722	2.382
2.13	204000	72.285

XF: 1.0000 E+ 0

1.0 µl

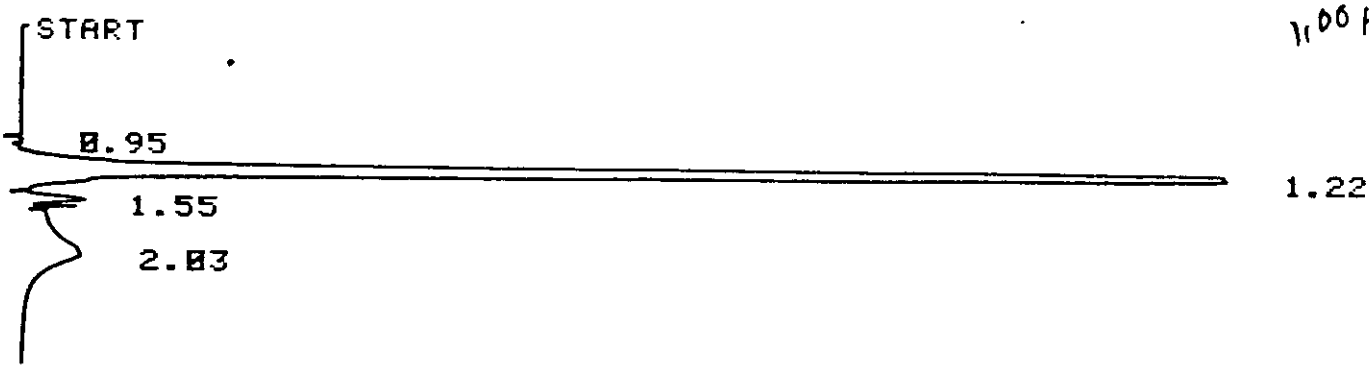


hp 5830A
AREA %

RT	AREA	AREA %
0.41	9690	3.823
0.97	94	0.037
1.23	28190	11.122
1.28	39680	15.656
1.56	3590	1.416
1.63	5910	2.332
2.03	166300	65.614

XF: 1.0000 E+ 0

MOS-2-I-2
1.00 µl



hp 5830A
AREA %

RT	AREA	AREA %

1.55	36950	2.895
2.03	169300	13.265

XF: 1.0000 E+ 0

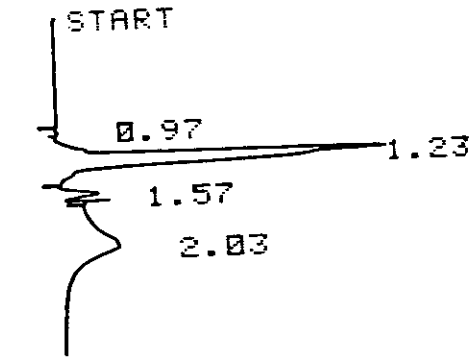
1.00 µl

hp 5830A
AREA %

RT	AREA	AREA %
0.43	10270	0.824
0.97	22	0.002
1.23	1029000	82.557
1.56	28520	2.288
2.05	178600	14.329

XF: 1.0000 E+ 0

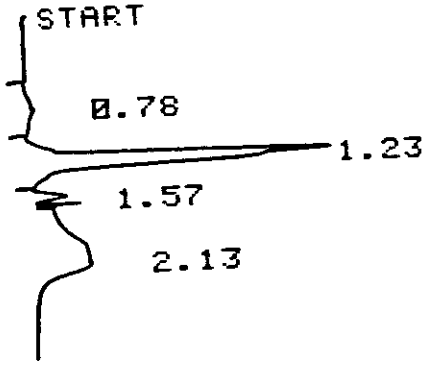
MOS-2-OUT-2
0.80 µl



hp 5830A
AREA %

RT	AREA	AREA %
0.97	90	0.021
1.23	235100	54.871
1.57	18470	4.311
2.03	174800	40.797

XF: 1.0000 E+ 0



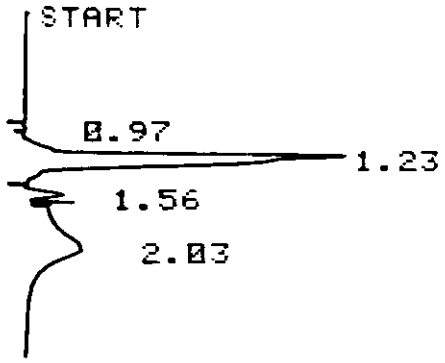
0.9 µl

hp 5830A
AREA %

0.78	9454	2.068
1.23	223200	48.819
1.57	17950	3.926
2.13	206600	45.188

XF: 1.0000 E+ 0

0.9 µl



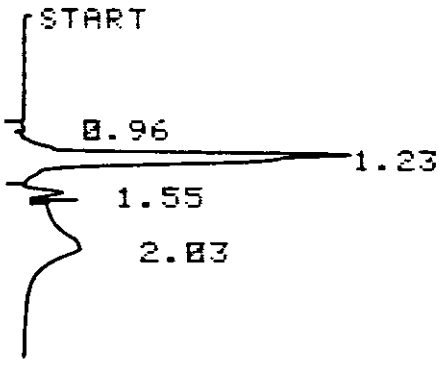
MOS-2 OUT-2

hp 5830A
AREA %

RT	AREA	AREA %
0.97	95	0.023
1.23	229800	54.571
1.56	18110	4.301
2.03	173100	41.106

XF: 1.0000 E+ 0

1.00 µl

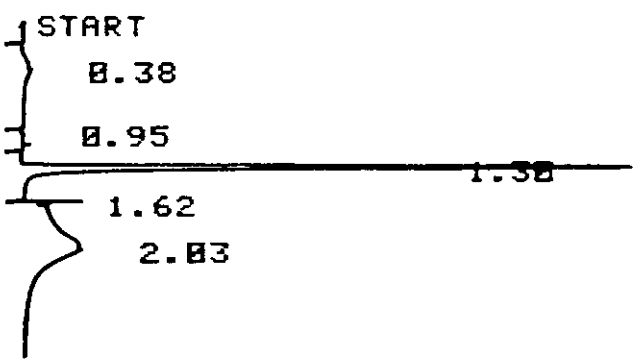


hp 5830A
AREA %

RT	AREA	AREA %
0.96	180	0.042
1.23	236900	55.025
1.55	18650	4.332
2.03	174800	40.601

XF: 1.0000 E+ 0

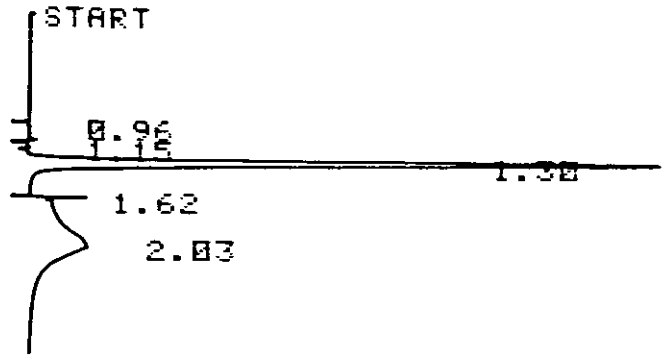
0.90 µl STD



hp 5830A

RT	AREA	AREA %
0.38	10570	2.463
0.95	68	0.016
1.30	239500	55.808
1.62	6710	1.564
2.03	172300	40.149

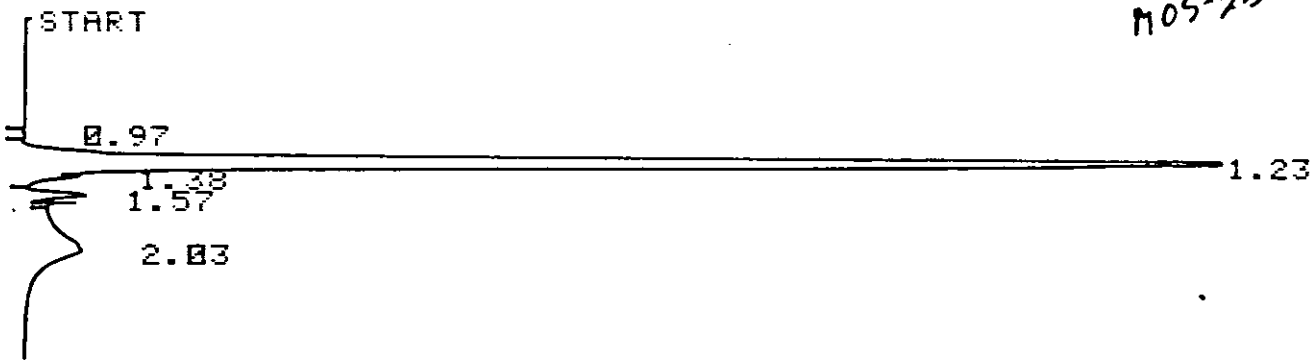
XF: 1.0000 E+ 0



hp 5830A
AREA %

RT	AREA	AREA %
0.96	126	0.029
1.15	19	0.004
1.30	250900	58.035
1.62	5377	1.244
2.03	175900	40.687

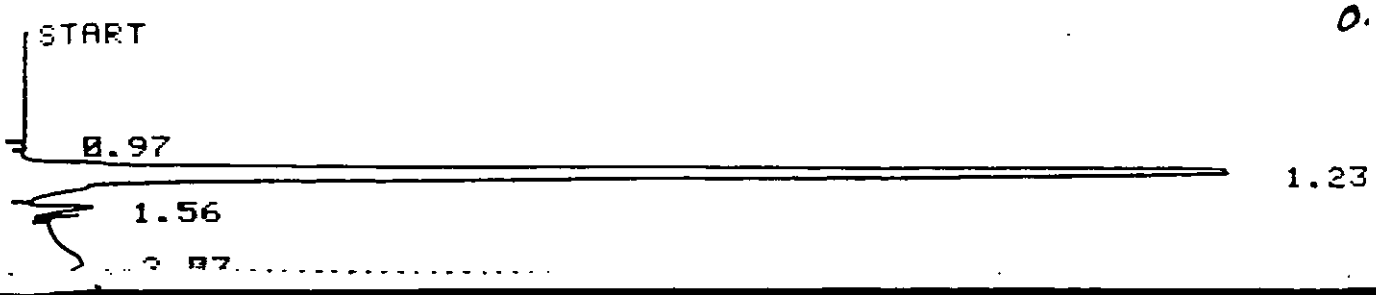
XF: 1.0000 E+ 0



hp 5830A
AREA %

RT	AREA	AREA %
0.97	92	0.008
1.23	934800	80.842
1.38	19420	1.679
1.57	29820	2.579
2.03	172200	14.892

XF: 1.0000 E+ 0



TCC

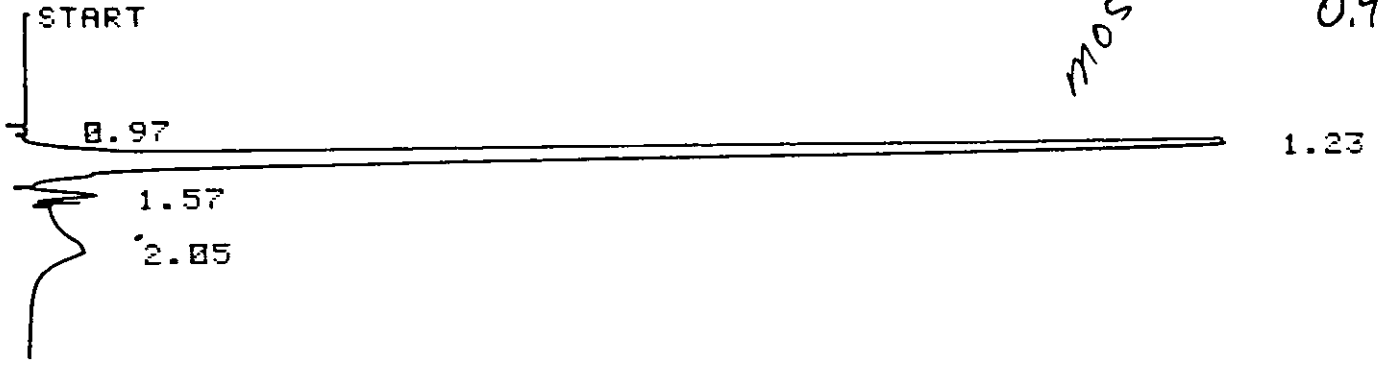
hp 5830A
AREA %

RT	AREA	AREA %
0.97	125	0.010
1.23	1039000	83.522
1.56	32760	2.633
2.03	172100	13.835

XF: 1.0000 E+ 0

MOS-2-IN-3

0.90µl

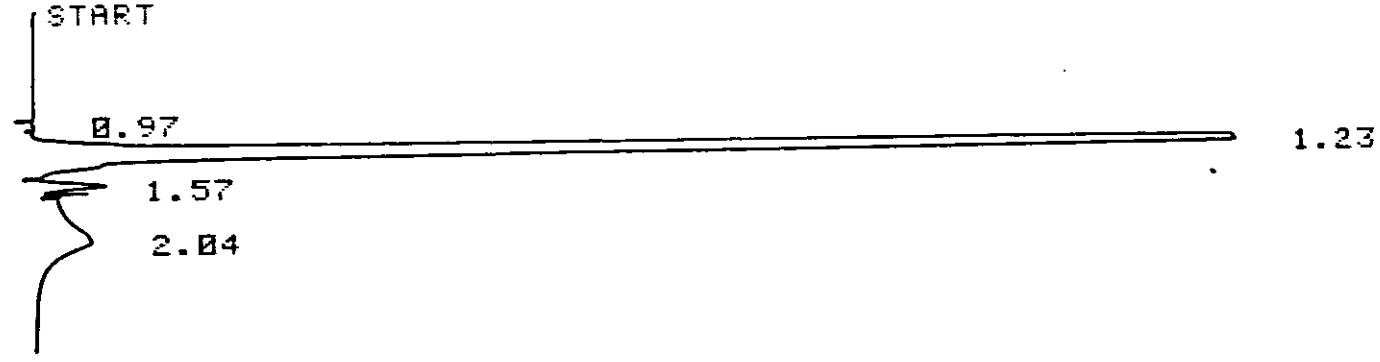


hp 5830A
AREA %

RT	AREA	AREA %
0.97	93	0.007
1.23	1063000	83.530
1.57	33400	2.625
2.05	176100	13.838

XF: 1.0000 E+ 0

0.85µl

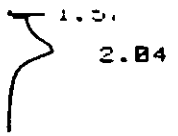


hp 5830A
AREA %

RT	AREA	AREA %
0.97	81	0.006
1.23	1088000	83.812
1.57	34660	2.670
2.04	175400	13.512

XF: 1.0000 E+ 0

MOS-1-IN-3
1:100
0.90Nl



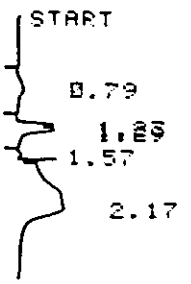
hp 5830A
AREA %

RT	AREA	AREA %
0.97	121	0.057
1.23	15780	7.375
1.29	23910	11.175
1.57	2253	1.053
2.04	171900	80.341

XF: 1.0000 E+ 0

mos-1-IN-3

0.90 ml

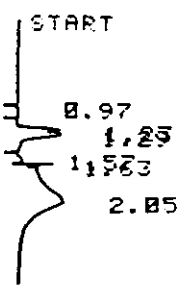


hp 5830A
AREA %

RT	AREA	AREA %
0.79	9396	3.522
1.23	14960	5.608
1.29	26150	9.803
1.57	2460	0.922
2.17	213800	80.145

XF: 1.0000 E+ 0

1.05 µl

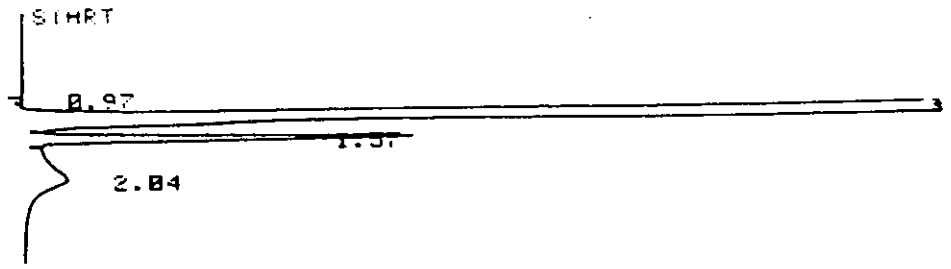


hp 5830A
AREA %

RT	AREA	AREA %
0.97	61	0.027
1.23	17800	7.881
1.29	29480	13.053
1.57	2756	1.220
1.63	5456	2.416
2.05	170300	75.403

XF: 1.0000 E+ 0

MOS-1-IN-3
0.90µl

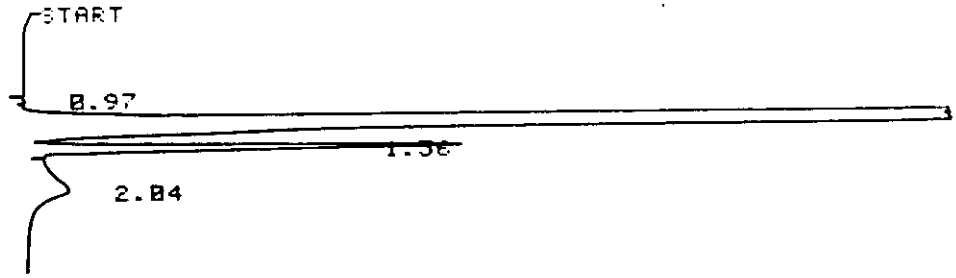


hp 5830A
APEA %

RT	AREA	AREA %
0.97	127	0.003
1.23	1350000	35.631
1.29	2036000	53.737
1.57	234600	6.192
2.04	168100	4.437

XF: 1.0000 E+ 0

0.98µl

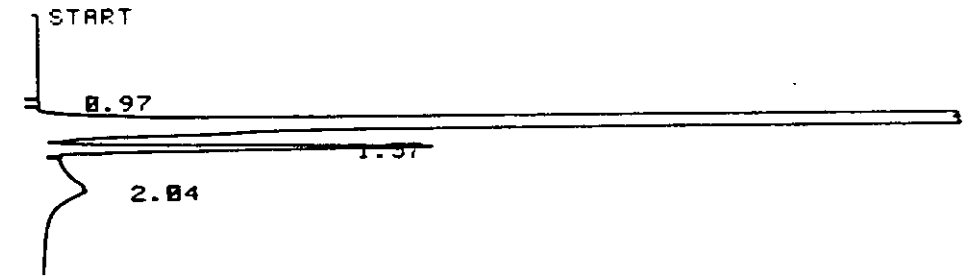


hp 5830A
AREA %

RT	AREA	AREA %
0.97	157	0.004
1.23	1487000	34.786
1.28	2358000	55.162
1.56	265300	6.206
2.04	164200	3.841

XF: 1.0000 E+ 0

0.90µl



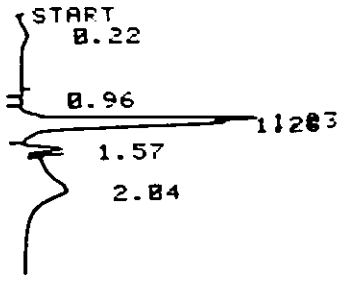
hp 5830A
AREA %

RT	AREA	AREA %
0.97	104	0.003
1.23	1358000	35.557
1.29	2052000	53.729

2.84	172900	4.527

XF: 1.0000 E+ 0

MOS-2-OUT-3
0.90µl

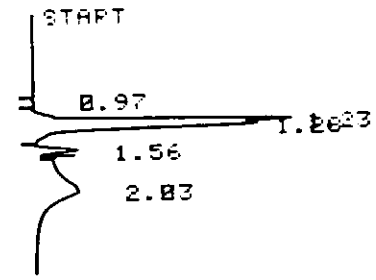


5830A
AREA %

RT	AREA	AREA %
0.22	11950	2.675
0.96	66	0.015
1.23	117800	26.371
1.28	121300	27.154
1.57	23490	5.258
2.84	172100	38.527

XF: 1.0000 E+ 0

0.90µl

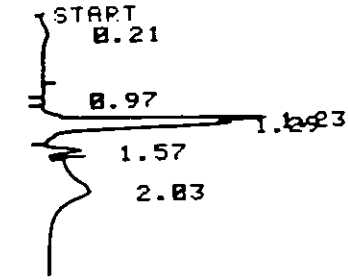


5830A
AREA %

RT	AREA	AREA %
0.97	115	0.025
1.23	124700	27.077
1.28	139200	30.226
1.56	25920	5.628
2.83	170600	37.044

XF: 1.0000 E+ 0

0.70µl

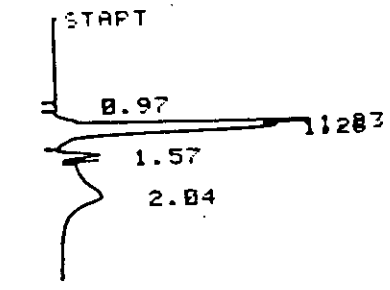


5830A
AREA %

RT	AREA	AREA %
0.21	9990	2.364
0.97	109	0.026
1.23	105700	25.010
1.29	113800	26.926
1.57	21640	5.120
2.83	171400	40.555

XF: 1.0000 E+ 0

0.80µl

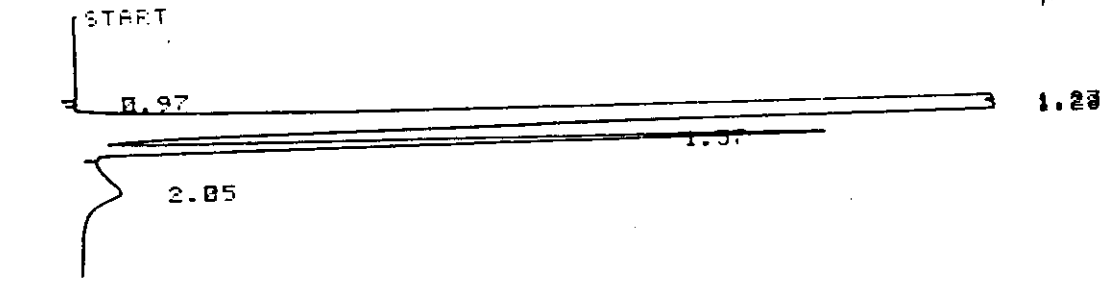


hp 5830A
AREA %

RT	AREA	AREA %
0.97	106	0.023
1.23	122700	27.200
1.28	135200	29.971
1.57	25300	5.608
2.04	167800	37.198

XF: 1.0000 E+ 0

MOS-1-IN-2
1.10 μl



hp 5830A
AREA %

RT	AREA	AREA %
0.97	105	0.001
1.23	2887000	36.395
1.28	4421000	55.733
1.57	455800	5.746
2.05	168500	2.124

XF: 1.0000 E+ 0

0.90 μl

hp 5830A
AREA %

RT	AREA	AREA %
0.39	74	0.000
2.04	67140000	100.000

XF: 1.0000 E+ 0

0.95

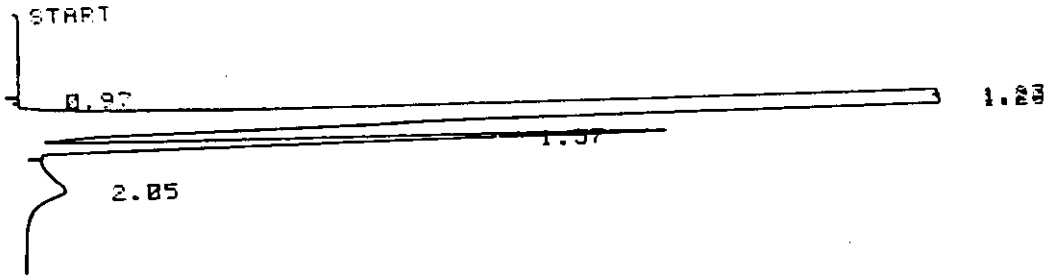
-START-

hp 5830A
AREA %

RT	AREA	AREA %
0.97	128	0.002
1.23	2583000	37.457
1.28	3752000	54.410
1.57	397100	5.759
2.04	163600	2.372

XF: 1.0000 E+ 0

NOS-1-IN-2
0.95 ml

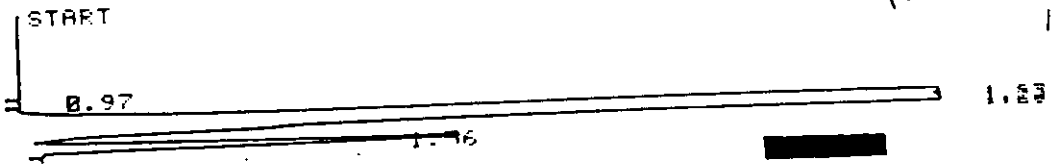


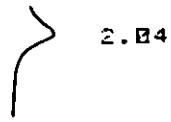
hp 5830A
AREA %

RT	AREA	AREA %
0.97	116	0.002
1.23	2497000	36.774
1.28	3738000	55.051
1.57	391400	5.764
2.05	163600	2.409

XF: 1.0000 E+ 0

NOS-1-IN-4
1.00





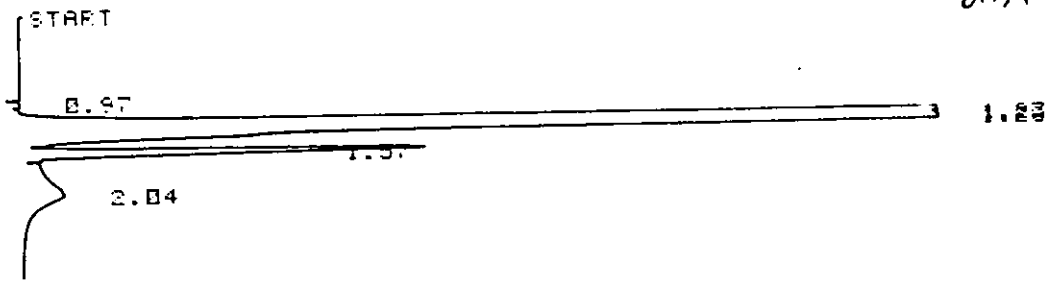
HP 5830A
AREA %

RT	AREA	AREA %
0.97	114	0.002
1.23	1749000	38.228
1.28	2395000	52.347
1.56	262300	5.733
2.04	168800	3.689

XF: 1.0000 E+ 0

mos-1 · In-4

0.95 ml

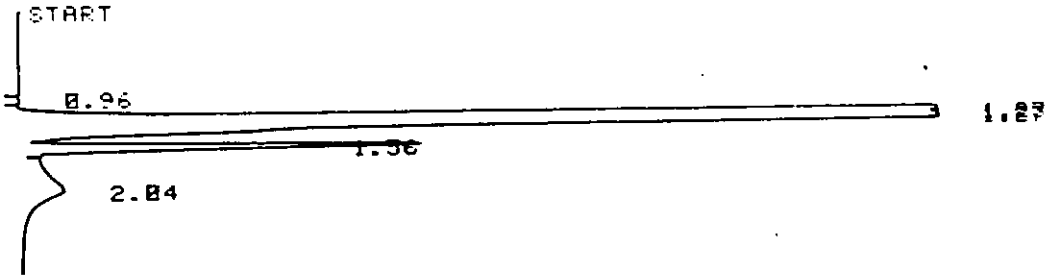


HP 5830A
AREA %

RT	AREA	AREA %
0.97	81	0.002
1.23	1591000	37.184
1.28	2277000	53.216
1.57	243800	5.698
2.04	166900	3.901

XF: 1.0000 E+ 0

0.95 ml



HP 5830A
AREA %

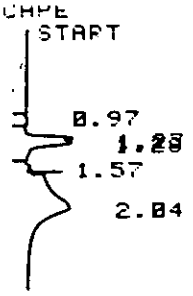
RT	AREA	AREA %
0.96	142	0.003
1.23	1558000	36.412
1.27	2309000	53.963
1.56	243500	5.691
2.04	168200	3.931

XF: 1.0000 E+ 0

TEMP1	70	70

MOS-1-2N-4
1:100
1.00µl

ESCAPE

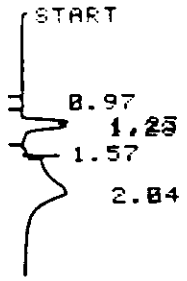


hp 5830A
AREA %

RT	AREA	AREA %
0.97	153	0.068
1.23	21128	9.442
1.28	30640	13.698
1.57	2672	1.195
2.04	169100	75.597

XF: 1.0000 E+ 0

1.00µl

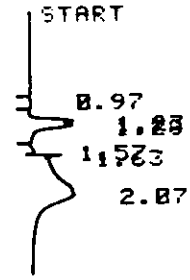


hp 5830A
AREA %

RT	AREA	AREA %
0.97	163	0.074
1.23	20590	9.396
1.28	28720	13.106
1.57	2571	1.173
2.04	167100	76.251

XF: 1.0000 E+ 0

0.75µl



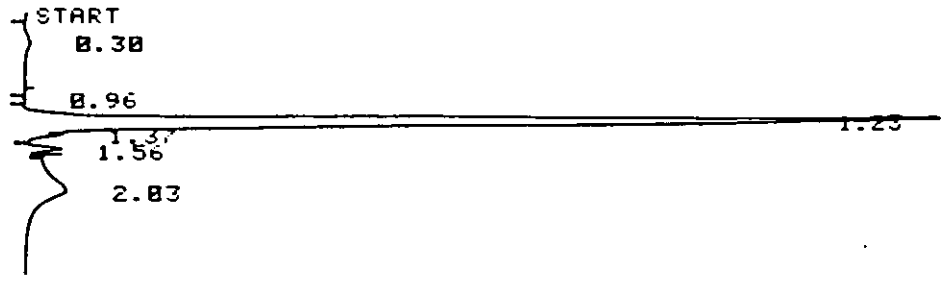
hp 5830A
AREA %

RT	AREA	AREA %
0.97	149	0.066
1.23	18988	8.335
1.28	28650	12.635
1.57	2465	1.087
1.63	6686	2.949
2.07	169900	74.928

XF: 1.0000 E+ 0

XF: 1.0000 E+ 0

MOS-2-IN-4
0.95 µl



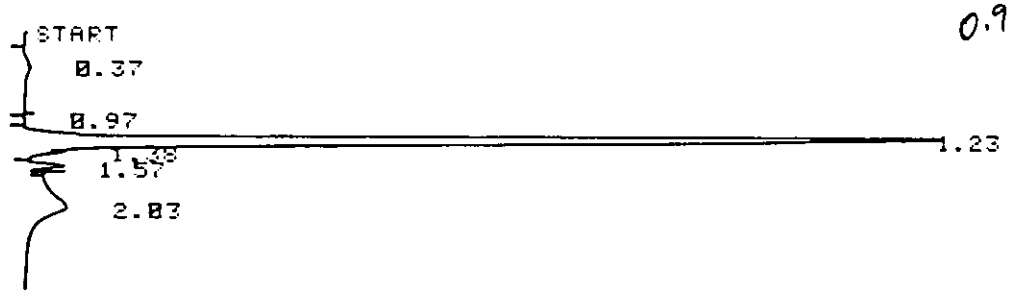
5830A
AREA %

RT	AREA	AREA %
0.30	9692	0.940
0.96	101	0.010
1.23	810800	78.634
1.37	16930	1.642
1.56	22690	2.201
2.03	170900	16.574

XF: 1.0000 E+ 0

0.90 µl

96



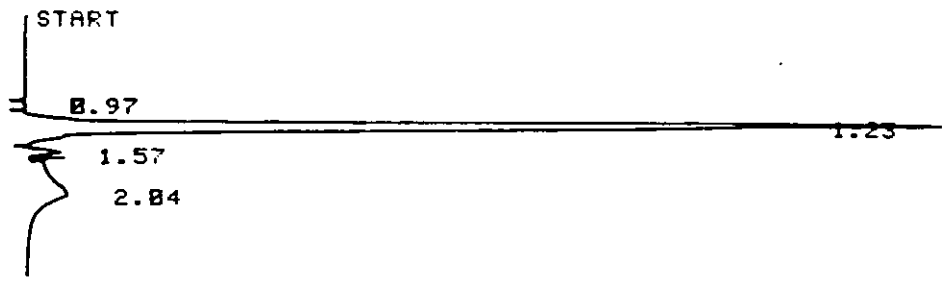
5830A
AREA %

RT	AREA	AREA %
0.37	10090	0.930
0.97	145	0.013
1.23	867400	79.957
1.38	18100	1.668
1.57	24500	2.258
2.03	164600	15.173

XF: 1.0000 E+ 0

0.80 µl

101



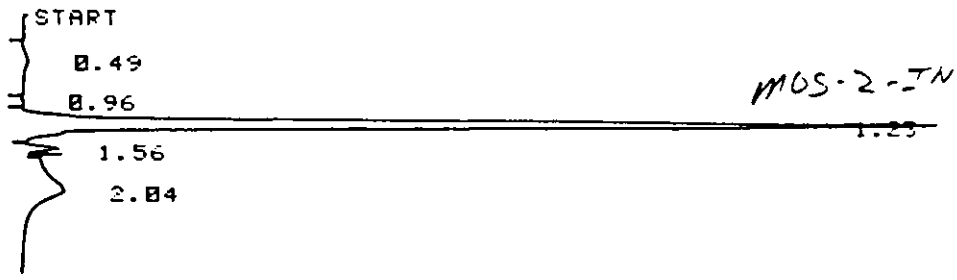
5830A
AREA %

RT	AREA	AREA %
0.97	178	0.018
1.23	811800	80.958
1.57	22160	2.210
2.04	168600	16.814

XF: 1.0000 E+ 0

0.90 µl

MOS-2-IN-4

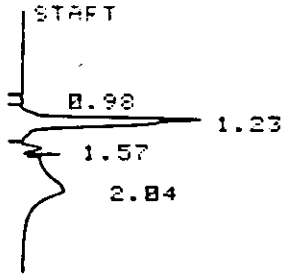


hp 5830A
AREA %

RT	AREA	AREA %
0.49	9532	0.935
0.96	114	0.011
1.23	818200	80.238
1.56	22670	2.223
2.04	169200	16.593

XF: 1.0000 E+ 0

MOS-2-OUT-4
0.80 µl

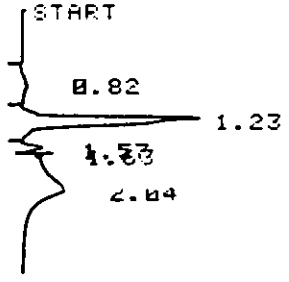


hp 5830A
AREA %

RT	AREA	AREA %
0.98	98	0.029
1.23	165300	47.394
1.57	12780	3.664
2.04	170600	48.914

XF: 1.0000 E+ 0

0.85



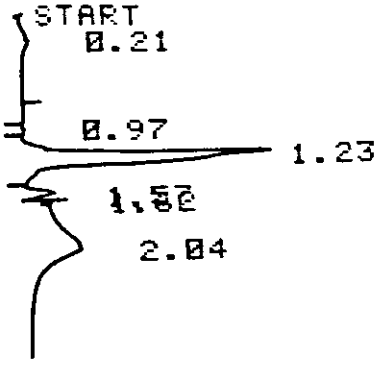
hp 5830A
AREA %

RT	AREA	AREA %
0.82	9064	2.588
1.23	164200	46.883
1.57	12370	3.532
1.63	7100	2.027
2.04	157500	44.970

U41

XF: 1.0000 E+ 0

0.90 µl



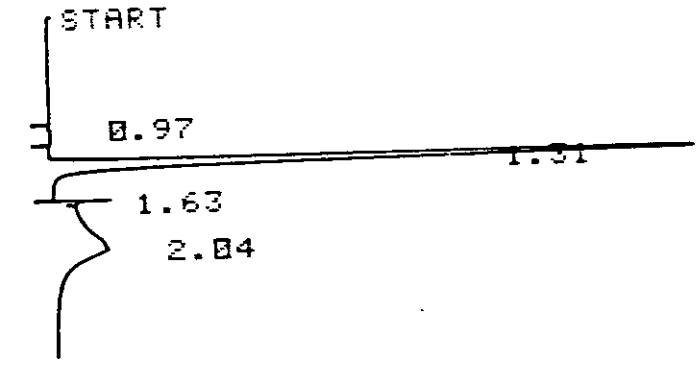
MOS-2-ov-4

hp 5830A
AREA %

RT	AREA	AREA %
0.21	9832	2.660
0.97	135	0.037
1.23	177500	48.020
1.57	13630	3.687
1.62	3139	0.849
2.04	165400	44.747

XF: 1.0000 E+ 0

STD 1.00 µl

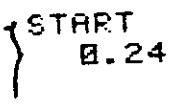


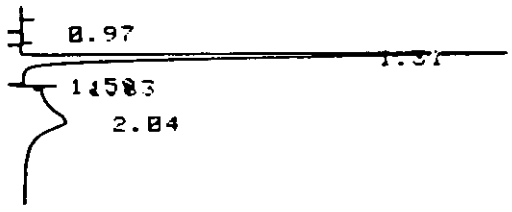
hp 5830A
AREA %

RT	AREA	AREA %
0.97	199	0.047
1.31	255900	60.498
1.63	6291	1.487
2.04	160600	37.968

XF: 1.0000 E+ 0

0.95 µl





hp 5830A
AREA %

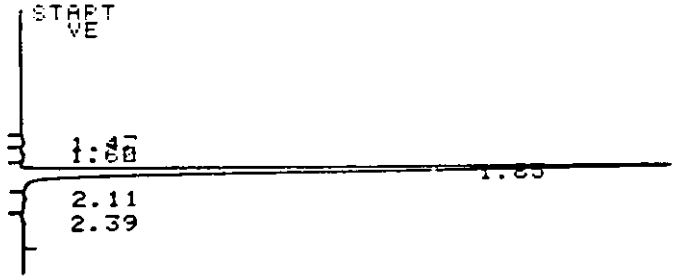
RT	AREA	AREA %
0.24	9746	2.263
0.97	80	0.019
1.31	254600	59.116
1.59	42	0.010
1.63	6508	1.511
2.04	159700	37.081

XF: 1.0000 E+ 0

TEMP:	70	70
TIME:	2.0	
INJ TEMP	100	100
FID TEMP	250	250
TCD TEMP	0	44
AUX TEMP	0	46
OVEN MAX	280	
CHT SPD	1.50	
ATTN 2↑	10	
FID SGNL	A	
SLP SENS	0.05	
AREA REJ	1	
FLOW A	1	
FLOW B	20	
OPTN	0	

VLV/EXT 1 MINO . 2 0

.483 mm STD



hp 5830A
AREA %

RT	AREA	AREA %
1.47	2004	0.588
1.60	1148	0.337
1.85	333000	97.709
2.11	2819	0.828
2.39	1559	0.458

XF: 1.0000 E+ 0

HP 5830A
AREA %

RT	AREA	AREA %
1.01	90	0.027
1.58	44	0.013
1.56	26	0.008
1.65	23	0.007
1.84	331100	98.891
2.11	3530	1.054

XF: 1.0000 E+ 0

796.5
2 min 23.5°C Oxygen N2 0

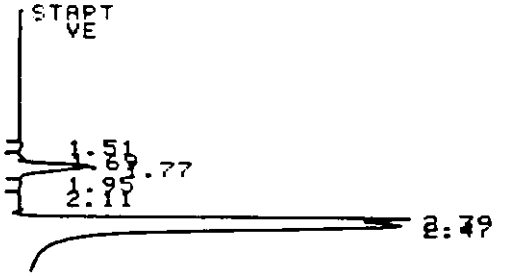
HP 5830A
AREA %

RT	AREA	AREA %
1.51	291	0.337
1.68	385	0.445
1.77	7074	8.184
1.95	174	0.201
2.11	105	0.121
2.39	25180	29.130
2.47	53230	61.581

XF: 1.0000 E+ 0

2 min ATT

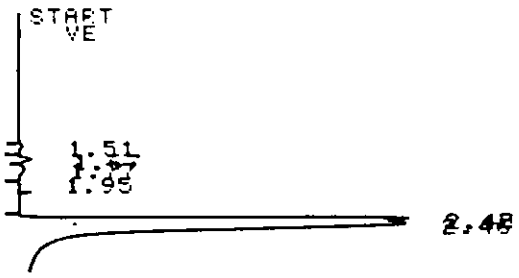
ATTN 2↑ 7 @



HP 5830A
AREA %

RT	AREA	AREA %
1.51	255	0.293
1.69	395	0.454
1.77	7144	8.217
1.95	152	0.175
2.11	85	0.098
2.39	23950	27.547
2.47	54960	63.215

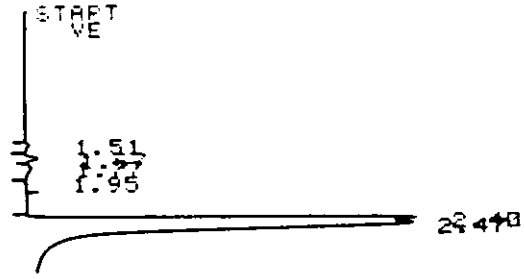
XF: 1.0000 E+ 0



hp 5830A
AREA %

RT	AREA	AREA %
1.51	273	0.359
1.67	759	0.999
1.77	618	0.814
1.95	51	0.067
2.48	25168	33.127
2.46	49098	64.634

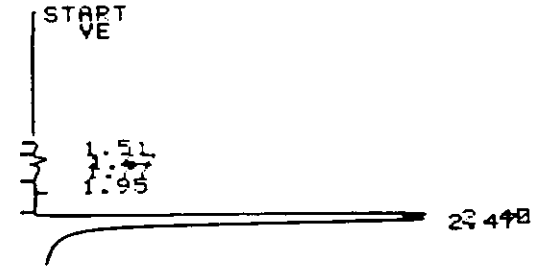
XF: 1.0000 E+ 0



hp 5830A
AREA %

RT	AREA	AREA %
1.51	265	0.349
1.67	770	1.015
1.77	576	0.759
1.95	43	0.057
2.48	24930	32.861
2.47	49280	64.958

XF: 1.0000 E+ 0

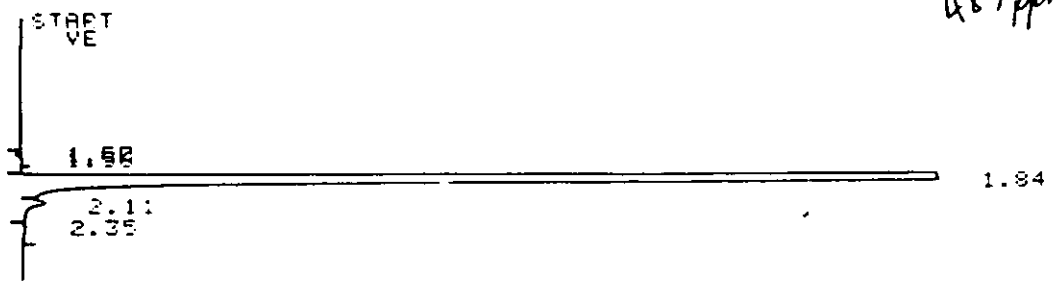


hp 5830A
AREA %

RT	AREA	AREA %
1.51	263	0.346
1.67	768	1.010
1.77	575	0.756
1.95	48	0.063
2.48	24900	32.744
2.47	49490	65.081

XF: 1.0000 E+ 0

483 ppm STD



hp 5830A
AREA %.

RT	AREA	AREA %
1.50	73	0.010
1.56	54	0.007
1.84	770800	99.012
2.11	2807	0.360
2.35	437	0.131

XF: 1.0000 E+ 0

ATT

ATTN 2↑ 1 0 @

TEMP1	70	70
TIME1	3.0	
INJ TEMP	100	100
FID TEMP	250	250
TCD TEMP	0	44
AUX TEMP	0	46
OVEN MAX	280	
CHT SPD	1.50	
ATTN 2↑	10	
FID SGNL	A	
SLP SENS	0.05	
AREA REJ	1	
FLOW A	2	
FLOW B	20	
OPTN	0	
0.2 VLV/EXT	1	

[redacted]

[redacted]

1-11-79

LIQ. STDS.

1-9-79 0.676 MG/ML

Run #	ml inj	RT	AREA	AREA/1.0 ml
1	0.90	1.31	265,000	298,900
2	1.00	1.31	249,000	249,000
3	1.00	1.29	262,300	262,300
4	0.90	1.30	231,400	257,100
				1,067,300 ✓

AVE = 266,800 ✓

2.5337 x 10

AVE = 2.5578 x 10

1-11-79 0.662 MG/ML

1	0.95	1.31	251,900	265,200
2	1.10	1.30	283,900	257,900
3	0.95	1.30	241,200	253,900
4	1.10	1.30	273,400	248,500
				1025,500 ✓

2.5819 x 1

AVE = 256,400

1	1.00	1.31	264,900	264,900 ✓
2	1.00	1.31	266,200	266,200 ✓
3	0.95	1.31	271,600	285,900 ✓
4	0.90	1.31	230,100	255,700 ✓
			~~1032,800~~	1072,700 ✓

AVE 268,175 ✓

2.4685 x 10 -6

1-11-79

SAMPLE #	Run #	µl SIZE INJ	R.T.	AREA	AREA/µl
CV-1	1	0.80	0.96	97	
			1.23	1335	
			1.29	2027	
			1.56	208	
				3667 ✓	4584 ✓
	2	1.00	0.97	44	
			1.23	1575	
			1.29	2480	
			1.57	267	
				4416 ✓	4416 ✓
	3	0.85	0.97	97	
		~~1.23~~	1.23	1418	
			1.29	2258	
			1.57	222	
				3995 ✓	4700 ✓
OV-1	1	1.10	0.97	95	
		~~1.23~~	1.23	1190	
			1.29	2370	
			1.56	291	
				3946 ✓	3587 ✓
	2	0.90	0.97	115	
			1.14	72	
			1.23	1092	
			1.30	2388	
			1.57	283	
				3950 ✓	4389 ✓
	3	1.00	.97	74	
			1.23	1089	
			1.30	2238	
			1.57	301	
				3702 ✓	3702 ✓

CV-1 (runs 1–3): 4567 ✓ AVE.

