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Final Report - Volume I of II

Iron and Steel Foundries
Manual Emissions Testing
Cupola Wet Scrubber
General Motors Corp.
Saginaw, Michigan

Office of Air Quality
Clean Air
OAQPS
Planning and Standards

FINAL REPORT

IRON AND STEEL FOUNDRIES
MANUAL EMISSIONS TESTING
CUPOLA WET SCRUBBER
GENERAL MOTORS CORP., SAGINAW, MICHIGAN

VOLUME I OF II
REPORT TEXT & APPENDICES A & B

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1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) Emission Standards Division (ESD) is investigating iron and steel foundries to identify and quantify hazardous air pollutants (HAPs) emitted from cupolas; electric arc furnaces; and pouring, cooling and shakeout operations of sand mold casting processes. ESD had requested that EPA's Emissions, Monitoring and Analysis Division (EMAD) conduct the required testing. EMAD had issued a work assignment to Pacific Environmental Services, Inc. (PES) to plan and conduct the air emissions test program to gather emissions data as specified in the ESD test request. The planning and testing phase of the program was conducted through EPA Contract No. 68D20162, Work Assignment No. 4-14. This test report was completed under EPA Contract No. 68D70069, Work Assignment No. 2-08.

The EPA's ESD is investigating two types of control devices (baghouses and scrubbers) as potential Maximum Achievable Control Technology (MACT) floor technology for cupolas. Two facilities were selected by ESD as host facilities for the testing program. One uses a baghouse for control of cupola emissions, and the other uses a wet scrubber for the control of cupola emissions. General Motors Corporation, Saginaw Metals Casting Operations (GMC), located in Saginaw, Michigan, uses a wet scrubber and was the subject of this test program. Results of tests on a baghouse at the second facility were presented under a separate report.

Testing at GMC was conducted by two EMAD contractors to address the following ESD requirements: 1) characterize HAP emissions from cupolas that are controlled by wet scrubbers; 2) characterize uncontrolled HAP emissions from pouring, cooling, and shakeout (PCS) processes; 3) determine wet scrubber performance in controlling HAP emissions from cupolas; and 4) identify surrogates for estimating HAP emissions from the subject foundry processes. PES conducted testing for requirements (1) and (3). Data gathering for requirements (2) and (4) was conducted by the other contractor and is not a part of this document.

GMC was selected by the ESD as the host facility for this project. This facility is a large foundry that conducts melting and casting operations. EPA deemed this facility to be representative of a large segment of the sand casting foundry industry. It operates a relatively large cupola that is controlled by a wet scrubber. Tests were conducted at the cupola wet scrubber inlet and outlet. PES performed particulate matter (PM) and metals (HAPs and non-HAPs) testing at the cupola wet scrubber inlet and outlet, and organic HAPs testing at the scrubber outlet. The organic HAPs consisted of polychlorinated dibenzo-*p*-dioxins and polychlorinated dibenzofurans (PCDDs/PCDFs) and semi-volatile organic hazardous air pollutants (SVOHAPs). Volatile organic hazardous air pollutants (VOHAPs) were measured by direct interface gas chromatography/mass spectrometry (GC/MS) at the scrubber outlet.

PES used four subcontractors for this effort: Deeco, Inc. (DEECO); Emission Monitoring, Inc. (EMI); Triangle Laboratories, Inc. (TLI); and Atlantic Technical Services, Inc. (ATS). DEECO provided onsite sampling support for the determination of PM and metal HAPs; EM provided onsite sampling and analysis by direct interface GC/MS for the determination of VOHAPs; TLI provided analytical support for the analysis of HAPs; and ATS provided support for preparation of the site-specific test plan (SSTP), quality assurance project plan (QAPP), and report documentation.

The field testing program organization and major lines of communication are presented in Figure 1.1. The PES Project Manager communicated directly with the EPA Work Assignment Manager and coordinated all of the on-site testing activities.

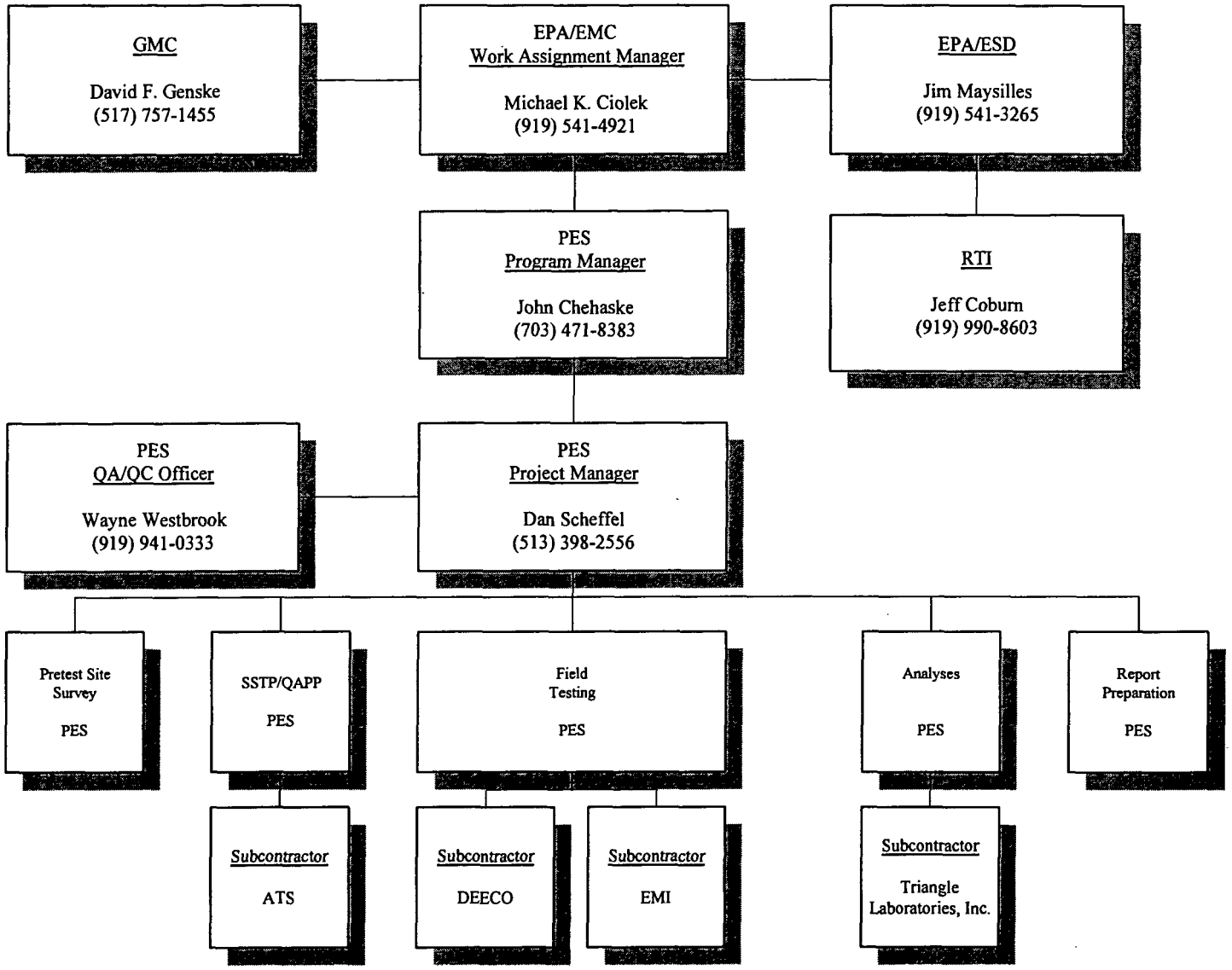


Figure 1.1 Key Personnel and Responsibility for Testing at GMC - Saginaw, Michigan

2.0 SUMMARY OF RESULTS

This section provides test results summaries obtained from GMC testing. Included are results of the tests conducted for particulate matter/metals at the cupola wet scrubber inlet and outlet, and SVOHAPs and PCDDs/PCDFs testing at the cupola wet scrubber outlet. Although we have included averages, there were differences in production rates and operating conditions. It should also be noted that the inlet sample location was located after the quench chamber. The quench chamber is the first stage of the particulate matter/metals control system. A true removal efficiency can not be determined based on the inlet sample loading.

2.1 EMISSIONS TEST LOG

Sampling at the cupola wet scrubber was conducted on September 23, 24, and 25, 1997. Table 2.1 summarizes the emissions test log. Presented are the run numbers, test dates, pollutants, run times, and downtime for filter and port changes.

2.2 PARTICULATE MATTER AND METALS

2.2.1 Wet Scrubber Inlet

Table 2.2 summarizes the particulate matter and metals emissions sampling and flue gas parameters at the wet scrubber inlet. The total sampling time varies for each test run with an average of 148 minutes. The average sample volume was 97.591 dry standard cubic feet (dscf) or 2.763 dry standard cubic meters (dscm). The average flue gas temperature was 131°F. The flue gas contained 9.8 percent (%) carbon dioxide (CO_2), 12.3% oxygen (O_2), and 16.6% moisture. The average flue gas volumetric flow rate was 82,300 actual cubic feet per minute (acfm) or 57,400 dry standard cubic feet per minute (dscfm) or 1,630 dry standard cubic meters per minute (dscmm).

Table 2.3 summarizes the flue gas particulate matter concentrations and emission rates at the cupola wet scrubber inlet. The average concentration was 0.363 grains per dry standard cubic foot (gr/dscf) or 0.830 grams per dry standard cubic meter (g/dscm). The concentrations are also shown adjusted to 7% O_2. The average mass emission rate was 177 pounds per hour (lb/hr) or 80.4 kilograms per hour (kg/hr).

Table 2.4 summarizes the flue gas metals concentrations and emission rates. The metals concentrations shown by the reagent blank analysis for the acetone rinse, filters (3 inch and 4 inch), dilute nitric acid rinse, and metals absorbing solution (acidified hydrogen peroxide) were

TABLE 2.1

EMISSIONS TEST LOG
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	Date	Pollutant	Run Time	Downtime, Minutes
Wet Scrubber Inlet				
I-M29-1	09/23/97	PM/Metals	1410-1841	156
I-M29-2	09/24/97	PM/Metals	0934-1343	12
I-M29-3	09/25/97	PM/Metals	0838-1149	71
I-M29-4	09/25/97	PM/Metals	1512-1845	103
Wet Scrubber Outlet				
O-M29-1	09/23/97	PM/Metals	1412-1846	164
SO-23-1	09/23/97	PCDDs/PCDFs	1415-1846	161
SO-0010-1	09/23/97	SVOHAPs	1415-1847	162
O-M29-2	09/24/97	PM/Metals	0938-1347	9
SO-23-2	09/24/97	PCDDs/PCDFs	0851-1347	56
SO-0010-2	09/24/97	SVOHAPs	0851-1400	69
O-M29-3	09/25/97	PM/Metals	0845-1145	60
SO-23-3	09/25/97	PCDDs/PCDFs	0844-1321	37
SO-0010-3	09/25/97	SVOHAPs	0844-1321	37
O-M29-4	09/25/97	PM/Metals	1523-1843	80
SO-23-4	09/25/97	PCDDs/PCDFs	1443-1918	35
SO-0010-4	09/25/97	SVOHAPs	1443-1919	36

TABLE 2.2

PARTICULATE MATTER/METALS EMISSIONS SAMPLING AND FLUE GAS PARAMETERS, CUPOLA WET SCRUBBER INLET GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	I-M29-1	I-M29-2	I-M29-3	I-M29-4	Average
Date	9/23/97	9/24/97	9/25/97	9/25/97	
Total Sampling Time, min	115	237.3	120	120	148
Average Sampling Rate, dscfm[a]	0.517	0.515	0.881	0.858	0.693
Sample Volume:					
dscf[b]	59.458	122.140	105.757	103.008	97.591
dscm[c]	1.684	3.459	2.995	2.917	2.763
Average Flue Gas Temp., °F	125	128	133	137	131
O_2 Concentration, % by Volume	12.3	12.7	12.2	11.9	12.3
CO_2 Concentration, % by Volume	8.9	9.4	10.0	11.0	9.8
Moisture, % by Volume	14.0	15.1	17.7	19.7	16.6
Flue Gas Volumetric Flow Rate:					
acfm[d]	82,000	81,100	82,900	83,300	82,300
dscfm[a]	60,200	58,700	56,100	54,700	57,400
dscmm[d]	1,700	1,660	1,590	1,550	1,630
Isokinetic Sampling Ratio, %	102.3	104.5	102.0	105.1	103.5

[a] Dry standard cubic feet per minute at 68° F (20° C) and 1 atm.

[b] Dry standard cubic feet at 68° F (20° C) and 1 atm.

[c] Dry standard cubic meters at 68° F (20° C) and 1 atm.

[d] Actual cubic feet per minute at flue gas conditions.

[e] Dry standard cubic meters per minute at 68° F (20° C) and 1 atm.

TABLE 2.3

PARTICULATE MATTER CONCENTRATIONS AND EMISSION RATES
CUPOLA WET SCRUBBER INLET
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	I-M29-1	I-M29-2	I-M29-3	I-M29-4	Average
Date	9/23/97	9/24/97	9/25/97	9/25/97	
Clock Time, 24-hr clock	1410-1841	0934-1343	0838-1149	1512-1845	
Concentration:					
gr/dscf [a]	0.269	0.335	0.387	0.459	0.363
gr/dscf @ 7% O_2 [b]	0.434	0.568	0.618	0.710	0.583
g/dscm [c]	0.615	0.767	0.885	1.051	0.830
g/dscm @ 7% O_2 [d]	0.994	1.30	1.41	1.62	1.33
Emission Rate:					
lb/hr [e]	138.6	169	186	215	177
kg/hr [f]	62.9	76.5	84.4	97.7	80.4

[a] Grains per dry standard cubic foot at 68° F (20° C) and 1 atm.

[b] Grains per dry standard cubic foot at 68° F (20° C) and 1 atm adjusted to 7 percent O_2.

[c] Grams per dry standard cubic meter at 68° F (20° C) and 1 atm.

[d] Grams per dry standard cubic meter at 68° F (20° C) and 1 atm adjusted to 7 percent O_2.

[e] Pounds per hour.

[f] Kilograms per hour.

TABLE 2.4

METALS CONCENTRATIONS AND EMISSION RATES
CUPOLA WET SCRUBBER INLET
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	I-M29-1	I-M29-2	I-M29-3	I-M29-4	Average
Date	9/23/97	9/24/97	9/25/97	9/25/97	
Clock Time, 24-hr clock	1410-1841	0934-1343	0838-1149	1512-1845	
Antimony (Sb)					
µg/dscm [a]	37.2	15.5	70.6	85.3	52.1
µg/dscm @ 7% O_2 [b]	60.1	26.2	113	132	82.7
lb/hr [c]	0.00838	0.00340	0.0148	0.0175	0.01102
Arsenic (As)					
µg/dscm [a]	15.6	23.6	21.5	28.3	22.2
µg/dscm @ 7% O_2 [b]	25.2	39.9	34.3	43.7	35.8
lb/hr [c]	0.00351	0.00518	0.00451	0.00579	0.00475
Barium (Ba)					
µg/dscm [a]	183	319	248	340	272
µg/dscm @ 7% O_2 [b]	295	541	397	525	439
lb/hr [c]	0.0411	0.0701	0.0522	0.0696	0.0583
Beryllium (Be)					
µg/dscm [a]	ND	0.688	ND	ND	0.172
µg/dscm @ 7% O_2 [b]	ND	1.17	ND.	ND	0.292
lb/hr [c]	ND	0.000151	ND	ND	0.0000378
Cadmium (Cd)					
µg/dscm [a]	49.2	69.8	78.1	63.1	65.1
µg/dscm @ 7% O_2 [b]	79.6	118	125	97.4	105
lb/hr [c]	0.01110	0.0153	0.0164	0.01293	0.01394
Chromium (Cr)					
µg/dscm [a]	281	294	259	247	270
µg/dscm @ 7% O_2 [b]	454	498	414	382	437
lb/hr [c]	0.0633	0.0646	0.0544	0.0507	0.0583
Cobalt (Co)					
µg/dscm [a]	12.9	11.8	10.6	11.2	11.6
µg/dscm @ 7% O_2 [b]	20.8	20.0	16.9	17.4	18.8
lb/hr [c]	0.00291	0.00260	0.00222	0.00230	0.00251
Lead (Pb)					
µg/dscm [a]	5,682	3,824	8,269	8,777	6,638
µg/dscm @ 7% O_2 [b]	9,184	6,482	13,211	13,556	10,608
lb/hr [c]	1.281	0.840	1.74	1.80	1.414

TABLE 2.4 (Concluded)

METALS CONCENTRATIONS AND EMISSION RATES
CUPOLA WET SCRUBBER INLET
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	I-M29-1	I-M29-2	I-M29-3	I-M29-4	Average
Manganese (Mn)					
µg/dscm [a]	36,405	41,676	35,940	39,504	38,381
µg/dscm @ 7% O_2 [b]	58,840	70,646	57,421	61,011	61,980
lb/hr [c]	8.21	9.16	7.55	8.09	8.25
Mercury (Hg)					
µg/dscm [a]	4.75	3.21	33.8	5.97	11.9
µg/dscm @ 7% O_2 [b]	7.68	5.44	54.0	9.21	19.1
lb/hr [c]	0.001071	0.000705	0.00710	0.001222	0.00252
Nickel (Ni)					
µg/dscm [a]	15.5	13.2	15.2	11.6	13.9
µg/dscm @ 7% O_2 [b]	25.1	22.3	24.3	17.9	22.4
lb/hr [c]	0.00350	0.00290	0.00320	0.00237	0.00299
Phosphorus (P)					
µg/dscm [a]	243	1,614	1,113	1,125	1,024
µg/dscm @ 7% O_2 [b]	393	2,735	1,779	1,737	1,661
lb/hr [c]	0.0548	0.355	0.234	0.230	0.218
Selenium (Se)					
µg/dscm [a]	12.3	16.4	12.5	13.8	13.7
µg/dscm @ 7% O_2 [b]	19.9	27.8	19.9	21.3	22.2
lb/hr [c]	0.00277	0.00360	0.00262	0.00282	0.00295
Silver (Ag)					
µg/dscm [a]	6.35	7.85	10.2	6.17	7.64
µg/dscm @ 7% O_2 [b]	10.3	13.3	16.3	9.53	12.3
lb/hr [c]	0.00143	0.00173	0.00214	0.001264	0.00164
Thallium (Tl)					
µg/dscm [a]	18.2	18.4	16.2	17.8	17.6
µg/dscm @ 7% O_2 [b]	29.4	31.1	25.9	27.4	28.5
lb/hr [c]	0.00410	0.00404	0.00340	0.00364	0.00379
Zinc (Zn)					
µg/dscm [a]	45,858	47,631	64,566	85,608	60,916
µg/dscm @ 7% O_2 [b]	74,119	80,740	103,157	132,217	97,558
lb/hr [c]	10.34	10.47	13.57	17.5	12.98

[a] Micrograms per dry standard cubic meter at 68° F (20° C) and 1 atm.

[b] Micrograms per dry standard cubic meter at 68° F (20° C) and 1 atm, adjusted to 7% O2.

[c] Pounds per hour.

used to blank correct the scrubber inlet metals concentrations. Blank corrections were made if the blank target analyte was less than 10% of the sample concentration. Average concentrations ranged from 0.172 micrograms per dry standard cubic meter (μg/dscm) for beryllium to 60,916 μg/dscm for zinc.

2.2.2 Wet Scrubber Outlet

Table 2.5 summarizes the particulate matter and trace metals emissions sampling and exhaust gas parameters at the wet scrubber outlet. The total sampling time varies for each test with an average of 148 minutes. The average sample volume was 113.671 dscf or 3.219 dscm. The average exhaust gas temperature was 119°F. The exhaust gas contained 8.7 % CO_2, 13.4% O_2, and 12.0 % moisture. The average exhaust gas volumetric flow rate was 73,200 acfm or 58,000 dscfm (1,640 dscmm).

Table 2.6 summarizes the exhaust gas particulate matter concentrations and emission rates at the wet scrubber outlet. The average concentration was 0.00952 gr/dscf or 0.0218 g/dscm. The concentrations are also shown adjusted to 7% O_2. The average mass emission rate was 4.78 lb/hr or 2.17 kg/hr.

Table 2.7 summarizes the exhaust gas metals concentrations and emission rates. The metals concentrations shown by the field blank analysis were used to blank correct the scrubber outlet multiple metals concentrations. Blank corrections were made if the blank target analyte was less than 10% of the sample concentration. All of the target metals, except arsenic, beryllium, cobalt, and nickel, were found to be present in all four samples. Metals that were not detected in a sample have "ND" in place of any emissions calculations and were not included in the total metals sum. Average concentrations ranged from 0.075 μg/dscm for beryllium to 1,919 μg/dscm for zinc.

2.2.3 Wet Scrubber Performance

Table 2.8 summarizes the performance of the wet scrubber in controlling PM and total HAP metals emissions. The removal efficiencies for PM and total HAP metals are based on the inlet and outlet mass emission rates. As noted previously, the inlet sampling location was located after the quench chamber. The scrubber performance does not include the particulate/metals removed by the quench chamber. As a result of the inlet sample location, the particulate/metals removal efficiencies are biased low. The average removal efficiency for PM and total HAP metals was 97.3% and 96.0%, respectively.

2.3 DIOXINS AND FURANS

Table 2.9 summarizes the PCDDs/PCDFs emissions sampling and exhaust gas parameters at the wet scrubber outlet. The total sampling time was 110 minutes for the first run, and 240 minutes for the additional three runs. The average sample volume was 161.244 dscf or 4.566 dscm. The average exhaust gas temperature was 119°F. The flue gas contained 8.7%

TABLE 2.5

PARTICULATE MATTER/METALS EMISSIONS SAMPLING AND EXHAUST GAS PARAMETERS CUPOLA WET SCRUBBER OUTLET GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	O-M29-1	O-M29-2	O-M29-3	O-M29-4	Average
Date	9/23/97	9/24/97	9/25/97	9/25/97	
Total Sampling Time, min	110	240	120	120	148
Average Sampling Rate, dscfm[a]	0.692	0.633	0.946	0.943	0.803
Sample Volume:					
dscf[b]	76.163	151.911	113.491	113.118	113.671
dscm[c]	2.157	4.302	3.214	3.203	3.219
Average Exhaust Gas Temp., °F	125	133	109	109	119
O_2 Concentration, % by Volume	16.7	11.8	12.5	12.4	13.4
CO_2 Concentration, % by Volume	4.0	10.6	9.7	10.3	8.7
Moisture, % by Volume	13.0	16.4	9.2	9.6	12.0
Exhaust Gas Volumetric Flow Rate:					
acfm[d]	80,200	74,000	68,700	69,800	73,200
dscfm[a]	62,800	55,200	56,600	57,500	58,000
dscmm[e]	1,780	1,560	1,600	1,630	1,640
Isokinetic Sampling Ratio, %	95.4	99.3	97.8	95.9	97.1

[a] Dry standard cubic feet per minute at 68° F (20° C) and 1 atm.

[b] Dry standard cubic feet at 68° F (20° C) and 1 atm.

[c] Dry standard cubic meters at 68° F (20° C) and 1 atm.

[d] Actual cubic feet per minute at exhaust gas conditions.

[e] Dry standard cubic meters per minute at 68° F (20° C) and 1 atm.

TABLE 2.6

PARTICULATE MATTER CONCENTRATIONS AND EMISSION RATES
CUPOLA WET SCRUBBER OUTLET
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	O-M29-1	O-M29-2	O-M29-3	O-M29-4	Average
Date	9/23/97	9/24/97	9/25/97	9/25/97	
Clock Time, 24-hr clock	1412-1846	0938-1347	0845-1145	1523-1843	
Concentration:					
gr/dscf[a]	0.0150	0.0161	0.00352	0.00347	0.00952
gr/dscf @ 7% O_2 [b]	0.0497	0.0246	0.00583	0.00567	0.0214
g/dscm c	0.0344	0.0368	0.00806	0.00793	0.0218
g/dscm @ 7% O_2 [d]	0.114	0.0562	0.0133	0.0130	0.0491
Emission Rate:					
lb/hr[e]	8.08	7.61	1.71	1.71	4.78
kg/hr[f]	3.66	3.45	0.776	0.775	2.17

[a] Grains per dry standard cubic foot at 68° F (20° C) and 1 atm.

[b] Grains per dry standard cubic foot at 68° F (20° C) and 1 atm adjusted to 7 percent O2.

[c] Grams per dry standard cubic meter at 68° F (20° C) and 1 atm.

[d] Grams per dry standard cubic meter at 68° F (20° C) and 1 atm adjusted to 7 percent O2.

[e] Pounds per hour.

[f] Kilograms per hour.

TABLE 2.7

EXHAUST GAS METALS CONCENTRATIONS AND EMISSION RATES
CUPOLA WET SCRUBBER OUTLET
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	O-M29-1	O-M29-2	O-M29-3	O-M29-4	Average
Date	9/23/97	9/24/97	9/25/97	9/25/97	
Clock Time, 24-hr clock	1412-1846	0938-1347	0845-1145	1523-1843	
Antimony (Sb)					
µg/dscm [a]	5.19	3.47	2.88	2.61	3.54
µg/dscm @ 7% O_2 [b]	17.2	5.29	4.76	4.27	7.88
lb/hr [c]	0.00122	0.000716	0.000610	0.000563	0.000778
Arsenic (As)					
µg/dscm [a]	2.72	1.61	ND	ND	1.51
µg/dscm @ 7% O_2 [b]	8.99	2.45	ND	ND	3.56
lb/hr [c]	0.000639	0.000332	ND	ND	0.000334
Barium (Ba)					
µg/dscm [a]	24.6	24.1	11.5	7.52	17.0
µg/dscm @ 7% O_2 [b]	81.5	36.9	19.0	12.3	37.4
lb/hr [c]	0.00579	0.00499	0.00244	0.00162	0.00371
Beryllium (Be)					
µg/dscm [a]	0.158	0.144	ND	ND	0.075
µg/dscm @ 7% O_2 [b]	0.522	0.220	ND	ND	0.185
lb/hr [c]	0.0000371	0.0000298	ND	ND	0.0000167
Cadmium (Cd)					
µg/dscm [a]	3.96	5.37	1.23	0.659	2.80
µg/dscm @ 7% O_2 [b]	13.1	8.21	2.03	1.08	6.10
lb/hr [c]	0.000930	0.00111	0.000260	0.000142	0.000610
Chromium (Cr)					
µg/dscm [a]	29.3	23.8	8.46	6.03	16.9
µg/dscm @ 7% O_2 [b]	96.8	36.4	14.0	9.85	39.3
lb/hr [c]	0.00688	0.00492	0.00180	0.00130	0.00372
Cobalt (Co)					
µg/dscm [a]	ND	1.33	0.672	ND	1.16
µg/dscm @ 7% O_2 [b]	ND	2.04	1.11	ND	2.69
lb/hr [c]	ND	0.000276	0.000143	ND	0.000256
Lead (Pb)					
µg/dscm [a]	382	366	141	71.5	240
µg/dscm @ 7% O_2 [b]	1,265	559	234	117	544
lb/hr [c]	0.0899	0.0756	0.0299	0.0154	0.0527

TABLE 2.7 (Concluded)

EXHAUST GAS METALS CONCENTRATIONS AND EMISSION RATES
CUPOLA WET SCRUBBER OUTLET
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	O-M29-1	O-M29-2	O-M29-3	O-M29-4	Average
Manganese (Mn)					
µg/dscm [a]	2,984	2,510	475	324	1,573
µg/dscm @ 7% O_2 [b]	9,875	3,834	786	530	3,756
lb/hr [c]	0.702	0.518	0.101	0.0698	0.348
Mercury (Hg)					
µg/dscm [a]	4.81	4.98	17.1	5.61	8.12
µg/dscm @ 7% O_2 [b]	15.9	7.61	28.2	9.17	15.2
lb/hr [c]	0.00113	0.00103	0.00362	0.00121	0.00175
Nickel (Ni)					
µg/dscm [a]	4.57	2.80	1.99	ND	2.80
µg/dscm @ 7% O_2 [b]	15.1	4.28	3.29	ND	6.43
lb/hr [c]	0.00107	0.000579	0.000422	ND	0.000618
Phosphorus (P)					
µg/dscm [a]	146	15.0	30.1	18.5	52.4
µg/dscm @ 7% O_2 [b]	484	22.9	49.8	30.3	147
lb/hr [c]	0.0344	0.00310	0.00639	0.00400	0.0120
Selenium (Se)					
µg/dscm [a]	2.89	2.15	1.57	1.59	2.05
µg/dscm @ 7% O_2 [b]	9.56	3.28	2.61	2.60	4.51
lb/hr [c]	0.000679	0.000444	0.000334	0.000343	0.000450
Silver (Ag)					
µg/dscm [a]	2.34	1.83	0.660	0.562	1.35
µg/dscm @ 7% O_2 [b]	7.75	2.80	1.09	0.919	3.14
lb/hr [c]	0.000551	0.000378	0.000140	0.000121	0.000298
Thallium (Tl)					
µg/dscm [a]	1.99	1.20	0.380	0.462	1.01
µg/dscm @ 7% O_2 [b]	6.58	1.83	0.628	0.756	2.45
lb/hr [c]	0.000468	0.000247	0.0000805	0.0000996	0.000224
Zinc (Zn)					
µg/dscm [a]	3,082	2,953	862	781	1,919
µg/dscm @ 7% O_2 [b]	10,200	4,511	1,426	1,277	4,353
lb/hr [c]	0.725	0.610	0.183	0.168	0.421

[a] Micrograms per dry standard cubic meter at 68° F (20° C) and 1 atm.

[b] Micrograms per dry standard cubic meter at 68° F (20° C) and 1 atm, adjusted to 7% O2.

[c] Pounds per hour.

TABLE 2.8

PARTICULATE MATTER AND METALS REMOVAL EFFICIENCIES
CUPOLA WET SCRUBBER
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Test Set No.	M29-1	M29-2	M29-3	M29-4	Average
Date	9/23/97	9/24/97	9/25/97	9/25/97	
PM Emission Rate, lb/hr:[a]					
Inlet	139	169	186	215	177
Outlet	8.08	7.61	1.71	1.71	4.78
Removal Efficiency, %:[b]	94.2	95.5	99.1	99.2	97.3
Total Metals Emission Rate, lb/hr:[a]					
Inlet	20.0	21.0	23.3	27.8	23.0
Outlet	1.57	1.22	0.330	0.263	0.846
Removal Efficiency, %:[b]	92.2	94.2	98.6	99.1	96.0

[a] Pounds per hour.

[b] Percent removal efficiencies are calculated using the emission rates (lb/hr).

TABLE 2.9

PCDDS/PCDFS EMISSIONS SAMPLING AND EXHAUST GAS PARAMETERS
CUPOLA WET SCRUBBER OUTLET
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	O-23-1	O-23-2	O-23-3	O-23-4	Average
Date	9/23/97	9/24/97	9/25/97	9/25/97	
Total Sampling Time, min	110	240	240	240	208
Average Sampling Rate, dscfm [a]	0.499	0.629	0.904	0.925	0.739
Sample Volume:					
dscf [b]	54.895	151.041	217.061	221.977	161.244
dscm [c]	1.554	4.277	6.146	6.286	4.566
Average Exhaust Gas Temp., °F	125	133	110	108	119
O_2 Concentration, % by Volume	16.7	11.8	12.5	12.4	13.4
CO_2 Concentration, % by Volume	4.0	10.6	9.7	10.3	8.7
Moisture, % by Volume	12.2	16.2	8.7	8.5	11.4
Exhaust Gas Volumetric Flow Rate:					
acfm [d]	65,300	73,600	64,600	66,500	67,500
dscfm [a]	51,600	54,900	53,200	55,200	53,700
dscmm [e]	1,460	1,560	1,510	1,560	1,520
Isokinetic Sampling Ratio, %	93.0	101.5	103.4	102.0	100.0

[a] Dry standard cubic feet per minute at 68° F (20° C) and 1 atm.

[b] Dry standard cubic feet at 68° F (20° C) and 1 atm.

[c] Dry standard cubic meters at 68° F (20° C) and 1 atm.

[d] Actual cubic feet per minute at exhaust gas conditions.

[e] Dry standard cubic meters per minute at 68° F (20° C) and 1 atm.

CO_2, 13.4% O_2, and 11.4% moisture. The average exhaust gas volumetric flow rate was 67,500 acfm or 53,700 dscfm (1,520 dscmm).

The EPA Method 23 sample extracts were first analyzed using a DB-5 capillary column to determine the concentration of each isomer of PCDDs and PCDFs (tetra- through octa-). Tetra-chlorinated dibenzofurans were detected in this analysis; therefore, another aliquot of the sample was analyzed using a DB-225 capillary column to measure the 2,3,7,8 tetra-chloro dibenzofuran isomer (2378 TCDF).

Some PCDDs/PCDFs catch weights were reported as estimated maximum possible concentration or EMPCs. Catch weights, concentrations, and emission rates based on EMPC values were noted by enclosing them in brackets ({}). EMPC values were included in the four-run averages and total PCDDs/PCDFs calculations. Averages or totals that were based on EMPC values were also enclosed in brackets to indicate the values were estimated. The PCDDs/PCDFs test results are presented in actual concentrations and mass emission rates, concentrations adjusted to 7% O_2, and concentrations adjusted to 7% O_2 in 2378 TCDF toxic equivalents.

Table 2.10 presents the PCDDs/PCDFs stack gas concentrations and emission rates. The average concentration of total PCDDs was estimated to be {1.68} ng/dscm. The average concentration of total PCDFs was estimated to be {14.1} ng/dscm. The average concentration of total PCDDs/PCDFs was estimated to be {15.8} ng/dscm. These values corresponded to average estimated emission rates of {152}, {1,290}, and {1,442} µg/hr, respectively.

Table 2.11 presents the PCDDs/PCDFs concentrations adjusted to 7% O_2. The average measured stack gas O_2 concentration was 13.4%. The average adjusted concentration of total PCDDs was estimated to be {3.70} ng/dscm @ 7% O_2. The average adjusted concentration of total PCDFs was estimated to be {29.6} ng/dscm @ 7% O_2. The average adjusted concentration of total PCDDs/PCDFs was {33.3} ng/dscm @ 7% O_2. The concentrations, adjusted to 7% O_2, were also adjusted by each congener's respective Toxic Equivalent Factor (TEF). The TEFs used were the international TEF values. The average concentration for total PCDDs/PCDFs, adjusted for the 2378 TCDD TEFs, was estimated to be {0.436} ng/dscm @ 7% O_2.

2.4 SEMIVOLATILE ORGANIC HAZARDOUS AIR POLLUTANTS

The semivolatile organic hazardous air pollutants (SVOHAPs) were collected using a SW-846 Method 0010 Modified Method 5 (MM5) sampling train. The MM5 sampling train collects organic-laden particulate materials and semi-volatile organics species. This method speciates and quantitates low concentrations of these semi-volatile organics with boiling points above 100°C.

Table 2.12 summarizes the SVOHAPs emissions sampling and exhaust gas parameters at the cupola wet scrubber outlet. The total sampling time was 110 minutes for Run 1 and 240 minutes for the additional three runs. The average sample volume was 162.319 dscf or 4.596

TABLE 2.10

PCDDS/PCDFS EXHAUST GAS CONCENTRATIONS AND EMISSION RATES
CUPOLA WET SCRUBBER OUTLET
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

CONGENER	CONCENTRATION [a] ng/dscm, as measured					EMISSION RATE [b] µg/hr				
	O-23-1	O-23-2	O-23-3	O-23-4	Average	O-23-1	O-23-2	O-23-3	O-23-4	Average
DIOXINS:										
2378 TCDD	{0.0322}	0.0491	0.0212	0.0191	{0.0304}	{2.82}	4.58	1.91	1.79	{2.78}
Total TCDD	1.74	1.54	0.667	0.732	1.17	152	144	60.3	68.6	106
12378 PeCDD	0.045	0.0538	0.0163	0.0159	0.033	3.94	5.02	1.47	1.49	2.98
Total PeCDD	0.540	0.561	0.120	0.207	0.357	47.3	52.4	10.9	19.4	32.5
123478 HxCDD	0.0129	0.0164	(ND)	0.00318	0.00810	1.13	1.53	(ND)	{0.298}	{0.74}
123678 HxCDD	{0.0129}	0.0187	(ND)	0.00477	0.00909	1.13	1.75	(ND)	0.447	0.83
123789 HxCDD	0.0193	0.0257	(ND)	0.00636	0.0128	1.69	2.40	(ND)	0.597	1.17
Total HxCDD	0.122	0.257	0.0390	0.0652	0.121	10.7	24.0	3.53	6.12	11.1
1234678 HpCDD	0.0129	{0.0281}	(ND)	{0.00477}	0.0114	1.13	{2.62}	(ND)	{0.447}	{1.05}
Total HpCDD	0.0129	0.0327	(ND)	0.00477	0.0126	1.13	3.05	(ND)	0.447	1.16
12346789 OCDD	0.0193	{0.0210}	{0.00651}	0.0127	{0.0149}	1.69	{1.96}	{0.589}	1.19	{1.36}
Total CDDs	{2.43}	{2.42}	{0.833}	{1.02}	{1.68}	{213}	{225}	{75.3}	{95.8}	{152}
FURANS:										
2378 TCDF	0.46	0.54	0.293	0.207	0.38	41	50	26.5	19.4	34
Total TCDF	12.3	14.0	8.33	6.84	10.4	1,076	1,309	753	641	945
12378 PeCDF	0.232	0.327	0.106	0.0970	0.190	20.3	30.5	9.56	9.10	17.4
23478 PeCDF	0.244	0.327	0.0765	0.0827	0.183	21.4	30.5	6.92	7.76	16.7
Total PeCDF	3.92	5.66	1.74	1.80	3.28	344	528	157	169	299
123478 HxCDF	0.103	0.213	0.0293	0.0414	0.0966	9.02	19.9	2.65	3.88	8.85
123678 HxCDF	0.0450	0.108	0.0146	0.0175	0.0462	3.94	10.0	1.32	1.64	4.24
234678 HxCDF	0.0322	0.0608	0.00813	0.00955	0.0277	2.82	5.67	0.736	0.895	2.53
123789 HxCDF	(ND)	{0.00935}	(ND)	(ND)	0.00234	(ND)	{0.87}	(ND)	(ND)	{0.218}
Total HxCDF	0.444	1.10	0.150	0.191	0.471	38.9	103	13.5	17.9	43.2
1234678 HpCDF	{0.0450}	{0.0701}	0.00651	0.0111	{0.0332}	{3.94}	{6.55}	0.589	1.04	{3.03}
1234789 HpCDF	(ND)	{0.0117}	(ND)	(ND)	0.00292	(ND)	{1.09}	(ND)	(ND)	{0.273}
Total HpCDF	0.0257	0.0234	0.00651	0.0111	0.0167	2.25	2.18	0.589	1.04	1.52
12346789 OCDF	{0.00643}	0.00935	{0.00488}	{0.00159}	{0.00556}	{0.564}	0.87	{0.441}	{0.149}	{0.507}
Total CDFs	{16.7}	{20.8}	{10.2}	{8.84}	{14.1}	{1,462}	{1,943}	{925}	{829}	{1,290}
Total CDDs + CDFs	{19.1}	{23.2}	{11.1}	{9.86}	{15.8}	{1,675}	{2,168}	{1,001}	{925}	{1,442}

[a] Nanogram per dry standard cubic meter at 20°C and 1 atm.

[b] Micrograms per hour.

(ND) Non Detectable - Results are below target analyte detection limits. ND values are used as zeroes (0) in totals and averages.

{ } Estimated Maximum Possible Concentration. EMPC values are used as reported in totals and averages.

TABLE 2.11

PCDDS/PCDFS EXHAUST GAS CONCENTRATIONS AND 2378 TOXIC EQUIVALENT STACK GAS CONCENTRATIONS ADJUSTED TO 7 PERCENT OXYGEN CUPOLA WET SCRUBBER OUTLET GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

CONGENER	CONCENTRATION (ng/dscm, adjusted to 7% O2)					2378-TCDD [b] Toxic Equivalent Factor	2378 TOXIC EQUIVALENT (ng/dscm, adjusted to 7% O2)				
	O-23-1	O-23-2	O-23-3	O-23-4	Average		O-23-1	O-23-2	O-23-3	O-23-4	Average
DIOXINS:											
2378 TCDD	{0.106}	0.0750	0.0350	0.0312	{0.0619}	1.00	{0.106}	0.0750	0.0350	0.0312	{0.0619}
Total TCDD	5.75	2.36	1.10	1.20	2.60						
12378 PeCDD	0.149	0.0821	0.0269	0.0260	0.0710	0.500	0.0745	0.0411	0.0135	0.0130	0.0355
Total PeCDD	1.79	0.857	0.199	0.338	0.796						
123478 HxCDD	0.0426	0.0250	(ND)	0.00520	0.0182	0.100	0.00426	0.00250	(ND)	0.000520	0.00182
123678 HxCDD	{0.0426}	0.0286	(ND)	0.00780	{0.0193}	0.100	{0.00426}	0.00286	(ND)	0.000780	{0.00198}
123789 HxCDD	0.0639	0.0393	(ND)	0.0104	0.0284	0.100	0.00639	0.00393	(ND)	0.00104	0.00284
Total HxCDD	0.405	0.393	0.0646	0.107	0.242						
1234678 HpCDD	0.0426	{0.0429}	(ND)	{0.00780}	{0.0233}	0.0100	0.000426	{0.000429}	(ND)	{0.0000780}	{0.000233}
Total HpCDD	0.0426	0.0500	(ND)	0.00780	0.0335						
12346789 OCDD	0.0639	{0.0321}	{0.0108}	0.0208	{0.0319}	0.00100	0.0000639	{0.0000321}	{0.0000108}	0.0000208	{0.0000319}
Total CDDs	{8.05}	{3.69}	{1.38}	{1.67}	{3.70}		{0.196}	{0.126}	{0.0485}	{0.0467}	{0.104}
FURANS:											
2378 TCDF	1.53	0.82	0.48	0.34	0.79	0.100	0.153	0.082	0.048	0.034	0.079
Total TCDF	40.7	21.4	13.8	11.2	21.8						
12378 PeCDF	0.766	0.500	0.175	0.159	0.400	0.0500	0.0383	0.0250	0.00875	0.00793	0.0200
23478 PeCDF	0.809	0.500	0.127	0.135	0.393	0.500	0.405	0.250	0.0633	0.0676	0.196
Total PeCDF	13.0	8.64	2.88	2.94	6.86						
123478 HxCDF	0.341	0.325	0.0485	0.0676	0.195	0.100	0.0341	0.0325	0.00485	0.00676	0.0195
123678 HxCDF	0.149	0.164	0.0242	0.0286	0.0915	0.100	0.0149	0.0164	0.00242	0.00286	0.00915
234678 HxCDF	0.106	0.0929	0.0135	0.0156	0.0571	0.100	0.0106	0.00929	0.00135	0.00156	0.00571
123789 HxCDF	(ND)	{0.0143}	(ND)	(ND)	{0.00358}	0.100	(ND)	{0.00143}	(ND)	(ND)	{0.000357}
Total HxCDF	1.47	1.68	0.248	0.312	0.927						
1234678 HpCDF	{0.149}	{0.107}	0.0108	0.0182	{0.0713}	0.0100	{0.00149}	{0.00107}	0.000108	0.000182	{0.000713}
1234789 HpCDF	(ND)	{0.0179}	(ND)	(ND)	{0.00448}	0.0100	(ND)	{0.000179}	(ND)	(ND)	{0.0000446}
Total HpCDF	0.0852	0.0357	0.0108	0.0182	0.0375						
12346789 OCDF	{0.0213}	0.0143	{0.00808}	{0.00260}	{0.0116}	0.00100	{0.0000213}	0.0000143	{0.00000808}	{0.00000260}	{0.0000116}
Total CDFs	{55.2}	{31.8}	{16.9}	{14.5}	{29.6}		{0.66}	{0.418}	{0.129}	{0.121}	{0.331}
Total CDDs + CDFs	{63.3}	{35.5}	{18.3}	{16.1}	{33.3}		{0.85}	{0.544}	{0.178}	{0.167}	{0.436}

[a] Nanogram per dry standard cubic meter adjusted to 7 percent oxygen at 20°C and 1 atm.

[b] North Atlantic Treaty Organization, Committee on the challenges of Modern Society. Pilot study on International Information Exchange on Dioxins and Related Compounds: International Toxicity Equivalency Factor (I-TEF) Methods of Risk Assessment for Complex Mixtures of Dioxins and Related Compounds. Report No. 176, August 1988.