1.168×10^{-2} µg/µl

mg/ml

1-11-79

SAMPLE #	RUN #	INJ SIZE µl	RT	AREA	AREA/µl
DV-1	4	0.90	0.97	138	
			1.24	1175	
			1.30	2122	
			1.57	265	
				3700 ✓	4111 ✓
	5	0.85	0.97	112	
			1.23	1126	
			1.29	2102	
			1.57	256	
				3596 ✓	4231 ✓ 1.024 µg

AVE = 4004 ✓ µg

						Area/µl
DV-2	1	0.90 (3.70)	0.97	111	Blank	
			1.31	2734		
			1.57	297	2550 ✓	2833 ✓
				3142 ✓		~~3324~~ ✓
	2	0.80 (3.66)	0.97	184		
			1.31	2650	✓	
			1.57	296	2554	3193 ✓
				3130 ✓		~~3913~~ ✓
	3	0.90 (3.90)	0.97	123		
			1.30	2786		
			1.57	308	2625 ✓	2917 ✓
				3217 ✓		~~3504~~ ✓
	4	1.00 (3.80)	0.97	130		
			1.30	2925	2778 ✓	2778 ✓
			1.57	331		
				3386 ✓		~~3386~~ ✓

AVE = ~~3324~~ ✓

AVE = 2930

overall ave DV-2 2925

7.220×10^{-3} µg/µl

µg/ml

1-11-79

SAMPLE #	RUN #	μl INJ SIZE	RT	AREA	AREA/μl
DV-2 Trap	1	0.90 (3.70)	0.97	145	
			1.23	280	
			1.30	317	592 blank
			1.57	50	(200) 222
				792 ✓	
	2	0.80 (3.60)	0.95	113	
			1.14	37	
			1.21	221	
			1.27	268	576 blank
			1.54	35	(98) 123
				674 ✓	
	3	1.85 (4.65)	0.95	117	
			1.23	324	
			1.29	338	744 blank.
			1.55	34	(69) 37
				813 ✓	
	4	1.80 (4.60)	0.97	135	
			1.23	321	
			1.30	354	736 blank
			1.55	41	(115) 64
				851 ✓	
CS_2 FLUSH	1	5.00 μl	0.98	35	
			1.17	41	
			1.23	235	
			1.30	261	
			1.57	32	
				604 ✓	121 units/μl blank.

sample + 2.8 μl of CS_2 flush

(74 area units / μl)

1.827×10^{-4} g/μl mg/ml

1-11-79

SAMPLE	RUN#	INJ SIZE µl	RT	AREA	AREA / INJ SIZE
CS_2 Fluid	1	0.90 (3.70)	0.97	108	
			1.23	221	
			1.30	298	
			1.56	35	179 ✓
				662 ✓	~~185~~
		~~1.00 (3.80)~~			
	2	1.00 (3.80)	0.97	81	
			1.23	196	
			1.30	230	
			1.57	43	145 ✓
				550 ✓	~~150~~
	3	0.90 (3.70)	0.97	117	
			1.23	195	
			1.30	226	
			1.57	41	156 ✓ ✓ 16
				579 ✓	~~155~~ AVE =
DV-2 - Trap	1	0.80 µl (3.60)	0.97	93	
			1.23	179	
			1.30	221	576 blank (-48)
			1.57	35	
				528	
					not over blank
	2	1.70 (4.50)	0.96	52	
			1.23	227	
			1.29	286	? 20 blank (-124)
			1.55	31	
				596	
					blank
DV-2	1	0.90 (3.70)	0.97	108	
			1.31	2914	2764 ✓ ✓ 3071
			1.57	334	
				~~3356~~ 3256 ✓	~~3727~~
	2	0.95 (3.75)	.97	141	✓ ✓
			1.31	2617	
			1.57	307	2465 2595
				3065 ✓	~~3226~~
	3	0.95 (3.75)	.97	95	✓ ✓
			1.30	3051 ✓	2935 3089 AVE

1-11-79

SAMPLE #	RUN #	µl INJ SIZE	R.T.	AREA	AREA-Blnk	AREA/µl
CV-2	1	1.00 (3.80)	0.97	106		
			1.23	351		
			1.29	794		
			1.56	79		
				1330 ✓	722 ✓	722 ✓
	2	1.05 (3.85)	0.97	115		
			1.23	271		
			1.30	795		
			1.57	97		
				1278 ✓	662 ✓	630 ✓
	3	1.00 (3.80)	0.97	74		
			1.23	374		
			1.30	809		
			1.56	101		
				1358 ✓	750 ✓	750 ✓
	4	1.05 (3.85)	0.98	107		
			1.31	1137		
			1.57	100		
				1344 ✓	728 ✓	693 ✓
					AVE =	**699** ✓
						1.726×10^{-3} [illegible]
CV-2 Trip	1	1.00 (3.80)	0.98	132		
			1.24	194		
			1.31	205		
			1.57	36		
				567 ✓	-41	
	2	0.80 (3.60)	0.96	118		
			1.23	185		
			1.31	225		
			1.57	33		
				561 ✓	-15	
	3	1.90 (4.70)	0.97	61		
			1.23	321		
			1.30	327		
			1.55	33	-10	

0

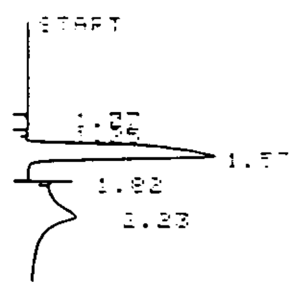
SAMPLE	ml	mg/ml	collected mg
CV-1	106.39	1.168×10^{-2} ~~after~~	1.243 mg
DV-1	(118.74 ml)	1.024×10^{-2}	1.216 mg
CV-2	(111.74 ml)	1.926×10^{-3}	.193 mg
CV-2 trap	(52.54 ml)	— not above blank	—
DV-2	(113.28 ml)	7.220×10^{-3}	0.818 mg
DV-2 trap	(48.94 ml)	1.827×10^{-4}	0.009 mg

1-11-79

Air 60/28
N_2 50
H_2 15.5

TEMP1 70 70
TIME1 3.0
INJ TEMP 100 100
FID TEMP 250 250
TCD TEMP 0 43
AUX TEMP 0 44
OVEN MAX 280

CHT SPD 1.53
ATTN 2^ 10
FID SIG A
SLP SENS 0.05
AREA REJ 1
[illegible] 1
[illegible] 20
[illegible] 0
0.1 VLV EXT 1
DELETE TIME TBL

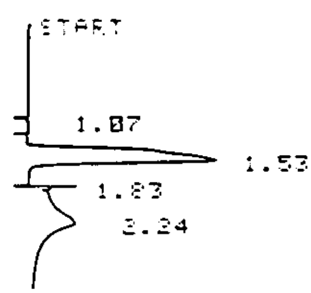


0.95 µl

[illegible] 5830A
AREA %

RT	AREA	AREA %
1.07	77	0.018
1.25	7	0.002
1.57	259200	59.092
1.82	9456	2.156
2.23	169900	38.733

XF: 1.0000 E+ 0



1.00 µl

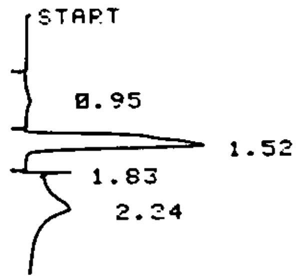
[illegible] 5830A
AREA %

RT	AREA	AREA %
1.07	104	0.024
1.53	254300	59.150
1.83	9118	2.121
2.24	166400	38.705

XF: 1.0000 E+ 0

..0000 E+ 0

0.95 µl
9
gor
Contguide

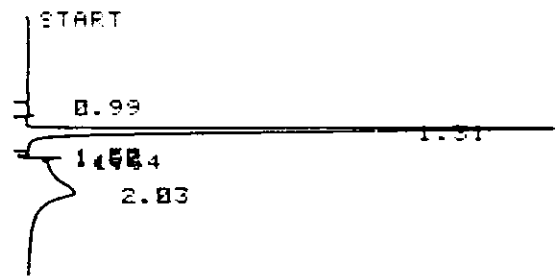


hp 5830A
AREA %

RT	AREA	AREA %
0.95	8782	2.080
1.52	243600	57.693
1.83	8956	2.121
2.24	160900	38.107

XF: 1.0000 E+ 0

Std liq Cntrs
0.90 µl

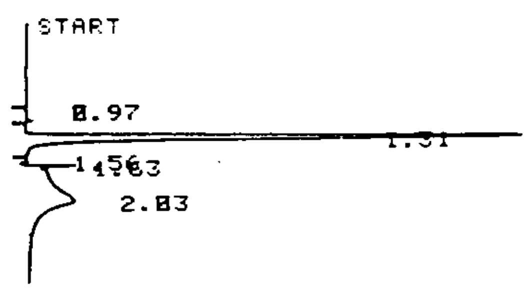


hp 5830A
AREA %

RT	AREA	AREA %
0.99	103	0.023
1.31	269000	61.330
1.57	201	0.046
1.60	19	0.004
1.64	7090	1.616
2.03	162200	36.980

XF: 1.0000 E+ 0

1.00 µl



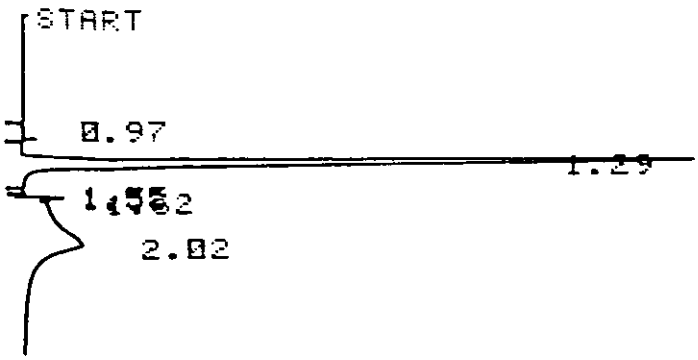
hp 5830A
AREA %

RT	AREA	AREA %
0.97	75	0.018
1.31	249000	59.556
1.56	190	0.045
1.63	7328	1.753
2.03	161500	38.628

XF: . 0000 E+ 0

XF: 1.0000 E+ 0

1.00 ML

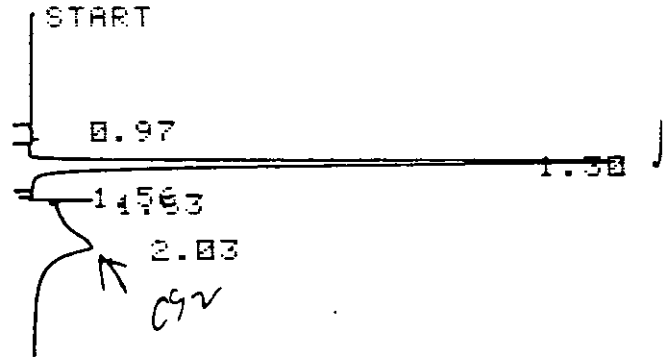


hp 5830A
AREA %

RT	AREA	AREA %
0.97	74	0.017
1.29	262300	60.860
1.55	196	0.045
1.58	18	0.004
1.62	7104	1.648
2.02	161300	37.425

XF: 1.0000 E+ 0

0.90 ML

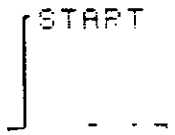


hp 5830A
AREA %

RT	AREA	AREA %
0.97	50	0.013
1.30	231400	57.982
1.56	162	0.041
1.63	6476	1.623
2.03	161000	40.342

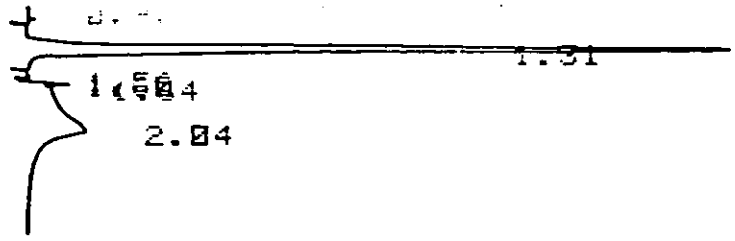
XF: 1.0000 E+ 0

new STD
0.95 ML



[redacted]

Buffer

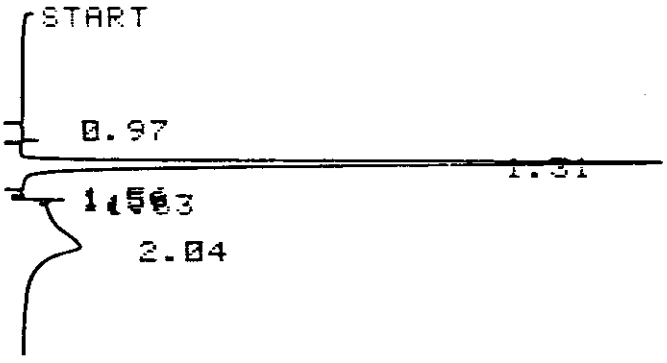


hp 5830A
AREA %

RT	AREA	AREA %
0.97	51	0.012
1.31	274600	62.183
1.56	210	0.048
1.60	15	0.003
1.64	6026	1.365
2.04	160700	36.390

XF: 1.0000 E+ 0

0.95 µl

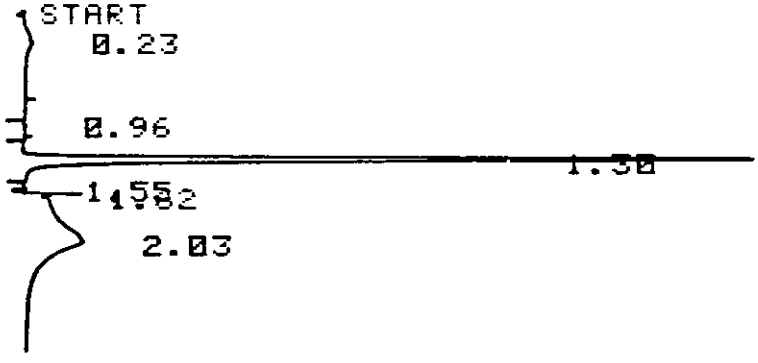


hp 5830A
AREA %

RT	AREA	AREA %
0.97	93	0.022
1.31	251900	60.208
1.56	152	0.036
1.59	10	0.002
1.63	6630	1.585
2.04	159600	38.147

XF: 1.0000 E+ 0

1.10 µl



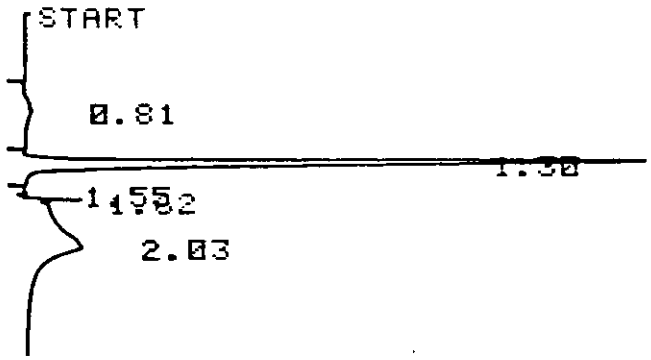
hp 5830A
AREA %

RT	AREA	AREA %
0.23	9698	2.078
0.96	63	0.014
1.30	283700	60.797
1.55	761	0.177

2.03	166300	35.638

XF: 1.0000 E+ 0

0.95 µl

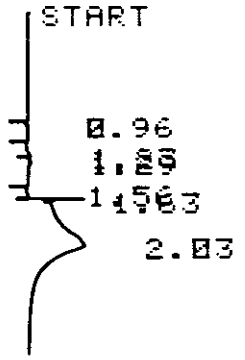


hp 5830A
AREA %

RT	AREA	AREA %
0.81	9468	2.272
1.30	241200	57.874
1.55	113	0.027
1.62	6088	1.461
2.03	159900	38.367

XF: 1.0000 E+ 0

CV-1
0.80 ND



hp 5830A
AREA %

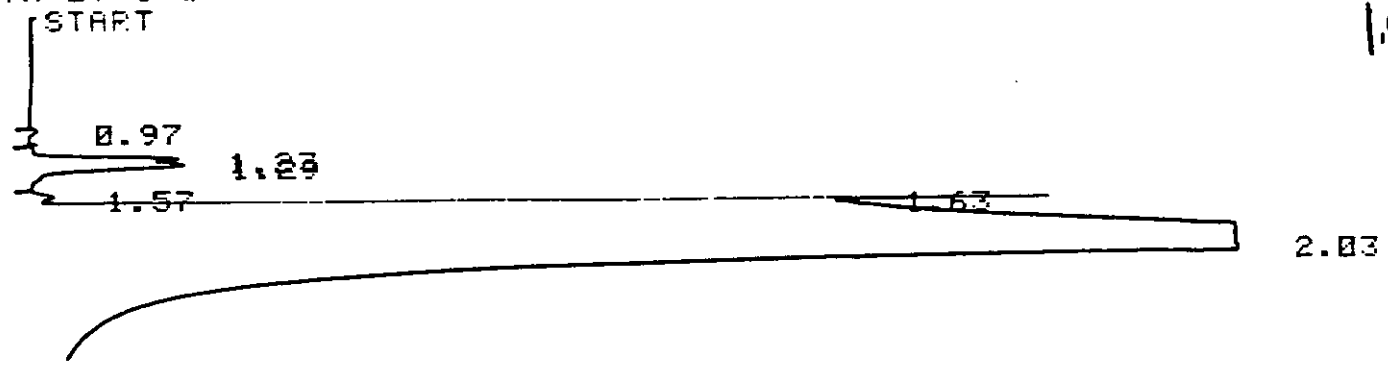
RT	AREA	AREA %
0.96	97	0.056
1.23	1335	0.768
1.29	2027	1.166
1.56	208	0.120
1.63	5386	3.098
2.03	164800	94.793

XF: 1.0000 E+ 0

ATT

1.00 ND

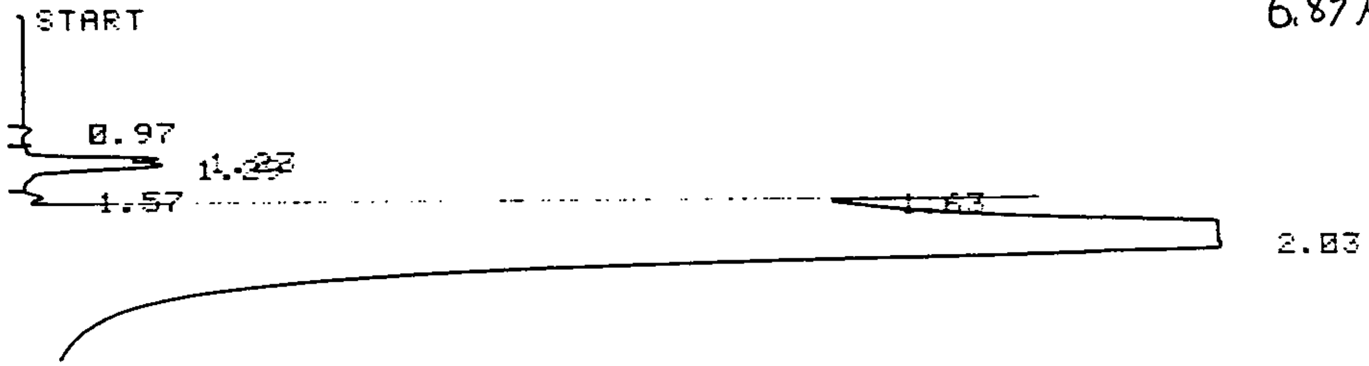
ATTN 2↑ 5 @



RT	AREA	AREA %
0.97	94	0.056
1.23	1575	0.938
1.29	2480	1.476
1.57	267	0.159
1.63	5261	3.132
2.03	158300	94.239

XF: 1.0000 E+ 0

6.85 µl



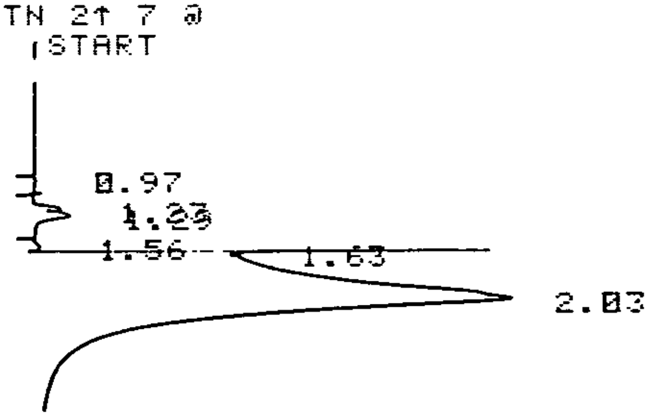
hp 5830A
AREA %

RT	AREA	AREA %
0.97	97	0.057
1.23	1418	0.826
1.29	2258	1.316
1.57	222	0.129
1.63	5974	3.482
2.03	161600	94.190

XF: 1.0000 E+ 0

ATTN 2↑ 7 @

DU-1 ← ATT
1.10 µl

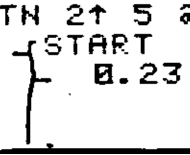


hp 5830A
AREA %

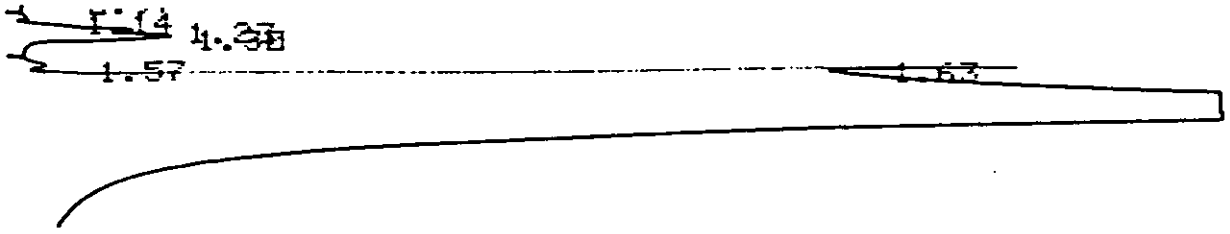
RT	AREA	AREA %
0.97	95	0.054
1.23	1190	0.678
1.29	2370	1.351
1.56	291	0.166
1.63	6103	3.479
2.03	165400	94.272

XF: 1.0000 E+ 0

ATTN 2↑ 5 @



← 0.90µl

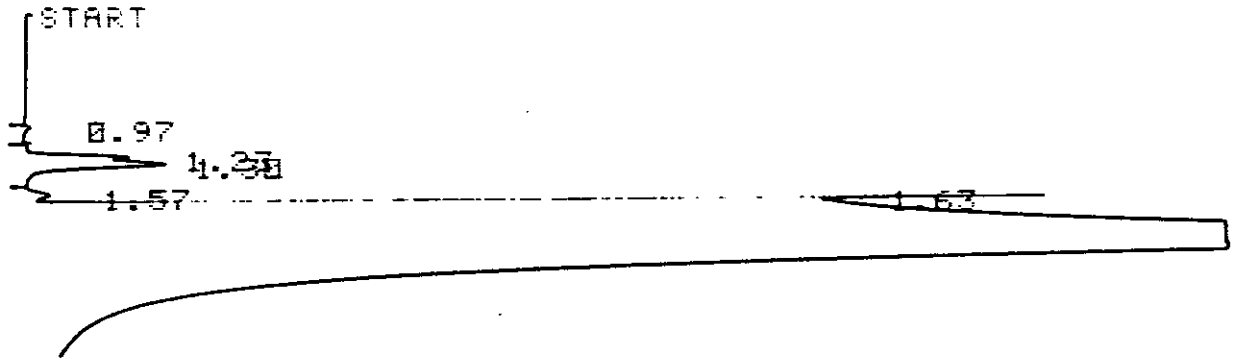


hp 5830A
AREA %

RT	AREA	AREA %
0.23	105	0.061
0.97	115	0.066
1.14	72	0.042
1.23	1092	0.630
1.30	2388	1.377
1.57	283	0.163
1.63	5806	3.347
2.03	163600	94.315

XF: 1.0000 E+ 0

1.00 µl

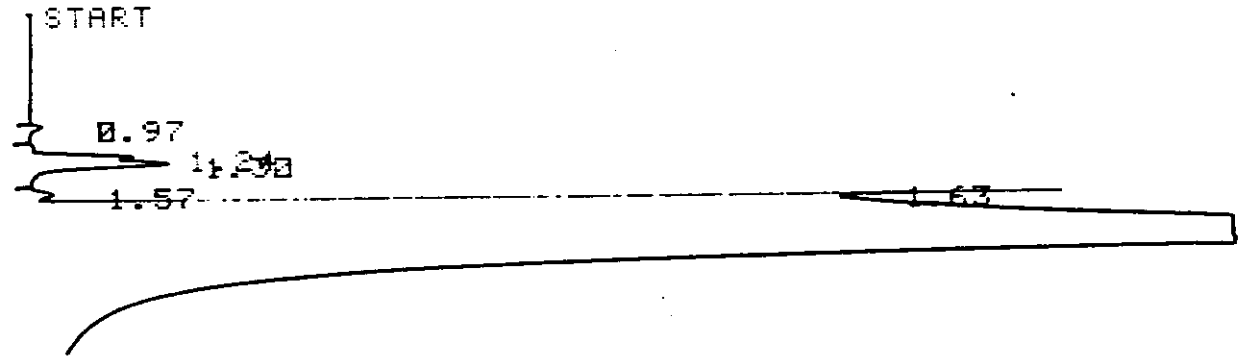


hp 5830A
AREA %

RT	AREA	AREA %
0.97	74	0.043
1.23	1089	0.630
1.30	2238	1.295
1.57	301	0.174
1.63	5088	2.945
2.03	164000	94.913

XF: 1.0000 E+ 0

0.90 µl



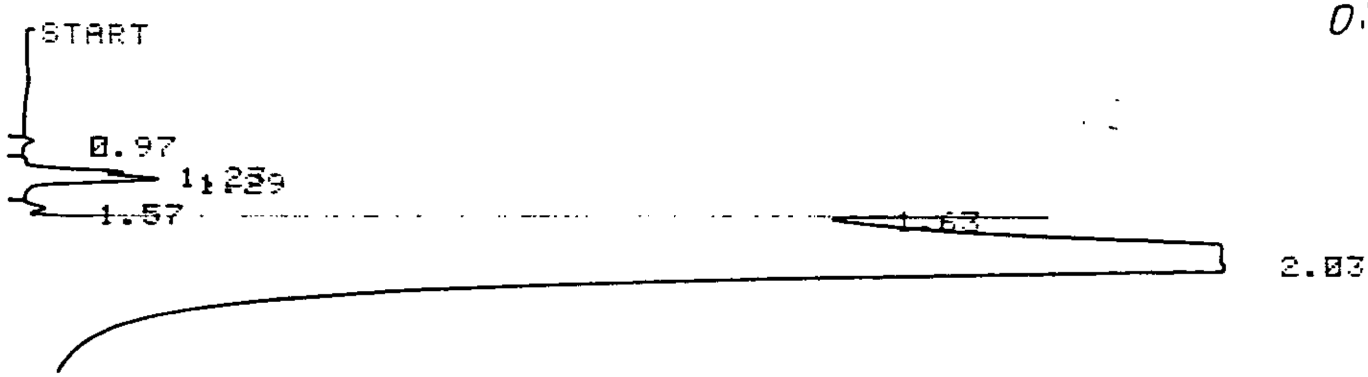
hp 5830A
AREA %

RT	AREA	AREA %
0.97	138	0.081
1.24	1175	0.692

2.03	159500	93.904

XF: 1.0000 E+ 0

0.85 nl



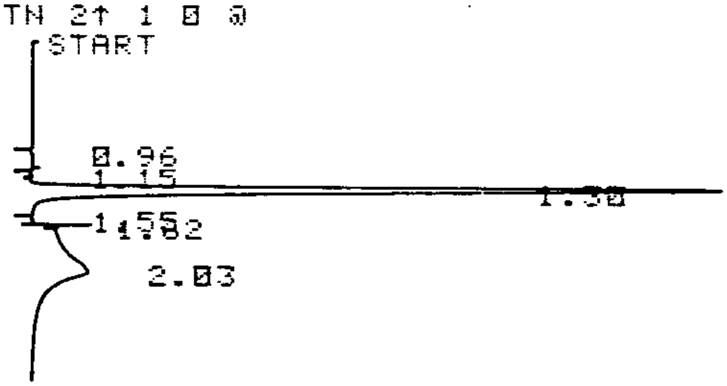
hp 5830A
AREA %

RT	AREA	AREA %
0.97	112	0.065
1.23	1126	0.656
1.29	2102	1.225
1.57	256	0.149
1.63	6261	3.650
2.03	161700	94.254

XF: 1.0000 E+ 0

ATTN 2↑ 1 0 @

1.10 nl new STD ← ATT



hp 5830A
AREA %

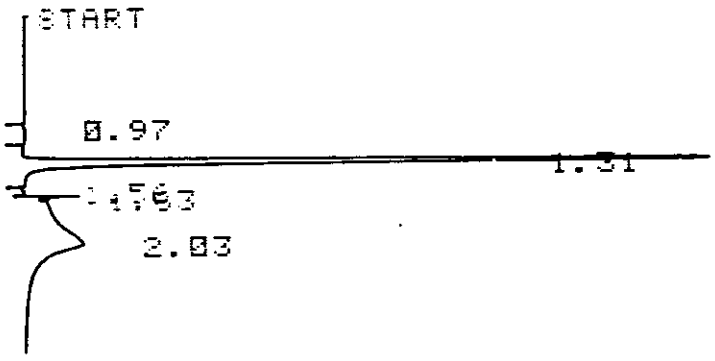
RT	AREA	AREA %
0.96	83	0.019
1.15	9	0.002
1.30	273400	62.796
1.55	204	0.047
1.62	6182	1.420
2.03	155500	35.716

XF: 1.0000 E+ 0

1-11-79
altiman
air 60/28
N_2 50
H_2 15.5

TEMP1	70	70
TIME1	3.0	
INJ TEMP	100	100
FID TEMP	250	250
TCD TEMP	0	44
AUX TEMP	0	46
OVEN MAX	280	
CHT SPD	1.50	
ATTN 2↑	[illegible]	
FID SGNL	[illegible]	
SLP SENS	0.35	
AREA REJ	[illegible]	
FLOW B	[illegible]	
OPTN	0	

NEW STD
1.00 NR

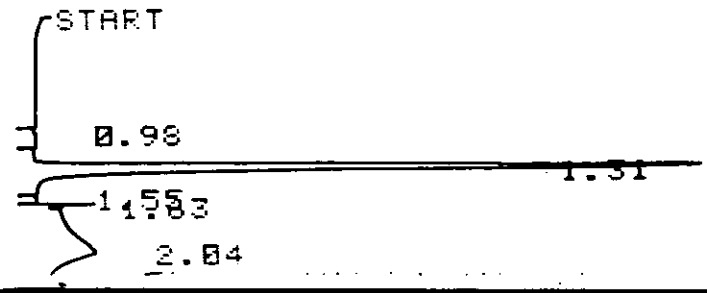


hp 5830A
AREA %

RT	AREA	AREA %
0.97	149	0.034
1.31	264900	61.138
1.56	213	0.049
1.63	7018	1.620
2.03	161000	37.158

XF: 1.0000 E+ 0

1.00 NR

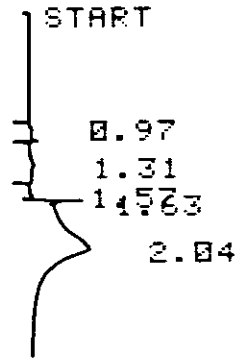


hp 5830A
AREA %

RT	AREA	AREA %
0.98	90	0.021
1.31	266200	61.500
1.55	194	0.045
1.63	6361	1.470
2.04	160000	36.965

XF: 1.0000 E+ 0

DV-2
0.90 ml



hp 5830A
AREA %

304

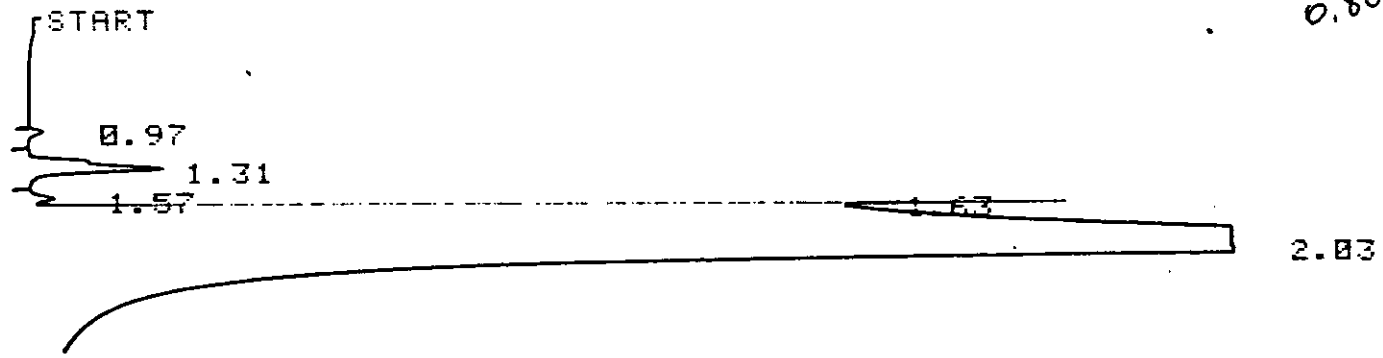
RT	AREA	AREA %
0.97	111	0.063
1.31	2734	1.553
1.57	297	0.169
1.63	6450	3.665
2.04	166400	94.550

XF: 1.0000 E+ 0

ATTN 2↑ 5 @

ATT

0.80 ml

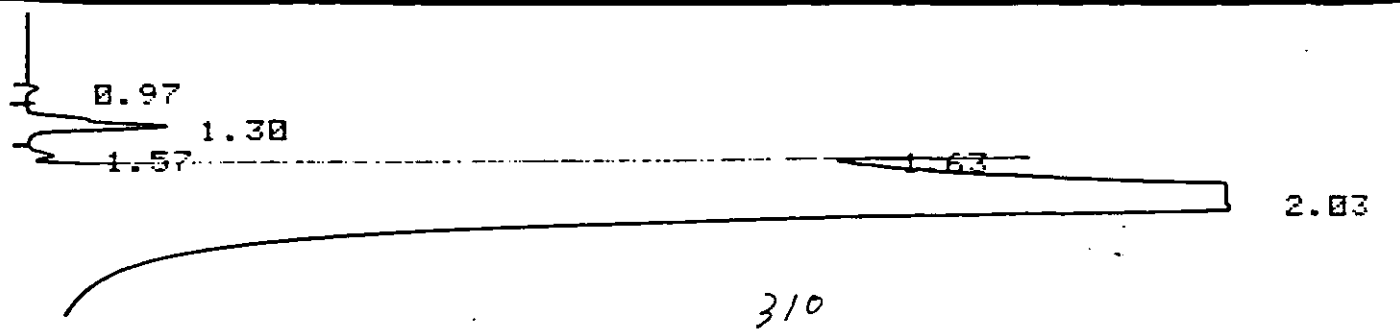


hp 5830A
AREA %

RT	AREA	AREA %
0.97	184	0.110
1.31	2650	1.589
1.57	296	0.177
1.63	6380	3.825
2.03	157300	94.299

331

XF: 1.0000 E+ 0



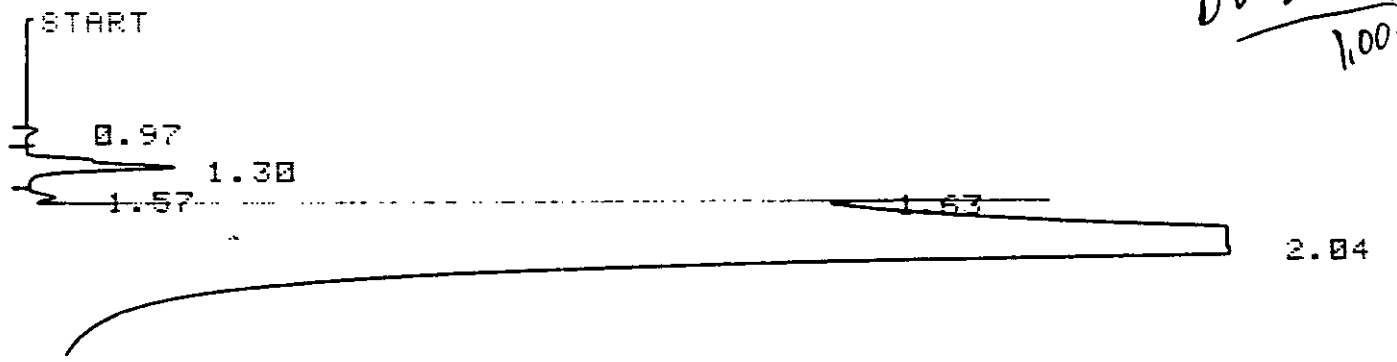
310

hp 5830A
AREA %

RT	AREA	AREA %
0.97	123	0.074
1.30	2786	1.665
1.57	308	0.184
1.63	6296	3.763
2.03	157800	94.314

XF: 1.0000 E+ 0

continued
DV-2
1.00 µl

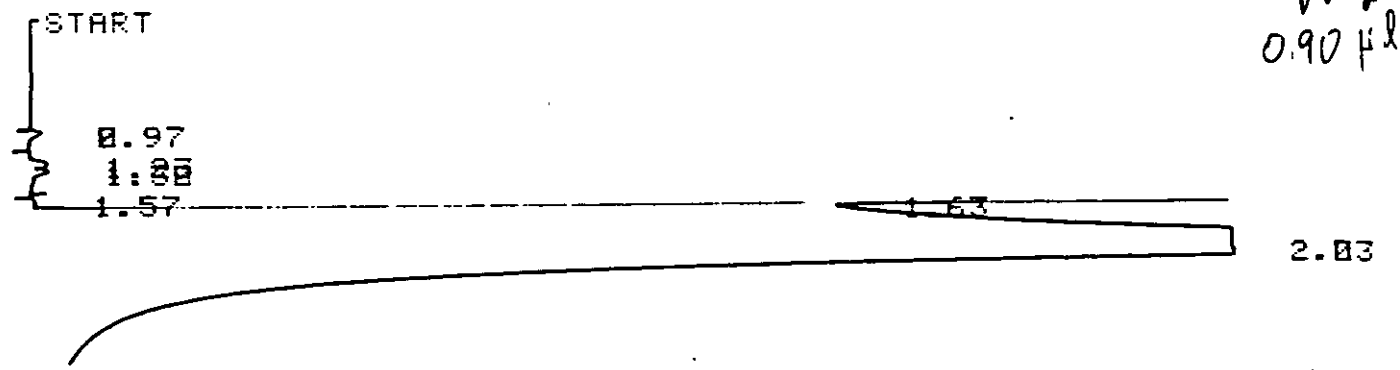


hp 5830A
AREA %

RT	AREA	AREA %
0.97	130	0.074
1.30	2925	1.667
1.57	331	0.189
1.63	6210	3.539
2.04	165900	94.532

XF: 1.0000 E+ 0

DV-2-trip
0.90 µl



663

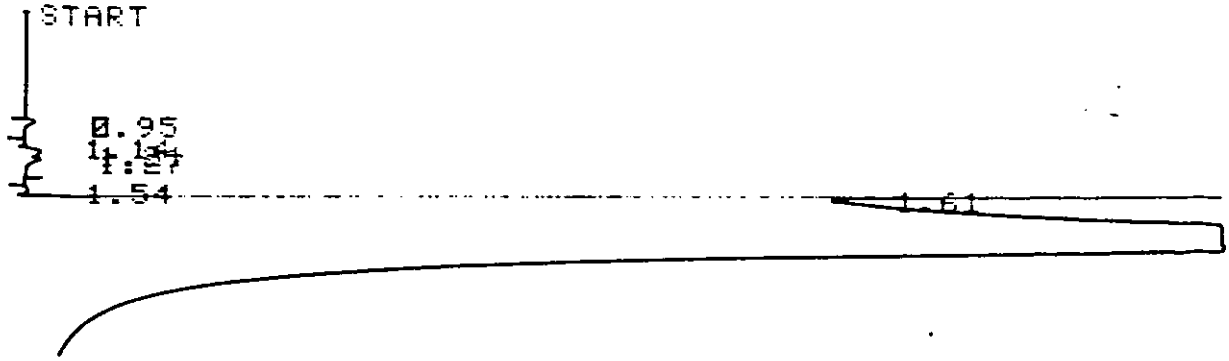
hp 5830A
AREA %

RT	AREA	AREA %
0.97	145	0.088
1.23	280	0.170
1.30	317	0.193

2.03	158200	96.093

XF: 1.0000 E+ 0

0.80 ml



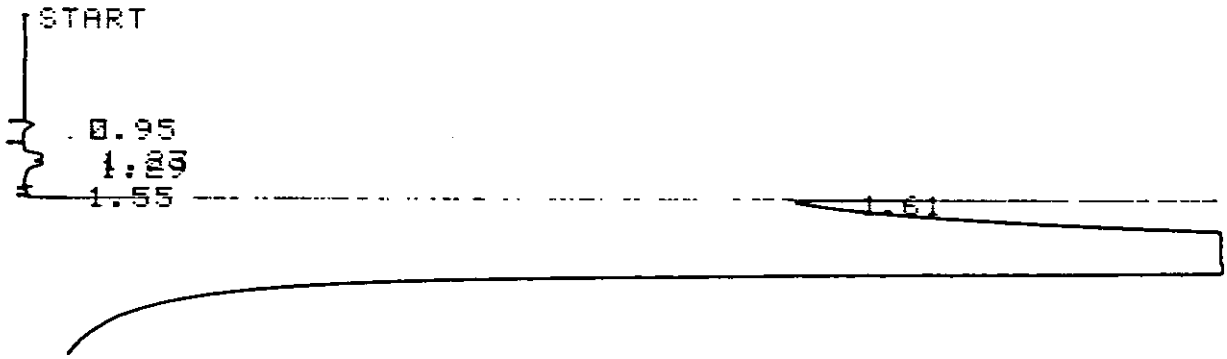
671

hp 5830A
AREA %

RT	AREA	AREA %
0.95	113	0.069
1.14	37	0.023
1.21	221	0.135
1.27	268	0.164
1.54	35	0.021
1.61	6311	3.863
2.01	156400	95.725

XF: 1.0000 E+ 0

1.85 ml



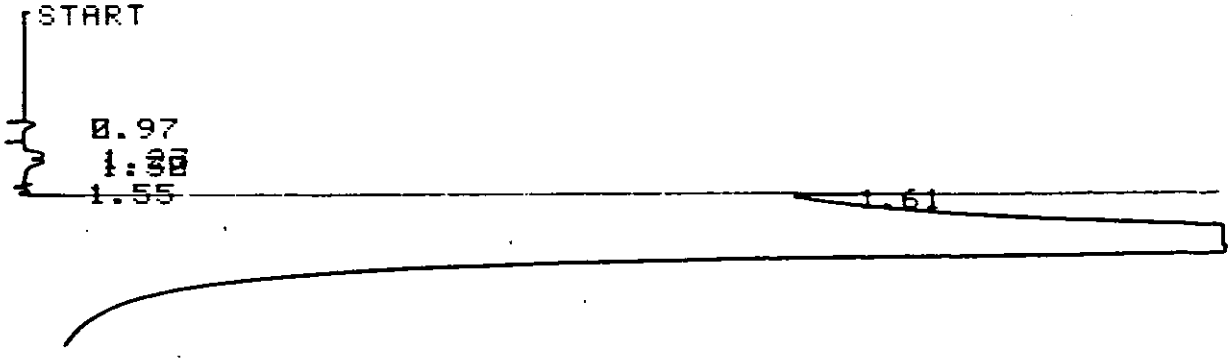
358

hp 5830A
AREA %

RT	AREA	AREA %
0.95	117	0.055
1.23	324	0.153
1.29	338	0.160
1.55	34	0.016
1.61	5953	2.818
2.15	204500	96.797

XF: 1.0000 E+ 0

1.80 ml



hp 5830A
AREA %

RT	AREA	AREA %
0.97	135	0.077
1.23	321	0.183
1.30	354	0.202
1.55	41	0.023
1.61	6180	3.527
2.05	168200	95.988

XF: 1.0000 E+ 0

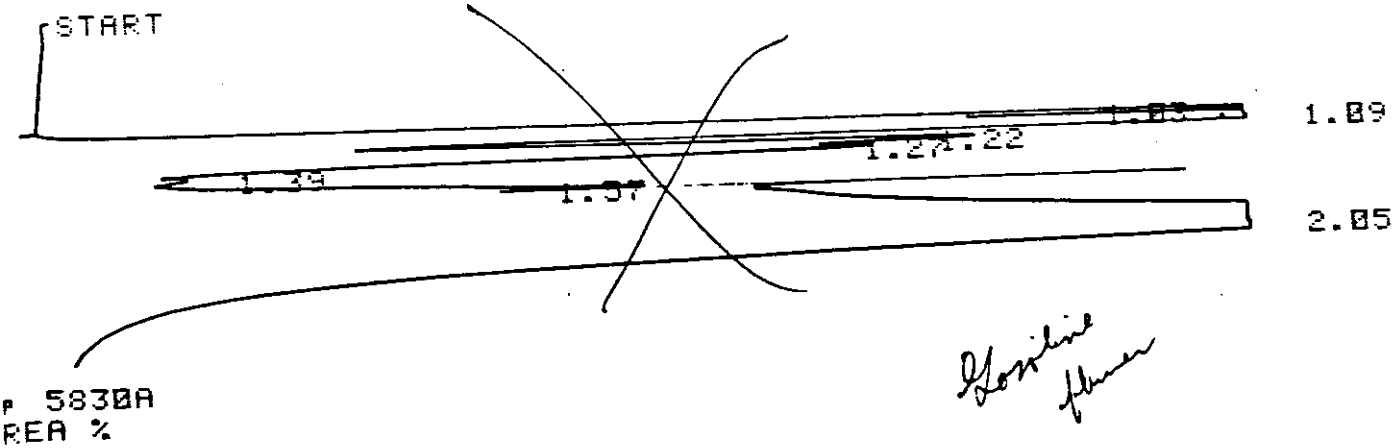
5µl CS_2 Flush

hp 5830A
AREA %

RT	AREA	AREA %
0.98	35	0.016
1.17	41	0.018
1.23	235	0.105
1.30	261	0.116
1.57	32	0.014
1.63	4954	2.205
2.05	219100	97.526

XF: 1.0000 E+ 0

5µl



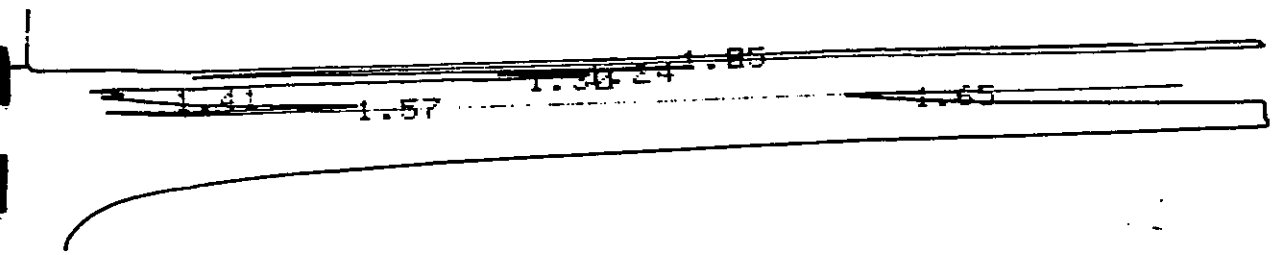
Gasoline Thinner

hp 5830A
AREA %

RT	AREA	AREA %
1.03	12330	4.163
1.09	71580	24.168
1.22	11300	3.815
1.27	12980	4.382
1.39	1810	0.611
1.57	16280	5.497
2.05	169900	57.364

XF: 1.0000 E+ 0

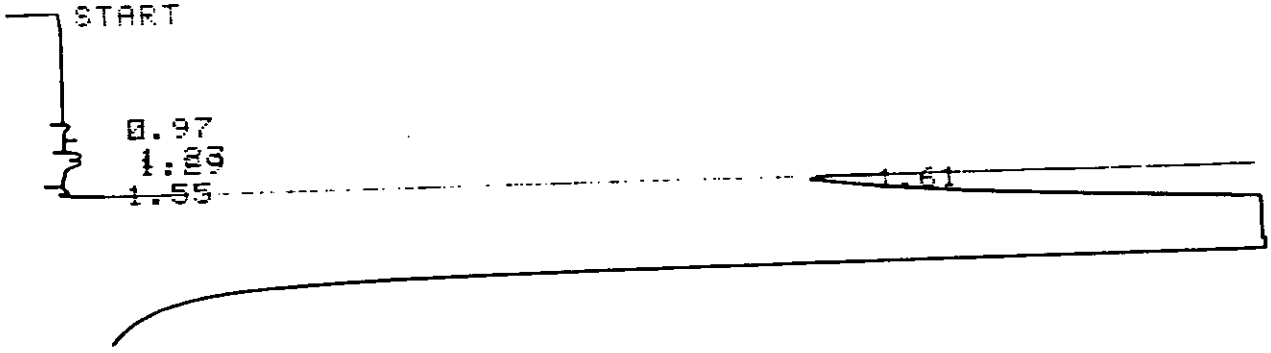
3.0µl



hp 5830A
AREA %

RT	AREA	AREA %
1.05	8036	3.346
1.11	45110	18.784
1.24	7364	3.066
1.30	8016	3.338
1.41	1098	0.457
1.57	6632	2.762
1.65	7696	3.205
2.03	156200	65.042

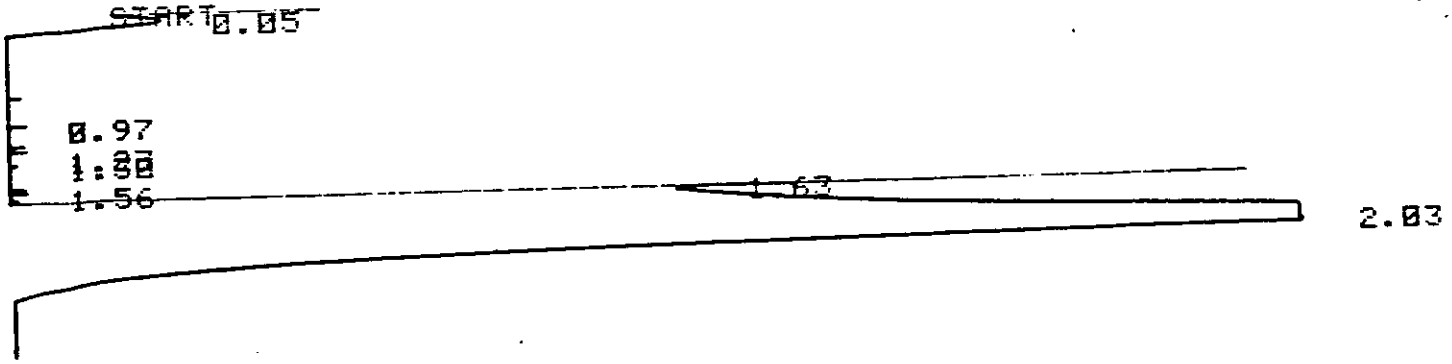
XF: 1.0000 E+ 0



hp 5830A
AREA %

RT	AREA	AREA %
0.97	52	0.021
1.23	219	0.089
1.29	277	0.113
1.55	44	0.018
1.61	6059	2.476
2.27	238100	97.283

XF: 1.0000 E+ 0

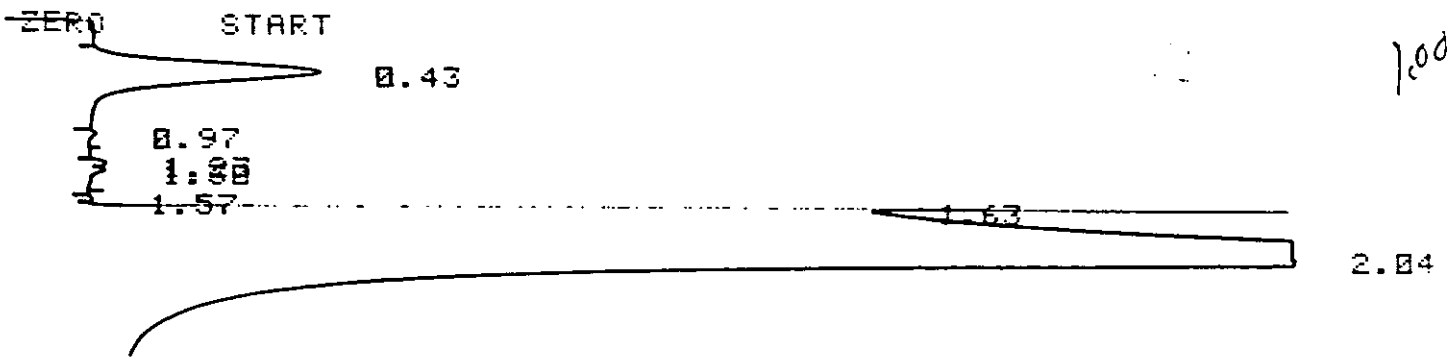


hp 5830A
AREA %

RT	AREA	AREA %
0.97	108	0.067
	221	0.138

1.56	35	0.022
1.63	6332	3.948
2.03	153400	95.640

XF: 1.0000 E+ 0

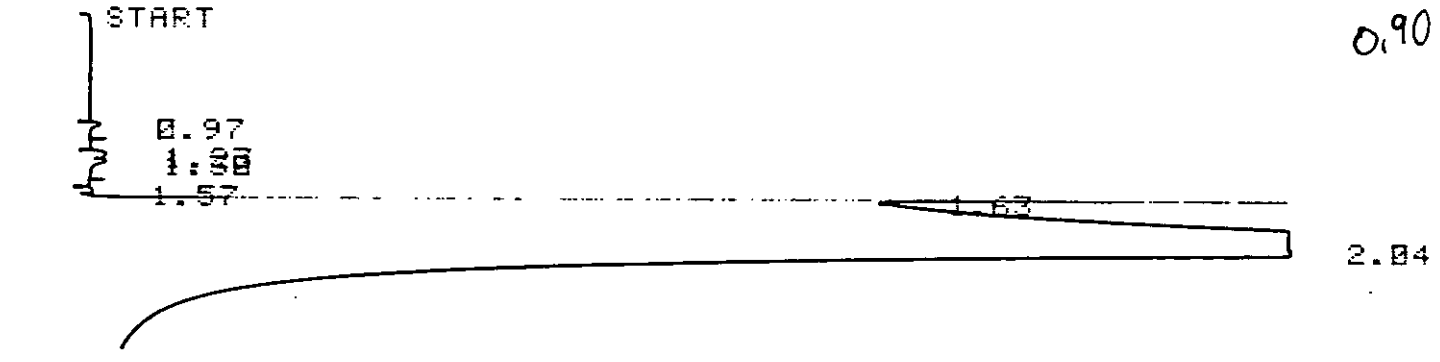


1.00 Nl CSL + Flu

hp 5830A
AREA %

RT	AREA	AREA %
0.43	9534	5.571
0.97	81	0.047
1.23	196	0.115
1.30	230	0.134
1.57	43	0.025
1.63	6040	3.530
2.04	155000	90.578

XF: 1.0000 E+ 0



0.90 Nl C Fl

hp 5830A
AREA %

RT	AREA	AREA %
0.97	117	0.071
1.23	195	0.118
1.30	226	0.137
1.57	41	0.025
1.63	5924	3.599
2.04	158100	96.049

XF: 1.0000 E+ 0

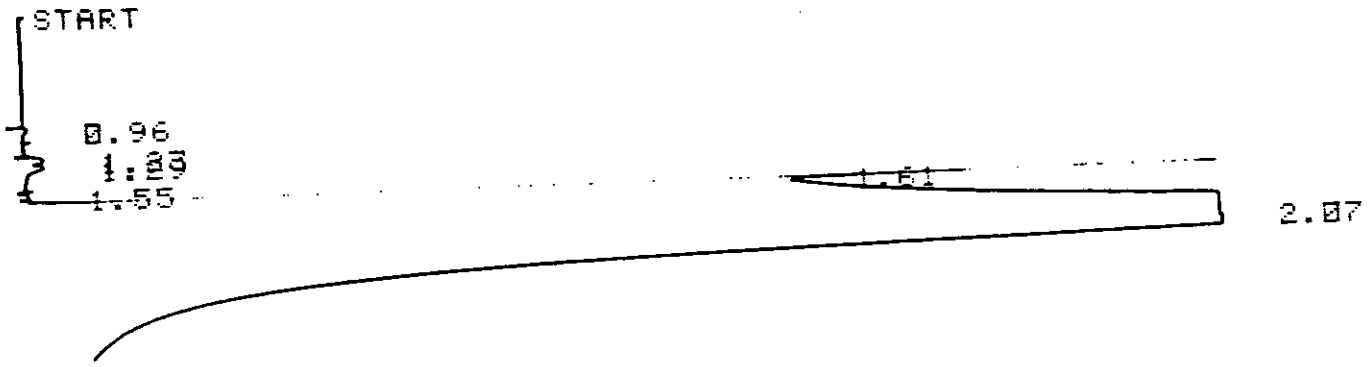
0.80 Nl DV-2 Tra

5830A
AREA %

RT	AREA	AREA %
0.97	93	0.055
1.23	179	0.105
1.30	221	0.130
1.57	35	0.021
1.63	5823	3.416
2.03	164100	96.274

XF: 1.0000 E+ 0

170 µl

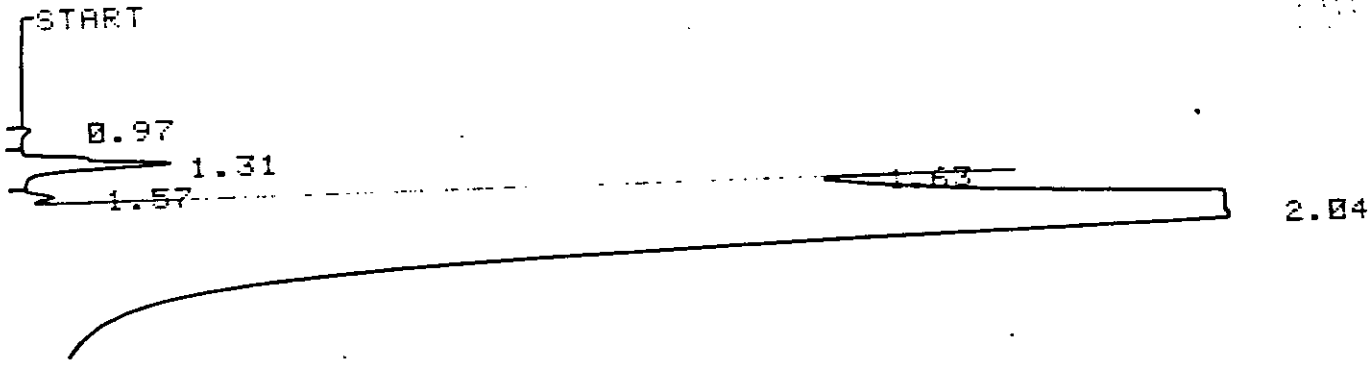


5830A
AREA %

RT	AREA	AREA %
0.96	52	0.028
1.23	227	0.120
1.29	286	0.152
1.55	31	0.016
1.61	6221	3.298
2.07	181800	96.386

XF: 1.0000 E+ 0

D1-2

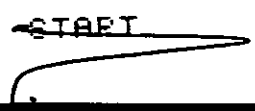


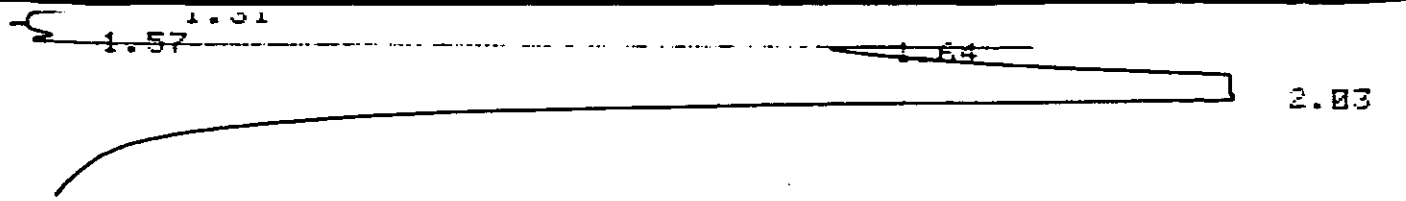
5830A
AREA %

RT	AREA	AREA %
0.97	108	0.063
1.31	2914	1.687
1.57	334	0.193
1.63	6282	3.637
2.04	163100	94.421

XF: 1.0000 E+ 0

0.95 µl





hp 5830A
AREA %

RT	AREA	AREA %
0.19	9506	5.573
0.97	141	0.083
1.31	2617	1.534
1.57	307	0.180
1.64	5812	3.407
2.03	152200	89.223

XF: 1.0000 E+ 0

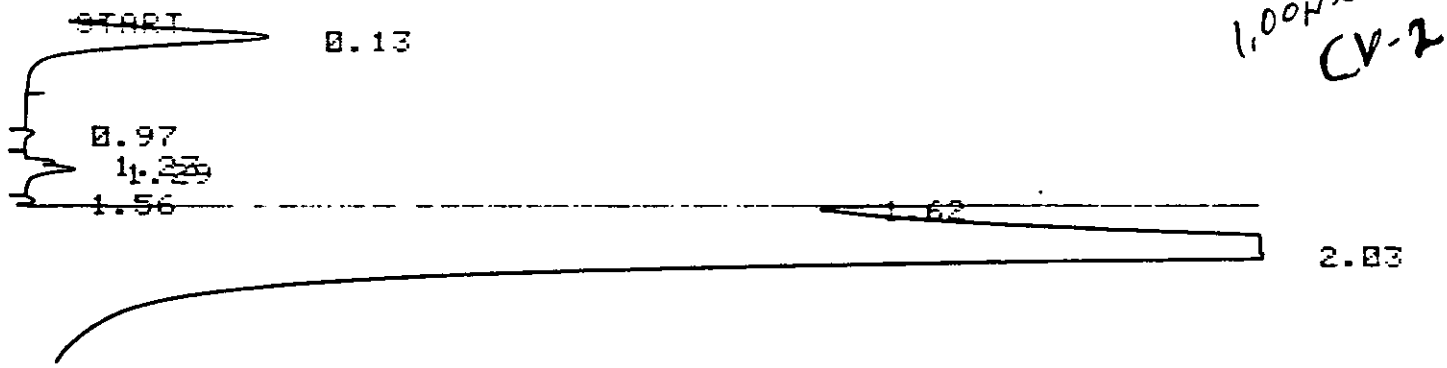
0.95 ft

hp 5830A
AREA %

RT	AREA	AREA %
0.97	95	0.057
1.30	3051	1.823
1.57	389	0.232
1.63	6470	3.865
2.03	157400	94.024

XF: 1.0000 E+ 0

1.00 ft CV-2



hp 5830A
AREA %

RT	AREA	AREA %
0.13	7212	4.282
0.97	106	0.063
1.23	351	0.208
1.29	794	0.471
1.56	79	0.047
1.62	6187	3.673

153700 91.355

RF: 1.0000 E+ 0

1.05 μl

HP 5830A
AREA %

RT	AREA	AREA %
0.97	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	153500	[illegible]

RF: 1.0000 E- 0

1.00 μl

HP 5830A
AREA %

RT	AREA	AREA %
0.97	74	0.045
1.27	274	0.130
1.30	889	0.497
[illegible]	181	0.061
1.57	6027	7.586
[illegible]	155500	91.480

RF: 1.0000 E- 0

1.05 μl

HP 5830A

RT	AREA	AREA %
[illegible]	157	0.257
[illegible]	1137	[illegible]
[illegible]	182	[illegible]
[illegible]	5484	3.178
[illegible]	167288	[illegible]

[illegible] 1.0000 E+ 0

CV-2 TMP.
1.00 NL

RT	AREA	AREA %
0.[illegible]	9634	5.334
[illegible]	173	[illegible]
[illegible]	184	[illegible]
[illegible]	205	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]
[illegible]	161600	[illegible]

1.0000 E+ 0

0.90 µl

RT	AREA	AREA %
0.53	9684	5.394
0.96	118	.066
1.23	185	0.103
1.31	225	0.125
1.57	33	0.017
1.63	5574	3.107
2.03	163700	91.191

NF: 1.0000 E+ 0

1.90 µl

Boy samples Dryer + Cooler 1-12-79

483 ppm STD.

#	RT	area
1	1.84	316,300
	2.11	3,061
		319,361 ✓
	1.84	317,200
	2.10	2,965
		320,165 ✓
3	1.84	322,300
	2.11	3,179
		325,479 ✓
4	1.84	322,400
	2.11	3,145
		325,545 ✓

AVE = 322,638 ✓

B-CV-1

1	1.51	207
	1.67	30
	1.83	2545
	2.10	446
	2.45	343
		3571 ✓
2	1.51	214
	1.67	23
	1.83	2475
	2.10	443
	2.45	306
		3461 ✓

AVE = 3516 ✓

5.26 ppm ✓

Cooler Boy

1-12-79

B-DV-1

Run	RT	area
1	1.51	216
	1.83	20730
	2.10	3495
	2.37	478
		25419
2	1.51	226
	1.83	20950
	2.10	4084
	2.37	474
		25734

25,577 ✓

38.3 ppm ✓

Dryer
Boy

1-12-79

STD
1-11-79 0.662 ng/ml ✓

RUN#	ml INJ SIZE	RT	AREA	AREA/ml
1	1.00	1.31	247,600	247,600 ✓
2	0.90	1.31	244,800	272,000 ✓
3	0.95	1.31	256,100	269,600 ✓
4	1.00	1.31	273,500	273,500 ✓
5	1.05	1.30	262,500	250,000 ✓
6	1.00	1.30	243,700	243,700 ✓
7	0.95	1.31	282,500	297,400 ✓
8	6.95	1.31	236,200	248,600 ✓
9	0.95	1.31	243,900	256,700 ✓
				2,359,100 ✓

AVE = 262,100 ✓

✓ 2.5258×10^{-6} ng/area unit

	Conc	ml	ng recovered
CV-3	2.124×10^{-3} mg/ml	108.05 ml	0.2295 ✓
CV-3 Trap	2.576×10^{-4} mg/ml	47.24 ml	0.0122 ✓
DV-3	8.891×10^{-3} mg/ml	123.10 ml	1.095 ✓
DV-3 Trap	2.804×10^{-4} mg/ml	45.61 ml	0.0128 ✓

1-12-79

SAMPLE #	RUN #	INJ SIZE	RT	AREA	AREA-BLANK	AREA/µl
BLANKCS$_2$	1	1.05 (3.85)	0.97	161	—	
			1.23	193	—	
			1.30	237	—	
			1.56	29	—	
				620 ✓		161 ✓
	2	1.10 (3.90)	0.97	89	—	
			1.23	186	—	
			1.30	214	—	
			1.56	34	—	
				523 ✓		134 ✓
	3	1.90 (4.70)	0.97	120	—	
			1.23	299	—	
			1.29	333	—	
			1.54	31	—	
				783 ✓	166 ✓	
						AVE = 154 ✓
CV-3	1	0.80 (3.60)	0.97	87		
			1.23	337		
			1.30	745		
			1.57	76		
				1245 ✓	691 ✓	863 ✓
	2	1.10 (3.90)	0.97	90		
			1.23	351		
			1.30	817		
			1.56	113		
				1371 ✓	770 ✓	700 ✓
	3	0.80 (3.60	0.97	98		
			1.30	1267		
			1.57	70		
				1435 ✓	881 ✓	~~1400~~ 1100 ✓

1-12-79

SAMPLE #	RUN #	INJ SIZE	RT	AREA	AREA - BLANK	AREA/ML
CV-3	4	0.80 (3.6)	0.97	135		
			1.23	271		
			1.30	683		
			1.56	84		
				1173 ✓	619 ✓	✓ 773
	5	1.00 (3.80)	0.97	100		
			1.23	365		
			1.30	808		
			1.56	82		
				1355 ✓	770 ✓	✓ 770

AVE = 841 ✓
2.124×10^{-3} mg/ml
mg/ml

CV-3 Trap	1	0.95 (3.7)	0.97	89		
		[redacted]	1.23	246		
			1.30	229		
			1.56	40		
				604 ✓	27 ✓	·28 ✓
	2	0.85 (3.65)	0.97	107		
			1.23	273		
			1.30	221		
			1.57	61		
				662 ✓	100 ✓	118 ✓
	3	0.90 (3.70)	0.97	92		
		[redacted]	1.23	290		
			1.29	299		
			1.55	54		
				735 ✓	165 ✓	184 ✓
	4	0.90 (3.70)	0.97	140		
			1.23	287		
			1.30	295		
			1.57	62		
				764 ✓	194 ✓	216 ✓

1-12-79

SAMPLE #	RUN #	Wt INT SIZE	RT	Area	area-Blank	area/µl
CV-3 Trap	5	0.90 (3.70)	0.97	92		
			1.23	184		
			1.30	217		
			1.57	46	-31 ✓	-34 ✓
				539 ✓		
						AVE = 102 ✓
						2.526×10^{-4} µg/µl
						mg/ml
DV-3	1	1.05 (3.85) ±	0.97	131		
			1.30	3630		
			1.56	401		
				4162 ✓	3569 ✓	3399 ✓
	2	1.00 (3.80)	0.98	111		
			1.30	3733		
			1.56	412		
				4256 ✓	3671 ✓	3671 ✓
	3	1.05 (3.85)	0.98	121		
			1.30	3710		
			1.56	425		
				4256 ✓	3663 ✓	3489 ✓
						AVE = 3520 ✓
						8.891×10^{-3}
						µg/µl
						mg/ml
DV-3 Trap	1	0.80 (3.60)	0.97	59		
			1.23	261		
			1.30	262		
			1.57	32	60 ✓	75 ✓
				614 ✓		
	2	0.85 (3.65)	0.98	127		
			1.23	266		
			1.30	266		
			1.57	30	127 ✓	149 ✓
				689 ✓		
	3	1.05 (3.85)	0.97	93		
			1.23	303		
			1.30	276		
			1.56	35	114 ✓	109 ✓
				707 ✓		

AVE = 111 ✓

2.804×10^{-4} µg/µl mg/ml

1-12-79
H_2 16 psi
N_2 50
Air 60/28

```
TEMP1          70    70
TIME1           3.0
INJ TEMP      100   100
FID TEMP      250   250
TCD TEMP        0    43
AUX TEMP        0    45
OVEN MAX      280

CHT SPD         1.50
ATTN 2↑         5
FID SGNL      A
SLP SENS        0.05
AREA REJ        1
FLOW  A         1
FLOW  B        20
OPTN            0
```

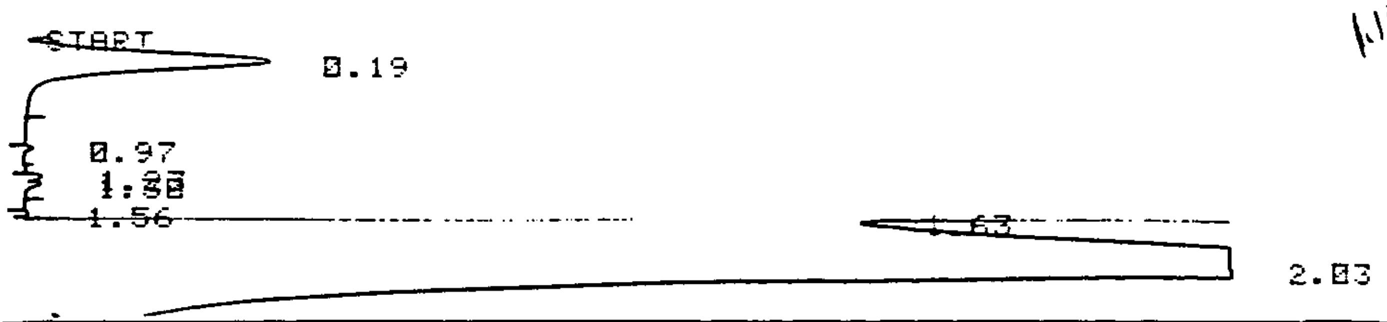
1.05 µl CS2 flush

hp 5830A
AREA %

RT	AREA	AREA %
0.97	161	0.087
1.23	193	0.104
1.30	237	0.128
1.56	29	0.016
1.62	7448	4.014
2.03	177500	95.652

XF: 1.0000 E+ 0

1.10 µl

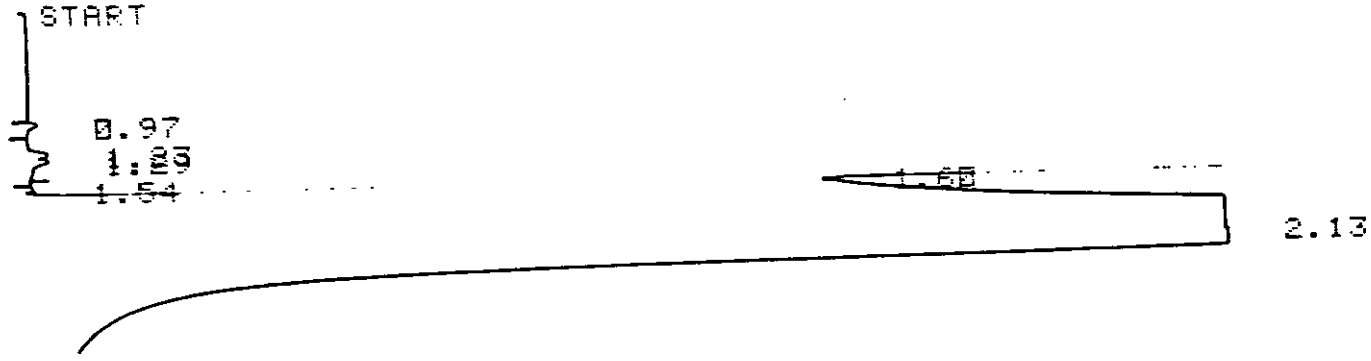


hp 5830A
AREA %

RT	AREA	AREA %
0.19	9740	5.203
0.97	89	0.048
1.23	186	0.099
1.30	214	0.114
1.56	34	0.018
1.63	7234	3.864
2.03	169730	90.653

XF: 1.0000 E+ 0

1.90 µl

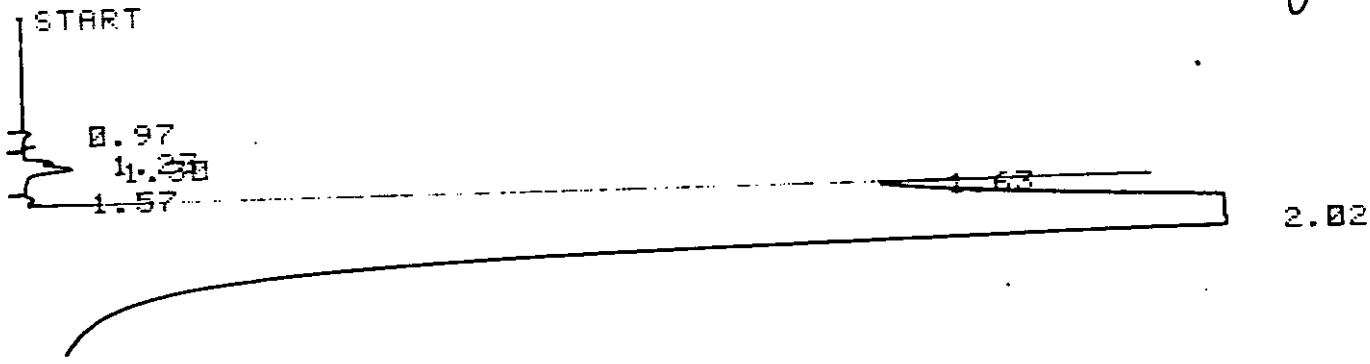


hp 5830A
AREA %

RT	AREA	AREA %
0.97	120	0.051
1.23	299	0.128
1.29	333	0.143
1.54	31	0.013
1.60	5979	2.564
2.13	226400	97.100

XF: 1.0000 E+ 0

CV-3
0.80 µl



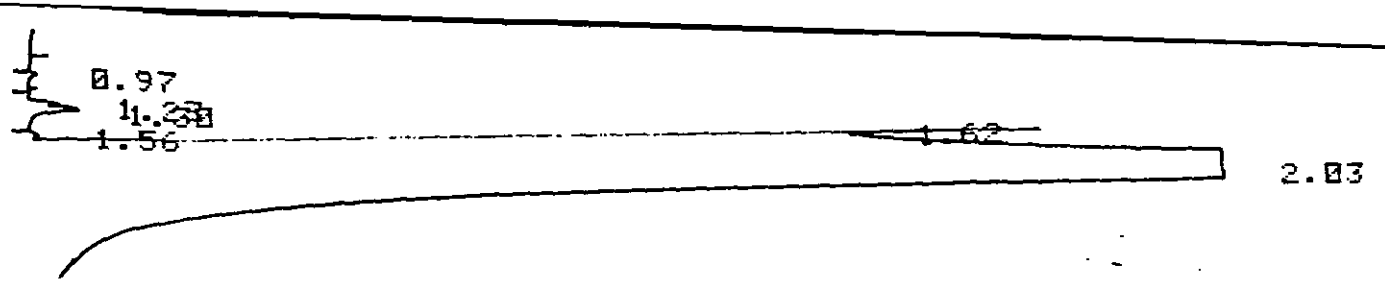
hp 5830A
AREA %

RT	AREA	AREA %
0.97	87	0.049
1.23	337	0.191
1.30	745	0.421
1.57	76	0.043
1.63	7216	4.080
2.02	168400	95.216

XF: 1.0000 E+ 0

1.10 µl

START

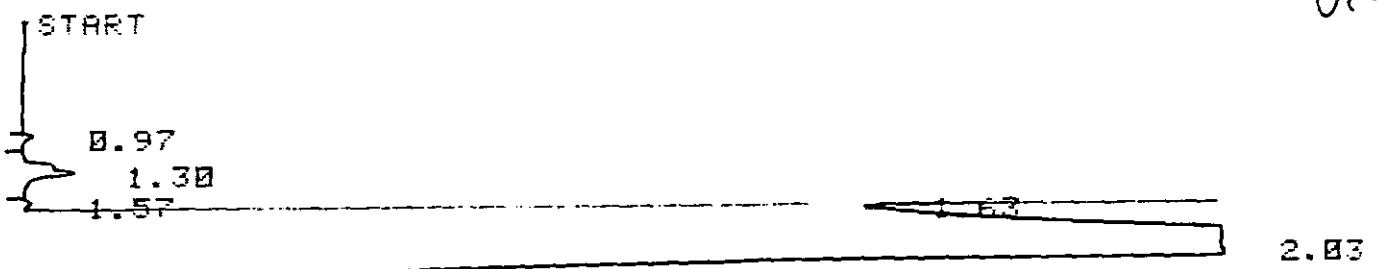


hp 5830A
AREA %

RT	AREA	AREA %
0.24	9298	4.979
0.97	90	0.048
1.23	351	0.188
1.30	817	0.437
1.56	113	0.061
1.62	6492	3.476
2.03	169600	90.811

XF: 1.0000 E+ 0

0,80 µl

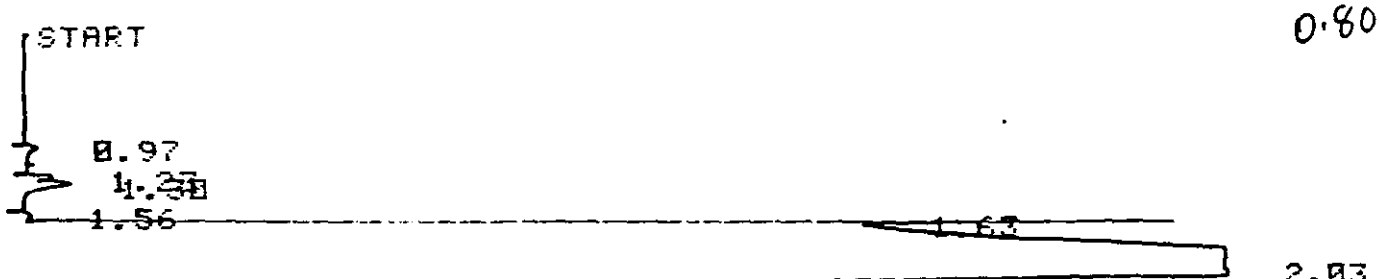


hp 5830A
AREA %

RT	AREA	AREA %
0.97	98	0.058
1.30	1267	0.753
1.57	70	0.042
1.63	6422	3.817
2.03	160400	95.330

XF: 1.0000 E+ 0

0.80 µl

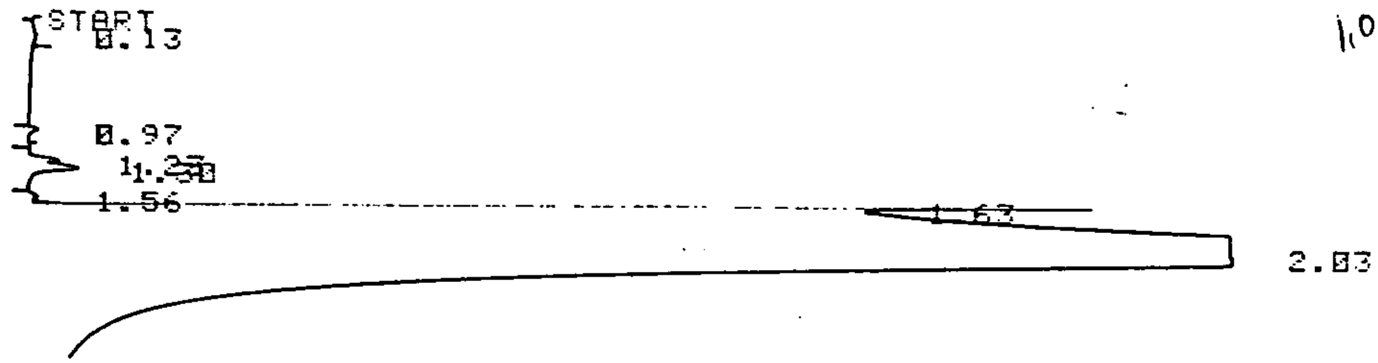


hp 5830A
AREA %

RT	AREA	AREA %
0.97	135	0.080
1.23	271	0.161
1.30	683	0.407

1.56	84	0.050
1.63	6502	3.871
2.03	160300	95.431

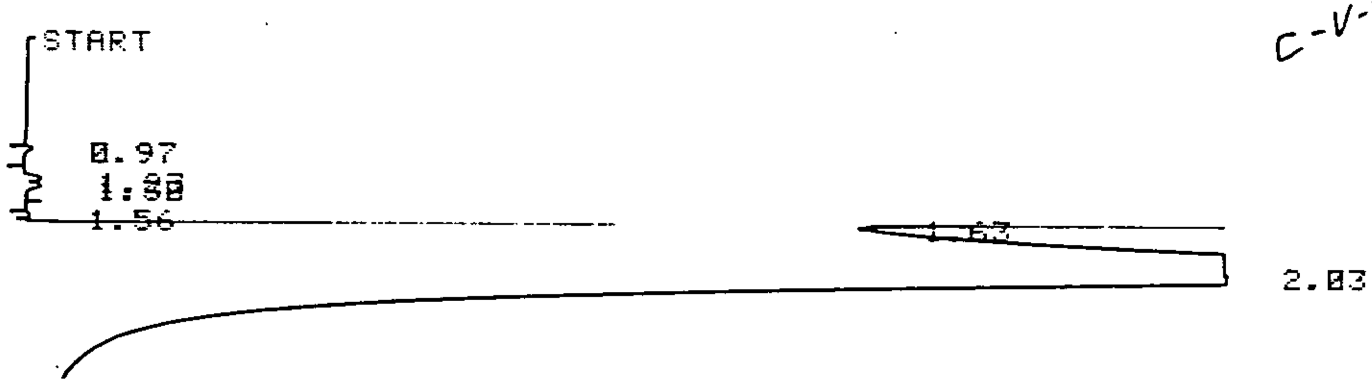
XF: 1.0000 E+ 0



hp 5830A
AREA %

RT	AREA	AREA %
0.13	101	0.056
0.97	100	0.056
1.23	365	0.203
1.30	808	0.450
1.56	82	0.046
1.63	6994	3.895
2.03	171100	95.294

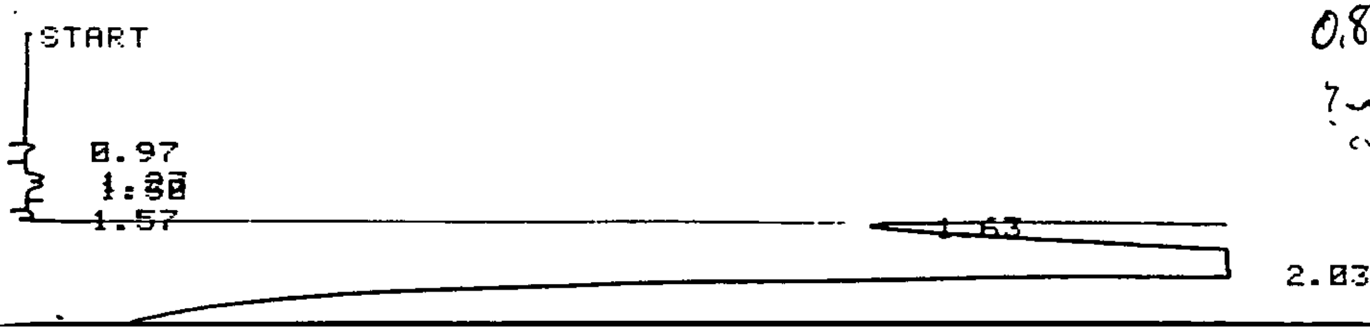
XF: 1.0000 E+ 0



hp 5830A
AREA %

RT	AREA	AREA %
0.97	89	0.050
1.23	246	0.138
1.30	229	0.129
1.56	40	0.022
1.63	6578	3.700
2.03	170600	95.960

XF: 1.0000 E+ 0

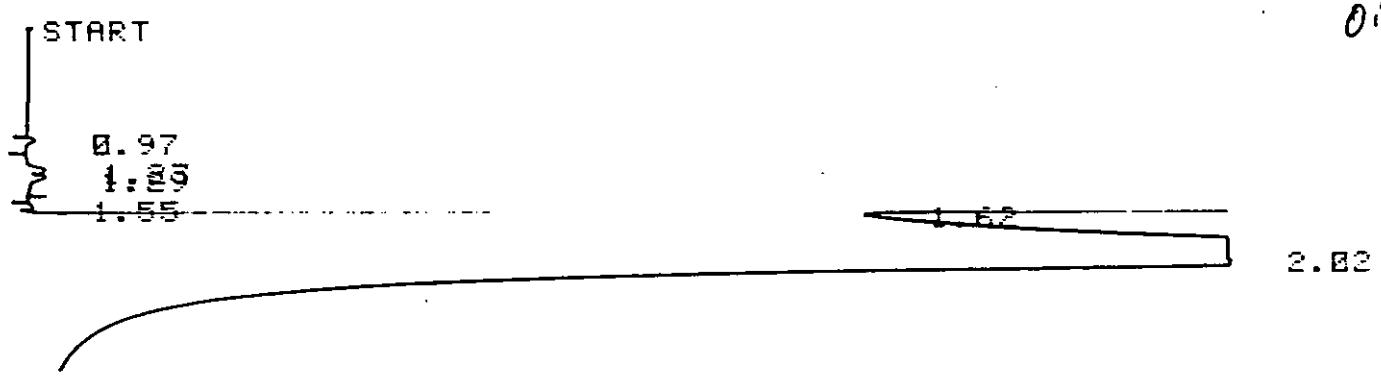


AREA %

RT	AREA	AREA %
0.97	107	0.065
1.23	273	0.165
1.30	221	0.133
1.57	61	0.037
1.63	6788	4.100
2.03	158100	95.500

XF: 1.0000 E+ 0

0.90 HL



hp 5830A
AREA %

RT	AREA	AREA %
0.97	92	0.055
1.23	290	0.174
1.29	299	0.180
1.55	54	0.032
1.62	6558	3.946
2.02	158900	95.612

XF: 1.0000 E+ 0

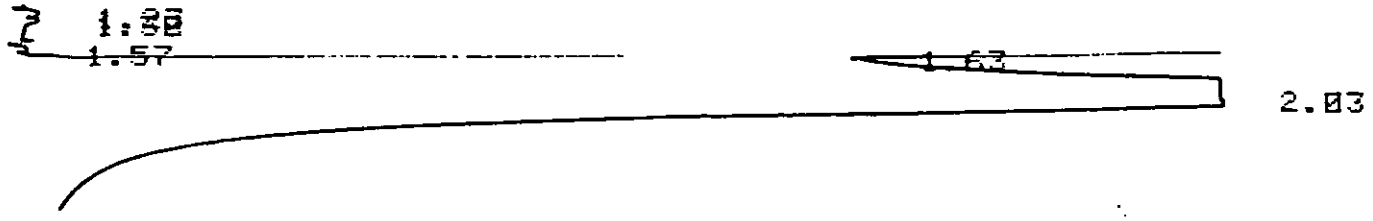
CV-3 any 0.90 HL

hp 5830A
AREA %

RT	AREA	AREA %
0.97	140	0.084
1.23	287	0.172
1.30	275	0.165
1.57	62	0.037
1.63	5993	3.587
2.03	160300	95.955

XF: 1.0000 E+ 0

0.90 HL

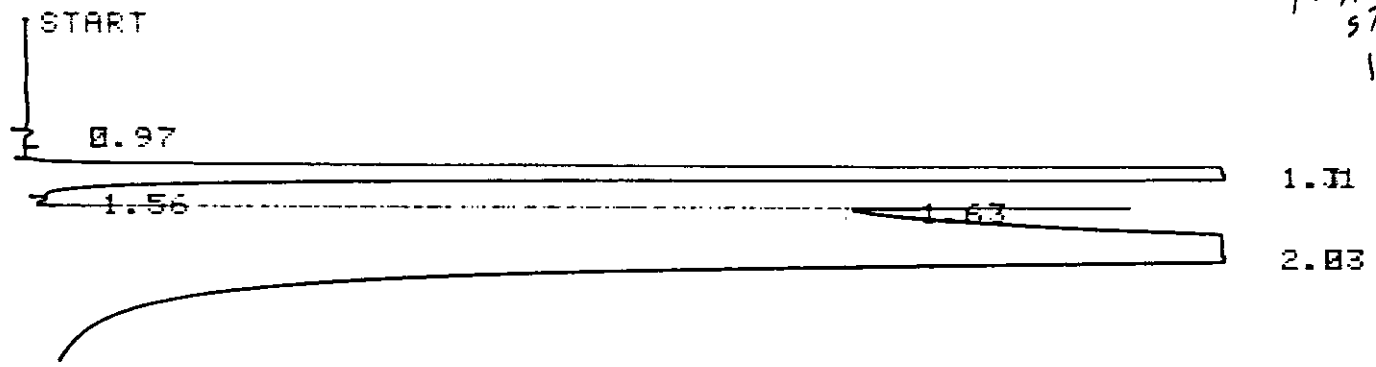


hp 5830A
AREA %

RT	AREA	AREA %
0.97	92	0.055
1.23	184	0.110
1.30	217	0.130
1.57	46	0.028
1.63	5421	3.255
2.03	160600	96.422

XF: 1.0000 E+ 0

1-11-79
STD
100µl

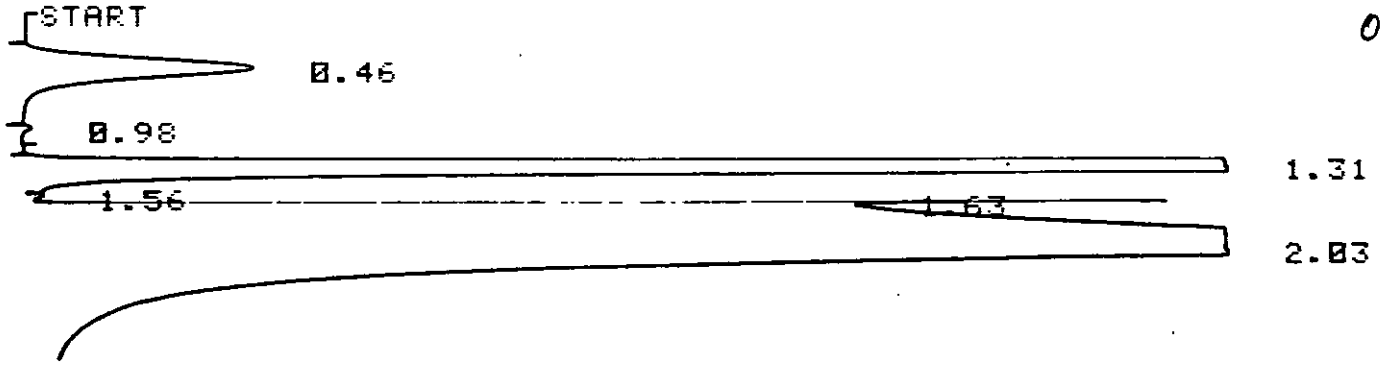


hp 5830A
AREA %

RT	AREA	AREA %
0.97	67	0.016
1.31	247600	60.052
1.56	193	0.047
1.63	5747	1.394
2.03	158700	38.491

XF: 1.0000 E+ 0

0.90µl



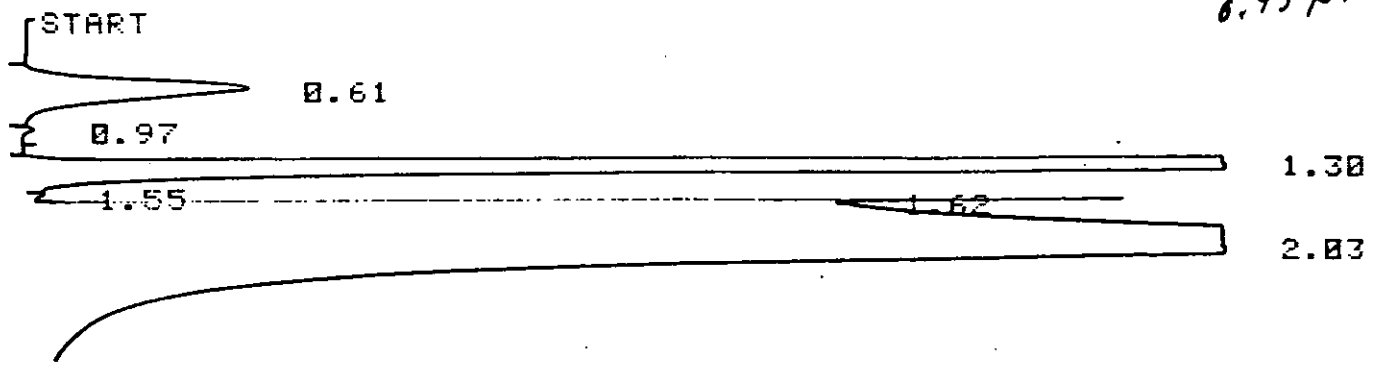
hp 5830A
AREA %

RT	AREA	AREA %
0.46	9606	2.304
0.98	122	0.029
1.31	244800	58.715
1.56	169	0.041
1.63	6630	1.590

2.03 158600 37.321

XF: 1.0000 E+ 0

0.95 ml



hp 5830A
AREA %

RT	AREA	AREA %
0.61	9418	2.191
0.97	143	0.033
1.30	256100	59.580
1.55	192	0.045
1.62	5686	1.323
2.03	158300	36.828

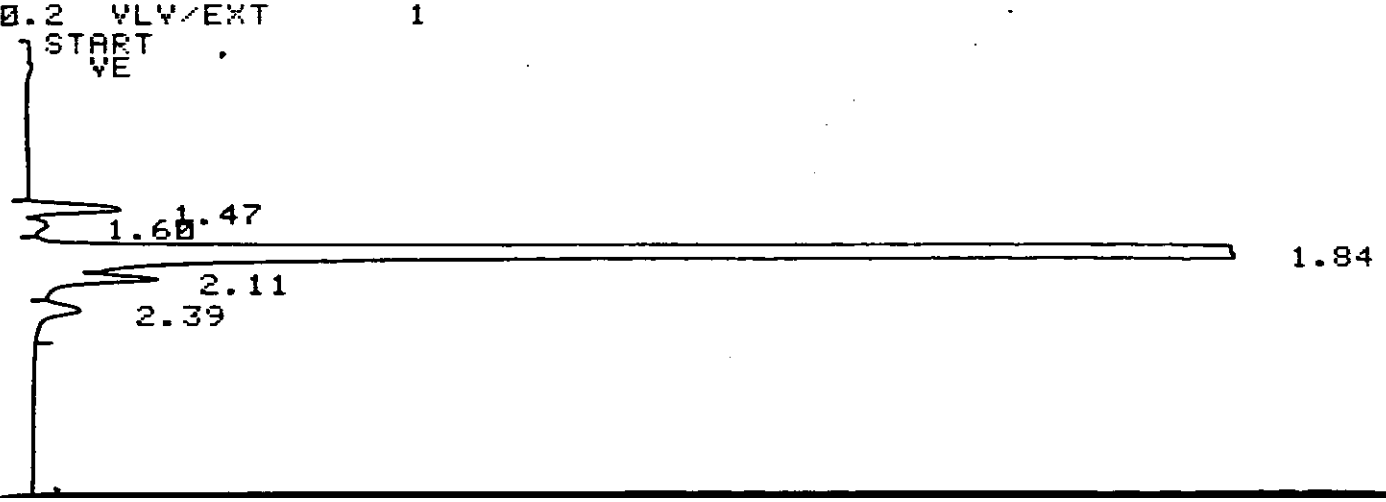
XF: 1.0000 E+ 0

483 PPM STP

VLV/EXT . 2 MIN? ESCAPE
VLV/EXT 1 MIN? . 2 @

TIME1 5 @

TEMP1	70	70
TIME1	5.0	
INJ TEMP	100	100
FID TEMP	250	250
TCD TEMP	0	43
AUX TEMP	0	45
OVEN MAX	280	
CHT SPD	1.50	
ATTN 2↑	5	
FID SGNL	A	
SLP SENS	0.05	
AREA REJ	1	
FLOW A	1	
FLOW B	20	
OPTN	0	
0.2	VLV/EXT	1