(ND) Non Detectable - Results are below target analyte detection limits. ND values are used as zeroes (0) in totals and averages.

{ } Estimated Maximum Possible Concentration. EMPC values are used as reported in totals and averages.

TABLE 2.12

SVOHAPS EMISSIONS SAMPLING AND EXHAUST GAS PARAMETERS
CUPOLA WET SCRUBBER OUTLET
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	O-0010-1	O-0010-2	O-0010-3	O-0010-4	Average
Date	9/23/97	9/24/97	9/25/97	9/25/97	
Total Sampling Time, min	110	240	240	240	
Average Sampling Rate, dscfm [a]	0.640	0.636	0.881	0.895	0.763
Sample Volume:					
dscf [b]	70.444	152.632	211.429	214.771	162.319
dscm [c]	1.995	4.322	5.987	6.082	4.596
Average Exhaust Gas Temp., °F	125	135	111	111	121
O_2 Concentration, % by Volume	16.7	11.8	12.5	12.4	13.4
CO_2 Concentration, % by Volume	4.0	10.6	9.7	10.3	8.7
Moisture, % by Volume	12.7	16.6	9.3	9.2	11.9
Exhaust Gas Volumetric Flow Rate:					
acfm [d]	74,600	76,400	64,400	65,600	70,300
dscfm [a]	58,600	56,600	52,700	53,700	55,400
dscmm [e]	1,660	1,600	1,490	1,520	1,570
Isokinetic Sampling Ratio, %	98.4	101.2	101.1	100.8	100.4

[a] Dry standard cubic feet per minute at 68° F (20° C) and 1 atm.
[b] Dry standard cubic feet at 68° F (20° C) and 1 atm.
[c] Dry standard cubic meters at 68° F (20° C) and 1 atm.
[d] Actual cubic feet per minute at exhaust gas conditions.
[e] Dry standard cubic meters per minute at 68° F (20° C) and 1 atm.

dcsm. The average exhaust gas temperature was 121 °F. The exhaust gas contained 8.7% CO_2, 13.4% O_2, and 11.9% moisture. The average exhaust gas volumetric flow rate was 70,300 acfm or 55,400 dscfm or 1,570 dscmm.

The results of the semivolatile organic emissions are shown in Table 2.13. Analysis was performed for 70 target compounds. Of these 70 target compounds, 45 were not detected on any of the four sample runs. In cases where a compound was not detected, the emission rate, and concentration, was replaced with a "ND". If a compound was not detected in one of the four runs, a zero was used in the four-run average for that compound and was not summed in any SVOHAPs totals. Table 2.14 lists the target SVOHAPs detection limits. Compounds that were detected are indicated with a "D".

Analysis for the SVOHAPs was performed using SW-846 Method 8270. The lower quantitation limit for SW-846 Method 8270 for all but four compounds was 10 μg/sample. The four compounds, 2,4-dinitrophenol, 4-nitrophenol, 4,6-dinitro-2-methylphenol and pentachlorophenol, had quantitation limits of 25 μg/sample. Some samples had reported values below the quantitation limit but above the detection limit. This was the case for 19 of the 25 detected target compounds. Like the PCDDs/PCDFs, these values were reported as estimates and all values and calculated results were enclosed by brackets ({}) to indicate that the compound was detected but was below the quantitation limit. These estimated values were used in the four-run averages and the resulting averages were also enclosed in brackets to indicate the values were estimated.

Three compounds were detected in the run samples that were also detected in the laboratory blank. Naphthalene, acetophenone, 2-chloroacetophenone, di-n-butylphthalate, and bis(2-ethylhexyl)phthalate were detected in the method blank, but at amounts below the quantitation limit. TLI's case narrative advises that target analytes in the laboratory blanks should not be considered as truly present in the native samples unless found at five times the amount found in the blank. In the case of di-n-butylphthalate, all four run samples had estimated amounts that were greater than five times the blank and therefore should be considered truly present in the native samples. In the case of acetophenone, only the third run had an estimated amount slightly higher than five times the estimated lab blank value. In the case of bis(2-ethylhexyl) phthalate, all four run samples had estimated catches that were more than five times the estimated lab blank value. In the case of naphthalene, all four run samples estimated catches were more than five times that of the estimated blank value. In the case of 2-chloroacetophenone, all four samples had values at non-detectable limits. The TLI's case narrative also advises that "in the event that the amount of a target analyte found in the samples is twenty times the amount found in the associated blank, the contribution from the blank can be considered negligible." The estimated amount of bis(2-ethylhexyl) phthalate in the second and third run's sample were greater than 20 times the estimated blank value. Refer to Table 6.16 in Section 6.0 for a complete listing of all the detected or estimated SW-846 Method 0010 field, method, and laboratory blanks compared to the average sample catch weights.

TABLE 2.13

SVOHAPS EXHAUST GAS CONCENTRATIONS AND EMISSION RATES
CUPOLA WET SCRUBBER OUTLET
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	O-0010-1	O-0010-2	O-0010-3	O-0010-4	Average
Date	9/23/97	9/24/97	9/25/97	9/25/97	
Clock Time, 24-hr clock	1415-1847	0851-1400	0844-1321	1443-1919	
Acenaphthene					
Concentration, ppbvd [a]	2.19E-02	ND	2.45E-02	1.59E-02	1.56E-02
Emission Rate, lb/hr [b]	3.08E-05	ND	3.10E-05	2.05E-05	2.06E-05
Acenaphthylene					
Concentration, ppbvd [a]	{6.33E-02}	2.31E-02	{5.58E-02}	{2.82E-02}	{4.26E-02}
Emission Rate, lb/hr [b]	{8.91E-05}	3.14E-05	{7.05E-05}	{3.64E-05}	{5.68E-05}
Acetophenone					
Concentration, ppbvd [a]	8.22E-01	4.14E-01	4.53E-01	2.86E-01	4.94E-01
Emission Rate, lb/hr [b]	9.01E-04	4.38E-04	4.47E-04	2.87E-04	5.18E-04
4-Aminobiphenyl					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
Aniline					
Concentration, ppbvd [a]	ND	ND	{1.38E-02}	ND	{3.45E-03}
Emission Rate, lb/hr [b]	ND	ND	{1.05E-05}	ND	{2.64E-06}
o-Anisidine					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
Anthracene					
Concentration, ppbvd [a]	1.76E-02	ND	7.66E-03	6.21E-03	7.87E-03
Emission Rate, lb/hr [b]	2.86E-05	ND	1.12E-05	9.26E-06	1.23E-05
Benzidine					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
Benzo(a)anthracene					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
Benzo(b)fluoranthene					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND

TABLE 2.13 (Continued)

SVOHAPS EXHAUST GAS CONCENTRATIONS AND EMISSION RATES
CUPOLA WET SCRUBBER OUTLET
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	O-0010-1	O-0010-2	O-0010-3	O-0010-4	Average
Benzo(k)fluoranthene					
Concentration, ppbvd[a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr[b]	ND	ND	ND	ND	ND
Benzo(ghi)perylene					
Concentration, ppbvd[a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr[b]	ND	ND	ND	ND	ND
Benzo(a)pyrene					
Concentration, ppbvd[a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr[b]	ND	ND	ND	ND	ND
Benzo(e)pyrene					
Concentration, ppbvd[a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr[b]	ND	ND	ND	ND	ND
Benzyl Chloride					
Concentration, ppbvd[a]	ND	ND	{7.20E-02}	ND	{1.80E-02}
Emission Rate, lb/hr[b]	ND	ND	{7.48E-05}	ND	{1.87E-05}
Biphenyl					
Concentration, ppbvd[a]	{1.67E-01}	{4.40E-02}	{1.33E-01}	{6.41E-02}	{1.02E-01}
Emission Rate, lb/hr[b]	{2.34E-04}	{5.98E-05}	{1.68E-04}	{8.26E-05}	{1.36E-04}
2-Chloroacetophenone					
Concentration, ppbvd[a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr[b]	ND	ND	ND	ND	ND
bis-(2-Chloroethyl)ether					
Concentration, ppbvd[a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr[b]	ND	ND	ND	ND	ND
2-Chloronaphthalene					
Concentration, ppbvd[a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr[b]	ND	ND	ND	ND	ND
Chrysene					
Concentration, ppbvd[a]	{1.16E-02}	ND	ND	ND	{2.91E-03}
Emission Rate, lb/hr[b]	{2.42E-05}	ND	ND	ND	{6.05E-06}
Cumene					
Concentration, ppbvd a	ND	{2.59E-02}	{5.21E-02}	{1.48E-02}	{2.32E-02}
Emission Rate, lb/hr b	ND	{2.75E-05}	{5.14E-05}	{1.49E-05}	{2.34E-05}

TABLE 2.13 (Continued)

SVOHAPS EXHAUST GAS CONCENTRATIONS AND EMISSION RATES
CUPOLA WET SCRUBBER OUTLET
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	O-0010-1	O-0010-2	O-0010-3	O-0010-4	Average
Dibenz(a,h)anthracene					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
Dibenzofuran					
Concentration, ppbvd [a]	ND	ND	{5.95E-02}	{2.94E-02}	{2.22E-02}
Emission Rate, lb/hr [b]	ND	ND	{8.21E-05}	{4.13E-05}	{3.09E-05}
1,2-Dibromo-3-chloropropane					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
Di-n-butylphthalate					
Concentration, ppbvd [a]	{4.15E-01}	{1.77E-01}	{1.25E-01}	{8.31E-02}	{2.00E-01}
Emission Rate, lb/hr [b]	{1.05E-03}	{4.33E-04}	{2.86E-04}	{1.93E-04}	{4.92E-04}
1,4-Dichlorobenzene					
Concentration, ppbvd [a]	{5.99E-02}	{3.10E-02}	{3.50E-02}	{3.50E-02}	{4.02E-02}
Emission Rate, lb/hr [b]	{8.03E-05}	{4.02E-05}	{4.22E-05}	{4.30E-05}	{5.14E-05}
3,3'-Dichlorobenzidine					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
N,N-Diethylaniline					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
3,3'-Dimethoxybenzidine					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
Dimethylaminoazobenzene					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
N,N-Dimethylaniline					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
3,3'-Dimethylbenzidine					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND

TABLE 2.13 (Continued)

SVOHAPS EXHAUST GAS CONCENTRATIONS AND EMISSION RATES
CUPOLA WET SCRUBBER OUTLET
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	O-0010-1	O-0010-2	O-0010-3	O-0010-4	Average
Dimethylphthalate					
Concentration, ppbvd[a]	{1.55E-01}	{5.42E-02}	{4.61E-02}	{2.91E-02}	{7.10E-02}
Emission Rate, lb/hr[b]	{2.74E-04}	{9.26E-05}	{7.35E-05}	{4.73E-05}	{1.22E-04}
4,6-Dinitro-2-methylphenol					
Concentration, ppbvd[a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr[b]	ND	ND	ND	ND	ND
2,4-Dinitrophenol					
Concentration, ppbvd[a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr[b]	ND	ND	ND	ND	ND
2,4-Dinitrotoluene					
Concentration, ppbvd[a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr[b]	ND	ND	ND	ND	ND
bis(2-Ethylhexyl)phthalate					
Concentration, ppbvd[a]	3.41E-01	{2.89E-01}	2.18E-01	9.26E-02	{2.35E-01}
Emission Rate, lb/hr[b]	1.22E-03	{9.94E-04}	6.99E-04	3.02E-04	{8.03E-04}
Fluoranthene					
Concentration, ppbvd[a]	{5.72E-02}	3.77E-02	{1.71E-02}	{1.78E-02}	{3.25E-02}
Emission Rate, lb/hr[b]	{1.06E-04}	6.72E-05	{2.84E-05}	{3.01E-05}	{5.78E-05}
Fluorene					
Concentration, ppbvd[a]	{6.82E-02}	2.04E-02	{3.21E-02}	{1.83E-02}	{3.48E-02}
Emission Rate, lb/hr[b]	{1.03E-04}	2.99E-05	{4.38E-05}	{2.55E-05}	{5.06E-05}
Hexachlorobenzene					
Concentration, ppbvd[a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr[b]	ND	ND	ND	ND	ND
Hexachlorobutadiene					
Concentration, ppbvd[a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr[b]	ND	ND	ND	ND	ND
Hexachlorocyclopentadiene					
Concentration, ppbvd[a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr[b]	ND	ND	ND	ND	ND
Hexachloroethane					
Concentration, ppbvd[a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr[b]	ND	ND	ND	ND	ND

TABLE 2.13 (Continued)

SVOHAPS EXHAUST GAS CONCENTRATIONS AND EMISSION RATES
CUPOLA WET SCRUBBER OUTLET
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	O-0010-1	O-0010-2	O-0010-3	O-0010-4	Average
Hydroquinone					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
Isophorone					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
Methylene bis-chloroaniline					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
4,4'-Methylenedianiline					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
2-Methylnaphthalene					
Concentration, ppbvd [a]	{2.17E+00}	{8.75E-01}	{3.86E+00}	{1.63E+00}	{2.13E+00}
Emission Rate, lb/hr [b]	{2.81E-03}	{1.10E-03}	{4.51E-03}	{1.93E-03}	{2.59E-03}
2-Methylphenol					
Concentration, ppbvd [a]	ND	ND	8.03E-02	2.56E-02	2.65E-02
Emission Rate, lb/hr [b]	ND	ND	7.12E-05	2.31E-05	2.36E-05
3/4-Methylphenol					
Concentration, ppbvd [a]	ND	ND	ND	3.62E-02	9.05E-03
Emission Rate, lb/hr [b]	ND	ND	ND	3.27E-05	8.18E-06
Naphthalene					
Concentration, ppbvd [a]	2.35E+00	{1.22E+00}	2.89E+00	1.42E+00	{1.97E+00}
Emission Rate, lb/hr [b]	2.74E-03	{1.38E-03}	3.04E-03	1.52E-03	{2.17E-03}
Nitrobenzene					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
4-Nitrobiphenyl					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND

TABLE 2.13 (Continued)

SVOHAPS EXHAUST GAS CONCENTRATIONS AND EMISSION RATES
CUPOLA WET SCRUBBER OUTLET
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	O-0010-1	O-0010-2	O-0010-3	O-0010-4	Average
4-Nitrophenol					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
n-Nitrosodimethylamine					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
n-Nitrosomorpholine					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
Pentachloronitrobenzene					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
Pentachlorophenol					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
Perylene					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
Phenanthrene					
Concentration, ppbvd [a]	{1.40E-01}	{3.62E-02}	{3.99E-02}	{2.60E-02}	{6.05E-02}
Emission Rate, lb/hr [b]	{2.28E-04}	{5.69E-05}	{5.84E-05}	{3.87E-05}	{9.54E-05}
Phenol					
Concentration, ppbvd [a]	8.42E-01	{2.08E+00}	{4.73E-01}	{8.17E-01}	{1.05E+00}
Emission Rate, lb/hr [b]	7.23E-04	{1.72E-03}	{3.66E-04}	{6.43E-04}	{8.63E-04}
1,4-Phenylenediamine					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
Pyrene					
Concentration, ppbvd [a]	7.04E-02	4.57E-02	2.09E-02	1.92E-02	3.90E-02
Emission Rate, lb/hr [b]	1.30E-04	8.14E-05	3.46E-05	3.24E-05	6.95E-05
o-Toluidine					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND

TABLE 2.13 (Concluded)

SVOHAPS EXHAUST GAS CONCENTRATIONS AND EMISSION RATES
CUPOLA WET SCRUBBER OUTLET
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	O-0010-1	O-0010-2	O-0010-3	O-0010-4	Average
1,2,4-Trichlorobenzene					
Concentration, ppbvd [a]	ND	ND	ND	{2.81E-02}	{7.03E-03}
Emission Rate, lb/hr [b]	ND	ND	ND	{4.26E-05}	{1.07E-05}
2,4,5-Trichlorophenol					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
2,4,6-Trichlorophenol					
Concentration, ppbvd [a]	ND	{1.10E-02}	ND	ND	{2.75E-03}
Emission Rate, lb/hr [b]	ND	{1.91E-05}	ND	ND	{4.78E-06}
a,a,a-Trichlorotoluene					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND
Trifluralin					
Concentration, ppbvd [a]	ND	ND	ND	ND	ND
Emission Rate, lb/hr [b]	ND	ND	ND	ND	ND

[a] Parts per billion by volume, dry basis.

[b] Pounds per hour.

ND Not Detectable - Results are below target analyte detection limit. Values are counted as zero (0) in averages.

{} Estimate - Analyte results are below the quantitation limit and above the detection limit. Values are counted in the averages.

TABLE 2.14

SVOHAPS DETECTION LIMITS, PPBVD
CUPOLA WET SCRUBBER OUTLET
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	O-0010-1	O-0010-2	O-0010-3	O-0010-4	Average
Date	9/23/97	9/24/97	9/25/97	9/25/97	
Clock Time, 24-hr clock	1415-1847	0851-1400	0844-1321	1443-1919	
Acenaphthene	D	1.59E-02	D	D	1.59E-02
Acenaphthylene	D	D	D	D	D
Acetophenone	D	D	D	D	D
4-Aminobiphenyl	2.92E-02	1.22E-02	9.97E-03	8.18E-03	1.49E-02
Aniline	6.47E-02	2.99E-02	D	1.95E-02	3.81E-02
o-Anisidine	8.91E-02	4.16E-02	3.20E-02	2.76E-02	4.76E-02
Anthracene	D	8.74E-03	D	D	8.74E-03
Benzidine	2.16E-02	7.85E-03	7.20E-03	5.58E-03	1.06E-02
Benzo(a)anthracene	1.27E-02	4.63E-03	4.22E-03	3.29E-03	6.21E-03
Benzo(b)fluoranthene	9.56E-03	3.31E-03	3.03E-03	2.51E-03	4.60E-03
Benzo(k)fluoranthene	9.56E-03	3.53E-03	3.18E-03	2.66E-03	4.73E-03
Benzo(ghi)perylene	8.73E-03	3.22E-03	2.76E-03	2.29E-03	4.25E-03
Benzo(a)pyrene	1.00E-02	3.53E-03	3.18E-03	2.66E-03	4.85E-03
Benzo(e)pyrene	8.60E-03	3.09E-03	2.87E-03	2.35E-03	4.23E-03
Benzyl Chloride	3.72E-02	1.71E-02	D	1.12E-02	2.18E-02
Biphenyl	D	D	D	D	D
2-Chloroacetophenone	2.73E-02	1.26E-02	9.88E-03	8.44E-03	1.46E-02
bis-(2-Chloroethyl)ether	9.02E-02	4.16E-02	3.20E-02	2.74E-02	4.78E-02
2-Chloronaphthalene	3.19E-02	1.47E-02	1.09E-02	9.73E-03	1.68E-02
Chrysene	D	4.63E-03	4.40E-03	3.29E-03	4.11E-03
Cumene	3.81E-02	D	D	D	3.81E-02
Dibenz(a,h)anthracene	1.04E-02	3.80E-03	3.32E-03	2.84E-03	5.09E-03
Dibenzofuran	2.37E-02	1.09E-02	D	D	1.73E-02
1,2-Dibromo-3-chloropropane	7.24E-02	3.37E-02	2.58E-02	2.21E-02	3.85E-02
Di-n-butylphthalate	D	D	D	D	D
1,4-Dichlorobenzene	D	D	D	D	D
3,3'-Dichlorobenzidine	2.86E-02	1.06E-02	9.52E-03	7.34E-03	1.40E-02
N,N-Diethylaniline	4.12E-02	1.90E-02	1.48E-02	1.27E-02	2.19E-02
3,3'-Dimethoxybenzidine	4.05E-02	1.46E-02	1.33E-02	1.04E-02	1.97E-02
Dimethylaminoazobenzene	3.80E-02	1.38E-02	1.27E-02	9.83E-03	1.86E-02
N,N-Dimethylaniline	4.98E-02	2.30E-02	1.79E-02	1.53E-02	2.65E-02
3,3'-Dimethylbenzidine	2.33E-02	8.39E-03	7.76E-03	5.96E-03	1.14E-02
Dimethylphthalate	D	D	D	D	D
4,6-Dinitro-2-methylphenol	1.70E-01	7.84E-02	5.90E-02	5.19E-02	8.99E-02

TABLE 2.14 (Concluded)

SVOHAPS DETECTION LIMITS, PPBVD
CUPOLA WET SCRUBBER OUTLET
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Run No.	O-0010-1	O-0010-2	O-0010-3	O-0010-4	Average
2,4-Dinitrophenol	2.46E-01	1.13E-01	8.51E-02	7.48E-02	1.30E-01
2,4-Dinitrotoluene	9.33E-02	4.31E-02	3.24E-02	2.84E-02	4.93E-02
bis(2-Ethylhexyl)phthalate	D	D	D	D	D
Fluoranthene	D	D	D	D	D
Fluorene	D	D	D	D	D
Hexachlorobenzene	4.19E-02	1.72E-02	1.41E-02	1.17E-02	2.12E-02
Hexachlorobutadiene	6.24E-02	2.90E-02	2.23E-02	1.93E-02	3.33E-02
Hexachlorocyclopentadiene	6.68E-02	3.06E-02	2.31E-02	2.03E-02	3.52E-02
Hexachloroethane	6.98E-02	3.22E-02	2.48E-02	2.12E-02	3.70E-02
Hydroquinone	8.32E-02	3.89E-02	2.99E-02	2.59E-02	4.45E-02
Indeno(1,2,3-cd)pyrene	7.48E-03	2.68E-03	2.35E-03	2.04E-03	3.64E-03
Isophorone	3.84E-02	1.77E-02	1.37E-02	1.17E-02	2.04E-02
Methylene bis-chloroaniline	6.32E-02	2.29E-02	2.09E-02	1.61E-02	3.08E-02
4,4'-Methylenedianiline	4.87E-02	1.77E-02	1.62E-02	1.26E-02	2.38E-02
2-Methylnaphthalene	D	D	D	D	D
2-Methylphenol	9.59E-02	4.43E-02	D	D	7.01E-02
3/4-Methylphenol	8.48E-02	3.91E-02	4.24E-02	3.62E-02	5.06E-02
Naphthalene	D	D	D	D	D
Nitrobenzene	5.09E-02	2.35E-02	1.83E-02	1.57E-02	2.71E-02
4-Nitrobiphenyl	6.42E-02	3.39E-02	2.79E-02	2.31E-02	3.73E-02
4-Nitrophenol	1.49E-01	6.84E-02	5.14E-02	4.52E-02	7.85E-02
n-Nitrosodimethylamine	2.43E-01	1.13E-01	8.62E-02	7.42E-02	1.29E-01
n-Nitrosomorpholine	1.50E-01	6.90E-02	5.33E-02	4.56E-02	7.94E-02
Pentachloronitrobenzene	1.56E-01	6.43E-02	5.27E-02	4.37E-02	7.92E-02
Pentachlorophenol	7.92E-02	3.25E-02	2.67E-02	2.21E-02	4.01E-02
Perylene	9.56E-03	3.53E-03	3.03E-03	2.51E-03	4.66E-03
Phenanthrene	D	D	D	D	D
Phenol	D	D	D	D	D
1,4-Phenylenediamine	8.03E-02	3.76E-02	2.90E-02	2.49E-02	4.29E-02
Pyrene	D	D	D	D	D
o-Toluidine	5.85E-02	2.70E-02	2.10E-02	1.81E-02	3.12E-02
1,2,4-Trichlorobenzene	5.52E-02	2.55E-02	1.97E-02	D	3.34E-02
2,4,5-Trichlorophenol	7.39E-02	3.41E-02	2.56E-02	2.24E-02	3.90E-02
2,4,6-Trichlorophenol	7.88E-02	D	2.73E-02	2.40E-02	4.34E-02
a,a,a-Trichlorotoluene	3.95E-02	1.82E-02	1.42E-02	1.21E-02	2.10E-02
Trifluralin	7.52E-02	3.45E-02	2.61E-02	2.29E-02	3.97E-02

"D" indicates that compound was detected.

2.5 VOLATILE ORGANIC HAZARDOUS AIR POLLUTANTS (VOHAPS)

The volatile organic hazardous air pollutants (VOHAPs) were measured using direct interface gas chromatography/mass spectrometry at the inlet and outlet sampling locations of the wet scrubber. Compounds of interest were those that had boiling points below 100° C. Measurements taken at both locations did not show any target analytes to be in concentrations above their respective analytical instrument detection limits. Table 2.15 lists the target analytes and estimated detection limits.

TABLE 2.15

GC/MS TARGET ANALYTES AND ESTIMATED DETECTION LIMITS

Analyte	Estimated Detection Limit Parts per Billion (PPB)
Chloromethane	50
Chloroethane	50
Methylene Chloride	10
1,1-dichloroethane	25
c-12-dichloroethene	25
1,1,1-trichloroethane	25
1,2-dichloropropane	25
1,1,2-trichloroethane	25
Dibromochloromethane	25
Ethylbenzene	10
p-xylene	30
1,1,2,2-tetrachloroethane	10
Bromomethane	50
1,1-dichloroethene	25
t-1,2-dichloroethane	25
Methyl Ethyl Ketone	500
1,2-dichloroethane	50
Carbon tetrachloride	10
Trichloroethene	25
c-1,2-dichloropropene	25
t-1,2-chlhloropropene	25
2-hexanone	500
Chlorobenzene	10

TABLE 2.15 (Concluded)

GC/MS TARGET ANALYTES AND ESTIMATED DETECTION LIMITS

Analyte	Estimated Detection Limit Parts per Billion (PPB)
m-xylene	30
p-xylene	30
Vinyl chloride	250
Carbon disulfide	10
Vinyl acetate	250
Chloroform	10
Benzene	10
Bromodichloromethane	10
Methyl iso-Butyl Ketone	1000
Toluene	10
Tetrachloroethylene	10
Bromoform	50
Styrene	30

3.0 PROCESS DESCRIPTION

3.1 INTRODUCTION

The GM Powertrain Group, part of the General Motors Corporation, operates a foundry in Saginaw, Michigan named Saginaw Metal Casting Operations (SMCO), which casts grey iron and aluminum. This foundry was constructed by GM in 1918 and is currently operating three cupolas and two green sand lines for casting iron along with a melting furnace and one casting line for aluminum to produce engine blocks for use in GM automobiles. The plant has about 2,000 employees. This section of the test report provides a description of the cupola operation for iron melting and the casting operation, including pouring, cooling, and shakeout.

3.2 PROCESS DESCRIPTION

3.2.1 Iron Melting in Cupolas

There are three cupolas in operation ("B", "C", and "D"). Cupolas B and C are very similar and are configured with an afterburner followed by a venturi scrubber (i.e., they burn "dirty" gas). Cupola D burns the gas after removal of PM by the scrubber. Plant personnel indicated that Cupolas B and C were more representative of the industry and pointed out that cupolas configured like D are no longer constructed. Consequently, Cupola B was chosen for testing, primarily because it had more modern and complete controls and instrumentation.

Cupola B has a diameter of 114 inches and melts at a rate of about 55 tons per hour (tph) with a blast rate of 21,000 to 23,000 cubic feet per minute (cfm), which makes it among the largest cupolas in use in the United States. The blast is enriched with O_2 at a rate of about 4%. Figure 3.1 is a simplified schematic of the cupola gas handling system and emission control equipment.

The cupola is charged with metal scrap, briquettes made from metal shavings, coke, and limestone at a point that is above the gas take-off. The composition of a typical charge is given in Table 3.1 and includes six tons of iron. Very few emissions occur from charging because of the below-charge gas take-off and the maintenance of negative pressure on the cupola. The off gas from the cupola is removed at about 400 to 500°F and contains 12 to 14% carbon monoxide (CO). This gas enters a large combustion chamber where the CO is burned at about 1500 to 1600°F. Some heavy and larger size particles settle out in the combustion chamber and are removed at that point. The hot exhaust gases from the combustion chamber pass through two recuperators that

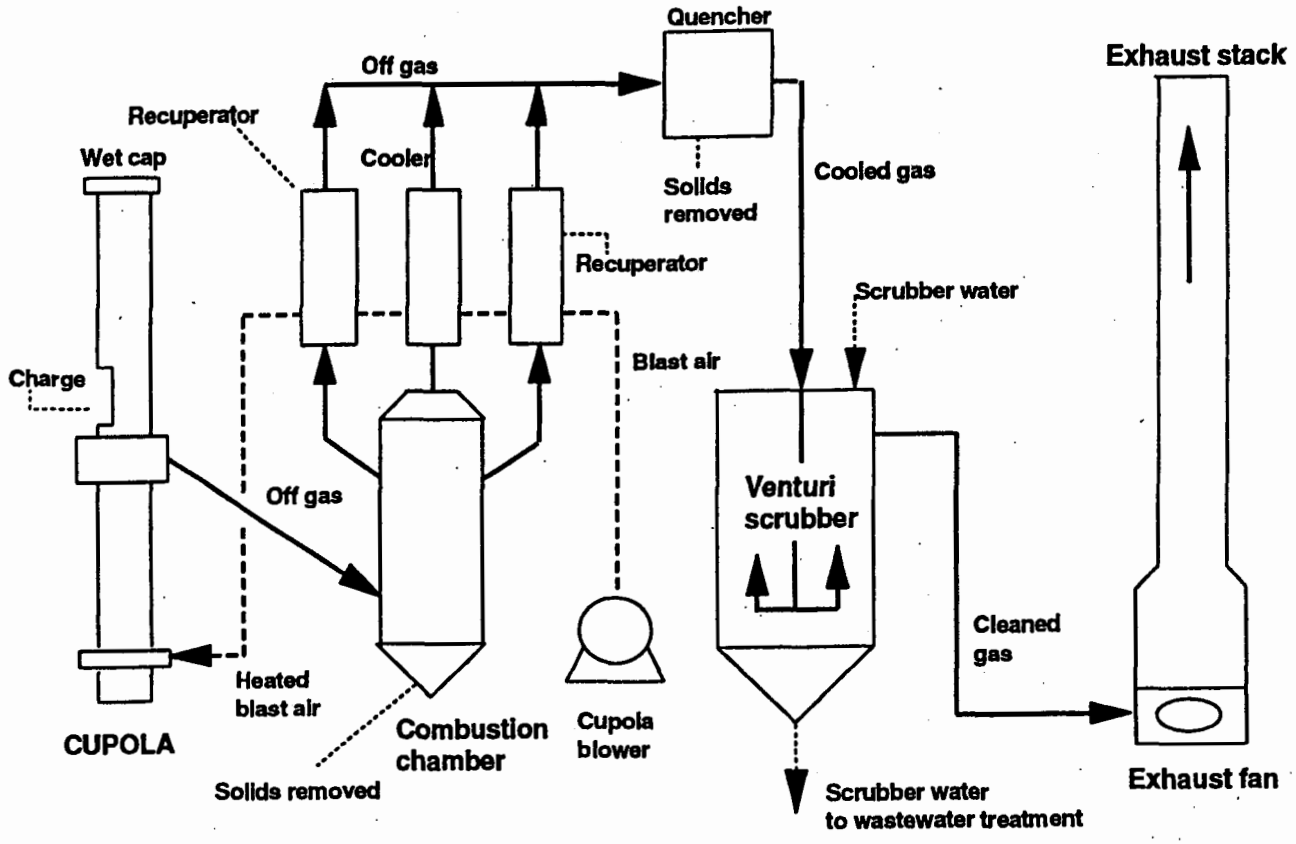


Figure 3.1 Schematic of the Cupola Gas Handling System

TABLE 3.1

TYPICAL CUPOLA CHARGE MATERIALS

Material	Typical range (lbs/charge)[a]
Remelt from foundry[b]	4,000 to 6,000
Steel scrap[b]	3,000 to 4,000
Gray iron bricks[b, c]	3,000
Silicon bricks	70 to 105
Blend bricks (Si, Mn, Cr)	260 to 300
Silicon carbide	300
Coke	1,400 to 1,500
Limestone	500

[a] Typical range observed during the test days.
[b] Remelt, steel scrap, and gray iron bricks are the sources of iron and total 12,000 lbs (6 tons) per charge.
[c] Gray iron bricks are a pressed material made from borings, shavings, etc.

are used to pre-heat the cupola's blast air to about 1100°F. There is also a cooler available for additional temperature control as necessary.

From the recuperators, the gas passes through a quencher, which cools the gas and also removes some of the entrained particulate matter. The gas then enters a venturi scrubber (manufactured by Air Pollution Industries) that is operated at a pressure drop of about 40 inches of water and a water flow rate of about 625 gallons per minute. A vacuum is maintained on the system and the gas is moved by a 1200 hp exhaust fan following the scrubber. The cleaned gas is exhausted through a stack. The wastewater from the scrubber is sent to a wastewater treatment recycle system where polymers are added to assist in settling fine particles, and 99% of the water is recycled to the scrubber (with a 1% blowdown to the city's wastewater treatment facility). Particulate matter emissions from the scrubber are limited to 0.15 lb per 1,000 lb of gas by the State.

The plant has instrumentation available to monitor several parameters associated with the emission control system, including the pressure drop across the scrubber, the water flow rate, electric current to the fan, and gas temperature. Temperature and blast rate for the cupola are monitored routinely. In addition, an accurate measure of the melting rate (e.g., for use in

normalizing mass emission rates by production rate) can be obtained from the charging data sheets.

The plant buys scrap from other GM plants and controls the quality because scrap quality directly affects the quality of the castings. However, plant personnel pointed out that it would be difficult to have a parameter to measure scrap quality that could be used to make valid comparisons among different foundries.

3.2.2 Pouring, Cooling and Shakeout

The two iron pouring lines are labeled Lines 3 and 4. Plant personnel indicated that Line 4 was the best candidate for testing because it is newer and the layout is more amenable to sampling. A simplified schematic of the capture and control equipment for Line 4 is given in Figure 3.2. The line has a capacity of 270 molds per hour with two engine blocks per mold. Each horizontal mold contains 3,300 lbs of green sand (lake sand, sea coal, and bentonite). The typical properties that are measured and the range during the test days are given in Table 3.2.

The cores used in the molds include both hot box and cold box systems with phenol-formaldehyde. For the 4-cylinder engine, 15.7 lbs of hot box cores and 74.5 lbs of cold box cores are used for a total core weight of 90.2 lbs per block or 180.4 lbs per mold. For the 6-cylinder engine, 17.9 lbs of hot box cores and 95.2 lbs of cold box cores are used for a total core weight of 113 lbs per block or 226 lbs per mold. The chemicals used to make the cores are summarized in Table 3.3. The materials used for core dipping are primarily minerals, such as crystalline silica (quartz), mica, aluminum silicate, along with graphite, clay and water.

The pouring station for Line 4 is automated and uses six ladles in a circular configuration. A large, circular side draft hood evacuates the entire pouring area at a rate of about 50,000 cfm. During the testing, no significant visible emissions were observed escaping capture from the pouring operation. The captured emissions are ducted overhead through the roof to the atmosphere. During the test days, both 4- and 6-cylinder engine blocks were poured on Line 4. The pouring weight of iron for the 4-cylinder block is 202.8 lbs to produce a casting of 116.2 lbs. For the 6-cylinder block, the pouring weight is 250.4 lbs and the casting weight is 149.2 lbs.

The cooling line is enclosed and has a series of hoods throughout the line that evacuate the enclosures at a rate of about 50,000 cfm and send the emissions to a bank of pre-coated cartridge filters to remove particulate matter. The cooling line is evacuated through three main ducts that send the cooling emissions to three separate sets of cartridge filters. The residence time of the cooling line is about 25 minutes.

The shakeout operation is totally enclosed in a small, evacuated building (roughly 40 by 60 feet). The room is evacuated at about 150,000 cfm, and the captured emissions are sent to three spray scrubbers that have 2 to 3 stages for cleaning.

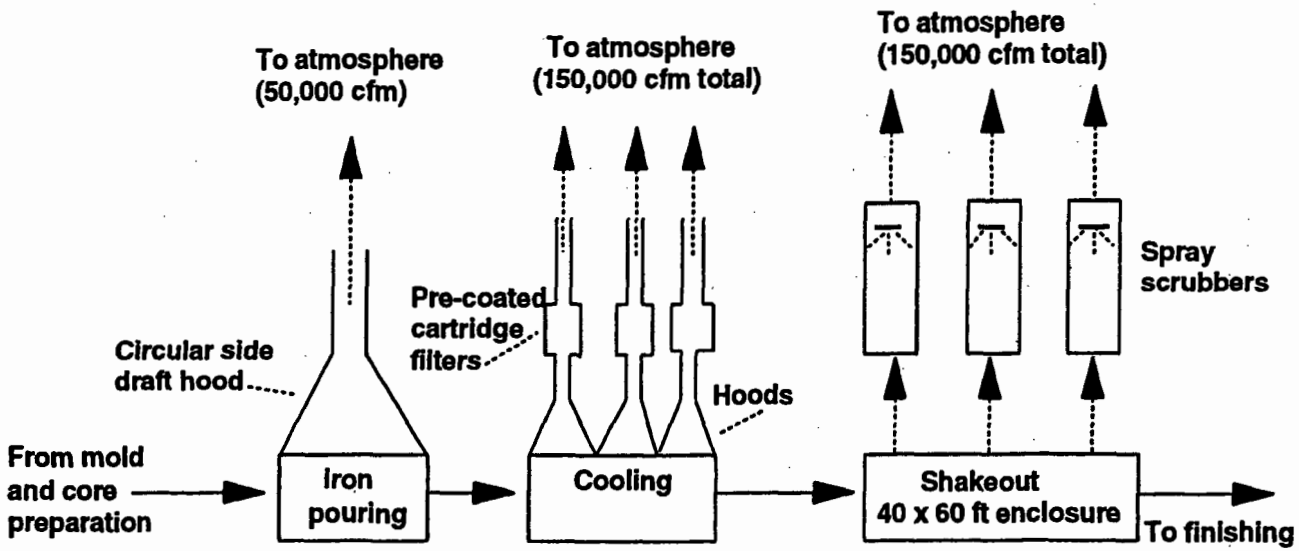


Figure 3.2 Schematic of Capture and Control Systems for Line 4

TABLE 3.2

TYPICAL RESULTS FROM GREEN SAND ANALYSIS[a]

Property	Range
Moisture (%)	2.8 to 3.3
Clay (%)	6.8 to 7.4
Compactability (%)	3.6 to 4.8
Green strength (psi)	164 to 221
Permeability (AFS units)	114 to 130
Loss on ignition (%)	3.8 to 5.0

[a] From analyses during the first shift of the test days.

TABLE 3.3

CHEMICALS USED IN CORE MAKING AND MOLD SPRAYING[a]

Product	Function	Chemical	Percent
Acme 45MR1BS®	Hot box catalyst	Urea	30 to 35
		Ammonium hydroxide	0.1 to 1
		Ammonium nitrate	10 to 15
		Water	45 to 50
		Ammonium chloride	0.1 to 1
		Siloxanes and silicones	1 to 5
Acme 745LF®	Phenolic resin for hot box cores	Formaldehyde	1 to 5
		Phenol	5 to 10
Acme-flow 2012®	Phenolic resin for cold box cores	Formaldehyde	0.1 to 1
		Phenol	1 to 5
		Ethyl 3-ethoxypropionate	5 to 10
		Heavy aromatic solvent naphtha	10 to 30
Acme-flow 2052A®	Isocyanate resin for cold box Part 2	Diphenylmethane 4,4'-Diisocyanate	10 to 30
		Kerosene	5 to 10
		Polymeric Diphenylmethane Diisocyanate	30 to 50
		Isocyanic acid, methylenediphenylene ester	1 to 5
		Heavy aromatic solvent naphtha	10 to 30
Tribonol®	Mold spray	Zircon	90
		Diethylene glycol polymer with 1-chloro-2,3-epoxypropane	10

[a] From the manufacturer's material safety data sheets (MSDS).

3.3 PROCESS AND CONTROL DEVICE MONITORING RESULTS

3.3.1 Cupola B

During each test run, several parameters associated with the operation of the cupola and the Venturi scrubber were monitored and recorded. For the cupola, these parameters included the blast air flow rate, the relief stack flow rate, the hot blast temperature, oxygen feed pressure, and the combustion chamber temperature. In addition, information was obtained on each time the cupola was charged and the charge composition. Each time period was also recorded that the blast was stopped (and the emission testing was also stopped).

The plant had instrumentation installed to monitor several parameters associated with the Venturi scrubber, including the water flow rate to the scrubber, flow rate of makeup water, inlet temperature, inlet pressure, pressure drop, and the pressure (vacuum) at the induced draft fan. These parameters, with the exceptions noted below, were monitored and recorded during the test. Before the sampling runs were begun, the process observers worked with the plant personnel to determine if the instruments indicating venturi pressure drop and water flow rate to the scrubber were showing correct readings. Calibration of the pressure drop instrumentation, completed early on September 24, consisted of a direct manometer reading at the venturi followed by adjustment of the pressure drop reading in the control room. Calibration of the water flow rate reading could not be confirmed during the sampling campaign. After the testing was completed, plant personnel confirmed that the instrument had been calibrated and that the water flow rate was 625 gallons per minute.

Table 3.4 summarizes the major monitoring results for the cupola during each test run, and Table 3.5 provides the cupola charging data for about 12 hours during each test day. The blast air temperature and flow rate are plotted for the four test runs in Figures 3.3 and 3.4. The blast air rate showed very little variability during the test; however, there were significant differences in the temperature of the hot air blast, which averaged 464 to 488°F during Runs 1 and 2 and 364 to 366°F during Runs 3 and 4.

The pressure drop across the Venturi scrubber increased during each run. At the request of EPA personnel, adjustments were made after the first test run to increase the scrubber pressure and to maintain a range closer to the original design specifications. The pressure drop averaged 33, 35, 38, and 42 inches of water for Runs 1, 2, 3, and 4 respectively.

TABLE 3.4

SUMMARY OF CUPOLA MONITORING RESULTS

Parameter	Run	Average	Range
Blast flow rate (cfm)	1	21,400	21,000 - 22,200
	2	22,100	21,800 - 22,500
	3	21,900	21,700 - 22,800
	4	21,800	21,000 - 22,400
Hot blast temperature (°F)	1	488	443 - 539
	2	464	448 - 488
	3	366	336 - 385
	4	364	327 - 409
Oxygen (psig)	1	30	30
	2	49	43 - 61
	3	50	40 - 65
	4	59	54 - 65
Combustion chamber temperature (°F)	1	not available	
	2	1,557	1,401 - 1,669
	3	1,518	1,276 - 1,633
	4	1,608	1,495 - 1,670
Melting rate (tons/hr)[a]	1	38.8	--
	2	41.7	--
	3	45.4	--
	4	43.5	--
Time blast stopped (min)	1	156	--
	2	6	--
	3	29	--
	4	15	--
Scrubber pressure drop (in. water)	1	33.4	33 - 35
	2	35	32 - 37
	3	38	36 - 40
	4	42	40 - 42

[a] Adjusted for the downtime when the blast was stopped (i.e., the downtime was subtracted from the operating time when determining the melting rate).

TABLE 3.5

SUMMARY OF CUPOLA CHARGING DURING THE TEST DAYS

9/23/97*		9/24/97		9/25/97	
Time period	Tons charged	Time period	Tons charged	Time period	Tons charged
--	--	6:00-7:05	54	7:11-8:05	42
--	--	7:13-8:02	42	8:11-9:01	36
--	--	8:25-9:14	30	9:10-10:07	42
--	--	9:19-10:09	42	10:12-11:06	42
--	--	10:14-11:05	36	11:10-12:02	36
--	--	11:14-12:05	42	12:12-13:03	42
--	--	12:10-13:02	42	13:12-14:07	42
--	--	13:20-14:03	42	14:18-15:10	48
--	--	14:08-15:12	54	15:27-16:02	30
13:58-14:49	48	15:17-16:08	42	16:11-17:03	42
15:51-16:19	30	16:21-17:10	36	17:12-17:59	42
18:20-19:12	24	17:17-18:18	36	18:07-19:10	42
Average rate (tons/hr)	38.8	Average rate (tons/hr)	40.5	Average rate (tons/hr)	40.6

* Run 1 on this day was a short test with 110 minutes of sampling between 14:10 and 18:41.

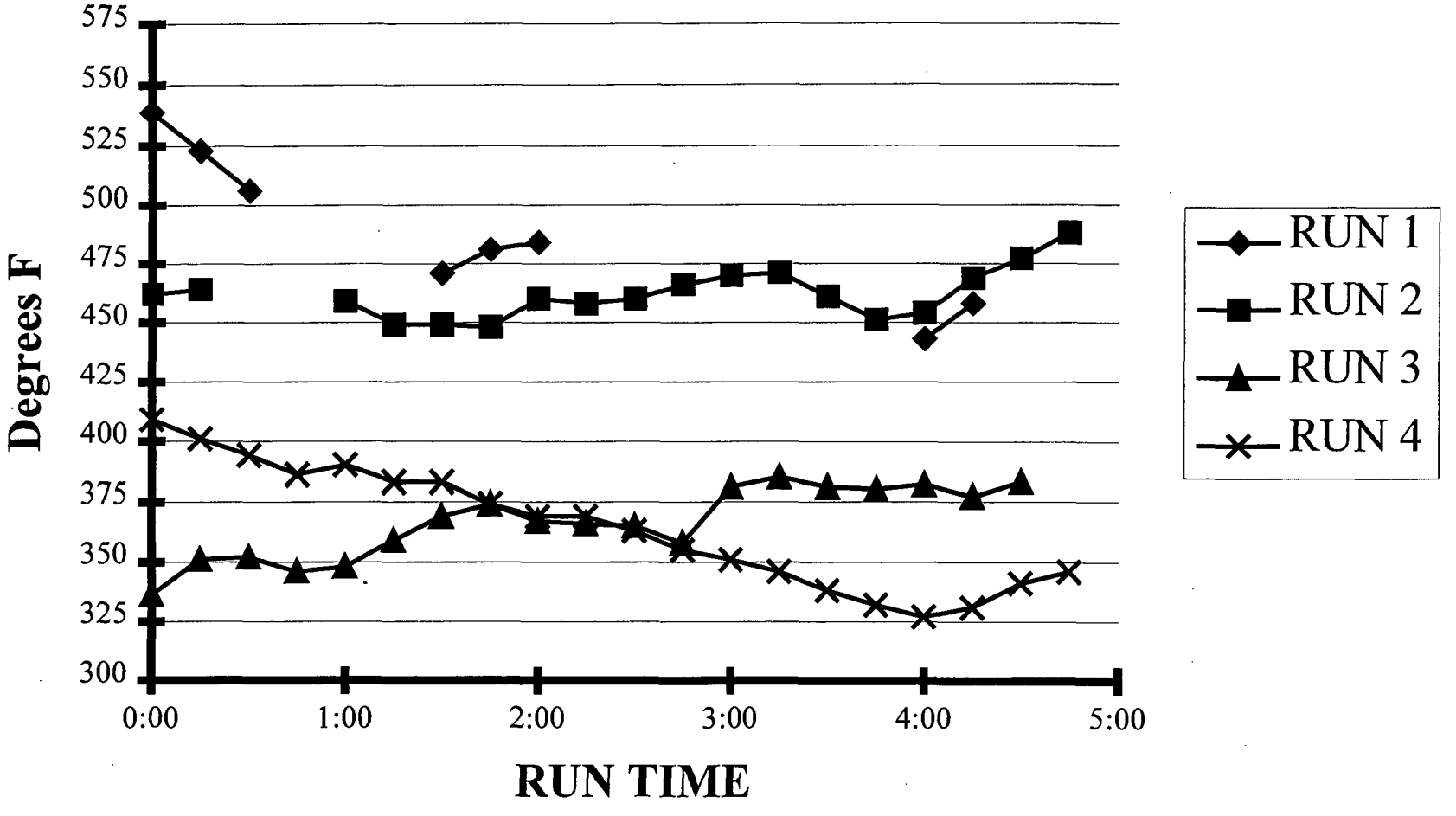


Figure 3.3 Hot Blast Temperature During Each Test Run

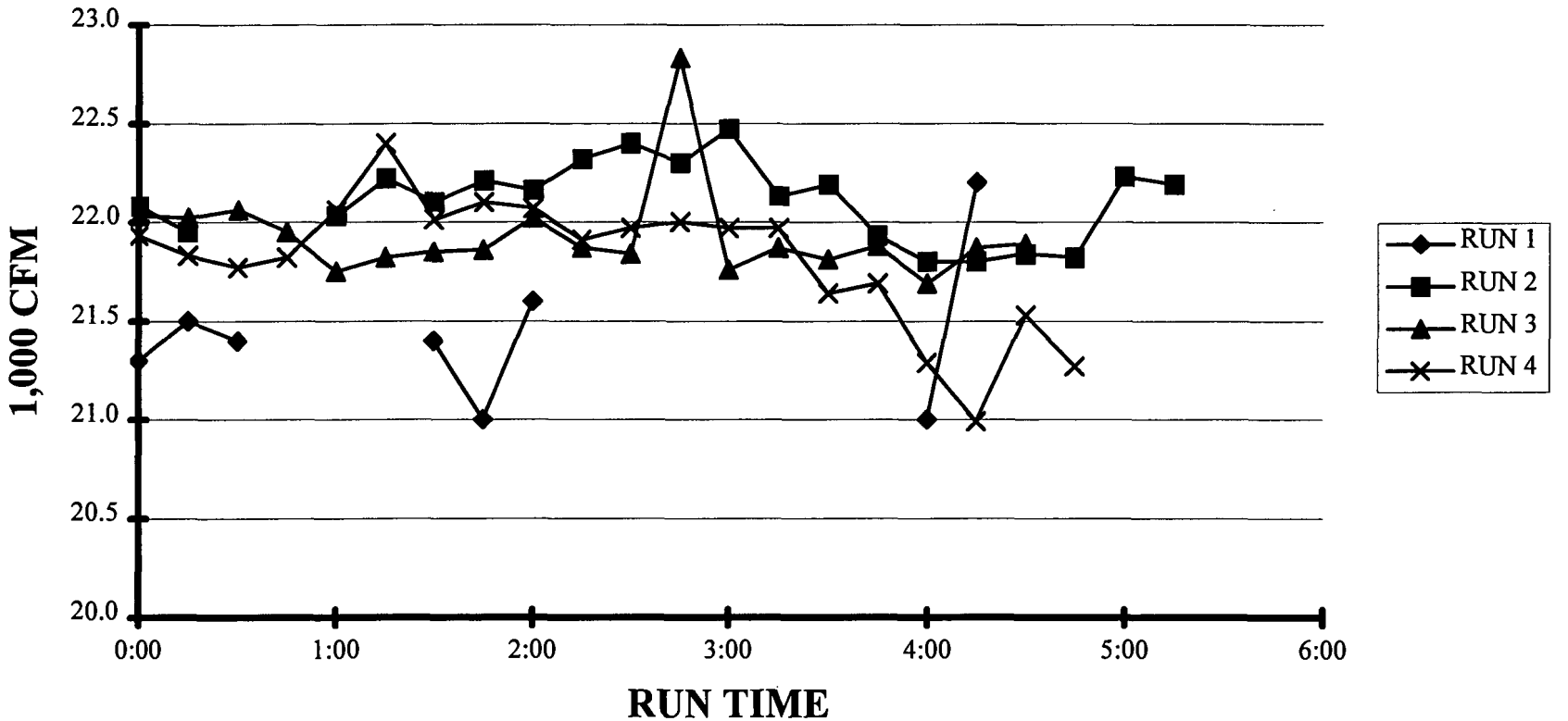


Figure 3.4 Hot Blast Rate During the Test Runs

3.3.2 Mold Line 4

During the testing of Line 4, a record was kept of the rate at which the line moved (e.g., molds per hour) and pouring was observed to identify when broken molds were not poured and the temperature of the molten iron when poured. Several observations were made of the time to "light off" after pouring, when the vapors escaping from the mold self-ignited. The first hole ignited on average about 6 to 8 seconds after pouring, and all holes were lit 11 to 18 seconds after pouring. During the testing of the scrubbers used on the shakeout operation, the pressure drop across the scrubbers was recorded and ranged from 13.9 to 16.5 inches of water.

Table 3.6 provides a summary of the number and types of molds that were processed during each test day from plant records, and Table 3.7 provides a summary of the quantity of iron poured and the downtime during each hour of the testing days. Table 3.8 contains the mold counts made by the process observers when testing was being performed. Table 3.9 provides an estimate of the tons of iron poured per hour and the number of molds poured per hour during the testing periods on Line 4.

During the testing days, the pouring temperature of the iron was maintained within a narrow range of 2,743 °F to 2,818 °F. A typical analysis of the iron (from 9/25/97) showed 3.11% carbon, 0.13% sulfur, and 2.28% silicon.

TABLE 3.6

SUMMARY OF NUMBER OF MOLDS POURED ON LINE 4

Hour (first shift)	Number of molds poured[a]							
	9/22/97		9/23/97		9/24/97		9/25/97	
	4-cyl.	6-cyl.	4-cyl.	6-cyl.	4-cyl.	6-cyl.	4-cyl.	6-cyl.
1	223	--	224	--	152	--	180	--
2	64	126	16	165	194	--	235	--
3	--	220	--	214	59	--	155	48
4	--	185	--	208	0	--	--	208
5	56	36	--	217	171	--	--	245
6	237	--	225	--	114	98	48	126
7	37	46	205	--	--	195	202	--
8	--	217	70	76	--	227	176	18
9[b]	--	106	--	108	83	109	--	108
	--	--	--	--	104	--	--	--

[a] Does not include broken molds that were not poured.
[b] The line usually shut down around 3 pm.

TABLE 3.7

SUMMARY OF METAL POURED AND DOWNTIME FOR LINE 4

Hour (first shift)	Tons of metal poured[a]				Downtime (minutes)			
	9/22/97	9/23/97	9/24/97	9/25/97	9/22/97	9/23/97	9/24/97	9/25/97
1	45.2	45.4	30.8	36.5	8	10	26	20
2	44.5	44.6	39.3	47.7	17	20	17	8
3	55.1	53.6	12.0	43.5	11	12	47	15
4	46.3	52.1	0.0	52.1	15	14	60	14
5	20.4	54.3	34.7	61.3	40	12	22	6
6	48.1	45.6	47.7	41.3	7	10	13	21
7	19.0	41.6	48.8	41.0	42	14	17	15
8	54.3	33.2	56.8	40.2	12	26	10	17
9	26.5	27.0	44.1	27.0	0	0	17	0
	--	--	21.1	--	--	--	1	--

[a] Based on 202.8 lbs per 4-cylinder engine block (405.6 lbs per mold) and 250.4 lbs per 6-cylinder engine block (500.8 lbs per mold).

TABLE 3.8

LINE 4 MOLD COUNTS DURING TESTING PERIODS

Date: 09/22/97				
Time	**Number of molds[a]**	**Molds/hr[b]**	**Cumulative molds/hr[c]**	**Comments**
1:41 pm	0	0	0	6-cylinder engine blocks; 8 broken molds were not poured between 1:30 and 3:00
1:42 pm	5	300	300	
1:45 pm	14	280	285	
1:50 pm	21	252	267	
2:00 pm	40	240	253	
2:15 pm	57	228	242	
2:20 pm	21	252	243	
2:25 pm	21	252	244	
2:30 pm	22	264	246	
2:40 pm	28	168	233	
2:45 pm	22	264	235	
2:50 pm	21	252	237	
2:53 pm	17	340	241	
2:55 pm	3	90	237	
3:00 pm	16	192	**234**	
Date: 9/23/97				
Time	**Number of molds[a]**	**Molds/hr[b]**	**Cumulative molds/hr[c]**	**Comments**
8:39 am	0	0	0	6-cylinder engine blocks; 26 6-cylinder molds not poured between 8:00 and 12:00
8:40 am	5	300	300	
8:43 am	14	280	285	
8:57 am	54	231	243	
9:23 am	93	215	226	
9:41 am	69	230	227	
10:00 am	64	202	221	
10:18 am	73	243	225	
10:30 am	32	160	218	
10:42 am	49	245	221	
10:54 am	44	220	221	
11:02 am	35	263	223	
11:10 am	34	255	225	

TABLE 3.8

LINE 4 MOLD COUNTS DURING TESTING PERIODS (Concluded)

Date: 9/23/97				
Time	**Number of molds[a]**	**Molds/hr[b]**	**Cumulative molds/hr[c]**	**Comments**
11:42 am	109	204	221	Switched to 4-cylinder blocks at 11:45; 3 4-cylinder molds not poured
12:01 pm	78	246	**224**	
Date: 9/24/97				
Time	**Number of molds[a]**	**Molds/hr[b]**	**Cumulative molds/hr[c]**	**Comments**
11:03 am	0	0	0	4-cylinder engine blocks; 5 molds not poured
11:06 am	12	240	240	
11:08 am	9	270	252	
11:10 am	9	270	257	
11:35 am	94	226	233	
11:51 am	68	255	240	
12:04 pm	44	203	**232**	
Date: 9/25/97				
Time	**Number of molds[a]**	**Molds/hr[b]**	**Cumulative molds/hr[c]**	**Comments**
8:57 am	0	0	0	4-cylinder engine blocks; 3 molds not poured
9:17 am	68	204	204	
9:30 am	41	189	198	Switched to 6-cylinder at 9:30; 14 molds not poured
9:48 am	72	240	213	
9:58 am	42	252	219	
10:15 am	52	184	212	
10:26 am	38	207	211	
10:41 am	59	236	215	
10:57 am	64	240	218	
11:25 am	118	253	225	
11:32 am	29	249	**226**	

[a] Number of molds counted for the incremental time period.
[b] Rate based on the incremental time period.
[c] Cumulative rate based on number of molds from the start time; this is the most accurate measure of the rate over the time period (i.e., the last bolded number in this column).

TABLE 3.9

MOLD LINE 4 PRODUCTION DURING TESTING PERIODS

Date	Time Period	No. of molds poured		Molds/hr poured	Tons/hr poured[a]
		4-cylinder	6-cylinder		
9/22/97	1:41 - 3:00 pm	--	300	227	56.9
9/23/97	8:39 - 12:01 pm	75	652	216	53.0
9/24/97	11:03 - 12:04 pm	231	--	226	45.8
9/25/97	8:57 - 11:32 am	106	460	219	53.0

[a] Based on 405.6 lbs for 4-cylinder molds and 500.8 lbs for 6-cylinder molds.

4.0 SAMPLING LOCATIONS

Isokinetic source sampling was conducted at the inlet and outlet of the cupola wet scrubber at the GM-Saginaw SMCO facility. Descriptions of the sampling locations are presented below, as well as schematic diagrams.

4.1 CUPOLA WET SCRUBBER INLET

The cupola wet scrubber inlet measurement site was located in a 66¼-inch inside diameter (ID) round, vertical duct, 93¼ inches (1.4 duct diameters (d.d.)) downstream of the nearest flow disturbance (90° bend) and 80 inches (1.2 d.d.) upstream of the nearest flow disturbance. According to EPA Method 1 criteria, this site required 24 sample traverse points, 12 along each of two perpendicular diameters. Figure 4.1 shows a simplified schematic of the wet scrubber inlet measurement site. Figure 4.2 shows the sample traverse point locations. A check for the presence of non-parallel flow was conducted as specified in Section 2.4 of EPA Method 1. The check confirmed the average yaw angle of 7.1 degrees, which is less than the Method 1 requirement of 20 degrees based on the average. A quench (water) chamber was located just upstream of the inlet sampling ports. It was attempted to locate sampling ports before the quench chamber, but due to support beams and other ductwork, a suitable sampling site was not accessible.

4.2 CUPOLA WET SCRUBBER OUTLET

The wet scrubber outlet sampling location was located in a 75-inch ID round, vertical stack. Sampling ports were located along two separate planes to enable adequate access for the multiple metals, semi-volatile organics and dioxin/furan sampling trains. The two sampling ports utilized for the semi-volatile organics and dioxin/furan sampling trains were located close to the rooftop. Sampling ports were located 639 inches (8.5 d.d.) downstream of a bend in the duct and 273 inches (3.6 d.d.) upstream of the exhaust to atmosphere. The second set of sampling ports was used to conduct the filterable particulate/multiple metals train. These ports were located 672 inches (9.0 d.d.) downstream of a bend in the duct and 240 inches (3.2 d.d.) upstream of the exhaust to atmosphere. Figure 4.3 is a schematic of the scrubber outlet sampling locations. Figure 4.4 shows the sample traverse point locations. A check for the presence of non-parallel

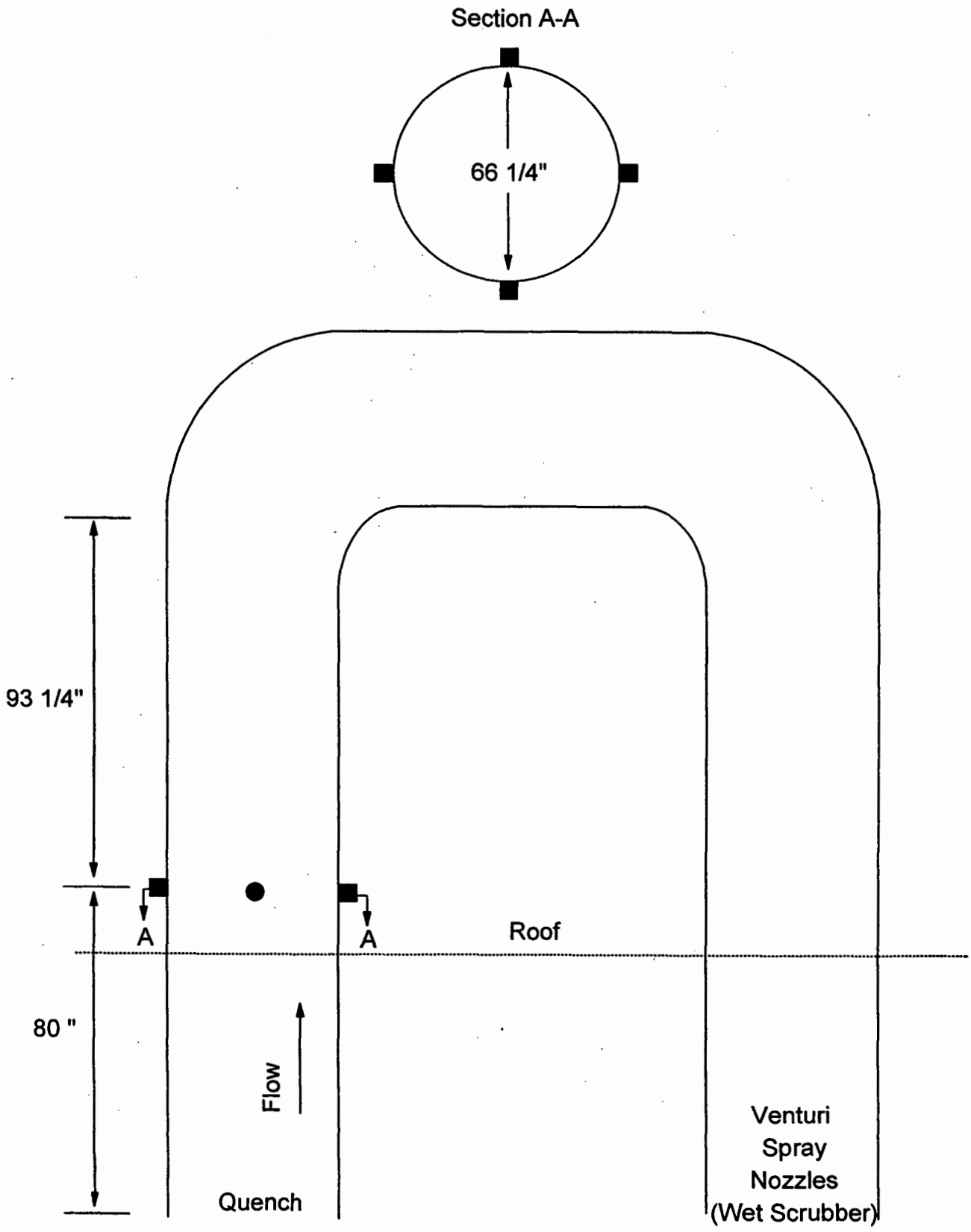


Figure 4.1 Cupola Wet Scrubber Inlet Sampling Location

Circular Stack Method 1 Calculation Results

Date: 07/20/99 Time: 15:18:28

Facility:	General Motors Corp.
Source ID:	Scrub. inlet
Source Name:	Cupola Wet Scrubber Inlet
Date:	09/21/97
Calculated By:	F. Meadows

Input Values

Traverse Point Type:	Sample - M5	
Inside of far wall to outside of nipple:	70 3/8	(inches)
Nipple Length:	4 1/8	(inches)
Distance from Upstream Disturbance:	80 even	(inches)
Distance from Downstream Disturbance:	93 1/4	(inches)
Number of ports:	2 ports at 90 degrees	

Calculated Values

Inside Diameter:	66.2500	(inches)
Upstream Duct Diameters:	1.20	
Downstream Duct Diameters:	1.40	
Mininum Traverse Points:	24	

Traverse Point Number	Fraction of Length	Length (inches)	Product of Columns 2 & 3	Nipple Length (inches)	Traverse Point Location Sum of Col. 4 & 5
1	0.021	66 1/4	1 3/8	4 1/8	5 1/2
2	0.067	66 1/4	4 7/16	4 1/8	8 9/16
3	0.118	66 1/4	7 13/16	4 1/8	11 15/16
4	0.177	66 1/4	11 3/4	4 1/8	15 7/8
5	0.250	66 1/4	16 9/16	4 1/8	20 11/16
6	0.356	66 1/4	23 9/16	4 1/8	27 11/16
7	0.644	66 1/4	42 11/16	4 1/8	46 13/16
8	0.750	66 1/4	49 11/16	4 1/8	53 13/16
9	0.823	66 1/4	54 1/2	4 1/8	58 5/8
10	0.882	66 1/4	58 7/16	4 1/8	62 9/16
11	0.933	66 1/4	61 13/16	4 1/8	65 15/16
12	0.979	66 1/4	64 7/8	4 1/8	69 even

Figure 4.2 Cupola Wet Scrubber Inlet Traverse Point Locations

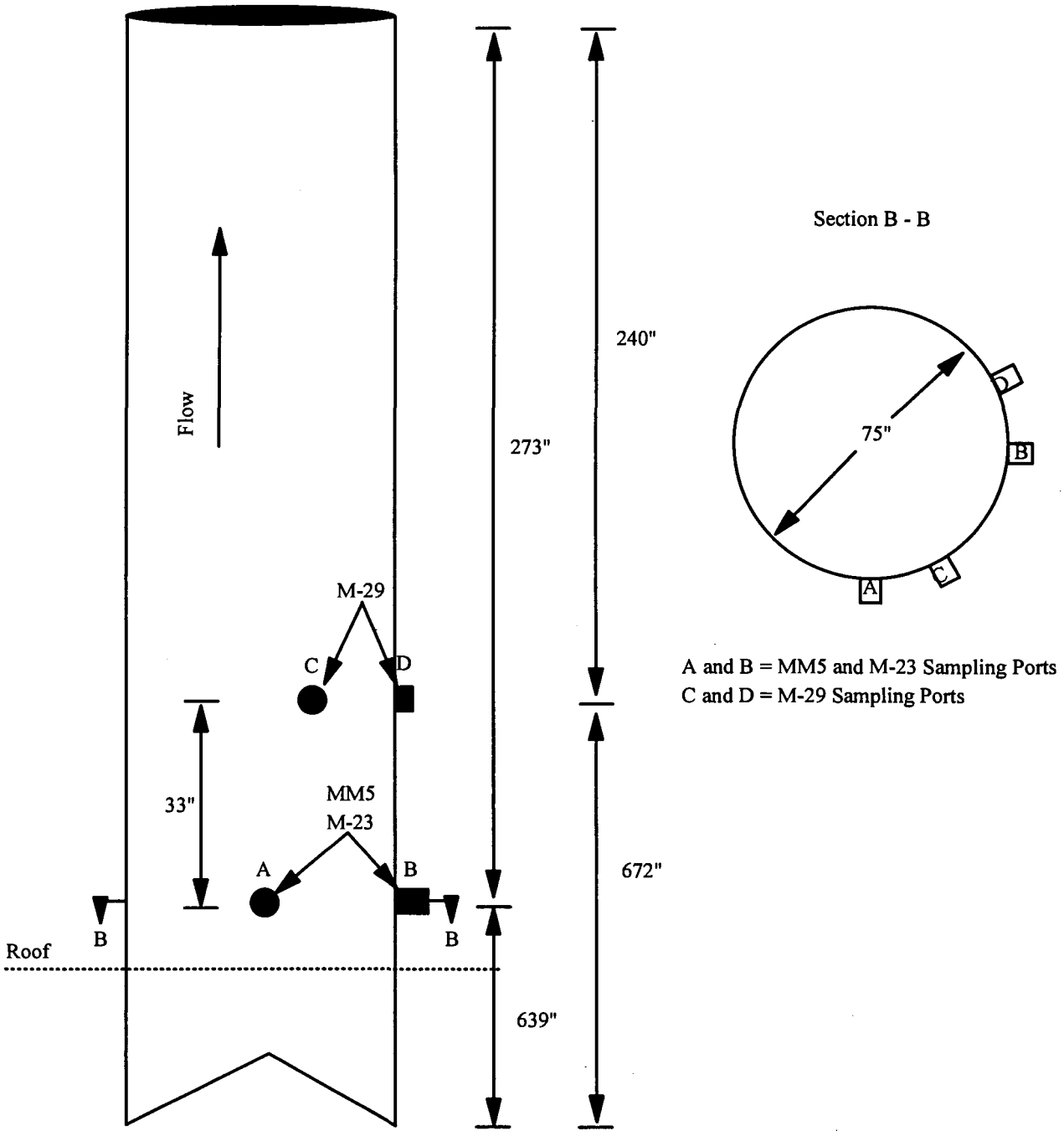


Figure 4.3 Cupola Wet Scrubber Outlet Sampling Location

Circular Stack Method 1 Calculation Results

Date: 07/20/99 Time: 15:21:16

Facility:	General Motors Corp.
Source ID:	Scrb. Outlet
Source Name:	Wet Scrubber Outlet
Date:	09/21/97
Calculated By:	F. Meadows

Input Values

Traverse Point Type:	Sample - M5	
Inside of far wall to outside of nipple:	79 1/4	(inches)
Nipple Length:	4 1/4	(inches)
Distance from Upstream Disturbance:	672 even	(inches)
Distance from Downstream Disturbance:	240 even	(inches)
Number of ports:	2 ports at 90 degrees	

Calculated Values

Inside Diameter:	75.0000	(inches)
Upstream Duct Diameters:	8.96	
Downstream Duct Diameters:	3.20	
Mininum Traverse Points:	12	

Traverse Point Number	Fraction of Length	Length (inches)	Product of Columns 2 & 3	Nipple Length (inches)	Traverse Point Location Sum of Col. 4 & 5
1	0.021	75 even	1 9/16	4 1/4	5 13/16
2	0.067	75 even	5 even	4 1/4	9 1/4
3	0.118	75 even	8 7/8	4 1/4	13 1/8
4	0.177	75 even	13 1/4	4 1/4	17 1/2
5	0.250	75 even	18 3/4	4 1/4	23 even
6	0.356	75 even	26 11/16	4 1/4	30 15/16
7	0.644	75 even	48 5/16	4 1/4	52 9/16
8	0.750	75 even	56 1/4	4 1/4	60 1/2
9	0.823	75 even	61 3/4	4 1/4	66 even
10	0.882	75 even	66 1/8	4 1/4	70 3/8
11	0.933	75 even	70 even	4 1/4	74 1/4
12	0.979	75 even	73 7/16	4 1/4	77 11/16

Figure 4.4 Cupola Wet Scrubber Outlet Traverse Point Locations

flow was conducted as specified in Section 2.4 of EPA Method 1. The check indicated the average yaw angle to be 7.7 degrees, which is less than the EPA Method 1 requirement of 20 degrees, based on the average.

5.0 SAMPLING AND ANALYTICAL PROCEDURES

Table 5.1 summarizes the sources, test parameters, test methods, number of tests, and net run times. Simultaneous isokinetic sampling was conducted at the cupola wet scrubber inlet and outlet for PM/metals. Sampling was also performed for VOHAPs at both the inlet and outlet locations. Simultaneous with the PM/metals and VOHAPs testing, additional isokinetic sampling was conducted at the cupola wet scrubber outlet for PCDDs/PCDFs and SVOHAPs. Brief descriptions of the methods used follow.

5.1 LOCATION OF MEASUREMENT SITES AND SAMPLE/VELOCITY TRAVERSE POINTS

EPA Method 1, "Sample and Velocity Traverses for Stationary Sources," was used to select the measurement sites and to establish velocity and sample traverse point locations. The location of measurement sites and traverse points are discussed in Section 4.0.

5.2 DETERMINATION OF STACK GAS VOLUMETRIC FLOW RATE

EPA Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)," was used to determine stack gas volumetric flow rate at the cupola wet scrubber inlet and outlet. A Type S pitot tube, constructed according to Method 2 criteria and having an assigned coefficient of 0.84 and connected to an inclined-vertical manometer was used to measure velocity pressure. A calibrated Type K thermocouple attached directly to the pitot tube was used to measure stack gas temperature. The average stack gas velocity was calculated from the average square roots of the velocity pressure, average stack gas temperature, stack gas molecular weight, and absolute stack pressure. The volumetric flow rate is the product of velocity and the stack cross-sectional area.

5.3 DETERMINATION OF DRY MOLECULAR WEIGHT AND EMISSION CORRECTION FACTORS

EPA Method 3B, "Gas Analysis for the Determination of Emission Rate Correction Factor or Excess Air," was used to measure carbon dioxide and oxygen content of the stack gases. Gas samples were extracted from the stack or duct, simultaneous with the EPA Method 29 (scrubber inlet) or Method 23 (scrubber outlet) sample trains using the multi-point, integrated bag sampling technique. The bag contents were analyzed on-site within four hours after sample collection using an Orsat® analyzer to determine % concentrations of carbon dioxide and oxygen.

TABLE 5.1

SOURCES, TEST PARAMETERS, AND TEST METHODS SUMMARY
GENERAL MOTORS CORPORATION - SAGINAW, MICHIGAN

Source	Parameter	Test Methods	No. of Tests	Net Run Time, Minutes
Cupola Wet Scrubber Inlet	Flow Rate	EPA 1 & 2	4	240
	O_2/CO_2*	EPA 3B	4	240
	Moisture	EPA 4	4	240
	PM/Metals*[a]	EPA 29	4	120
Cupola Wet Scrubber Outlet	Flow Rate	EPA 1 & 2	4	240
	O_2/CO_2*	EPA 3B	4	240
	Moisture	EPA 4	4	240
	PM/Metals*[a]	EPA 29	4	120
	PCDDs/PCDFs	EPA 23	4	240
	SVOHAPs	SW-846 0010	4	240
	VOHAPs	On-site GC/MS	--[b]	10-15/sample

*One integrated bag sample was collected for each 60 minutes of sampling time.
[a]Sample Runs I-M29-2 and O-M29-2 were run for 237 minutes; all other runs were approximately 120 minutes.
[b]Several 10-15 minute GC/MS samples were collected during the periods of manual sampling.

The Orsat® analyzer had 0.1% subdivisions. One integrated bag sample was collected for each 60 minutes of sampling time at the wet scrubber inlet and outlet.

5.4 DETERMINATION OF STACK GAS MOISTURE CONTENT

EPA Method 4, "Determination of Moisture Content in Stack Gases," was used to determine stack gas moisture content. The quantity of condensed water was determined gravimetrically and then compared to the total volume of gas sampled to determine the volume % moisture content. The Method 4 procedure was conducted in conjunction with the EPA Methods 23 and 29 and SW-846 Method 0010 sampling runs. Condensed moisture was determined by the difference in pre-test and post-test weights of the impingers, reagents, and silica gel. Condensed moisture in the XAD® adsorbent trap from the SW-846 Method 0010 and EPA Method 23 sample trains was also determined gravimetrically and the results included in the moisture content calculations.

5.5 DETERMINATION OF PARTICULATE MATTER AND METALS

EPA Method 29, "Determination of Metals Emissions From Stationary Sources," was used to determine filterable particulate matter and metals at the cupola wet scrubber inlet and outlet. The target metals included: antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), cadmium (Cd), chromium (Cr), cobalt (Co), lead (Pb), manganese (Mn), mercury (Hg), nickel (Ni), phosphorus (P), selenium (Se), silver (Ag), thallium (Tl), and zinc (Zn). Multi-point integrated samples were extracted isokinetically from the 24 traverse points at the inlet and 24 traverse points at the outlet as shown in Figures 4.2 and 4.4, respectively. At each traverse point, sampling was performed for five minutes at the inlet and five minutes at the outlet for a total run time of 120 minutes per test. The samples were extracted through a glass nozzle, a heated glass-lined probe, a heated quartz fiber filter, an empty impinger, two impingers containing an acidic hydrogen peroxide solution (H_2O_2/HNO_3), an empty impinger, and two impingers containing acidic potassium permanganate ($KMnO_4$). The final impinger contained silica gel. The nozzle was attached to the probe using Teflon® or Teflon®-coated unions and Teflon® or graphite ferrules. A schematic of the EPA Method 29 sampling train is shown in Figure 5.1. The sample recovery scheme for metals is shown in Figure 5.2.

The filter and acetone rinses of the probe and front half of the filter housing were analyzed gravimetrically in the PES laboratory to determine filterable particulate matter. Upon completion of the particulate matter analyses, the particulate fractions and aqueous fractions were submitted to TLI for metals analyses. The sample preparation and analysis scheme is shown in Figure 5.3. Metals other than Hg were analyzed by graphite furnace atomic absorption spectroscopy (GFAAS) or inductively coupled argon plasma (ICP) emission spectroscopy. Mercury was analyzed by cold vapor atomic absorption spectroscopy (CVAAS).

5.6 DETERMINATION OF DIOXINS AND FURANS

EPA Method 23, "Determination of Polychlorinated Dibenzo-*p*-Dioxins and Polychlorinated Dibenzofurans from Stationary Sources" was used to determine PCDDs/PCDFs at the cupola wet scrubber outlet. The proposed rules amending EPA Method 23, as published in the Federal Register, Volume 60, No. 104, May 31, 1995, were incorporated. The proposed changes correct existing errors in the method, eliminate the methylene chloride rinse, and clarify the quality assurance requirements of the method. Samples were extracted through a glass nozzle, a heated glass-lined probe, a pre-cleaned and heated glass fiber filter, a water cooled condenser coil and an adsorbent trap containing approximately 40 grams of XAD®-2 adsorbent resin. A schematic of the EPA Method 23 sampling train (which is the identical to the SW-846 Method 0010 train) is shown in Figure 5.4. Multi-point integrated samples were extracted isokinetically from the 24 traverse points shown in Figure 4.4. At each traverse point, sampling was performed for 10 minutes, with pertinent readings taken every five minutes, for a net run time of 240 minutes per test. TLI prepared the filters and adsorbent traps, and performed the required analyses.

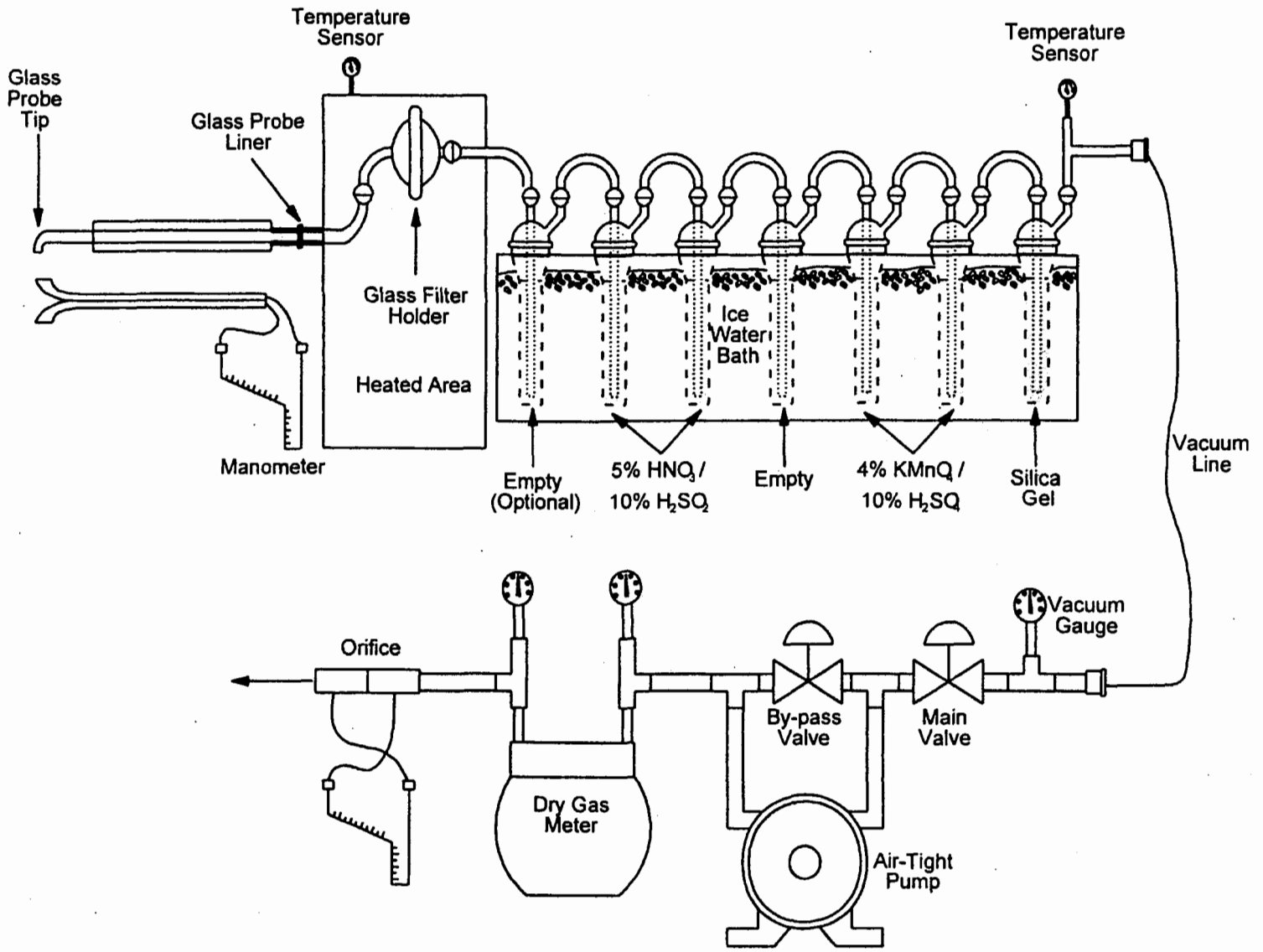


Figure 5.1 EPA Method 29 Sampling Train Schematic

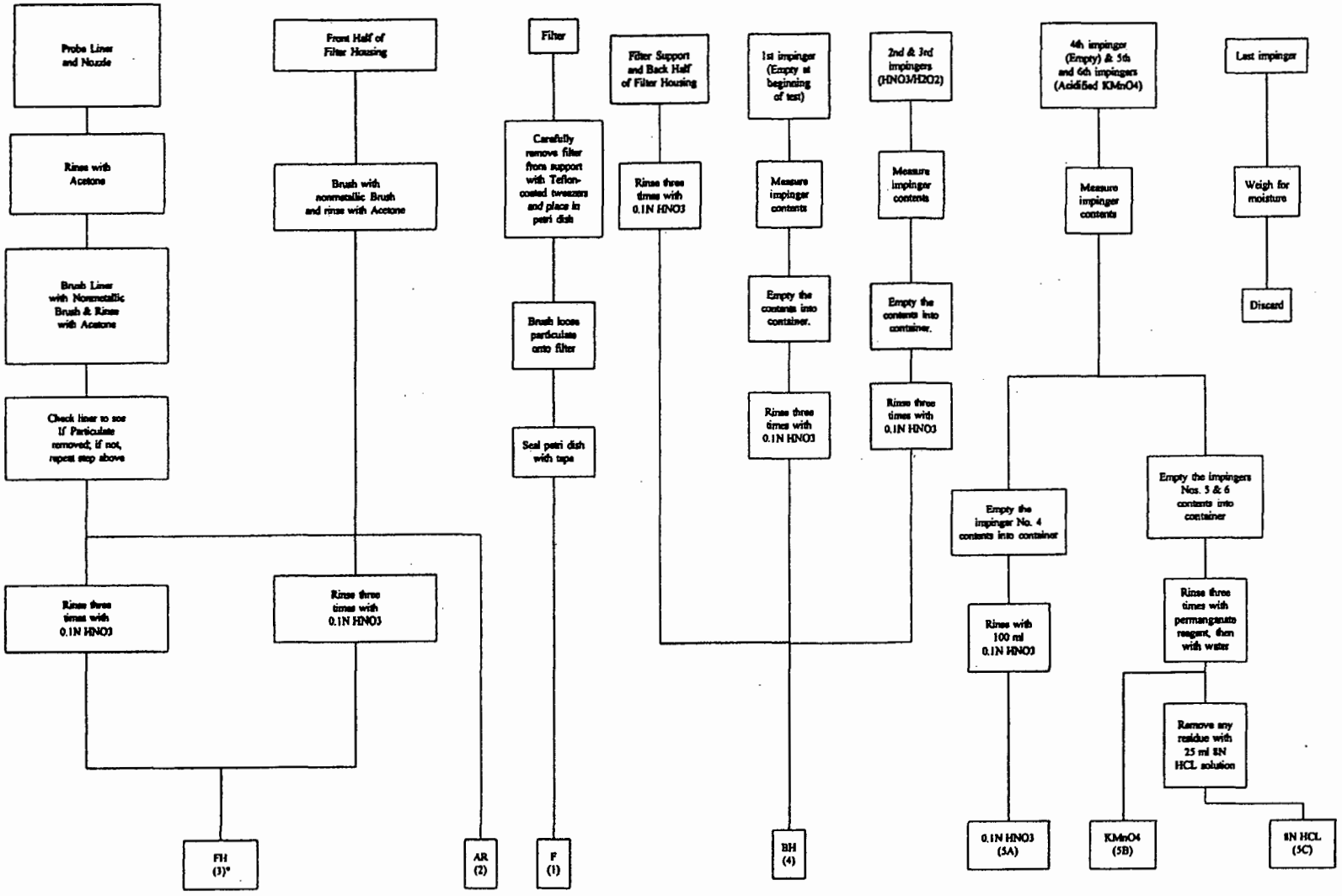
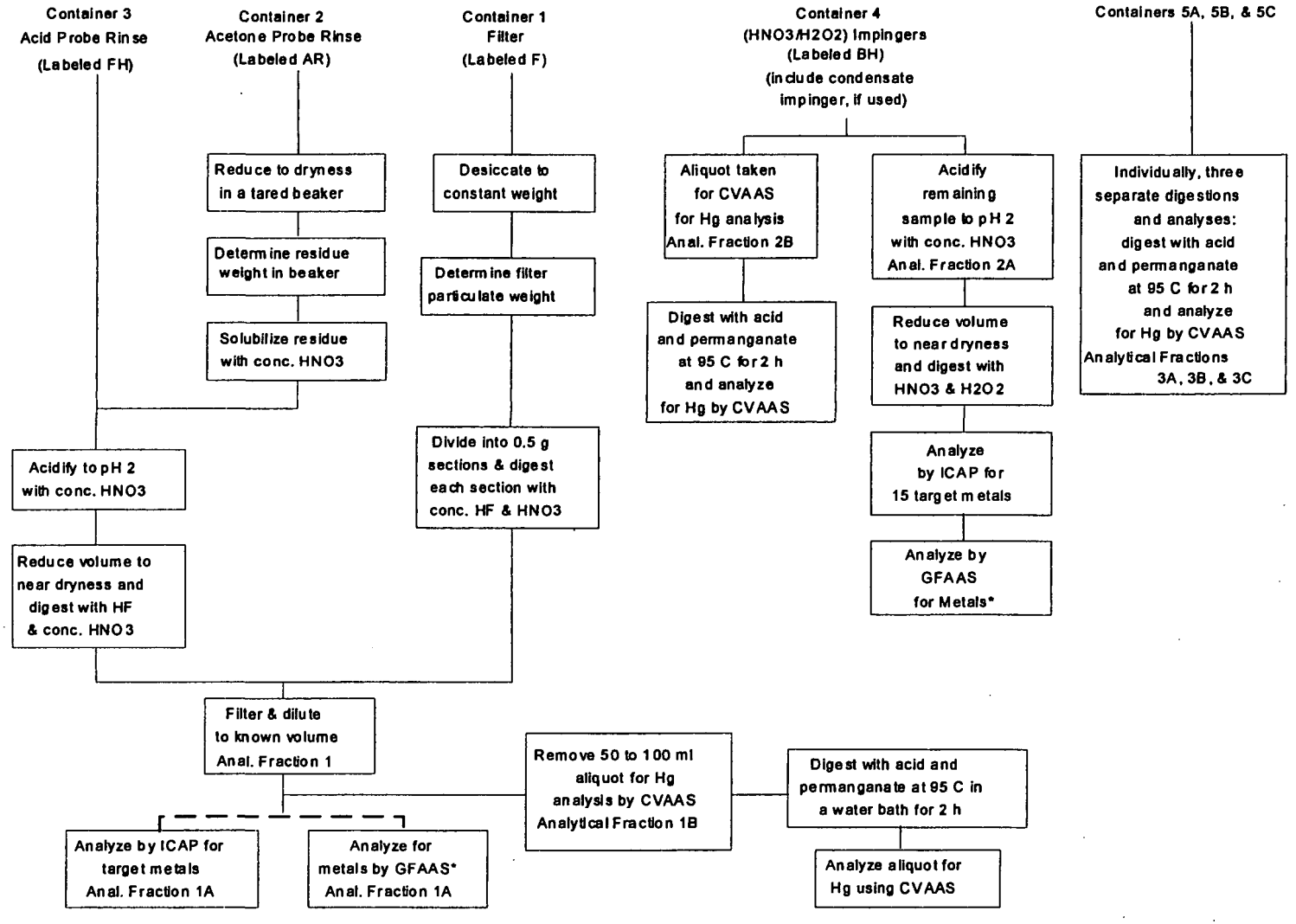


Figure 5.2 EPA Method 29 Sample Recovery Scheme



*Analysis by AAS for metals found at less than 2 ug/ml in digestate solution, if desired. Or analyze for each metal by AAS, if desired.