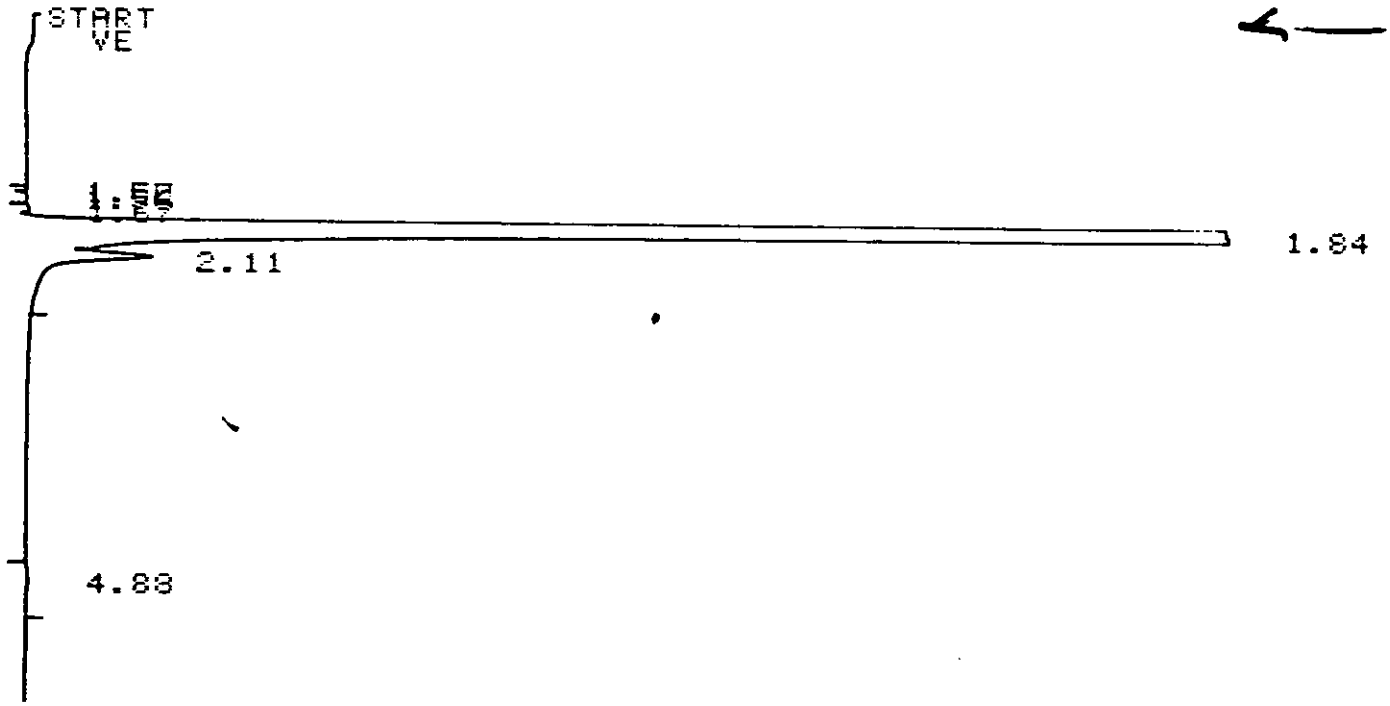


hp 5830A
AREA %

RT	AREA	AREA %
1.47	1655	0.507
1.60	377	0.116
1.84	320200	98.111
2.11	2689	0.824
2.39	1282	0.393
4.86	161	0.049

XF: 1.0000 E+ 0

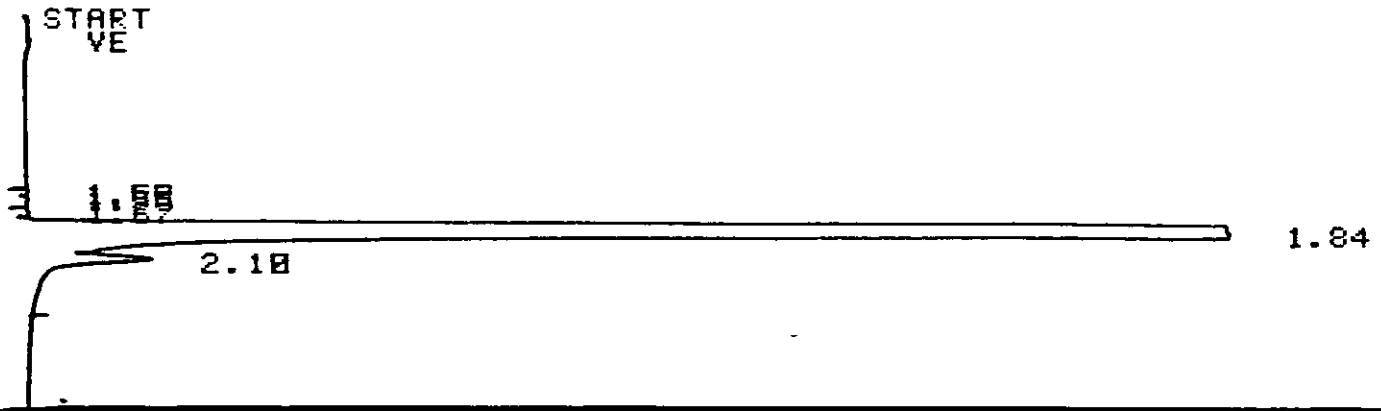
TIME1 6 @

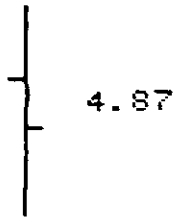


hp 5830A
AREA %

RT	AREA	AREA %
1.50	13	0.004
1.56	14	0.004
1.67	41	0.013
1.84	316300	98.984
2.11	3061	0.958
4.88	117	0.037

XF: 1.0000 E+ 0



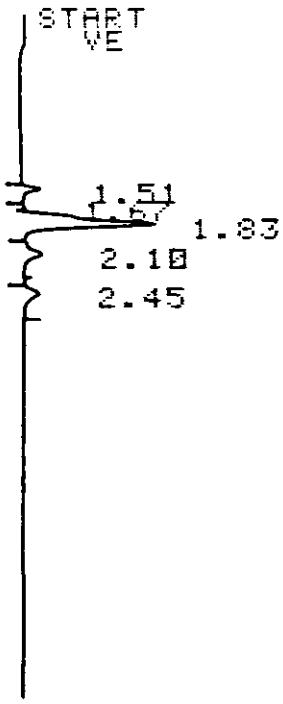


hp 5830A
AREA %

RT	AREA	AREA %
1.50	20	0.006
1.55	13	0.004
1.67	25	0.008
1.84	317200	99.017
2.10	2965	0.926
4.87	127	0.040

XF: 1.0000 E+ 0

B-CV-1
1 min

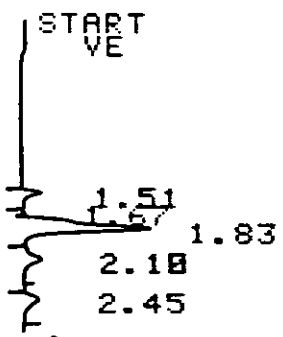


hp 5830A
AREA %

RT	AREA	AREA %
1.51	207	5.797
1.67	30	0.840
1.83	2545	71.269
2.10	446	12.490
2.45	343	9.605

XF: 1.0000 E+ 0

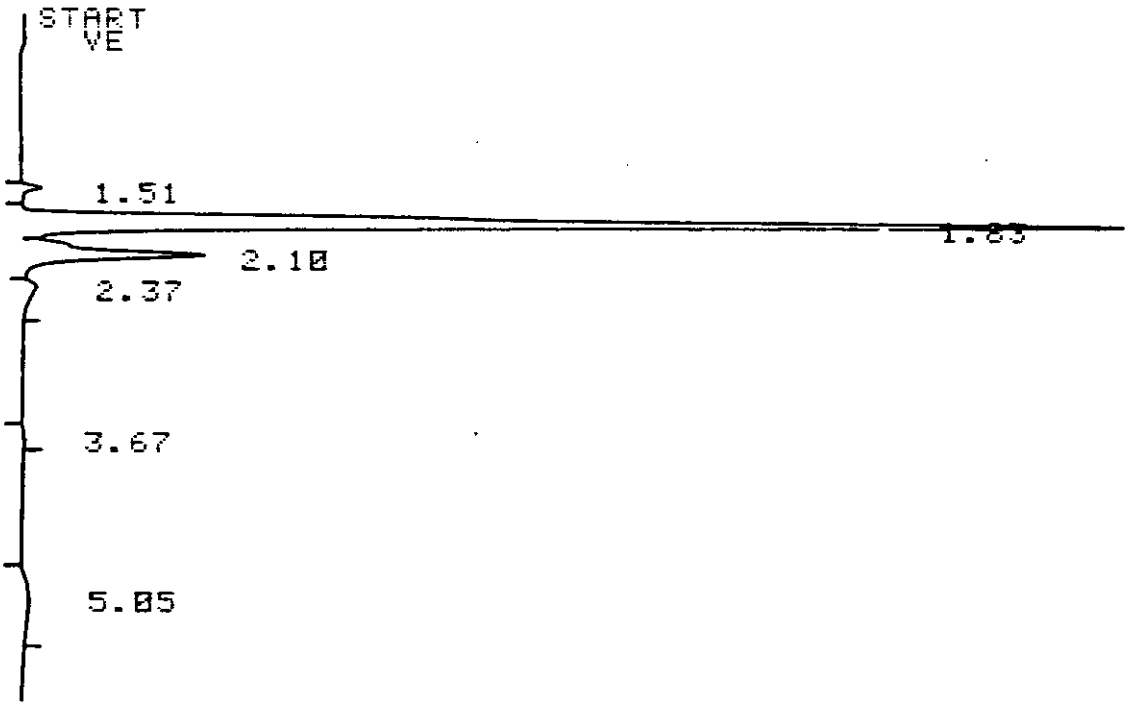
1-min



hp 5830A
AREA %

RT	AREA	AREA %
1.51	214	6.183
1.67	23	0.665
1.83	2475	71.511
2.10	443	12.800
2.45	306	8.841

XF: 1.0000 E+ 0



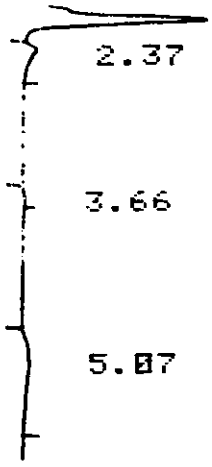
B-P.V.-1
1 min

hp 5830A
AREA %

RT	AREA	AREA %
1.51	216	0.829
1.83	20730	79.596
2.10	3995	15.339
2.37	478	1.835
3.67	62	0.238
5.05	563	2.162

XF: 1.0000 E+ 0

1 min



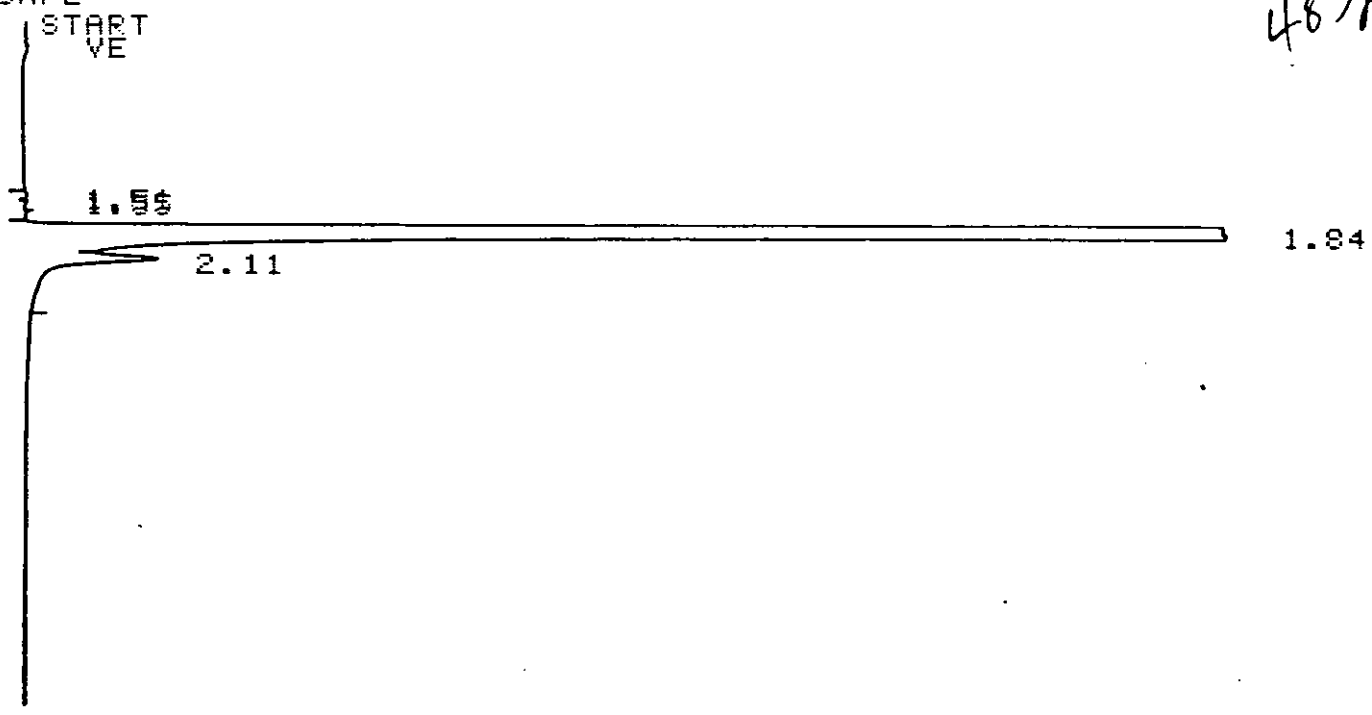
5830A
AREA %

RT	AREA	AREA %
1.51	226	0.852
1.83	20950	79.000
2.10	4084	15.400
2.37	474	1.787
3.66	53	0.200
5.07	732	2.760

XF: 1.0000 E+ 0

TEMP1 70 70
ESCAPE

483 ppm STP

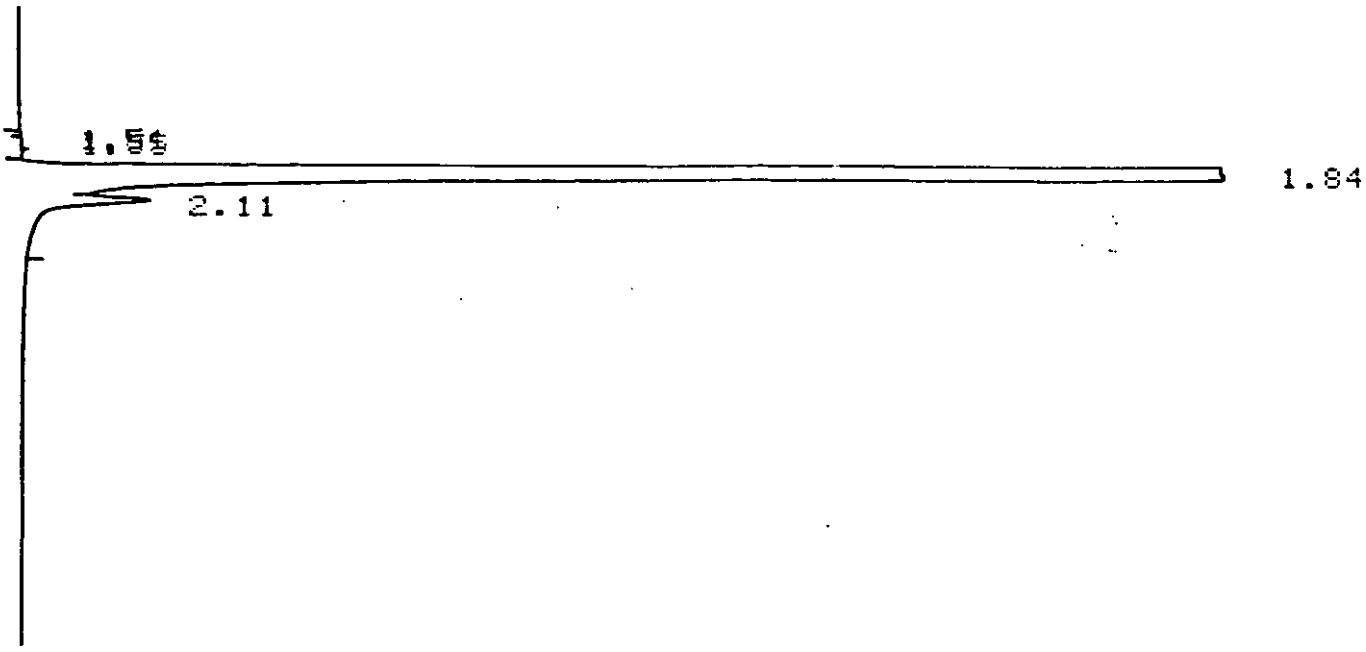


5830A
AREA %

RT	AREA	AREA %
1.51	38	0.012
1.55	17	0.005
1.84	322300	99.007
2.11	3179	0.977

XF: 1.0000 E+ 0

START



HP 5830A
AREA %

RT	AREA	AREA %
1.51	11	0.003
1.55	17	0.005
1.84	322400	99.025
2.11	3145	0.966

XF: 1.0000 E+ 0

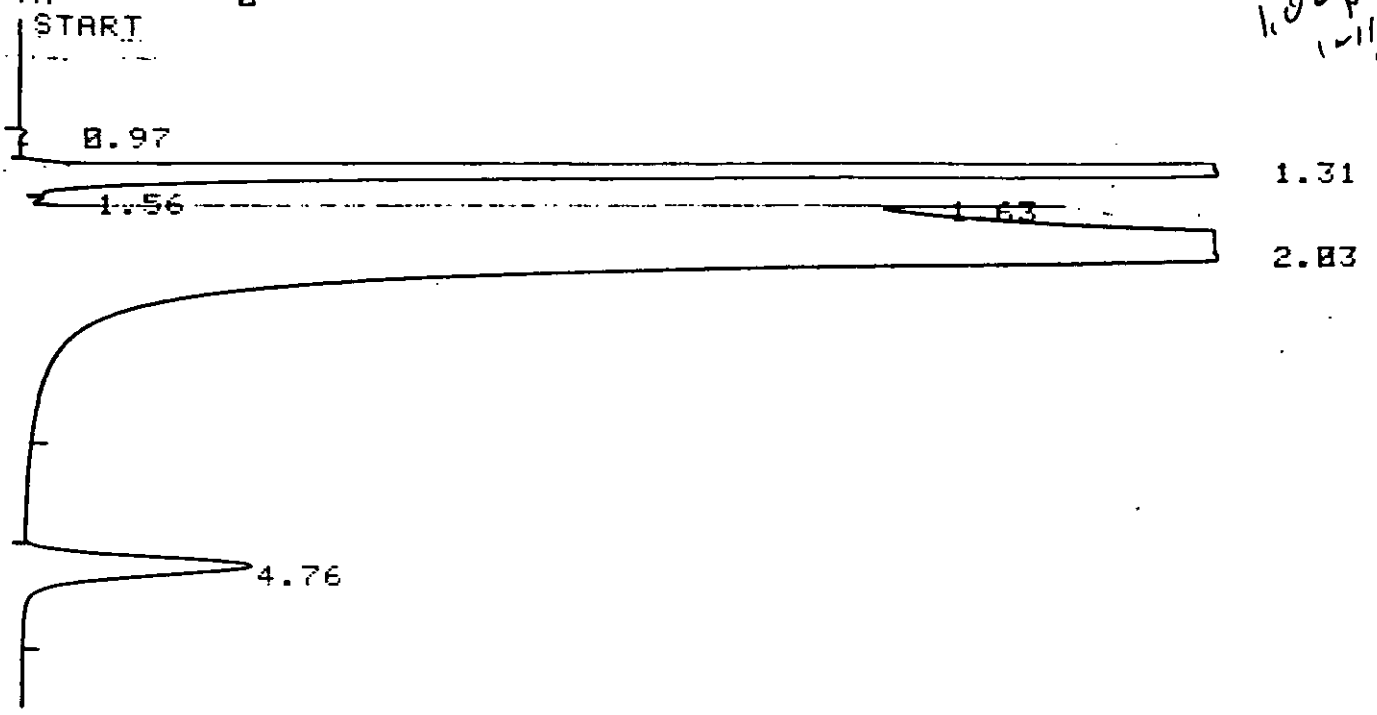
TEMP1	70	70
TIME1	6.0	
INJ TEMP	100	100
FID TEMP	250	250
TCD TEMP	0	43
AUX TEMP	0	45
OVEN MAX	280	
CHT SPD	1.50	
ATTN 2↑	5	
FID SGNL	A	
SLP SENS	0.05	
AREA REJ	1	
FLOW A	1	
FLOW B	20	
OPTN	0	
0.2	VLV/EXT	1

DELETE TIME TBL

TEMP1	70	70
TIME1	6.0	
INJ TEMP	100	100
FID TEMP	250	250
TCD TEMP	0	43
AUX TEMP	0	45
OVEN MAX	280	
CHT SPD	1.50	
ATTN 2↑	5	
FID SGNL	A	
SLP SENS	0.05	
AREA REJ	1	

FLOW B 20
OPTN 0

1.00 µl



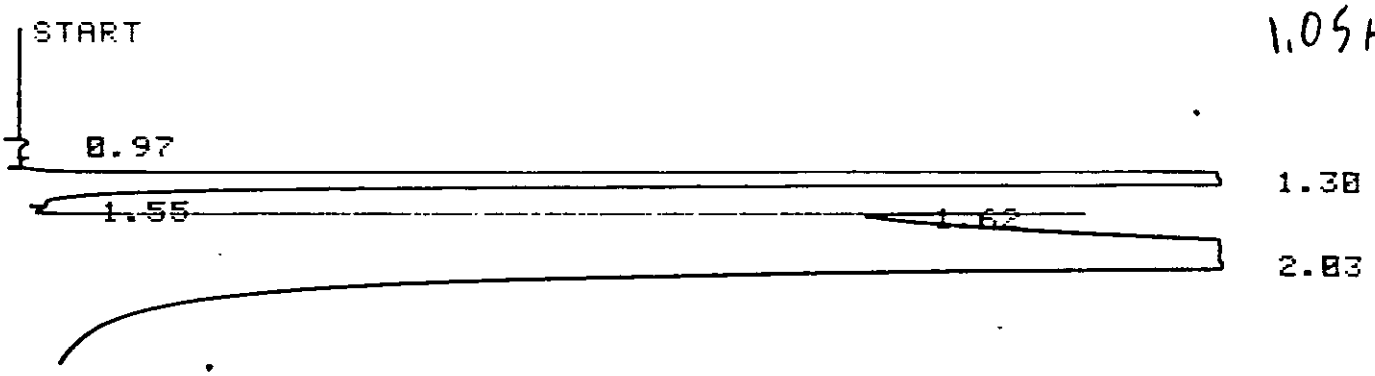
hp 5830A
AREA %

RT	AREA	AREA %
0.97	79	0.017
1.31	273500	59.271
1.56	308	0.067
1.63	6990	1.515
2.03	170800	37.014
4.76	9766	2.116

XF: 1.0000 E+ 0

TIME1 3 @

1.05 µl



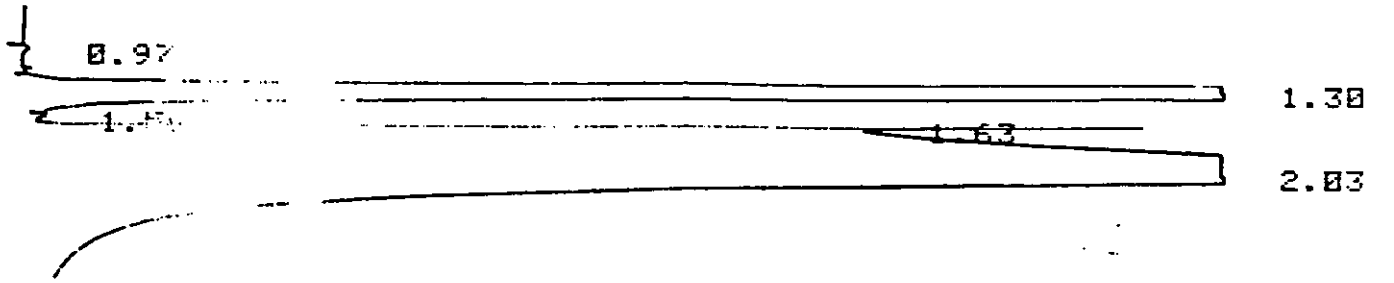
hp 5830A
AREA %

RT	AREA	AREA %
0.97	118	0.027
1.30	262500	60.370
1.55	201	0.046
1.62	5801	1.334
2.03	166200	38.223

XF: 1.0000 E+ 0

START

1.00 µl

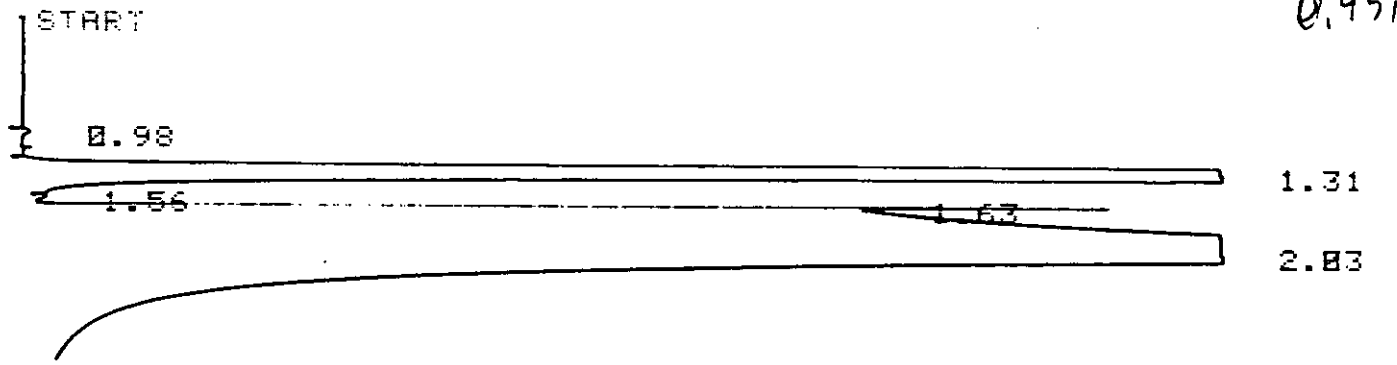


hp 5830A
AREA %

RT	AREA	AREA %
0.97	73	0.018
1.30	243700	59.179
1.56	216	0.052
1.63	5814	1.412
2.83	162000	39.339

XF: 1.0000 E+ 0

0.95 HR

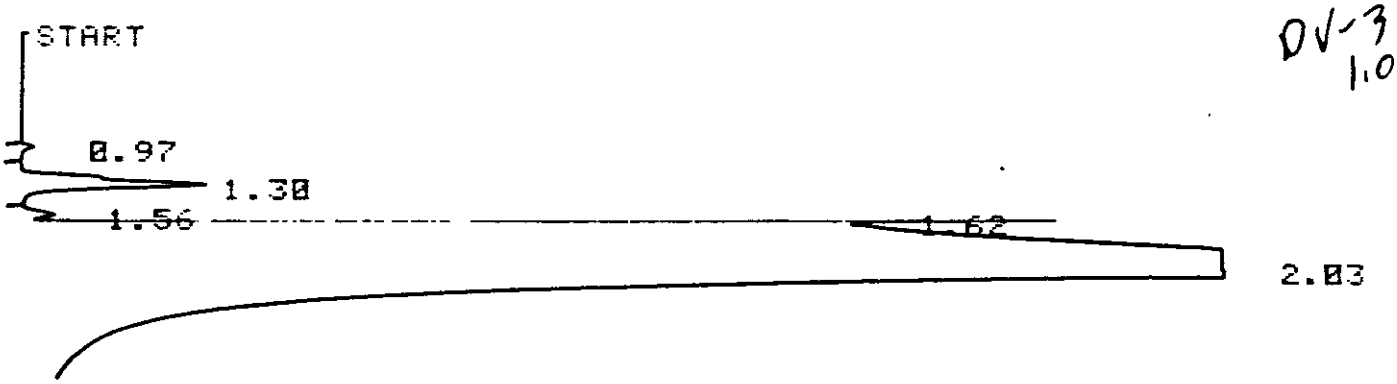


hp 5830A
AREA %

RT	AREA	AREA %
0.98	88	0.020
1.31	282500	62.793
1.56	225	0.050
1.63	5678	1.262
2.83	161400	35.875

XF: 1.0000 E+ 0

DV-3
1.05 HR

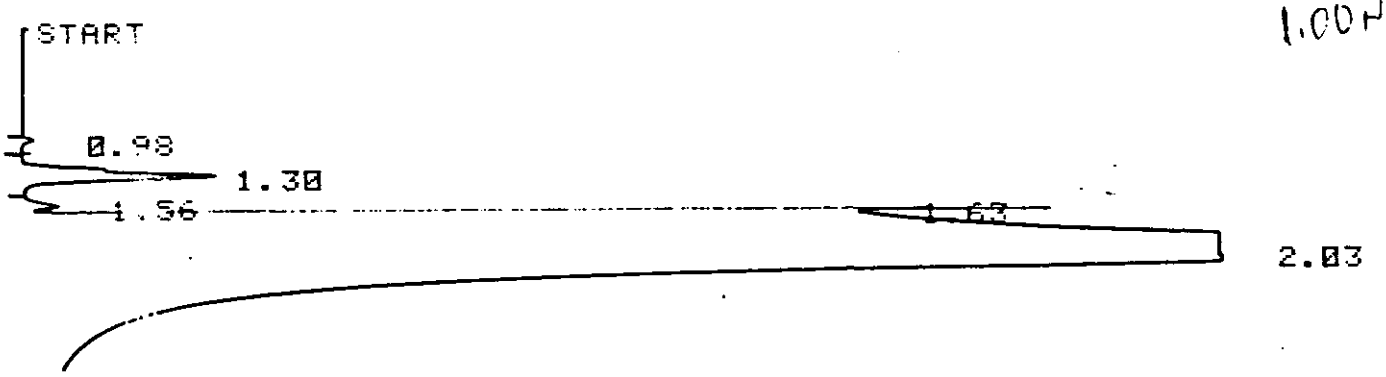


hp 5830A
AREA %

RT	AREA	AREA %
0.97	131	0.876
1.30	3630	2.099
1.56	401	0.232
1.62	6187	3.577
2.83	162600	94.216

XF: 1.0000 E+ 0

1.00 µl

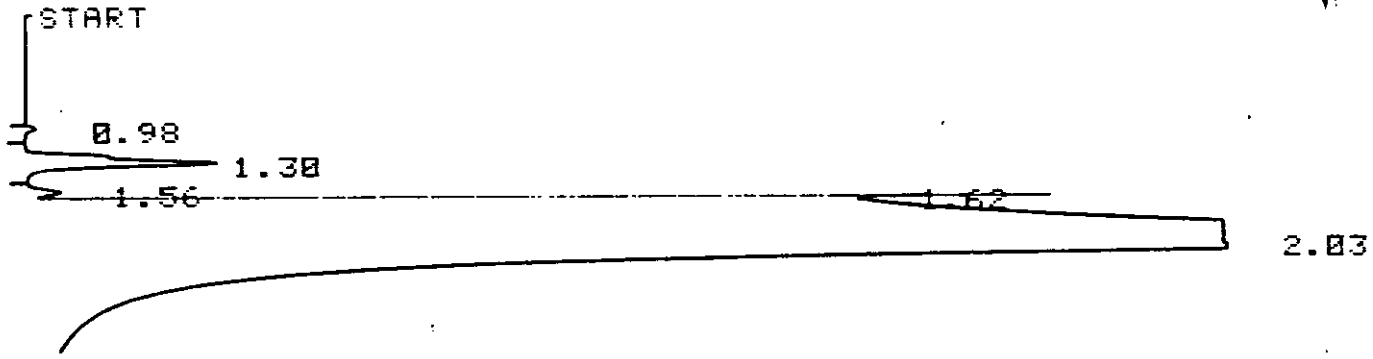


hp 5830A
AREA %

RT	AREA	AREA %
0.98	111	0.064
1.30	3733	2.156
1.56	412	0.238
1.63	6858	3.962
2.03	162000	93.580

XF: 1.0000 E+ 0

1.05 µl

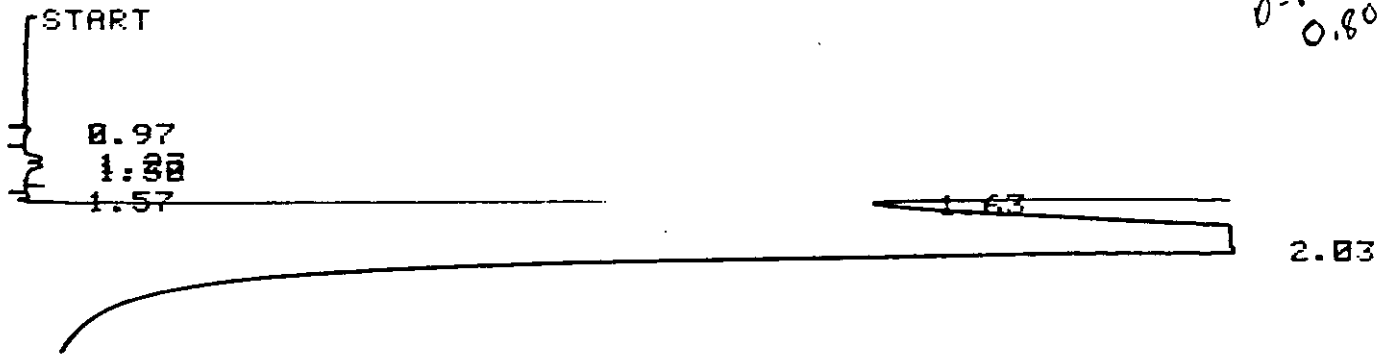


hp 5830A
AREA %

RT	AREA	AREA %
0.98	121	0.070
1.30	3710	2.161
1.56	425	0.248
1.62	6309	3.675
2.03	161100	93.846

XF: 1.0000 E+ 0

0-V-3 Trap
0.80 µl

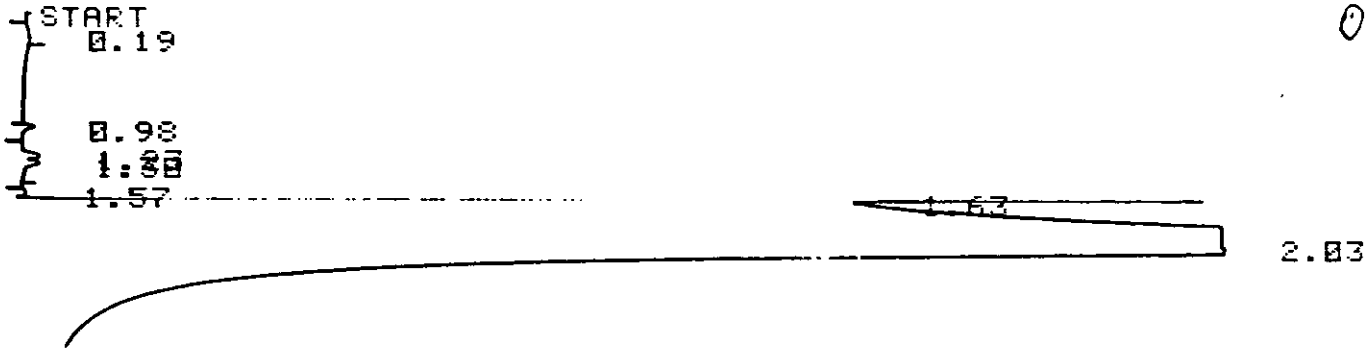


hp 5830A
AREA %

0.97	59	0.036
1.23	261	0.157
1.30	262	0.158
1.57	32	0.019
1.63	5750	3.469
2.03	159400	96.161

XF: 1.0000 E+ 0

0.85 NL

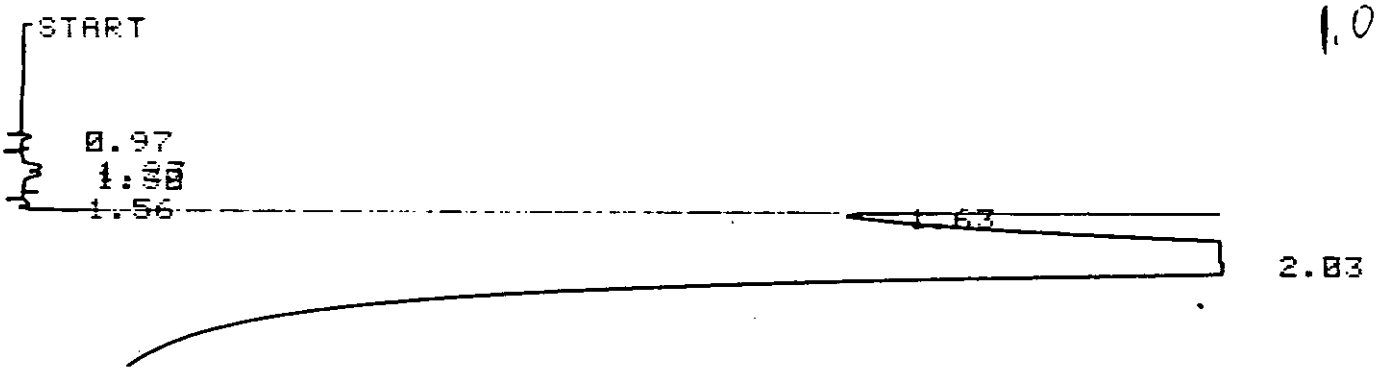


hp 5830A
AREA %

RT	AREA	AREA %
0.19	76	0.045
0.98	127	0.076
1.23	266	0.158
1.30	266	0.158
1.57	30	0.018
1.63	5162	3.074
2.03	162000	96.471

XF: 1.0000 E+ 0

1.05 NL



hp 5830A
AREA %

RT	AREA	AREA %
0.97	93	0.048
1.23	303	0.157
1.30	276	0.143
1.56	35	0.018
1.63	6576	3.402
2.03	186000	96.232

XF: 1.0000 E+ 0

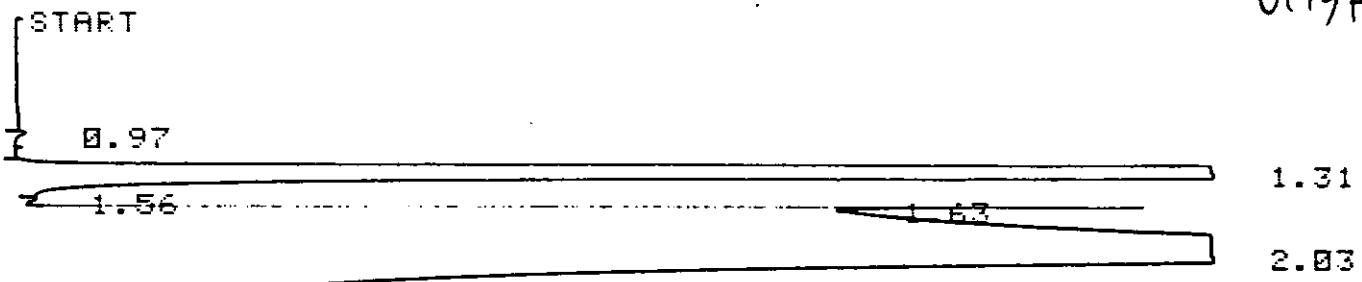
NEW STD
0.95 NL

hp 5830A
AREA %

RT	AREA	AREA %
0.98	69	0.017
1.31	236200	58.639
1.56	148	0.037
1.63	6087	1.511
2.03	160300	39.796

XF: 1.0000 E+ 0

0.95 pR



hp 5830A
AREA %

RT	AREA	AREA %
0.97	69	0.017
1.31	243900	59.640
1.56	160	0.039
1.63	5926	1.449
2.03	158900	38.855

XF: 1.0000 E+ 0

TEMP1	70	70
TIME1	3.0	
INJ TEMP	100	100
FID TEMP	250	250
TCD TEMP	0	43
AUX TEMP	0	45
OVEN MAX	280	
CHT SPD	1.50	
ATTN 2↑	5	
FID SGNL	A	
SLP SENS	0.05	
AREA REJ	1	
FLOW A	1	
FLOW B	20	
OPTN	0	

TEMP1 0 @
INJ TEMP 0 @
FID TEMP 0 @

```
TEMP1          70    70
TIME1           0.0
INJ TEMP      105   100
FID TEMP      252   250
TCD TEMP        0    43
AUX TEMP        0    45
OVEN MAX      380

CHT SPD         1.00
ATTN 2↑         5
FID SGNL       A
SLP SENS        0.05
AREA REJ        1
FLOW  A         [illegible]
FLOW  B        30
OFFS            [illegible]
```

REANALYSIS OF TANKS FROM TCA SAMPLING TRAIN

2/13/79

Tank no.	Sample no.	Average area	Conc. of tank ppm	Dilution factor	Conc. in source ppm
17	DV-5	2302	5.87	3.30	19.4
21	CV-5	1116	2.84	2.12	6.02
10	MOS-2-OUT-4	97145	248	1.82	451
12	MOS-2-IN-4	110638	282	3.62	1020
3	MOS-1-IN-4	1,005,928	2563	3.42	8770

256.05 mm Hg and 22.6 °C
2-13-79

(1)

RESIDUAL IN PCS's TANKS.

483 rpm

inj 0.500 cc

Run #	RT.	AREA
1	1.51	631
	1.85	188,300
	2.11	2,638
		191,569 ✓
2	1.51	619
	1.85	186,100
	2.11	2,552
		189 271 ✓
3	1.51	628
	1.85	187,200
	2.11	2,396
		190224 ✓
		571,064
4	1.52	608
	1.85	185,600
	2.11	2,359
		188,567 ✓
5	1.52	601
	1.85	186,300
	2.11	2,448
		189,349 ✓
6	1.52	595
	1.85	185,200
	2.11	2,417
		188,212 ✓
		1,137,192 ✓

AVE = 189,532

0.500 cc
inj

(2)

TANK # 17 DV-5

RUN #	RT	AREA
1	1.52	506
	1.84	1668
	2.12	243
		2417 ✓
2	1.52	492
	1.68	33
	1.85	1481
	2.12	233
		2239 ✓
3	1.52	496
	1.68	39
	1.84	1491
	2.12	225
		2251 ✓

$\frac{6907}{3}$ = 2302 AVE

5.87 ppm ✓

TANK # 21 CV-5

1	1.52	484
	1.68	47
	1.85	615
	2.12	74
		1220 ✓
2	1.52	470
	1.68	41
	1.85	562
	2.11	49
		1122 ✓
		1.00 cc
3	1.54	~~487~~ 886
	1.89	~~664~~ ✓ 1023
	2.13	~~61~~ ✓ 101
		~~1424~~ 2010 ✓ 1005 ✓

$\frac{3347}{3}$ ✓ = 1116 AVE

2.84 ppm ✓

3.29 9,395 ✓ ? ? ?

0.500 cc INJ

(3)

TANK # 10 main vent 4 MOS-2-OUT-4

RUN #	R.T.	AREA
1	1.53	1198
	1.78	89060
	1.95	3663
	2.12	4177
	2.39	214
		99,312 ✓
2	1.53	1181
	1.78	88,200
	1.95	3583
	2.11	4136
	2.37	191
		97,291 ✓
3	1.52	1159
	1.78	86,900
	1.95	3,523
	2.11	4,063
	2.38	187
		95,832 ✓

$\frac{291,435}{3}$ = 97,145 AVE.

248 ppm ✓

~~3.71~~

RT ?? AREA
3.71 " 84

TANK #12 MOS-2-IN-4

1	1.53	580
	1.78	104,400
	1.95	4,667
	2.12	1,816
		111,463 ✓
2	1.53	572
	1.78	103,700
	1.95	4,608
	2.12	1,770
		110,650 ✓
3	1.53	563
	1.78	102,800

$\frac{331,914}{3}$ = 110,638 AVE

282 ppm ✓

RT AREA
3.60 ? 363

0,500 cc INJ

(4)

TANK #3

RUN #	MOS-1-IN-4 RT.	AREA
1	1.52	474
	1.83	909,800
	2.12	99,840
	2.38	7,778
		1,017,892 ✓
	5.34	585 ???
2	1.52	464
	1.83	900,200
	2.11	98,660
	2.38	6,916
		1,006,240 ✓
3	1.52	459
	1.83	888,600
	2.11	97,640
	2.38	6,954
		993,653 ✓

$\frac{3,017,785}{3} =$ AVE 1,005,928 ✓

2563 ppm

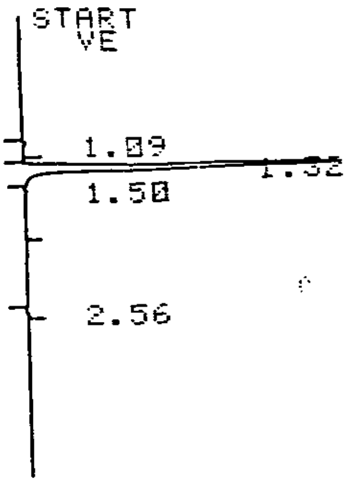
Central Soya:

Data from Frank at PCS

Tank #	dilution factor	sample volume
21	2.12 ✓	2.970 ✓
3	3.42 ✓	1.829 ✓
17	3.30 ✓	1.903 ✓
12	3.62 ✓	1.729 ✓
10	1.82 ✓	3.445 ✓

multiply concentration found in tank by dilution factor to get concentration in source

XF: 1.0000 E+ 0



hp 5830A
AREA %

RT	AREA	AREA %
1.09	951	0.941
1.32	98460	97.384
1.50	1660	1.642
2.56	34	0.034

XF: 1.0000 E+ 0

A	11	
B	11	
TEMP1	70	70
ESCAPE		
B	16	
A	11	
A	6	
B	19	
A	6	
B	19	
B	20	

TEMP1	70	70
TIME1	4.0	
INJ TEMP	100	100
FID TEMP	250	250
TCD TEMP	0	43
AUX TEMP	0	45
OVEN MAX	280	

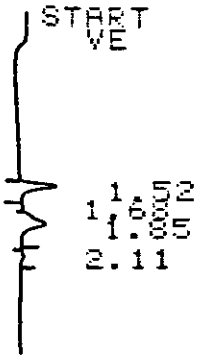
CHT SPD	1.50
ATTN 2↑	10
FID SGNL	A
SLP SENS	0.05
AREA REJ	1
FLOW A	6
FLOW B	20
OPTN	0

0.2 VLV/EXT 1

Frank
Meadows
Tank
Delphos
Test

2-13-79

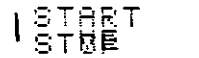
4 83 ppm



hp 5830A
AREA %

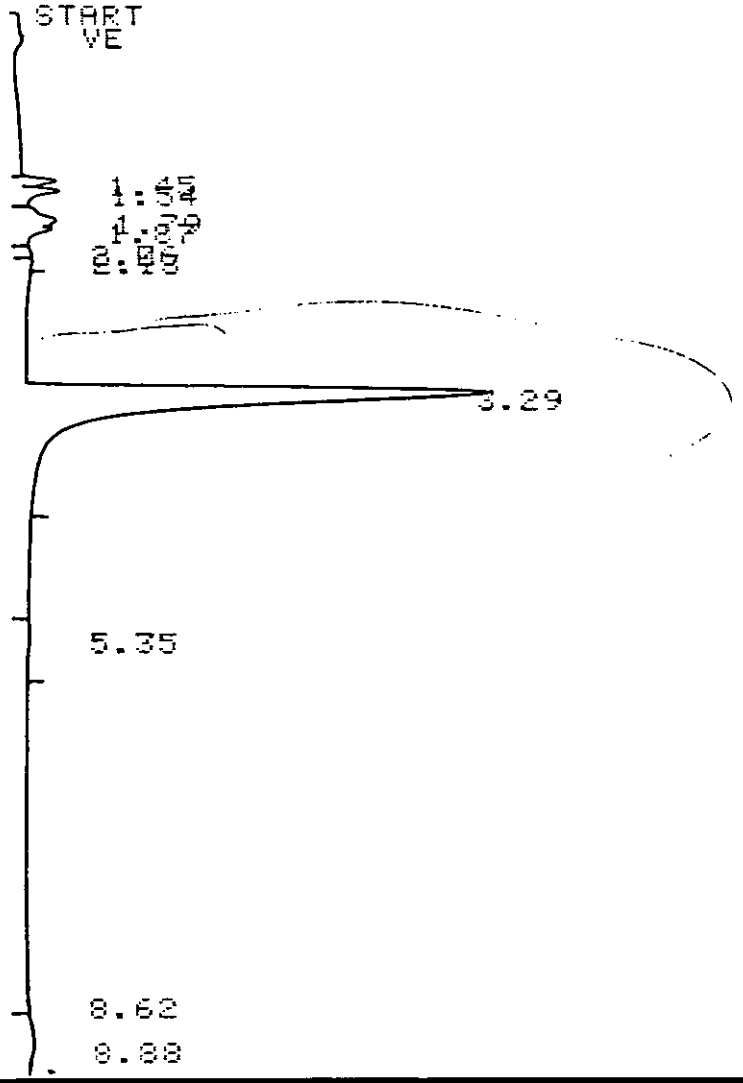
RT	AREA	AREA %
1.52	470	41.890
1.68	41	3.654
1.85	562	50.089
2.11	49	4.367

XF: 1.0000 E+ 0



hp 5830A

TEMP1 ESCAPE
TIME1 1 0 0



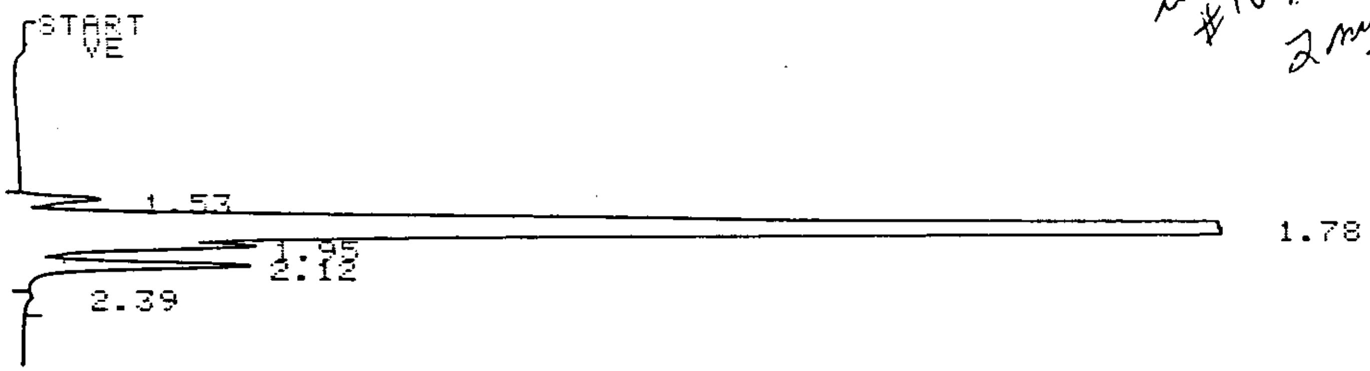
hp 5830A
AREA %

RT	AREA	AREA %
1.45	397	1.852
1.54	489	2.281
1.79	664	3.097
1.87	359	1.675
2.06	40	0.187
2.13	61	0.285
3.29	18790	87.652
5.35	129	0.602
8.88	508	2.370

XF: 1.0000 E+ 0

TIME1 3 @

Tubed #10 main vent 4
2 min at
7 sec/10



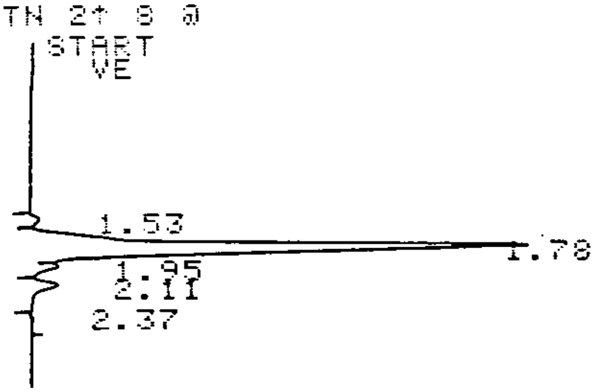
hp 5830A
AREA %

RT	AREA	AREA %
1.53	1198	1.219
1.78	89060	90.589
1.95	3663	3.726
2.12	4177	4.249
2.39	214	0.218

XF: 1.0000 E+ 0

ATTN 2↑ 8 @

7.5 sec/10 ml
2 min



hp 5830A
AREA %

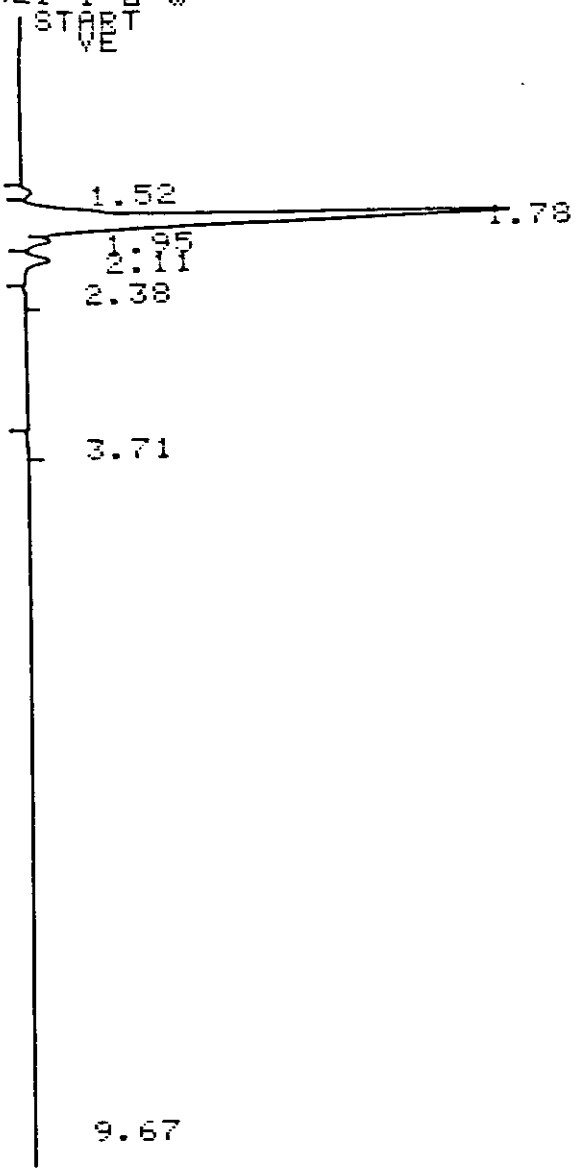
RT	AREA	AREA %
1.53	1181	1.214
1.78	88200	90.656

2.37 191 0.196

XF: 1.0000 E+ 0

8.5 sec/10 ml

TIME1 1 0 @



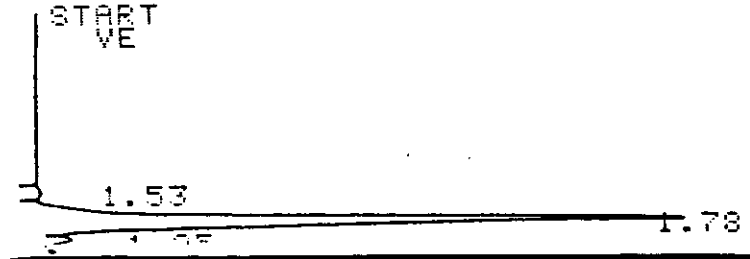
Tank 10
main vent 4

hp 5830A
AREA %

RT	AREA	AREA %
1.52	1159	1.208
1.78	86900	90.600
1.95	3523	3.673
2.11	4063	4.236
2.38	187	0.195
3.71	84	0.088

XF: 1.0000 E+ 0

Tank #12
mus-2-inj
2 min
7.0 sec/10



STØP61
hp 5830A
AREA %

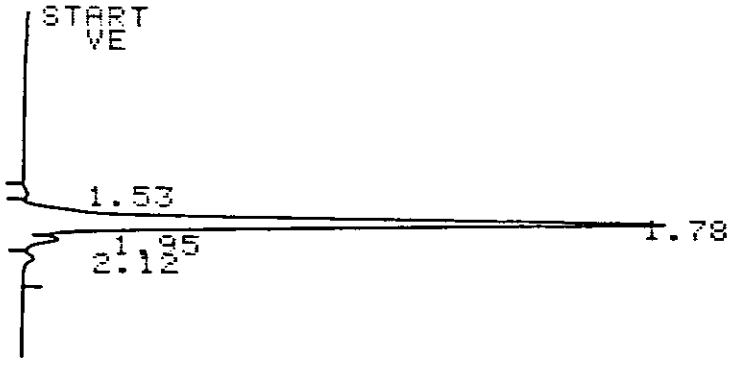
RT	AREA	AREA %
1.53	580	0.520
1.78	104400	93.568
1.95	4667	4.183
2.12	1816	1.628
3.61	114	0.102

XF: 1.0000 E+ 0

TANK 2
MOS-2-IN-4

2 min 7.5 ml/10 ml

TIME1 3 @



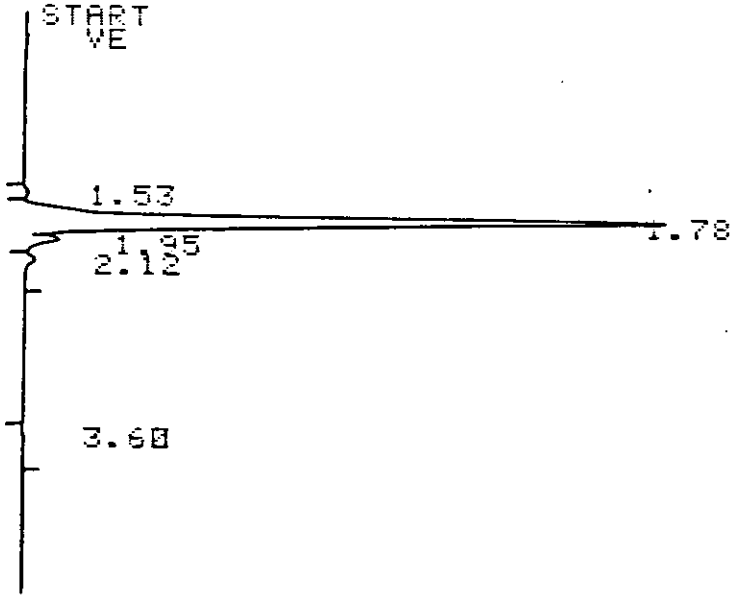
hp 5830A
AREA %

RT	AREA	AREA %
1.53	572	0.517
1.78	103700	93.719
1.95	4608	4.164
2.12	1770	1.600

XF: 1.0000 E+ 0

2 min 8.0/10 ml

TIME1 1 Ø @



6.71

7.94

hp 5830A
AREA %

RT	AREA	AREA %
1.53	563	0.511
1.78	102800	93.315
1.95	4641	4.213
2.12	1797	1.631
3.60	363	0.330

XF: 1.0000 E+ 0

MOS-1-IW-4
Tank #3
2 min
8 sec/10 mL

START
VE

1.52

1.83

2.12

2.38

5.34

8.48

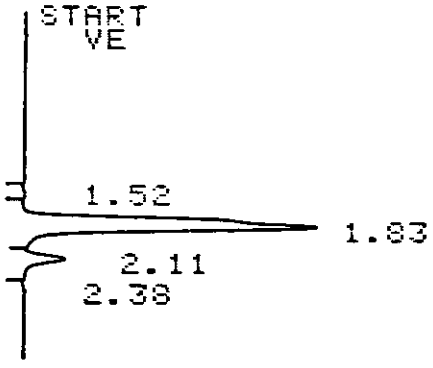
AREA %

RT	AREA	AREA %
1.52	474	0.047
1.83	909800	89.330
2.12	99840	9.803
2.38	7778	0.764
5.34	585	0.057

XF: 1.0000 E+ 0

2 min 8.8 ml/10ml

TIME1 3 @
ATTN 2↑ 1 2 @



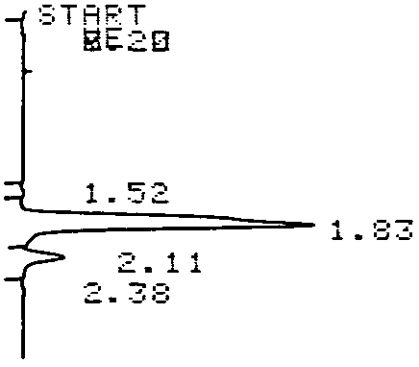
Tank 3
POS-1-IN-4

hp 5830A
AREA %

RT	AREA	AREA %
1.52	464	0.046
1.83	900200	89.462
2.11	98660	9.805
2.38	6916	0.687

XF: 1.0000 E+ 0

2 min 8.9 ml/10ml



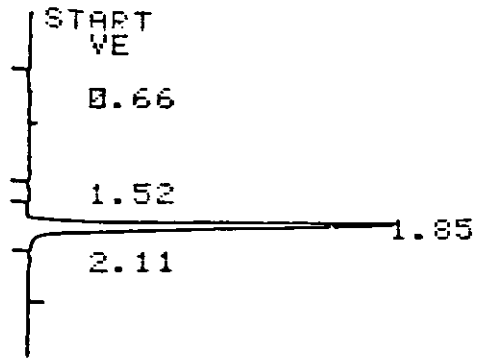
hp 5830A
AREA %

RT	AREA	AREA %
0.20	565	0.057
1.52	459	0.046
1.83	888600	89.377
2.11	97640	9.821
2.38	6954	0.699

XF: 1.0000 E+ 0

ATTN 2↑ 1 0 @

483 ppm Red

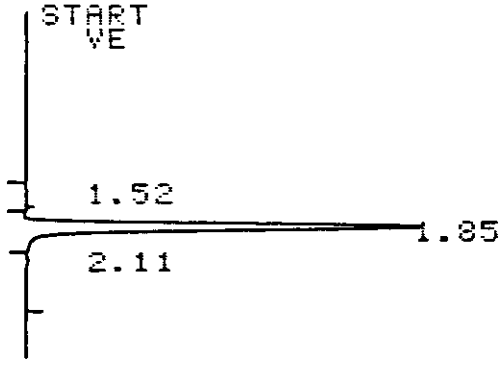


hp 5830A
AREA %

RT	AREA	AREA %
0.66	508	0.301
1.52	535	0.317
1.85	165800	98.150
2.11	2083	1.233

XF: 1.0000 E+ 0

(830 pm STD



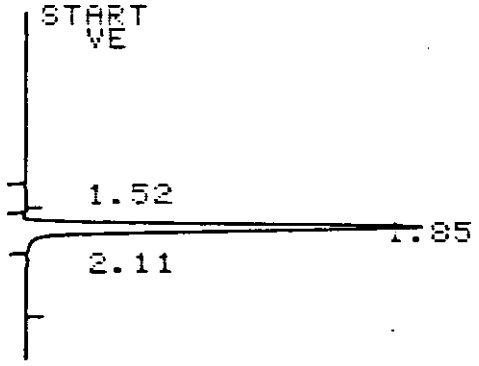
(4)

hp 5830A
AREA %

RT	AREA	AREA %
1.52	608	0.322
1.85	185600	98.427
2.11	2359	1.251

XF: 1.0000 E+ 0

756.05 mm Hg
22°C

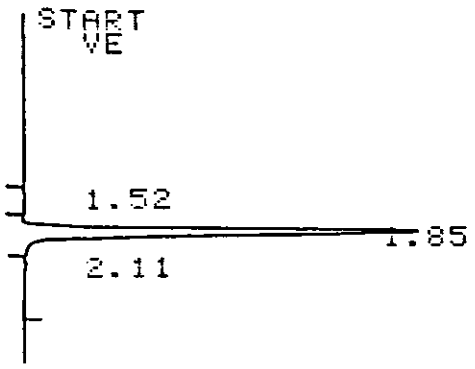


(5)

hp 5830A
AREA %

RT	AREA	AREA %
1.52	601	0.317
1.85	184300	98.398

XF: 1.0000 E+ 0



6

483 ppm STD

hp 5830A
AREA %

RT	AREA	AREA %
1.52	595	0.316
1.85	185200	98.400
2.11	2417	1.284

XF: 1.0000 E+ 0

TEMP1	70	70
TIME1	3.0	
INJ TEMP	100	100
FID TEMP	250	250
TCD TEMP	0	42
AUX TEMP	0	45
OVEN MAX	280	
CHT SPD	1.50	
ATTN 2↑	10	
FID SGNL	A	
SLP SENS	0.05	
AREA REJ	1	
FLOW A	6	
FLOW B	19	
OPTN	0	
0.2	VLV/EXT	1
B	9	

2. CERTIFICATION OF GAS STANDARDS USED

Scott Environmental Technology Inc.