Figure 5.3 EPA Method 29 Sample Preparation and Analysis Scheme

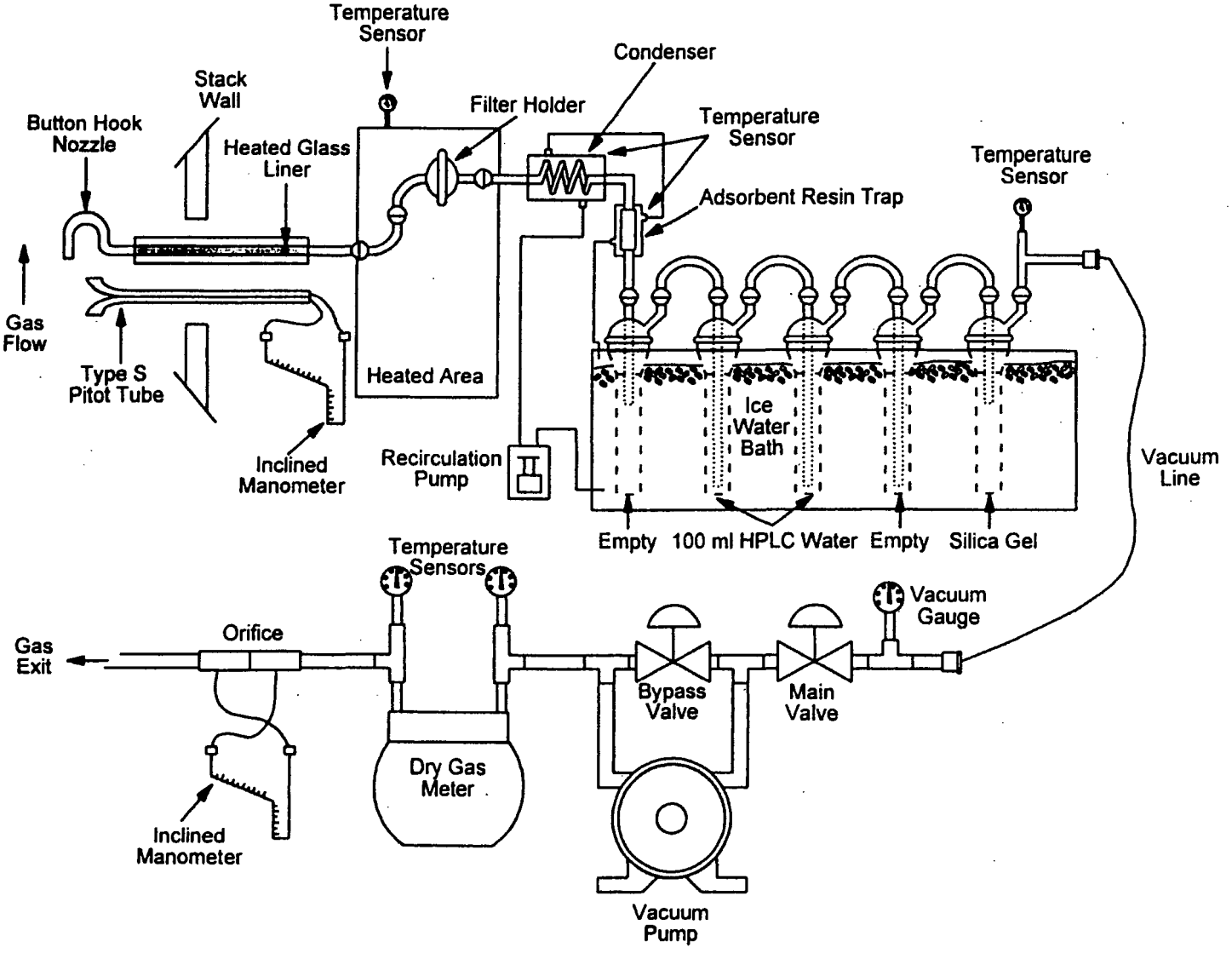


Figure 5.4 EPA Method 23 (PCDD/PCDF) and SW-846 0010 (SVOHAPS) Sampling Train Schematic

5.7 DETERMINATION OF SEMIVOLATILE ORGANIC HAZARDOUS AIR POLLUTANTS (SVOHAPs)

Method SW-846 0010, "Modified Method 5 Sampling Train (MM5)," was used to collect SVOHAPs at the cupola wet scrubber outlet. Multi-point, integrated samples were extracted isokinetically from the 24 traverse points shown in Figure 4.4. At each traverse point, sampling was performed for 10 minutes for a total run time of 240 minutes per test. Meter box readings were recorded every five minutes. The SW-846 Method 0010 samples were extracted through a glass nozzle, a heated glass-lined probe, a precleaned and heated glass fiber filter, a water-cooled condenser coil and an adsorbent trap containing approximately 40 grams of XAD®-2 adsorbent resin. A schematic of the SW-846 Method 0010 sampling train is shown in Figure 5.4.

The SW-846 Method 0010 samples were extracted following the procedure of Method 3542, dated January, 1995. The extracts were analyzed in accordance with the guidelines of Method 8270A by High Resolution Gas Chromatography/Low Resolution Mass Spectrometry. The three sample fractions for each test run, i.e., front half extract, the back half extract (XAD®-2 and back half rinse), and the condensate extract were combined for one analysis, per test run. The samples were analyzed for the SW-846 Method 8270 polynuclear aromatic hydrocarbon (PAH) and Clean Air Act (CCA) semivolatile compounds.

5.8 DETERMINATION OF VOLATILE ORGANIC HAZARDOUS AIR POLLUTANTS (VOHAPS)

Direct interface gas chromatography/mass spectrometry (GC/MS) was used to determine volatile organic hazardous air pollutant (VOHAP) concentrations at the inlet and outlet of the cupola wet scrubber. A single point, constant rate sample was withdrawn from the individual gas streams using a heated probe and sample line to prevent condensation. A conditioning unit was used to protect the GC/MS from particulate matter and excess moisture. The gas chromatography (GC) portion of the GC/MS separates the gaseous mixture of molecules by their affinity for the analytical column's stationary and mobile phases. The mass spectrometer (MS) portion of the GC/MS uniquely identifies each molecule by detecting individualized fragments. Positive identification of target analytes is achieved by comparison of eluting analyte GC peak retention times in the total ion chromatogram to those obtained from the calibration, and by examining the mass spectral pattern.

Sample gas is introduced into the GC/MS via a pneumatic valve assembly or equivalent. The internal standard mixture must be quantitatively co-added to every sample before injection. Compounds are typically separated and detected in a 10- to 15-minute isothermal run. Effluent samples are quantified by comparing analyte GC retention times and the corresponding instrument response to the initial three-point calibration. Figure 5.5 is a schematic of the direct interface GC/MS sampling system.

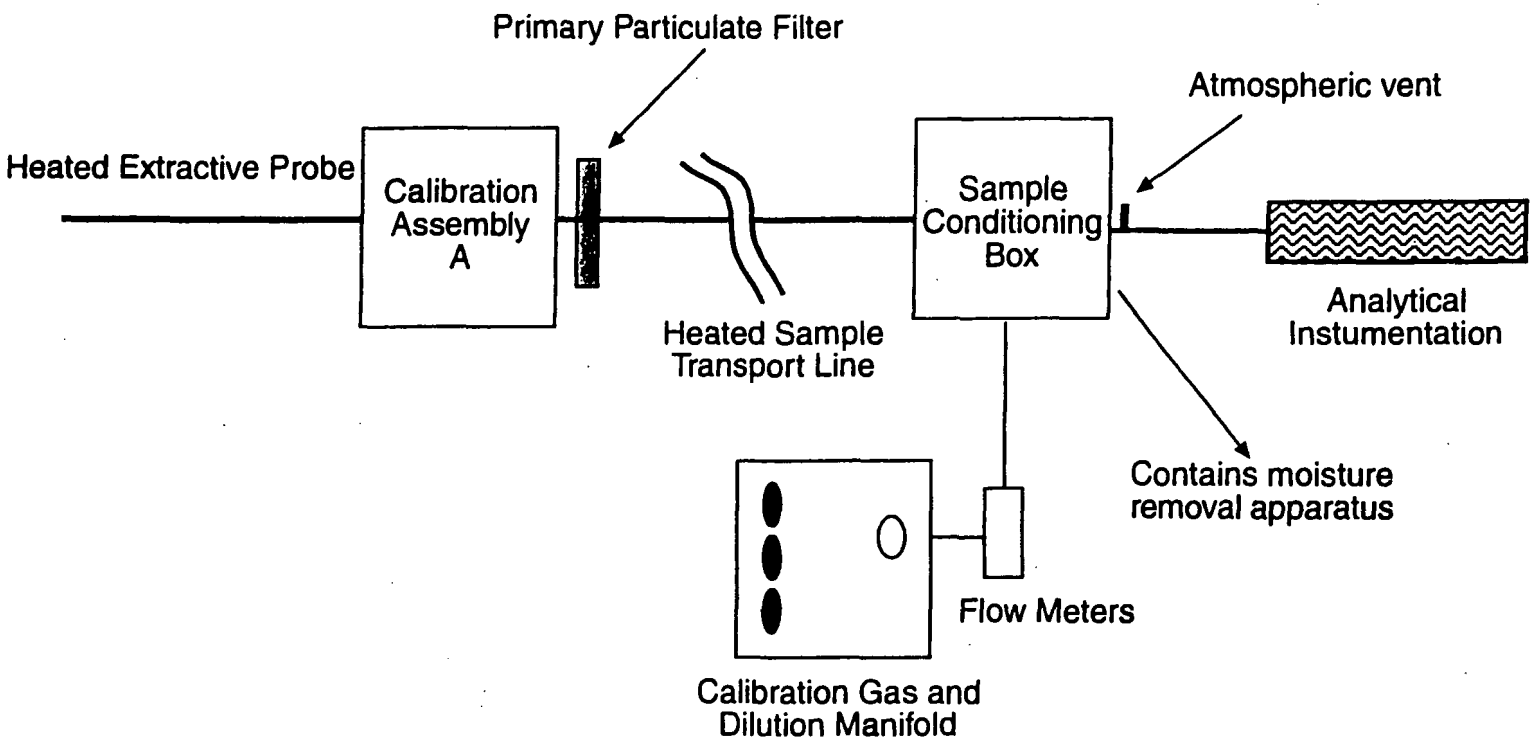


Figure 5.5 Schematic of Direct Interface GC/MS Sampling System

Measurement of VOHAPs at the cupola wet scrubber inlet and outlet showed no concentrations above analytical instrument detection limits for any of the target analytes. Control spikes in the parts per billion (ppb) range showed recoveries of 100%, demonstrating the integrity of the sampling system.

6.0 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES AND RESULTS

This section describes the specific QA/QC procedures employed by PES in performing this series of tests. The procedures contained in the "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods," EPA/600/R-94/038c, and in the reference test methods served as the basis for performance for all testing and related work activities in this project.

6.1 CALIBRATION OF APPARATUS

The preparation and calibration of source sampling equipment is essential in maintaining data quality. Brief descriptions of the calibration procedures used by PES follow.

6.1.1 Barometers

PES used aneroid barometers which are calibrated against a station pressure value reported by a nearby National Weather Service Station corrected for elevation.

6.1.2 Temperature Sensors

Bimetallic dial thermometers and Type K thermocouples were calibrated using the procedure described in Section 3.4.2 of the Quality Assurance Handbook, Volume III, 1994. Each temperature sensor was calibrated over the expected range of use against an ASTM 3C or 3F thermometer. Table 6.1 summarizes the type of calibrations performed, the acceptable levels of variance, and the results. Digital thermometers were calibrated using a thermocouple simulator having a range of 0-2400°F.

6.1.3 Pitot Tubes

Type S pitot tubes constructed to EPA Method 2 specifications were used. Pitot tubes meeting these specifications are assigned to a baseline coefficient to 0.84 and need not be calibrated. The dimensional criteria and results for each pitot tube used are summarized in Table 6.2.

TABLE 6.1

SUMMARY OF TEMPERATURE SENSOR CALIBRATION DATA

Temp. Sensor I.D.	Usage	Temperature, °F		Temperature Difference	Tolerances
		Reference	Sensor		
T6C	Stack Gas	69	70	-0.2%	<±1.5%
		32	31	0.2%	<±1.5%
		200	203	-0.5%	<±1.5%
		378	375	0.4%	<±1.5%
7C	Stack Gas	70	71	-0.2%	<±1.5%
		32	33	-0.2%	<±1.5%
		204	202	0.3%	<±1.5%
		440	437	0.3%	<±1.5%
8C	Stack Gas	70	70	0.0%	<±1.5%
		33	33	0.0%	<±1.5%
		190	188	0.3%	<±1.5%
		396	395	0.1%	<±1.5%
7B	Stack Gas	72	73	-0.2%	<±1.5%
		34	35	-0.2%	<±1.5%
		204	201	0.5%	<±1.5%
		394	391	0.4%	<±1.5%
RMB-13	Meter Box Inlet	76	76	0	≤1.5%
		34	35	-0.2%	≤1.5%
		150	149	0.2%	≤1.5%
	Outlet	76	75	0.2%	≤1.5%
		34	35	-0.2%	≤1.5%
		150	151	-0.2%	≤1.5%
MB-14	Meter Box Inlet	74	75	-0.2%	≤1.5%
		33	34	-0.2%	≤1.5%
		128	129	-0.2%	≤1.5%
	Outlet	70	71	-0.2%	≤1.5%
		33	34	-0.2%	≤1.5%
		149	150	-0.2%	≤1.5%

TABLE 6.2

SUMMARY OF PITOT TUBE DIMENSIONAL DATA

Measurement	Criteria	Results			
		Pitot Tube Identification			
		T6C	7C	8C	7B
$\alpha 1$	<10°	3	0	0	1
$\alpha 2$	<10°	3	1	1	0
$\beta 1$	<5°	3	0	1	1
$\beta 2$	<5°	1	1	0	0
γ	-	0	2	0	0
θ	-	0	1	1	1
A	-	1.031	0.98	0.914	0.947
Z	≤ 0.125 in.	0	0.03	0	0
W	≤ 0.03125 in.	0	0.017	0.016	0.165
D_t	0.1875" ≤ D_t ≤ 0.375"	0.375	0.375	0.375	0.375
$A/2D_t$	1.05 D_t ≤ A≤ 1.50 D_t	1.37	1.31	1.22	1.26
	Acceptable	Yes	Yes	Yes	Yes
	Assigned Coefficient	0.84	0.84	0.84	0.84

6.1.4 Differential Pressure Gauges

PES used Dwyer inclined/vertical manometers to measure differential pressures. The differential pressures measurements included velocity pressure, static pressure, and meter orifice pressure. Manometers are selected with sufficient sensitivity to accurately measure pressures over the entire range of expected values. Manometers are primary standards and require no calibration.

6.1.5 Dry Gas Meters and Orifices

The SW-846 Method 0010 and EPA Method 23 and 29 dry gas meters and orifices were calibrated in accordance with Sections 5.3.1 and 5.3.2 of EPA Method 5. This procedure involves direct comparison of the dry gas meter to a reference dry test meter. The reference dry test meter is calibrated annually using a wet test meter. Before its initial use in the field, the metering system was calibrated over the entire range of operation as specified in EPA Method 5. After field use, the metering system was calibrated at a single intermediate setting based on the previous field test. Acceptable tolerances for the initial and final dry gas meter factors and orifice calibration factors are ± 0.05 and ± 0.20 from average, respectively. The results for the gas meter and orifice used in this test program are summarized in Table 6.3.

6.2 ON-SITE MEASUREMENTS

The on-site QA/QC activities include:

6.2.1 Measurement Sites

Prior to sampling, the stack and inlet duct were checked dimensionally to determine measurement site locations, location of velocity and sample test ports, inside stack/duct dimensions, and sample traverse point locations. Inside stack/duct dimensions were checked through both traverse axis to ensure uniformity of the stack/duct inside diameter. The inside stack/duct dimensions, wall thickness, and sample port depths were measured to the nearest 1/8 inch.

6.2.2 Velocity Measurements

All velocity measurement apparatus were assembled, leveled, zeroed, and leak-checked prior to use and at the end of each determination. The static pressure was determined at a single point near the center of the stack or duct cross-section.

TABLE 6.3

SUMMARY OF DRY GAS METER AND ORIFICE CALIBRATION DATA

Meter No.	Gamma				Orifice Coefficient		
	Pre-test	Post-test	% Diff.	EPA Criteria	Average	Range	EPA Criteria
M5-10	0.999	1.016	1.7	± 5%	1.591	1.532-1.640	1.591 ± 0.20
M5-11	1.024	1.027	0.3	± 5%	1.819	1.798-1.926	1.819 ± 0.20
RMB-13	1.010	0.990	-2.0	± 5%	1.859	1.800-1.925	1.859 ± 0.20
MB-14	0.966	0.982	1.9	± 5%	1.862	1.756-1.923	1.862 ± 0.20

6.2.3 Flue Gas Composition

Integrated, multi-point, flue gas samples were collected in Tedlar® gas bags from the wet scrubber inlet and outlet. Prior to use the bags were leak checked and purged with nitrogen to ensure cleanliness. Prior to and after completion of each sampling run the entire sampling system was leak checked from the tip of the probe. The bag samples were analyzed on-site using an Orsat® analyzer within four hours after sample collection, in accordance with EPA Method 3B. Prior to use the Orsat® analyzer was assembled and replenished with fresh reagents and leak checked using the manufacturer's procedures.

6.2.4 Moisture

The SW-846 Method 0010 and EPA Methods 23 and 29 sampling trains were used to determine the flue gas moisture content. During sampling, the exit gas of the last impinger was maintained below 68°F to ensure complete condensation of flue gas water vapor. The total moisture was determined gravimetrically using an electronic platform balance with 0.1 gram sensitivity. The XAD® adsorbent modules from the EPA Method 23 and SW-846 Method 0010 sampling trains were also weighed and their weights included in the moisture catch.

6.2.5 Method 23, Method 0010 and Method 29

The field sampling QA/QC for EPA Methods 23 and 29 and SW-846 Method 0010 were similar. Table 6.4 summarizes the critical measurements made and the EPA's acceptability criteria. All pre- and post-test sample train leaks met the acceptance criteria. The isokinetic sampling rates deviated by no more than 7.0% thereby meeting each method criteria of 90-110%.

EPA Methods 23 and 29 and SW-846 Method 0010 field blanks were collected near each of the sampling locations to check for any sample contamination at the sites. Sample trains were assembled and pre- and post-test leak checks were conducted. The sample trains were recovered in the same manner as the actual sample runs. Each field blank train was subjected to a minimum of one leak check in the laboratory and three to five leak checks at the sampling site, depending on the location.

An acetone blank and quartz fiber filter were taken as control samples for the particulate analysis and subsequent analysis for the target metals. Blanks were taken of the metals absorbing and recovery reagents.

TABLE 6.4

SUMMARY OF EPA METHODS 23 AND 29 AND SW-846 METHOD 0010 FIELD SAMPLING QA/QC DATA

Date	Site	Run No.	Pre-Test Leak Rate acfm	Post-Test Leak Rate acfm	EPA Criteria acfm	Percent Isokinetic	EPA Criteria
09/23/97	Wet Scrubber Inlet	I-M29-1	0.003 @ 11" Hg	0.006 @ 10" Hg	0.02	102.3	90-110%
	Wet Scrubber Outlet	O-M29-1	0.005 @ 12" Hg	0.001 @ 7" Hg	0.02	95.4	90-110%
		O-23-1	0.003 @ 15" Hg	0.003 @ 6" Hg	0.02	93.0	90-110%
		O-0010-1	0.003 @ 15" Hg	0.032 @ 7" Hg	0.02	98.4	90-110%
09/24/97	Wet Scrubber Inlet	I-M29-2	0.006 @ 11" Hg	0.005 @ 22" Hg	0.02	104.5	90-110%
	Wet Scrubber Outlet	O-M29-2	0.002 @ 11" Hg	0.001 @ 6" Hg	0.02	99.3	90-110%
		O-23-2	0.002 @ 15" Hg	0.002 @ 10" Hg	0.02	101.5	90-110%
		O-0010-2	0.005 @ 15" Hg	0.002 @ 9" Hg	0.02	101.2	90-110%
09/25/97	Wet Scrubber Inlet	I-M29-3	0.014 @ 27" Hg	0.001 @ 12" Hg	0.02	103.8	90-110%
		I-M29-4	0.008 @ 15" Hg	0.002 @ 18" Hg	0.02	105.1	90-110%
	Wet Scrubber Outlet	O-M29-3	0.002 @ 10" Hg	0.002 @ 15" Hg	0.02	97.8	90-110%
		O-M29-4	0.002 @ 11" Hg	0.002 @ 11" Hg	0.02	95.9	90-110%
	Wet Scrubber Outlet	O-23-3	0.008 @ 15" Hg	0.019 @ 17" Hg	0.02	103.4	90-110%
		O-23-4	0.005 @ 15" Hg	0.002 @ 16" Hg	0.02	102.0	90-110%
	Wet Scrubber Outlet	O-0010-3	0.011 @ 16" Hg	0.004 @ 11" Hg	0.02	101.2	90-110%
		O-0010-4	0.004 @ 15" Hg	0.003 @ 11" Hg	0.02	100.8	90-110%

6.3 LABORATORY ANALYSES

6.3.1 Particulate Matter

Particulate matter analysis consisted of front half acetone sample rinses and quartz fiber filters. Prior to the field testing program, the filters were tared in the PES (or DEECO) laboratory, stored in petri dishes, and sealed with Teflon® tape. Several beakers were also cleaned and tared for subsequent use in evaporating the acetone rinses. Upon receipt in the PES laboratory, the acetone rinses were placed in the tared beakers and evaporated to dryness at room temperature. The filters and beakers were desiccated and weighed to a constant weight. All weighings were within the method requirements of 0.5 milligrams between two consecutive weighings taken at least six hours apart.

6.3.2 EPA Method 29

TLI analyzed the EPA Method 29 samples consisting of eight stack gas samples, two blank samples and one reagent blank to determine concentrations of antimony (Sb), arsenic (As), barium (Ba), beryllium (Be), cadmium (Cd), chromium (Cr), cobalt (Co), lead (Pb), manganese (Mn), mercury (Hg), nickel (Ni), phosphorus (P), selenium (Se), silver (Ag), thallium (Tl), and zinc (Zn). All metals, except Hg, Tl, As and Co concentrations, were determined by inductively coupled plasma emission spectroscopy (ICP). Thallium concentrations for most of the back half samples (refer to the TLI case narrative for an exact listing of the samples) were determined using graphite furnace atomic absorption (GFAA). Arsenic and Co were also analyzed by GFAA. Specific TLI QA/QC activities for GFAA and ICP analyses consisted of: laboratory control spikes, post-digestion matrix spikes of one sample set, duplicate analysis of one sample set, serial dilution and analysis of one sample set, analysis of a method blank, and analysis of field and reagent blanks. Mercury was analyzed by cold vapor atomic absorption spectroscopy (CVAAS). Specific TLI QA/QC activities for CVAAS analyses consisted of analysis of a method blank and analysis of field and reagent blanks. The results of these QA/QC activities are summarized in Tables 6.5 through 6.10 for metals other than Hg and in Tables 6.11 through 6.14 for Hg. Complete QA/QC data are contained in the TLI analytical report in Appendix C.

6.3.3 EPA Method 23 PCDDs/PCDFs

Prior to the field testing program, TLI prepared PES' XAD®-2 adsorbent traps and precleaned the glass fiber filters. TLI's laboratory QA/QC program consisted of adding isotopically labeled standards to each sample at various stages of the project to determine recovery efficiencies. The following types of standards were used:

TABLE 6.5

SUMMARY OF EPA METHOD 29 ANALYSIS QC DATA
LAB CONTROL SPIKES (LCS)

Analyte	Spike Amt $\mu g/L^a$	LCS Recovery	Recovery Limits
Ag	50	88%	80-120%
As	50	79%	80-120%
Ba	50	91%	80-120%
Be	50	88%	80-120%
Cd	50	91%	80-120%
Co	50	94%	80-120%
Cr	50	91%	80-120%
Mn	50	92%	80-120%
Ni	50	90%	80-120%
P	1000	91%	80-120%
Pb	50	91%	80-120%
Sb	50	92%	80-120%
Se	50	91%	80-120%
Tl	50	91%	80-120%
Zn	200	92%	80-120%

[a] Micrograms per liter.

TABLE 6.6

SUMMARY OF EPA METHOD 29 ANALYSIS QC DATA MATRIX SPIKES (POST-DIGESTION)

		Percent Recovery*		
Analyte	**Spike Amt μg**	**Run No. M29-1-FH**	**Run No. M29-1-BH**	**Recovery Limits**
Ag	50	87%	76%	75-125%
As	50	82%	104%	75-125%
Ba	50	SL	96%	75-125%
Be	50	65%	93%	75-125%
Cd	50	SL	97%	75-125%
Co	25	92%	N/A	75-125%
Cr	50	SL	94%	75-125%
Mn	50	SL	94%	75-125%
Ni	50	SL	95%	75-125%
P	1000	83%	86%	75-125%
Pb	50	SL	93%	75-125%
Sb	50	SL	90%	75-125%
Se	50	SL	72%	75-125%
Tl	50/25	SL	93%	75-125%
Zn	200	SL	90%	75-125%

*SL = Spike Low, % Recovery is not considered valid when spike amount is less than 20% of recovered amount.

TABLE 6.7

SUMMARY OF EPA METHOD 29 ANALYSIS QC DATA
DUPLICATE ANALYSES

Analyte	Sample μg[a]	Duplicate μg[a]	RPD[b]	RPD Limits
Run I-M29-2-FH[c]				
Ag	25.2	24.7	2.00%	± 20%
As[d]	82.4	N/A	N/A	± 20%
Ba	1,170	1,190	1.69%	± 20%
Be	2.37	2.34	1.27%	± 20%
Cd	231	227	1.75%	± 20%
Co[d]	46.7	N/A	N/A	± 20%
Cr	1,020	1,010	0.985%	± 20%
Mn	140,800	149,500	5.99%	± 20%
Ni	55.7	55.2	0.902%	± 20%
P	5,560	5,550	0.180%	± 20%
Pb	22,300	23,800	6.51%	± 20%
Sb	54.4	59.1	8.28%	± 20%
Se	60.0	58.7	2.19%	± 20%
Tl	63.7	63.2	0.788%	± 20%
Zn	160,700	172,100	6.85%	± 20%
Run I-M29-2-BH[e]				
Ag	2.32	2.44	5.04%	± 20%
As[d]	1.90	N/A	N/A	± 20%
Ba	32.0	31.9	0.313%	± 20%
Be	0.205	0.206	< RDL	± 20%
Cd	10.7	10.8	0.930%	± 20%
Co[d]	4.12	N/A	N/A	± 20%
Cr	27.9	28.2	1.07%	± 20%
Mn	3,360	3,850	13.6%	± 20%
Ni	2.06	2.18	< RDL	± 20%
P	99.1	99.9	0.804%	± 20%
Pb	497	501	0.802%	± 20%
Sb	3.89	4.24	< RDL	± 20%
Se	1.59	1.54	< RDL	± 20%
Tl[d]	< 0.217	N/A	N/A	± 20%
Zn	4,090	4,140	1.22%	± 20%

[a] Micrograms
[b] RPD = Relative Percent Deviation, which is not considered when the concentration in the analyte is less than 10 times the Reported Detection Limit (RDL) for ICP analysis and 5 times the RDL for GFAA analysis.
[c] Front Half
[d] Duplicate analysis not reported for elements analyzed by GFAA.
[e] Back Half

TABLE 6.8

SUMMARY OF EPA METHOD 29 ANALYSIS QC DATA
SERIAL DILUTION

Analyte	Sample μg	Serial Dilution μg[a]	RPD[b]	RPD Limits
Run I-M29-1-FH[c]				
Ag	10.8	12.3	13.0%	± 10%
As	28.2	27.3	< RDL	± 10%
Ba	406	424	4.34%	± 10%
Be	< 0.100	< 0.500	< RDL	± 10%
Cd	82.8	97.0	15.8%	± 10%
Co	31.3	40.7	26.1%	± 10%
Cr	502	574	13.4%	± 10%
Mn	61,300	62,400	1.78%	± 10%
Ni	37.5	44.9	18.0%	± 10%
P	476	530	10.7%	± 10%
Pb	9,560	9,610	0.522%	± 10%
Sb	66.5	74.4	11.2%	± 10%
Se	25.1	23.5	6.58%	± 10%
Tl	30.8	39.5	24.8%	± 10%
Zn	77,200	78,200	1.29%	± 10%
Run I-M29-1-BH[d]				
Ag	0.245	< 0.600	< RDL	± 20%
As	< 0.900	< 4.50	< RDL	± 20%
Ba	0.672	< 1.20	< RDL	± 20%
Be	< 0.120	< 0.600	< RDL	± 20%
Cd	0.326	< 0.600	< RDL	± 20%
Co	0.264	0.900	< RDL	± 20%
Cr	1.80	< 1.20	< RDL	± 20%
Mn	11.6	12.3	5.86%	± 20%
Ni	0.863	< 1.80	< RDL	± 20%
P	11.1	< 18.0	< RDL	± 20%
Pb	11.6	12.4	6.67%	± 20%
Sb	0.890	< 2.40	< RDL	± 20%
Se	0.427	< 1.80	< RDL	± 20%
Tl	< 0.240	< 1.20	< RDL	± 20%
Zn	62.7	70.5	< RDL	± 20%

[a] Micrograms
[b] RPD = Relative Percent Deviation, which is not considered when the concentration in the analyte is less than 10 times the Reported Detection Limit (RDL) for ICP analysis and 5 times the RDL for GFAA analysis.
[c] Front Half
[d] Back Half

TABLE 6.9

SUMMARY OF EPA METHOD 29 ANALYSIS QC DATA
METHOD BLANK RESULTS

Analyte	Detection Limit $\mu g/L^a$	MB 1 Recovered Amount $\mu g/L^a$
Ag	1	-0.47
As	7.5	-0.30
Ba	2	-0.05
Be	1	0.01
Cd	1	-0.37
Co	1.5	0.70
Cr	2	0.92
Mn	2	0.12
Ni	3	-1.13
P	30	-12.45
Pb	2	0.20
Sb	4	-1.43
Se	3	0.08
Tl	5	-2.46
Zn	12	5.47

The Method Blank is considered a "Pass" when the recovered amount is less than the detection limit.
[a] Micrograms per liter.

TABLE 6.10

SUMMARY OF EPA METHOD 29 ANALYSIS QC DATA FIELD BLANKS RESULTS

Analyte	Outlet Front Half, μg[a]	Outlet Back Half, μg[a]
Ag	0.129	0.128
As	< 0.750	< 0.750
Ba	13.0	0.366
Be	< 0.100	< 0.100
Cd	< 0.100	< 0.100
Co	0.640	< 0.150
Cr	7.06	0.737
Mn	1.54	4.69
Ni	4.03	< 0.300
P	5.19	4.35
Pb	0.237	1.08
Sb	3.89	0.550
Se	4.07	< 0.300
Tl	0.720	0.610
Zn	10.2	6.78

[a] Micrograms.

TABLE 6.11

SUMMARY OF EPA METHOD 29 ANALYSIS QC DATA
MERCURY SUMMARY REPORT - LAB CONTROL SPIKES

Sample ID	Spike Amount $\mu g/L$[a]	Recovery	Recovery Limits
LCS 1	4.7	95%	80-120%
LCS 1 Dup	4.8	96%	80-120%
LCS 2	5.2	103%	80-120%
LCS 2 Dup	5.2	104%	80-120%

[a] Micrograms per liter.

TABLE 6.12

SUMMARY OF EPA METHOD 29 ANALYSIS QC DATA
MERCURY SUMMARY REPORT - MATRIX SPIKES (PRE-DIGESTION)

Sample ID	Spike Concentration $\mu g/L$[a]	Recovery	Recovery Limits
I-M29-1-H202 BH MS	5	97%	75-125%
I-M29-1-H202 BH MSD	5	100%	75-125%
O-M29-1-H202 BH MS	5	81%	75-125%
O-M29-1-H202 BH MSD	5	83%	75-125%
O-M29-2-H202 BH MS	5	104%	75-125%
O-M29-2-H202 BH MSD	5	111%	75-125%
O-M29-4 H202 BH MS	5	108%	75-125%
O-M29-4-H202 BH MSD	5	113%	75-125%

[a] Micrograms per liter.

TABLE 6.13

SUMMARY OF EPA METHOD 29 ANALYSIS QC DATA
MERCURY SUMMARY REPORT - METHOD BLANK

Sample ID	Detection Limit $\mu g/L^a$	Recovered Amount, $\mu g/L^a$
MB1	0.200	0.023
MB1 Dup	0.200	0.005
MB2	0.200	0.018
MB2 Dup	0.200	0.010

The Method Blank is considered a "pass" when the recovered amount is less than the detection limit.
[a] Micrograms per liter.

TABLE 6.14

SUMMARY OF EPA METHOD 29 ANALYSIS QC DATA
MERCURY SUMMARY REPORT - FIELD AND REAGENT BLANKS

Sample ID	Outlet Field Blank μg[a]	Reagent Blank μg[a]
FH	< 0.400	< 0.400
FH - Dup	< 0.400	< 0.400
BH	< 0.600	< 0.600
BH- Dup	< 0.600	< 0.600
HNO_3	< 0.400	< 0.116
HNO_3 - Dup	< 0.400	< 0.116
$KMnO_4$	< 1.60	< 1.60
$KMnO_4$ - Dup	< 1.60	< 1.60
HCl	< 0.880	< 0.920
HCl - Dup	< 0.880	< 0.920

[a] Micrograms

Internal Standards were spiked in the TLI laboratory after the field sampling program and prior to sample extraction. Recovery efficiencies for these compounds were used in quantifying the actual PCDDs/PCDFs isomers measured in the samples.

Surrogate Standards were spiked in the TLI laboratory on the XAD®-2 resin prior to the field sampling program. Recovery efficiencies for these surrogate compounds provided a measure of the sample collection efficiency and an indication of any analytical matrix effects.

Alternate Standards were spiked in the TLI laboratory after the field sampling program and prior to sample extraction. Recovery of these compounds indicated the extraction efficiencies.

Recovery Standards were added in the laboratory after extraction just prior to GC/MS analysis.

Table 6.15 summarizes the recovery efficiencies for the various standards and the respective quality control limits. The recovery efficiencies for the XAD® blank, field blank, and samples were all within the method QC limits. Refer to TLI's case narrative for their discussion of any quality control anomalies.

6.3.4 SW-846 Method 0010

TLI analyzed the SW-846 Method 0010 samples following the procedures of SW-846 Method 8270A Rev. 1 (7/92). Field blanks and laboratory blanks were used to check for contamination. The blanks were processed in the same way the field samples were processed. The results of the field and laboratory blanks are presented in Table 6.16. Also shown are the average catch weights for the compounds presented. The significance of the blank values was discussed in Section 2.

A five point initial calibration was performed using internal standards and instrument response factors developed for the target analytes. Method 8720A procedures require the percent standard deviations of the initial calibrations to be within 50% for most analytes and 30% for some analytes. All internal standards were within the Method 8270A quality control criteria. The XAD®-2 resins were spiked with surrogate standards prior to the field sampling. The percent recoveries for the surrogate standards are presented in Table 6.17.

TABLE 6.15

SUMMARY OF EPA METHOD 23 STANDARDS RECOVERY EFFICIENCIES

	Percent Recovery								QC Limits
	TLI M23 Blank	M23 1	M23 2	Trip Blank	O-23-1	O-23-2	O-23-3	O-23-4	
FULL SCREEN ANALYSIS									
Internal Standards									
2,3,7,8-TCDF	79.4	57.6	78.9	85.0	89.8	103	45.9	69.7	40-130%
2,3,7,8-TCDD	75.4	86.4	90.2	82.3	85.5	90.5	58.6	83.5	40-130%
1,2,3,7,8-PeCDF	96.9	93.5	87.5	101	78.8	96.1	77.7	96.0	40-130%
1,2,3,7,8-PeCDD	86.6	109	100	118	83.7	103	84.8	110	40-130%
1,2,3,6,7,8-HxCDF	123	110	102	105	111	120	62.8	85.6	40-130%
1,2,3,6,7,8-HxCDD	94.9	102	101	95.7	94.1	106	61.3	87.7	40-130%
1,2,3,4,6,7,8-HpCDF	92.5	80.5	82.1	90.0	61.3	92.4	47.5	65.1	25-130%
1,2,3,4,6,7,8-HpCDD	87.5	99.6	94.8	102	95.0	89.7	70.9	84.5	25-130%
1,2,3,4,6,7,8,9-OCDD	84.0	99.7	95.1	104	63.5	63.8	89.2	95.2	25-130%
Surrogate Standards									
2,3,7,8-TCDD	92.5	85.8	89.0	94.1	93.7	102	85.9	91.1	70-140%
2,3,4,7,8-PeCDF	100	97.7	94.4	98.5	95.6	92.0	80.7	95.4	70-140%
1,2,3,4,7,8-HxCDF	92.3	88.3	95.3	93.1	92.0	95.8	88.1	99.0	70-140%
1,2,3,4,7,8-HxCDD	96.7	94.3	99.6	96.8	98.9	85.6	97.6	101	70-140%
1,2,3,4,7,8,9-HpCDF	91.3	98.3	88.0	92.4	101	94.6	97.2	105	70-140%
Alternate Standards									
1,2,3,7,8,9-HxCDF	68.6	79.9	93.3	85.3	101	107	49.2	75.3	40-130%
2,3,4,6,7,8-HxCDF	81.4	91.8	104	104	112	116	48.9	82.5	40-130%
CONFIRMATION ANALYSIS									
Internal Standards									
2,3,7,8-TCDF			81.8		95.4	102	58.9	87.9	40-130%

* Confirmation analysis was not necessary on these samples since no TCDF's were detected in the full screen analysis.

TABLE 6.16

SW-846 METHOD 0010 FIELD AND LABORATORY BLANKS RESULTS

Compound	Amount, micrograms*			
	Average Catch Weight**	Field Blank	Method Blank	Laboratory Blank
Acetophenone	13.12	3.78	2.53	ND
Di-n-butylphthalate	{10.98}	3.41	1.61	29.02
2-Chloroacetophenone	ND	{0.35}	3.83	{0.41}
bis(2-Ethylhexyl)phthalate	{20.56}	21.61	0.57	1.19
Naphthalene	{52.80}	5.85	2.44	ND

* Values in brackets { } are estimated values that were above the detection limit, but below the quantitation limit.
ND = Compound was not detected.

** Average Catch Weight = Average sample amount from runs O-0010-1, O-0010-2, O-0010-3 and O-0010-4.

TABLE 6.17

SW-846 METHOD 0010 SURROGATE RECOVERY RESULTS

Surrogate	Percent Recovery							Method QC Limits
	O-0010-1	O-0010-2	O-0010-3	O-0010-4	Field Blank	Method 0010 Blank	Lab Blank	
Phenol-d_5	77	79	77	75	66	57	69	20-120 %
Nitrobenzene-d_5	76	68	72	63	62	56	74	20-120 %
1,3,5-Trichlorobenzene-d_3	80	63	68	58	60	53	63	20-120 %
1,4-Dibromobenzene-d_4	82	81	82	71	68	64	74	20-120 %
2-Fluorobiphenyl	82	78	84	81	72	67	72	20-120 %
2,4,6-Tribromophenol	103	108	110	119	92	99	91	20-120 %
Anthracene-d_{10}	103	93	98	91	90	95	92	20-120 %
Pyrene-d_{10}	82	81	87	79	87	106	97	20-120 %
Terphenyl-d_{14}	91	90	94	86	108	ND	ND	20-120 %

ND = None Detected.

APPENDIX A

RAW FIELD DATA

Appendix A.1

Raw Field Data

Wet Scrubber Inlet

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

Plant: GM @ Saginaw MI

Date: ~~9-22-97~~ 9-21-97

Sampling Location: Inlet Cupola

Inside of Far Wall to Outside of Nipple: 70 3/8"

Inside of Near Wall to Outside of Nipple (Nipple Length): 4 1/8"

Stack I.D.: 66 1/4"

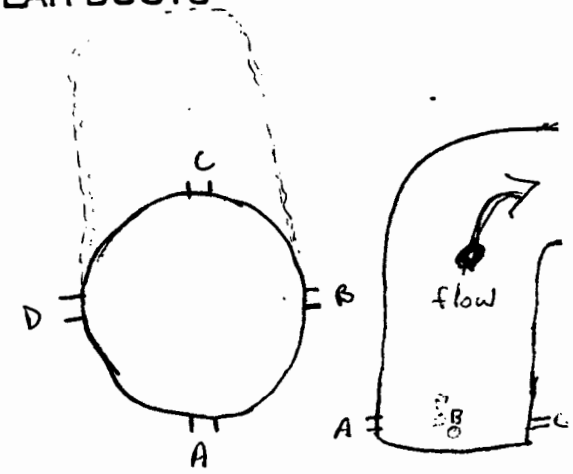
Distance Downstream from Flow Disturbance (Distance B):

80" inches / Stack I.D. = 1.2 dd

Distance Upstream from Flow Disturbance (Distance A):

93 1/4" inches / Stack I.D. = 1.4 dd

Calculated By: ADD



Schematic of Sampling Location

Traverse Point Number	Fraction of Length	Length (inches)	Product of Columns 2 & 3 (To nearest 1/8")	Nipple Length (inches)	Traverse Point Location (Sum of Col. 4 & 5)
1	0.021	66.25	1.391 ~ 1 3/8"	4 1/8"	5 1/2"
2	0.067	66.25	4.439 ~ 4 1/2"	4 1/8"	8 5/8"
3	0.118	66.25	7.818 ~ 7 3/4"	4 1/8"	11 7/8"
4	0.177	66.25	11.726 ~ 11 3/4"	4 1/8"	15 7/8"
5	0.250	66.25	16.563 ~ 16 5/8"	4 1/8"	20 3/4"
6	0.356	66.25	23.585 ~ 23 5/8"	4 1/8"	27 7/8"
7	0.644	66.25	42.665 ~ 42 5/8"	4 1/8"	46 3/4"
8	0.750	66.25	49.688 ~ 49 5/8"	4 1/8"	53 3/4"
9	0.823	66.25	54.524 ~ 54 1/2"	4 1/8"	58 5/8"
10	0.882	66.25	58.433 ~ 58 3/8	4 1/8"	62 1/2"
11	0.933	66.25	61.811 ~ 61 3/4"	4 1/8"	65 7/8"
12	0.979	66.25	64.859 ~ 64 7/8"	4 1/8"	69"

.125
.25
.375
.5
.625
.75
.875

GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant: G.M. @ Saginaw MI Date: 9-23-97
Sampling Location: Inlet Clock Time: 1:55
Run #: Pre-test data Operators: ADD / MM
Barometric Pressure, in. Hg: 29.74 Static Pressure, in. H_2O: -19.75
Moisture, %: 12 Molecular wt., Dry: 30.4 Pitot Tube, Cp: 0.84
Stack Dimension, in. Diameter or Side 1: 66 1/4" Side 2: ——
Wet Bulb, °F: —— Dry Bulb, °F: ——

Traverse Point Number	Velocity Head in. H_2O	Stack Temp. °F (10° Upstream)
A 1	1.2	138/11
2	1.3	141/12
3	1.1	144/2
4	1.1/1.1	143/3
5	1.2	144/5
6	~~1.2~~ 1.3	145/3
7	0.93	145/4
8	0.96	146/3
9	0.95	147/6
10	1.1	149/10
11	1.1	150/12
12	1.2	150/14
B 1	3.1	135/9
2	1.2	136/10
3	1.3	138/6
4	1.4	139/5
5	1.3	140/1
6	~~1.2~~ 1.2	140/1
7	0.76	141/5
8	0.34	140/6
9	0.32	140/14
10	0.28	138/13
11	0.20	136/14
12	0.20	137/1
	$\overline{\sqrt{\Delta P}}$ = 0.979	$\overline{T_s}$ = 141.8

7.1

$Md = (0.44 \times \%CO_2) + (0.32 \times \%O_2) + (0.28 \times \%N_2)$

$Md = (0.44 \times \quad) + (0.32 \times \quad) + (0.28 \times \quad)$

$Md =$

$Ms = Md \times (1 - \frac{\%H_2O}{100}) + 18 (\frac{\%H_2O}{100})$

$Ms = (\quad) \times (1 - \frac{\quad}{100}) + 18 (\frac{\quad}{100})$

$Ms =$

$\overline{T_s} =$ °F = °R (°F + 460)

$P_s = P_b + \frac{S.P.}{13.6} = (\quad) + \frac{\quad}{13.6}$

$P_s =$ in. Hg

$\overline{\sqrt{\Delta P}} =$

$V_s = 85.49 \times C_p \times \overline{\sqrt{\Delta P}} \times \sqrt{\frac{T_s (°R)}{P_s \times M_s}}$

$V_s = 85.49 \times (\quad) \times (\quad) \times \sqrt{\quad}$

$V_s =$ ft/s

$A_s =$ ft^2

$Q_s = V_s \times A_s \times 60$ s/m

$Q_s = \quad \times \quad \times 60$

$Q_s =$ acfm

$Q_{s_{std}} = Q_s \times 17.647 \times \frac{P_s}{T_s} \times (1 - \frac{\%H_2O}{100})$

$Q_{s_{std}} = \quad \times 17.647 \times \frac{\quad}{\quad} \times (1 - \frac{\quad}{100})$

$Q_{s_{std}} =$ dscfm

~~Ts 125 K = 1.0000~~
~~Pb = 0.9600~~
Pg 1 of 2

FIELD DATA SHEET

Plant: L-M @ Saginaw MI
Sampling Location: Inlet
Run Number: SI M29-1 Date: 9-23-97
Pretest Leak Rate: 0.003 cfm @ 11" in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: ✓

Sample Type: M29 Operator: ADD/MM
Pbar: 29.74 Ps: -19.75
CO2: O2:
Probe Length/Type: 6'/Glass Pitot #: 6-0
Stack Diameter: 66 1/4" As: —

Nozzle ID: 0.192 Thermocouple #: 60
Assumed Bws: 12.15 Filter #:
Meter Box #: M-11 Y: 1.024 ΔH@: 1.861
Post-Test Leak Rate: 0.001 cfm @ 10 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: ✓

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Actual	Stack Temp. (Ts)	Temperature °F Probe	Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Outlet (Tm out °F)	Pump Vacuum (in. Hg)
A 1	0	14:10	401.848										
1	5		405.39	1.4	1.4	1.4	109	230	237	68	98	90	4
2	10	14:20	408.75	1.0	0.98	0.98	116	230	238	61	101	91	3.5
	15		411.35	1.05	1.1	1.1	116	227	238	60	105	92	4
3	20	14:30	414.37	1.1	1.2	1.2	118	228	238	61	105	92	4.5
	25		417.31	1.1	1.2	1.2	129	227	237	61	106	93	5
4	30	14:40	420.26	1.1	1.24	1.2	132	227	238	62	107	94	5
	35		424.14	.97	1.09	1.1	132	228	238	61	107	94	5
5	40	15:51	427.13	.93	1.04	1.0	130	224	244	61	95	84	5
	45		429.88	.87	0.98	0.98	125	225	243	61	96	84	5
6	50	16:01	432.57	.95	1.06	1.1	128	225	242	60	99	85	6
	55		435.38	.93	1.04	1.0	133	225	242	63	101	86	6
7	60	16:11	438.11	.76	0.86	0.86	123	225	241	64	101	86	6.5
	65		440.67	.73	0.82	0.82	128	226	243	66	102	87	6
8	70	16:21	443.16	.75	0.83	0.83	126	225	243	60	102	87	6
	75		445.66	.67	0.74	0.74	126	224	244	57	103	88	6
9	80	16:31	448.11	.23	0.24	0.24	128	225	244	54	100	88	3
	85		449.85	.65	0.73	0.73	120	225	244	55	97	88	6
10	90	18:20	451.47	.75	0.80	0.80	121	224	243	60	78	78	6
	95		454.36	.85	0.94	0.94	129	225	241	57	82	76	7
11	100	18:30	456.92	.85	0.94	0.94	126	225	241	56	85	76	7
	~~110~~ 105		459.49	.87	0.96	0.96	129	224	243	56	88	75	7
12	~~115~~ 110	18:40	461.22	.33			127	225	243	54	89	76	
	~~120~~ 115	18:41	462.800	— END OF RUN —									
B 1	120												
	~~135~~ 125												
2	130												

Plant down 14:44 → 15:45 Plant up

Plant Down 16:36 18:15 Plant up

Plant Down min 11.05

1.13					
~~125~~ ~~1.13~~					
~~130~~ ~~1.12~~					
~~135~~ ~~1.11~~					
~~140~~ ~~1.10~~					
Tm 105					
15	15				
125	1.13				
130	1.12				
135	1.11				
140	1.10				
Tm 95					
20	1.12				
25	1.11				
30	1.10				
35	1.09				
40	1.08				

ΔVm= 60.951 ✓ $\overline{\sqrt{\Delta p}}$= .9292 ✓ $\overline{\Delta H}$= .96 ✓ $\overline{Ts}$= 125 ✓ $\overline{Tm}$= 92 ✓

Tso 101

FIELD DATA SHEET

Pg 1 of 2

Plant: GM @ Saginaw MI
Sampling Location: Inlet
Run Number: 2 Date: 9-24-97
Pretest Leak Rate: ~~0.012~~ 0.006 cfm @ 11 in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: ✓

Sample Type: M29 Operator: ADD/mm
Pbar: 29.85 Ps: -19.75
CO2: 11 O2: 10
Probe Length/Type: 6'/Glass Pitot #: 6D
Stack Diameter: 66 1/4" As: —

Nozzle ID: 0.192 Thermocouple #: 6D
Assumed Bws: 12 Filter #: 1016
Meter Box #: M5-11 Y: 1.024 ΔH@: 1.861
Post-Test Leak Rate: 0.005 cfm @ 22 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: ✓

SL M29-2

Tm 60

Ts	K
20	1.084
25	1.075
30	1.066
35	1.057
40	1.048
45	1.039
50	1.031
55	1.023

Tm 70

Ts	K
115	1.078
110	1.064
125	1.075
130	1.069
135	1.037
140	~~1.029~~ 1.029

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Orifice Pressure Differential (ΔH) in H2O Actual	Stack Temp. (Ts)	Temperature °F Probe	Temperature °F Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Dry Gas Meter Temp. Outlet (Tm out °F)	Pump Vacuum (in. Hg)
A 12	0	9:34	~~463.488~~ 463.652										
	5		466.51	1.1	1.19	1.2	118	225	239	54	62	59	3.5
11	10	9:44	469.43	1.1	1.19	1.2	122	226	239	52	66	59	3.5
	15		472.31	1.1	1.19	1.2	121	225	239	51	69	60	4
10	20	9:54	475.32	0.81	0.855	0.86	123	225	239	51	76	61	3.5
	25		477.90	0.93	0.990	0.99	122	224	239	52	78	62	4
9	30	10:04	480.54	0.80	0.851	0.85	120	226	240	53	80	63	4
	35		483.05	0.90	0.958	0.96	121	226	239	54	81	64	4.5
8	40	10:14	485.65	0.76	0.809	0.81	122	225	239	55	82	65	4.5
	45		488.09	0.77	0.819	0.82	120	225	239	44	82	66	5
7	50	10:24	490.54	0.73	0.770	0.77	125	225	240	57	82	67	5
	55		492.96	0.86	0.907	0.91	126	230	239	58	82	67	6
6	60	10:34	495.51	1.1	1.16	1.22	125	228	239	58	82	67	6.5
	65		498.37	1.0	1.04	1.0	137	229	239	60	82	67	6.5
5	70	10:44	501.05	1.0	1.06	1.1	124	234	240	64	81	67	7
	75		503.98	1.0	1.03	1.0	138	235	237	64	82	68	7
4	80	10:54	506.58	1.0	1.03	1.0	138	238	238	65	81	68	7
	85		509.25	1.0	1.04	1.0	136	242	240	67	82	68	7.5
3	90	11:04	511.93	1.1	1.14	1.1	134	245	239	60	82	68	8
	95		514.82	1.1	1.14	1.1	135	244	240	56	82	69	8
2	100	11:14	517.67	0.93	0.990	0.99	126	243	241	55	81	69	8
	105		520.42	0.98	1.03	1.0	123	246	240	56	81	69	8.5
1	110	11:24	523.09	0.90	0.436	0.44	128	251	239	58	81	69	8.5
	115		525.64	1.1	1.170	1.2	126	248	240	57	80	69	9.5
B 12	120	~~11:34~~ 11:43	~~528.347~~ 528.452	0.37	0.390	0.39	125	218	223	58	78	68	7.5
	125		530.44	0.41	0.426	0.43	128	224	227	58	81	68	7.5
11	130	11:53	532.75	0.38	0.395	0.40	128	223	232	59	81	69	7.5

Leak ✓
0.00311"
0.00311"

ΔVm= _____ $\overline{\sqrt{\Delta p}}$= _____ $\overline{\Delta H}$= _____ $\overline{Ts}$= _____ $\overline{Tm}$= _____

Plant Name: GM @ Saginaw **Test Date:** 9-24-97

Run Number: 2 SC 1129-2 **Operator:** ADD/MM

Traverse Point Number	Sampling Time, (min.)	Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft³	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Actual	Stack Temp. °F (T_s)	Probe Temp. / Filter Temp. °F	Impinger Temp. °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Outlet ($T_{m_{out}}$) °F	Pump Vacuum In. Hg
	135	/ ~~12:03~~	534.00	0.30	0.317	0.32	124	224 / 236	59	82	69	6
10	140	/ 12:03	535.61	0.30	0.311	0.31	133	225 / 238	61	81	70	6
	145	/	537.15	0.29	0.306	0.31	124	243 / 238	62	81	70	6.5
9	150	/ 12:13	538.70	0.31	0.322	0.32	131	259 / 237	62	81	71	6.5
	155	/	540.30	0.33	0.343	0.34	130	236 / 235	59	80	72	7
8	160	/ 12:23	541.89	0.41	0.433	0.43	129	239 / 236	55	81	72	7.5
	165	/	543.69	0.41	0.433	0.43	125	238 / 235	50	81	71	8
7	170	/ 12:33	545.47	0.68	0.717	0.72	126	235 / 236	53	81	71	11
	175	/	547.68	0.70	0.739	0.74	127	224 / 230	50	82	71	11
6	180	/ 12:43	549.99	0.98	1.02	1.0	132	210 / 233	50	81	71	13
	185	/	552.41	1.1	1.132	1.1	139	221 / 236	50	82	71	14
5	190	/ 12:53	555.07	1.2	1.24	1.2	139	225 / 240	50	82	71	15
	195	/	558.11	1.2	1.25	1.3	132	246 / 256	52	81	71	15.5
4	200	/ 13:03	561.15	1.3	1.35	1.4	132	263 / 257	56	80	72	16
	205	/	564.24	1.2	1.25	1.3	129	268 / 258	55	80	72	17
3	210	/ 13:13	567.43	1.2	1.25	1.3	129	247 / 255	55	80	72	17
	215	/	570.48	1.3	1.35	1.4	130	240 / 257	58	79	72	18.5
2	220	/ 13:23	573.60	1.3	1.35	1.4	130	237 / 246	60	77	72	20.5
	225	/	576.79	1.0	1.04	1.0	132	225 / 251	60	76	72	17.5
1	230	/ 13:33	579.54	1.2	1.24	1.2	136	223 / 254	65	76	71	20
	235	/	582.42	1.3	1.35	1.4	130	227 / 249	60	76	71	21.5
Filter blew	~~240~~	/ 13:43	584.354		END OF RUN							
	237.30	/										
		/		$\overline{\Delta p}$ = 0.9177			$\overline{T_s}$ = 128					

ΔV_m = ~~120.702~~ 120.696 ΔH = 0.903 588 R $\overline{T_m}$ = 73.9 °F ~~534 R~~

JC

Port change 1st leak check 0.017 @ 11" Changed filter housing
2nd leak check 0.002 @ 11"

FIELD DATA SHEET

Plant: GM
Sampling Location: Inlet Scrubber
I M29-3 Run Number: 3 Date: 9/25/97
Pretest Leak Rate: 0.014 mm cfm @ 27 mm in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: ✓

Sample Type: M29 Operator: MM/AM
Pbar: 29.10 Ps: -19.75
CO2: 11 O2: 10
Probe Length/Type: 6' Glass Pitot #: 60
Stack Diameter: 66¼" As: [illegible]

Nozzle ID: ~~0.216~~ 0.260 Thermocouple #: 6D
Assumed Bws: [illegible] Filter #:
Meter Box #: M5-11 Y: 1.024 ΔH@: 1.861
Post-Test Leak Rate: .001 cfm @ 12 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: ✓

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Actual	Stack Temp. (Ts)	Temperature °F Probe	Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Outlet (Tm out °F)	Pump Vacuum (in. Hg)
A12	0	8:38	587.005	1.05	3.168	3.15	140	273	270	67	70	62	5
11	5		592.52	~~[illegible]~~ 1.05	3.168	3.15	170	266	262	52	71	63	5
10	10		597.11	.99	2.851	2.9	143	264	262	53	75	63	6
9	15		601.68	.90	2.386	2.4	142	271	267	55	76	64	7
8	20		605.88	.85	2.448	2.4	142	272	274	57	76	65	6
7	25		610.10	.86	2.841	2.8	132	274	273	59	78	65	7
6	30		614.51	1.05	3.469	3.5	131	269	273	61	78	66	8
5	35		619.48	1.05	3.024	3.0	138	242	271	62	79	67	8
4	40		624.19	1.0	2.880	2.9	139	253	273	65	79	67	8
3	45		628.83	1.0	3.098	3.1	136	265	274	66	79	68	9
2	50		633.63	.93	3.156	3.2	126	272	274	68	79	68	9
1	55		Port change 638.47	1.1	3.733	3.7	126	269	275	66	80	69	10
B 1	60	9:38 10:30	645.168 643.316	1.05	3.564	3.55	126	253	271	68	78	71	5
2	65		650.10	1.0	3.394	3.4	126	240	263	63	83	72	6
3	70		654.99	1.0	3.394	3.4	125	247	263	56	87	73	7
4	75		659.95	1.1	3.733	3.7	125	259	269	56	89	74	9
5	80		665.19	1.1	3.738	3.7	130	263	272	55	90	76	10
6	85		670.32	1.2	3.554	3.6	138	274	270	58	89	77	11
7	90	11:05 11:16	675.41 679.212	.80	2.549	2.5	136	256	263	60	88	78	11
8	95		680.05	.50	1.699	1.7	130	255	267	63	85	77	10
9	100	11:22 11:31	683.72	.40	1.359	1.4	127	237	270	64	87	78	9
10	105		686.90	.31	1.115	1.1	127	273	274	67	89	76	8
11	110		689.85	.28	1.007	1.0	127	270	266	62	90	79	7
12	115		692.59	.32	1.087	1.1	129	266	266	62	90	79	9
	120	11:49	695.948										

ΔVm = 1 / 1.08 avg √Δp = ~~.933~~ .95 ΔH = 2.765 / 2.35 Ts = 132.583 / 3182 Tm = ~~73.583~~ / 3537 76.33 / 366.

70°
~~130 → 1.607~~
115 → 3.683
125 → 3.374
130 → 3.304
140 → 2.880
145 → 2.651
135 → 3.088
85
120 → 2.78
125 → 3.578
130 → 3.38
140 → 2.762
135 → 3.186

JC

Pre - .001 @ 7"
Post - .006 @ 15"

FIELD DATA SHEET

Plant: GM
Sampling Location: Inlet Scrubber
SIM29-4 Run Number: 4 Date: 9/25/97
Pretest Leak Rate: .008 cfm @ 15 in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: ✓

Sample Type: M-29 Operator: MM/ADD
Pbar: 29.10 Ps: -19.75
CO2: 11 O2: 10
Probe Length/Type: 6' Glass Pitot #: 60
Stack Diameter: 66¼ As:

Nozzle ID: .256 Thermocouple #: 60
Assumed Bws: 14 Filter #:
Meter Box #: M5-11 Y: 1.024 ΔH@: 1.861
Post-Test Leak Rate: .002 cfm @ 18 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: ✓

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Actual	Stack Temp. (Ts)	Temperature °F Probe	Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Outlet (Tm out °F)	Pump Vacuum (in. Hg)
B12	0	15:12	696.317	.31	1.072	1.1	134	270	268	57	102	96	3
11	5		700.25	.25	.811	.81	135	267	270	57	103	96	3
10	10		702.78	.26	.843	.84	136	245	270	58	105	97	3
9	15	15:31/15:40	705.32	.27	.876	.88	136	248	273	58	107	97	4
8	20		708.61	.34	1.176	1.2	130	263	259	67	100	98	4
7	25	16:35	711.63	1.0	3.459	3.5	131	265	273	58	103	98	8
6	30		717.30	1.2	3.618	3.6	138	265	252	56	97	95	9
5	35		722.40	1.3	3.886	3.9	142	253	273	49	105	96	10
4	40		727.73	1.2	3.618	3.6	138	267	269	52	109	96	12
3	45		732.90	1.3	4.216	4.2	134	254	267	55	110	96	15
2	50		738.42	1.1	3.567	3.6	136	254	269	58	108	97	15
1	55		743.61	1.1	3.317	3.3	138	247	268	64	107	96	16
A12	60	17:05 17:45	748.50	1.0	3.015	3.0	140	273	251	56	100	93	5
11	65		753.73	.95	2.613	2.6	145	265	267	51	107	93	5
10	70		758.17	.91	2.526	2.5	145	266	272	51	110	94	6
9	75		762.52	.96	2.664	2.7	143	264	265	52	110	94	7
8	80		767.02	.82	2.276	2.3	143	264	265	55	110	95	8
7	85		771.18	.91	2.744	2.7	139	263	268	54	110	98	9
6	90		775.82	1.1	3.805	3.8	137	263	267	55	111	96	12
5	95		781.05	.92	2.774	2.8	138	230	263	56	110	96	11
4	100		785.87	1.0	3.015	3.0	141	271	269	59	109	96	12
3	105		790.53	1.0	3.015	3.0	139	263	268	60	109	96	13
2	110		795.43	1.1	3.805	3.8	131	260	267	61	109	96	16
1	115		800.70	.90	3.297	3.3	126	259	265	65	106	96	17
	120	6:45	805.821				END OF RUN						

125 → 3.66
130 → 3.45
135 → 3.243
140 → 3.015
145 → 2.776

105°
106°
130 → 3.429
135 → 3.215
140 → 2.989
145 → 2.751

109.504 ΔVm= 109.178 √Δp= 0.9172 ΔH= ~~2.705~~ 2.751 Ts= ~~131.250~~ 136.917 Tm= 101

~~64.93~~ 3286
160.03

JC

PARTICULATE/SAMPLE RECOVERY DATA SHEET

Client/Location: PES/GM-SAGINAW Sampling Date(s): 9/22/97-9/25/97

RUN No.: I-M29-1 Recovery Date: 9/23 Recovered By: BHR

Impingers:	1	2	3	4	5	6	Silica Gel
Final Wt.	756.0	702.6	732.2	481.7	715.7	642.4	918.8
Initial Wt.	595.1	589.2	709.8	476.9	712.6	644.7	904.8
Net Weight	160.9	113.4	22.4	4.8	3.1	-2.3	14.0

2HR

Total Moisture = 316.3 grams

Description of Impinger Contents: CLEAR

Silica Gel Color: _____ Percent Spent: 20 %

Filter I.D. No.: _____ Filter Container I.D.: _____

Description of Particulate on Filter: BROWN Sealed: (Y) N

Probe Rinse Container I.D.: _____ Liquid Level Marked/Sealed: (Y) N

Impinger Contents Container: _____ Liquid Level Marked/Sealed: (Y) N

RUN No.: I-M29-2 Recovery Date: 9/24 Recovered By: BHR

Impingers:	1	2	3	4	5	6	Silica Gel
Final Wt.	1040.1	744.3	815.3	782.2	786.6	645.5	950.1
Initial Wt.	595.0	589.6	713.1	481.9	710.8	642.5	918.6
Net Weight	445.1	154.7	102.2	300.3	75.8	3.0	31.5

4HR

BAD RUN FOR Hg FIRST KMNO4 IMP SPENT.

Total Moisture = 1112.6 grams

Description of Impinger Contents: CLOUDY

Silica Gel Color: _____ Percent Spent: 60 %

Filter I.D. No.: _____ Filter Container I.D.: _____

Description of Particulate on Filter: FILTER WET & BLOWN DARK Sealed: Y N

Probe Rinse Container I.D.: _____ Liquid Level Marked/Sealed: Y N

Impinger Contents Container: _____ Liquid Level Marked/Sealed: Y N

RUN No.: I-M29-3 Recovery Date: 9/25 Recovered By: BHR

Impingers:	1	2	3	4	5	6	Silica Gel
Final Wt.	825.5	975.6	952.2	509.7	774.0	689.9	807.1
Initial Wt.	556.6	739.1	713.2	485.5	738.8	712.7	777.5
Net Weight	268.9	236.5	239.0	24.2	35.2	-22.8	29.6

2HR

CYCLONE H_2O = 103.4 g →

Total Moisture = 914.0 grams

Description of Impinger Contents: CLEAR W/ SLIGHT STRAW COLOR

Silica Gel Color: _____ Percent Spent: 50 %

Filter I.D. No.: _____ Filter Container I.D.: _____

Description of Particulate on Filter: HEAVY & DRY / BROWN Sealed: Y N

Probe Rinse Container I.D.: _____ Liquid Level Marked/Sealed: Y N

Impinger Contents Container: _____ Liquid Level Marked/Sealed: Y N

BLANKS: Probe rinse: _____ Impinger: _____ Filter: _____

PARTICULATE/SAMPLE RECOVERY DATA SHEET

Client/Location: PES/GM-SAGINAW Sampling Date(s): 9/22-9/25/97

RUN No.: I-M29-4 Recovery Date: 9/25 Recovered By: BHR

Impingers:	1	2	3	4	5	6	Silica Gel
Final Wt.	1005.1	879.3	790.9	608.5	723.8	650.4	893.0
Initial Wt.	595.6	710.0	584.4	480.4	718.3	647.7	863.7
Net Weight	409.5	169.3	206.5	128.1	5.5	2.7	29.3

Total Moisture = 950.9 grams

Description of Impinger Contents: _____

Silica Gel Color: _____ Percent Spent: _____ %

Filter I.D. No.: _____ Filter Container I.D.: _____

Description of Particulate on Filter: _____ Sealed: Y N

Probe Rinse Container I.D.: _____ Liquid Level Marked/Sealed: Y N

Impinger Contents Container: _____ Liquid Level Marked/Sealed: Y N

RUN No.: _____ Recovery Date: _____ Recovered By: _____

Impingers:	1	2	3	4	5	6	Silica Gel
Final Wt.							
Initial Wt.							
Net Weight							

Total Moisture = _____ grams

Description of Impinger Contents: _____

Silica Gel Color: _____ Percent Spent: _____ %

Filter I.D. No.: _____ Filter Container I.D.: _____

Description of Particulate on Filter: _____ Sealed: Y N

Probe Rinse Container I.D.: _____ Liquid Level Marked/Sealed: Y N

Impinger Contents Container: _____ Liquid Level Marked/Sealed: Y N

RUN No.: _____ Recovery Date: _____ Recovered By: _____

Impingers:	1	2	3	4	5	6	Silica Gel
Final Wt.							
Initial Wt.							
Net Weight							

Total Moisture = _____ grams

Description of Impinger Contents: _____

Silica Gel Color: _____ Percent Spent: _____ %

Filter I.D. No.: _____ Filter Container I.D.: _____

Description of Particulate on Filter: _____ Sealed: Y N

Probe Rinse Container I.D.: _____ Liquid Level Marked/Sealed: Y N

Impinger Contents Container: _____ Liquid Level Marked/Sealed: Y N

BLANKS: Probe rinse: _____ Impinger: _____ Filter: _____

Pacific Environmental Services, Inc.

Dry Molecular Weight Determination

Client/Project: GM-Saginaw 5414.003
Date/Time: 9/23/97
Sample Type: Orsat Bag
Ambient Temp. °F: 70

Orsat No.: O-2
Operator: R Kolb
Comments:
Site Location: Scrubber Inlet

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
SI-1A	CO_2	9.2	9.2	9.2	9.2			9.2	0.44	
	O_2[a]	21.4	12.2	21.2	12.0			12.1	0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

$O_2 = 12.3$
$CO_2 = 8.9$

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
SI-1B	CO_2	8.4	8.4	8.6	8.6			8.5	0.44	
	O_2[a]	20.8	12.4	21.0	12.4			~~20.9~~ 12.4	0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
	CO_2								0.44	
	O_2[a]								0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

[a] O_2 Net Volume is O_2 actual reading minus CO_2 actual reading.

[b] CO Net Volume is CO actual reading minus O_2 actual reading.

[c] N_2 Net Volume is 100 minus CO actual reading.

PACIFIC ENVIRONMENTAL SERVICES, INC.

Pacific Environmental Services, Inc.

Dry Molecular Weight Determination

Client/Project:	GM-Saginaw 5414.003	Orsat No.	O-2
Date/Time:	9/24/97	Operator:	RKlk
Sample Type:	Orsat Bag	Comments:	
Ambient Temp. °F	70	Site Location:	Scotts Fruit

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
S1-2A	CO_2	8.4	8.4	8.4	8.4			8.4	0.44	3.70
	O_2[a]	21.8	13.4	21.8	13.4			13.4	0.32	4.29
	CO[b]								0.28	
	N_2[c]	100.0	78.2	100.0	78.2			78.2	0.28	21.90
									Md =	29.89

$O_2 = 12.7$

$CO_2 = 9.4$

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
S1-2B	CO_2	10.4	10.4	10.4	10.4			10.4	0.44	4.58
	O_2[a]	22.4	12.0	22.2	11.8			11.9	0.32	3.81
	CO[b]								0.28	
	N_2[c]	100.0	77.6	100.0	77.8			77.7	0.28	21.76
									Md =	30.15

Average = 30.02

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
	CO_2								0.44	
	O_2[a]								0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

[a] O_2 Net Volume is O_2 actual reading minus CO_2 actual reading.

[b] CO Net Volume is CO actual reading minus O_2 actual reading.

[c] N_2 Net Volume is 100 minus CO actual reading.

PACIFIC ENVIRONMENTAL SERVICES, INC.

Run No. 3

Pacific Environmental Services, Inc.

Dry Molecular Weight Determination

Client/Project: EPA
Date/Time: 9/25
Sample Type: M.29
Ambient Temp. °F 70

Orsat No. O-2
Operator: D Schaffel
Comments:
Site Location: INLET

SI-M29-3

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
1st Hr		Actual	Net	Actual	Net	Actual	Net			
	CO_2	10.2	10.2	10.1	10.1			10.15	0.44	
	O_2[a]	22.4	12.2	22.4	12.3			12.25	0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

$O_2 = 12.2$

$CO_2 = 10.0$

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
2nd Hr		Actual	Net	Actual	Net	Actual	Net			
	CO_2	9.8	9.8	9.9	9.9			9.85	0.44	
	O_2[a]	22.0	12.2	22.1	12.2			12.20	0.32	
	CO[b]								0.28	
	N_2[c]							77.95	0.28	
									Md =	

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
	CO_2								0.44	
	O_2[a]								0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

[a] O_2 Net Volume is O_2 actual reading minus CO_2 actual reading.

[b] CO Net Volume is CO actual reading minus O_2 actual reading.

[c] N_2 Net Volume is 100 minus CO actual reading.

PACIFIC ENVIRONMENTAL SERVICES, INC.

Pacific Environmental Services, Inc.

Dry Molecular Weight Determination

Client/Project: EPA
Date/Time: 9/25/97
Sample Type: M.29
Ambient Temp. °F 70

Orsat No. 0-2
Operator: D Schuffel
Comments:
Site Location: Inlet

SI-M29-4

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
1st Bag		Actual	Net	Actual	Net	Actual	Net			
	CO_2	11.2	11.2	11.2	11.2			11.2	0.44	
	O_2[a]	23.0	11.8	23.0	11.8			11.8	0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

Ave

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
2nd Bag		Actual	Net	Actual	Net	Actual	Net			
	CO_2	10.8	10.8	10.8	10.8			10.8	0.44	
	O_2[a]	22.8	12.0	22.8	12.0			12.0	0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

O_2 = 11.9
CO_2 = 11.0

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
	CO_2								0.44	
	O_2[a]								0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

[a] O_2 Net Volume is O_2 actual reading minus CO_2 actual reading.

[b] CO Net Volume is CO actual reading minus O_2 actual reading.

[c] N_2 Net Volume is 100 minus CO actual reading.

PACIFIC ENVIRONMENTAL SERVICES, INC.

PARTICULATE/SAMPLE RECOVERY DATA SHEET

Client/Location: PES/GM-SAGINAW Sampling Date(s): 9/22/97

RUN No.: FIELD BLK Recovery Date: 9/22 Recovered By: BHR

Impingers:	1	2	3	4	5	6	Silica Gel
Final Wt.	576.0	681.2	732.8	621.9	743.1	737.6	829.0
Initial Wt.	575.6	680.8	732.3	621.8	743.1	737.6	828.2
Net Weight	0.4	0.4	0.5	0.1	0.0	0.0	0.8

Total Moisture = _____ grams

Description of Impinger Contents: CLEAR

Silica Gel Color: BLUE Percent Spent: _____ %

Filter I.D. No.: _____ Filter Container I.D.: _____

Description of Particulate on Filter: NONE Sealed: (Y) N

Probe Rinse Container I.D.: _____ Liquid Level Marked/Sealed: (Y) N

Impinger Contents Container: _____ Liquid Level Marked/Sealed: (Y) N

RUN No.: _____ Recovery Date: _____ Recovered By: _____

Impingers:	1	2	3	4	5	6	Silica Gel
Final Wt.							
Initial Wt.							
Net Weight							

Total Moisture = _____ grams

Description of Impinger Contents: _____

Silica Gel Color: _____ Percent Spent: _____ %

Filter I.D. No.: _____ Filter Container I.D.: _____

Description of Particulate on Filter: _____ Sealed: Y N

Probe Rinse Container I.D.: _____ Liquid Level Marked/Sealed: Y N

Impinger Contents Container: _____ Liquid Level Marked/Sealed: Y N

RUN No.: _____ Recovery Date: _____ Recovered By: _____

Impingers:	1	2	3	4	5	6	Silica Gel
Final Wt.							
Initial Wt.							
Net Weight							

Total Moisture = _____ grams

Description of Impinger Contents: _____

Silica Gel Color: _____ Percent Spent: _____ %

Filter I.D. No.: _____ Filter Container I.D.: _____

Description of Particulate on Filter: _____ Sealed: Y N

Probe Rinse Container I.D.: _____ Liquid Level Marked/Sealed: Y N

Impinger Contents Container: _____ Liquid Level Marked/Sealed: Y N

BLANKS: Probe rinse: _____ Impinger: _____ Filter: _____

Appendix A.2

Raw Field Data

Wet Scrubber Outlet

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

Plant: GM SAGINAW MI

Date: 9-21.97

Sampling Location: # B CUPOLA SCRUBBER OUTLET

Inside of Far Wall to Outside of Nipple: 79.25

Inside of Near Wall to Outside of Nipple (Nipple Length): 4.25

Stack I.D.: 75"

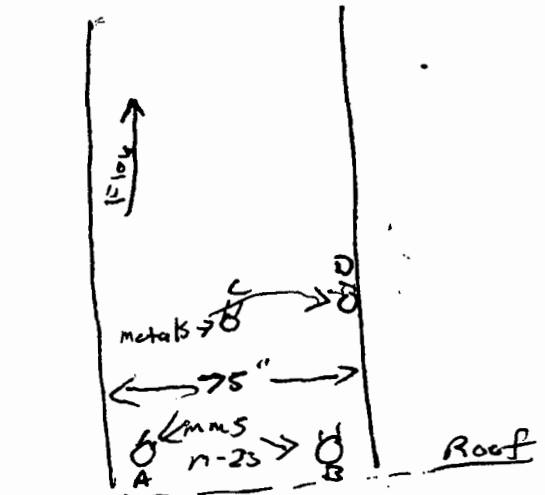
Distance Downstream from Flow Disturbance (Distance B):

677 inches / Stack I.D. = 8.9 dd

Distance Upstream from Flow Disturbance (Distance A):

240 inches / Stack I.D. = 3.2 dd

Calculated By: G Gray



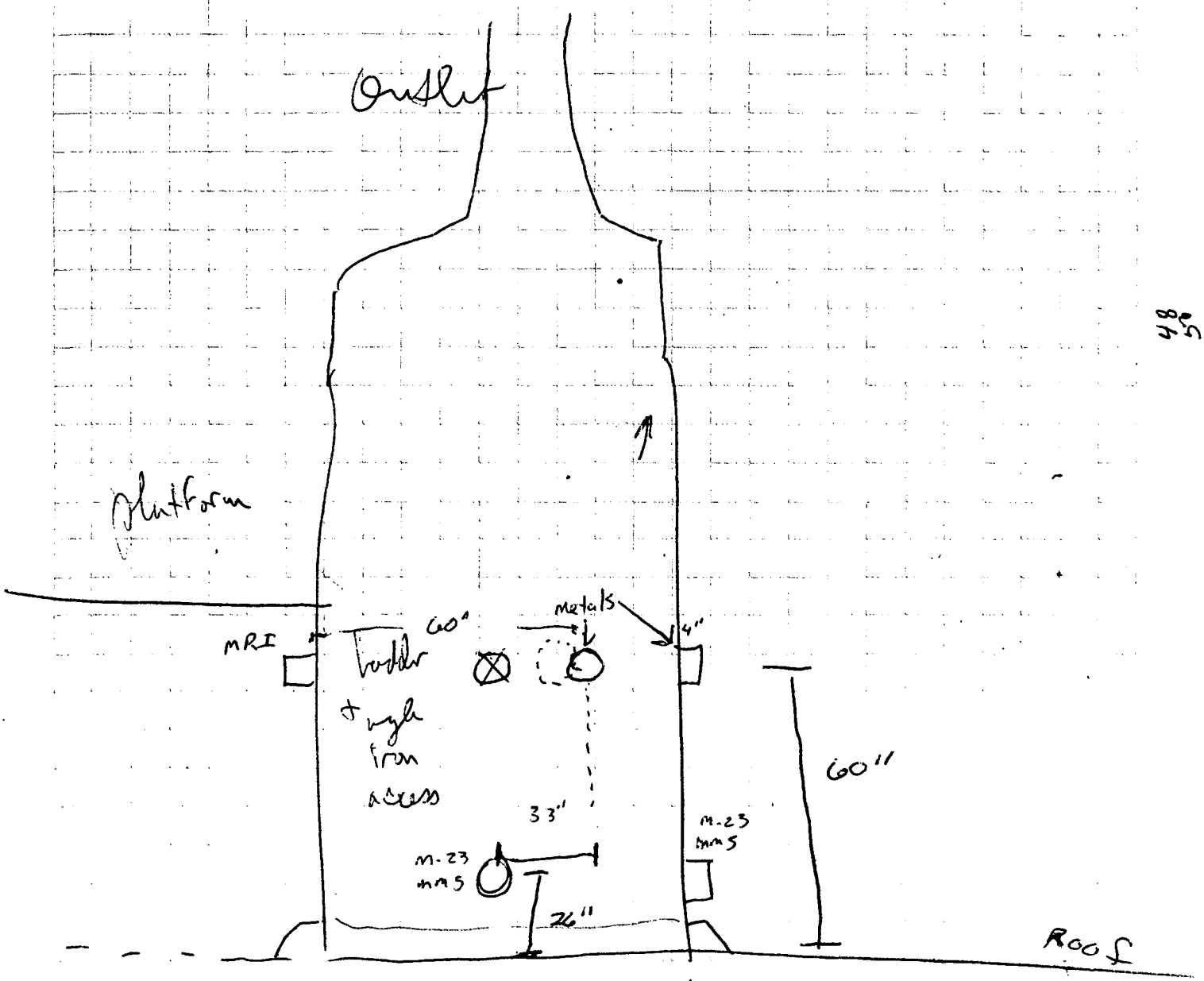
Schematic of Sampling Location

Traverse Point Number	Fraction of Length	Length (inches)	Product of Columns 2 & 3 (To nearest 1/8")	Nipple Length (inches)	Traverse Point Location (Sum of Col. 4 & 5)
1	.026	75	1.57	4.25	5.8
2	.067 ~~.0870~~		5.0	~~4.25~~	9.27
3	.118		8.85		13.1
4	.177		13.2		17.5
5	.250		18.7		23.0
6	.356		26.7		30.9
7	.644		48.3		52.5
8	.750		56.2		60.5
9	.823		61.7		65.9
10	.882		66.1		70.4
11	.933		69.9		74.4
12	.974		73.4		77.9

PACIFIC ENVIRONMENTAL SERVICES, INC.

Project No.	Page of
Client	
Location	

Prepared By	Date	Checked By	Date	Sheet Title



GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant: GM — Date: 9-23-97
Sampling Location: Cupola Outlet — Clock Time: 1244
Run #: Preliminary — Operators: TA/GG
Barometric Pressure, in. Hg: ____ — Static Pressure, in. H_2O: .17
Moisture, %: 6.6 — Molecular wt., Dry: ____ — Pitot Tube, Cp: .84
Stack Dimension, in. Diameter or Side 1: 75 — Side 2: ____
Wet Bulb, °F: ____ — Dry Bulb, °F: ____

Cyclonic Flow check Δ ins	Direction	Traverse Point Number	Velocity Head in. H_2O	Stack Temp. °F
5	CC	A 1	.27	128
	CC	2	.44	132
	CC	3	.22	134
3	CC	4	.55	134
3	CC	5	.52	134
5	CC	6	.52	135
9	CW	7	.47	135
0	—	8	.45	139
6	CW	9	.45	135
5	CW	10	.44	135
13	CW	11	.38	138
0	CW	12	.30	135
10	CC	B 1	.32	132
0	—	2	.33	132
3	CC	3	.43	132
8	CC	4	.46	133
9	CC	5	.47	138
5	CW	6	.52	138
4	CW	7	.52	138
10	CW	8	.45	139
8	CW	9	.43	139
13	CW	10	.40	139
10	CW	11	.33	139
9	CW	12	.32	137
7.7			$\overline{\sqrt{\Delta P}}$ =	$\overline{Ts}$ =

$Md = (0.44 \times \%CO_2) + (0.32 \times \%O_2) + (0.28 \times \%N_2)$

$Md = (0.44 \times \quad) + (0.32 \times \quad) + (0.28 \times \quad)$

$Md =$

$Ms = Md \times (1 - \frac{\%H_2O}{100}) + 18 (\frac{\%H_2O}{100})$

$Ms = (\quad) \times (1 - \frac{}{100}) + 18 (\frac{}{100})$

$Ms =$

$\overline{Ts} =$ °F = °R (°F + 460)

$Ps = Pb + \frac{S.P.}{13.6} = (\quad) + \frac{}{13.6}$

$Ps =$ in. Hg

$\overline{\sqrt{\Delta P}} =$

$Vs = 85.49 \times Cp \times \overline{\sqrt{\Delta P}} \times \sqrt{\frac{Ts\,(°R)}{Ps \times Ms}}$

$Vs = 85.49 \times (\quad) \times (\quad) \times \sqrt{\quad}$

$Vs =$ ft/s

$As =$ ft^2

$Qs = Vs \times As \times 60$ s/m

$Qs =$ x x 60

$Qs =$ acfm

$Qs_{std} = Qs \times 17.647 \times \frac{Ps}{Ts} \times (1 - \frac{\%H_2O}{100})$

$Qs_{std} =$ x 17.647 x ____ x (1 - ____)

$Qs_{std} =$ dscfm

FIELD DATA SHEET

20M29-1

Plant: G.M. Saginaw
Sampling Location: B. Coupola
Run Number: M29-0-1 Date: 9-23-97
Pretest Leak Rate: 0.005 cfm @ 12" in. Hg.
Pretest Leak Check: Pitot: o.k. Orsat: N/A

K=2.62

Sample Type: M-29 Operator: Malone
Pbar: 29.74 Ps: +1.1
CO2: 11% O2: 10%
Probe Length/Type: 7' SS/Glass Pitot #: 7-18
Stack Diameter: 75" As: —

Nozzle ID: .255 Thermocouple #: D-100-5
Assumed Bws: 17.33% Filter #: 2485
Meter Box #: M5-10 Y: 0.999 ΔH@: 1.591
Post-Test Leak Rate: 0.001 cfm @ 7 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: ✓

K=2.6

Port upper A

K=3.0 →

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Actual	Stack Temp. (Ts)	Temperature °F Probe	Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Outlet (Tm out °F)	Pump Vacuum (in. Hg)
1	0	14:12	259.862										
	5		261.78	0.28	.734	.73	125°	246°	239°	49°	90°	79°	3"
2	10		264.47	0.28	.739	.73	125°	247°	244°	50°	92°	79°	3"
	15		267.52	0.38	.996	1.0	124°	251°	253°	49°	94°	80°	3"
3	20		270.56	0.38	.996	1.0	124°	250°	248°	48°	97°	80°	3"
	25		273.88	0.45	1.179	1.2	125°	252°	260°	48°	98	81°	4"
4	30		277.17	0.46	1.38	1.4	128°	252°	252°	48°	99°	82°	4"
	35	*	280.749	0.51	1.53	1.5	128°	248°	257°	49°	99°	82°	4"
5	40		284.74	0.66	1.98	2.0	119°	260°	255°	51°	90°	79°	5"
	45		288.82	0.66	1.98	2.0	124°	268°	255°	46°	98°	79°	5"
6	50		292.84	0.63	1.89	1.9	123°	263°	256°	42°	100°	80°	5"
	55		297.03	0.65	1.95	2.0	126°	270°	255°	43°	101°	81°	5"
7	60		301.07	0.65	1.95	1.9	125°	268°	255°	43°	100°	82°	5"
	65		304.98	0.62	1.86	1.9	126°	257°	254°	44°	100°	83°	5"
8	70		308.99	0.63	1.89	1.9	126°	253°	255°	45°	100°	83°	5"
	75		313.56	0.62	1.86	1.9	127°	252°	253°	45°	100°	83°	5"
9	80		317.04	0.62	1.86	1.9	127°	253°	250°	46°	96°	83°	5"
	85	⊛	320.738	0.54	1.62	1.6	119°	252°	251°	45°	93°	82°	5"
10	90		324.57	0.63	1.89	1.9	115°	256°	259°	50°	73°	71°	5"
	95		~~332.19~~	0.60	1.8	1.8	121°	252°	259°	45°	80°	70°	5"
11	100		332.19	0.60	1.8	1.8	127°	251°	258°	43°	82°	69°	6"
	105		335.96	0.51	1.53	1.5	129°	250°	254°	43°	83°	70°	6"
12	110	18:45 ■	338.902	0.33	0.99	0.99	125°	250°	254°	43°	84°	69°	4"
	115												
	120												

* 14:47 Plant down Stop Run 15:10 Restart run

ΔVm= 79.040 ✓ √Δp= .7231 ✓ ΔH= 1.57 ✓ Ts= 125 ✓ Tm= 86 ✓

⊛ 16:33 Plant down - Stop Run. Final restart - Run.