Plumsteadville, PA 18949
(215) 766-8861

Madison Heights, MI 48071
(313) 544-0625

San Bernardino, CA 92411
(714) 887-2571

SPECIALTY GAS DIVISION

Date: January 3, 1979

Our Project No.: 306052

Your P.O. No.: 6331-3333G

PEDCO ENVIRONMENTAL
11499 CHESTER ROAD
CINCINNATI, OH 45246

ATTENTION: DALE HERSHEY

Gentlemen:

Thank you for choosing Scott for your Specialty Gas needs. The analyses for the gases ordered, as reported by our laboratory, are listed below. Results are in volume percent, unless otherwise indicated.

ANALYTICAL REPORT

Cyl. No. A-12712 — Analytical Accuracy ±2%

Component	Concentration
HEXANE	483 ppm
HYDROCARBON FREE AIR	BALANCE

Cyl. No. XL-423 — Analytical Accuracy ±2%

Component	Concentration
HEXANE	1450 ppm
HYDROCARBON FREE AIR	BALANCE

Cyl. No. _____ — Analytical Accuracy _____

Component	Concentration

Cyl. No. _____ — Analytical Accuracy _____

Component	Concentration

Analyst Francis Nevill

Approved By Robert B. Denyszyn

The only liability of this Company for gas which fails to comply with this analysis shall be replacement thereof by the Company without extra cost.

3. TCA TRAIN ANALYTICAL DATA

POLLUTION CONTROL SCIENCE, INC.
6015 Manning Road, Miamisburg, Ohio 45342 (513) 866-05XX 5908

Account #/Name 92-004
Sample
PCS #:
Date Rec'd:
Client's P.O. #:
Report Date: 1/31/79
Analyst's Note:

MR. WILLIAM G. DeWEES
PEDCo ENVIRONMENTAL, INC.
11499 CHESTER ROAD
CINCINNATI, OH 45246

SUMMARY OF TCA DATA FROM CENTRAL SOYA-DELPHOS 1/31/79

Source	Sample	mg C_1 tank	mg C_1 trap	ppm C_1 @ source
MINERAL OIL	2	tank sample lost[1]	240	135000 (trap only)
SCRUBBER #1	3	2.319	189.0	230700
	4	64.43	181.0	272700
MINERAL OIL	2	tank sample lost	50.00	29230
SCRUBBER #2	3	6.590	47.70	91420
	4	7.090	21.91	34140
MAIN VENT	2	4.381	0.530	3060
DISCHARGE	3	6.296	4.226	11280
	4	6.009	14.33	12020
COOLER	2	0.034	0.325	476
	3	0.325	0.384	876
	4	NDL	0.336[2]	216
	5	0.299	trap sample lost[2]	-
DRYER	2	2.425	1.454	7980
	3	0.387	1.069	1160
	4	NDL	0.133[2]	470
	5	NDL	trap sample lost[2]	-

NDL - No Detectable Level.

David Robinson
Signature

POLLUTION CONTROL SCIENCE, INC.

6015 Manning Road, Miamisburg, Ohio 45342 (513) 866-0521 XXX 5908

Account #/Name 92-004

Sample Summary of TCA Data From Central Soya - Delphos

PCS #:

Date Rec'd:

Client's P.O. #:

Report Date: 1/31/79

Analyst's Note:

PEDCo

1 Dirt and/or dried grain had gotten lodged in the tank quick connect, and the sample was contaminated.

2 These samples were taken by PEDCo. personnel. The trap samples were not refrigerated. Nuts on traps from Dryer 5 and Cooler 5 were loose.

NOTE: Due to the extremely high concentrations of hexane and/or water in the traps, analysis of the trap samples from Mineral Oil Scrubber #1 was difficult.

David Robinson
Signature

TCA SAMPLE ANALYTICAL SHEET

CLIENT Central Soya - Pedco. DATE TRAP ANALYSIS _____

PROJECT NO. 92-004 DATE TANK ANALYSIS 1/17/79

TEST NO. 1/9/79 MOS Inlet 2 ANALYST OR/GH

TRAP NO. 48 TANK NO. 7

TANK INITIAL

$P_{B(1)}$ 751 mm Hg

$P_{T(1)}$ 726 mm Hg
Initial Vacuum
(Pre-Test)

TANK FINAL

$P_{B(2)}$ 747 mm Hg

$P_{T(2)}$ 143 mm Hg - Post-Test Vacuum

$P_{T(3)}$ 253 mm Hg - Final Pressure

T 74 °F

SAMPLE VOLUME

$$V_S = \frac{[P_{B(2)} - P_{T(2)}] - [P_{B(1)} - P_{T(1)}]}{(T + 460) \times 0.299}$$

$$V_S = \frac{[(747) - (143)] - [(751) - (726)]}{[(74) + 460] \times 0.299}$$

V_S = 3.626 sample volume - liters

TANK ANALYSIS sample lost

Sample Loop	Backflush Area	Attn.	Std. Area	Attn.	Std. Conc. (ppm)	$C_{VOC(1)}$ Sample Conc. ppm

$C_{VOC(1)}$ ____ ppm as CO_2 - measured

$$C_{VOC(2)} = \frac{[P_{T(3)} + P_{B(2)}]}{[P_{B(2)} - P_{T(2)}] - [P_{B(1)} - P_{T(1)}]} \times C_{VOC(1)}$$

$$C_{VOC(2)} = \frac{[(253) + (747)]}{[(747) - (143)] - [(751) - (726)]} \times (\text{____})$$

$C_{VOC(2)}$ = ____ ppm as CO_2 - sample

MASS OF CARBON IN TANK

$C_{VOC(3)} = C_{VOC(2)} \times 4.996 \times 10^{-4}$ = ____ mg/l (68°F, 760 mm Hg)

$M_{n\ VOC(1)} = C_{VOC(3)} \times V_S$ = ____ mg Carbon in Tank

over

TRAP ANALYSIS

Collection Vessel No. CV-11 Trap 48

Volume of Collection Vessel 4.82 liters - V_{CV}

$P_{B(2)}$ 747 mm Hg

$P_{CV(1)}$ 745 mm Hg - Initial Vacuum

$P_{CV(2)}$ 235 mm Hg - Final Pressure

Sample plugged outlet tube.

MASS OF CARBON COLLECTED

$C_{VOC(4)}$ 78,500 ppm as CO_2

$$M_{n\ VOC(2)} = C_{VOC(4)} \times \left[P_{CV(2)} + P_{CV(1)}\right] \left[\frac{3.467 \times 10^{-4} \times V_{CV}}{T(°F) + 460}\right]$$

$$M_{n\ VOC(2)} = (78,500) \times \left[(235) + (745)\right]\left[\frac{3.467 \times 10^{-4} (4.82)}{(76 + 460)}\right]$$

$M_{n(2)}$ = 240 mg

$Mn_T = Mn_{(1)} + Mn_{(2)}$

Mn_T = (N.T.) + (240)

Mn_T = 240 mg Carbon

$$\text{mg Carbon/liter} = \frac{Mn_T}{V_{sv}} = \frac{(240)}{(3.626)} = 66.2$$

mg Carbon/DSCF = mg Carbon/liter X 28.32

= 1870

TCA SAMPLE ANALYTICAL SHEET

CLIENT Central Soya - Pedco. DATE TRAP ANALYSIS _____

PROJECT NO. 92-004 DATE TANK ANALYSIS 1/17/79

TEST NO. MOS-1 · Inlet 3 ANALYST SR/GH

TRAP NO. 44 TANK NO. 62

TANK INITIAL

$P_{B(1)}$ 756 mm Hg

$P_{T(1)}$ 729 mm Hg
Initial Vacuum
(Pre-Test)

TANK FINAL

$P_{B(2)}$ 747 mm Hg

$P_{T(2)}$ 448 mm Hg - Post-Test Vacuum

$P_{T(3)}$ 252 mm Hg - Final Pressure

T 74 °F

SAMPLE VOLUME

$$V_S = \frac{\left[P_{B(2)} - P_{T(2)}\right] - \left[P_{B(1)} - P_{T(1)}\right]}{(T + 460) \times 0.299}$$

$$V_S = \frac{[(747) - (448)] - [(756) - (726)]}{[(74) + 460] \times 0.299}$$

V_S = 1.685 sample volume - liters

TANK ANALYSIS

Sample Loop	Backflush Area	Attn.	Std. Area	Attn.	Std. Conc. (ppm)	$C_{VOC(1)}$ Sample Conc. ppm
3	1095/3	9=200	296/3	9=200	2113	750

$C_{VOC(1)}$ 750 ppm as CO_2 - measured

$$C_{VOC(2)} = \frac{\left[P_{T(3)} + P_{B(2)}\right]}{\left[P_{B(2)} - P_{T(2)}\right] - \left[P_{B(1)} - P_{T(1)}\right]} \times C_{VOC(1)}$$

$$C_{VOC(2)} = \frac{[(252) + (747)]}{[(747) - (448)] - [(756) - (729)]} \times (750)$$

$C_{VOC(2)}$ = 1750 ppm as CO_2 - sample

MASS OF CARBON IN TANK

$C_{VOC(3)} = C_{VOC(2)} \times 4.996 \times 10^{-4}$ = 1.380 mg/l (68°F, 760 mm Hg)

$M_{n\ VOC(1)} = C_{VOC(3)} \times V_S$ = 2.324 mg Carbon in Tank

over

TRAP ANALYSIS NEW TRAP

Collection Vessel No. 16 Trap #4

Volume of Collection Vessel 4.82 liters - V_{CV}

$P_{B(2)}$ 747 mm Hg

$P_{CV(1)}$ 745 mm Hg - Initial Vacuum

$P_{CV(2)}$ 562 mm Hg - Final Pressure

T= 74°F

MASS OF CARBON COLLECTED

$C_{VOC(4)}$ 74900 ppm as CO_2

$$M_{n\ VOC(2)} = C_{VOC(4)} \times \left[P_{CV(2)} + P_{CV(1)}\right] \left[\frac{3.467 \times 10^{-4} \times V_{CV}}{T(°F) + 460}\right]$$

$$M_{n\ VOC(2)} = (74900) \times \left[(562) + (745)\right]\left[\frac{3.467 \times 10^{-4} (4.82)}{(74 + 460)}\right]$$

$M_{n(2)}$ = 189 mg

$Mn_T = Mn_{(1)} + Mn_{(2)}$

$Mn_T = (2.32) + (189)$

Mn_T = 191 mg Carbon

mg Carbon/liter = $\frac{Mn_T}{V_{sv}} = \frac{(191)}{(1.685)} =$ 114

mg Carbon/DSCF = mg Carbon/liter X 28.32

= 3240

TCA SAMPLE ANALYTICAL SHEET

CLIENT Central Soya - Pedco. DATE TRAP ANALYSIS _____

PROJECT NO. 92-004 DATE TANK ANALYSIS 1/17/79

TEST NO. MS-1 - Inlet 4 ANALYST DR / GH.

TRAP NO. 30 TANK NO. 3

TANK INITIAL

$P_{B(1)}$ 756 mm Hg

$P_{T(1)}$ 723 mm Hg
Initial Vacuum
(Pre-Test)

TANK FINAL

$P_{B(2)}$ 747 mm Hg

$P_{T(2)}$ 422 mm Hg - Post-Test Vacuum

$P_{T(3)}$ 252 mm Hg - Final Pressure

T 74 °F

SAMPLE VOLUME

$$V_S = \frac{[P_{B(2)} - P_{T(2)}] - [P_{B(1)} - P_{T(1)}]}{(T + 460) \times 0.299}$$

$$V_S = \frac{[(747) - (422)] - [(756) - (723)]}{[(74) + 460] \times 0.299}$$

V_S = 1.829 sample volume - liters

TANK ANALYSIS

Sample Loop	Backflush Area	Attn.	Std. Area	Attn.	Std.Conc. (ppm)	$C_{VOC(1)}$ Sample Conc. ppm
3	5753	9=60	2403	9=60	10800	26010

$C_{VOC(1)}$ 26010 ppm as CO_2 - measured

$$C_{VOC(2)} = \frac{[P_{T(3)} + P_{B(2)}]}{[P_{B(2)} - P_{T(2)}] - [P_{B(1)} - P_{T(1)}]} \times C_{VOC(1)}$$

$$C_{VOC(2)} = \frac{[(252) + (747)]}{[(747) - (422)] - [(756) - (723)]} \times (26010)$$

$C_{VOC(2)}$ = 70510 ppm as CO_2 - sample

MASS OF CARBON IN TANK

$C_{VOC(3)} = C_{VOC(2)} \times 4.996 \times 10^{-4}$ = ~~35.428~~ 35.23 mg/l (68°F, 760 mm Hg)

$M_{n\ VOC(1)} = C_{VOC(3)} \times V_S$ = 64.43 mg Carbon in Tank

over

TRAP ANALYSIS

Collection Vessel No. 18 Trap 30

Volume of Collection Vessel 4.82 liters - V_{CV}

$P_{B(2)}$ 747 mm Hg

$P_{CV(1)}$ 746 mm Hg - Initial Vacuum

$P_{CV(2)}$ 248 mm Hg - Final Pressure

T = 76°F

MASS OF CARBON COLLECTED

$C_{VOC(4)}$ 584000 ppm as CO_2

$$M_{n\ VOC(2)} = C_{VOC(4)} \times \left[P_{CV(2)} + P_{CV(1)}\right] \left[\frac{3.467 \times 10^{-4} \times V_{CV}}{T(°F) + 460}\right]$$

$$M_{n\ VOC(2)} = (584000) \times \left[(248) + (746)\right]\left[\frac{3.467 \times 10^{-4} \times (4.82)}{(76 + 460)}\right]$$

$M_{n(2)}$ = 181 mg

$Mn_T = Mn_{(1)} + Mn_{(2)}$

$Mn_T = (64.43) + (181)$

Mn_T = 245 mg Carbon

mg Carbon/liter = $\frac{Mn_T}{V_{sv}} = \frac{(245)}{(1.829)}$ = 134

mg Carbon/DSCF = mg Carbon/liter X 28.32

= 3800

TCA SAMPLE ANALYTICAL SHEET

CLIENT Central Soya - Pedco DATE TRAP ANALYSIS 1/24/79

PROJECT NO. 92-004 DATE TANK ANALYSIS

TEST NO. MOS 2 - Outlet 2 (1/9) ANALYST DR/GH

TRAP NO. 20 TANK NO. 2

TANK INITIAL

$P_{B(1)}$ 751 mm Hg

$P_{T(1)}$ 724 mm Hg
Initial Vacuum
(Pre-Test)

TANK FINAL

$P_{B(2)}$ 747 mm Hg

$P_{T(2)}$ 164 mm Hg - Post-Test Vacuum

$P_{T(3)}$ 253 mm Hg - Final Pressure ← tank leaked

T 74 °F

SAMPLE VOLUME

$$V_S = \frac{\left[P_{B(2)} - P_{T(2)}\right] - \left[P_{B(1)} - P_{T(1)}\right]}{(T + 460) \times 0.299}$$

$$V_S = \frac{[(747) - (164)] - [(751) - (724)]}{[(74) + 460] \times 0.299}$$

V_S = 3.482 sample volume - liters

TANK ANALYSIS sample lost

Sample Loop	Backflush Area	Attn.	Std. Area	Attn.	Std. Conc. (ppm)	$C_{VOC(1)}$ Sample Conc. ppm

$C_{VOC(1)}$ _____ ppm as CO_2 - measured

$$C_{VOC(2)} = \frac{\left[P_{T(3)} + P_{B(2)}\right]}{\left[P_{B(2)} - P_{T(2)}\right] - \left[P_{B(1)} - P_{T(1)}\right]} \times C_{VOC(1)}$$

$$C_{VOC(2)} = \frac{[(\quad) + (\quad)]}{[(\quad)-(\quad)] - [(\quad)-(\quad)]} \times (\quad)$$

$C_{VOC(2)}$ = _____ ppm as CO_2 - sample

MASS OF CARBON IN TANK

$C_{VOC(3)} = C_{VOC(2)} \times 4.996 \times 10^{-4}$ = _____ mg/l (68°F, 760 mm Hg)

$M_{n\ VOC(1)} = C_{VOC(3)} \times V_S$ = _____ mg Carbon in Tank

over

TRAP ANALYSIS

Collection Vessel No. ~~CV~~ 2 Trap 2.1 CV 4-4

Volume of Collection Vessel 1000 liters - V_{CV} 1.000

$P_{B(2)}$ 743 mm Hg 743

$P_{CV(1)}$ 742 mm Hg - Initial Vacuum 740

$P_{CV(2)}$ 802 mm Hg - Final Pressure

MASS OF CARBON COLLECTED

$C_{VOC(4)}$ 49846 ppm as CO_2

$$M_{n\ VOC(2)} = C_{VOC(4)} \times \left[P_{CV(2)} + P_{CV(1)}\right] \left[\frac{3.467 \times 10^{-4} \times V_{CV}}{T(°F) + 460}\right]$$

$$M_{n\ VOC(2)} = (49846) \times \left[(802) + (742)\right]\left[\frac{3.467 \times 10^{-4} (1000)}{(74 + 460)}\right]$$

$M_{n(2)}$ = 47.97 mg

$Mn_T = Mn_{(1)} + Mn_{(2)}$

Mn_T = ( ) + (47.97)

Mn_T = _____ mg Carbon

mg Carbon/liter = $\frac{Mn_T}{V_{sv}} = \frac{(\quad)}{(3.482)}$ = _____

mg Carbon/DSCF = mg Carbon/liter X 28.32

= _____

TCA SAMPLE ANALYTICAL SHEET

CLIENT Central Soya - Pedo. DATE TRAP ANALYSIS _____

PROJECT NO. 92-004 DATE TANK ANALYSIS 1/17/79

TEST NO. MOS 2 - Inlet 3 ANALYST DF/GH

TRAP NO. 49 TANK NO. 22

TANK INITIAL

$P_{B(1)}$ 756 mm Hg

$P_{T(1)}$ 724 mm Hg
Initial Vacuum
(Pre-Test)

TANK FINAL

$P_{B(2)}$ 747 mm Hg

$P_{T(2)}$ 522 mm Hg - Post-Test Vacuum

$P_{T(3)}$ 250 mm Hg - Final Pressure

T 74 °F

SAMPLE VOLUME

$$V_S = \frac{[P_{B(2)} - P_{T(2)}] - [P_{B(1)} - P_{T(1)}]}{(T + 460) \times 0.299}$$

$$V_S = \frac{[(747) - (522)] - [(756) - (724)]}{[(74) + 460] \times 0.299}$$

V_S = 1.209 sample volume - liters

TANK ANALYSIS

Sample Loop	Backflush Area	Attn.	Std. Area	Attn.	Std.Conc. (ppm)	$C_{VOC(1)}$ Sample Conc. ppm
3	119/3	g-80	113/3	g-80	2113	2113

$C_{VOC(1)}$ 2113 ppm as CO_2 - measured

$$C_{VOC(2)} = \frac{[P_{T(3)} + P_{B(2)}]}{[P_{B(2)} - P_{T(2)}] - [P_{B(1)} - P_{T(1)}]} \times C_{VOC(1)}$$

$$C_{VOC(2)} = \frac{[(250) + (747)]}{[(747) - (522)] - [(756) - (724)]} \times (2113)$$

$C_{VOC(2)}$ = 10920 ppm as CO_2 - sample

MASS OF CARBON IN TANK

$C_{VOC(3)} = C_{VOC(2)} \times 4.996 \times 10^{-4} =$ ~~5.455~~ 5.46 mg/l (68°F, 760 mm Hg)

$M_{n\ VOC(1)} = C_{VOC(3)} \times V_S =$ ~~6.593~~ 6.60 mg Carbon in Tank

over

TRAP ANALYSIS

Collection Vessel No. 13 Trap 4-9

Volume of Collection Vessel 4.82 liters - V_{CV}

$P_{B(2)}$ 747 mm Hg

$P_{CV(1)}$ 745 mm Hg - Initial Vacuum

$P_{CV(2)}$ 218 mm Hg - Final Pressure

T= 76°F

MASS OF CARBON COLLECTED

$C_{VOC(4)}$ 15400 ppm as CO_2

$$M_{n\ VOC(2)} = C_{VOC(4)} \times \left[P_{CV(2)} + P_{CV(1)}\right] \left[\frac{3.467 \times 10^{-4} \times V_{CV}}{T(°F) + 460}\right]$$

$$M_{n\ VOC(2)} = (15400) \times \left[(218) + (745)\right]\left[\frac{3.467 \times 10^{-4} (4.82)}{(76 + 460)}\right]$$

$M_{n(2)}$ = 47.7 mg

$Mn_T = Mn_{(1)} + Mn_{(2)}$

Mn_T = ~~(6.60)~~ + (47.7)

Mn_T = 54.3 mg Carbon

mg Carbon/liter = $\frac{Mn_T}{V_{sv}} = \frac{(54.3)}{(1.209)} =$ 44.9

mg Carbon/DSCF = mg Carbon/liter X 28.32

= 1270

TCA SAMPLE ANALYTICAL SHEET

CLIENT Central Soya-Pedco. DATE TRAP ANALYSIS 1/25/79

PROJECT NO. 92-004 DATE TANK ANALYSIS 1/17/79

TEST NO. MOS 2 - Inlet 4 ANALYST GR/GH

TRAP NO. 11 TANK NO. 12

TANK INITIAL

$P_{B(1)}$ 756 mm Hg

$P_{T(1)}$ 729 mm Hg
Initial Vacuum
(Pre-Test)

TANK FINAL

$P_{B(2)}$ 747 mm Hg

$P_{T(2)}$ 444 mm Hg - Post-Test Vacuum

$P_{T(3)}$ 253 mm Hg - Final Pressure

T 74 °F

SAMPLE VOLUME

$$V_S = \frac{[P_{B(2)} - P_{T(2)}] - [P_{B(1)} - P_{T(1)}]}{(T + 460) \times 0.299}$$

$$V_S = \frac{[(747) - (444)] - [(756) - (729)]}{[(74) + 460] \times 0.299}$$

V_S = 1.729 sample volume - liters

TANK ANALYSIS

Sample Loop	Backflush Area	Attn.	Std. Area	Attn.	Std. Conc. (ppm)	$C_{VOC(1)}$ Sample Conc. ppm
3	132/3	g-80	124/3	g-80	2113	2266

$C_{VOC(1)}$ 2266 ppm as CO_2 - measured

$$C_{VOC(2)} = \frac{[P_{T(3)} + P_{B(2)}]}{[P_{B(2)} - P_{T(2)}] - [P_{B(1)} - P_{T(1)}]} \times C_{VOC(1)}$$

$$C_{VOC(2)} = \frac{[(253) + (747)]}{[(747) - (444)] - [(756) - (729)]} \times (2266)$$

$C_{VOC(2)}$ = 8210 ppm as CO_2 - sample

MASS OF CARBON IN TANK

$C_{VOC(3)} = C_{VOC(2)} \times 4.996 \times 10^{-4}$ = 4.102 mg/l (68°F, 760 mm Hg)

$M_{n\ VOC(1)} = C_{VOC(3)} \times V_S$ = 7.094 mg Carbon in Tank

over

TRAP ANALYSIS

Collection Vessel No. 24 Trap II — CV2

Volume of Collection Vessel 2.525 liters - V_{CV} — 1.000

$P_{B(2)}$ 29.92 mm Hg — 29.92

$P_{CV(1)}$ 738 mm Hg - Initial Vacuum — 739

$P_{CV(2)}$ 612 mm Hg - Final Pressure — 773

T = 74°F

MASS OF CARBON COLLECTED

$C_{VOC(4)}$ 24191 / CV4 ppm as CO_2, -718 / CV2

$$M_{n\ VOC(2)} = C_{VOC(4)} \times \left[P_{CV(2)} + P_{CV(1)}\right] \left[\frac{3.467 \times 10^{-4} \times V_{CV}}{T(°F) + 460}\right]$$

$$M_{n\ VOC(2)} = \left(\frac{718}{24191}\right) \times \left[(773) + (739)\right]\left[\frac{3.467 \times 10^{-4} (1.000)}{(74 + 460)}\right]$$

$M_{n(2)}$ = 21.203 / CV4 mg + 0.765 / CV2 mg = 21.91 mg

$Mn_T = Mn_{(1)} + Mn_{(2)}$

Mn_T = (2.709 kg) + (21.91)

Mn_T = 2900 mg Carbon

mg Carbon/liter = $\frac{Mn_T}{V_{sv}} = \frac{(2900)}{(1.729)}$ = 16.77

mg Carbon/DSCF = mg Carbon/liter X 28.32

= 475

TCA SAMPLE ANALYTICAL SHEET

CLIENT Central Soya - Pedco
PROJECT NO. 92-004
TEST NO. M.V.D. 2 (outlet)
DATE TRAP ANALYSIS
DATE TANK ANALYSIS 1/17/79
ANALYST DR/GH
TRAP NO. 46 TANK NO. 63

TANK INITIAL

$P_{B(1)}$ 751 mm Hg

$P_{T(1)}$ 726 mm Hg
Initial Vacuum
(Pre-Test)

TANK FINAL

$P_{B(2)}$ 747 mm Hg

$P_{T(2)}$ 201 mm Hg - Post-Test Vacuum

$P_{T(3)}$ 253 mm Hg - Final Pressure

T 74 °F

SAMPLE VOLUME

$$V_S = \frac{\left[P_{B(2)} - P_{T(2)}\right] - \left[P_{B(1)} - P_{T(1)}\right]}{(T + 460) \times 0.299}$$

$$V_S = \frac{[(747) - (201)] - [(751) - (726)]}{[(74) + 460] \times 0.299}$$

V_S = 3.263 sample volume - liters

TANK ANALYSIS

Sample Loop	Backflush Area	Attn.	Std. Area	Attn.	Std.Conc. (ppm)	$C_{VOC(1)}$ Sample Conc. ppm
~~1~~	~~1500/3~~	~~g=70~~	~~121/3~~	~~g=70~~	10800	~~1400~~
3	120/3	g=120	181/3	g=120	2113	1400

$C_{VOC(1)}$ 1400 ppm as CO_2 - measured

$$C_{VOC(2)} = \frac{\left[P_{T(3)} + P_{B(2)}\right]}{\left[P_{B(2)} - P_{T(2)}\right] - \left[P_{B(1)} - P_{T(1)}\right]} \times C_{VOC(1)}$$

$$C_{VOC(2)} = \frac{[(253) + (747)]}{[(747) - (201)] - [(751) - (726)]} \times (1400)$$

$C_{VOC(2)}$ = ~~2691~~ 2690 ppm as CO_2 - sample

MASS OF CARBON IN TANK

$C_{VOC(3)} = C_{VOC(2)} \times 4.996 \times 10^{-4}$ = 1.34 mg/l (68°F, 760 mm Hg)

$M_{n\ VOC(1)} = C_{VOC(3)} \times V_S$ = 4.39 mg Carbon in Tank

over

TRAP ANALYSIS

Collection Vessel No. #3 Trap #6

Volume of Collection Vessel 1000 liters - V_{CV}

$P_{B(2)}$ 744 mm Hg

$P_{CV(1)}$ 743 mm Hg - Initial Vacuum

$P_{CV(2)}$ 396 mm Hg - Final Pressure

T = 74°F

MASS OF CARBON COLLECTED

$C_{VOC(4)}$ 722 ppm as CO_2

$$M_{n\ VOC(2)} = C_{VOC(4)} \times \left[P_{CV(2)} + P_{CV(1)}\right] \left[\frac{3.467 \times 10^{-4} \times V_{CV}}{T(°F) + 460}\right]$$

$$M_{n\ VOC(2)} = (\ 722\ ) \times \left[(\ 396\ ) + (\ 743\ )\right]\left[\frac{3.467 \times 10^{-4}\ (1000\ )}{(\ 74\ + 460)}\right]$$

$M_{n(2)}$ = 0.530 mg

$Mn_T = Mn_{(1)} + Mn_{(2)}$

$Mn_T = (4.390) + (0.530)$

Mn_T = 4.920 mg Carbon

$$\text{mg Carbon/liter} = \frac{Mn_T}{V_{sv}} = \frac{(4.920)}{(3.263)} = 1.51$$

mg Carbon/DSCF = mg Carbon/liter X 28.32

= ~~42.80~~ 42.7

TCA SAMPLE ANALYTICAL SHEET

CLIENT Central Soya - Pedco. DATE TRAP ANALYSIS _____

PROJECT NO. 92-004 DATE TANK ANALYSIS 1/17/79

TEST NO. M.V.D. - 3 ANALYST GH/DR

TRAP NO. 29 TANK NO. 61

TANK INITIAL

$P_{B(1)}$ 756 mm Hg

$P_{T(1)}$ 709 mm Hg
Initial Vacuum
(Pre-Test)

TANK FINAL

$P_{B(2)}$ 747 mm Hg

$P_{T(2)}$ 397 mm Hg - Post-Test Vacuum

$P_{T(3)}$ 249 mm Hg - Final Pressure

T 74 °F

SAMPLE VOLUME

$$V_S = \frac{\left[P_{B(2)} - P_{T(2)}\right] - \left[P_{B(1)} - P_{T(1)}\right]}{(T + 460) \times 0.299}$$

$$V_S = \frac{[(747) - (397)] - [(756) - (709)]}{[(74) + 460]} \times 0.299$$

V_S = 1.498 sample volume - liters

TANK ANALYSIS

Sample Loop	Backflush Area	Attn.	Std. Area	Attn.	Std. Conc. (ppm)	$C_{VOC(1)}$ Sample Conc. ppm
3	175/3	9=120	183/3	9=120	2113	2020

$C_{VOC(1)}$ 2020 ppm as CO_2 - measured

$$C_{VOC(2)} = \frac{\left[P_{T(3)} + P_{B(2)}\right]}{\left[P_{B(2)} - P_{T(2)}\right] - \left[P_{B(1)} - P_{T(1)}\right]} \times C_{VOC(1)}$$

$$C_{VOC(2)} = \frac{[(249) + (747)]}{[(747) - (397)] - [(756) - (709)]} \times (2020)$$

$C_{VOC(2)}$ = 6640 ppm as CO_2 - sample

MASS OF CARBON IN TANK

$C_{VOC(3)} = C_{VOC(2)} \times 4.996 \times 10^{-4} =$ ~~3.317~~ 3.32 mg/l (68°F, 760 mm Hg)

$M_{n\ VOC(1)} = C_{VOC(3)} \times V_S =$ ~~6.295~~ 6.30 mg Carbon in Tank

over

TRAP ANALYSIS

Collection Vessel No. 4 Trap #9

Volume of Collection Vessel 1.000 liters - V_{CV}

$P_{B(2)}$ 744 mm Hg

$P_{CV(1)}$ 742 mm Hg - Initial Vacuum

$P_{CV(2)}$ 102 mm Hg - Final Pressure

T = 78 °F

MASS OF CARBON COLLECTED

$C_{VOC(4)}$ 5732 ppm as CO_2

$$M_{n\ VOC(2)} = C_{VOC(4)} \times \left[P_{CV(2)} + P_{CV(1)}\right] \left[\frac{3.467 \times 10^{-4} \times V_{CV}}{T(°F) + 460}\right]$$

$$M_{n\ VOC(2)} = (5732) \times \left[(102) + (742)\right]\left[\frac{3.467 \times 10^{-4} (1.000)}{(78 + 460)}\right]$$

$M_{n(2)}$ = 4.226 mg

$Mn_T = Mn_{(1)} + Mn_{(2)}$

$Mn_T = (6.296) + (4.226)$

Mn_T = 10.52 mg Carbon

mg Carbon/liter = $\frac{Mn_T}{V_{sv}} = \frac{(10.52)}{(1.898)} =$ 5.54

mg Carbon/DSCF = mg Carbon/liter X 28.32

= 157

TCA SAMPLE ANALYTICAL SHEET

CLIENT Central Soya - Pekin DATE TRAP ANALYSIS 1/25/79
PROJECT NO. 92-004 DATE TANK ANALYSIS 1/17/79
TEST NO. M.V.D. - 4 ANALYST DG/GH
TRAP NO. 47 TANK NO. 10

TANK INITIAL

$P_{B(1)}$ 756 mm Hg

$P_{T(1)}$ 729 mm Hg
Initial Vacuum
(Pre-Test)

TANK FINAL

$P_{B(2)}$ 747 mm Hg
$P_{T(2)}$ 170 mm Hg - Post-Test Vacuum
$P_{T(3)}$ 252 mm Hg - Final Pressure
T 74 °F

SAMPLE VOLUME

$$V_S = \frac{[P_{B(2)} - P_{T(2)}] - [P_{B(1)} - P_{T(1)}]}{(T + 460) \times 0.299}$$

$$V_S = \frac{[(747) - (170)] - [(756) - (729)]}{[(74) + 460] \times 0.299}$$

V_S = 3.445 sample volume - liters

TANK ANALYSIS

Sample Loop	Backflush Area	Attn.	Std. Area	Attn.	Std. Conc. (ppm)	$C_{VOC(1)}$ Sample Conc. ppm
3	171/3	g·120	199/3	g·120	2113	1922

$C_{VOC(1)}$ 1922 ppm as CO_2 - measured

$$C_{VOC(2)} = \frac{[P_{T(3)} + P_{B(2)}]}{[P_{B(2)} - P_{T(2)}] - [P_{B(1)} - P_{T(1)}]} \times C_{VOC(1)}$$

$$C_{VOC(2)} = \frac{[(252) + (747)]}{[(747) - (170)] - [(756) - (729)]} \times (1922)$$

$C_{VOC(2)}$ = 8340 ppm as CO_2 - sample

MASS OF CARBON IN TANK

$C_{VOC(3)} = C_{VOC(2)} \times 4.996 \times 10^{-4} =$ ~~1514~~ 1.74 mg/l (68°F, 760 mm Hg)

$M_{n\ VOC(1)} = C_{VOC(3)} \times V_S =$ ~~6009~~ / 6.01 mg Carbon in Tank

over

TRAP ANALYSIS

Collection Vessel No. 3 Trap 47

Volume of Collection Vessel 1.000 liters - V_{CV}

$P_{B(2)}$ 742 mm Hg

$P_{CV(1)}$ 738 mm Hg - Initial Vacuum

$P_{CV(2)}$ 661 mm Hg - Final Pressure

T: 75 °F

MASS OF CARBON COLLECTED

$C_{VOC(4)}$ 15804 ppm as CO_2

$$M_{n\ VOC(2)} = C_{VOC(4)} \times \left[P_{CV(2)} + P_{CV(1)}\right] \left[\frac{3.467 \times 10^{-4} \times V_{CV}}{T(°F) + 460}\right]$$

$$M_{n\ VOC(2)} = (15804) \times \left[(661) + (738)\right] \left[\frac{3.467 \times 10^{-4} (1.000)}{(75 + 460)}\right]$$

$M_{n(2)}$ = 14.33 mg

$Mn_T = Mn_{(1)} + Mn_{(2)}$

$Mn_T = \left(\frac{\cancel{15804}}{6.01}\right) + (14.33)$

Mn_T = 20.34 mg Carbon

mg Carbon/liter = $\frac{Mn_T}{V_{sv}} = \frac{(20.34)}{(3.445)}$ = 5.903

mg Carbon/DSCF = mg Carbon/liter X 28.32

= 167

TCA SAMPLE ANALYTICAL SHEET

CLIENT CENTRAL Soya - PEDCo. DATE TRAP ANALYSIS 1/24/79

PROJECT NO. 92-004 DATE TANK ANALYSIS 1/17/79

TEST NO. COOLER - 2 ANALYST DR./GH

TRAP NO. 21 TANK NO. 14

TANK INITIAL

$P_{B(1)}$ 760 mm Hg

$P_{T(1)}$ 670 mm Hg
Initial Vacuum (Pre-Test)

TANK FINAL

$P_{B(2)}$ 747 mm Hg

$P_{T(2)}$ 412 mm Hg - Post-Test Vacuum

$P_{T(3)}$ 251 mm Hg - Final Pressure

T 74 °F

SAMPLE VOLUME

$$V_S = \frac{[P_{B(2)} - P_{T(2)}] - [P_{B(1)} - P_{T(1)}]}{(T + 460) \times 0.299}$$

$$V_S = \frac{[(747) - (412)] - [(760) - (670)]}{[(74) + 460] \times 0.299}$$

V_S = 1.534 sample volume - liters

TANK ANALYSIS

Sample Loop	Backflush Area	Attn.	Std. Area	Attn.	Std. Conc. (ppm)	$C_{VOC(1)}$ Sample Conc. ppm
5	33/3 : 11	gain = 375	291/3	gain = 375	204	11

$C_{VOC(1)}$ 11 ppm as CO_2 - measured

$$C_{VOC(2)} = \frac{[P_{T(3)} + P_{B(2)}]}{[P_{B(2)} - P_{T(2)}] - [P_{B(1)} - P_{T(1)}]} \times C_{VOC(1)}$$

$$C_{VOC(2)} = \frac{[(251) + (747)]}{[(747) - (412)] - [(760) - (670)]} \times (11..)$$

$C_{VOC(2)}$ = 45 ppm as CO_2 - sample

MASS OF CARBON IN TANK

$C_{VOC(3)} = C_{VOC(2)} \times 4.996 \times 10^{-4}$ = 0.022 mg/l (68°F, 760 mm Hg)

$M_{n\ VOC(1)} = C_{VOC(3)} \times V_S$ = 0.034 mg Carbon in Tank

over

TRAP ANALYSIS

Collection Vessel No. 4 Trap 21

Volume of Collection Vessel 1000 liters - V_{CV}

$P_{B(2)}$ 740 mm Hg

$P_{CV(1)}$ ~~740~~ 738 mm Hg - Initial Vacuum

$P_{CV(2)}$ 950 mm Hg - Final Pressure

MASS OF CARBON COLLECTED

$C_{VOC(4)}$ 297 ppm as CO_2

$$M_{n\ VOC(2)} = C_{VOC(4)} \times \left[P_{CV(2)} + P_{CV(1)}\right] \left[\frac{3.467 \times 10^{-4} \times V_{CV}}{T(°F) + 460}\right]$$

$$M_{n\ VOC(2)} = (\ 297\ ) \times \left[(\ 950\ ) + (\ 738\ )\right]\left[\frac{3.467 \times 10^{-4}\ (\ 1000\ )}{(\ 74\ + 460)}\right]$$

$M_{n(2)}$ = 0.335 mg

$Mn_T = Mn_{(1)} + Mn_{(2)}$

$Mn_T = (\ 0.034\ ) + (\ \overset{0.325}{\cancel{0.33}}\ )$

Mn_T = ~~0.0~~0.359 mg Carbon

$$\text{mg Carbon/liter} = \frac{Mn_T}{V_{sv}} = \frac{(\ 0.359\ )}{(\ 1.534\ )} = 0.234$$

mg Carbon/DSCF = mg Carbon/liter X 28.32

= 6.637

TCA SAMPLE ANALYTICAL SHEET

CLIENT Central Soya - Pekco. DATE TRAP ANALYSIS 1/24/79

PROJECT NO. 92-004 DATE TANK ANALYSIS 1/17/79

TEST NO. Cooler 3 ANALYST DR/GH

TRAP NO. 27 TANK NO. 5

TANK INITIAL

$P_{B(1)}$ 760 mm Hg

$P_{T(1)}$ 714 mm Hg Initial Vacuum (Pre-Test)

TANK FINAL

$P_{B(2)}$ 747 mm Hg

$P_{T(2)}$ 438 mm Hg - Post-Test Vacuum

$P_{T(3)}$ 252 mm Hg - Final Pressure

T 74 °F

SAMPLE VOLUME

$$V_S = \frac{[P_{B(2)} - P_{T(2)}] - [P_{B(1)} - P_{T(1)}]}{(T + 460) \times 0.299}$$

$$V_S = \frac{[(747) - (438)] - [(760) - (714)]}{[(74) + 460] \times 0.299}$$

V_S = 1.647 sample volume - liters

TANK ANALYSIS

Sample Loop	Backflush Area	Attn.	Std. Area	Attn.	Std. Conc. (ppm)	$C_{VOC(1)}$ Sample Conc. ppm
5	1169 17	9=375	3021 2	9=375	204	104

$C_{VOC(1)}$ 104 ppm as CO_2 - measured

$$C_{VOC(2)} = \frac{[P_{T(3)} + P_{B(2)}]}{[P_{B(2)} - P_{T(2)}] - [P_{B(1)} - P_{T(1)}]} \times C_{VOC(1)}$$

$$C_{VOC(2)} = \frac{[(252) + (747)]}{[(747) - (438)] - [(760) - (714)]} \times (104)$$

$C_{VOC(2)}$ = 395 ppm as CO_2 - sample

MASS OF CARBON IN TANK

$C_{VOC(3)} = C_{VOC(2)} \times 4.996 \times 10^{-4}$ = 0.197 mg/l (68°F, 760 mm Hg)

$M_{n\ VOC(1)} = C_{VOC(3)} \times V_S$ = 0.325 mg Carbon in Tank

over

TRAP ANALYSIS

Collection Vessel No. 81 Trip 27

Volume of Collection Vessel 0885 liters - V_{CV}

$P_{B(2)}$ 726 mm Hg

$P_{CV(1)}$ 723 mm Hg - Initial Vacuum

$P_{CV(2)}$ 249 mm Hg - Final Pressure

MASS OF CARBON COLLECTED

$C_{VOC(4)}$ 688 ppm as CO_2

$$M_{n\ VOC(2)} = C_{VOC(4)} \times \left[P_{CV(2)} + P_{CV(1)}\right] \left[\frac{3.467 \times 10^{-4} \times V_{CV}}{T(°F) + 460}\right]$$

$$M_{n\ VOC(2)} = (688) \times \left[(249) + (723)\right]\left[\frac{3.467 \times 10^{-4}\ (0.885)}{(74 + 460)}\right]$$

$M_{n(2)}$ = 0.384 mg

$Mn_T = Mn_{(1)} + Mn_{(2)}$

$Mn_T = (0.325) + (0.384)$

Mn_T = 0.709 mg Carbon

mg Carbon/liter = $\frac{Mn_T}{V_{sv}} = \frac{(0.709)}{(1.647)} =$ 0.431

mg Carbon/DSCF = mg Carbon/liter X 28.32

= 12.20

TCA SAMPLE ANALYTICAL SHEET

CLIENT CENTRAL SOYA-PEDO. DATE TRAP ANALYSIS _____

PROJECT NO. 92-004 DATE TANK ANALYSIS 11/17/79

TEST NO. DRYER 2 ANALYST DR/DN

TRAP NO. 51 TANK NO. 18

TANK INITIAL

$P_{B(1)}$ 760 mm Hg

$P_{T(1)}$ 734 mm Hg
Initial Vacuum
(Pre-Test)

TANK FINAL

$P_{B(2)}$ 747 mm Hg

$P_{T(2)}$ 563 mm Hg - Post-Test Vacuum

$P_{T(3)}$ 250 mm Hg - Final Pressure

T 74 °F

SAMPLE VOLUME

$$V_S = \frac{[P_{B(2)} - P_{T(2)}] - [P_{B(1)} - P_{T(1)}]}{(T + 460) \times 0.299}$$

$$V_S = \frac{[(747) - (563)] - [(760) - (734)]}{[(74) + 460] \times 0.299}$$

V_S = 0.990 sample volume - liters

TANK ANALYSIS

Sample Loop	Backflush Area	Attn.	Std. Area	Attn.	Std.Conc. (ppm)	$C_{VOC(1)}$ Sample Conc. ppm
5	423/3	g=150	111/3	g=150	204	777

$C_{VOC(1)}$ 777 ppm as CO_2 - measured

$$C_{VOC(2)} = \frac{[P_{T(3)} + P_{B(2)}]}{[P_{B(2)} - P_{T(2)}] - [P_{B(1)} - P_{T(1)}]} \times C_{VOC(1)}$$

$$C_{VOC(2)} = \frac{[(250) + (747)]}{[(747)-(563)] - [(760)-(734)]} \times (777)$$

$C_{VOC(2)}$ = 4900 ppm as CO_2 - sample

MASS OF CARBON IN TANK

$C_{VOC(3)} = C_{VOC(2)} \times 4.996 \times 10^{-4}$ = 2.450 mg/l (68°F, 760 mm Hg)

$M_{n\ VOC(1)} = C_{VOC(3)} \times V_S$ = 2.42 mg Carbon in Tank

over

TRAP ANALYSIS

Collection Vessel No. 2 Temp 51

Volume of Collection Vessel 1.000 liters - V_{CV}

$P_{B(2)}$ 744 mm Hg

$P_{CV(1)}$ 742 mm Hg - Initial Vacuum

$P_{CV(2)}$ 399 mm Hg - Final Pressure

T = 78°F

MASS OF CARBON COLLECTED

$C_{VOC(4)}$ 1977 ppm as CO_2

$$M_{n\ VOC(2)} = C_{VOC(4)} \times \left[P_{CV(2)} + P_{CV(1)}\right] \left[\frac{3.467 \times 10^{-4} \times V_{CV}}{T(°F) + 460}\right]$$

$$M_{n\ VOC(2)} = (1977) \times \left[(399) + (742)\right]\left[\frac{3.467 \times 10^{-4} (1.000)}{(78 + 460)}\right]$$

$M_{n(2)}$ = 1.454 mg

$Mn_T = Mn_{(1)} + Mn_{(2)}$

$Mn_T = (2.428) + (1.454)$

Mn_T = 3.882 mg Carbon

$$\text{mg Carbon/liter} = \frac{Mn_T}{V_{sv}} = \frac{(3.882)}{(0.990)} = 3.92$$

mg Carbon/DSCF = mg Carbon/liter X 28.32

= 111

TCA SAMPLE ANALYTICAL SHEET

CLIENT Central Soya - Pedco. DATE TRAP ANALYSIS 1/24/79

PROJECT NO. 92-004 DATE TANK ANALYSIS 1/17/79

TEST NO. Dryer 3 ANALYST DR/GH

TRAP NO. 39 TANK NO. 16.

TANK INITIAL

$P_{B(1)}$ 760 mm Hg

$P_{T(1)}$ 735 mm Hg
Initial Vacuum
(Pre-Test)

TANK FINAL

$P_{B(2)}$ 747 mm Hg

$P_{T(2)}$ 315 mm Hg - Post-Test Vacuum

$P_{T(3)}$ 250 mm Hg - Final Pressure

T 74 °F

SAMPLE VOLUME

$$V_S = \frac{[P_{B(2)} - P_{T(2)}] - [P_{B(1)} - P_{T(1)}]}{(T + 460) \times 0.299}$$

$$V_S = \frac{[(747) - (315)] - [(760) - (735)]}{[(74) + 460] \times 0.299}$$

V_S = 2.549 sample volume - liters

TANK ANALYSIS

Sample Loop	Backflush Area	Attn.	Std. Area	Attn.	Std.Conc. (ppm)	$C_{VOC(1)}$ Sample Conc. ppm
5	70/-	g=150	114/-	g=150	204	124
~~3~~		~~g=120~~		~~g=120~~	~~413~~	

$C_{VOC(1)}$ 124 ppm as CO_2 - measured

$$C_{VOC(2)} = \frac{[P_{T(3)} + P_{B(2)}]}{[P_{B(2)} - P_{T(2)}] - [P_{B(1)} - P_{T(1)}]} \times C_{VOC(1)}$$

$$C_{VOC(2)} = \frac{[(250) + (747)]}{[(747) - (315)] - [(760) - (735)]} \times (124)$$

$C_{VOC(2)}$ = 304 ppm as CO_2 - sample

MASS OF CARBON IN TANK

$C_{VOC(3)} = C_{VOC(2)} \times 4.996 \times 10^{-4}$ = 0.152 mg/l (68°F, 760 mm Hg)

$M_{n\ VOC(1)} = C_{VOC(3)} \times V_S$ = 0.387 mg Carbon in Tank

over

TRAP ANALYSIS

Collection Vessel No. 5-6 Trap 39 CV1

Volume of Collection Vessel 1.000 liters - V_{CV} 0.845

$P_{B(2)}$ 743 mm Hg 743

$P_{CV(1)}$ 26.72 mm Hg - Initial Vacuum 740

$P_{CV(2)}$ 6.41 mm Hg - Final Pressure 437

T: 76° F

MASS OF CARBON COLLECTED

$C_{VOC(4)}$ 757 ppm as CO_2, 570 ppm
CV6 CV1

$$M_{n\ VOC(2)} = C_{VOC(4)} \times \left[P_{CV(2)} + P_{CV(1)}\right] \left[\frac{3.467 \times 10^{-4} \times V_{CV}}{T(°F) + 460}\right]$$

$$M_{n\ VOC(2)} = \left(\frac{570}{757}\right) \times \left[\left(\frac{422}{664}\right) + \left(\frac{740}{740}\right)\right]\left[\frac{3.467 \times 10^{-4} \left(\frac{0.595}{0.845}\right)}{(71 + 460)}\right]$$

$M_{n(2)}$ = 0.687 mg CV6 + 0.382 CV1 = 1.069 mg TOTAL

$Mn_T = Mn_{(1)} + Mn_{(2)}$

$Mn_T = (0.387) + (1.069)$

Mn_T = 1.456 mg Carbon

mg Carbon/liter = $\frac{Mn_T}{V_{sv}} = \frac{(1.456)}{(2.549)}$ = 0.571

mg Carbon/DSCF = mg Carbon/liter X 28.32

= 16.18

TCA SAMPLE ANALYTICAL SHEET

Sample taken by Perco Personnel

CLIENT Central Soya — DATE TRAP ANALYSIS _____

PROJECT NO. 92-004 — DATE TANK ANALYSIS 1/21/92

TEST NO. Dryer Vent 5 — ANALYST DF/GH

TRAP NO. 35 — TANK NO. 17

TANK INITIAL

$P_{B(1)}$ 747 mm Hg

$P_{T(1)}$ 747 mm Hg Initial Vacuum (Pre-Test)

TANK FINAL

$P_{B(2)}$ 748 mm Hg

$P_{T(2)}$ 439 mm Hg - Post-Test Vacuum

$P_{T(3)}$ 260 mm Hg - Final Pressure

T 76 °F

SAMPLE VOLUME

Trap sample lost.

$$V_S = \frac{\left[P_{B(2)} - P_{T(2)}\right] - \left[P_{B(1)} - P_{T(1)}\right]}{(T + 460) \times 0.299}$$

$$V_S = \frac{[(748) - (439)] - [(747) - (743)]}{[(76) + 460] \times 0.299}$$

V_S = 1.903 sample volume - liters

TANK ANALYSIS

Sample Loop	Backflush Area	Attn.	Std. Area	Attn.	Std.Conc. (ppm)	$C_{VOC(1)}$ Sample Conc. ppm
5		1=500		1=500	2.04	410

$C_{VOC(1)}$ _____ ppm as CO_2 - measured

$$C_{VOC(2)} = \frac{\left[P_{T(3)} + P_{B(2)}\right]}{\left[P_{B(2)} - P_{T(2)}\right] - \left[P_{B(1)} - P_{T(1)}\right]} \times C_{VOC(1)}$$

$$C_{VOC(2)} = \frac{[(\quad) + (\quad)]}{[(\quad)-(\quad)] - [(\quad)-(\quad)]} \times (\quad)$$

$C_{VOC(2)}$ = _____ ppm as CO_2 - sample

MASS OF CARBON IN TANK

$C_{VOC(3)} = C_{VOC(2)} \times 4.996 \times 10^{-4}$ = _____ mg/l (68°F, 760 mm Hg)

$M_{n\ VOC(1)} = C_{VOC(3)} \times V_S$ = _____ mg Carbon in Tank

over

TRAP ANALYSIS

Collection Vessel No. 6

Volume of Collection Vessel 1.000 liters - V_{CV}

$P_{B(2)}$ 726 mm Hg

$P_{CV(1)}$ 725 mm Hg - Initial Vacuum

$P_{CV(2)}$ 298 mm Hg - Final Pressure

T= 76°F

MASS OF CARBON COLLECTED

$C_{VOC(4)}$ 2.01 ppm as CO_2

$$M_{n\ VOC(2)} = C_{VOC(4)} \times \left[P_{CV(2)} + P_{CV(1)}\right] \left[\frac{3.467 \times 10^{-4} \times V_{CV}}{T(°F) + 460}\right]$$

$$M_{n\ VOC(2)} = (\ 2.01\ ) \times \left[(\ 2.98\ ) + (\ 725\ )\right]\left[\frac{3.467 \times 10^{-4}\ (\ 1.000\ )}{(\ 76\ + 460)}\right]$$

$M_{n(2)}$ = 0.133 mg

$Mn_T = Mn_{(1)} + Mn_{(2)}$

$Mn_T = (\ 000\ ) + (0.133)$

Mn_T = 0.133 mg Carbon

$$\text{mg Carbon/liter} = \frac{Mn_T}{V_{sv}} = \frac{(\ 0.133\ )}{(0.580\ )} = 0.229$$

mg Carbon/DSCF = mg Carbon/liter X 28.32

= 6.49

TCA SAMPLE ANALYTICAL SHEET

Sample taken by Pedco Personnel

CLIENT Central Soya-Pedco DATE TRAP ANALYSIS 1/25/79

PROJECT NO. 92-CC4 DATE TANK ANALYSIS 1/31/79

TEST NO. Co-Dryer Vent 4 ANALYST EA/EH

TRAP NO. 15 TANK NO. 1

TANK INITIAL

$P_{B(1)}$ 747 mm Hg

$P_{T(1)}$ 743 mm Hg
Initial Vacuum
(Pre-Test)

TANK FINAL

$P_{B(2)}$ 748 mm Hg

$P_{T(2)}$ 651 mm Hg - Post-Test Vacuum

$P_{T(3)}$ 243 mm Hg - Final Pressure

T 76 °F

SAMPLE VOLUME

T.

$$V_S = \frac{\left[P_{B(2)} - P_{T(2)}\right] - \left[P_{B(1)} - P_{T(1)}\right]}{(T + 460) \times 0.299}$$

$$V_S = \frac{[(748) - (651)] - [(747) - (743)]}{[(76) + 460] \times 0.299}$$

V_S = 0.580 sample volume - liters

TANK ANALYSIS

Sample Loop	Backflush Area	Attn.	Std. Area	Attn.	Std.Conc. (ppm)	$C_{VOC(1)}$ Sample Conc. ppm
5	*	g=500		g=500	204	ND

$C_{VOC(1)}$ NDL ppm as CO_2 - measured

$$C_{VOC(2)} = \frac{\left[P_{T(3)} + P_{B(2)}\right]}{\left[P_{B(2)} - P_{T(2)}\right] - \left[P_{B(1)} - P_{T(1)}\right]} \times C_{VOC(1)}$$

$$C_{VOC(2)} = \frac{[(\quad) + (\quad)]}{[(\quad)-(\quad)] - [(\quad)-(\quad)]} \times (\quad)$$

$C_{VOC(2)}$ = NDL ppm as CO_2 - sample

MASS OF CARBON IN TANK

$C_{VOC(3)} = C_{VOC(2)} \times 4.996 \times 10^{-4}$ = NDL mg/l (68°F, 760 mm Hg)

$M_{n\ VOC(1)} = C_{VOC(3)} \times V_S$ = NDL mg Carbon in Tank

over

TCA SAMPLE ANALYTICAL SHEET

Sample taken by TEDCo Personnel

CLIENT CENTRAL SOYA - TEDCo. DATE TRAP ANALYSIS 1/25/79

PROJECT NO. 92-004 DATE TANK ANALYSIS 1/31/79

TEST NO. COOLEE VENT 4 ANALYST GP

TRAP NO. 3 TANK NO. 6

TANK INITIAL

$P_{B(1)}$ 747 mm Hg

$P_{T(1)}$ 744 mm Hg
Initial Vacuum (Pre-Test)

TANK FINAL

$P_{B(2)}$ 748 mm Hg

$P_{T(2)}$ 237 mm Hg - Post-Test Vacuum

$P_{T(3)}$ 244 mm Hg - Final Pressure

T 76 °F

SAMPLE VOLUME

$$V_S = \frac{\left[P_{B(2)} - P_{T(2)}\right] - \left[P_{B(1)} - P_{T(1)}\right]}{(T + 460) \times 0.299}$$

$$V_S = \frac{\left[(\ 748\ ) - (\ 237\ )\right] - \left[(\ 747\ ) - (\ 744\ )\right]}{\left[(\ 76\ ) + 460\right] \times 0.299}$$

V_S = .170 sample volume - liters

TANK ANALYSIS

Sample Loop	Backflush Area	Attn.	Std. Area	Attn.	Std. Conc. (ppm)	$C_{VOC(1)}$ Sample Conc. ppm
5	ND	1.500		1.500	204	NDL

$C_{VOC(1)}$ ——— ppm as CO_2 - measured

$$C_{VOC(2)} = \frac{\left[P_{T(3)} + P_{B(2)}\right]}{\left[P_{B(2)} - P_{T(2)}\right] - \left[P_{B(1)} - P_{T(1)}\right]} \times C_{VOC(1)}$$

$$C_{VOC(2)} = \frac{\left[(\quad) + (\quad)\right]}{\left[(\quad)-(\quad)\right] - \left[(\quad)-(\quad)\right]} \times (\quad)$$

$C_{VOC(2)}$ = ——— ppm as CO_2 - sample

MASS OF CARBON IN TANK

$C_{VOC(3)} = C_{VOC(2)} \times 4.996 \times 10^{-4}$ = ——— mg/l (68°F, 760 mm Hg)

$M_{n\ VOC(1)} = C_{VOC(3)} \times V_S$ = ——— mg Carbon in Tank

over

TCA SAMPLE ANALYTICAL SHEET

Sample taken by PCSC Personnel

CLIENT Central Soya-Pedco DATE TRAP ANALYSIS _____

PROJECT NO. 92-004 DATE TANK ANALYSIS 1/31/79

TEST NO. Cooler Vent 5 ANALYST MR/EH

TRAP NO. 13 TANK NO. 21

TANK INITIAL

$P_{B(1)}$ 747 mm Hg

$P_{T(1)}$ 744 mm Hg
Initial Vacuum
(Pre-Test)

TANK FINAL

$P_{B(2)}$ 748 mm Hg

$P_{T(2)}$ 269 mm Hg - Post-Test Vacuum

$P_{T(3)}$ 260 mm Hg - Final Pressure

T 76 °F

SAMPLE VOLUME

Trap sample lost

$$V_S = \frac{\left[P_{B(2)} - P_{T(2)}\right] - \left[P_{B(1)} - P_{T(1)}\right]}{(T + 460) \times 0.299}$$

$$V_S = \frac{[(748) - (269)] - [(747) - (744)]}{[(76) + 460] \times 0.299}$$

V_S = 2.970 sample volume - liters

TANK ANALYSIS

Sample Loop	Backflush Area	Attn.	Std. Area	Attn.	Std.Conc. (ppm)	$C_{VOC(1)}$ Sample Conc. ppm
5	30.2	y=500	64.7	y=500	204	95

$C_{VOC(1)}$ 95 ppm as CO_2 - measured

$$C_{VOC(2)} = \frac{\left[P_{T(3)} + P_{B(2)}\right]}{\left[P_{B(2)} - P_{T(2)}\right] - \left[P_{B(1)} - P_{T(1)}\right]} \times C_{VOC(1)}$$

$$C_{VOC(2)} = \frac{[(260) + (748)]}{[(748) - (269)] - [(747) - (744)]} \times (95)$$

$C_{VOC(2)}$ = 201 ppm as CO_2 - sample

MASS OF CARBON IN TANK

$C_{VOC(3)} = C_{VOC(2)} \times 4.996 \times 10^{-4}$ = 0.101 mg/l (68°F, 760 mm Hg)

$M_{n\ VOC(1)} = C_{VOC(3)} \times V_S$ = 0.299 mg Carbon in Tank

over

TRAP ANALYSIS #3

Collection Vessel No. 5

Volume of Collection Vessel 1.000 liters - V_{CV}

$P_{B(2)}$ 726 mm Hg

$P_{CV(1)}$ 725 mm Hg - Initial Vacuum

$P_{CV(2)}$ 298 mm Hg - Final Pressure

T = 76°F

MASS OF CARBON COLLECTED

$C_{VOC(4)}$ 508 ppm as CO_2

$$M_{n\ VOC(2)} = C_{VOC(4)} \times \left[P_{CV(2)} + P_{CV(1)}\right] \left[\frac{3.467 \times 10^{-4} \times V_{CV}}{T(°F) + 460}\right]$$

$$M_{n\ VOC(2)} = (508) \times \left[(298) + (72.5)\right] \left[\frac{3.467 \times 10^{-4} (1.000)}{(76 + 460)}\right]$$

$M_{n(2)}$ = 0.336 mg

$Mn_T = Mn_{(1)} + Mn_{(2)}$

Mn_T = (NDL) + (0.336)

Mn_T = 0.336 mg Carbon

$$\text{mg Carbon/liter} = \frac{Mn_T}{V_{sv}} = \frac{(0.336)}{(3170)} = 0.106$$

mg Carbon/DSCF = mg Carbon/liter X 28.32

= 3.002

4. LAB ANALYSIS HEXANE IN CS_2 AND MEAL

PEDCo ENVIRONMENTAL, INC.

MEMORANDUM

TO: Mr. Dale Hershey ✓

DATE: March 2, 1979

SUBJECT: Analytical Results of Hexane in Carbon Disulfide and Soybean Meal

FROM: Julianne M. Bigner

Julie Bigner

FILE:

cc: Bill DeWees
Gregg Fusaro
Tom Wagner

Attached are the analytical results of the analyses performed in our laboratory for hexane in samples collected at Central Soya, Delphos, Ohio. The results include hexane levels in soybean meal samples, hexane levels in carbon disulfide and gross weights for CS_2 bottles. A water sample is currently being analyzed for hexane content and this data will be reported to you within the next week. A suitable method for the detection of hexane in mineral oil has not yet been found. All procedures reviewed,to date, involve either extensive modification of instrumentation or the purchase of new equipment.

MEAL samples

CASCADE® L1-C2462 EPA - Hexane P/N 3333-G Req # 714 PRINTED IN U.S.A.

	Sample No.	Lab No.	tot. µg (from curve)	% Recov.	tot µg after % Recov	gr. meal used	µg/gr per bottle	
DT1	001	AI329	462.6	38.8%	1192.2	1.5225	783	
DT2	002	AI330	1344.6	↓	3465.4	3.3054	1047	
DT1	003	AI331	710.8	35.5%	2002.2	1.6836	1189	
DT2	004	AI332	160.1		450.9	1.6005	282	
DT1	005	AI333	922.8		2599.4	1.8572	1399	
DT2	006	AI334	718.8		2034.7	1.3596	1498 1482	
DT1	007	AI335	- 9.8			2.2523		
DT2	008	AI336	- 11.3			1.6147		
DRYER	009	AI337	710.8		2002.2	1.9814	1010	
DRYER	010	AI338	1119.7		3154.0	2.0210	1560 ~~1450~~	
COOLER	011	AI339	1032.0		2878.8	2.2906	1257	
COOLER	012	AI340	865.7	↓	2438.5	2.1683	1125	
DT1	013	AI341	474.6	38.7%	1226.3	1.4245	861	
DT2	014	AI342	522.6		1350.3	1.5648	863	
DRYER	015	AI343	71.4		184.4	2.2091	80	
DRYER	016	AI344	487.3		1359.1	1.8955 ~~1.8524~~	~~768~~	664
COOLER	017	AI345	478.3		1235.9	2.3983	515	
COOLER	018	AI346	281.8		728.1	2.3486	310	
DT1	019	AI347	120.2	↓	310.5	1.1614	267	
DT2	020	AI348	535.8	48%	1116.2	1.5363	726	
DRYER	021	AI349	10.7		22.2	2.3088	10	
—	022	~~AI350~~	BROKEN		—	—	—	
COOLER	023	AI350	39.3		81.8	2.7055	30	
COOLER	024	AI351	255.5	↓	~~523.2~~ 526.0	1.8404	~~284~~ 286	
	Duplicates							%
	004	AI332	141.1 ~~198.7~~ -4.8	35.5%	405.9 ~~448.8~~	1.6005	254 ~~282~~	93%
	007	AI335	~~7.1~~			2.2523	1453	
	010	AI338	1095.2 ~~1058.1~~	↓	~~2935.7~~ ~~2980.5~~ 147.0	2.0210	~~1475~~ 64	95%
	015	AI343	56.9	38.7%	148.7	2.3091	tol	76%
	021	AI349	14.0	48.0%	29.1	2.3088	13	130%
	024	AI351	245.4	↓	511.2	1.8404	278	98%

Hexane Analysis of Meal Samples
Collected at Central Soya, Delphos, Ohio

Test Site	Sample #	Lab #	Hexane Concentration[a] (µg/g)
DT-1[b]	001	AI329	783
DT-2	002	AI330	1047
DT-1	003	AI331	1189
DT-2	004	AI332	282
DT-1	005	AI333	1399
DT-2	006	AI334	1489
DT-1	007	AI335	<10
DT-2	008	AI336	<10
Dryer	009	AI337	1010
Dryer	010	AI338	1560
Cooler	011	AI339	1257
Cooler	012	AI340	1125
DT-1	013	AI341	861
DT-2	014	AI342	863
Dryer	015	AI343	80
Dryer	016	AI344	664
Cooler	017	AI345	515
Cooler	018	AI346	310
DT-1	019	AI347	267
DT-2	020	AI348	726
Dryer	021	AI349	10
Dryer (Broken)	022	----	----
Cooler	023	AI350	30
Cooler	024	AI351	286

a: reported as n-Hexane

b: desolvatizer toaster

Analysis Results of Hexane in Carbon Disulfide Samples Collected at Central Soya - Delphos, Ohio

Test Site	Sample No.	Lab No.	Hexane Concentration[a] (µg/µl)
M.O.S.[b]-1	IN-1	AI900	91.2
Diluted 1 to 100 M.O.S.-1	IN-1	AI906	1.1
M.O.S.-1	IN-2	AI901	19.6
Diluted 1 to 100 M.O.S.-1	IN-2	AI907	0.2
M.O.S.-2	IN-1	AI902	6.5
M.O.S.-2	IN-2	AI903	4.9
M.O.S.-2	Out-1	AI904	1.9
M.O.S.-2	Out-2	AI905	0.8
M.O.S.-1	IN-3	AI908	11.5
Diluted 1 to 100 M.O.S.-1	IN-3	AI909	0.1
M.O.S.-1	IN-4	AI910	12.5
Diluted 1 to 100 M.O.S.-1	IN-4	AI911	0.2
M.O.S.-2	IN-3	AI912	2.9
M.O.S.-2	IN-4	AI913	2.6
M.O.S.-2	Out-3	AI914	0.8
M.O.S.-2	Out-4	AI915	0.5
D.V.	1	AI916	<0.01
C.V.	1	AI917	<0.01
D.V.[c]	2	AI918	<0.01
D.V. Trap	2	AI919	<0.01
C.V.[d]	2	AI920	<0.01
C.V. Trap	2	AI921	<0.01
D.V.	3	AI922	<0.01
D.V. Trap	3	AI923	<0.01
C.V.	3	AI924	<0.01
C.V. Trap	3	AI925	<0.01
D.V.	4	AI926	0.03
D.V. Trap	4	AI927	0.01
C.V.	4	AI928	<0.01
C.V. Trap	4	AI929	<0.01
D.V.	5	AI930	0.08
D.V. Trap	5	AI931	0.02
C.V.	5	AI932	<0.01
Flush CS_2		AI933	<0.01
Rinse CS_2		AI934	<0.01
CS_2 for D.V. and C.V., Run 4 & 5	1	AI935	<0.01
CS_2 for C.V. and C.V., Run 4 & 5	2	AI936	<0.01

a. reported as n-Hexane

b. Mineral oil scrubber

c. Dryer

d. Cooler

Gross Weights of Carbon Disulfide Bottles
Collected at Central Soya - Delphos, Ohio

Test Site		Sample No.	Lab No.	Bottle, Gross Weight (g)
	M.O.S.[b]-1	IN-1	AI900	189.29
Diluted 1 to 100	M.O.S.-1	IN-1	AI906	234.86
	M.O.S.-1	IN-2	AI901	237.89
Diluted 1 to 100	M.O.S.-1	IN-2	AI907	242.62
	M.O.S.-2	IN-1	AI902	232.70
	M.O.S.-2	IN-2	AI903	244.95
	M.O.S.-2	Out-1	AI904	205.80
	M.O.S.-2	Out-2	AI905	245.64
	M.O.S.-1	IN-3	AI908	234.85
Diluted 1 to 100	M.O.S.-1	IN-3	AI909	224.45
	M.O.S.-1	IN-4	AI910	244.05
Diluted 1 to 100	M.O.S.-1	IN-4	AI911	224.14
	M.O.S.-2	IN-3	AI912	241.69
	M.O.S.-2	IN-4	AI913	248.00
	M.O.S.-2	Out-3	AI914	233.08
	M.O.S.-2	Out-4	AI915	256.40
	D.V.	1	AI916	262.58
	C.V.	1	AI917	246.09
	D.V.[c]	2	AI918	254.96
	D.V. Trap	2	AI919	170.25
	C.V.[d]	2	AI920	252.29
	C.V. Trap	2	AI921	176.79
	D.V.	3	AI922	267.45
	D.V. Trap	3	AI923	170.13
	C.V.	3	AI924	248.58
	C.V. Trap	3	AI925	171.00
	D.V.	4	AI926	235.59
	D.V. Trap	4	AI927	165.04
	C.V.	4	AI928	269.40
	C.V. Trap	4	AI929	150.77
	D.V.	5	AI930	225.95
	D.V. Trap	5	AI931	174.05
	C.V.	5	AI932	258.22
Flush	CS_2		AI933	111.98
Rinse	CS_2		AI934	113.09
CS_2 for D.V. and C.V.,	Run 4 & 5	1	AI935	121.90
CS_2 for D.V. and C.V.,	Run 4 & 5	2	AI936	116.94

a. reported as n-Hexane

b. Mineral oil scrubber

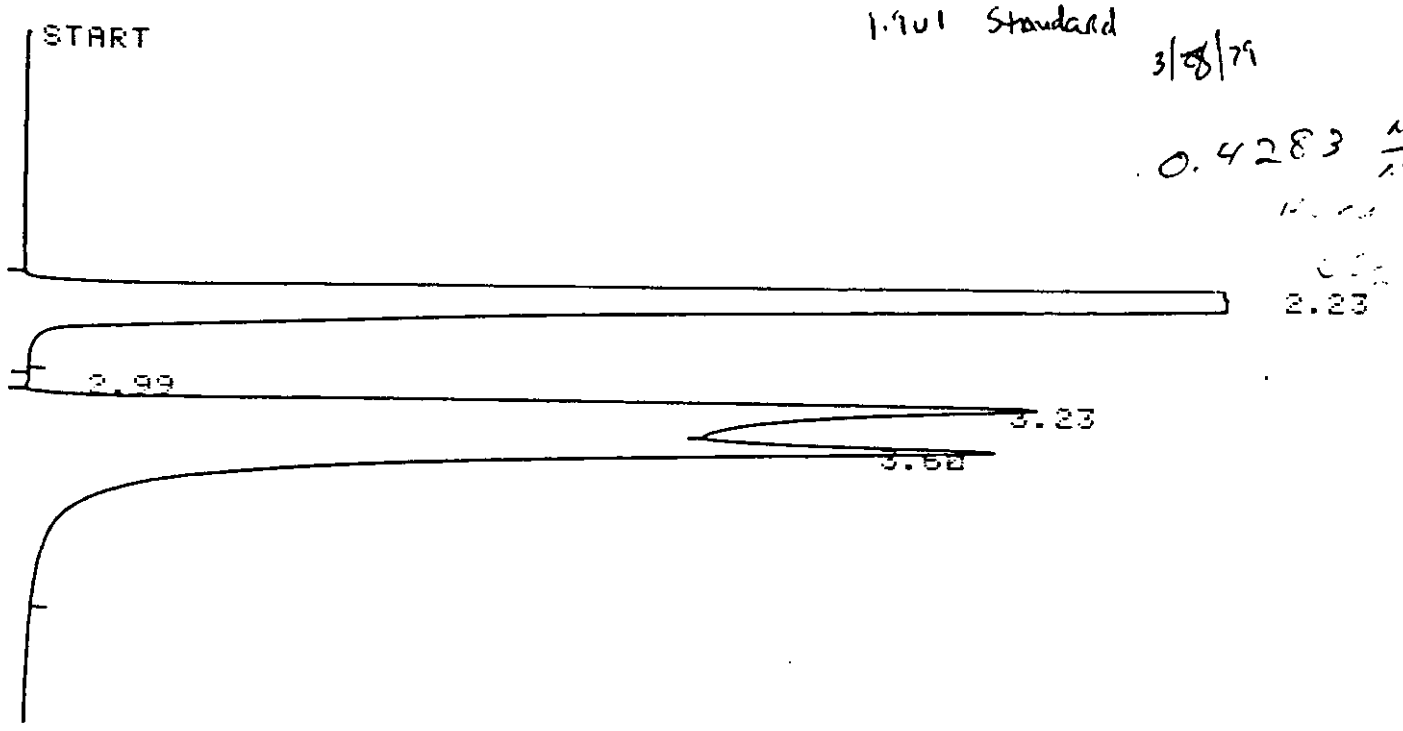
c. Dryer

d. Cooler

5. WASTE WATER ANALYSIS

1.9ul Standard 3/28/79

0.4283 $\frac{\mu c}{\mu l}$

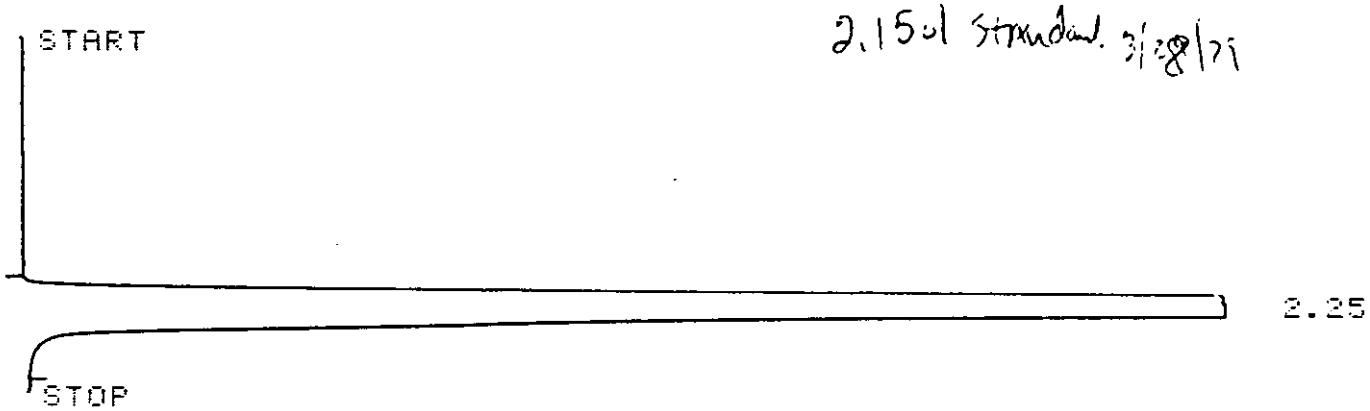


hp 5830A
AREA %

RT	AREA	AREA %
2.23	531100	56.173
2.99	172	0.018
3.23	217900	23.047
3.60	196300	20.762

XF: 1.0000 E+ 0

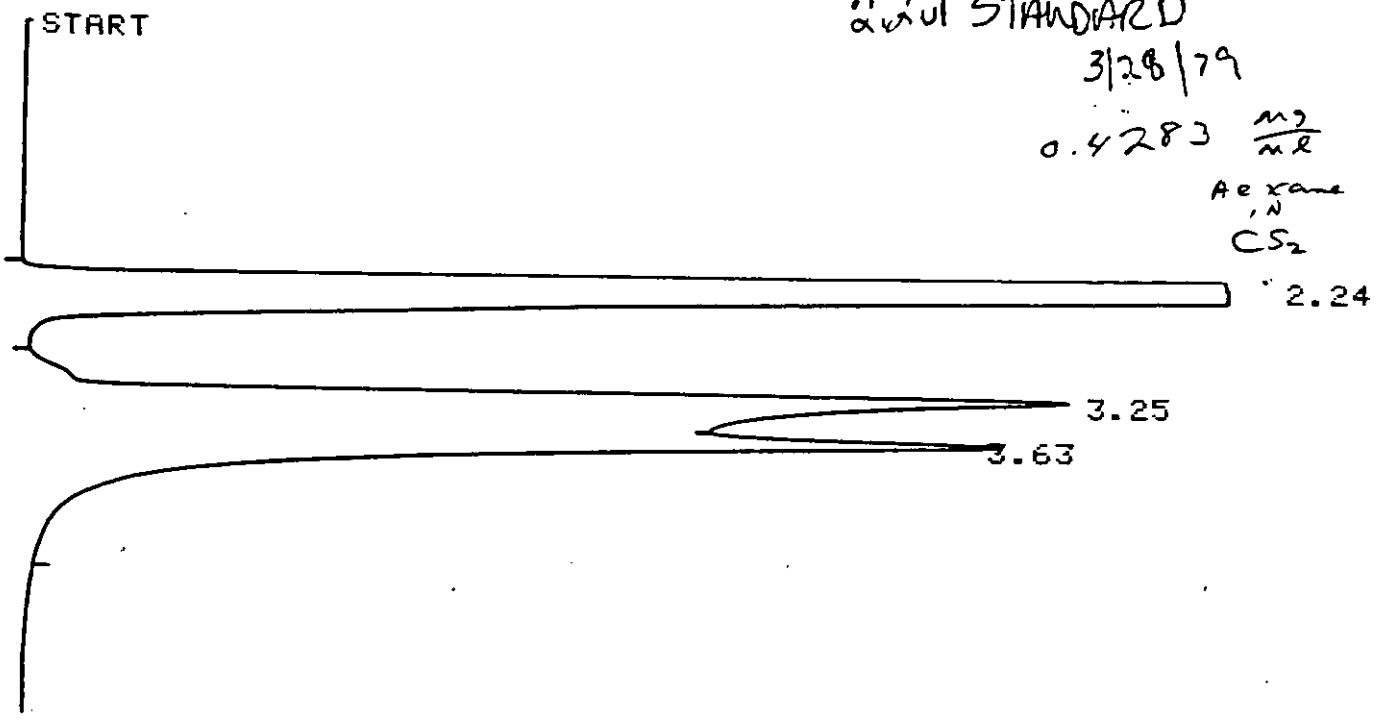
2.15ul Standard 3/28/79



hp 5830A
AREA %

XF: 1.0000 E+ 0

2.2 ul STANDARD
3/28/79
0.4283 $\frac{mg}{ml}$
Hexane
CS_2

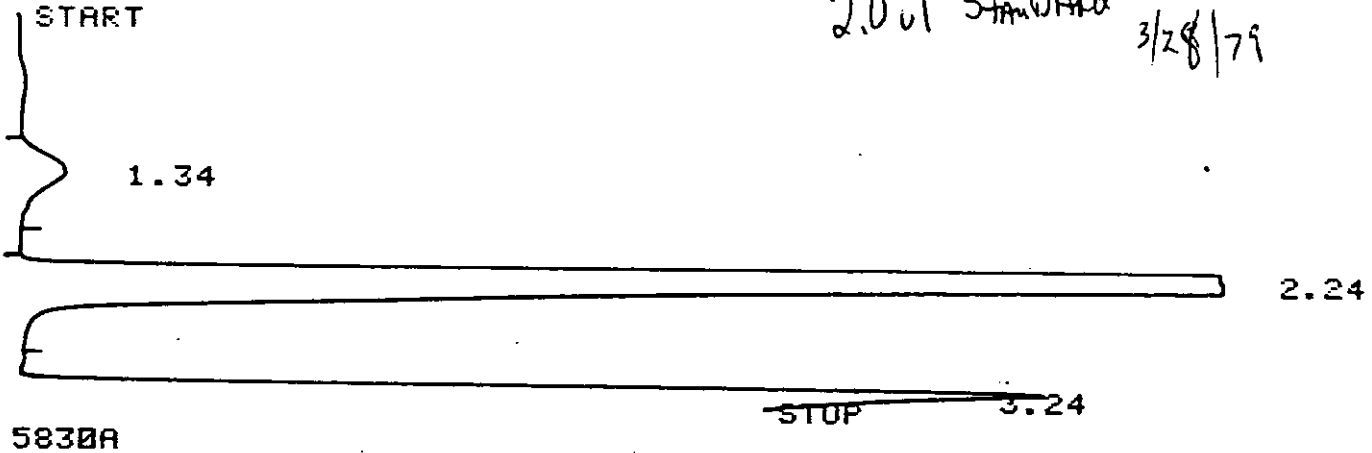


hp 5830A
AREA %

RT	AREA	AREA %
2.24	589600	57.561
3.25	239800	23.411
3.63	194900	19.028

XF: 1.0000 E+ 0

2.0 ul STANDARD 3/28/79



hp 5830A
AREA %

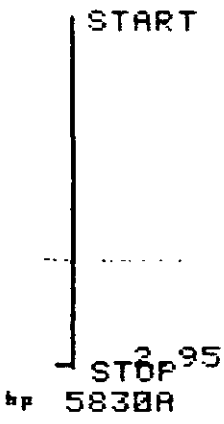
RT	AREA	AREA %
1.34	12440	1.788
2.24	531000	76.322
3.24	152300	21.890

XF: 1.0000 E+ 0

WASTE WATER ANALYSIS

Sample I.D.	µl injected	R.T.	Area unit	Response factor, µg/AV	Concentration, µg/µl
Wastewater 1/11/79	2.9	2.17	16,800	1.62×10^{-6}	
		2.59	6,008		
		2.07	5,173		
			27,981		0.0156
	3.9	2.17	269,600		
		2.60	7,712		
			277,312		0.0173
	4.0	2.07	3,910		
		2.18	18,960		
		2.61	7,220		
			30,090		0.0122
				Average	0.015 $\frac{\mu g}{\mu l}$

XF: 1.0000 E+ 0

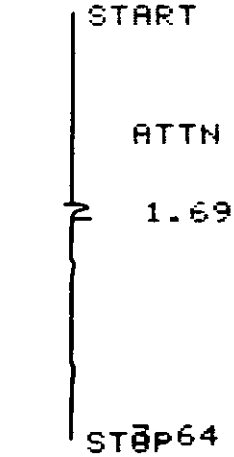


2.9 ml dist. H_2O

hp 5830A

3.0 ml AJ 798, wastewater 1-12-79

1:15



att changed from 128 to 32

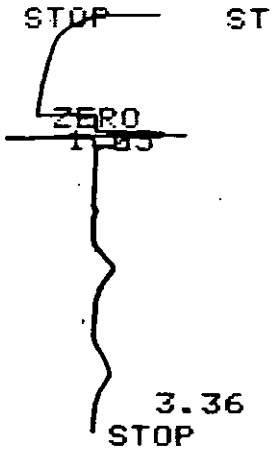
hp 5830A
AREA %

RT	AREA	AREA %
1.69	185	100.000

XF: 1.0000 E+ 0

3.5 ml AJ 794 wastewater 9:30 AM

1-10-79



hp 5830A
AREA %

RT	AREA	AREA %
1.05	367	100.000

XF: 1.0000 E+ 0

STOP
hp 5830A
AREA %

RT	AREA	AREA %
2.07	5173	18.345
2.17	16800	59.579
2.59	6008	21.307
3.02	217	0.770

XF: 1.0000 E+ 0

3.9 ml AJ791 Peru

START
ZERO
ZERO
ZERO
1.50
1.69
2.17
2.60
3.03
STOP

Calibration

hp 5830A
AREA %

RT	AREA	AREA %
2.17	269600	97.106
2.60	7712	2.778
3.03	322	0.116

XF: 1.0000 E+ 0

4.0 ml AJ791 Peru

START
1.69
2.07
2.18
2.61
3.03
STOP

1805 Au/ml

Unknown Au/ml

hp 5830A
AREA %

RT	AREA	AREA %
2.07	3910	12.860
2.18	18960	62.360
2.61	7220	23.747
3.03	314	1.033

XF: 1.0000 E+ 0

START

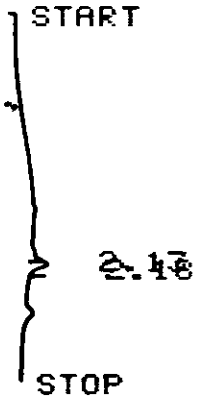
2.3 ml dist H2O only

2.3 ml dist H_2O only

HP 5830A
AREA %

RT	AREA	AREA %
5.58	140100	100.000

XF: 1.0000 E+ 0

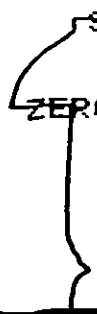


4.0 ml AJ 792 watertank
1-9-91 5:50

HP 5830A
AREA %

RT	AREA	AREA %
2.18	145	100.000

XF: 1.0000 E+ 0



4.45 ml AJ 792 Rerun

2.85

STOP

hp 5830A

3.15 ml AJ 793 1700-1800 1-9-79
Filtered sp Mineral scrubber
DRIPPINGS FROM OUTLET

hp 5830A
AREA %

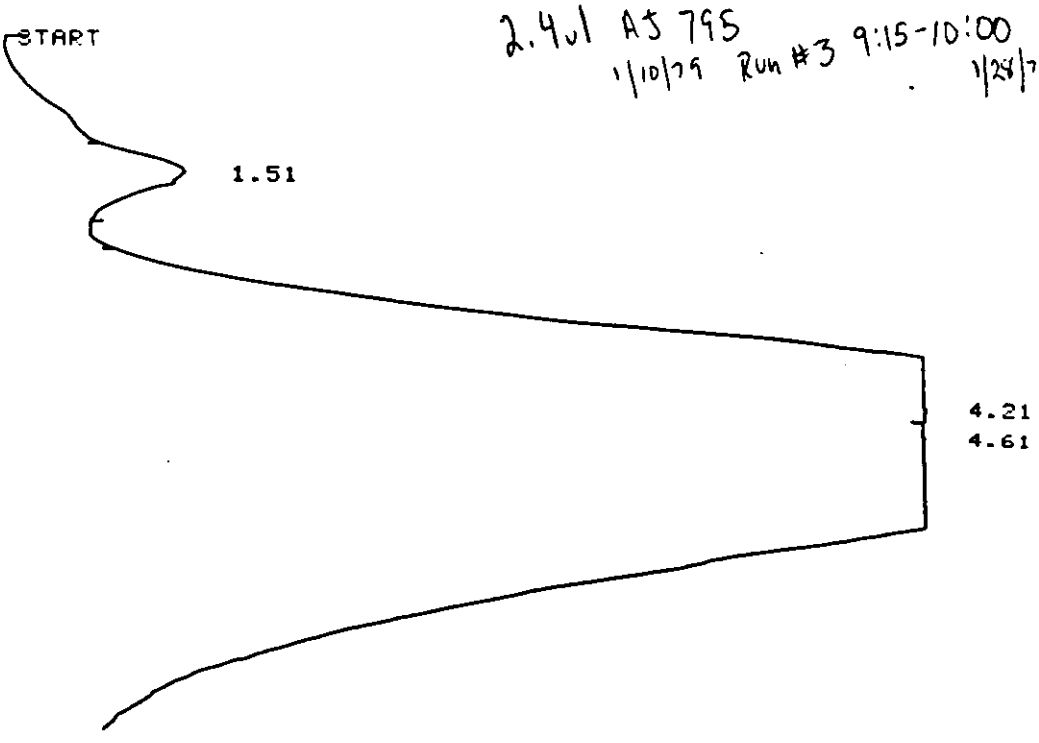
RT	AREA	AREA %
1.85	160	100.000

XF: 1.0000 E+ 0

1.60 ml AJ 793 1700-1800 1/9/79
Filtered SX mineral scrubber

hp 5830A

2.4 ml AJ 795
1/10/79 Run #3 9:15-10:00 1/28/79



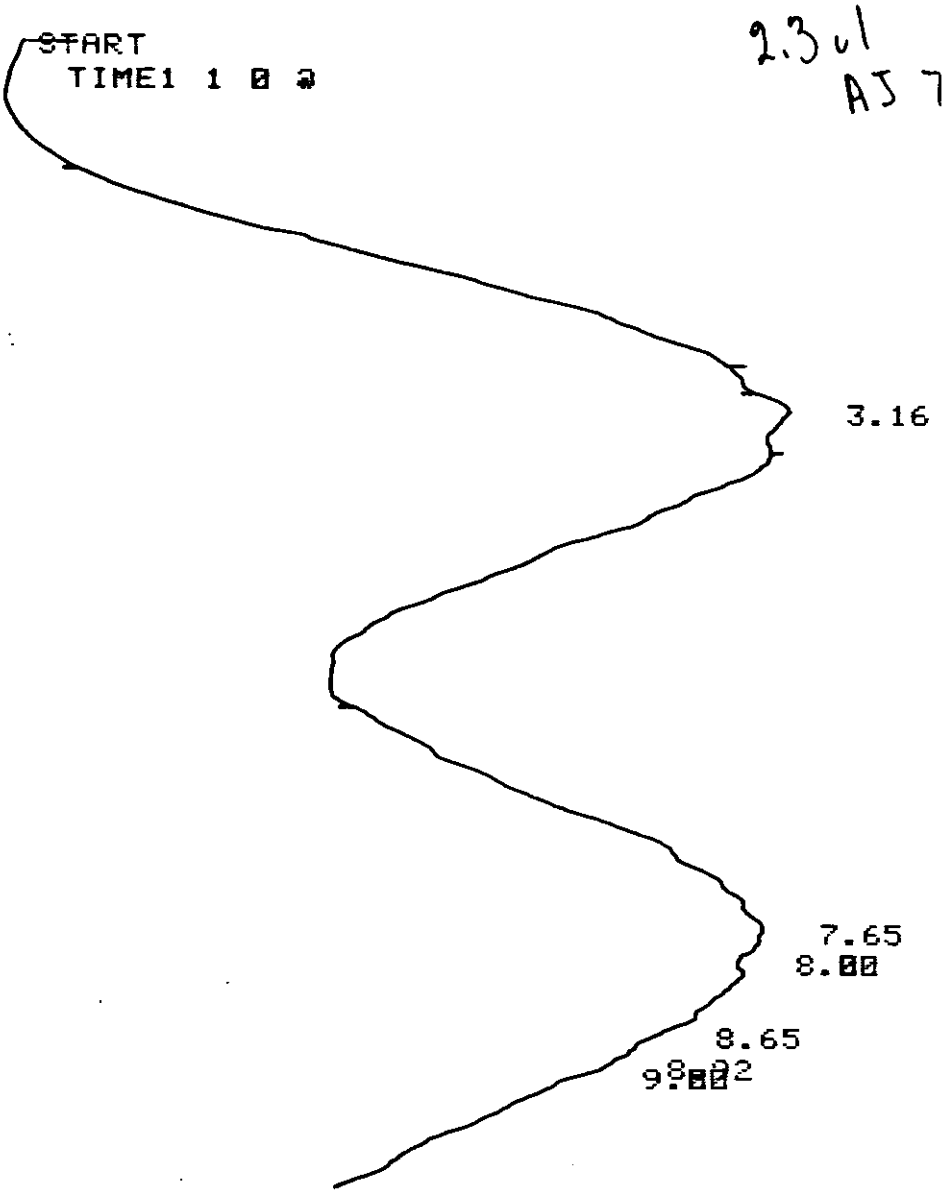
hp 5830A
AREA %

RT	AREA	AREA %
1.51	11080	1.196

XF: 1.0000 E+ 0

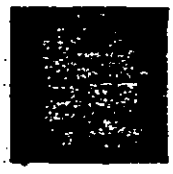
START
TIME1 1 0 0

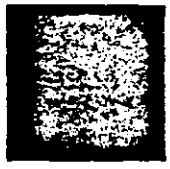
2.3 ul DRIPPING FROM MOS OUTLET
AJ 796 11:00 ~11:45
11/10/79 1/29/79



hp 5830A
AREA %

RT	AREA	AREA %
7.16	1744	0.779





APPENDIX B

RAW FIELD DATA

1. CS_2 BUBBLER TRAIN DATA SHEETS

PLANT AND CITY: CENTRAL SOYA, DELPHOS.

DATE: 1-9-79 SAMPLE LOCATION: MOS-1 INLET

AMBIANT TEMP 0 °F BAROMETRIC PRESS. 29.56 IN. Hg

RUN NO. MOS-1-IN-1

SAMPLE TRAIN DESCRIPTION: Pedco BUBBLER TRAIN WITH Bag sample Back up.

PUMP NO. 224 (USED TO EVACUATE BAG) CALIBRATION FACTOR: ~~2.0~~ 0.490 ml/count

223 (USED TO EVACUATE BAG) 0.6345 ml/count

CLOCK TIME START 11:15 FINISH 12:15

	# 224	# 223
INITIAL PUMP COUNT	785690	774825
FINAL PUMP COUNT	797388	795569
NET PUMP COUNT.	11698	20744

SAMPLE VOLUME - 18.894 l at 71 F, 29.56 IN Hg

STACK TEMP 80 °F STATIC PRESSURE -7.8 IN. H_2O

SAMPLE TRAIN TEMP. 0 F

MOISTURE DETERMINATION - NOT RUN

SILICA GEL TUBE NUMBER -

PUMP NUMBER - CALIBRATION FACTOR - ml/Co

INITIAL PUMP COUNT

FINAL PUMP COUNT

NET PUMP COUNT

PLANT AND CITY: CENTRAL SOYA, DELPHOS

DATE: 1-9-79 SAMPLE LOCATION: MOS-2-INLET

AMBIANT TEMP 0 F BAROMETRIC PRESS. 29.56 IN Hg

RUN NO - MOS-2-IN-1

SAMPLE TRAIN DESCRIPTION: Pedco BUBBLER TRAIN WITH Bag Sampler BACKUP.