■ 18:46 Plant down - stop Run.

150 76.0

FIELD DATA SHEET

Plant: G.M. Saginaw
Sampling Location: Coupola 4B Outlet
Run Number: M29-0-2 Date: 9-24-97
Pretest Leak Rate: .002 cfm @ 11" in. Hg.
Pretest Leak Check: Pitot: O.K. Orsat: O.K.

Sample Type: M29 Operator: Malone
Pbar: 29.85 Ps: +1.1
CO2: 11% O2: 10%
Probe Length/Type: 7' SS/Glass Pitot #: D-7-2
Stack Diameter: 75" As:

Nozzle ID: 0.255 Thermocouple #: D-100
Assumed Bws: 17% Filter #: #2486
Meter Box #: M5-10 Y: .999 ΔH@: 1.591
Post-Test Leak Rate: .001 cfm @ 6" in. Hg.
Post-Test Leak Check: Pitot: O.K. Orsat: O.K.

upper port A
ks = 2.7

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Actual	Stack Temp. (Ts)	Temperature °F Probe	Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Outlet (Tm out °F)	Pump Vacuum (in. Hg)	
1	0	09:38	338.945											
	5		342.29	0.52	1.4	1.4	126°	262°	253°	45°	80°	63°	2"	71
2	10		345.56	0.49	1.32	1.3	127°	256°	254°	42°	83°	64°	2"	73
	15		348.85	0.52	1.4	1.4	129°	253°	255°	41°	84	65°	2"	74
3	20		351.99	0.48	1.296	1.3	129°	252°	252°	40°	85°	66°	2"	75
	25		355.55	0.47	1.269	1.3	131°	252°	255°	40°	86°	67°	2"	76
4	30		358.71	0.44	1.188	1.2	130°	251°	252	41°	87°	68°	2"	77
	35		362.20	0.55	1.485	1.5	129°	252°	251°	42°	88°	69°	3"	78
5	40		365.56	0.48	1.296	1.3	130°	252°	252°	43°	89°	70°	3"	79
	45		368.82	0.42	1.134	1.1	130°	252°	250°	41°	88°	72°	3"	80
6	50		371.97	0.34	0.918	0.92	130°	253°	252°	39°	88°	73°	3"	81
	55		374.78	0.30	0.81	0.81	130°	253°	253°	39°	87°	73°	2"	81
7	60		377.45	0.47	1.269	1.3	131°	253°	253°	40°	88	73°	3"	81
	65		380.81	0.47	1.269	1.3	131°	252°	253°	40°	90°	73°	3"	81
8	70		384.10	0.47	1.269	1.3	131°	252°	253°	41°	90°	75°	3"	82
	75		387.39	0.47	1.269	1.3	131	253°	253°	41°	90°	75	3"	82
9	80		390.58	0.46	1.242	1.2	131°	252°	253°	41°	91°	74°	3"	82
	85		393.79	0.42	1.134	1.1	131°	253°	252°	42°	91°	75°	3"	82
10	90		396.84	0.40	1.08	1.1	133°	253°	254°	43°	92°	75°	3"	83
	95		399.18	0.22	0.594	0.59	132°	253°	253°	43°	92°	76°	3"	83
11	100		403.40	0.65	1.755	1.8	133°	253°	253°	43°	93°	78°	3"	85
	105		407.04	0.65	1.755	1.8	131°	249°	252°	43°	93°	78°	3"	85
12	110		410.86	0.22	0.594	0.59	133°	250°	252°	43°	94°	77°	3"	85
	115		413.05	0.18	0.486	0.48	134°	250°	254°	45°	92°	78°	3"	84
	120	11:38	415.548	0.26	0.702	0.7	134°	252°	252°	46°	91°	78°	3"	84

ISO = ~~99.5~~

ΔVm = 156.915 / 76.603 ✓ √Δp = ~~.565~~ .668 / 15.583 .649 ✓ ΔH = ~~1.497~~ 1.234 / 40.69 1.695 ✓ Ts = 132.625 / 3137 130.708 ✓

Tm = ~~80.167~~ = ~~1924~~ / 84.854 / 85 ✓

631.5

Plant Name: G.P. Saginaw **Test Date:** 9-24-97

Run Number: M29-O-2 **Operator:** Malone

Port B upper

Traverse Point Number	Sampling Time, (min.)	Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft³	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Actual	Stack Temp. °F (T_s)	Probe Temp. / Filter Temp. °F	Impinger Temp. °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Outlet ($T_{m_{out}}$) °F	Pump Vacuum In. Hg	
1	120	11:47	415.564					~~255~~ / ~~253~~ 95/91					
	125		418.23	0.30	0.81	.81	133°	255 / 253	49°	85°	77°	3"	81
2	130		420.64	0.24	0.648	.65	135°	252 / 252	44°	92°	77°	3"	85
	135		423.20	0.22	0.594	.59	134°	251 / 254	42°	92°	78°	3"	85
3	140		425.97	0.37	0.999	1.0 ~~0.99~~ 95/91	135°	250 / 252	42°	92°	79°	3"	85
	145		429.51	0.51	1.377	1.4	133°	250 / 252	41°	95°	79°	4"	87
4	150		432.84	0.51	1.377	1.4	133°	250 / 251	41°	96°	80°	4"	88
	155		436.26	0.49	1.323	1.3	132°	249 / 250	42°	97°	80°	4"	88
5	160		439.51	0.47	1.269	1.3	132°	250 / 250	43°	97°	81°	4"	87
	165		443.18	0.54	1.458	1.5	132°	250 / 253	44°	98°	82°	4"	90
6	170		446.90	0.49	1.323	1.3	131°	250 / 254	44°	99°	83°	4"	91
	175		449.97	0.56	1.512	1.5	132°	250 / 249	45°	99°	83°	4"	91
7	180		453.58	0.56	1.512	1.5	132°	250 / 251	46°	100°	84°	4"	92
	185		457.17	0.51	1.377	1.4	132°	250 / 252	42°	99°	84°	5"	92
8	190		460.66	0.51	1.377	1.4	133°	251 / 253	41°	99°	85°	5"	92
	195		464.24	0.47	1.269	1.3	135°	251 / 253	41°	99°	85°	5"	92
9	200		468.04	0.59	1.593	1.6	136°	251 / 253	41°	98°	85°	5"	91
	205		471.43	0.61	1.647	1.6	135°	250 / 252	42°	99°	85°	5"	92
10	210		475.28	0.64	1.728	1.7	136°	251 / 253	42°	99	84°	5"	92
	215		478.97	0.61	1.647	1.6	137°	250 / 252	42°	99	84	5"	91
11	220		482.65	0.60	1.62	1.6	137°	252° / 253°	44°	99°	86°	5"	92
	225		486.48	0.48	1.296	1.3	140°	252 / 254°	46°	98°	84°	5"	91
12	230		489.46	0.45	1.215	1.2	139°	252 / 256°	47°	98°	84°	5"	91
	235		492.69	0.41	1.107	1.1	140°	253 / 253	47°	99°	84°	5"	92
	240	13:47	495.876	0.40	1.08	1.1	135°	252 / 248	48°	99°	87°	5"	91

11.540 31.15 3229 2149

16.4.10

FIELD DATA SHEET

Plant: G.M. Saginaw
Sampling Location: Coupola 4B-Outlet
Run Number: O-M29-3 Date: 9-25-97
Pretest Leak Rate: .002 cfm @ 10" in. Hg.
Pretest Leak Check: Pitot: O.K. Orsat: O.K.

~~K=6.9~~
K=7

Sample Type: M29 Operator: Malone
Pbar: 29.10 Ps: 0.35
CO2: 11% O2: 10%
Probe Length/Type: 7' SS/Glass Pitot #: D-7-4
Stack Diameter: 75" As:

Nozzle ID: ~~.260~~ .310 Thermocouple #: D-100-7
Assumed Bws: 10% Filter #: #2490
Meter Box #: M5-10 Y: .999 ΔH@: 1.591
Post-Test Leak Rate: .002 cfm @ 11 in. Hg.
Post-Test Leak Check: Pitot: O.K. Orsat: O.K.

Port	Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Actual	Stack Temp. (Ts)	Temperature °F Probe	Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Outlet (Tm out °F)	Pump Vacuum (in. Hg)	
upper B	1	0	08:45	497.405											
	2	5		501.97	.33	2.31	2.3	109°	259°	260°	42°	83	69	5	86
	3	10		506.63	.35	2.45	2.5	109°	256	252°	42°	89	69	5	79
	4	15		511.47	.39	2.73	2.7	109°	249°	251°	45°	90	71	6	80
	5	20		516.55	.42	2.94	2.9	109°	248°	250°	48°	91	73	~~6~~ 7	82
	6	25		521.58	.42	2.94	2.9	109°	251°	250°	51°	91	74	7	82
	7	30		526.70	.42	2.94	2.9	109°	251°	249°	50°	91	75	7	83
	8	35		531.69	.39	2.73	2.7	109°	253°	248°	49°	91	76	7	83
	9	40		536.85	.45	3.15	3.2	109°	253°	258°	51°	91	76	8	83
	10	45		542.19	.45	3.15	3.2	108°	252°	254°	51°	91	77	8	84
	11	50		547.62	.48	3.36	3.4	108°	252°	255°	52°	91	77	8	84
	12	55		552.71	.42	2.94	2.9	107°	252°	255°	52°	91	77	8	84
A	1	60	09:45 / 10:31	557.661 / 557.991	.34	2.38	2.4	108°	253°	252°	48°	91	77	6"	84
	2	65		562.32	.34	2.38	2.4	109°	255°	252°	40°	93	79	6	86
	3	70		567.00	.34	2.38	2.4	109°	254°	251°	39°	96	79	6"	87
	4	75		571.90	.39	2.73	2.7	110°	252°	250°	41°	99	80	7"	88
	5	80		576.67	.34	2.38	2.4	110°	247°	253°	45°	100	82	6"	91
	6	85		581.99	.49	3.43	3.4	109°	248°	251°	47°	101	83	8"	92
	7	90		587.58	.45	3.15	3.2	109°	250°	247°	48°	101°	84°	8"	92
	8	95		592.74	.42	2.94	2.9	110°	248°	249°	51°	100°	85°	7"	93
	9	100		598.12	.47	3.29	3.3	110°	245°	252°	52°	100°	85°	7"	93
	10	105		603.28	.42	2.94	2.9	110°	247°	253°	52°	102°	86°	7"	94
	11	110	11:31 / 11:35 *	608.762	.47	3.29	3.3	109°	249°	253°	53°	101°	86°	8"	94
	12	115	11:40	613.62	.36	2.52	2.5	109°	249°	253°	53°	101°	87°	7"	95
	END	120	11:45	617.939	.30	2.1	2.1	107	259°	253°	54°	100°	86°	6"	94

Actual % H_2O = 9.163

% ISO = 98.137

Grams H_2O 243.4

ΔVm= 120.204 $\overline{\sqrt{\Delta p}}$= .633 ΔH= 2.813 Ts= 108.917 Tm= 86.792

* Plant down - Stop Run: 11:21
Restart 11:35

FIELD DATA SHEET

Plant: G.M. Saginaw
Sampling Location: Cupola 4B-Outlet
Run Number: O-M29-4 Date: 9-25-97
Pretest Leak Rate: .002 cfm @ 11 in. Hg.
Pretest Leak Check: Pitot: O.K. Orsat: O.K.

Sample Type: M29 Operator: Malone
Pbar: 29.10 Ps: 0.35
CO2: 11% O2: 10%
Probe Length/Type: 7'/SS/Glass Pitot #: D-2-4
Stack Diameter: 75" As:

Nozzle ID: .310 Thermocouple #: D-100-7
Assumed Bws: 10% Filter #:
Meter Box #: M5-10 Y: .999 ΔH@: 1.591
Post-Test Leak Rate: 0.002 cfm @ 11" in. Hg.
Post-Test Leak Check: Pitot: O.K Orsat: O.K

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Actual	Stack Temp. (Ts)	Temperature °F Probe	Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Outlet (Tm out °F)	Pump Vacuum (in. Hg)	
Port upper "B" 1	0	15:23	619.435											
2	5		624.06	.33	2.31	2.3	111°	230°	261°	47°	87°	80°	3"	89
3	10		628.29	.32	2.24	2.2	110°	241°	265°	45°	96°	81°	3"	88
4	15	*	632.95	.35	2.45	2.5	110°	242°	253°	45°	98°	82°	4"	90
5	20		637.86	.38	2.66	2.7	106°	260°	252°	43°	104°	84	4"	94
6	25	⊗	642.834	.40	2.8	2.8	107°	258°	253°	44°	105°	86°	4"	96
7	30		647.69	.38	2.66	2.7	108°	253°	252°	40°	106°	87°	4"	97
8	35		652.23	.36	2.52	2.5	110°	254°	256°	40°	105°	82°	4"	97
9	40		657.99	.40	2.8	2.8	109°	253°	250°	39°	107	87°	4"	97
10	45		662.25	.42	2.94	2.9	109°	254°	252°	40°	109°	88°	4"	98
11	50		667.50	.44	3.08	3.1	109°	253°	251°	42°	108°	90°	4"	98
12	55		672.70	.38	2.66	2.7 ~~2.38~~	109°	252°	253°	42°	106°	90°	4"	98
Port "A"	60		677.003	.36	2.52	2.5	110°	249°	250°	42°	105°	90°	4"	98
1	60	17:18	677.064	~~.42~~	~~2.94~~	~~2.9~~								
2	65	1723 / 1798 ⊠	682.15	.42	2.94	2.9	109°	247°	260°	44°	100°	89°	4"	95
3	70		687.60	.42	2.94	2.9	109°	270°	260°	40°	99°	86°	4"	95
4	75		693.29	.50	3.5	3.5	109°	264°	259°	38°	106°	86°	5"	96
5	80		698.73	.55	3.85	3.8	110°	258°	260°	39°	106°	87°	5"	96
6	85		704.25	.55	3.85	3.9	110°	256°	258°	40°	106°	88°	5"	97
7	90		710.62	.55	3.85	3.9	109°	251°	260°	41°	106°	89°	5"	97
8	95		715.76	.44	3.08	3.1	109°	249°	259°	41°	105°	89°	4"	97
9	100		721.59	.50	3.5	3.5	108°	252°	261°	41°	104°	89°	4"	97
10	105		726.31	.42	2.94	2.9	109°	250°	261°	41°	103°	88°	4"	96
11	110		732.04	.48	3.36	3.4	108°	250°	260°	42°	104°	88°	5"	96
12	115		736.91	.42	2.94	2.9 pm	108°	249°	260°	42°	103°	89°	5"	96
END	120	18:43	741.021	.25	1.75	~~1.7~~ 1.8	108°	248°	260°	43°	103°	88°	4"	96

.061

actual H_2O 9.575%

FSO = 96.382

ΔVm= 121.525 $\overline{\sqrt{\Delta p}}$= .644 $\overline{\Delta H}$= 2.925 $\overline{T_s}$= 108.917 $\overline{T_m}$= 95.375

* Stop Test Plant down 11 min into test 629.187 15:34 Restart 1 3

⊗ Stop Test 25 Min 15:58 Restart 16

⊠ Stop 17:23 Restart 18

PARTICULATE/SAMPLE RECOVERY DATA SHEET

Client/Location: PES/GM-SAGINAW Sampling Date(s): 9/22/97-9/25/97

RUN No.: O-M29-1 Recovery Date: 9/23 Recovered By: BHR

Impingers:	1	2	3	4	5	6	Silica Gel
Final Wt.	725.2	756.3	740.6	624.7	737.6	735.5	843.9
Initial Wt.	577.3	681.8	731.5	624.1	739.9	737.8	829.4
Net Weight	147.9	74.5	9.1	0.6	-2.3	-2.3	14.5

2HR

Total Moisture = 242.0 grams

Description of Impinger Contents: CLEAR
Silica Gel Color: BLUE/WHITE Percent Spent: 20 %
Filter I.D. No.: Filter Container I.D.:
Description of Particulate on Filter: BROWN Sealed: Y N
Probe Rinse Container I.D.: Liquid Level Marked/Sealed: Y N
Impinger Contents Container: Liquid Level Marked/Sealed: Y N

RUN No.: O-M29-2 Recovery Date: 9/24 Recovered By: BHR

Impingers:	1	2 *	3	4	5	6	Silica Gel
Final Wt.	883.1	670.2	893.6	686.1	738.9	736.5	866.7
Initial Wt.	532.8	733.7	634.3	624.7	736.4	735.2	842.9
Net Weight	350.3	-63.5	259.3	61.4	2.5	1.3	23.8

4HR

* REVERSED IMPINGER

Total Moisture = 635.1 grams

Description of Impinger Contents: CLEAR
Silica Gel Color: BLUE/WHITE Percent Spent: 50 %
Filter I.D. No.: Filter Container I.D.:
Description of Particulate on Filter: BROWN Sealed: Y N
Probe Rinse Container I.D.: Liquid Level Marked/Sealed: Y N
Impinger Contents Container: Liquid Level Marked/Sealed: Y N

RUN No.: O-M29-3 Recovery Date: 9/25 Recovered By: BHR

Impingers:	1	2	3	4	5	6	Silica Gel
Final Wt.	654.5	834.4	711.3	487.3	732.4	620.4	770.7
Initial Wt.	579.0	731.7	683.6	480.2	731.0	613.5	748.6
Net Weight	75.5	102.7	27.7	7.1	1.4	6.9	22.1

2HR

Total Moisture = 243.4 grams

Description of Impinger Contents: CLEAR
Silica Gel Color: BLUE/WHITE Percent Spent: 25 %
Filter I.D. No.: Filter Container I.D.:
Description of Particulate on Filter: BROWN Sealed: Y N
Probe Rinse Container I.D.: Liquid Level Marked/Sealed: Y N
Impinger Contents Container: Liquid Level Marked/Sealed: Y N

BLANKS: Probe rinse: Impinger: Filter:

PARTICULATE/SAMPLE RECOVERY DATA SHEET

9/22/97 to

Client/Location: PES/GM-SAGINAW Sampling Date(s): 9/25/97

RUN No.: 0-M29-4 Recovery Date: 9/25 Recovered By: BHR

Impingers:	1	2	3	4	5	6	Silica Gel
Final Wt.	693.2	700.6	745.4	625.4	747.7	741.5	799.2
Initial Wt.	533.9	638.0	734.6	624.0	746.6	741.8	779.7
Net Weight	159.3	62.6	10.8	1.4	1.1	-.3	19.5

Total Moisture = 254.4 grams

Description of Impinger Contents: _____

Silica Gel Color: _____ Percent Spent: 50 %

Filter I.D. No.: _____ Filter Container I.D.: _____

Description of Particulate on Filter: _____ Sealed: Y N

Probe Rinse Container I.D.: _____ Liquid Level Marked/Sealed: Y N

Impinger Contents Container: _____ Liquid Level Marked/Sealed: Y N

RUN No.: _____ Recovery Date: _____ Recovered By: _____

Impingers:	1	2	3	4	5	6	Silica Gel
Final Wt.							
Initial Wt.							
Net Weight							

Total Moisture = _____ grams

Description of Impinger Contents: _____

Silica Gel Color: _____ Percent Spent: _____ %

Filter I.D. No.: _____ Filter Container I.D.: _____

Description of Particulate on Filter: _____ Sealed: Y N

Probe Rinse Container I.D.: _____ Liquid Level Marked/Sealed: Y N

Impinger Contents Container: _____ Liquid Level Marked/Sealed: Y N

RUN No.: _____ Recovery Date: _____ Recovered By: _____

Impingers:	1	2	3	4	5	6	Silica Gel
Final Wt.							
Initial Wt.							
Net Weight							

Total Moisture = _____ grams

Description of Impinger Contents: _____

Silica Gel Color: _____ Percent Spent: _____ %

Filter I.D. No.: _____ Filter Container I.D.: _____

Description of Particulate on Filter: _____ Sealed: Y N

Probe Rinse Container I.D.: _____ Liquid Level Marked/Sealed: Y N

Impinger Contents Container: _____ Liquid Level Marked/Sealed: Y N

BLANKS: Probe rinse: _____ Impinger: _____ Filter: _____

Pacific Environmental Services, Inc.

Dry Molecular Weight Determination

Client/Project: GM-Saginaw 5414.003
Date/Time: 9/23/97
Sample Type: Orsat Bag
Ambient Temp. °F: 70

Orsat No.: O-2
Operator: R Kolde
Comments:
Site Location: Scrubber Outlet

Run 1
Outlet

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
50-1B	CO_2	4.0	4.0	4.0	4.0			4.0	0.44	
	O_2[a]	20.6	16.6	20.8	16.8			16.7	0.32	
	CO[b]								0.28	
	N_2[c]	100.0	83.4	100.0	83.2			83.3	0.28	
									Md =	

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
	CO_2								0.44	
	O_2[a]								0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
	CO_2								0.44	
	O_2[a]								0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

[a] O_2 Net Volume is O_2 actual reading minus CO_2 actual reading.

[b] CO Net Volume is CO actual reading minus O_2 actual reading.

[c] N_2 Net Volume is 100 minus CO actual reading.

PACIFIC ENVIRONMENTAL SERVICES, INC.

Pacific Environmental Services, Inc.

Dry Molecular Weight Determination

Client/Project: GM-Saginaw 5414.003
Date/Time: 9/24/97
Sample Type: Orsat Bag
Ambient Temp. °F: 70

Orsat No.: O-2
Operator: R Klotz
Comments:
Site Location: Scrubber Outlet

Run 2
Outlet

Ave = 11.8
O_2 = ~~[illegible]~~
CO_2 = 10.6

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
SO-2A	CO_2	10.4	10.4	10.2	10.2			10.3	0.44	4.53
	O_2[a]	22.4	12.0	22.2	12.0			12.0	0.32	3.84
	CO[b]								0.28	
	N_2[c]	100.0	77.6	100.0	77.8			77.7	0.28	21.76
									Md =	30.13

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
SO-2B	CO_2	10.6	10.6	10.8	10.8			10.7	0.44	4.71
	O_2[a]	22.4	11.8	22.4	11.6			11.7	0.32	3.74
	CO[b]								0.28	
	N_2[c]	100.0	77.6	100.0	77.6			77.6	0.28	21.73
									Md =	30.18

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
SO-2C	CO_2	10.6	10.6	10.6	10.6			10.6	0.44	4.66
	O_2[a]	22.4	11.8	22.2	11.6			11.7	0.32	3.74
	CO[b]								0.28	
	N_2[c]	100.0	77.6	100.0	77.8			77.7	0.28	21.76
									Md =	30.16

[a] O_2 Net Volume is O_2 actual reading minus CO_2 actual reading.

[b] CO Net Volume is CO actual reading minus O_2 actual reading.

[c] N_2 Net Volume is 100 minus CO actual reading.

PACIFIC ENVIRONMENTAL SERVICES, INC.

Pacific Environmental Services, Inc.

Dry Molecular Weight Determination

Client/Project: GM-Saginaw 5414.003
Date/Time: 9/24/97
Sample Type: Orsat Bag
Ambient Temp. °F: 70

Orsat No.: O-2
Operator: A. Kolde
Comments:
Site Location: Scrubber Outlet

Run 2 Ave on Page 1

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
50-2D	CO_2	11.0	11.0	10.8	10.8			10.9	0.44	4.80
	O_2[a]	22.6	11.6	22.4	11.6			11.6	0.32	3.71
	CO[b]								0.28	
	N_2[c]	100.0	77.4	100.0	77.6			77.5	0.28	21.70
									Md =	30.21

Average = 30.17

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
	CO_2								0.44	
	O_2[a]								0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
	CO_2								0.44	
	O_2[a]								0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

[a] O_2 Net Volume is O_2 actual reading minus CO_2 actual reading.

[b] CO Net Volume is CO actual reading minus O_2 actual reading.

[c] N_2 Net Volume is 100 minus CO actual reading.

PACIFIC ENVIRONMENTAL SERVICES, INC.

Pacific Environmental Services, Inc.

Dry Molecular Weight Determination

Client/Project: EPA
Date/Time: 9/25
Sample Type: MM5/M23/M29
Ambient Temp. °F: ~70

Orsat No.: 0-2
Operator: DSchettel
Comments:
Site Location: Outlet

SO - MM5 - 3

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
e1345		Actual	Net	Actual	Net	Actual	Net			
	CO_2	9.6	9.6	9.7	9.7			9.65	0.44	4.25
	O_2[a]	22.0	12.4	22.1	12.4			12.40	0.32	3.97
	CO[b]	—	—						0.28	
	N_2[c]	78	78		77.9			77.95	0.28	21.83
									Md =	30.05

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
e945		Actual	Net	Actual	Net	Actual	Net			
	CO_2	9.6	9.6	9.7	9.7			9.65	0.44	4.25
	O_2[a]	22.2	12.6	22.2	12.5			12.55	0.32	4.02
	CO[b]								0.28	
	N_2[c]							77.8	0.28	21.78
									Md =	30.05

Ave
$O_2 = 12.5$
$CO_2 = 9.7$

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
	CO_2								0.44	
	O_2[a]								0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

[a] O_2 Net Volume is O_2 actual reading minus CO_2 actual reading.

[b] CO Net Volume is CO actual reading minus O_2 actual reading.

[c] N_2 Net Volume is 100 minus CO actual reading.

PACIFIC ENVIRONMENTAL SERVICES, INC.

Pg 1/2

Pacific Environmental Services, Inc.

Dry Molecular Weight Determination

Client/Project: EPA

Date/Time: 9/25

Sample Type: MM5/M23/M29

Ambient Temp. °F: 70

SO-MM5-4

Orsat No.: O-2

Operator: DSchuppe

Comments:

Site Location: ~~Inlet~~ Outlet

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
0162.0	CO_2	9.4	9.4	9.5	9.5			9.45	0.44	
	O_2[a]	22.4	13.0	22.4	12.9			12.95	0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
0175.0	CO_2	10.6	10.6	10.6	10.6			10.6	0.44	
	O_2[a]	22.6	12.0	22.7	12.1			12.05	0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
0188.0	CO_2	10.4	10.4	10.4	10.4			10.4	0.44	
	O_2[a]	22.6	12.2	22.6	12.2			12.2	0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

[a] O_2 Net Volume is O_2 actual reading minus CO_2 actual reading.

[b] CO Net Volume is CO actual reading minus O_2 actual reading.

[c] N_2 Net Volume is 100 minus CO actual reading.

PACIFIC ENVIRONMENTAL SERVICES, INC.

Pg 2/2

Pacific Environmental Services, Inc.

Dry Molecular Weight Determination

Client/Project: EPA

Date/Time: 9/25/97

Sample Type: M5/M23/M29

Ambient Temp. °F: 70

Orsat No.: D-2

Operator: D Schuffel

Comments:

Site Location: Outlet

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
C1900	CO_2	10.8	10.8	10.9	10.9			10.8	0.44	
	O_2[a]	23.0	12.2	23.1	12.2			12.2	0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

Ave =

O_2 = 12.4

CO_2 = 10.3

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
	CO_2								0.44	
	O_2[a]								0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

Run No.(s)	Gas	Run 1		Run 2		Run 3		Average Net Volume %	Multiplier	Molecular Weight of Stack Gas, Md (lb/Mole)
		Actual	Net	Actual	Net	Actual	Net			
	CO_2								0.44	
	O_2[a]								0.32	
	CO[b]								0.28	
	N_2[c]								0.28	
									Md =	

[a] O_2 Net Volume is O_2 actual reading minus CO_2 actual reading.

[b] CO Net Volume is CO actual reading minus O_2 actual reading.

[c] N_2 Net Volume is 100 minus CO actual reading.

PACIFIC ENVIRONMENTAL SERVICES, INC.

K - 2. ,,

FIELD DATA SHEET

SO-M23-1

Plant: GM SAGINAW
Sampling Location: B COUPOLA
Run Number: B-1 Date: 9-23-97
Pretest Leak Rate: .003 cfm @ 15 in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: NA

Sample Type: M23 Operator: G Gay
Pbar: 29.74 Ps: + 1.0
CO2: 7 O2: 10
Probe Length/Type: 8' Glass Pitot #: 8C
Stack Diameter: 75 As:

Nozzle ID: .242 Thermocouple #: 8C
Assumed Bws: 17 Filter #: M23-1
Meter Box #: RMB13 Y: 1.010 ΔH@: 1.859
Post-Test Leak Rate: .003 cfm @ 6 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: NA

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Actual	Stack Temp. (Ts)	Temperature °F Probe	Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Outlet (Tm out °F)	Pump Vacuum (in. Hg)	
1	0	215	096.280											
1	5	220	099.3	.42	1.0	1.0	123	254	250	69	75	74	5	66
2	10	225	101.8	.38	.96	.96	125	253	251	66	81	76	5	50
	15	230	104.7	.42	1.0	1.0	125	252	551	64	84	77	5	40
3	20	235	107.4	.45	1.1	1.1	126	265	252	63	83	76	5	41
	25	240	110.3	.48	1.2	1.2	129	256	254	60	87	77	6	46
4	30	245	113.3	.34	.86	.86	130	250	252	60	88	78	5	47
	35	260 350	115.9	.34	.86	.86	121	254	256	61	87	88	5	47
5	40	355	121.7	.52	1.3	1.3	117	255	250	69	80	78	6	49
	45	400	124.5	.51	1.3	1.3	120	254	255	61	83	78	6	44
6	50	405	126.7	.25	.63	.63	124	252	255	56	86	79	6	45
	55	410	127.2	.50	1.2	1.2	126	255	251	52	87	79	6	45
7	60	415	129.6	.50	1.2	1.2	125	250	251	51	88	80	6	46
	65	420	131.7	.25	.63	.63	128	251	247	51	89	80	5	47
8	70	425	134.0	.25	.63	.63	127	255	256	51	88	81	5	46
	75	430	136.2	.28	.71	.71	127	249	254	51	88	81	5	45
9	80	435	138.5	.38	.97	.97	126	255	253	50	88	81	5	45
	85	440 1820	140.8	.24	.61	.61	126	253	251	50	84	78	5	44
10	90	~~445~~ 1826	143.0	.22	.55	.55	116	251	250	54	68	68	5	43
	95	~~450~~ 1831	145.0	.22	.55	.55	125	253	251	50	69	68	5	43
11	100	~~455~~ 1836	147.1	.21	.52	~~.52~~	128	255	249	50	71	68	5	44
	105	1841	149.6	.31	.76	.76	129	254	253	50	71	68	5	
	110	1846	152.001		CWO of Run									
12	115	1852												
	120	1857												

STOP 250 START 350

STOP 1821

ΔVm= 55.721 ✓ √Δp= .5895 ✓ ΔH= .88 ✓ Ts= 125 ✓ Tm= 79 ✓

Iso 94.3

METHOD 23 CDD/CDF SAMPLE RECOVERY DATA

Plant: GM - SAGINAW		Run No.: SO-23-1
Sample Date: 9/23/97	Filter No.(s): SO-23-1	Job No.: 5414.013
Sample Location: B Cupola / Scrubber Outlet		
Recovery Date: 9/24/97	XAD-2 Trap No.(s): SO-23-1	
Sample Recovery Person: RK/BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	—	626.3	702.3	717.3	595.4	880.2	g
Initial wt.	—	474.7	703.6	717.8	594.0	~~872.4~~ BE	g
Net wt.	—	151.6	-1.3	-0.50	1.4	869.5 10.7	g

Description

Train System: EPA Method 23 / Box #24 / Total: 161.9

Probe: 7' Glass / Clear

Filter: Color - Grey / Thin Loading - Medium

Impinger Contents: Clear

Silica Gel: @Grams Used - 300 Color - lt blue % Spent - 40

Condensate Observed In Front Half: None

Recovered Sample Fractions

Filter Container No. SO-23-1	marked/sealed: ✓
XAD Module Container No.: SO-23-1	marked/sealed: ✓
Probe (FH) & Back Half Rinse (Acetone) Container No.: SO-23-1	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (Toluene) Container No.:	Liquid level marked/sealed: ✗
Impinger Contents Container No.: SO-23-1	Liquid level marked/sealed: ✓
Impinger Rinse (Acetone/~~MeCl2~~ Toluene) Container No.:	Liquid level marked/sealed: ✗

FIELD DATA SHEET

K-3.4

Plant: Gm Saginaw
Sampling Location #6 outlet
Run Number: 5023-2 Date: 9-29-97
Pretest Leak Rate: .002 cfm @ 15 in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: NA

Sample Type: M23 Operator: GGM
Pbar: 29.85 Ps: +1.1
CO2: 9 O2: 11
Probe Length/Type: 8' Glass Pitot #: 8e
Stack Diameter: 75" As: 30.68

Nozzle ID: .252 Thermocouple #: 8C
Assumed Bws: 1% Filter #: 5023-2
Meter Box #: RMB13 Y: 1.010 ΔH@: 1.859
Post-Test Leak Rate: .002 cfm @ 10 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: NA

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Actual	Stack Temp. (Ts)	Temperature °F Probe	Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Outlet (Tm out °F)	Pump Vacuum (in. Hg)	
0	0	851	152.401											TEMP
1	5	856	155.1	.43	1.2	1.2	136	256	251	61	58	58	3	48
	10	901	158.7	.46	1.2	1.2	136	255	252	57	57	59	4	50
2	15	906	161.1	.45	1.3	1.3	137	256	253	57	65	59	4	51
	20	911	165.2	.42	1.2	1.2	136	250	251	56	69	60	5	50
3	25	916	167.5	.54	1.5	1.5	134	256	252	56	67	63	5	47
	30	921	170.9	.51	1.5	1.5	127	247	252	49	71	64	5	45
4	35	926	174.3	.56	1.6	1.6	129	250	253	48	74	64	6	45
	40	1000	177.7	.56	1.6	1.6	129	255	247	48	77	65	6	47
5	45	1005	180.4	.30	.88	.88	130	254	255	49	77	66	6	47
	50	1010	183.7	.55	1.6	1.6	132	248	254	51	78	67	6	45
6	55	1015	186.9	.51	1.5	1.5	131	249	252	51	78	67	6	49
	60	1020	190.5	.65	1.9	1.9	130	254	253	54	78	67	6	49
7	65	1025	193.8	.41	1.2	1.2	130	257	255	51	83	69	6	56
	70	1030	196.6	.32	.95	.95	130	254	256	52	84	70	5	49
8	75	1035	199.8	.50	1.5	1.5	130	248	254	52	84	71	5	48
	80	1040	202.8	.32	.96	.96	131	251	254	54	85	73	5	50
9	85	1045	205.4	.36	1.0	1.0	131	250	252	53	86	73	5	51
	90	1050	208.1	.29	.87	.87	131	250	253	54	86	74	5	51
10	95	1055	211.2	.41	1.2	1.2	131	250	254	55	86	75	5	50
	100	1100	213.7	.26	.82	.82	131	256	252	56	86	75	5	50
11	105	1105	216.3	.25	.78	.78	131	256	253	57	86	76	5	50
	110	1110	218.5	.21	.66	.66	131	251	252	54	86	77	5	52
12	115	1115	221.0	.26	.81	.81	132	260	254	59	85	77	5	53
	120	1120	223.290	.21	.66	.66	131	255	256	59	85	77	5	54

STOP 911
9:13
START 940

223.290
- 223.330

ΔVm= ~~70.889~~ 152.565 $\sqrt{\Delta p}$= ~~.6298~~ 0.6646 ΔH= ~~1.18~~ 1.37 Ts= ~~132~~ 133 Tm= ~~73~~ 79

DS

Plant Name: Gm Saginaw **Test Date:** 9-24-97

Run Number: SO23-2 **Operator:** GG

0 11:47 223380 .28 .87 .87 133 299 259 60 74 76 5 44

Traverse Point Number	Sampling Time, (min.) / Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft³	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Orifice Pres. Differential (ΔH) in. H_2O Actual	Stack Temp. °F (T_s)	Probe Temp. / Filter Temp. °F	Impinger Temp. °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Dry Gas Meter Temp. Outlet ($T_{m_{out}}$) °F	Pump Vacuum In. Hg	
B 1	125 / 1152	225.8	.28	.87	.87	135	249 / 252	60	79	76	5	48
	130 / 1157	228.9	.34	1.0	1.0	135	255 / 255	52	83	78	5	50
2	135 / 1202	231.1	.32	1.0	1.0	135	246 / 251	52	84	78	5	51
	140 / 1207	233.7	.28	.87	.87	135	247 / 250	52	85	78	5	51
3	145 / 1212	236.6	.30	.94	.94	134	244 / 251	52	86	79	5	51
	150 / 1217	238.9	.25	.78	.78	134	250 / 253	52	86	78	5	52
4	155 / 1222	241.9	.40	1.2	1.2	133	247 / 255	52	86	79	6	52
	160 / 1227	244.9	.48	1.5	1.5	132	249 / 255	53	87	79	6	54
5	165 / 1232	248.5	.55	1.7	1.7	132	249 / 255	52	88	79	6	54
	170 / 1237	251.9	.50	1.5	1.5	133	248 / 253	53	89	80	7	54
6	175 / 1242	254.0	.61	1.9	1.9	132	250 / 252	54	91	80	8	54
	180 / 1247	256.4	.60	1.8	1.8	133	254 / 253	57	91	81	9	55
7	185 / 1252	263.2	.68	2.1	2.1	132	256 / 253	55	92	81	9	55
	190 / 1257	267.1	.62	1.9	1.9	133	249 / 252	54	91	81	9	53
8	195 / 1302	271.1	.68	2.1	2.1	134	254 / 253	53	92	81	10	52
	200 / 1307	274.9	.70	2.2	2.2	137	255 / 253	54	93	82	10	52
9	205 / 1312	279.3	.72	2.2	2.2	136	247 / 253	55	93	82	10	53
	210 / 1317	283.1	.51	1.6	1.6	136	253 / 255	54	92	82	9	53
10	215 / 1322	286.7	.65	2.0	2.0	136	247 / 254	54	92	82	9	53
	220 / 1327	290.8	.57	1.8	1.8	137	248 / 254	54	92	82	9	53
11	225 / 1332	294.4	.55	1.7	1.7	138	250 / 251	57	92	83	9	52
	230 / 1337	298.0	.52	1.6	1.6	139	249 / 253	55	92	83	9	53
12	235 / 1342	302.0	.52	1.6	1.6	143	254 / 253	54	92	83	9	53
	240 / 1347	305.056	.40	1.2	1.2	137	250 / 253	53	92	84	9	53

81.676 .6999 1.5 134 ~~84~~ 79 450's =

152 .5 .6646 1.39 133

.22.7

METHOD 23 CDD/CDF SAMPLE RECOVERY DATA

Plant: GM-SAGINAW		Run No.: SO-23-2
Sample Date: 9/24/97	Filter No.(s): SO-23-2	Job No.: 9414.003
Sample Location: B Cupola Scrubber Outlet		
Recovery Date: 9/24/97	XAD-2 Trap No.(s): SO-23-2	
Sample Recovery Person: RK/BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	–	1068.3	700.1	706.4	605.0	898.7	g
Initial wt.	–	473.4	700.5	706.6	602.2	874.0	g
Net wt.	–	594.9	-0.4	0.2	2.8	24.7	g

Description 622.2

Train System: EPA Method 23 / BOX ID: N-5 / TOTAL: 622.2

Probe: 7' Glass

Filter: Color - TAN Loading - Medium

Impinger Contents: Clear

Silica Gel: @Grams Used - 300 Color - Lt. Blue % Spent - 60

Condensate Observed In Front Half: NONE

Recovered Sample Fractions

Filter Container No. SO-23-2	marked/sealed: ✓
XAD Module Container No.: SO-23-2	marked/sealed: ✓
Probe (FH) & Back Half Rinse (Acetone) Container No.: SO-23-2	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (Toluene) Container No.:	Liquid level marked/sealed: X
Impinger Contents Container No.: SO-23-2 A+B	Liquid level marked/sealed: ✓
Impinger Rinse (Acetone/MeCl2) Container No.:	Liquid level marked/sealed: X

FIELD DATA SHEET

~~K=.35~~ K = 8.59

Plant: GM Saginaw
Sampling Location: B Coupola
Run Number: S0233 Date: 9.25.97
Pretest Leak Rate: .008 cfm @ 15 in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: na

Sample Type: M23 Operator: G Gn
Pbar: 29.1 Ps: 1.1
CO2: O2:
Probe Length/Type: 8' Glass Pitot #: 8C
Stack Diameter: 75 As: 30.68

Nozzle ID: 1304 Thermocouple #: 8C
Assumed Bws: 18 Filter #: S0233
Meter Box #: RMB13 Y: 1.010 ΔH@: 1.859
Post-Test Leak Rate: .019 cfm @ 17 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: na

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Actual	Stack Temp. (Ts)	Temperature °F Probe	Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Outlet (Tm out °F)	Pump Vacuum (in. Hg)
	0	8:44	306.287										
1	5	849	309	.14	1.0	1.0	108	254	252	62 49	66	65	5
	10	854	311.7	.11	.87	.87	108	247	253	56 53	72	67	5
2	15	859	316.0	.34	2.7	2.7	109	246	253	50 50	74	67	10
	20	904	320.4	.23	1.8	1.8	110	250	253	50 50	78	77	8
3	25	909	325.9	.35	2.8	2.8	109	250	254	49 51	80	68	10
	30	914	328.5	.45	3.6	3.6	110	250	252	49 50	80	69	11
4	35	919	333.7	.45	3.6	3.6	109	250	252	50 51	81	70	12
	40	924	339.2	.43	3.4	3.4	109	250	254	51 51	81	70	15
5	45	929	343.9	.43	3.4	3.4	107	251	255	53 51	80	71	15
	50	934	348.6	.42	3.4	3.4	107	251	254	53 52	81	71	15
6	55	939	353.8	.42	3.4	3.4	107	252	251	53 53	81	71	15
	60	944	358.8	.43	3.4	3.4	107	252	253	54 53	82	72	15
7	65	949	363.9	.40	3.2	3.2	108	253	252	55 53	81	72	15
	70	954	368.8	.40	3.2	3.2	108	250	254	55 55	82	72	15
8	75	959	373.8	.41	3.3	3.3	108	254	253	56 56	82	73	15
	80	1004	378.8	.41	3.3	3.3	108	249	253	56 57	83	73	15
9	85	1009	384.0	.45	3.6	3.6	109	251	253	57 54	84	74	15
	90	1014	388.9	.41	3.3	3.3	109	254	254	58 56	85	74	15
10	95	1019	394.7	.41	3.3	3.3	110	255	253	56 56	85	74	15
	100	1024	399.3	.38	3.1	3.1	108	255	252	58 55	84	74	15
11	105	1029	404.3	.38	3.1	3.1	109	255	254	57 57	84	75	15
	110	1034	409.4	.38	3.1	3.1	109	255	254	55 57	85	76	15
12	115	1039	414.4	.38	3.1	3.1	110	254	255	56 57	86	76	15
	120	1044	419.276	.36	2.9	2.9	109	247	254	57 55	86	76	12

ΔVm = 223.582 ✓ → 23.798 $\overline{\sqrt{\Delta p}}$ = ~~.5955~~ ~~.06 .77~~ .5 ... ΔH = 2.94 ✓ Ts = 110 ✓ (F2D) Tm = 78 ✓ 538 °R