PUMP NO. 225 (used to evacuate Bags) CALIBRATION FACTOR: 0.577 ml/count

239 0.612 ml/count

CLOCK TIME START 10:50 FINISH 11:50

	#225	#239
INITIAL PUMP COUNT.	173960	431230
FINAL PUMP COUNT	184009	449709
NET PUMP COUNT.	10049	18479

SAMPLE VOLUME - 17.1074 l at 71F, 29.56 in Hg

STACK TEMP 64 °F STATIC PRESSURE -11.50 IN. H_2O

SAMPLE TRAIN TEMP.

MOISTURE DETERMINATION NOT RUN.

SILICA GEL TUBE NUMBER -

PUMP NUMBER - CALIBRATION FACTOR - ml/count

INITIAL PUMP COUNT

FINAL PUMP COUNT

NET PUMP COUNT

PLANT AND CITY :

DATE : 1-9-79 sample LOCATION : MOS-2 OUTLET

AMBIANT TEMP OF BAROMETRIC PRESS. 29.56 in Hg.

RUN NO - MOS-2-OUT-1

sample TRAIN DESCRIPTION : BUBBLER TRAIN WITH Bag Sampler Backup.

pump NO. 223 (USED TO EVACUATE BAGS) CALIBRATION FACTOR : 0.6345 ml/count
225 0.577

CLOCK TIME START 11:15 finish 12:15

	# 223	# 225
INITIAL pump COUNT.	744538	203049
final pump COUNT	755879	221605
NET pump COUNT.	11341	18556

sample Volume - 17.9027 l at 71F, 29.56 in Hg

STACK TEMP 60 °F STATIC PRESSURE -14.0 IN. H_2O

sample TRAIN TEMP.

MOISTURE DETERMINATION

SILICA GEL TUBE NUMBER -

PUMP NUMBER - CALIBRATION FACTOR - ml/count

INITIAL pump COUNT

FINAL pump COUNT

NET pump COUNT

PLANT AND CITY: CENTRAL SOYA, Delphos.

DATE: 1/9/79 SAMPLE LOCATION: MOS-1 INLET

AMBIANT TEMP 0 °F BAROMETRIC PRESS. 29.56 in Hg

RUN NO - MOS-1-INLET-2

SAMPLE TRAIN DESCRIPTION: BUBBLER TRAIN, NO Backup.

PUMP NO. 225 CALIBRATION FACTOR: 6,319 $\frac{mL}{count}$

CLOCK TIME START 17:05 FINISH 18:05

INITIAL PUMP COUNT 184009

FINAL PUMP COUNT 202809

NET PUMP COUNT. 18800

SAMPLE VOLUME 5,9942 ℓ

STACK TEMP 80 °F STATIC PRESSURE -7.7 in. H_2O

SAMPLE TRAIN TEMP. -0°F

MOISTURE DETERMINATION NOT RUN.

SILICA GEL TUBE NUMBER -

PUMP NUMBER - CALIBRATION FACTOR - $\frac{m}{Co}$

INITIAL PUMP COUNT

FINAL PUMP COUNT

NET PUMP COUNT

PLANT AND CITY: CENTRAL SOYA, DELPHOS

DATE: 1-9-79 SAMPLE LOCATION: MOS-2-INLET

AMBIENT TEMP 0°F BAROMETRIC PRESS. 29.56 IN Hg.

RUN NO - MOS-2-IN-2

SAMPLE TRAIN DESCRIPTION: BUBBLER TRAIN, NO BACKUP.

PUMP NO. 239 CALIBRATION FACTOR: 0.317 ML/COUNT

CLOCK TIME START 17:05 FINISH 18:05

INITIAL PUMP COUNT. 411735

FINAL PUMP COUNT. 430696

NET PUMP COUNT. 18961

Sample Volume - 6.01064 L at 0°F 29.56 IN Hg.

STACK TEMP 68 °F STATIC PRESSURE -11.5 IN. H_2O

SAMPLE TRAIN TEMP. 0°F

MOISTURE DETERMINATION NOT RUN.

SILICA GEL TUBE NUMBER -

PUMP NUMBER - CALIBRATION FACTOR - IN./COUNT

INITIAL PUMP COUNT

FINAL PUMP COUNT

NET PUMP COUNT

PLANT AND CITY: CENTRAL SOYA, Delphos

DATE: 1-9-79 SAMPLE LOCATION: MOS-2 OUTLET

AMBIANT TEMP 0°F BAROMETRIC PRESS. 29.56 IN Hg

RUN NO - MOS-2-OUT-2

SAMPLE TRAIN DESCRIPTION: BUBBLE TRAIN NO BACKUP.

PUMP NO. 223 CALIBRATION FACTOR: 0.497 ml/count

CLOCK TIME START 17:05 FINISH 18:05

INITIAL PUMP COUNT 756291

FINAL PUMP COUNT 773740

NET PUMP COUNT. 17449

Sample Volume - 8672.15 ml at 0°F, 29.56 in Hg

STACK TEMP 61 °F STATIC PRESSURE -14.0 IN. H_2O

SAMPLE TRAIN TEMP. ~0°F

MOISTURE DETERMINATION NOT RUN.

SILICA GEL TUBE NUMBER -

PUMP NUMBER - CALIBRATION FACTOR - ml/count

INITIAL PUMP COUNT

FINAL PUMP COUNT

NET PUMP COUNT

PLANT AND CITY: CENTRAL SOYA, Delphos.

DATE: 1-10-79 sample LOCATION: MOS-1-INLET.

AMBIANT TEMP 1° F BAROMETRIC PRESS. 29.75 in Hg

RUN NO - MOS-1-IN-3

Sample TRAIN dESCRIPTION: BUBBLER TRAIN,

pump NO. 225 CALIBRATION FACTOR: 0.319 ml/count

CLOCK TIME START 9:00 finish 9:45

INITIAL pump COUNT 221611

final pump COUNT 235434

NET pump COUNT. 13823

Sample Vol- 4409.54 ml. at 1°F 29.75 in Hg.

STACK TEMP 80 °F · STATIC PRESSURE -10.35 in. H_2O

Sample TRAIN TEMP. 1°F

MOISTURE DETERMINATION NOT RUN.

SILICA GEL TUBE NUMBER -

pump NUMBER - CALIBRATION FACTOR - ml/count

INITIAL pump COUNT

FINAL pump COUNT

NET pump COUNT

PLANT AND CITY: CENTRAL SOYA, Delphos

DATE: 1-10-79 SAMPLE LOCATION: MOS-2 INLET

AMBIANT TEMP 1 °F BAROMETRIC PRESS. 29.75 in Hg

RUN NO: MOS-2-IN-3

SAMPLE TRAIN DESCRIPTION: bubbler TRAIN - NO Backup.

PUMP NO. 223 CALIBRATION FACTOR: 0.497 ml/count

CLOCK TIME START 9:10 finish 9:45

INITIAL PUMP COUNT. 795973

FINAL PUMP COUNT 808357

NET PUMP COUNT. 12384

Sample Volume - 6154.85 ml

STACK TEMP 63 °F STATIC PRESSURE -12.25 IN. H_2O

SAMPLE TRAIN TEMP. 1°F

MOISTURE DETERMINATION NOT RUN.

SILICA GEL TUBE NUMBER -

PUMP NUMBER - CALIBRATION FACTOR - ml/Cou

INITIAL PUMP COUNT

FINAL PUMP COUNT

NET PUMP COUNT

PLANT AND CITY: CENTRAL SOYA. Delphos

DATE: 1-10-79 sample LOCATION:

AMBIANT TEMP 1°F BAROMETRIC PRESS. 29.75 IN Hg

RUN NO - MOS-2-OUT-3

Sample TRAIN description: Pedco Bubbler train, NO Backup

pump NO. 239 CALIBRATION FACTOR: 0.317 $\frac{ml}{count}$

Clock TIME START 9:13 finish 10:00

INITIAL pump COUNT.	449919
final pump COUNT	462977
NET pump COUNT.	13058

Sample volume - 4139.39 ml at 1°F 29.75 IN Hg

STACK TEMP 60 °F STATIC PRESSURE -14.0 IN. H_2O

sample TRAIN TEMP. 1°F

MOISTURE DETERMINATION NOT RUN.

SILICA GEL TUBE NUMBER -

pump NUMBER - CALIBRATION FACTOR - $\frac{ml}{Cou}$

INITIAL pump COUNT	
final pump COUNT	
NET pump COUNT	

PLANT AND CITY: CENTRAL SOYA, Delphos

DATE: 1-10-79 sample LOCATION: MOS-1 INLET

AMBIANT TEMP 7 °F BAROMETRIC PRESS. 29.75 IN Hg.

RUN NO - MOS-1 IN - 4

sample TRAIN DESCRIPTION: Gelco BUBBLER TRAIN.

pump NO. 223 CALIBRATION FACTOR: 0.497 ml/count

CLOCK TIME START 11:00 finish 11:45

INITIAL pump COUNT. 808659

final pump COUNT. 820391

NET pump COUNT. 11732

Sample Volume ~ 5830.80 ml at 7°F, 29.75 in Hg.

STACK TEMP 77 °F · STATIC PRESSURE -8.4 IN. H_2O

sample TRAIN TEMP. - 7°F.

MOISTURE DETERMINATION NOT RUN.

SILICA GEL TUBE NUMBER -

pump NUMBER - CALIBRATION FACTOR - ml/Cou

INITIAL pump COUNT

FINAL pump COUNT ———

NET pump COUNT

PLANT AND CITY: CENTRAL SOYA, Delphos

DATE: 1-10-79 SAMPLE LOCATION: MOS-2 - INLET

AMBIANT TEMP 7 °F BAROMETRIC PRESS. 29.75 IN Hg

RUN NO - MOS-2 IN -4

SAMPLE TRAIN DESCRIPTION: Pedco BUBBLER TRAIN

PUMP NO. 225 CALIBRATION FACTOR: 0.319 ml/COUN

CLOCK TIME START 11:00 FINISH 11:45

INITIAL PUMP COUNT 237.177

FINAL PUMP COUNT 249 280

NET PUMP COUNT. 12.103

Sample Volume - 3860.86 ml. @ 7°F, 29.75 IN Hg

STACK TEMP 63 °F STATIC PRESSURE -11.5 IN. H_2O

SAMPLE TRAIN TEMP. 7 °F

MOISTURE DETERMINATION NOT RUN.

SILICA GEL TUBE NUMBER -

PUMP NUMNER - CALIBRATION FACTOR. ml/Cou

INITIAL PUMP COUNT

FINAL PUMP COUNT

NET PUMP COUNT

PLANT AND CITY: CENTRAL SOYA, Delphos

DATE: 1-10-79 SAMPLE LOCATION: MOS-2 OUTLET

AMBIANT TEMP 7°F BAROMETRIC PRESS. 29.75 in Hg.

RUN NO. MOS-2-OUT-4

SAMPLE TRAIN DESCRIPTION: Pedco bubbler TRAIN

PUMP NO. 239 CALIBRATION FACTOR: 0.317 ml/coun

CLOCK TIME START 11:03 FINISH 11:48

INITIAL PUMP COUNT 463280

FINAL PUMP COUNT 476186

NET PUMP COUNT. 12906

SAMPLE VOLUME: 4091.20 ml at 7°F, 29.75 in Hg

STACK TEMP 60 °F STATIC PRESSURE -14.0 IN. H_2O

SAMPLE TRAIN TEMP. -7°F

MOISTURE DETERMINATION NOT RUN.

SILICA GEL TUBE NUMBER =

PUMP NUMBER - CALIBRATION FACTOR - ml/Cou

INITIAL PUMP COUNT

FINAL PUMP COUNT

NET PUMP COUNT

PLANT AND CITY: CENTRAL SOYA, Delphos

DATE: 1-10-79 SAMPLE LOCATION: DRYER VENT

AMBIANT TEMP 12°F BAROMETRIC PRESS. 29.75 IN Hg.

RUN NO. D. V - 1

SAMPLE TRAIN DESCRIPTION: Pedco bubbler with Bag sample Backup.

PUMP NO. 239 (USED TO EVACUATE Bag) CALIBRATION FACTOR: 0.612 ml/count

CLOCK TIME START ~~3:40~~ 15:10 FINISH 16:10

INITIAL PUMP COUNT	492343
FINAL PUMP COUNT	500485
NET PUMP COUNT.	8142

SAMPLE VOLUME: 4982.90 ml at. 71°F, 29.75 in Hg

STACK TEMP 150 °F STATIC PRESSURE -2.2 IN. H_2O

SAMPLE TRAIN TEMP. 42°F

MOISTURE DETERMINATION - NOT RUN.

SILICA GEL TUBE NUMBER -

PUMP NUMBER: CALIBRATION FACTOR: ml/count

INITIAL PUMP COUNT

FINAL PUMP COUNT

NET PUMP COUNT

PLANT AND CITY: CENTRAL SOYA, Delphos

DATE: 1-11-79 SAMPLE LOCATION: DRYER VENT

AMBIANT TEMP 2°F BAROMETRIC PRESS. 29.88 IN Hg

RUN NO - DV-2

SAMPLE TRAIN DESCRIPTION: BUBBLER TRAIN WITH FINAL IMPINGER TRAP TO BE ANALYZED SEPARATELY

PUMP NO 239 CALIBRATION FACTOR: 0.317 ml/count

CLOCK TIME START 10:30 FINISH 11:15

INITIAL PUMP COUNT 501142

FINAL PUMP COUNT 512108

NET PUMP COUNT 10966

SAMPLE VOLUME: 3476.2 ml at 2°F, 29.88 IN Hg

STACK TEMP 150 °F STATIC PRESSURE -2.2 IN. H_2O

SAMPLE TRAIN TEMP. -2°F

MOISTURE DETERMINATION

SILICA GEL TUBE NUMBER - 1180.

PUMP NUMBER - 222 CALIBRATION FACTOR 0.513 ml/count

INITIAL PUMP COUNT 283388

FINAL PUMP COUNT 300304

NET PUMP COUNT 16916 9.981 e 13.8% moisture

SAMPLE VOLUME -: 8677.9 ml (at 2°F, 29.88 IN Hg)

MOISTURE COLLECTED - 1.1997 gm IN 8677.9 ml(g)

PLANT AND CITY: CENTRAL SOYA, Delphos

DATE: 1-11-79 SAMPLE LOCATION: DRYER VENT

AMBIANT TEMP 12°F BAROMETRIC PRESS. 29.88 IN Hg.

RUN NO: DV-3

SAMPLE TRAIN DESCRIPTION: BUBBLER TRAIN WITH EXTRA IMPINGER TRAP ANALYSED SEPARATELY

PUMP NO. 239 CALIBRATION FACTOR: 0.317 $\frac{m^L}{COUN}$

CLOCK TIME START @ 14:30 FINISH 15:15

INITIAL PUMP COUNT 513460

FINAL PUMP COUNT 525782

NET PUMP COUNT. 12322

SAMPLE VOLUME: 3906.1 ml at 12F 29.88 IN Hg.

STACK TEMP 150 °F STATIC PRESSURE -2.2 IN. H_2O

SAMPLE TRAIN TEMP. - 12°F

MOISTURE DETERMINATION

SILICA GEL TUBE NUMBER - 129 F

PUMP NUMBER - R CALIBRATION FACTOR - 0.4108 $\frac{n}{Co}$

INITIAL PUMP COUNT 28483

FINAL PUMP COUNT 45076

NET PUMP COUNT 16593 1.475 gl

Sample Vol.: - 6769.9 ml at 12F, 29.88 in

MOISTURE collected 0.7226 gm. 11.43%

PLANT AND CITY: CENTRAL SOYA, Delphos

DATE: 1-22-79 SAMPLE LOCATION: DRYER VENT

AMBIANT TEMP 14°F BAROMETRIC PRESS. 29.54 IN Hg

RUN NO: DV-4

SAMPLE TRAIN DESCRIPTION: BUBBLER TRAIN WITH EXTRA IMPINGER ANALYSED SEPARATELY

PUMP NO. 223 CALIBRATION FACTOR: 0.497 $\frac{ml}{count}$

CLOCK TIME START 12:10 FINISH 14:25

INITIAL PUMP COUNT 903327

FINAL PUMP COUNT 941942

NET PUMP COUNT 38615 21.109 std

SAMPLE VOLUME: 19191.66 ml at 14°F, 29.54 IN Hg

STACK TEMP 145 °F STATIC PRESSURE -1.0 IN. H_2O

SAMPLE TRAIN TEMP. -14°F

MOISTURE DETERMINATION

SILICA GEL TUBE NUMBER - 1294

PUMP NUMBER - 222 CALIBRATION FACTOR 0.573 $\frac{m}{Co}$

INITIAL PUMP COUNT 310662

FINAL PUMP COUNT 364605

NET PUMP COUNT 53943 29.981 std

SAMPLE VOL. - 27672.76 ml at 14°F

3.6623 gm H_2O 14.03% moisture

PLANT AND CITY: CENTRAL SOYA, Delphos

DATE: 1-12-79 SAMPLE LOCATION: DRYER VENT

AMBIANT TEMP 14°F BAROMETRIC PRESS. 29.54 in Hg

RUN NO: DV-5

SAMPLE TRAIN DESCRIPTION: BUBBLER TRAIN with high Vol pump

PUMP NO: CALIBRATION FACTOR: ml/cou

CLOCK TIME START 12:10 FINISH 14:25

INITIAL PUMP COUNT

FINAL PUMP COUNT

NET PUMP COUNT.

SAMPLE VOLUME: 2.54 ft^3 at 60F, 29.54 in Hg

STACK TEMP 145 °F STATIC PRESSURE -1.0 in. H_2O

SAMPLE TRAIN TEMP. - 14°F

MOISTURE DETERMINATION see DV-4

SILICA GEL TUBE NUMBER =

PUMP NUMBER: CALIBRATION FACTOR: Co

INITIAL PUMP COUNT

FINAL PUMP COUNT

NET PUMP COUNT

PLANT AND CITY: CENTRAL SOYA, DeLphos

DATE: 1-12-79 SAMPLE LOCATION: COOLER VENT

AMBIANT TEMP 14°F BAROMETRIC PRESS. 29.54 in. Hg

RUN NO: CV-4

SAMPLE TRAIN DESCRIPTION: Pedco BUBBLER WITH FINAL IMPINGER TRAP ANALYSED SEPARATELY.

PUMP NO: 239 CALIBRATION FACTOR: 0.317 ml/coun
225 0.319

CLOCK TIME START 12:10 FINISH 13:53

	#239	#225
INITIAL PUMP COUNT	540413	288169
FINAL PUMP COUNT	562439	289686
NET PUMP COUNT	22026	1517

SAMPLE VOLUME: 9.212 std. 7466.17 ml at 14°F, 29.54 ~~29.82~~ in Hg.

STACK TEMP 105°F STATIC PRESSURE +.05 IN. H_2O 9.212

SAMPLE TRAIN TEMP. 14°F

MOISTURE DETERMINATION

SILICA GEL TUBE NUMBER - 1148

PUMP NUMBER: 225 CALIBRATION FACTOR .0.490 ml/Cou

INITIAL PUMP COUNT 253385

FINAL PUMP COUNT 288169 slight

NET PUMP COUNT 34780 18.83 45V

Sample Volume - 17042.2 ml at 14°F 29.54 in.

MOISTURE collected 1.2194 gm 8.0%

PLANT AND CITY: CENTRAL SOYA, Delphos

DATE: 1-12-79 SAMPLE LOCATION: COOLER VENT

AMBIANT TEMP 12°F BAROMETRIC PRESS. 29.54 IN Hg.

RUN NO: CV-5

SAMPLE TRAIN DESCRIPTION: Pedco GVABCGER with high Volume pump

PUMP NO. CALIBRATION FACTOR: ml/coun

CLOCK TIME START 12:10 finish 13:00

INITIAL PUMP COUNT.

final PUMP COUNT

NET PUMP COUNT.

SAMPLE VOLUME: 2.854 STD. ft³ 2.869 ft³ at 64F, 29.54 IN Hg.

STACK TEMP 105 °F STATIC PRESSURE +.05 IN. H_2O

SAMPLE TRAIN TEMP.

MOISTURE DETERMINATION see CV-4

SILICA GEL TUBE NUMBER =

PUMP NUMBER: CALIBRATION FACTOR: ml/Cou

INITIAL PUMP COUNT

FINAL PUMP COUNT

NET PUMP COUNT

PLANT AND CITY: CENTRAL SOYA, Delphos

DATE: 1-10-79 SAMPLE LOCATION: COOLER VENT

AMBIANT TEMP 12 F BAROMETRIC PRESS. 29.75 IN Hg.

RUN NO. CV-1

SAMPLE TRAIN DESCRIPTION: Pedco bubbler with Bag sample Back up.

PUMP NO. 223 (used to evacuate Bag) CALIBRATION FACTOR: 0.6345 ml/count

CLOCK TIME START 16:00 finish 16:25

INITIAL PUMP COUNT 862100

FINAL PUMP COUNT 869713

NET PUMP COUNT. 7613

SAMPLE VOLUME: 4830.45 ml at 71°F, 29.75 in Hg

STACK TEMP 122 °F STATIC PRESSURE +1.35 IN. H_2O

SAMPLE TRAIN TEMP.

MOISTURE DETERMINATION NOT RUN

SILICA GEL TUBE NUMBER =

PUMP NUMBER: CALIBRATION FACTOR: ml/count

INITIAL PUMP COUNT

FINAL PUMP COUNT

NET PUMP COUNT

PLANT AND CITY: CENTRAL SOYA, DELPHOS

DATE: 1-11-79 SAMPLE LOCATION: COOLER VENT

AMBIANT TEMP 0°F BAROMETRIC PRESS. 29.88 IN Hg

RUN NO - CV-2

SAMPLE TRAIN DESCRIPTION: Redco bubbler TRAIN WITH final IMPINGER TRAP TO BE ANALYSED SEPARATELY

PUMP NO. 223 CALIBRATION FACTOR: 0.497 ml/count

CLOCK TIME START 10:28 FINISH 11:13

INITIAL PUMP COUNT 869 734

FINAL PUMP COUNT 882 609

NET PUMP COUNT. 12875

SAMPLE VOLUME: 6398,88 ml at 0°F, 29.88 IN Hg

STACK TEMP 122 °F STATIC PRESSURE +0.35 IN. H_2O (CYCLONE CLOGGED)

SAMPLE TRAIN TEMP. : 0°F

MOISTURE DETERMINATION

SILICA GEL TUBE NUMBER - 1122

PUMP NUMBER: R CALIBRATION FACTOR 0.408 ml/count

INITIAL PUMP COUNT 6969

FINAL PUMP COUNT 24666

NET PUMP COUNT 17697 @ .350 SCFM

SAMPLE VOLUME: 7220.4 ml at 0°F, 29.88 IN Hg

9.3 mg H_2O collected in tube 0.15 %

PLANT AND CITY: CENTRAL SOYA Delphos

DATE: 1/11/79 SAMPLE LOCATION: COOLER VENT

AMBIANT TEMP 12 °F BAROMETRIC PRESS. 29.88 in Hg.

RUN NO: CU-3

SAMPLE TRAIN DESCRIPTION: Pedco BUBBLER with FINAL IMPINGER TRAP ANALIZED SEPARATELY.

PUMP NO. 223 CALIBRATION FACTOR: 0.497 $\frac{ml}{COUN}$

CLOCK TIME START FINISH

INITIAL PUMP COUNT. 883517

FINAL PUMP COUNT. 895203

NET PUMP COUNT. 11686

SAMPLE VOLUME: 5807.94 ml at 12°F, 29.88 in Hg.

STACK TEMP 122 °F STATIC PRESSURE +0.35 in. H_2O

SAMPLE TRAIN TEMP. - 12°F

MOISTURE DETERMINATION -

SILICA GEL TUBE NUMBER - # 133F

PUMP NUMBER - 222 CALIBRATION FACTOR 0.509 $\frac{m}{COU}$

INITIAL PUMP COUNT 301043

FINAL PUMP COUNT 310587

NET PUMP COUNT 9544

Sample Volume - 4857.9 ml. at 12F, 29.88 in

moisture collected 0.1222 gm - .163 ℓ

2.9 % mois

2. TCA SAMPLE TRAIN DATA SHEETS

VOLATILE ORGANIC CARBON

Facility CENTRAL SOYA — Sample Location MINERAL OIL SCRUBBER 1

Location DELPHOS, OH — Operator F. MEADOWS

Date 9 JAN 79 — Run Number MCS 1 INLET 2

Tank Number 7 — Barometric Pressure 29.56

Trap Number 4E — Temperature 15°F

Sample ID Number _____ — Stack Temperature 81°F

Leak Rate: Pretest 0.0 — Post Test _____

Tank Vacuum (inch Hg): Pretest (manometer) 29.6 (gauge) 29.0

Post Test (manometer) _____ (gauge) _____

Tank Pressure: (manometer, inch Hg) _____ (gauge, psi) _____

Time Clock/sample	Gauge Vacuum (inch Hg)	Rotameter Setting	Comments
1700	29.0	60 cc/min	
1705	[illegible]		
1710	23.5		
1715	21.0		
1720	19.1		
1725	17.0		
1730	14.5		
1735	12.0		
1740	[illegible]		
1745	9.0		
1750	8.0		

VOLATILE ORGANIC CARBON

Facility CENTRAL SOYA
Sample Location MINERAL OIL SCRUBBER 1
Location DELPHOS, OH
Operator F. MEADOWS
Date 10 JAN 79
Run Number OCS 1 INLET 3

Tank Number 62
Barometric Pressure 29.75
Trap Number 44
Temperature 3°F
Sample ID Number
Stack Temperature 81°F

Leak Rate: Pretest 0.05" H_2/5 min
Post Test

Tank Vacuum (inch Hg): Pretest (manometer) 28.7 (gauge) 29.0

Post Test (manometer) (gauge)

Tank Pressure: (manometer, inch Hg) (gauge, psi)

Time Clock/sample	Gauge Vacuum (inch Hg)	Rotameter Setting	Comments
0916	24.0		
0915	26.5		
0920	25.0		
0925	23.0		
0930	21.0		
0935	20.0		
0940	20.0		
0945	19.5		
0950	19.0		
0955	19.0		

VOLATILE ORGANIC CARBON

Facility CENTRAL SOYA — Sample Location MINERAL OIL SCRUBBER 1

Location DELPHOS, OH — Operator F MEADOWS

Date 10 JAN 79 — Run Number MCS 1 INLET 4

Tank Number 3 — Barometric Pressure 29.75

Trap Number 3C — Temperature 3°F

Sample ID Number _____ — Stack Temperature 77°F

Leak Rate: Pretest 0.0 — Post Test _____

Tank Vacuum (inch Hg): Pretest (manometer) 28.45 (gauge) ~~28.0~~ 28.5

Post Test (manometer) _____ (gauge) _____

Tank Pressure: (manometer, inch Hg) _____ (gauge, psi) _____

Time Clock/sample	Gauge Vacuum (inch Hg)	Rotameter Setting	Comments
1100	28.5		[illegible]
1105	26.0		to pressure test.
1110	24.0		
1115	22.5		
1120	[illegible]		
1125	19.0		
1130	17.0		
1135	18.5		
1140	18.5		
1145	18.5		

VOLATILE ORGANIC CARBON

Facility CENTRAL SOYA — Sample Location MINERAL OIL SCRUBBER 2

Location DELPHOS, OH — Operator F. HEADDINGS

Date 7 JAN 91 — Run Number MCS 2 ~~OUTLET~~ INLET 2

Tank Number 2 — Barometric Pressure 29.56

Trap Number 2C — Temperature 15°F

Sample ID Number _____ — Stack Temperature 65°F

Leak Rate: Pretest 0.0 "Hg/5min — Post Test _____

Tank Vacuum (inch Hg): Pretest (manometer) 28.5 (gauge) 29.0

Post Test (manometer) _____ (gauge) _____

Tank Pressure: (manometer, inch Hg) _____ (gauge, psi) _____

Time Clock/sample	Gauge Vacuum (inch Hg)	Rotameter Setting	Comments
1700	29.0	60cc/min	
1705	26.5		
1710	24.0		
1715	22.0		
1720	20.0		
1725	18.5		
1730	16.5		
1735	14.5		
1740	13.5		
1745	13.0		
1750	13.0		
1755	13.0		
1800	13.0		

VOLATILE ORGANIC CARBON

Facility CENTRAL SOYA — Sample Location MINERAL OIL SCRUBBER 2

Location DELPHOS, OH — Operator F. MEADOWS

Date 10 JAN 79 — Run Number MCS 2 INLET 3

Tank Number 22 — Barometric Pressure 29.75

Trap Number 49 — Temperature ?°F

Sample ID Number _____ — Stack Temperature 65°F

Leak Rate: Pretest 0.1 — Post Test _____

Tank Vacuum (inch Hg): Pretest (manometer) 28.5 (gauge) 28.5

Post Test (manometer) _____ (gauge) _____

Tank Pressure: (manometer, inch Hg) _____ (gauge, psi) _____

Time Clock/sample	Gauge Vacuum (inch Hg)	Rotameter Setting	Comments
0910	28.5		
0915	28.5		
0920	28.0		
0925	27.5		
0930	27.5		
0935	27.5		
0940	27.5		
0945	27.0		
0950	27.0		
0955	27.0		

VOLATILE ORGANIC CARBON

Facility CENTRAL SOYA — Sample Location MINERAL OIL SCRUBBER 2

Location DELPHOS, OH — Operator F. MEADOWS

Date 10 JAN 79 — Run Number MOS 2 INLET 4

Tank Number 12 — Barometric Pressure 29.75

Trap Number 11 — Temperature 70°F

Sample ID Number _____ — Stack Temperature 62°F

Leak Rate: Pretest 0.1 — Post Test _____

Tank Vacuum (inch Hg): Pretest (manometer) 28.70 (gauge) 27.5

Post Test (manometer) _____ (gauge) _____

Tank Pressure: (manometer, inch Hg) _____ (gauge, psi) _____

Time Clock/sample	Gauge Vacuum (inch Hg)	Rotameter Setting	Comments
1100	27.5		
1105	25.0		
1110	23.5		
1115	22.0		
1120	21.5		
1125	20.5		
1130	19.0		
1135	19.0		
1140	18.5		
1145	18.0		

VOLATILE ORGANIC CARBON

Facility CENTRAL SOYA
Sample Location MAIN VENT DISCHARGE
Location DELPHOS, OH
Operator F. MIRADOLUS
Date 7 JAN 91
Run Number MAIN VENT DISCHARGE 2

Tank Number 63
Barometric Pressure 29.56
Trap Number 46
Temperature 15°F
Sample ID Number
Stack Temperature 59°F

Leak Rate: Pretest 0.0 "Hg/5 MIN
Post Test

Tank Vacuum (inch Hg): Pretest (manometer) 28.6 (gauge) 27.5

Post Test (manometer) (gauge)

Tank Pressure: (manometer, inch Hg) (gauge, psi)

Time Clock/sample	Gauge Vacuum (inch Hg)	Rotameter Setting	Comments
1700	27.5	60 cc/min	
1705	25.0		
1710	22.5		
1715	21.5		
1720	19.5		
1725	18.2		
1730	16.7		
1735	15.5		
1740	13.5		
1745	11.0		
1750	10.0		
1755	9.0		
1800	9.0		

VOLATILE ORGANIC CARBON

Facility CENTRAL SOYA — Sample Location MAIN VENT DISCHARGE

Location DELPHOS, OH — Operator F. MEADOWS

Date 10 JAN 79 — Run Number MAIN VENT DISCHARGE 3

Tank Number 61 — Barometric Pressure 29.75

Trap Number 21 — Temperature 3°F

Sample ID Number _____ — Stack Temperature 59°F

Leak Rate: Pretest 0.05 "Hg/5 min — Post Test _____

Tank Vacuum (inch Hg): Pretest (manometer) 27.90 (gauge) 28.0

Post Test (manometer) _____ (gauge) _____

Tank Pressure: (manometer, inch Hg) _____ (gauge, psi) _____

Time Clock/sample	Gauge Vacuum (inch Hg)	Rotameter Setting	Comments
0911	28.0		
0916	25.0		
0921	23.0		
0926	21.0		
0931	19.0		
0936	18.5		
0941	18.0		
0946	17.5		
0951	17.0		
0956	17.0		

VOLATILE ORGANIC CARBON

Facility CENTRAL SOYA — Sample Location MAIN VENT DISCHARGE

Location DELPHOS, OH — Operator [illegible]

Date 10 JAN 79 — Run Number MAIN VENT DISCHARGE 4

Tank Number ~~#5~~ 10 — Barometric Pressure 29.75

Trap Number 47 — Temperature [illegible]

Sample ID Number _____ — Stack Temperature [illegible]

Leak Rate: Pretest 0.0 — Post Test _____

Tank Vacuum (inch Hg): Pretest (manometer) ~~GE~~ 28.70 (gauge) 28.5

Post Test (manometer) _____ (gauge) _____

Tank Pressure: (manometer, inch Hg) _____ (gauge, psi) _____

Time Clock/sample	Gauge Vacuum (inch Hg)	Rotameter Setting	Comments
1101	28.5		[illegible]
1106	[illegible]		[illegible]
1111	24.0		[illegible]
1116	21.5		[illegible]
1121	19.5		
1126	17.5		
[illegible]	15.5		
1136	13.5		
1141	11.5		
[illegible]			

VOLATILE ORGANIC CARBON

Facility CENTRAL SOYA — Sample Location COOLER

Location DELPHOS, OH — Operator F. MEADOWS

Date 11 JAN 79 — Run Number COOLER 2

Tank Number ~~18~~ 14 — Barometric Pressure 29.92

Trap Number 21 — Temperature 0°F

Sample ID Number _____ — Stack Temperature 122°F

Leak Rate: Pretest 0.1 — Post Test _____

Tank Vacuum (inch Hg): Pretest (manometer) 26.40 ~~26.40~~ (gauge) ~~25.5~~ 26.5

Post Test (manometer) _____ (gauge) _____

Tank Pressure: (manometer, inch Hg) _____ (gauge, psi) _____

Time Clock/sample	Gauge Vacuum (inch Hg)	Rotameter Setting	Comments
1027	26.5		
1032	24.5		
1037	23.0		
1042	23.0		
1047	23.0		
1052	23.5		
1057	23.5		
1102	23.5		

VOLATILE ORGANIC CARBON

Facility CENTRAL SOYA — Sample Location [illegible]

Location DELPHOS, OH — Operator F. MEADOWS

Date 11 JAN 89 — Run Number COOLER #3

Tank Number 5 — Barometric Pressure 29.92

Trap Number 27 — Temperature 15°F

Sample ID Number _____ — Stack Temperature 122°F

Leak Rate: Pretest 0.0 — Post Test _____

Tank Vacuum (inch Hg): Pretest (manometer) ~~30.5~~ 29.1 (gauge) 28.0

Post Test (manometer) _____ (gauge) _____

Tank Pressure: (manometer, inch Hg) _____ (gauge, psi) _____

Time Clock/sample	Gauge Vacuum (inch Hg)	Rotameter Setting	Comments
[illegible]	28.0	[illegible]	[illegible]
[illegible]	[illegible]		[illegible]
0415	25.5		[illegible]
1452	[illegible]		[illegible]
1500	16.5		
1508	14.5		
1518	13.5		

VOLATILE ORGANIC CARBON

Facility CENTRAL SOYA — Sample Location COOLER

Location DELPHOS, OH — Operator D. HERSHEY

Date 1/12/79 — Run Number COOLER VENT 4

Tank Number 6 — Barometric Pressure 29.54

Trap Number 3 — Temperature 14°F

Sample ID Number — Stack Temperature 105°F

Leak Rate: Pretest 0.0 — Post Test

Tank Vacuum (inch Hg): Pretest (manometer) 28.00 (gauge) 28.0

Post Test (manometer) (gauge)

Tank Pressure: (manometer, inch Hg) (gauge, psi)

Time Clock/sample	Gauge Vacuum (inch Hg)	Rotameter Setting	Comments
1210	28.0		
	24.0*		
	24.0		
	22.0		
	20.0		
	18.0		
	16.5		
	16.0		
	16.0		
1450	16.0		

VOLATILE ORGANIC CARBON

Facility CENTRAL — Sample Location COOLER VENT

Location DEPHOS — Operator D. HERSHEY

Date 1/12/79 — Run Number COOLER VENT 5

Tank Number 21 — Barometric Pressure 29.54

Trap Number 13 — Temperature 14°F

Sample ID Number — Stack Temperature 105°F

Leak Rate: Pretest 0.0 — Post Test

Tank Vacuum (inch Hg): Pretest (manometer) 28.4 (gauge) 28.5

Post Test (manometer) (gauge)

Tank Pressure: (manometer, inch Hg) (gauge, psi)

Time Clock/sample	Gauge Vacuum (inch Hg)	Rotameter Setting	Comments
1340	28.0		
1348	26.0		
1350	25.6		
1355	24.0		
1402	22.0		
1406	20.0		
1410	19.2		
1415	17.5		
1420	14.8		

VOLATILE ORGANIC CARBON

Facility CENTRAL SOYA — Sample Location DRYER

Location DELPHOS, OH — Operator F. MEADOWS

Date 11 JAN 79 — Run Number DRYER 2

Tank Number 18 — Barometric Pressure 29.92

Trap Number 51 — Temperature 0°F

Sample ID Number _____ — Stack Temperature 150°F

Leak Rate: Pretest 0.1 — Post Test _____

Tank Vacuum (inch Hg): Pretest (manometer) 28.9C (gauge) 27.0

Post Test (manometer) _____ (gauge) _____

Tank Pressure: (manometer, inch Hg) _____ (gauge, psi) _____

Time Clock/sample	Gauge Vacuum (inch Hg)	Rotameter Setting	Comments
1128	29.0		
11			
1027			
1013			
10			
1150			
1113			

VOLATILE ORGANIC CARBON

Facility [illegible] Sample Location DRYER

Location [illegible], OH Operator [illegible]

Date [illegible] Run Number DRYER 3

Tank Number 16 Barometric Pressure [illegible]

Trap Number 37 Temperature [illegible]

Sample ID Number _____ Stack Temperature 150 °F

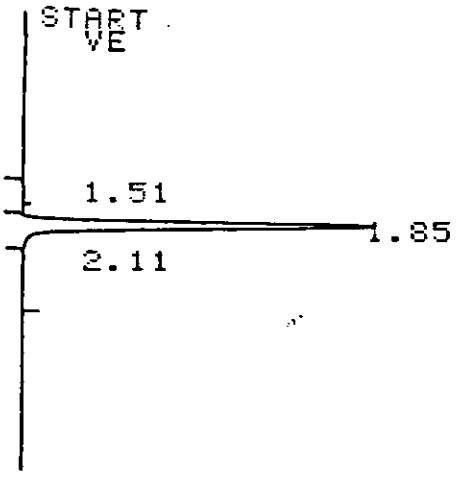
Leak Rate: Pretest 0.0 Post Test _____

Tank Vacuum (inch Hg): Pretest (manometer) 24.95 (gauge) 29.0

Post Test (manometer) _____ (gauge) _____

Tank Pressure: (manometer, inch Hg) _____ (gauge, psi) _____

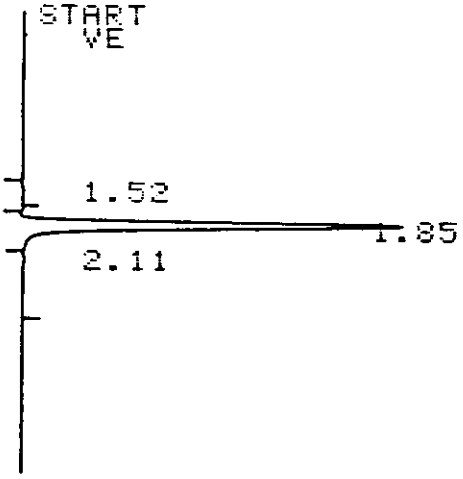
Time Clock/sample	Gauge Vacuum (inch Hg)	Rotameter Setting	Comments
1435	29.0		[illegible]
1441	26.5		[illegible]
1446	25.0		[illegible]
1451	[illegible]		
1502	19.0		
1510	16.5		
1520	14.0		



hp 5830A
AREA %

RT	AREA	AREA %
1.51	680	0.408
1.85	163900	98.306
2.11	2145	1.287

XF: 1.0000 E+ 0

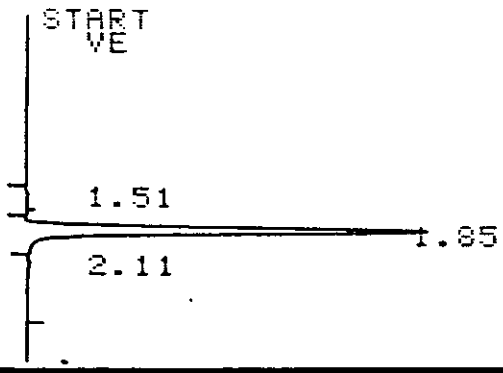


483 ppm
Hexane
in
HCF air

hp 5830A
AREA %

RT	AREA	AREA %
1.52	614	0.339
1.85	177900	98.297
2.11	2468	1.364

XF: 1.0000 E+ 0

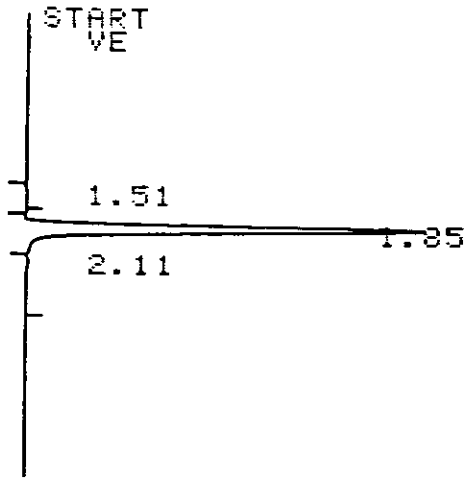


hp 5830A
AREA %

RT	AREA	AREA %
1.51	631	0.329
1.85	188300	98.294
2.11	2638	1.377

XF: 1.0000 E+ 0

(1)



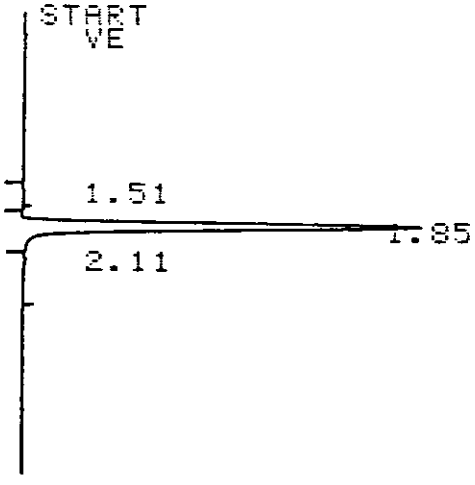
(2)

483 ppm
Hexane
in
HCF Air
STD.

hp 5830A
AREA %

RT	AREA	AREA %
1.51	619	0.327
1.85	186100	98.325
2.11	2552	1.348

XF: 1.0000 E+ 0



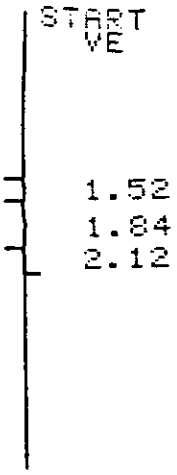
hp 5830A
AREA %

RT	AREA	AREA %
1.51	628	0.330
1.85	187200	98.410
2.11	2396	1.260

XF: 1.0000 E+ 0

(3)

7.73/10cc DV-5
2mm Tank 17
755.9 mm Hg
24.0 °C



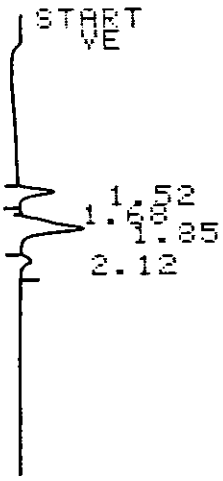
hp 5830A
AREA %

RT	AREA	AREA %
1.52	506	20.935
1.84	1668	69.011
2.12	243	10.054

XF: 1.0000 E+ 0

ATTN 2↑ 7 @
ATTN 2↑ 5 @

2 3/4 min
8 sec/10 mL



hp 5830A
AREA %

RT	AREA	AREA %
1.52	492	21.974
1.68	33	1.474
1.85	1481	66.146
2.12	233	10.406

XF: 1.0000 E+ 0

6.8 sec/10 mL
2 min

TIME1 1 0 @

DV-5

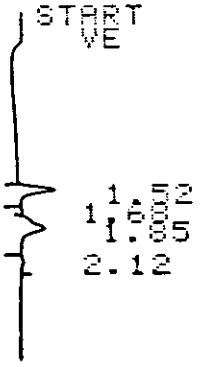
hp 5830A
AREA %

RT	AREA	AREA %
1.52	496	22.035
1.68	39	1.733
1.84	1491	66.237
2.12	225	9.996

XF: 1.0000 E+ 0

Tank CV-5
21 2.0 ml/10 ml
2 min

TIME1 3 0



hp 5830A
AREA %

RT	AREA	AREA %
1.52	484	39.672
1.68	47	3.852
1.85	615	50.410
2.12	74	6.066

VOLATILE ORGANIC CARBON

Facility CENTRAL SOYA — Sample Location DRYER

Location DELPHOS, OH — Operator L. SCHNIEDER

Date 1/12/79 — Run Number DRYER VENT 4

Tank Number 1 — Barometric Pressure 29.54

Trap Number 15 — Temperature 14°F

Sample ID Number _____ — Stack Temperature 145°F

Leak Rate: Pretest 0.1 — Post Test _____

Tank Vacuum (inch Hg): Pretest (manometer) 28.95 (gauge) 28.5

Post Test (manometer) _____ (gauge) _____

Tank Pressure: (manometer, inch Hg) _____ (gauge, psi) _____

Time Clock/sample	Gauge Vacuum (inch Hg)	Rotameter Setting	Comments
1210	27		
1205	27		
1210	26		
1215	26		
1220	26		
1225	26		
1230	26		
1235			
1240			
1245			
1250			
1255			

VOLATILE ORGANIC CARBON

Facility CENTRAL SOYA — Sample Location DRYER VENT

Location DELPHOS, OH — Operator L. SCHNEIDER

Date 1/12/79 — Run Number DRYER VENT 5

Tank Number 17 — Barometric Pressure 29.54

Trap Number 35 — Temperature 14°F

Sample ID Number _____ — Stack Temperature 145°F

Leak Rate: Pretest _____ Post Test _____

Tank Vacuum (inch Hg): Pretest (manometer) _____ (gauge) _____

Post Test (manometer) _____ (gauge) _____

Tank Pressure: (manometer, inch Hg) _____ (gauge, psi) _____

Time Clock/sample	Gauge Vacuum (inch Hg)	Rotameter Setting	Comments
1342	25		
	23		
	22		
	20		
	19		
	19		
	19		
	19		
	19		
	19		
1427			

3. VELOCITY DATA - COOLER AND DRYER SITES

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT CENTRAL SOYA
DATE JAN 10, 1979
SAMPLING LOCATION DRYER VENT
INSIDE OF FAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE A) —
INSIDE OF NEAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE B) —
STACK I.D., (DISTANCE A - DISTANCE B) 18 IN.
NEAREST UPSTREAM DISTURBANCE
NEAREST DOWNSTREAM DISTURBANCE
CALCULATOR

SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1/8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF COLUMNS 4 & 5)
1	2.6	18 IN.	1.0	—	1.0
2	8.2		1.5	—	1.5
3	14.6		2.6		2.6
4	22.6		4.1		4.1
5	34.2		6.2		6.2
6	65.8		11.8		11.8
7	77.4		13.9		13.9
8	85.4		15.4		15.4
9	91.8		16.5		16.5
10	97.4		17.5		17.5

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

PLANT CENTRAL SOYA, Delphos
DATE JAN 10, 1979
SAMPLING LOCATION COOLER VENT
INSIDE OF FAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE A) no Nipple
INSIDE OF NEAR WALL TO
OUTSIDE OF NIPPLE, (DISTANCE B)
STACK I.D., (DISTANCE A - DISTANCE B) 18 in.
NEAREST UPSTREAM DISTURBANCE 2 diameters
NEAREST DOWNSTREAM DISTURBANCE >9 diameters
CALCULATOR

SCHEMATIC OF SAMPLING LOCATION

TRAVERSE POINT NUMBER	FRACTION OF STACK I.D.	STACK I.D.	PRODUCT OF COLUMNS 2 AND 3 (TO NEAREST 1 8 INCH)	DISTANCE B	TRAVERSE POINT LOCATION FROM OUTSIDE OF NIPPLE (SUM OF COLUMNS 4 & 5)
1	2.1	18 in	1 in	—	1.0
2	6.7		1.2	—	1.2
3	11.8		2.1		2.1
4	17.7		3.2	—	3.2
5	25.0		4.5		4.5
6	35.6		6.4		6.4
7	64.4		11.6		11.6
8	75.0		13.5		13.5
9	82.3		14.8		14.8
10	88.2		15.9		15.9
11	93.3		16.8		16.8
12	97.9		17.6		17.

GAS VELOCITY AND VOLUME DATA

	PLANT AND CITY	RUN DATE
1.	CENTRAL SOYA, DELPHOS	6,1 / 1,0 / 79

SAMPLING LOCATION	CLOCK TIME
DRYER VENT	1510

	RUN NUMBER	OPERATOR	AMB. TEMP. (°F)	BAR. PRESS (in. Hg)	STATIC PRESS (in. H_2O)
2.	DV-1		12	29.75	-2.00

MOLECULAR WT.	STACK INSIDE DIMENSION (in.) DIAM OR SIDE 1	STACK INSIDE DIMENSION (in.) SIDE 2	PITOT TUBE C_p
27.53	18.0		0.84

FIELD DATA

TRAVERSE POINT NUMBER	POSITION (in.)	VELOCITY HEAD (Δp_s), in.H_2O	STACK TEMP, °F
1		0.90	150
2		1.00	
3		1.40	
4		1.80	
5		2.20	
6		2.40	
7		4.20	
8		4.60	
9		4.80	
10		4.80	
1		4.20	150
2		5.00	
3		5.40	
4		5.40	
5		4.80	
6		2.60	
7		2.00	
8		2.00	
9		1.80	
10		2.00	

$T_{s\,AVG} = 150°F = 610°R$

MOISTURE: NOT MEASURED, est. at 13.32% [illegible]

$P_s = 29.75 - \frac{2.00}{13.6} = 29.60$

$M_s = 27.53$

$(\sqrt{\Delta P})_{AVG} = 1.73$

$K_p = 85.49$

$C_p = 0.84$

$V_s = 85.49(0.84)(1.73)\sqrt{\frac{610}{(29.6)(27.5}}$

$V_s = 107.487$ ft/s

$A = 1.766$ ft^2

$Q = (60)(107.487)(1.766)$

$Q = 11,389$ acfm

$Q_{STD.} = 17.65(11389)\frac{29.60}{610}(1-.133)$

$= 8555$ dscfm.