Leak check — 0.2110

Plant Name: GM **Test Date:** 9-25-97

Run Number: 5023-3 **Operator:** GGG

Traverse Point Number	Sampling Time, (min.)	Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft³	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Orifice Pres. Differential (ΔH) in. H_2O Actual	Stack Temp. °F (T_s)	Probe Temp. / Filter Temp. °F	Impinger Temp. °F	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Dry Gas Meter Temp. Outlet ($T_{m_{out}}$) °F	Pump Vacuum In. Hg
	0	1112	419.492	.38	3.0	3.0	109	250 / 233	69 / 55	82	76	14
1	125	1117	423.7	.38	3.0	3.0	110	248 / 247	67 / 55	83	77	14
	130	1122	428.5	.38	3.0	3.0	110	246 / 254	61 / 56	86	77	14
2	135	1127	433.3	.38	3.0	3.0	107	251 / 251	70 / 56	85	77	15
	140	1132	438.1	.41	3.3	3.3	108	253 / 247	64 / 60	85	79	15
3	145	1137	443.2	.41	3.3	3.3	109	252 / 247	62 / 60	88	79	15
	150	1142	448.1	.41	3.3	3.3	110	257 / 247	62 / 60	88	80	15
4	155	1147	453.1	.44	3.5	3.5	110	252 / 250	58 / 58	88	79	15
	160	1201	458.3	.35	2.8	2.8	111	250 / 255	58 / 58	87	79	14
5	165	1206	463.4	.30	2.4	2.4	111	255 / 253	58 / 58	88	81	12
	170	1211	468.9	.30	2.4	2.4	111	246 / 251	57 / 58	88	80	11
6	175	1216	472.2	.45	3.6	3.6	110	245 / 251	57 / 58	90	80	13
	180	1221	477.2	.43	3.5	3.5	111	250 / 251	57 / 58	90	80	15
7	185	1226	482.3	.43	3.5	3.5	111	256 / 255	56 / 58	88	81	15
	190	1231	487.3	.42	3.4	3.4	110	251 / 250	55 / 56	86	79	15
8	195	1236	492.7	.25	2.0	2.0	110	251 / 250	54 / 56	83	78	10
	200	1241	496.7	.25	2.0	2.0	111	250 / 249	55 / 56	83	79	10
9	205	1246	501.1	.25	2.0	2.0	112	251 / 249	56 / 56	84	79	10
	210	1251	505.0	.22	1.7	1.7	113	246 / 255	56 / 56	89	80	9
10	215	1256	508.8	.28	2.2	2.2	112	250 / 254	57 / 57	90	80	10
	220	1301	512.7	.30	2.4	2.4	113	252 / 251	57 / 57	91	80	10
11	225	1306	516.9	.30	2.4	2.4	113	250 / 248	56 / 57	90	79	10
	230	1311	521.3	.31	2.5	2.5	113	260 / 248	56 / 57	89	80	11
12	235	1316	525.7	.31	2.5	2.5	113	250 / 246	56 / 57	90	81	11
	240	1321	530.080	.32	2.5	2.5	113	252 / 251	57 / 57	90	81	11

STOP 11:25 11:25

METHOD 23 CDD/CDF SAMPLE RECOVERY DATA

Plant: GM - SAGINAW		Run No.: SO-23-3
Sample Date: 9/25/97	Filter No.(s): SO-23-3	Job No.: 5414.003
Sample Location: B Cupola Scrubber Outlet		
Recovery Date: 9/25/97	XAD-2 Trap No.(s): SO-23-3	
Sample Recovery Person: RK / BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	—	875.0	694.8	714.2	602.7	932.5	g
Initial wt.	—	475.6	707.3	719.6	595.5	880.3	g
Net wt.	—	399.4	-12.5	-5.4	7.2	52.2	g

Description

Train System: EPA Method 23 / Box ID: N-5 / Total: 440.9

Probe: Clear

Filter: Color - TAN Loading - Medium

Impinger Contents: Clear

Silica Gel: @Grams Used - 300 Color - lt. blue % Spent - 40

Condensate Observed In Front Half: None

Recovered Sample Fractions

Filter Container No. SO-23-3	marked/sealed: ✓
XAD Module Container No.: SO-23-3	marked/sealed: ✓
Probe (FH) & Back Half Rinse (Acetone) Container No.: SO-23-3	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (Toluene) Container No.:	Liquid level marked/sealed:
Impinger Contents Container No.: SO-23-3	Liquid level marked/sealed: ✓
Impinger Rinse (Acetone/~~Methanol~~ Toluene) Container No.: BE	Liquid level marked/sealed:

FIELD DATA SHEET

Plant: Gm Sanger
Sampling Location: B Coupla
Run Number: 5023-4 Date: 9-25-91
Pretest Leak Rate: .005 cfm @ 15 in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: NA

Sample Type: M23 Operator: GGM
Pbar: 29.1 Ps: +.82
CO2: 10 O2: 12
Probe Length/Type: 8' Glass Pitot #: 8C
Stack Diameter: 75 As: 30.68

Nozzle ID: .1304 Thermocouple #: 8C
Assumed Bws: 10 Filter #: 5023-4
Meter Box #: R-3313 Y: 1.610 ΔH@: 1.859
Post-Test Leak Rate: .002 cfm @ 16 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: NA

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Actual	Stack Temp. (Ts)	Temperature °F Probe	Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Outlet (Tm out °F)	Pump Vacuum (in. Hg)
	0	1443	532.164										
1	5	1448	536.2	.30	2.4	2.4	113	253	255	71 62	81	84	6
	10	1453	540.6	.30	2.4	2.4	115	252	253	65 62	89	81	7
2	15	1458	544.8	.30	2.4	2.4	115	255	254	60 59	91	81	9
	20	1503	549.0	.36	2.9	2.9	112	256	249	60 60	95	83	10
3	25	1508	553.5	.36	2.9	2.9	112	251	250	60 60	94	83	10
	30	1513	558.1	.35	2.8	2.8	109	252	251	60 60	92	81	10
4	35	1518	563.1	.38	3.1	3.1	112	253	248	60 60	92	82	10
	40	1523	567.9	.38	3.1	3.1	112	257	250	60 60	93	83	11
5	45	1528	572.8	.38	3.1	3.1	111	254	252	60 59	92	83	11
	50	1533	577.8	.40	3.2	3.2	111	258	256	60 59	93	84	11
6	55	1538	582.9	.40	3.2	3.2	110	255	248	60 59	91	82	11
	60	1543	587.8	.43	3.5	3.5	107	255	253	60 58	91	84	14
7	65	1548	593.2	.43	3.5	3.5	106	251	253	60 58	91	82	15
	70	1609	595.9	.40	3.2	3.2	109	255	251	60 58	92	84	14
8	75	1614	600.9	.40	3.3	3.3	105	253	254	62 59	88	83	12
	80	1619	606.2	.43	3.5	3.5	108	250	251	60 58	92	84	12
9	85	1624	611.1	.35	2.8	2.8	109	251	252	60 58	92	84	12
	90	1629	615.6	.30	2.4	2.4	109	251	252	60 57	92	84	10
10	95	1634	620.2	.28	2.3	2.3	109	252	253	60 56	94	85	10
	100	1639	624.8	.38	3.1	3.1	109	254	250	60 56	95	84	11
11	105	1644	629.3	.35	2.8	2.8	109	252	252	60 56	96	85	11
	110	1649	634.0	.32	2.6	2.6	110	253	251	60 55	98	87	11
12	115	1654	638.4	.32	2.6	2.6	110	249	255	61 56	97	86	11
	~~120~~	~~1659~~	~~642.458~~	.25	2.0	2.0	110	252	254	61 56	98	86	10
1	125	1718	647.3	.42	3.4	3.4	108	256	255	67 67	85	84	14
	130	1723	652.7	.42	3.4	3.4	108	256	252	56 56	93	85	14

STOP 1535 Resta 1543

STOP 1658 START 1605

START 1713

Leak Rate .002

ΔVm= 232.814 $\overline{\sqrt{\Delta p}}$= .6153 $\overline{\Delta H}$= 3.08 $\overline{Ts}$= 108 $\overline{Tm}$= 88.1

Plant Name: Gm Saginaw **Test Date:** 9-25-97

Run Number: SO 23-A **Operator:** S. Gray

Traverse Point Number	Sampling Time, (min.)	Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft³	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Orifice Pres. Differential (ΔH) in. H_2O Actual	Stack Temp. °F (T_s)	Probe Temp. / Filter Temp. °F	Impinger Temp. °F F_{out}	Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Dry Gas Meter Temp. Outlet ($T_{m_{out}}$) °F	Pump Vacuum In. Hg
	0	/						253 / 255				
2	135	/ 1728	657.8	.42	3.4	3.4	108	253 / 255	56 56	93	85	14
	140	/ 1733	663.1	.40	3.3	3.3	107	257 / 252	58 58	94	86	14
3	145	/ 1738	668.3	.40	3.3	3.3	108	253 / 255	59 59	94	86	14
	150	/ 1743	673.5	.42	3.4	3.4	108	255 / 254	59 59	93	84	14
4	155	/ 1748	678.8	.42	3.4	3.4	108	253 / 254	60 59	93	85	14
	160	/ 1753	683.5	.42	3.4	3.4	109	251 / 252	60 59	93	85	14
5	165	/ 1758	690.0	.42	3.4	3.4	110	255 / 255	60 59	95	84	14
	170	/ 1803	694.1	.40	3.3	3.3	110	256 / 253	60 61	94	85	14
6	175	/ 1808	699.2	.42	3.4	3.4	107	256 / 254	60 61	94	85	14
	180	/ 1813	704.5	.41	3.3	3.3	108	246 / 254	60 59	93	84	14
7	185	/ 1818	709.7	.40	3.3	3.3	108	251 / 252	61 59	93	85	14
	190	/ 1823	715.0	.40	3.3	3.3	107	255 / 252	60 60	91	83	14
8	195	/ 1828	719.9	.42	3.4	3.4	107	254 / 253	60 60	90	83	14
	200	/ 1833	725.0	.42	3.4	3.4	108	255 / 254	60 60	91	83	14
10	205	/ 1838	730.0	.40	3.3	3.3	108	254 / 252	60 60	92	84	14
	210	/ 1843	735.5	.38	3.1	3.1	108	250 / 255	60 58	92	83	14
11	215	/ 1848	740.4	.38	3.1	3.1	107	252 / 253	61 59	93	83	14
	220	/ 1853	745.5	.40	3.3	3.3	107	252 / 254	61 59	93	83	14
	225	/ 1903	750.8	.38	3.1	3.1	107	253 / 255	61 59	94	83	14
	230	/ 1908	754.0	.38	3.1	3.1	107	254 / 253	60 60	96	84	14
	235	/ 1913	760.3	.38	3.1	3.1	108	251 / 252	58 59	91	83	11
	240	/ 1918	765.131	.38	3.1	3.1	106	256 / 254	58 58	93	83	11
		/						/				

STOP 1908

START 1910

METHOD 23 CDD/CDF SAMPLE RECOVERY DATA

Plant: GM - SAGINAW		Run No.: SO-23-4
Sample Date: 9/25/97	Filter No.(s): SO-23-4	Job No.: 5414.003
Sample Location: B Cupola Scrubber Outlet		
Recovery Date: 9/25/97	XAD-2 Trap No.(s): SO-23-4	
Sample Recovery Person: RK/BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	—	874.5	690.4	699.1	610.4	949.5	g
Initial wt.	—	473.7	702.7	706.7	604.6	~~899.4~~ 899.4	g
Net wt.	—	400.8	-12.3	-7.6	5.8	50.1	g

Description

Train System: EPA Method 23 / Box N-5 / Total: 436.8	
Probe: 2' GLASS	
Filter: Color - TAN	Loading - MEDIUM
Impinger Contents: Clear	
Silica Gel: @Grams Used - 300	Color - H blue % Spent - 60
Condensate Observed In Front Half: NONE	

Recovered Sample Fractions

Filter Container No. SO-23-4	marked/sealed: ✓
XAD Module Container No.: SO-23-4	marked/sealed: ✓
Probe (FH) & Back Half Rinse (Acetone) Container No.: SO-23-4	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (Toluene) Container No.:	Liquid level marked/sealed:
Impinger Contents Container No.: SO-23-4	Liquid level marked/sealed: ✓
Impinger Rinse (Acetone/MeCl2) Container No.:	Liquid level marked/sealed:

K = 3.529 D 12%

FIELD DATA SHEET

Plant: GM
Sampling Location: Cupola Outlet
Run Number: 50-MM5-1 Date: 9-23-97
Pretest Leak Rate: .003 cfm @ 15 in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: ✓

Sample Type: MM5 Operator: TA
Pbar: 29.74 Ps: 1.1
CO2: 7 O2: 10
Probe Length/Type: 7' Glass Pitot #: TGC
Stack Diameter: 75" As:

Nozzle ID: .250 Thermocouple #: TGC
Assumed Bws: .06 Filter #: 0-MM5-1
Meter Box #: 14 Y: .966 ΔH@: 1.862
Post-Test Leak Rate: .032 cfm @ 7 in. Hg. at nozzle
Post-Test Leak Check: Pitot: — Orsat: —

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Actual	Stack Temp. (Ts)	Temperature °F Probe	Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Outlet (Tm out °F)	Pump Vacuum (in. Hg)	% Rep
0	0	1415	34.868											
1	5	1420	37.9	.48	1.4	1.4	125	250	251	51	77	77	4	60
	10	1425	41.3	.48	1.4	1.4	127	248	252	52	75	75	4	60
2	15	1430	44.3	.45	1.3	1.3	130	247	249	60	77	75	5	59
	20	1435	48.2	.50	1.4	1.4	131	240	250	60	77	75	5	57
3	25	1440	53.2	.50	1.4	1.4	127	247	250	58	80	75	6	56
	30	1445	54.1	.48	1.4	1.4	127	240	230	56	80	75	6	56
4	35	1450	56.2	.42	1.2	1.2	130	240	232	56	81	75	6	56
	40	1553	60.3	.42	1.2	1.2	131	240	245	56	81	75	6	56
5	45	1558	64.2	.45	1.5	1.5	119	248	253	56	78	77	7	58
	50	1603	67.5	.44	1.4	1.4	123	253	248	56	79	76	7	60
6	55	1608	74.6	.45	1.5	1.5	125	256	248	56	81	76	7	61
	60	1613	78.2	.50	1.6	1.6	126	255	248	57	80	77	7	58
7	65	1618	81.7	.50	1.6	1.6	125	255	248	58	81	75	7	55
	70	1623	85.3	.48	1.6	1.6	127	255	248	58	81	75	7	56
8	75	1628	87.0	.48	1.6	1.6	126	255	248	55	77	77	7	57
	80	1633	90.2	.45	1.5	1.5	127	257	248	57	75	70	7	57
9	85	1638	92.3	.45	1.5	1.5	127	254	248	57	75	70	7	58
	90	1827	95.7	.44	1.4	1.4	117	248	255	59	64	63	7	52
10	95	1832	99.2	.41	1.3	1.3	118	248	251	58	64	63	7	52
	100	2837	102.5	.41	1.3	1.3	120	250	253	53	65	64	7	53
11	105	1842	105.7	.39	1.2	1.2	121	247	256	54	67	64	7	53
	110	1847	108.840	.39	1.2	1.2	125	248	255	55	67	64	7	53
12	115													
	120													
1	125													
	130													

Stop @ 1453
Start @ 1550
Stop @ 1638
Start @ 1822

ΔVm= 73.972 √Δp= ~~.6726~~ ΔH= 1.40 Ts= 125 Tm= 74

Vm std = 70.472 ~~0.6066~~ 0.6066 Vw std = 10.228 Pws = .27

Δ 30 9.3

METHOD 0010/MM5 SAMPLE RECOVERY DATA

Plant: GM - SAGINAW		Run No.: SO - MM5 - 1
Sample Date: 9/23/97	Filter No.(s): SO - MM5 - 1	Job No.: 5414.003
Sample Location: B Cupola / SCRUBBER OUTLET		
Recovery Date: 9/24/97	XAD-2 Trap No.(s): SO - MM5 - 1	
Sample Recovery Person: ~~SO-MM5~~ BE RK/BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
NET ~~Final~~ wt.	—	196.1	3.8	0.7	1.5	15.2	g
Initial wt.	—	495.3	717.4	719.5	617.2	875.5	g
Final ~~Net~~ wt.	—	691.4	721.2	720.2	618.7	890.7	g

217.3

Description

Train System: EPA Method 0010/MM5 / BOX ~~NO~~ BE #24/TOTAL 217.3	
Probe: 7' Glass / Clear	
Filter: Color - Grey/Tan	Loading - Medium
Impinger Contents: Clear	
Silica Gel: @Grams Used - 300	Color - lt blue % Spent - 40
Condensate Observed In Front Half: None	

Recovered Sample Fractions

Filter Container No. SO-MM5-1	marked/sealed: ✓
XAD Module Container No.: SO-MM5-1	marked/sealed: ✓
Probe (FH) & Back Half Rinse (~~Acetone~~ MeCl2/Methanol) Container No.: SO-MM5-1	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (~~Toluene~~ MeCl2/Methanol) Container No.: SO-MM5-1	Liquid level marked/sealed: ✓
Impinger Contents Container No.: SO-MM5-1	Liquid level marked/sealed: ✓
Impinger Rinse (~~Acetone~~ Methanol/MeCl2) Container No.:	Liquid level marked/sealed:

K = 3.30 @ 14% H_2O

FIELD DATA SHEET

Plant: GM
Sampling Location: Cupola Outlet
Run Number: 0-MM5-2 Date: 9-24-97
Pretest Leak Rate: .005 cfm @ 15 in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: —

Sample Type: MM5 Operator: TA
Pbar: 29.85 Ps: 1.1
CO2: 9 O2: 11
Probe Length/Type: 7' Glass Pitot #: 7C
Stack Diameter: 75" As: 30.68

Nozzle ID: .250 Thermocouple #: 7C
Assumed Bws: .14 Filter #: 0-MM5-2
Meter Box #: 14 Y: .966 ΔH@: 1.862
Post-Test Leak Rate: .002 cfm @ 7 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: —

	Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Actual	Stack Temp. (Ts)	Temperature °F Probe	Filter	Impinger Temp. °F		Dry Gas Meter Temp. Inlet (Tm in °F)	Outlet (Tm out °F)	Pump Vacuum (in. Hg)
Stop @ 0911 start 0940	0	0	0851	109.698							Temp				
B	1	5	0856	112.5	.37	1.1	1.1	137	246	251	59	52	64	63	4
		10	0901	115.8	.47	1.4	1.4	137	248	251	59	53	64	63	4
	2	15	0906	119.0	.47	1.4	1.4	139	248	250	50	46	64	62	5
		20	0911	122.2	.47	1.4	1.4	138	248	250	51	46	66	61	5
	3	25	0944	125.3	.47	1.4	1.4	136	248	249	52	46	68	62	5
		30	0949	128.4	.54	1.6	1.6	127	248	253	44	46	69	68	6
vlc = 646.2	4	35	0954	132.1	.56	1.7	1.7	129	247	253	49	51	70	65	6
		40	0959	135.7	.59	1.8	1.8	131	247	253	50	56	71	64	7
	5	45	1004	139.5	.59	1.8	1.8	133	247	253	50	57	71	64	7
		50	1009	143.3	.59	1.8	1.8	133	248	252	50	59	73	65	7
	6	55	1014	146.8	.51	1.5	1.5	131	248	251	52	59	74	65	6
		60	1019	150.2	.51	1.5	1.5	131	248	250	52	60	76	67	6
	7	65	1024	153.7	.51	1.5	1.5	132	247	250	56	62	77	68	6
		70	1029	157.2	.53	1.6	1.6	131	246	250	53	60	79	72	6
	8	75	1034	160.5	.47	1.4	1.4	132	248	251	51	62	80	70	6
		80	1039	164.0	.47	1.4	1.4	132	248	250	51	60	82	73	6
	9	85	1044	167.1	.39	1.2	1.2	133	248	250	51	60	83	74	5
		90	1049	170.2	.39	1.2	1.2	133	248	250	52	62	86	77	5
	10	95	1054	173.3	.37	1.1	1.1	136	248	250	51	62	86	77	5
		100	1059	176.4	.37	1.1	1.1	133	248	250	51	61	87	78	5
	11	105	1104	179.4	.37	1.1	1.1	133	247	250	51	60	85	78	5
		110	1109	182.4	.35	1.1	1.1	134	248	251	51	60	85	79	5
	12	115	1114	185.3	.37	1.1	1.1	135	248	252	51	59	85	79	5
		120	1119/1200	188.241	.37	1.1	1.1	133	248	253	52	62	85	79	5
A	1	125	1205	191.3	.35	1.1	1.1	136	249	259	60	49	78	78	6
		130	1210	194.261	.35	1.1	1.1	137	249	260	58	44	78	78	6

Leak check: 188.241 − 188.333 = −0.092

1st Peak Area → ΔVm = 84.471 $\overline{\sqrt{\Delta p}}$ = .6710 $\overline{\Delta H}$ = 1.37 $\overline{Ts}$ = 133.5 $\overline{Tm}$ = 73 (1966 / 1829)

Plant Name: GM - Powertrain **Test Date:** 9-23-97

Run Number: O-MMS-2 **Operator:** TA

Traverse Point Number	Sampling Time, (min.)	Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft³	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Orifice Pres. Differential (ΔH) in. H_2O Actual	Stack Temp. °F (T_s)	Probe Temp. / Filter Temp. °F	Impinger Temp. °F T_{impg}		Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Dry Gas Meter Temp. Outlet ($T_{m_{out}}$) °F	Pump Vacuum In. Hg
2	135	1215	197.2	.37	1.1	1.1	135	247 / 260	58	34	78	77	6
	140	1220	200.1	.37	1.1	1.1	135	248 / 257	60	36	80	76	6
3	145	1225	203.5	.48	1.5	1.5	134	247 / 256	60	33	80	78	6
	150	1230	207.0	.48	1.5	1.5	133	247 / 255	60	38	83	78	7
4	155	1235	210.7	.55	1.7	1.7	135	249 / 255	58	47	86	79	7
	160	1240	214.3	.55	1.7	1.7	135	249 / 255	57	54	87	80	7
5	165	1245	218.0	.50	1.5	1.5	135	248 / 255	57	55	89	81	7
	170	1250	221.6	.50	1.5	1.5	135	249 / 255	57	58	89	82	7
6	175	1255	225.0	.55	1.7	1.7	135	247 / 254	57	60	90	83	7
	180	1300	228.7	.55	1.7	1.7	135	249 / 254	57	60	90	83	7
7	185	1305	232.4	.57	1.7	1.7	136	249 / 254	58	58	91	83	7
	190	1310	235.9	.57	1.7	1.7	136	247 / 258	58	57	91	83	7
8	195	1315	239.6	.55	1.7	1.7	138	248 / 257	58	57	91	83	7
	200	1320	243.3	.55	1.7	1.7	136	248 / 256	59	57	91	83	7
9	205	1325	246.8	.56	1.7	1.7	138	247 / 253	60	57	91	83	7
	210	1330	250.3	.56	1.7	1.7	139	247 / 255	62	63	91	83	7
10	215	1335	253.7	.39	1.2	1.2	142	247 / 253	61	61	91	85	6
	220	1340	257.1	.40	1.2	1.2	141	247 / 255	55	54	92	85	6
11	225	1345	260.2	.53	1.6	1.6	144	248 / 255	56	57	92	87	7
	230	1350	264.0	.53	1.6	1.6	138	248 / 256	56	57	92	87	7
12	235	1355	267.6	.50	1.5	1.5	137	248 / 254	56	57	92	87	7
	240	1400	270.957	.48	1.5	1.5	136	248 / 254	56	56	92	87	7

V_m = 161.167 $\sqrt{\Delta P}$ = .6881 $\overline{\Delta H}$ 1.44 T_s 135 1949 79.3 78.9 - ok

ISO_s = 104.1%

METHOD 0010 **SAMPLE RECOVERY DATA**

Plant: GM - SAGINAW		Run No.: SO-MM5-2
Sample Date: 9/24/97	Filter No.(s): SO-MM5-2	Job No.: 5414.003
Sample Location: B Cupola Scrubber Outlet		
Recovery Date: 9/24/97	XAD-2 Trap No.(s): SO-MM5-2	
Sample Recovery Person: RK/BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	—	1090.8	720.2	721.5	617.5	892.5	g
Initial wt.	—	475.9	719.9	721.3	615.0	862.2	g
Net wt.	—	614.9	0.3	0.2	0.5	30.3	g

Description 646.2

Train System: EPA Method 0010/MM5 / Box N-10 / TOTAL: 646.2

Probe: 7' Glass / Clear

Filter: Color - Grey / TAN Loading - Medium

Impinger Contents: Clear

Silica Gel: @Grams Used - 300 Color - Lt. Blue % Spent - 60

Condensate Observed In Front Half: NONE

Recovered Sample Fractions

Filter Container No. SO-MM5-2	marked/sealed: ✓
XAD Module Container No.: SO-MM5-2	marked/sealed: ✓
Probe (FH) & Back Half Rinse (Acetone) Container No.: SO-MM5-2	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (Toluene) Container No.: SO-MM5-2	Liquid level marked/sealed: ✓
Impinger Contents Container No.: SO-MM5-2 A & B	Liquid level marked/sealed: ✓
Impinger Rinse (Acetone/MeCl2) Container No.:	Liquid level marked/sealed:

K 9.7 → 8% +120

FIELD DATA SHEET

Plant: GM
Sampling Location: Cupola Outlet
Run Number: 50-mm5-3 Date: 9-25-97
Pretest Leak Rate: ~~.004~~ .004 cfm @ 10 in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: —

Sample Type: mm 5 Operator: TA
Pbar: 29.1 Ps: + .72
CO2: 10 O2: 11
Probe Length/Type: 7' Glass Pitot #: 7C
Stack Diameter: 75 As:

Nozzle ID: .305 Thermocouple #: 7C
Assumed Bws: .10 Filter #: 50-mm5-3
Meter Box #: 14 Y: .966 ΔH@: 1.862
Post-Test Leak Rate: .004 cfm @ 11 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: —

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Actual	Stack Temp. (Ts)	Temperature °F Probe	Filter	Impinger Temp. °F		Dry Gas Meter Temp. Inlet (Tm in °F)	Outlet (Tm out °F)	Pump Vacuum (in. Hg)
0	0	0844	273.220 ~~272.814~~											
1	5	0849	277.8	.33	2.6	2.6	109	248	239	60	34	71	71	7
	10	0854	282.1	.33	2.7	2.7	110	248	242	62	35	71	68	7
2	15	0859	286.6	.31	2.5	2.5	111	246	243	58	33	73	67	7
	20	0904	291.0	.31	2.5	2.5	111	247	245	59	38	77	67	8
3	25	0909	295.8	.37	3.0	3.0	111	248	245	59	39	74	67	9
	30	0914	300.6	.37	3.0	3.0	111	249	246	60	41	75	67	9
4	35	0919	305.4	.37	3.0	3.0	111	248	246	60	41	75	67	9
	40	0924	310.2	.37	3.0	3.0	111	249	248	60	41	75	67	9
5	45	0929	315.1	.42	3.4	3.4	111	249	249	60	43	76	69	10
	50	0934	320.2	.42	3.4	3.4	109	248	248	60	43	76	69	10
6	55	0939	325.2	.37	3.0	3.0	109	244	248	62	46	77	70	9
	60	0944	330.0	.37	3.0	3.0	110	246	250	61	46	78	70	9
7	65	0949	334.8	.35	2.9	2.9	110	248	247	60	46	78	70	9
	70	0954	339.7	.35	2.9	2.9	109	247	247	60	46	78	70	9
8	75	0959	334.6	.35	2.9	2.9	110	248	250	60	45	78	70	9
	80	1004	349.3	.35	2.9	2.9	110	248	248	61	41	80	73	9
9	85	1009	354.1	.37	3.0	3.0	111	248	248	61	41	80	73	9
	90	1014	359.0	.37	3.0	3.0	111	247	245	60	45	81	74	10
10	95	1019	364.9	.33	2.6	2.6	111	247	245	60	48	81	74	9
	100	1024	367.9	.33	2.6	2.6	111	247	246	60	48	81	74	9
11	105	1029	372.5	.32	2.6	2.6	112	247	240	60	49	81	74	9
	110	1034	377.0	.32	2.6	2.6	111	248	242	60	49	81	75	9
12	115	1039	381.3	.27	2.2	2.2	112	246	244	60	48	81	75	8
	120	1044/1112	385.502	.27	2.2	2.2	111	247	245	60	48	82	76	8
1'	125	1117	390.3	.35	2.9	2.9	111	246	237	55	52	85	83	7
	130	1122	395.2	.35	2.9	2.9	112	247	242	55	52	85	83	7

385.617
390.772
-.155

385.502
385.603
-0.11

3883

ΔVm = 227.729 ✓ $\overline{\sqrt{\Delta p}}$ = .5923 ✓ $\overline{\Delta H}$ = 2.89 $\overline{Ts}$ = 111 $\overline{Tm}$ = 78 °F

227.985 ✓

LEAK CHECK - .256

Stop @ 1125
Start @ 1135

Plant Name: GM **Test Date:** 9-25

Run Number: SO-MMS-3 **Operator:** TA

Traverse Point Number	Sampling Time, (min.)	Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft³	Velocity Head (ΔP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Actual	Stack Temp. °F (T_s)	Probe Temp. / Filter Temp. °F	Impinger Temp. °F T_{imp}		Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Outlet ($T_{m_{out}}$) °F	Pump Vacuum in. Hg
2	135	1136	399.7	.32	2.6	2.6	111	244 / 242	55	56	84	79	8
	140	1141	404.3	.32	2.6	2.6	109	247 / 241	60	55	84	80	8
3	145	1146	409.0	.37	3.1	3.1	110	248 / 243	58	58	85	80	9
	150	1151	414.0	.37	3.1	3.1	110	246 / 240	58	58	86	80	9
4	155	1156	419.0	.41	3.4	3.4	111	247 / 243	56	55	86	80	10
	160	1201	423.7	.41	3.4	3.4	111	244 / 239	58	59	86	80	10
5	165	1206	429.2	.40	3.3	3.3	112	240 / 244	57	56	86	80	9
	170	1211	434.7	.40	3.3	3.3	112	244 / 242	56	56	86	80	9
6	175	1216	439.7	.37	3.1	3.1	112	241 / 244	58	56	86	80	9
	180	1221	444.7	.37	3.1	3.1	112	241 / 246	58	56	86	80	9
7	185	1226	449.8	.35	2.9	2.9	113	244 / 243	56	57	86	80	9
	190	1231	454.3	.35	2.9	2.9	113	243 / 247	60	55	86	80	9
8	195	1236	459.3	.37	3.1	3.1	113	243 / 241	60	56	87	80	9
	200	1241	464.0	.37	3.1	3.1	112	240 / 240	58	57	87	80	9
9	205	1246	469.2	.37	3.1	3.1	113	243 / 243	58	56	87	80	9
	210	1251	473.7	.37	3.1	3.1	113	244 / 245	58	56	86	80	9
10	215	1256	478.5	.35	2.9	2.9	114	247 / 244	58	56	86	80	9
	220	1301	483.0	.35	2.9	2.9	113	248 / 246	59	56	87	80	9
11	225	1306	487.9	.32	2.6	2.6	114	247 / 249	59	55	88	81	8
	230	1311	492.2	.32	2.6	2.6	114	242 / 241	59	55	88	82	8
12	235	1316	496.8	.30	2.5	2.5	115	242 / 248	59	55	88	82	7
	240	1321	501.205	.30	2.5	2.5	114	243 / 247	58	55	88	82	7

2585

METHOD 0010 **SAMPLE RECOVERY DATA**

Plant: GM- Saginaw		Run No.: SO-MM5-3
Sample Date: 9/25/97	Filter No.(s): SO-MM5-3	Job No.: 5414.003
Sample Location: Scrubber Outlet		
Recovery Date: 9/25/97	XAD-2 Trap No.(s): SO-MM5-3	
Sample Recovery Person: RK/BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	—	1031.7	649.4	663.8	622.2	954.6	g
Initial wt.	—	496.0	714.1	725.6	618.7	908.0	g
Net wt.	—	535.7	-64.7	-61.8	3.5	46.6	g

Description

Train System: EPA MM5/0010 / BOX ID: #24 / TOTAL: 459.3

Probe: 7' Glass

Filter: Color - TAN Loading - Medium* (TWO Filters)

Impinger Contents: Clear

Silica Gel: @Grams Used - 300 Color - Lt. blue % Spent - 60

Condensate Observed In Front Half: NONE

Recovered Sample Fractions

Filter Container No. SO-MM5-3	marked/sealed: ✓
XAD Module Container No.: SO-MM5-3	marked/sealed: ✓
Probe (FH) & Back Half Rinse (~~Acetone~~ $MeCl_2$/Methanol) Container No.: SO-MM5-3	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (~~Toluene~~ $MeCl_2$/Methanol) Container No.: SO-MM5-3	Liquid level marked/sealed: ✓
Impinger Contents Container No.: SO-MM5-3	Liquid level marked/sealed: ✓
Impinger Rinse (~~Acetone~~ Methanol/MeCl2) Container No.:	Liquid level marked/sealed:

BE

Stop @ 1535 Stop @ 1558
Start @ 1543 Start @ 1605

FIELD DATA SHEET

Plant: GM
Sampling Location Cupola Outlet
Run Number: 50-mms-4 Date: 9-25-97
Pretest Leak Rate: .004 cfm @ 15 in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: —

Sample Type: MMS Operator: TA
Pbar: 29.1 Ps: .85
CO2: .0 O2: 12
Probe Length/Type: 7' Glass Pitot #: 7C
Stack Diameter: 73 As:

Nozzle ID: .305 Thermocouple #: 7C
Assumed Bws: .08 Filter #: 50-mms-5-9
Meter Box #: 14 Y: .966 ΔH@: 1.862
Post-Test Leak Rate: .003 cfm @ 11 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: —

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Actual	Stack Temp. (Ts)	Temperature °F Probe	Filter	Impinger Temp. °F		Dry Gas Meter Temp. Inlet (Tm in °F)	Outlet (Tm out °F)	Pump Vacuum (in. Hg)
0	0	1443	501.562											
1	5	1448	506.4	.37	3.1	3.1	116	246	235	60	61	87	86	5
	10	1453	511.5	.37	3.1	3.1	116	246	235	60	58	87	86	8
2	15	1458	516.4	.41	3.4	3.4	116	240	240	59	57	86	83	10
	20	1503	521.5	.38	3.1	3.1	114	237	237	59	58	86	83	9
3	25	1508	526.4	.38	3.1	3.1	113	231	234	58	58	86	83	9
	30	1513	531.3	.38	3.1	3.1	112	230	230	56	58	86	84	10
4	35	1518	536.5	.41	3.4	3.4	113	234	231	57	56	87	85	10
	40	1523	541.5	.39	3.2	3.2	115	233	233	56	57	86	81	10
5	45	1528	546.4	.36	2.9	2.9	115	233	241	56	55	86	81	10
	50	1533	551.3	.37	3.1	3.1	114	233	241	56	55	86	82	10
6	55	1538	556.6	.43	3.5	3.5	112	237	230	55	55	87	81	10
	60	1543	561.7	.43	3.5	3.5	109	239	247	57	56	87	82	10
7	65	1550	566.8	.37	3.1	3.1	110	247	236	58	60	88	84	10
	70	1609	571.2	.37	3.1	3.1	111	248	239	56	57	88	84	10
8	75	1614	576.4	.33	2.8	2.8	108	247	241	60	60	88	86	10
	80	1619	581.1	.33	2.8	2.8	110	248	240	60	61	88	83	10
9	85	1624	586.5	.35	2.9	2.9	110	247	240	60	61	88	83	10
	90	1629	590.8	.35	2.9	2.9	111	248	239	57	56	88	83	10
10	95	1634	595.4	.33	2.8	2.8	111	247	240	55	60	88	81	10
	100	1639	600.6	.31	2.6	2.6	111	246	238	55	60	88	81	10
11	105	1644	604.8	.31	2.6	2.6	112	249	240	55	60	88	82	10
	110	1649	609.5	.31	2.6	2.6	112	248	240	56	57	88	82	10
12	115	1654	613.9	.30	2.5	2.5	112	248	240	52	57	88	82	10
	120	1659	618.461	.30	2.5	2.5	112	249	244	56	55	90	84	10
1	125	1718	622.7	.28	2.3	2.3	112	247	236	55	57	89	88	9
	130	1723	627.2	.30	2.5	2.5	111	248	230	56	53	87	84	9

ΔVm= 234.250 $\sqrt{\Delta p}$= .1604 ΔH= 3.04 Ts= 111 Tm= 85

618.461
627.2

Stop @ 1908
Start @ 1910

Plant Name: GM-

Test Date: 9-25-97

Run Number: SO-MM5-4

Operator: TA

Traverse Point Number	Sampling Time, (min.)	Clock Time (24-hour clock)	Gas Meter Reading (V_m) ft³	Velocity Head (δP_s) in. H_2O	Orifice Pres. Differential (ΔH) in. H_2O Desired	Orifice Pres. Differential (ΔH) in. H_2O Actual	Stack Temp. °F (T_s)	Probe Temp. / Filter Temp.° F	Impinger Temp. °F		Dry Gas Meter Temp. Inlet ($T_{m_{in}}$) °F	Dry Gas Meter Temp. Outlet ($T_{m_{out}}$) °F	Pump Vacuum In. Hg
2	135	1728	631.5	.30	2.5	2.5	111	248 / 232	54	62	86	82	9
	140	1733	635.8	.30	2.5	2.5	110	248 / 230	54	61	86	82	9
3	145	1738	640.9	.38	3.2	3.2	110	247 / 233	54	60	86	82	10
	150	1743	645.9	.38	3.2	3.2	111	248 / 232	55	60	86	83	11
4	155	1748	651.0	.41	3.4	3.4	111	248 / 230	55	60	86	82	11
	160	1753	655.9	.41	3.4	3.4	111	247 / 230	55	59	87	82	11
5	165	1758	661.2	.41	3.4	3.4	111	248 / 230	55	59	87	83	11
	170	1803	666.3	.41	3.4	3.4	111	248 / 230	55	57	87	82	11
6	175	1808	671.6	.39	3.2	3.2	111	248 / 230	57	58	88	85	11
	180	1813	676.4	.38	3.2	3.2	110	249 / 230	57	57	88	85	11
7	185	1818	682.0	.38	3.2	3.2	110	247 / 230	57	56	88	84	11
	190	1823	686.5	.39	3.2	3.2	110	248 / 230	56	56	84	81	11
8	195	1828	691.1	.34	2.8	2.8	109	247 / 230	60	56	84	80	10
	200	1833	695.9	.35	2.9	2.9	110	248 / 232	59	55	84	80	10
9	205	1838	701.1	.39	3.2	3.2	110	247 / 231	55	57	84	80	11
	210	1843	703.4	.38	3.2	3.2	110	248 / 231	56	56	84	80	11
10	215	1848	710.7	.38	3.2	3.2	109	247 / 230	55	52	84	80	11
	220	1853	715.8	.41	3.4	3.4	109	247 / 230	56	56	83	80	11
11	225	1858	721.1	.40	3.3	3.3	109	248 / 232	57	55	83	80	11
	230	1903	725.7	.40	3.3	3.3	109	248 / 231	55	52	83	80	11
12	235	1914	730.8	.38	3.2	3.2	105	248 / 231	57	52	86	82	11
	240	1919	735.923	.38	3.2	3.2	107	245 / 233	57	5	86	83	

METHOD 0010 **SAMPLE RECOVERY DATA**

Plant: GM-SAGINAW		Run No.: SB-MM5-4
Sample Date: 9/25/97	Filter No.(s): SO-MM5-4	Job No.: 544.003
Sample Location: B Cupola Scrubber Outlet		
Recovery Date: 9/25/97	XAD-2 Trap No.(s): SO-MM5-4	
Sample Recovery Person: RK/BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) BE (untipped)	3 (100 ml H2O) (tipped) BE	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	—	891.5	~~677.2~~ 718.8	~~718.8~~ 729.7	~~725.7~~ 722.0	951.9	g
Initial wt.	—	476.4	726.7	728.2	716.7	902.1	g
Net wt.	—	415.1	-7.9	1.5	5.3	49.8	g

Description

Train System: EPA Method 0010 / Box ID: N-10 / TOTAL: 463.8

Probe:

Filter: Color - Loading -

Impinger Contents:

Silica Gel: @Grams Used - Color - % Spent -

Condensate Observed In Front Half:

Recovered Sample Fractions

Filter Container No. SO-MM5-4	marked/sealed: ✓
XAD Module Container No.: SO-MM5-4	marked/sealed: ✓
Probe (FH) & Back Half Rinse (~~Acetone~~) Methanol/MeCl2 Container No.: SO-MM5-4	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (~~Toluene~~) Methanol/MeCl2 Container No.: SO-MM5-4	Liquid level marked/sealed: ✓
Impinger Contents Container No.: SO-MM5-4	Liquid level marked/sealed: ✓
Impinger Rinse (~~Acetone~~ Methanol/MeCl2) Container No.:	Liquid level marked/sealed:

FIELD DATA SHEET

Plant: GM
Sampling Location Cupola outlet
Run Number: Blanks Date: 5-21-97
Pretest Leak Rate: _____ cfm @ ___ in. Hg.
Pretest Leak Check: Pitot: ___ Orsat: _____

Sample Type: _____ Operator: _____
Pbar: _____ Ps: _____
CO2: _____ O2: _____
Probe Length/Type: _____ Pitot #: ___
Stack Diameter: _____ As: _____

Nozzle ID: _____ Thermocouple #: _____
Assumed Bws: ___ Filter #: _____
Meter Box #: PMB13Y: 1.010 ΔH@: 1.859
Post-Test Leak Rate: _____ cfm @ ___ in. Hg.
Post-Test Leak Check: Pitot: ___ Orsat: ___

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O		Stack Temp. (Ts)	Temperature °F		Impinger Temp. °F	Dry Gas Meter Temp.		Pump Vacuum (in. Hg)
					Desired	Actual		Probe	Filter		Inlet (Tm in°F)	Outlet (Tm out°F)	
1			MM5										
2		1	.003	@ 15 in Hg									
3		2	.002	@ 15 in Hg									
4		3	.002	@ 15 in Hg									
5													
			M-23										
		1	.003	@ 17 in Hg									
		2	.003	15 in Hg									
		3	.003	15 in Hg									

ΔVm= _____ $\overline{\sqrt{\Delta p}}$= _____ $\overline{\Delta H}$= _____ $\overline{Ts}$= _____ $\overline{Tm}$= _____

METHOD DD10/MM5 **SAMPLE RECOVERY DATA**

Plant: GM - SAGINAW		Run No.: ~~SD-MM5-1, BE~~ FB1 - MM5
Sample Date: 9/22/97	Filter No.(s): ~~SD-MM5-1BE~~ FB1-MM5	Job No.: 5414.003
Sample Location: SCRUBBER DUTLET B Cupola		
Recovery Date: 9/22/97	XAD-2 Trap No.(s): ~~SD-MM5-1~~ BE FB1-MM5	
Sample Recovery Person: RK/BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	—	475.9	719.9	721.3	615.0	862.2	g
Initial wt.	—	475.9	719.9	721.3	615.0	862.2	g
Net wt.	—	0.0	0.0	0.0	0.0	0.0	g

Description

Train System: EPA MM5 DD10 TRAIN / BOX No. N-10 / Total 0.0g

Probe: 7' Glass

Filter: Color - No Change Loading - NONE

Impinger Contents: Clear / No CHANGE

Silica Gel: @Grams Used - 300 Color - No CHANGE % Spent - NONE

Condensate Observed In Front Half: NONE

Recovered Sample Fractions

Filter Container No. FB1-MM5	marked/sealed: ✓
XAD Module Container No.: FB1-MM5	marked/sealed: ✓
Probe (FH) & Back Half Rinse (~~Acetone~~ MeCl2/Methanol) Container No.: FB1-MM5	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (~~Toluene~~ MeCl2/Methanol) Container No.: FB1-MM5	Liquid level marked/sealed: ✓
Impinger Contents Container No.:	Liquid level marked/sealed:
Impinger Rinse (~~Acetone~~ Methanol/MeCl2) Container No.:	Liquid level marked/sealed:

METHOD 23 CDD/CDF SAMPLE RECOVERY DATA

Plant: GM - SAGINAW		Run No.: ~~SD-23-1~~ FB1-23 BE
Sample Date: 9/22/97	Filter No.(s): ~~SD-23-1~~ FB1-23 BE	Job No.: 5414.003
Sample Location: B Cupola Scrubber Outlet		
Recovery Date: 9/22/97	XAD-2 Trap No.(s): ~~SD-25-1~~ BE FB1-23	
Sample Recovery Person: RK/BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	—	474.7	703.6	717.8	594.0	872.4	g
Initial wt.	—	474.7	703.6	717.8	594.0	872.4	g
Net wt.	—	0.0	0.0	0.0	0.0	0.0	g

Description

Train System: EPA Method 23 / Box ID: N-5 / Total: 0.0g

Probe: 7' Glass

Filter: Color - No Change Loading - NONE

Impinger Contents: No CHANGE

Silica Gel: @Grams Used - 300 Color - No Change % Spent - NONE

Condensate Observed In Front Half: NONE

Recovered Sample Fractions

Filter Container No. FB1-23	marked/sealed: ✓
XAD Module Container No.: FB1-23	marked/sealed: ✓
Probe (FH) & Back Half Rinse (Acetone) Container No.: FB1-23	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (Toluene) Container No.:	Liquid level marked/sealed: ✗
Impinger Contents Container No.:	Liquid level marked/sealed: ✗
Impinger Rinse (Acetone/~~MeCl2~~ Toluene) Container No.:	Liquid level marked/sealed: ✗

METHOD 23 CDD/CDF SAMPLE RECOVERY DATA

Plant: GM- Saginaw Michigan		Run No.: FB-23-2
Sample Date: 9/26/97	Filter No.(s): FB-23-2	Job No.: 5414.003
Sample Location: Scrubber Outlet - Roof		
Recovery Date: 9/26/97	XAD-2 Trap No.(s): FB-23-2	
Sample Recovery Person: R Kelly + B. Elsass		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	—	475.5	706.4	723.6	602.7	861.6	g
Initial wt.	—	475.6	706.3	723.6	602.8	861.4	g
Net wt.	—						g

Description

Train System: EPA Method 23

Probe: 7' effective glass lined- glass nozzle

Filter: Color - NA Loading - NA

Impinger Contents: Type II H_2O

Silica Gel: @Grams Used - 250 Color - Blue/White % Spent - 0

Condensate Observed In Front Half: None

Recovered Sample Fractions

Filter Container No. FB-23-2	marked/sealed: ✓
XAD Module Container No.: FB-23-2	marked/sealed: ✓
Probe (FH) & Back Half Rinse (Acetone) Container No.: FB-23-2	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (Toluene) Container No.:	Liquid level marked/sealed:
Impinger Contents Container No.: ~~FB-23-2~~	Liquid level marked/sealed:
Impinger Rinse (Acetone/MeCl2) Container No.: ~~FB-23-2~~	Liquid level marked/sealed:

FIELD DATA SHEET

Plant: GM
Sampling Location: Cupola Outlet
Run Number: Preliminary Date: 9-23-97
Pretest Leak Rate: _____ cfm @ ___ in. Hg.
Pretest Leak Check: Pitot: ___ Orsat: ___

Sample Type: M-4 Operator: _____
Pbar: 29.74 Ps: _____
CO2: _____ O2: _____
Probe Length/Type: 4'55 Pitot #: ___
Stack Diameter: 75 As: _____

Nozzle ID: _____ Thermocouple #: _____
Assumed Bws: ___ Filter #: _____
Meter Box #: 14 Y: .966 ΔH@: 1.662
Post-Test Leak Rate: _____ cfm @ ___ in. Hg.
Post-Test Leak Check: Pitot: ___ Orsat: ___

Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft³	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Actual	Stack Temp. (Ts)	Temperature °F Probe	Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Outlet (Tm out °F)	Pump Vacuum (in. Hg)
	0	1303	22.462										
	10		30.0			1.8	135	—	—		75	71	2
	16.3		34.710			1.8	135				76	72	2

67.7 x 0.04707 = 3.187

3.187 / (3.187 + 12.2) = 20.7 %

17% Moist Saturated Outlet

Use 12% at Inlet

ΔVm= 12.248 √Δp= _____ ΔH= _____ Ts= _____ Tm= 73.5 / 533.5 °R

SAMPLE RECOVERY DATA

Plant: GM

Run No.: Prelim #1

Date: 9-23-97

Sample Box No.: RN-2

Job No.:

Sample Location: Cup. B Outlet

Sample Type: Moisture

Filter No.:

Sample Recovery Person: DS

Comments:

FRONT HALF

Acetone Container No.:

Liquid Level Marked:

Sealed:

Filter Container No.:

Sealed:

Description of Filter:

Samples Stored and Locked:

BACK HALF/MOISTURE

Container No.:

Liquid Level Marked:

Sealed:

IMP. NO.	CONTENTS	INITIAL VOL (ml)	WEIGHT (grams)		
			INITIAL	FINAL	NET
1	DI H_2O	100	575.6	639.6	64
2	DI H_2O	100	715.4		
3	Empty	0	499.0		
4	Silica Gel	250	718.3	722	3.7
5					
6					
TOTAL					67.7

Description of Impinger Catch: Clear

K = 8.36 mms
K = 8.22

10% H2O

.305 → mms
.3041 →

GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant: C&M
Date: 9-25-97
Sampling Location: Cupola Outlet
Clock Time: 0745
Run #: Prelim.
Operators: TA/RK
Barometric Pressure, in. Hg: 29.1
Static Pressure, in. H_2O: ~~.28~~ .35
Moisture, %: 16
Molecular wt., Dry: _____
Pitot Tube, Cp: .84
Stack Dimension, in. Diameter or Side 1: 75"
Side 2: _____
Wet Bulb, °F: _____
Dry Bulb, °F: _____

Traverse Point Number	Velocity Head in. H_2O	Stack Temp. °F
1	.27	114
2	.32	114
3	.37	114
4	.35	114
5	.37	115
6	.34	116
7	.37	115
8	.40	116
9	.37	118
10	.34	117
11	.32	118
12	.25	117
1	.22	114
2	.25	114
3	.27	114
4	.35	114
5	.36	114
6	.36	115
7	.38	115
8	.39	116
9	.40	115
10	.42	116
11	.35	115
12	.28	114
	$\overline{\sqrt{\Delta P}}$ = .5790	$\overline{Ts}$ = 115

$\overline{\Delta P}$ = .3375

ON = .287

$Md = (0.44 \times \%CO_2) + (0.32 \times \%O_2) + (0.28 \times \%N_2)$

$Md = (0.44 \times \quad) + (0.32 \times \quad) + (0.28 \times \quad)$

$Md =$

$Ms = Md \times (1 - \frac{\%H_2O}{100}) + 18 (\frac{\%H_2O}{100})$

$Ms = (\quad) \times (1 - \frac{}{100}) + 18 (\frac{}{100})$

$Ms =$

$\overline{Ts} =$ °F = °R (°F + 460)

$Ps = Pb + \frac{S.P.}{13.6} = (\quad) + \frac{}{13.6}$

Ps = in. Hg

$\overline{\sqrt{\Delta P}} =$

$Vs = 85.49 \times Cp \times \overline{\sqrt{\Delta P}} \times \sqrt{\frac{Ts\ (°R)}{Ps \times Ms}}$

$Vs = 85.49 \times (\quad) \times (\quad) \times \sqrt{\frac{}{}}$

Vs = ft/s

As = ft^2

Qs = Vs x As x 60 s/m

Qs = x x 60

Qs = acfm

$Qs_{std} = Qs \times 17.647 \times \frac{Ps}{Ts} \times (1 - \frac{\%H_2O}{100})$

$Qs_{std} = \quad \times 17.647 \times \frac{}{} \times (1 - \frac{}{100})$

Qs_{std} = dscfm

APPENDIX B

ANALYTICAL DATA

PCDDs/PCDFs AND SVOHAPs

PACIFIC ENVIRONMENTAL SERVICES, INC.