GAS VELOCITY AND VOLUME DATA

PLANT AND CITY	RUN DATE
1. CENTRAL SOYA, DELPHOS	9 1 / 1 1 / 7 9

SAMPLING LOCATION	CLOCK TIME
DRYER VENT	1030

RUN NUMBER	OPERATOR	AMB. TEMP. (°F)	BAR. PRESS (in. Hg)	STATIC PRESS (in. H_2O)
2. DV-2		2	29.88	-3.0

MOLECULAR WT.	STACK INSIDE DIMENSION (in.) DIAM OR SIDE 1	STACK INSIDE DIMENSION (in.) SIDE 2	PITOT TUBE Cp
27.48	18.0		0.84

FIELD DATA

TRAVERSE POINT NUMBER	POSITION (in.)	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMP, °F
1		4.00	150
2		4.50	
3		4.60	
4		5.40	
5		4.60	
6		3.40	
7		2.20	
8		2.00	
9		2.20	
10		2.20	
1		1.00	150
2		1.00	
3		1.20	
4		1.40	
5		2.20	
6		3.40	
7		4.00	
8		4.20	
9		4.40	
10		3.80	

$T_{S AVG} = 150°F = 610°R$

$P_S = 29.88 - \frac{3.0}{13.6} = 29.66$

$M_S = 27.48$

$(\sqrt{\Delta p})_{AVG} = 1.692$

$K_p = 85.49$

$C_p = 0.84$

$V_S = 85.49\,(0.84)(1.692)\sqrt{\frac{610}{(29.66)(27.48)}}$

$V_S = 105.115$ ft/s

Moisture % = 13.8

$B_{WS} = 0.138$

$A = 1.766$

$Q = 60\,(105.115)(1.766)$

$Q = 11{,}138$ acfm

$Q_{STD} = 17.65(11138)\left(\frac{29.66}{610}\right)(1-.138)$

$= 8239$ dscfm.

3333G

Hershey
4902

GAS VELOCITY AND VOLUME DATA

PLANT AND CITY	RUN DATE
1. CENTRAL SOYA, DELPHOS	1/11/79

SAMPLING LOCATION	CLOCK TIME
DRYER VENT	3:15 (15:15)

RUN NUMBER	OPERATOR	AMB. TEMP. (°F)	BAR. PRESS (in. Hg)	STATIC PRESS (in. H_2O)
2. DV-3	SCHNEIDER	12	29.88	−2.2

MOLECULAR WT.	STACK INSIDE DIMENSION (in.)		PITOT TUBE Cp
	DIAM OR SIDE 1	SIDE 2	
27.74	18.0		.84

FIELD DATA

TRAVERSE POINT NUMBER	POSITION (in.)	VELOCITY HEAD (Δp_s), in.H_2O	STACK TEMP, °F
1		4.0	150
2		5.2	
3		5.2	
4		4.4	
5		3.6	
6		1.8	
7		1.8	
8		1.8	
9		1.6	
10		1.6	
1		2.0	
2		2.4	
3		2.6	
4		2.6	
5		2.4	
6		2.2	
7		2.6	
8		3.0	
9		3.2	
10		3.0	

$T_{SAVG} = 150°F = 610°R$

$P_s = 29.88 - \frac{2.2}{13.6} = 29.72$

$M_s = 27.74$

$(\sqrt{\Delta p})_{AVG} = 1.660$

$K_p = 85.49$

$C_p = 0.84$

$V_s = 85.49(0.84)(1.66)\sqrt{\frac{610}{(29.72)(27.74)}}$

$V_s = 102.54$ ft/D

$B_{ws} = 0.1143$

$A = 1.767\ ft^2$

$Q = 60(102.54)(1.767)$

$= 10871$ acfm

$Q_{std} = 10871\,(17.65)\left(\frac{29.72}{610}\right)(1 - .1143)$

$= 8280$ dscfm

GAS VELOCITY AND VOLUME DATA

PLANT AND CITY	RUN DATE
1. CENTRAL SOYA, DELPHOS	1/12/79

SAMPLING LOCATION	CLOCK TIME
DRYER VENT	3:00

15:00

RUN NUMBER	OPERATOR	AMB. TEMP. (°F)	BAR. PRESS (in. Hg)	STATIC PRESS (in. H_2O)
2. DV4 & DV5	schnieder	14	29.54	-1.0

MOLECULAR WT.	STACK INSIDE DIMENSION (in.) DIAM OR SIDE 1	STACK INSIDE DIMENSION (in.) SIDE 2	PITOT TUBE Cp
27.46	18.0		.84

FIELD DATA

TRAVERSE POINT NUMBER	POSITION (in.)	VELOCITY HEAD (Δp_s), in.H_2O	STACK TEMP, °F
7,8,9,10	11,12,13&14	25,26&27,28,29	38,39,40,41
1		1.0	145
2		1.4	
3		1.6	
4		1.8	
5		1.8	
6		1.8	
7		2.4	
8		3.0	
9		3.4	
10		3.6	
11		3.4	
12		3.2	
1		5.0	
2		5.0	
3		5.0	
4		4.2	
5		3.2	
6		3.6	
7		4.8	
8		4.6	
9		4.4	
10		4.4	
11		4.2	
12		4.8	

$T_{SAVG} = 145°F \quad 605°R$

$P_S = 29.54 - \frac{1.0}{13.6} = 29.47$

$M_S = 27.46$

$(\sqrt{\Delta P})_{AVG} = 1.576$

$K_P = 85.49$

$C_P = 0.84$

$V_S = 85.49(0.84)(1.576)\sqrt{\frac{605}{(29.47)(27.46}}$

$V_S = 97.86$ ft/s

$B_{WS} = 0.1403$

$A = 1.767\ ft^2$

$Q = (60)(1.767)(97.86)$

$= 10375$ acfm

$Q_{STD} = (10375)(17.65)(\frac{29.47}{605})(1-.140$

$= 7668$ dscfm.

GAS VELOCITY AND VOLUME DATA

PLANT AND CITY	RUN DATE
1. CENTRAL SOYA, DELPHOS	01/11/79

SAMPLING LOCATION	CLOCK TIME
COOLER VENT	1028

RUN NUMBER	OPERATOR	AMB. TEMP. (°F)	BAR. PRESS (in. Hg)	STATIC PRESS (in. H_2O)
2. CV-2		0	29.88	0.35

MOLECULAR WT.	STACK INSIDE DIMENSION (in.) DIAM OR SIDE 1	SIDE 2	PITOT TUBE C_p
28.65	180		0.84

FIELD DATA

TRAVERSE POINT NUMBER	POSITION (in.)	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMP, °F
1		0.15	122
2		0.10	
3		0.10	
4		0.15	
5		0.20	
6		0.20	
7		0.30	
8		0.35	
9		0.30	
10		0.45	
11		0.55	
12		0.55	↓
1		0.35	122
2		0.35	
3		0.35	
4		0.40	
5		0.40	
6		0.35	
7		0.30	
8		0.40	
9		0.35	
10		0.35	
11		0.30	
12		0.25	↓

$T_{s\,AVG} = 122°F = 582°R$

$P_s = 29.88 + \frac{0.35}{13.6} = 29.91$

$M_s = 28.65$

$(\sqrt{\Delta p})_{AVG} = 0.556$

$K_p = 85.49$

$C_p = 0.84$

$V_s = 85.49\,(0.84)(0.556)\sqrt{\frac{582}{(29.91)(28.65)}}$

$V_s = 32.90$ ft/p

$B_{ws} = 0.0015$

$A = 1.767$ ft²

$Q = (1.767)(32.90)(60)$

$= 3488$ acfm.

$Q_{sd} = 3488\,(17.65)\left(\frac{29.91}{582}\right)(1 - .0015)$

$= 3159$ dscfm.

GAS VELOCITY AND VOLUME DATA

	PLANT AND CITY	RUN DATE
1.	CENTRAL SOYA, DELPHOS	1/11/79

SAMPLING LOCATION	CLOCK TIME
COOLER VENT	3:15

15:15

	RUN NUMBER	OPERATOR	AMB. TEMP. (°F)	BAR. PRESS (in. Hg)	STATIC PRESS (in. H_2O)
2.	CV-3	HERSHEY	12	29.88	+0.35

MOLECULAR WT.	STACK INSIDE DIMENSION (in.)		PITOT TUBE C_p
	DIAM OR SIDE 1	SIDE 2	
28.65	18.0		.84

FIELD DATA

TRAVERSE POINT NUMBER	POSITION (in.)	VELOCITY HEAD (Δp_s), in. H_2O	STACK TEMP, °F
1		0.10	122
2		0.20	
3		0.15	
4		0.20	
5		0.15	
6		0.20	
7		0.20	
8		0.25	
9		0.30	
10		0.40	
11		0.40	
12		0.35	
1		0.25	
2		0.25	
3		0.25	
4		0.25	
5		0.25	
6		0.25	
7		0.15	
8		0.20	
9		0.20	
10		0.20	
11		0.15	
12		0.20	

$T_{SAVG} = 122°F = 582°R$

$P_s = 29.88 + \frac{0.35}{13.6} = 29.91$

$M_s = 28.65$

$(\sqrt{\Delta p})_{AVG} = 0.473$

$K_p = 85.49$

$C_p = 0.84$

$V_s = 85.49(0.84)(0.473)\sqrt{\frac{582}{(29.91)(28.65)}}$

$V_s = 27.99$ ft/p

$B_{WO} = 0.029$

$A = 1.767$ ft^2

$Q = (27.99)(1.767)(60) =$
2967 acfm

$Q_{SD} = (1-.029)(2967)(17.65)\left(\frac{29.91}{582}\right)$
$= 2613$ dscfm

GAS VELOCITY AND VOLUME DATA

PLANT AND CITY	RUN DATE
1. CENTRAL SOYA, DELPHOS	1/12/79

SAMPLING LOCATION	CLOCK TIME
COOKER VENT	2:25 pm. 14:25

RUN NUMBER	OPERATOR	AMB. TEMP. (°F)	BAR. PRESS (in. Hg)	STATIC PRESS (in. H_2O)
2. CV-4	Hershey, DeWees	14	29.54	+ .05

MOLECULAR WT.	STACK INSIDE DIMENSION (in.)		PITOT TUBE Cp
	DIAM OR SIDE 1	SIDE 2	
28.12	18.0		.84

FIELD DATA

TRAVERSE POINT NUMBER	POSITION (in.)	VELOCITY HEAD (Δp_s), in.H_2O	STACK TEMP, °F
1		0.65	105
2		0.70	
3		0.70	
4		0.75	
5		1.00	
6		1.50	
7		1.75	
8		1.85	
9		2.00	
10		2.00	
11		1.80	
12		1.90	
1		0.95	
2		0.75	
3		1.00	
4		1.25	
5		1.30	
6		1.25	
7		1.30	
8		1.25	
9		1.35	
10		1.20	
11		1.20	
12		1.00	

$T_{s_{AVG}} = 105°F = 565°R$

$P_s = 29.54 + \frac{0.05}{13.6} = 29.544$

$M_s = 28.12$

$(\sqrt{\Delta p})_{AVG} = 1.1096$

$K_p = 85.49$

$C_p = 0.84$

$V_s = 85.49(0.84)(1.1096)\sqrt{\frac{565}{(29.544)(28.12)}}$

$V_s = 65.71$ ft/s

$P_{ws} = 0.08$

$A = 1.767$ ft²

$Q = 1.767(65.71)(60)$

$= 6967$ acfm

$Q_{STD} = (1-.08)(6967)(17.65)\left(\frac{29.544}{565}\right) =$

$Q_{SD} = 5916$ dscfm

$=$

STACK VELOCITY DATA

PLANT	CENTRAL SOYA, DELPHOS
DATE	01/10/79
SAMPLING LOCATION	DRYER VENT
RUN NUMBER	DV-1
CLOCK TIME	1510
OPERATOR	
AMBIENT TEMP. (DEG.F)	12.
BAR.PRESS.(IN HG)	29.75
STATIC PRESS.(IN H2O)	-2.00
MOLECULAR WEIGHT	27.53
STACK INSIDE DIM(IN)	18.000
PITOT TUBE COEFF.	.84
MOISTURE CONTENT(%)	.00

TRANSVERSE POINT NO.	POSITION INCHES	VELOCITY HEAD (IN H2O)	STACK TEMP (DEG.F)
0001	.0	.900	150.
0002	.0	1.000	150.
0003	.0	1.400	150.
0004	.0	1.800	150.
0005	.0	2.200	150.
0006	.0	3.400	150.
0007	.0	4.200	150.
0008	.0	4.600	150.
0009	.0	4.800	150.
0010	.0	4.200	150.
0001	.0	4.200	150.
0002	.0	5.000	150.
0003	.0	5.400	150.
0004	.0	5.400	150.
0005	.0	4.800	150.
0006	.0	2.600	150.
0007	.0	2.000	150.
0008	.0	2.000	150.
0009	.0	1.800	150.
0010	.0	2.000	150.
AVERAGE		3.185	150.

PLANT	CENTRAL SOYA, DELPHOS
DATE	01/10/79
SAMPLING LOCATION	DRYER VENT
RUN NUMBER	DV-1

STACK AREA, SQ. FT.	1.767
STACK ABS. PRES., IN HG.	29.60
STACK GAS TEMPERATURE, DEG.F	150.
SQRT(VEL HD X STACK TEMP ABS)	1.7
STACK GAS VELOCITY, ACT. FPS	107.3
STACK GAS VOLUME (WET), ACT. CFM.	11581.6
STACK GAS VOLUME (DRY), ACT. CFM.	11381.6

SAMPLE CALCULATIONS

SYMBOLS:

AREA	CROSS-SECTIONAL STACK AREA, SQ FT	PIC	PITOT TUBE COEFFICENT
ASTEMP	AVERAGE STACK TEMPERATURE, DEG F	SPRES	STATIC PRESSURE, IN H2O
BPRES	BAROMETRIC PRESSURE, IN HG	STEMP	STACK TEMPERATURE, DEG F
DELP	DELTA P	STPRES	STACK PRESSURE, IN HG
DIA	DIAMETER OF CIRCULAR STACK, IN	STVEL	STACK VELOCITY, AFPM
DIM1	LENGTH OF RECTANGULAR STACK, IN	TEMP	AVERAGE TEMPERATURE, DEG R
DIM2	WIDTH OF RECTANGULAR STACK, IN	VH	VELOCITY HEAD, IN H2O
MOIST	MOISTURE CONTENT	VOLFLD	VOLUMETRIC FLOW (DRY), ACFM
MW	MOLECULAR WEIGHT	VOLFLW	VOLUMETRIC FLOW (WET), ACFM
NP	NUMBER OF TRANSVERSE POINTS		

FORMULAS AND SAMPLE CALCULATIONS:

$$DELP = \frac{SUM(SQRT(VH))}{NP} = \frac{34.56}{20} = 1.73$$

STPRES = BPRES + (SPRES/13.6) = 29.75 + (-2.00/13.6) = 29.6 IN HG

$$ASTEMP = \frac{SUM(STEMP)}{NP} = \frac{3000.}{20} = 150.\ DEG\ F$$

TEMP = ASTEMP + 460.0 = 150. + 460.0 = 610. DEG R

$$AREA(CIRCULAR\ STACK) = \frac{3.1416 * (DIA/2)**2}{144} = \frac{3.1416 * (18.000/2)**2}{144} = 1.767\ SQ\ FT$$

$$STVEL = 85.49 * PIC * DELP * SQRT\left[\frac{TEMP}{(MW * STPRES)}\right] = 85.49 * .84 * 1.73 * SQRT\left[\frac{610.}{27.53 * 29.6}\right] = 107.345\ AFPS$$

VOLFLW = 60. * STVEL * AREA = 60. * 107.345 * 1.767 = 11381.6 ACFM

VOLFLD = (1. - (MOIST/100.)) * VOLFLW = (1. - (.00/100.)) * 11381.6 = 11381.6 ACFM

STACK VELOCITY DATA

PLANT	CENTRAL SOYA, DELPHOS
DATE	01/11/79
SAMPLING LOCATION	DRYER VENT
RUN NUMBER	DV-2
CLOCK TIME	1030
OPERATOR	
AMBIENT TEMP. (DEG.F)	2.
BAR.PRESS.(IN HG)	29.88
STATIC PRESS.(IN H2O)	-5.00
MOLECULAR WEIGHT	27.48
STACK INSIDE DIM(IN)	18.000
PITOT TUBE COEFF.	.84
MOISTURE CONTENT(%)	.00

TRANSVERSE POINT NO.	POSITION INCHES	VELOCITY HEAD (IN H2O)	STACK TEMP (DEG.F)
0001	.0	4.000	150.
0002	.0	4.500	150.
0003	.0	4.600	150.
0004	.0	5.400	150.
0005	.0	4.600	150.
0006	.0	2.400	150.
0007	.0	2.200	150.
0008	.0	2.000	150.
0009	.0	2.200	150.
0010	.0	2.200	150.
0001	.0	1.000	150.
0002	.0	1.000	150.
0003	.0	1.200	150.
0004	.0	1.400	150.
0005	.0	2.200	150.
0006	.0	3.400	150.
0007	.0	4.000	150.
0008	.0	4.200	150.
0009	.0	4.400	150.
0010	.0	3.800	150.
AVERAGE		3.035	150.

PLANT	CENTRAL SOYA, DELPHOS
DATE	01/11/79
SAMPLING LOCATION	DRYER VENT
RUN NUMBER	DV-2

STACK AREA, SQ. FT.	1.767
STACK ABS. PRES., IN HG.	29.66
STACK GAS TEMPERATURE, DEG.F	150.
SQRT(VEL HD X STACK TEMP ABS)	1.7
STACK GAS VELOCITY, ACT. FPS	105.1
STACK GAS VOLUME (WET), ACT. CFM.	11148.6
STACK GAS VOLUME (DRY), ACT. CFM.	11148.6

SAMPLE CALCULATIONS

SYMBOLS:

AREA	CROSS-SECTIONAL STACK AREA, SQ FT	PTC	PITOT TUBE COEFFICENT
ASTEMP	AVERAGE STACK TEMPERATURE, DEG F	SPRES	STATIC PRESSURE, IN H20
BPRES	BAROMETRIC PRESSURE, IN HG	STEMP	STACK TEMPERATURE, DEG F
DELP	DELTA P	STPRES	STACK PRESSURE, IN HG
DIA	DIAMETER OF CIRCULAR STACK, IN	STVEL	STACK VELOCITY, AFPM
DIM1	LENGTH OF RECTANGULAR STACK, IN	TEMP	AVERAGE TEMPERATURE, DEG R
DIM2	WIDTH OF RECTANGULAR STACK, IN	VH	VELOCITY HEAD, IN H20
MOIST	MOISTURE CONTENT	VOLFLD	VOLUMETRIC FLOW (DRY), ACFM
MW	MOLECULAR WEIGHT	VOLFLW	VOLUMETRIC FLOW (WET), ACFM
NP	NUMBER OF TRANSVERSE POINTS		

FORMULAS AND SAMPLE CALCULATIONS:

$$DELP = \frac{SUM[SQRT(VH)]}{NP} = \frac{53.85}{20} = 1.69$$

STPRES = BPRES + (SPRES/13.6) = 29.88 + (-3.00/13.6) = 29.7 IN HG

$$ASTEMP = \frac{SUM[STEMP]}{NP} = \frac{3000.}{20} = 150.\ DEG\ F$$

TEMP = ASTEMP + 460.0 = 150. + 460.0 = 610. DEG R

$$AREA(CIRCULAR\ STACK) = \frac{3.1416 * (DIA/2)**2}{144} = \frac{3.1416 * (18.000/2)**2}{144} = 1.767\ SQ\ FT$$

$$STVEL = 85.49 * PTC * DELP * SQRT\left[\frac{TEMP}{(MW * STPRES)}\right] = 85.49 * .84 * 1.69 * SQRT\left[\frac{610.}{(27.48 * 29.7)}\right] = 105.147\ AFPS$$

VOLFLW = 60. * STVEL * AREA = 60. * 105.147 * 1.767 = 11148.6 ACFM

VOLFLD = (1. - (MOIST/100.)) * VOLFLW = (1. - (.00/100.)) * 11148.6 = 11148.6 ACFM

STACK VELOCITY DATA

PLANT	CENTRAL SOYA, DELPHOS
DATE	01/11/79
SAMPLING LOCATION	RY&K UE-1
RUN NUMBER	UV-5
CLOCK TIME	0
OPERATOR	SCHNIEDER
AMBIENT TEMP. (DEG.F)	12.
BAR.PRESS.(IN HG)	29.88
STATIC PRESS.(IN H2O)	-2.20
MOLECULAR WEIGHT	27.74
STACK INSIDE DIM(IN)	18.000
PITOT TUBE COEFF.	.84
MOISTURE CONTENT(%)	.00

TRANSVERSE POINT NO.	POSITION INCHES	VELOCITY HEAD (IN H2O)	STACK TEMP (DEG.F)
0001	.0	4.000	150.
0002	.0	5.200	150.
0003	.0	5.200	150.
0004	.0	4.400	150.
0005	.0	3.600	150.
0006	.0	1.800	150.
0007	.0	1.800	150.
0008	.0	1.800	150.
0009	.0	1.600	150.
0010	.0	1.600	150.
0001	.0	2.000	150.
0002	.0	2.400	150.
0003	.0	2.600	150.
0004	.0	2.600	150.
0005	.0	2.400	150.
0006	.0	2.200	150.
0007	.0	2.600	150.
0008	.0	3.000	150.
0009	.0	3.200	150.
0010	.0	3.000	150.
AVERAGE		2.850	150.

PLANT	CENTRAL SOYA, DELPHOS
DATE	01/11/79
SAMPLING LOCATION	HYSR DE-I
RUN NUMBER	DV-3

STACK AREA, SQ. FT.	1.767
STACK ABS. PRES., IN HG.	29.72
STACK GAS TEMPERATURE, DEG.F	150.
SQRT(VEL HD X STACK TEMP ABS)	1.7
STACK GAS VELOCITY, ACT. FPS	102.5
STACK GAS VOLUME (WET), ACT. CFM.	10871.3
STACK GAS VOLUME (DRY), ACT. CFM.	10871.3

SAMPLE CALCULATIONS

SYMBOLS:

AREA	CROSS-SECTIONAL STACK AREA, SQ FT	PTC	PITOT TUBE COEFFICENT
ASTEMP	AVERAGE STACK TEMPERATURE, DEG F	SPRES	STATIC PRESSURE, IN H20
BPRES	BAROMETRIC PRESSURE, IN HG	STEMP	STACK TEMPERATURE, DEG F
DELP	DELTA P	STPRES	STACK PRESSURE, IN HG
DIA	DIAMETER OF CIRCULAR STACK, IN	STVEL	STACK VELOCITY, AFPM
DIM1	LENGTH OF RECTANGULAR STACK, IN	TEMP	AVERAGE TEMPERATURE, DEG R
DIM2	WIDTH OF RECTANGULAR STACK, IN	VH	VELOCITY HEAD, IN H20
MOIST	MOISTURE CONTENT	VOLFLD	VOLUMETRIC FLOW (DRY), ACFM
MW	MOLECULAR WEIGHT	VOLFLW	VOLUMETRIC FLOW (WET), ACFM
NP	NUMBER OF TRANSVERSE POINTS		

FORMULAS AND SAMPLE CALCULATIONS:

$$DELP = \frac{SUM[SQRT(VH)]}{NP} = \frac{33.20}{20} = 1.66$$

STPRES = BPRES + (SPRES/13.6) = 29.88 + (-2.20/13.6) = 29.7 IN HG

$$ASTEMP = \frac{SUM[STEMP]}{NP} = \frac{3000.}{20} = 150.\ DEG\ F$$

TEMP = ASTEMP + 460.0 = 150. + 460.0 = 610. DEG R

$$AREA(CIRCULAR\ STACK) = \frac{3.1416 * (DIA/2)^{**}2}{144} = \frac{3.1416 * (18.000/2)^{**}2}{144} = 1.767\ SQ\ FT$$

$$STVEL = 85.49 * PTC * DELP * SQRT\left[\frac{TEMP}{(MW * STPRES)}\right] = 85.49 * .84 * 1.66 * SQRT\left[\frac{610.}{(27.74 * 29.7)}\right] = 102.532\ AFPS$$

VOLFLW = 60. * STVEL * AREA = 60. * 102.532 * 1.767 = 10871.3 ACFM

VOLFLD = (1. - (MOIST/100.)) * VOLFLW = (1. - (.00/100.)) * 10871.3 = 10871.3 ACFM

STACK VELOCITY DATA

PLANT	CENTRAL SOYA, DELPHOS
DATE	01/12/79
SAMPLING LOCATION	DRYER VENT
RUN NUMBER	DV4DV5
CLOCK TIME	1500
OPERATOR	SCHNIEDER
AMBIENT TEMP. (DEG.F)	14.
BAR.PRESS.(IN HG)	29.54
STATIC PRESS.(IN H2O)	-1.00
MOLECULAR WEIGHT	27.46
STACK INSIDE DIM(IN)	18.000
PITOT TUBE COEFF.	.84
MOISTURE CONTENT(%)	.00

TRANSVERSE POINT NO.	POSITION INCHES	VELOCITY HEAD (IN H2O)	STACK TEMP (DEG.F)
0001	.0	1.000	145.
0002	.0	1.400	145.
0003	.0	1.600	145.
0004	.0	1.800	145.
0005	.0	1.800	145.
0006	.0	1.800	145.
0007	.0	2.400	145.
0008	.0	3.000	145.
0009	.0	3.400	145.
0010	.0	3.600	145.
0011	.0	3.400	145.
0012	.0	3.200	145.
0001	.0	5.000	145.
0002	.0	5.000	145.
0003	.0	5.000	145.
0004	.0	4.200	145.
0005	.0	3.200	145.
0006	.0	3.000	145.
0007	.0	1.800	145.
0008	.0	1.600	145.
0009	.0	1.400	145.
0010	.0	1.400	145.
0011	.0	1.200	145.
0012	.0	1.800	145.
AVERAGE		2.625	145.

PLANT	CENTRAL SOYA, DELPHOS
DATE	01/12/79
SAMPLING LOCATION	DRYER VENT
RUN NUMBER	DV4DV5

STACK AREA, SQ. FT.	1.767
STACK ABS. PRES., IN HG.	29.47
STACK GAS TEMPERATURE, DEG.F	145.
SQRT(VEL HD X STACK TEMP ABS)	1.6
STACK GAS VELOCITY, ACT. FPS	97.8
STACK GAS VOLUME (WET), ACT. CFM.	10374.2
STACK GAS VOLUME (DRY), ACT. CFM.	10374.2

SAMPLE CALCULATIONS

SYMBOLS:

AREA	CROSS-SECTIONAL STACK AREA, SQ FT	PTC	PITOT TUBE COEFFICENT
ASTEMP	AVERAGE STACK TEMPERATURE, DEG F	SPRES	STATIC PRESSURE, IN H2O
BPRES	BAROMETRIC PRESSURE, IN HG	STEMP	STACK TEMPERATURE, DEG F
DELP	DELTA P	STPRES	STACK PRESSURE, IN HG
DIA	DIAMETER OF CIRCULAR STACK, IN	STVEL	STACK VELOCITY, AFPM
DIM1	LENGTH OF RECTANGULAR STACK, IN	TEMP	AVERAGE TEMPERATURE, DEG R
DIM2	WIDTH OF RECTANGULAR STACK, IN	VH	VELOCITY HEAD, IN H2O
MOIST	MOISTURE CONTENT	VOLFLD	VOLUMETRIC FLOW (DRY), ACFM
MW	MOLECULAR WEIGHT	VOLFLW	VOLUMETRIC FLOW (WET), ACFM
NP	NUMBER OF TRANSVERSE POINTS		

FORMULAS AND SAMPLE CALCULATIONS:

$$DELP = \frac{SUM(SQRT(VH))}{NP} = \frac{57.82}{24} = 1.58$$

STPRES = BPRES + (SPRES/13.6) = 29.54 + (-1.00/13.6) = 29.5 IN HG

$$ASTEMP = \frac{SUM(STEMP)}{NP} = \frac{3480.}{24} = 145.\ DEG\ F$$

TEMP = ASTEMP + 460.0 = 145. + 460.0 = 605. DEG R

$$AREA(CIRCULAR\ STACK) = \frac{3.1416 * (DIA/2)**2}{144} = \frac{3.1416 * (18.000/2)**2}{144} = 1.767\ SQ\ FT$$

$$STVEL = 85.49 * PTC * DELP * SQRT\left(\frac{TEMP}{MW * STPRES}\right) = 85.49 * .84 * 1.58 * SQRT\left(\frac{605.}{27.46 * 29.5}\right) = 97.844\ AFPS$$

VOLFLW = 60. * STVEL * AREA = 60. * 97.844 * 1.767 = 10374.2 ACFM

VOLFLD = (1. - (MOIST/100.)) * VOLFLW = (1. - (.00/100.)) * 10374.2 = 10374.2 ACFM

STACK VELOCITY DATA

PLANT	CENTRAL SOYA, DELPHOS
DATE	01/11/79
SAMPLING LOCATION	COOLER VENT
RUN NUMBER	CV-2
CLOCK TIME	1028
OPERATION	
AMBIENT TEMP. (DEG.F)	0.
BAR.PRESS.(IN HG)	29.88
STATIC PRESS.(IN H2O)	.35
MOLECULAR WEIGHT	28.65
STACK INSIDE DIM(IN)	16.000
PITOT TUBE COEFF.	.84
MOISTURE CONTENT(%)	.00

TRANSVERSE POINT NO.	POSITION INCHES	VELOCITY HEAD (IN H2O)	STACK TEMP (DEG.F)
0001	.0	.150	122.
0002	.0	.100	122.
0003	.0	.100	122.
0004	.0	.150	122.
0005	.0	.200	122.
0006	.0	.200	122.
0007	.0	.300	122.
0008	.0	.350	122.
0009	.0	.500	122.
0010	.0	.450	122.
0011	.0	.550	122.
0012	.0	.550	122.
0001	.0	.350	122.
0002	.0	.350	122.
0003	.0	.350	122.
0004	.0	.400	122.
0005	.0	.400	122.
0006	.0	.350	122.
0007	.0	.300	122.
0008	.0	.400	122.
0009	.0	.350	122.
0010	.0	.350	122.
0011	.0	.300	122.
0012	.0	.250	122.
AVERAGE		.323	122.

PLANT	CENTRAL SOYA, DELPHOS
DATE	01/11/79
SAMPLING LOCATION	COOLER VENT
RUN NUMBER	CV-2

STACK AREA, SQ. FT.	1.767
STACK ABS. PRES., IN HG.	29.91
STACK GAS TEMPERATURE, DEG.F	122.
SQRT(VEL HD X STACK TEMP ABS)	.6
STACK GAS VELOCITY, ACT. FPS	32.9
STACK GAS VOLUME (WET), ACT. CFM.	3489.2
STACK GAS VOLUME (DRY), ACT. CFM.	3489.2

SAMPLE CALCULATIONS

SYMBOLS:

AREA	CROSS-SECTIONAL STACK AREA, SQ FT	PTC	PITOT TUBE COEFFICENT
ASTEMP	AVERAGE STACK TEMPERATURE, DEG F	SPRES	STATIC PRESSURE, IN H20
BPRES	BAROMETRIC PRESSURE, IN HG	STEMP	STACK TEMPERATURE, DEG F
DELP	DELTA P	STPRES	STACK PRESSURE, IN HG
DIA	DIAMETER OF CIRCULAR STACK, IN	STVEL	STACK VELOCITY, AFPM
DIM1	LENGTH OF RECTANGULAR STACK, IN	TEMP	AVERAGE TEMPERATURE, DEG R
DIM2	WIDTH OF RECTANGULAR STACK, IN	VH	VELOCITY HEAD, IN H20
MOIST	MOISTURE CONTENT	VOLFLD	VOLUMETRIC FLOW (DRY), ACFM
MW	MOLECULAR WEIGHT	VOLFLW	VOLUMETRIC FLOW (WET), ACFM
NP	NUMBER OF TRANSVERSE POINTS		

FORMULAS AND SAMPLE CALCULATIONS:

$$DELP = \frac{SUM(SQRT(VH))}{NP} = \frac{13.34}{24} = .56$$

STPRES = BPRES + (SPRES/13.6) = 29.88 + (.35/13.6) = 29.9 IN HG

$$ASTEMP = \frac{SUM(STEMP)}{NP} = \frac{2928.}{24} = 122.\ DEG\ F$$

TEMP = ASTEMP + 460.0 = 122. + 460.0 = 582. DEG R

$$AREA(CIRCULAR\ STACK) = \frac{3.1416 * (DIA/2)**2}{144} = \frac{3.1416 * (18.000/2)**2}{144} = 1.767\ SQ\ FT$$

$$STVEL = 85.49 * PTC * DELP * SQRT\left(\frac{TEMP}{(MW * STPRES)}\right) = 85.49 * .84 * .56 * SQRT\left(\frac{582.}{28.65 * 29.9}\right) = 32.908\ AFPS$$

VOLFLW = 60. * STVEL * AREA = 60. * 32.908 * 1.767 = 3489.2 ACFM

VOLFLD = (1. - (MOIST/100.)) * VOLFLW = (1. - (.00/100.)) * 3489.2 = 3489.2 ACFM

STACK VELOCITY DATA

PLANT	CENTRAL SOYA, DELPHOS
DATE	01/11/79
SAMPLING LOCATION	COOLER VENT
RUN NUMBER	CV-3
CLOCK TIME	1515
OPERATOR	HERSHEY
AMBIENT TEMP. (DEG.F)	12.
BAR.PRESS.(IN HG)	29.88
STATIC PRESS.(IN H2O)	.35
MOLECULAR WEIGHT	28.65
STACK INSIDE DIA(IN)	18.000
PITOT TUBE COEFF.	.84
MOISTURE CONTENT(%)	.00

TRANSVERSE POINT NO.	POSITION INCHES	VELOCITY HEAD (IN H2O)	STACK TEMP (DEG.F)
0001	.0	.100	122.
0002	.0	.200	122.
0003	.0	.150	122.
0004	.0	.200	122.
0005	.0	.150	122.
0006	.0	.200	122.
0007	.0	.200	122.
0008	.0	.250	122.
0009	.0	.300	122.
0010	.0	.400	122.
0011	.0	.400	122.
0012	.0	.350	122.
0001	.0	.250	122.
0002	.0	.250	122.
0003	.0	.250	122.
0004	.0	.250	122.
0005	.0	.250	122.
0006	.0	.250	122.
0007	.0	.150	122.
0008	.0	.200	122.
0009	.0	.200	122.
0010	.0	.200	122.
0011	.0	.150	122.
0012	.0	.200	122.
AVERAGE		.229	122.

PLANT	CENTRAL SOYA, DELPHOS
DATE	01/11/79
SAMPLING LOCATION	COOLER VENT
RUN NUMBER	CV-3
STACK AREA, SQ. FT.	1.767
STACK ABS. PRES., IN HG.	29.91
STACK GAS TEMPERATURE, DEG.F	122.
SQRT(VEL HD X STACK TEMP ABS)	.5
STACK GAS VELOCITY, ACT. FPS	28.0
STACK GAS VOLUME (WET), ACT. CFM.	2967.0
STACK GAS VOLUME (DRY), ACT. CFM.	2967.0

SAMPLE CALCULATIONS

SYMBOLS:

AREA	CROSS-SECTIONAL STACK AREA, SQ FT	PTC	PITOT TUBE COEFFICENT
ASTEMP	AVERAGE STACK TEMPERATURE, DEG F	SPRES	STATIC PRESSURE, IN H20
BPRES	BAROMETRIC PRESSURE, IN HG	STEMP	STACK TEMPERATURE, DEG F
DELP	DELTA P	STPRES	STACK PRESSURE, IN HG
DIA	DIAMETER OF CIRCULAR STACK, IN	STVEL	STACK VELOCITY, AFPM
DIM1	LENGTH OF RECTANGULAR STACK, IN	TEMP	AVERAGE TEMPERATURE, DEG R
DIM2	WIDTH OF RECTANGULAR STACK, IN	VH	VELOCITY HEAD, IN H20
MOIST	MOISTURE CONTENT	VOLFLD	VOLUMETRIC FLOW (DRY), ACFM
MW	MOLECULAR WEIGHT	VOLFLW	VOLUMETRIC FLOW (WET), ACFM
NP	NUMBER OF TRANSVERSE POINTS		

FORMULAS AND SAMPLE CALCULATIONS:

$$DELP = \frac{SUM(SQRT(VH))}{NP} = \frac{11.35}{24} = .47$$

STPRES = BPRES + (SPRES/13.6) = 29.88 + (.35/13.6) = 29.9 IN HG

$$ASTEMP = \frac{SUM(STEMP)}{NP} = \frac{2928.}{24} = 122.\ DEG\ F$$

TEMP = ASTEMP + 460.0 = 122. + 460.0 = 582. DEG R

$$AREA(CIRCULAR\ STACK) = \frac{3.1416 * (DIA/2)**2}{144} = \frac{3.1416 * (18.000/2)**2}{144} = 1.767\ SQ\ FT$$

$$STVEL = 85.49 * PTC * DELP * SQRT\left(\frac{TEMP}{MW * STPRES}\right) = 85.49 * .84 * .47 * SQRT\left(\frac{582.}{28.65 * 29.9}\right) = 27.983\ AFPS$$

VOLFLW = 60. * STVEL * AREA = 60. * 27.983 * 1.767 = 2967.0 ACFM

VOLFLD = (1. - (MOIST/100.)) * VOLFLW = (1. - (.00/100.)) * 2967.0 = 2967.0 ACFM

STACK VELOCITY DATA

PLANT	CENTRAL SOYA, DELPHOS
DATE	01/12/79
SAMPLING LOCATION	COOLER VENT
RUN NUMBER	CV-4
CLOCK TIME	1425
OPERATOR	HERSHEY, DEWEES
AMBIENT TEMP. (DEG.F)	14.
BAR.PRESS.(IN HG)	29.54
STATIC PRESS.(IN H2O)	.05
MOLECULAR WEIGHT	28.12
STACK INSIDE DIM(IN)	14.000
PITOT TUBE COEFF.	.84
MOISTURE CONTENT(%)	.00

TRANSVERSE POINT NO.	POSITION INCHES	VELOCITY HEAD (IN H2O)	STACK TEMP (DEG.F)
0001	.0	.650	105.
0002	.0	.700	105.
0003	.0	.700	105.
0004	.0	.750	105.
0005	.0	1.000	105.
0006	.0	1.500	105.
0007	.0	1.750	105.
0008	.0	1.850	105.
0009	.0	2.000	105.
0010	.0	2.000	105.
0011	.0	1.800	105.
0012	.0	1.900	105.
0001	.0	.950	105.
0002	.0	.750	105.
0003	.0	1.000	105.
0004	.0	1.250	105.
0005	.0	1.300	105.
0006	.0	1.250	105.
0007	.0	1.300	105.
0008	.0	1.250	105.
0009	.0	1.350	105.
0010	.0	1.200	105.
0011	.0	1.200	105.
0012	.0	1.000	105.
AVERAGE		1.267	105.

PLANT	CENTRAL SOYA, DELPHOS
DATE	01/12/79
SAMPLING LOCATION	COOLER VENT
RUN NUMBER	CV-4

STACK AREA, SQ. FT.	1.767
STACK ABS. PRES., IN HG.	29.54
STACK GAS TEMPERATURE, DEG.F	105.
SQRT(VEL HD X STACK TEMP ABS)	1.1
STACK GAS VELOCITY, ACT. FPS	65.7
STACK GAS VOLUME (WET), ACT. CFM.	6967.2
STACK GAS VOLUME (DRY), ACT. CFM.	6967.2

PITOT TUBE CALIBRATION

The pitot tubes used in sampling were constructed by PEDCo Environmental and met all requirements of Method 2, section 4.1 of the Federal Register*. Therefore, a baseline coefficient of 0.84 was assigned to each pitot tube. See Figures E-4 and E-5 for alignment requirements of Method 2.

* Federal Register, Vol. 42, No. 160, August 18, 1977.

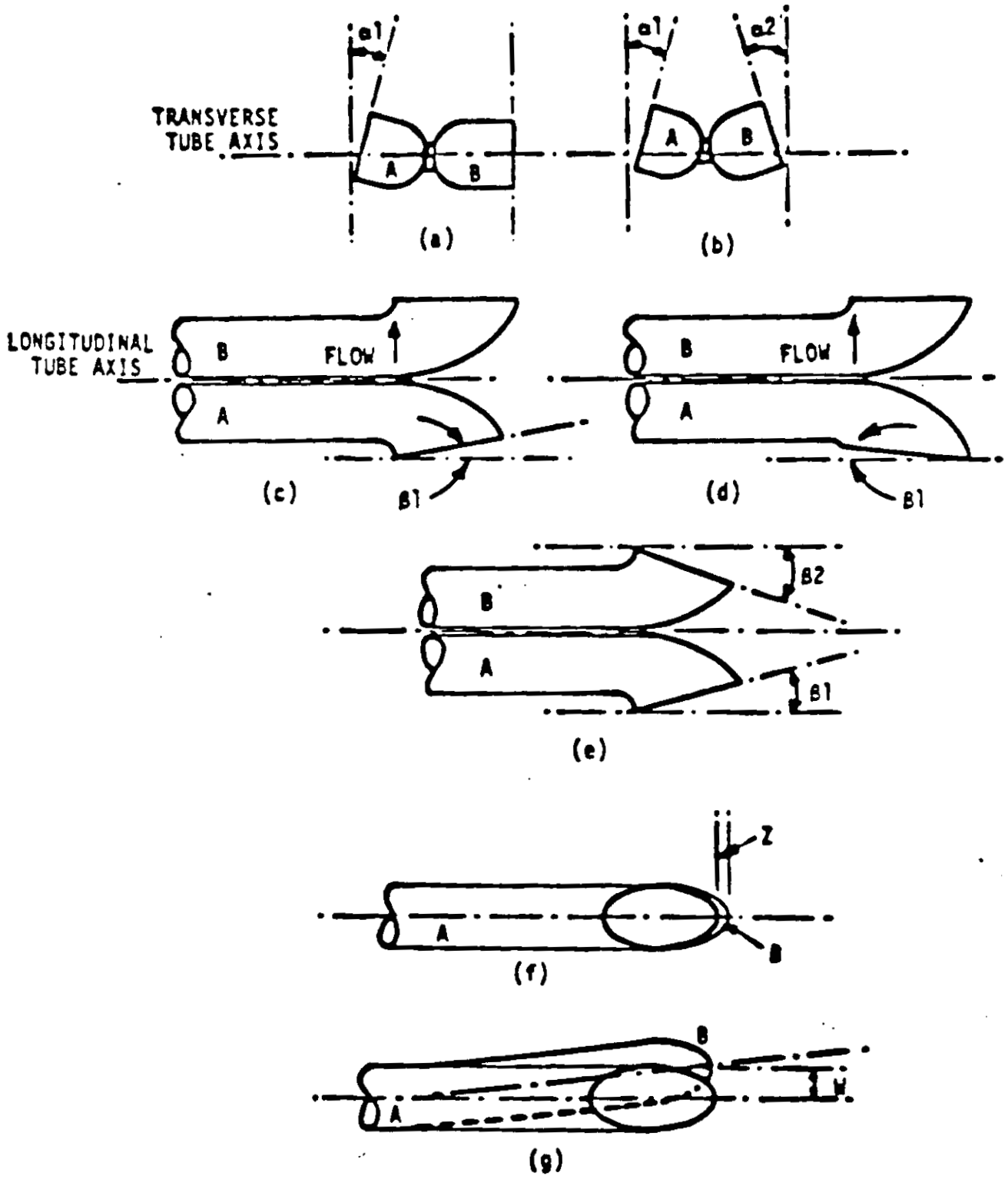


Figure E-5 Types of face-opening misalignment that can result from field use or improper construction of Type S pitot tubes. These will not affect Cp so long as a_1 and a_2 <10°, β_1 and β_2 <5°, z <0.32 cm (1/8 in.) and w<0.08 cm (1/32 in.).

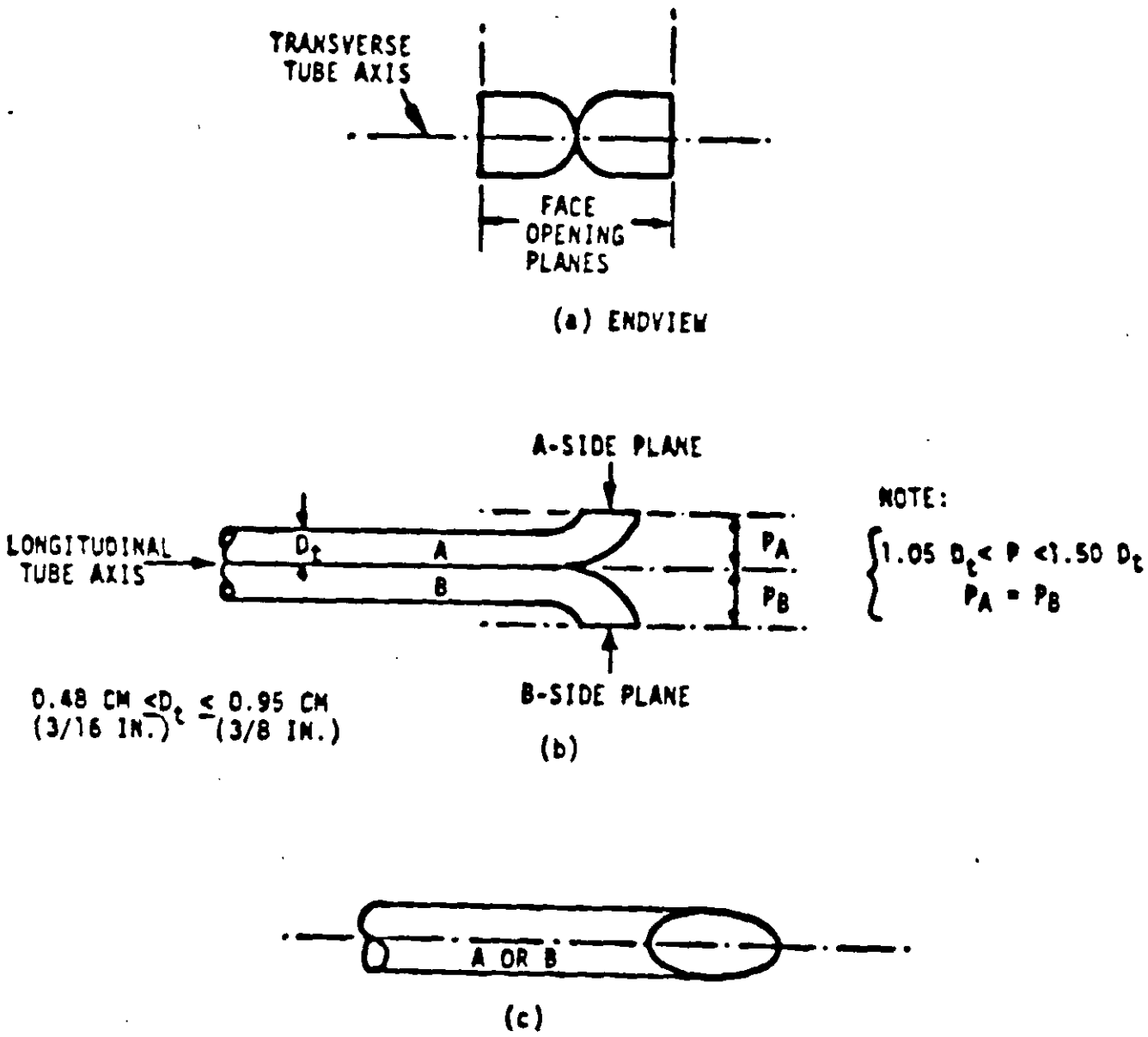


Figure E-4 Properly constructed Type S pitot tube, shown in: (a) end view; face opening planes perpendicular to transverse axis; (b) top view; face opening planes parallel to longitudinal axis; (c) side view; both legs of equal length and centerlines coincident, when viewed from both sides. Baseline coefficient values of 0.84 may be assigned to pitot tubes constructed this way.

APPENDIX C

PROJECT PARTICIPANTS

PROJECT PARTICIPANTS

Name	Affiliation	Title/Function
Nancy McLaughlin	EMB/USEPA	Technical Manager
Kerri Brothers	~~CPB/EMB~~ USEPA	Process Data Collection
William DeWees	PEI	Project Director
Thomas Wagner	PEI	Analytical Chemist
Dale Hershey	PEI	Project Manager
Lance Schnieder	PEI	Source Test Tech.
Frankling Meadows	PCS	Subcontractor

EMB - emission measurement branch - USEPA
RTI - Research Triangle Institute
PEI - PEDCo Environmental, Inc.
PCS - Pollution Control Science, Inc.

APPENDIX D

SAMPLING LOG

SAMPLING LOG

Date	Time	Activities
1/8/79	13:00-17:00	Test team from PEI and PCS arrives; set up lab and sampling equipment; make inspection of test sites
1/9/79	8:00-11:00	Test team calibrating pumps; setup test site and equipment
	11:00-12:00	Test 1 on mineral oil scrubber sites
	12:30-13:30	Lunch break
	13:30-16:30	Cleaning up sample trains and setting up for next test
	17:00-18:00	Test 2 at MOS sites
	19:30	Test team leaves for day
1/10/79	8:00-9:00	Team arrives on site and sets up for test
	9:00-9:45	Test 3 at MOS
	10:00-11:00	Clean up and recover samples
	11:00-11:45	Test 4 at MOS
	12:00-15:00	Lunch, test recovery, set up for first tests at cooler and dryer sites
	15:10-16:10	Test 1 at dryer and cooler sites
	16:10-17:30	Clean up, recover samples; leave site for day

SAMPLING LOG (continued)

Date	Time	Activities
1/11/79	8:00-10:30	Set up for test 2 at dryer and cooler
	10:30-11:30	Test 2 at dryer and cooler, meal samples taken at DT's, dryer, and cooler
	11:30-13:00	Clean up, recover samples
	13:00-13:30	Lunch break
	13:30-14:30	Set up for next test
	14:30-15:15	Test 3 at dryer and cooler
	15:30	Plant shut down to repair and clean cyclone at cooler test site
1/12/79	8:00-10:30	Set up for bag sample tests
	10:30-11:30	Bag samples drawn at cooler and dryer sites; analyzed immediately
	12:10-14:25	Tests 4 and 5 conducted simultaneously at cooler and dryer sites
	14:25-16:30	Recover samples, clean up, pack up equipment
	16:30	Test team leaves plant