Project No.	Page	of
5414.003	1	3

Client: GM- Saginaw Melt Casting Operations

Location: Saginaw Michigan

Prepared By	Date	Checked By	Date	Sheet Title
R Kolde				Master Sample Log

Run No.	Date	Fractions	ID No.
①. FB-0010-1 (MMS)	9/22/97	Filter	#1
		XAD trap	2
TARE: 267.4 FINAL: 534.3		Front ½ rinse (Methylene Chloride and Methanol)	3
TARE: 170.0 FINAL: 316.5		Back ½ rinse (Methylene Chloride and Methanol)	4
②. FB-23-1	9/22/97	Filter	5
		XAD trap	6
TARE: 267.0 FINAL: 614.3		Rinse (Acetone + Toluene)	7
③. SO-MMS-1		Filter	8
		XAD trap	9
TARE: 268.0 FINAL: 602.8		Front ½ rinse (Methylene Chloride and Methanol)	10
TARE: 172.2 FINAL: 367.2		Condensate (1st impinger)	11
TARE: 266.6 FINAL: 469.6		Back ½ rinse (Methylene Chloride and Methanol)	12
④. SO-23-1		Filter	13
A / B	A / B	XAD trap	14
TARE: 267.1 / 266.8 FINAL: 611.9 / 456.6		Rinse (Acetone and Toluene)	15A+15B
TARE: 172.2 FINAL: 322.7		Condensate	16
⑤. SO-MMS-2		Filter	17
		XAD trap	18
TARE: 267.2 FINAL: 589.2		Front ½ rinse (Methylene Chloride and Methanol)	19
TARE: 267.3 FINAL: 719.7		Condensate = Bottle A (500 ml)	20
TARE: 173.5 FINAL: 335.1		Condensate = Bottle B (250 ml)	21
TARE: 269.1 FINAL: 400.1		Back ½ rinse (Methylene Chloride and Methanol)	22
⑥. SO-23-2		Filter	23
		XAD trap	24
TARE: 267.1 FINAL: 622.5		Rinse (Acetone and Toluene)	25
TARE: 267.7 FINAL: 723.6		Condensate = Bottle A (500 ml)	26
TARE: 172.2 FINAL: 309.8		Condensate = Bottle B (250 ml)	27

PACIFIC ENVIRONMENTAL SERVICES, INC.

Project No.	Page 2 of 3
Client	
Location	

Prepared By	Date	Checked By	Date	Sheet Title

(7) MM5 Blanks		Filter	# 28
		~~XAD trap~~	~~29~~
TARE: 268.3	FINAL: 710.4	Methylene Chloride/Methanol (50:50)	30
TARE: 269.3	FINAL: 707.8	Type II Water	31
(8) M23 Blanks		Filter	32
		~~XAD trap~~	~~33~~
TARE: 268.1	FINAL: 644.5	Acetone	34
TARE: 268.9	FINAL: 668.9	Toluene	35
TARE: 267.4	FINAL: 728.3	Type II Water	36
(9) SO-MM5-3		Filter A	37
		Filter B	38
		XAD trap	39
TARE: 269.6	FINAL: 525.0	Front ½ rinse	40
TARE: 267.2	FINAL: 802.6	Condensate	41
TARE: 267.8	FINAL: 487.9	Back ½ rinse	42
(10) SO-23-3		Filter	43
		XAD trap	44
TARE: 267.7	FINAL: 620.1	Acetone/Toluene Rinse	45
TARE: 267.3	FINAL: 666.7	Condensate	46
(11) SO-23-4		Filter	47
		XAD trap	48
TARE: 268.9	FINAL: 639.8	Acetone/Toluene Rinse	49
TARE: 269.3	FINAL: 669.6	Condensate	50

PACIFIC ENVIRONMENTAL SERVICES, INC.

Project No.	Page 3 of 3
Client	
Location	

Prepared By	Date	Checked By	Date	Sheet Title

			#
(12) SO-MMS-4		Filter	51
		XAD trap	52
Tare: 267.2	Final: 505.2	Front ½ rinse (Methylene Chloride/Methanol)	53
Tare: 262.6	Final: 677.2	Condensate	54
Tare: 264.5	Final: 456.4	Back ½ rinse (Methylene Chloride/Methanol)	55
(13) FB-23-2		Filter	56
		XAD	57
Tare: 265.6	Final: 537.0	Acetone/Toluene Rinse	58

CLIENT CHAIN OF CUSTODY **SAMPLER'S SIGNATURE** _____ **P/Q 03927/0700003270**

From: Pacific Environmental Services
5001 S. Miami Blvd. Suite 300

RTP, NC 27709

Project: ~~Tell City, IN~~
GM - Saginaw

(PES03 /AJB)

Contact: Frank Meadows
Phone: 919-941-0333
Fax: 919-941-0234
P.O.#: _____

If the data will be reported to a state agency, which one? ____

Analysis Wanted: EPA Method 23 | EPA Method 6010

Total Number of Containers:

Sample Name	Date	Time	Comp	Grab	Matrix	Sample Amt.						Remarks
FBi-MMS	9/22/97				Filter, XAD Front + Back Rinse	4 Containers			X			
FB-23-1	9/22/97				Filter, XAD, Rinse	3 Containers	X					
SO-MMS-1	9/23/97				Filter, XAD, Front/Back Rinse, Cond	5 Containers			X			
SO-~~MM~~ 23-1	9/23/97				Filter, XAD, Rinse, Condensate	4 Containers	X					
SO-MMS-2	9/24/97				Filter, XAD, Rinses Condensate	6 Containers			X			
SO-23-2	9/24/97				Filter, XAD, Rinse Condensate	5 Containers	X					
SO-MMS-3	9/25/97				Filters, XAD, Front/Back Rinse, Cond	6 Containers			X			
SO-23-3	9/25/97				Filter, XAD, Rinse Cond	4 Containers	X					
SO-23-4	9/25/97				Filter, XAD, Rinse, Condensate	4 Containers	X					
SO-~~23~~ MMS-4	9/25/97				Filter, XAD, Rinse Condensate	5 Containers			X			
FB-23-2	9/26/97				Filter, XAD, Rinse	3 Containers	X					

Relinquished By/Sign.	Date/Time	Received By/Sign.	Relinquished By/Sign.	Date/Time	Received By/Sign.
Ron Kalch	9/26/97	B Rayfield			
Relinquished By/Sign.	**Date/Time**	**Received By/Sign.**	**Relinquished By/Sign.**	**Date/Time**	**Received By/Sign.**

Received for Laboratory By/Signature	Date/Time	Send Samples to: Triangle Laboratories, Inc. Attn: Sample Custodian 801 Capitola Drive Durham, NC 27713 USA Phone: (919) 544-5729 • Fax: (919) 544-5491

ANALYTICAL REQUEST AND CHAIN OF CUSTODY

PLANT: Oil - Sugarman

PROJECT #: 5414.003

RECOVERY PERSON: Ronald Kolb / B. Elgass

SAMPLE TECHNICIAN: T. Hoverstad, G. Cooper

SAMPLE IDENTIFICATION	COLLECTION DATE	COLLECTION TIME	SAMPLE NAME	NUMBER OF CONTAINERS	EPA Method	23	EPA Method	8010							COMMENTS (Type of container, special preparation, special handling, etc.)
MHS Lab Blanks	9/24/97		Filter ~~XAD~~ Methanol Water	~~4~~ 3			X								No XAD trap
M23 Lab Blanks	9/24/97		Filter, Acetone Toluene, Water	4	X										No XAD trap

Ronald J. Kolb — 9/26/97 — RELINQUISHER'S NAME — DATE/TIME — RELINQUISHER'S SIGNATURE — SHIPPER'S NAME AND ID NUMBER

B. Mayfield — 9/26/97 — RECEIVER'S NAME — DATE/TIME — RECEIVER'S SIGNATURE

ANALYTICAL REQUEST AND CHAIN OF CUSTODY

57 containers

PLANT: GM- Saginaw

PROJECT #: 5414.003

RECOVERY PERSON: RKolde, B. Elsass

SAMPLE TECHNICIAN: G. Gay, T. Abernathy

SAMPLE IDENTIFICATION	COLLECTION DATE	COLLECTION TIME	SAMPLE NAME	NUMBER OF CONTAINERS	EPA Method 0010	Semi Volatile Organics	EPA Method 23	Cr PCDD/PCDF							COMMENTS (Type of container, special preparation, special handling, etc.)
FB-0010-1	9/22/97		FB-0010-1	Filter, XAD trap, Front & Back Rinse	X										4 containers
FB-23-1	9/22/97		FB-23-1	Filter, XAD, Rinse			X								3 containers
SO-MM5-1	9/23/97		SO-MM5-1	Filter, XAD, Rinse (Front & Back) 2s Condensate	X										5 containers
SO-23-1	9/23/97		SO-23-1	Filter, XAD, rinse condensate			X								4 Containers
SO-MM5-2	9/24/97		SO-MM5-2	Filter, XAD, Condensate Front/Back Rinses	X										6 Containers
SO-23-2	9/24/97		SO-23-2	Filter, XAD, Condensate Rinse			X								5 containers
SO-MM5-3	9/25/97		SO-MM5-3	Filter, XAD, Rinses (Front + back) Condensate	X										6 Containers
SO-23-3	9/25/97		SO-23-3	Filter, XAD, Rinse, condensate			X								4 Containers
SO-23-4	9/25/97		SO-23-4	Filter, XAD, Rinse, Condensate			X								4 containers
SO-MM5-4	9/25/97		SO-MM5-4	Filter, XAD, Rinses (Front + Back), Condensate	X										5 containers
FB2-23-2	9/26/97		FB-23-2	Filter, XAD, Rinse, ~~Condensate~~			X								3 Containers
Lab blanks	9/25/97		See	other	page										

Ronald L Kolde — RELINQUISHER'S NAME

9/26/97 — DATE/TIME

Ronald L Kolde — RELINQUISHER'S SIGNATURE

SHIPPER'S NAME AND ID NUMBER

RECEIVER'S NAME

DATE/TIME

RECEIVER'S SIGNATURE

Appendix B.1

Analytical Data

Method 23 PCDDs/PCDFs

AIR QUALITY PREPARATION WORK ORDER FORM
TRIANGLE LABORATORIES, INC.

pick up sept 9-18-97

TLI Project Number: 03927 Due Date: 9/18/97

ORDER INFORMATION

Client/Company Name: Pacific Environmental Order Date: 9/17/97
Project Manager: AJB Client Project #: _____
Client MILES Code: PES03 Client P.O. #: _____
Quote Number: 07/3270

MATERIALS NEEDED

12 Filters — 12 XAD traps — ___ PUFs
___ 3½"/9.0 cm — ✓ Ball and Socket — Sandwich PUF: yes no
___ 4"/10.16 cm — ___ Socket and Socket — Ship PUFs in : jars sleeves
___ 4½"/11.0 cm — ___ Screw cap
___ 5"/12.5 cm — ___ Other Cap/Clamps 12/caps - Clamps 6
___ Other _____

Filter Material: ___ Quartz ___ glass fiber other _____
Ship filter in: ___ one petri dish ___ separate petri dishes

SAMPLE PREPARATION INFORMATION

Preparer: [illegible] Date: 9/18/97
# of Laboratory Blanks: 1
XAD Resin Batch #: P-1037 Supplier: Supelco
Pre-spike required: yes no
Intended Analysis: ~~PCDD/PCDF~~ ~~HR-PAH~~ HR-PCB LR-PAH SV Table 2 (Circle all applicable)
Other: _____

	Dioxin	Organics
Spiker/Observer Initials:	WM / GL	WM / GL
Spiking Date:	9/18/97	9/18/97
Spiking Solution ID:	USF-C, -S 5236I	5217B
Volumn Spiked (µL):	40	1000
Nominal Concentration:	0.1 µg/mL	100 µg/mL
Expiration Date:	12/27/97	12/26/97

PCDD/PCDF Surrogates

$^{37}Cl_4$-2,3,7,8-TCDD	4 ng
$^{13}C_{12}$-2,3,4,7,8-PeCDF	___ ng
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	___ ng
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	___ ng
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	___ ng

PAH-HRMS Surrogates

Terphenyl-d_{14}	___ ng
Fluorene-d_{10}	___ ng

PAH-LRMS Surrogates

Terphenyl-d_{14}	100 µg

PCB-HRMS Surrogates

$^{13}C_{12}$-3,3',5,5'-TetraCB	___ ng
$^{13}C_{12}$-2,2',4,5,5'-PentaCB	___ ng
$^{13}C_{12}$-2,2',3,4,4',5'-HexaCB	___ ng
$^{13}C_{12}$-2,2',3,3',5,5',6,6'-OctaCB	___ ng

SHIPPING INSTRUCTIONS

Ship to the Attention of Frank Meadows
Mailing Address Pacific Environmental
Street Address 5001 S. Miami Blvd, Ste 300
RTP, NC 27709
Phone Number (919) 941 - ~~0234~~ 0333
Special Instructions: _____

Form Prepared by Rose V. West
Signature Date

Please return this form to Triangle Laboratories, Inc. with the samples.

SRVR1\QA\FORMS\AQUQO.FRM (4/11/96)

TRIANGLE LABS

CASE NARRATIVE

Analysis of Samples for the Presence of

Polychlorinated Dibenzo-*p*-Dioxins and Dibenzofurans by

High-Resolution Chromatography / High-Resolution Mass Spectrometry

Method 23 (6/93)

Date:	October 21, 1997
Client ID:	Pacific Environmental Services
P.O. Number:	
TLI Project Number:	43432

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Rev. 05/08/97

Triangle Laboratories, Inc.
801 Capitola Drive
Durham, NC 27713-4411
919-544-5729
P.O. Box 13485
Research Triangle Park, NC 27709-3485
Fax # 919-544-5491

Overview

Seven M23 samples were received from Pacific Environmental Services at 3 °C in good condition on September 29, 1997 and were stored in a refrigerator at 4°C. The samples and any associated QC samples were extracted and analyzed according to procedures described in the Triangle Laboratories' Data User's Manual (Rev. 12/92-HK-2-AH-2/93). Any particular difficulties encountered during the sample handling by Triangle Laboratories will be discussed in the QC Remarks section below. Results reported relate only to the items tested.

Quality Control Samples

A laboratory method blank, identified as the TLI Blank, was prepared along with the samples.

Quality Control Remarks

This release of this particular set of Pacific Environmental Services analytical data by Triangle Laboratories was authorized by the Quality Control Chemist who has reviewed each sample data package individually following a series of inspections/reviews. When applicable, general deviations from acceptable QC requirements are identified below and comments are made on the effect of these deviations upon the validity and reliability of the results. Please consult Triangle Laboratories' Data User's Manual for further details. Specific QC issues associated with this particular project are:

Sample Preparation Laboratory: None

Mass Spectrometry: None

Data Review: None

Other Comments: Any analytes found in the TLI Blank are detected at a level equal to or less than the Target Detection Limit. This level of contamination is acceptable as per TLI guidelines.

Sample Calculations:

Analyte Concentration

The amount of any analyte is calculated using the following expression.

$$Amt_{(\sigma)} = \frac{A_\sigma * Q_\beta}{A_\beta * RRF_{(\sigma)} * W}$$

Where:

$Amt_{(\sigma)}$ is the amount of a given analyte,

A_σ is the integrated current for the characteristic ions of the analyte,

A_β is the integrated current of the characteristic ions of the corresponding internal standard,

Q_β represents the amount of internal standard added to the sample before extraction,

$RRF_{(\sigma)}$ is the mean analyte relative response factor from the initial calibration (ICal) and,

W is the sample weight or volume (W = 1 for M23)

The amount is expressed in nanograms (ng) or picograms (pg).

Detection Limits

The detection limit reported for a target analyte that is not detected or presents an analyte response that is less than 2.5 times the background level is calculated by using the following expression. The area of the analyte is replaced by the noise level measured in a region of the chromatogram clear of genuine GC signals multiplied by an empirically determined factor. The detection limits represent the maximum possible concentration of a target analyte that could be present without being detected.

$$DL_{(\sigma)} = \frac{2 * 2.5 * (F * H) * Q_\beta}{A_\beta * RRF_{(\sigma)} * W}$$

Where:

$DL_{(\sigma)}$ is the estimated detection limit for a target analyte,

2.5 is the minimum response required for a GC signal,

F is an empirical number that approximates the area to height ratio for a GC signal. This number is 3.7 for both the DB-5 GC column and the DB-225 GC column,

H is the height of the noise

A_β is the integrated current of the characteristic ions of the corresponding internal standard,

Q_β represents the amount of internal standard added to the sample before extraction,

$RRF_{(\sigma)}$ is the mean analyte relative response factor from the initial calibration (ICal) and,

W is the sample weight or volume

The detection limit is expressed in nanograms (ng) or picograms (pg).

Other sample calculations may be found in the Triangle Laboratories Data User's Manual.

Data Flags

In order to assist with data interpretation, data qualifier flags are used on the final reports, as discussed in Triangle Laboratories' Method 23 Data User's Manual. Please note that all data qualifier flags are subjective and are applied as consistently as possible. Each flag has been reviewed by two independent Chemists and the impact of the data qualifier flag on the quality of the data discussed above. The most commonly used flags are:

A **'B'** flag is used to indicate that an analyte has been detected in the laboratory method blank as well as in an associated field sample. The 'B' flag will be used only when the concentration of analyte found in the sample is less than 20 times that found in the associated blank. This flag denotes possible contribution of background laboratory contamination to the concentration or amount of that analyte detected in the field sample. Under Triangle Laboratories guidelines, a laboratory blank is acceptable if the tetra- through hepta-CDD/CDF levels are all below the target detection limits (TDLS) or if the contamination levels are less than 5% of the levels detected in the associated field samples. If these conditions are satisfied or if the blank is unable to be reextracted, the interpretation of the contamination levels relative to the samples should be as follows: 1) analyte quantitations should be considered valid if the level of blank contamination is less than five percent of the level detected in the field sample, 2) analyte quantitations should be considered estimated if the analyte level in the sample is five to twenty times the level of the analyte in the blank, or 3) analytes whose level in a sample is the same as or less than five times the level detected in the associated blank should be considered present likely due to laboratory contamination and not native to the sample.

An **'E'** flag is used to indicate that an PCDF peak has eluted at the same time as the associated diphenyl ether (DPE) and that the DPE peak intensity is ten percent or more of the PCDF peak intensity. Total PCDF values are flagged 'E' if the total DPE contribution to the total PCDF value is greater than ten percent. All PCDF peaks that are significantly influenced by the presence of DPE peaks are quantitated with EMPC values, regardless of

the isotopic abundance ratio. These EMPC values are most likely overestimated due to the DPE contribution to the peak area.

An **'I'** flag is used to indicate labeled standards have been interfered with on the GC column by coeluting, interferent peaks. The interference may have caused the standard's area to be overestimated. All quantitations relative to this standard, therefore, may be underestimated.

A **'PR'** flag is used to indicate that a GC peak is poorly resolved. This resolution problem may be seen as two closely eluting peaks without a reasonable valley between the peak tops, overly broad peaks, or peaks whose shapes vary greatly from a normal distribution. The concentrations or amounts reported for such peaks are most likely overestimated.

A **'Q'** flag is used to indicate the presence of QC ion instabilities caused by quantitative interferences. Affected analytes may be overestimated or underestimated as a result of this interference. A peak is flagged 'Q' only if it is affected by a QC ion deviation greater than 20% full scale as determined relative to the labeled standard against which it is quantitated. Total PCDF/PCDF quantitations will be flagged 'Q' if the interferences affect ten percent or more of the total PCDD/PCDF peak areas.

An **'RO'** flag is used to indicate that a labeled standard has an ion abundance ratio that is outside of the acceptable QC limits, most likely due to a coeluting interference. This may have caused the percent recovery of the standard to be overestimated. All quantitations versus this standard, therefore, may be underestimated.

A **'U'** flag is used to indicate that a specific (2,3,7,8-substituted) isomer cannot be resolved from a large, coeluting interferent GC peak. The specific isomer is reported as not detected as a valid concentration/amount cannot be determined. The calculated detection limit, therefore, should be considered an underestimated value.

A **'V'** flag is used to indicate that, although the percent recovery of a labeled standard may be below a specific QC limit, the signal-to-noise ratio of the peak is greater than ten-to-one. The standard is considered reliably quantifiable. All quantitations derived from the standard are considered valid as well.

By our interpretation, the analytical data in this project are valid based on the guidelines of EPA Method 23 (6/93) and Triangle Laboratories' Method 23 Data User's Manual. Any specific QC concerns or problems have been discussed in the QC Remarks section of this case narrative with emphasis on their effect on the data. Should Pacific Environmental Services have any questions or comments regarding this data package, please feel free to contact our Project Scientist, Amy Boehm, at 919/544-5729 ext. 268.

For Triangle Laboratories, Inc.,

Report Preparation

Vijay S. Chhabra
Report Preparation Chemist

Quality Control

Kenneth Varley
Report Preparation Chemist

The total number of pages in the data package is : 297 .

TRIANGLE LABORATORIES, INC.

LIST OF CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

American Association for Laboratory Accreditation. Certification pending. Certificate Number 0226-01. Accreditation for technical competence in Environmental Testing.(Including Waste Water, Sol/Haz Waste, Pulp/Paper, and Air Matrices) Parameters are AOX/TOX, Volatiles, Pesticides, PCB's, BNA's, and Dioxin/Furan. Method 1613 for Drinking Water.

State of Alabama, Department of Environmental Management. Expires December 31, 1997. Laboratory I.D. # 40950. Dioxin in drinking water.

State of Alaska, Department of Environmental Conservation. Expires December 21, 1997. Certificate number OS-00397. Dioxin in drinking water.

State of Arizona, Department of Health Services. Expires May 26, 1998. Certificate #AZ0423. Drinking Water for Dioxin, Dioxin in WW and S/H Waste.

State of Arkansas, Department of Pollution Control and Ecology. Expires February 18, 1998. Pulp/paper, soil, water, and Hazardous Waste for Dioxin/Furan; AOX/TOX.

State of California, Department of Health Services. Expires August 31, 1999. Certificate #1922. Selected Metals in Waste Water; Volatiles, Semi-volatiles, and Dioxin/furan in WW and Sol/Haz Waste. Dioxin in drinking water.

State of Connecticut, Department of Health Services. Expires September 30, 1997. Registration # PH-0117. Dioxin in drinking water.

Delaware Health and Social Services. Expires December 31, 1997. Certificate #NC 140. Dioxin in drinking water.

Florida Department of Health and Rehabilitative Services. Expires June 30, 1998.Dioxin in DW. Drinking Water ID HRS# 87424. Metals, Extractable Organics (GC/MS), Pesticides/PCB's (GC) and Volatiles (GC/MS) in Environmental Samples. Environmental water ID HRS# E87411.

Hawaii Department of Health. Expires March 1, 1998. Dioxin in drinking water. "Accepted" status for regulatory purposes .

Idaho Department of Health and Welfare. Expires November 30, 1997. Dioxin in drinking water.

State of Kansas, Department of Health and Environment. Expires January 31, 1998. Environmental Analyses/Non potable Water and Solid and Hazardous Waste. Method 1613 for drinking water. ID #'s - Drinking water and/or pollution control - E-215. Solid or Hazardous Waste - E-1209.

Commonwealth of Kentucky, Department for Environmental Protection. Expires December 31, 1997. ID#90060. Dioxin in drinking water.

Maryland Department of Health and Mental Hygiene. Expires September 30, 1997. Certification #235. Drinking water by Method 1613A.

State of Michigan, Department of Public Health. Expires March 31, 1998. Drinking water by Method 1613.

Mississippi State Department of Health. No expiration date.. Dioxin in drinking water.

Montana Department of Health and Environmental Services. Expires December 31, 1997. Dioxin in drinking water.

State of New Jersey, Department of Environmental Protection and Energy. Extended by state. Temporary certificate until December 31, 1997. ID #67851. BNAs and Volatiles. Dioxin in drinking water.

State of New Mexico, Environment Department. Certification pending. Dioxin in drinking water.

New York State Department of Health. *Expires June 30, 1997. ID #11026. Environmental Analyses of non-potable Water, Solid and Hazardous Waste. Method 1613 in DW.*

State of North Carolina, Department of Environment Health and Natural Resources Expires August 31, 1999. Certificate # 37751. Dioxin in drinking water.

State of North Carolina, Department of Environment, Health, and Natural Resources, Division of Environmental Management. Expires December 31, 1997. Certificate # 485. Metals, pesticides & PCBs, semi-volatiles and volatiles; TCLP.

North Dakota State Department of Health and Consolidated Laboratories. Expires December 31, 1997. Certificate # R-076. Effective October 4, 1993. Dioxin in drinking water.

Oklahoma Department of Environmental Quality. Expires October 31, 1997. Laboratory #9612. Dioxin by 1613A, 8290 and 8280.

State of South Carolina, Department of Health and Environmental Control. Expires June 30, 1997. Certificate number #99040001 (drinking water). Expires August 31, 1999. Certificate number #99040002 (other parameters). Dioxin/Furans, BNA, Volatiles, and PCBs/pesticides under Clean Water Act, 2,3,7,8-TCDD for Drinking Water, and Organic extractables for Solid and Hazardous Waste.

State of Tennessee. Department of Environment and Conservation. Expires February 5, 1999. ID #02992. Method 1613 Drinking water only.

U.S. Department of Agriculture Soil Permit. Expires September 30, 2001. Permit No. S-3790. Under the authority of the Federal Plant Pest Act, permission is granted to receive foreign soil samples for use in laboratory analysis.

U.S. Army Corps of Engineers. Expires November 30, 1997. Validated to perform methods 8280 & 8290 for Lockbourne Landfill Site Investigation, Defense Distribution Depot Projects, and assorted projects for the USACE North Pacific Division Laboratory.

U.S. EPA Region V. Expires November 14, 1999. Dioxin in drinking water.

U.S. EPA Region VIII, for the State of Wyoming. Expires November 13, 1997. Dioxin in drinking water.

State of Utah, Department of Health. Expires December 31, 1997. Certificate Number E-166. Certification for the following parameters: Semi-Volatiles and Volatiles under RCRA; Volatiles under Clean Water Act; Dioxin/furans by Method 8280; Drinking water for Dioxin by Method 1613; Metals including Mercury and Microwave Digestion.

Commonwealth of Virginia, Department of General Services, Division of Consolidated Laboratory Services. Expires June 30, 1998. ID # 00341. Dioxin in drinking water.

State of Washington, Department of Ecology. Expires September 1998. Lab Accreditation Number C067. Scope of Accreditation applies to water analyses for Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans, BNA Extr (Semivolatile) Organics and Purgeable (Volatile) Organics.

State of Washington, Department of Health. Expires April 30, 1998. Dioxin in drinking water. Lab I.D. 129

State of West Virginia, Department of Health. Expires December 31, 1997. Certificate No. 9923(C). Dioxin in drinking water.

State of Wisconsin, Department of Natural Resources. Expires August 31, 1998. Laboratory ID Number 999869530. Certification for the following categories of Organics: Purgeable, Base/Neutral, Acid, PCBs, and Dioxin. Expires November 14, 1999. Laboratory ID 999869530. Dioxin in drinking water.

PHARMACEUTICAL

Drug Enforcement Agency (DEA). Expires November 30, 1997. Registration number RT01195835. Controlled substance registration for schedules 1,2,3,3N,4,5.

N.C. Department of Human Resources. Expires October 31, 1997. Registration number NC-PT 0000 0031. North Carolina controlled substances registration. Application submitted for renewal.

Food & Drug Administration (FDA) Registration. Expires June 1998. ID #'s 001500 1053481. Annual registration of drug establishment. Annual registration of drug establishment.

OTHER

Clinical Laboratory Improvement Amendments (CLIA) Registration. Expires May 30, 1999. ID # 34D0705123. Department of Health & Human Services, Health Care Financing Administration.

U.S. EPA Large Quantity Hazardous Waste Generator. No expiration date. EPA ID #NCD982156879. Permit indicates that the laboratory is a large generator of hazardous waste.

North Carolina Radioactive Materials License. Expires April 30 1998. License No. 032-0954-1. License authorizes the licensee to receive, acquire, own, possess, transfer, import and use such radioactive materials as designated.

North Carolina General License for Radiation Protection. No. expiration date. License No. 032-875-OG. The general license applies only to radioactive material contained in devices which have been manufactured and labeled in accordance with specific requirements.

TRIANGLE LABS

DOCUMENT CONTROL

Triangle Laboratories, Inc.
801 Capitola Drive
Durham, NC 27713-4411
919-544-5729
P.O. Box 13485
Research Triangle Park, NC 27709-3485
Fax # 919-544-5491

ANALYTICAL REQUEST AND CHAIN OF CUSTODY

57 containers

PLANT: GM- Saginaw

PROJECT #: 5414.003

RECOVERY PERSON: RKolle, B. Elsass

SAMPLE TECHNICIAN: G. Gay, T. Abernathy

SAMPLE IDENTIFICATION	COLLECTION DATE	COLLECTION TIME	SAMPLE NAME	NUMBER OF CONTAINERS	EPA Method 0010	Semi Volatile Organics	EPA Method 23	Gr. POD/PCDF							COMMENTS (Type of container, special preparation, special handling, etc.)
FB-0010-1	9/22/97		FB-0010-1	Filter, XAD trap, Front & Rinse Back & Rinse	X										4 containers
FB-23-1	9/22/97		FB-23-1	Filter, XAD. Rinse			X								3 containers
SO-MM5-1	9/23/97		SO-MM5-1	Filter, XAD, Rinse (Front + Back) & Condensate	X										5 containers
SO-23-1	9/23/97		SO-23-1	Filter, XAD, Rinse Condensate			X								4 Containers
SO-MM5-2	9/24/97		SO-MM5-2	Filter, XAD, Condensate Front/Back Rinses	X										6 Containers
SO-23-2	9/24/97		SO-23-2	Filter, XAD, Condensate Rinse			X								5 containers
SO-MM5-3	9/25/97		SO-MM5-3	Filter, XAD, Rinses (Front + back) Condensate	X										6 Containers
SO-23-3	9/25/97		SO-23-3	Filter, XAD, Rinse, condensate			X								4 Containers
SO-23-4	9/25/97		SO-23-4	Filter, XAD, Rinse, Condensate			X								4 containers
SO-MM5-4	9/25/97		SO-MM5-4	Filter, XAD, Rinses, (Front + back, Condensate	X										5 containers
FB2-23-2	9/26/97		FB-23-2	Filter, XAD, Rinse, ~~Condensate~~			X								3 Containers
Lab Blanks	9/25/97		See	other	page										

Randall L Kolle	9/26/97	Randall L Kolle	
RELINQUISHER'S NAME	DATE/TIME	RELINQUISHER'S SIGNATURE	SHIPPER'S NAME AND ID NUMBER
Kathi McLynch	9/27/97 1413		
RECEIVER'S NAME	DATE/TIME	RECEIVER'S SIGNATURE	

COPY KMM 9/29/97

CLIENT CHAIN OF CUSTODY

SAMPLER'S SIGNATURE _____

P/Q 03927/0700003270

From: Pacific Environmental Services
5001 S. Miami Blvd. Suite 300

RTP, NC 27709

Project: ~~Tell City, IN~~ GM - Saginaw

(PES03 /AJB)

Contact: Frank Meadows
Phone: 919-941-0333
Fax: 919-941-0234
P.O.#: _____

If the data will be reported to a state agency, which one? ____

Analysis Wanted: EPA Method 23 | EPA Method | GC/10

Total Number of Containers:

Sample Name	Date	Time	Comp	Grab	Matrix	Sample Amt.						Remarks
FB1-MMS	9/22/97				Filter, XAD Front + Back Rinse	4 Containers			X			
FB-23-1	9/22/97				Filter, XAD, Rinse	3 Containers	X					
SO-MMS-1	9/23/97				Filter, XAD, Front/Back Rinse, Cond	5 Containers			X			
SO-~~MMS~~ 23-1	9/23/97				Filter, XAD, Rinse, Condensate	4 Containers	X					
SO-MMS-2	9/24/97				Filter, XAD, Rinses Condensate	6 Containers			X			
SO-23-2	9/24/97				Filter, XAD, Rinse Condensates	5 Containers	X					
SO-MMS-3	9/25/97				Filters, XAD, Front/Back Rinse, Cond	6 Containers			X			
SO-23-3	9/25/97				Filter, XAD, Rinse Cond	4 Containers	X					
SO-23-4	9/25/97				Filter, XAD, Rinse, Condensate	4 Containers	X					
SO-~~23~~ MMS-4	9/25/97				Filter, XAD, Rinse Condensate	5 Containers			X			
FB-23-2	9/26/97				Filter, XAD, Rinse	3 Containers	X					

Relinquished By/Sign.	Date/Time	Received By/Sign.	Relinquished By/Sign.	Date/Time	Received By/Sign.
Ron Kolb	9/26/97	B Rayfield	B Rayfield	9/29/97	[illegible]
Relinquished By/Sign.	Date/Time	Received By/Sign.	Relinquished By/Sign.	Date/Time	Received By/Sign.

Received for Laboratory By/Signature	Date/Time	Send Samples to:
Rakia M Lynch	9/29/97 1413	Triangle Laboratories, Inc. Attn: Sample Custodian 801 Capitola Drive Durham, NC 27713 USA Phone: (919) 544-5729 • Fax: (919) 544-5491

FINAL FOR NOT

ANALYTICAL REQUEST AND CHAIN OF CUSTODY

PLANT: GM - Singapore

PROJECT #: 5414.003

RECOVERY PERSON: R Kolb / B. Elgass

SAMPLE TECHNICIAN: T. Abercrombie, G. Cary

SAMPLE IDENTIFICATION	COLLECTION DATE	COLLECTION TIME	SAMPLE NAME	NUMBER OF CONTAINERS	ANALYTICAL REQUEST: EPA Method 23	ANALYTICAL REQUEST: EPA Method for ID	COMMENTS (Type of container, special preparation, special handling, etc.)
MM5 Lab Blanks	9/25/97		Filter, ~~XAD~~ Acetone Water	~~4~~ 3		X	No XAD trap
M23 Lab Blanks	9/25/97		Filter, Acetone Toluene, Water	4	X		No XAD trap

Ronald J. Kolb — RELINQUISHER'S NAME — 9/26/97 — DATE/TIME — RELINQUISHER'S SIGNATURE

B. Elgass — RECEIVER'S NAME — 9/26/97 — DATE/TIME — A. McDonald — RECEIVER'S SIGNATURE

SHIPPER'S NAME AND ID NUMBER

Kathie M. Lynch 9/27/97 1413

METHOD 23 CDD/CDF SAMPLE RECOVERY DATA

Plant: GM - SAGINAW		Run No.: ~~SD-23-1~~ FB1-23 BE
Sample Date: 9/22/97	Filter No.(s): ~~SD-23-1~~ FB1-23 BE	Job No.: 5414.003
Sample Location: B Cupola Scrubber Outlet		
Recovery Date: 9/22/97	XAD-2 Trap No.(s): ~~SD-23-1~~ BE FB1-23	
Sample Recovery Person: JK/BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	—	474.7	703.6	717.8	594.0	872.4	g
Initial wt.	—	474.7	703.6	717.8	594.0	872.4	g
Net wt.	—	0.0	0.0	0.0	0.0	0.0	g

Description

Train System: EPA Method 23 / Box ID: N-5 / Total C.D.

Probe: 7' Glass

Filter: Color - No Change Loading - NONE

Impinger Contents: No CHANGE

Silica Gel: @Grams Used - 300 Color - No Change % Spent - NONE

Condensate Observed In Front Half: None

Recovered Sample Fractions

Filter Container No. FB1-23	marked/sealed: ✓
XAD Module Container No.: FB1-23	marked/sealed: ✓
Probe (FH) & Back Half Rinse (Acetone) Container No.: FB1-23	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (Toluene) Container No.:	Liquid level marked/sealed: X
Impinger Contents Container No.:	Liquid level marked/sealed: X
Impinger Rinse (Acetone/~~MeCl2~~ Toluene) Container No.:	Liquid level marked/sealed: X

METHOD 23 CDD/CDF SAMPLE RECOVERY DATA

Plant: GM - SAGINAW		Run No.: SO-23-1
Sample Date: 9/23/97	Filter No.(s): SO-23-1	Job No.: 5414.23
Sample Location: B Cupola / Scrubber Outlet		
Recovery Date: 9/24/97	XAD-2 Trap No.(s): SO-23-1	
Sample Recovery Person: RK/BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	—	626.3	702.3	717.3	595.4	880.2	g
Initial wt.	—	474.7	703.6	717.8	594.0	~~872.4~~ BE	g
Net wt.	—	151.6	-1.3	-0.50	1.4	869.5	g

Description

Train System: EPA Method 23 / Box = 24 / TOTAL: 161.9

Probe: 7' Glass / Clear

Filter: Color - Grey / Thin Loading - Medium

Impinger Contents: Clear

Silica Gel: @Grams Used - 300 Color - Blue % Spent - 40

Condensate Observed In Front Half: None

Recovered Sample Fractions

Filter Container No. SO-23-1	marked/sealed: ✓
XAD Module Container No.: SO-23-1	marked/sealed: ✓
Probe (FH) & Back Half Rinse (Acetone) Container No.: SO-23-1	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (Toluene) Container No.:	Liquid level marked/sealed: X
Impinger Contents Container No.: SO-23-1	Liquid level marked/sealed: ✓
Impinger Rinse (Acetone/~~MeCl2~~ Toluene) Container No.:	Liquid level marked/sealed: X

METHOD 23 CDD/CDF SAMPLE RECOVERY DATA

Plant: GM-SAGINAW		Run No.: SO-23-2
Sample Date: 9/24/97	Filter No.(s): SO-23-2	Job No.: 5414.003
Sample Location: B Cupola Scrubber Outlet		
Recovery Date: 9/24/97	XAD-2 Trap No.(s): SO-23-2	
Sample Recovery Person: CK/BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	–	1068.3	700.1	706.4	605.0	898.7	g
Initial wt.	–	473.4	700.5	706.6	602.2	874.0	g
Net wt.	–	594.9	-0.4	0.2	2.8	24.7	g

Description 622.2

Train System: EPA Method 23 / BOX ID: N-5 / TOTAL: 622.2	
Probe: 7' Glass	
Filter: Color - TAN	Loading - Medium
Impinger Contents: Clear	
Silica Gel: @Grams Used - 300	Color - Lt. Blue % Spent - 60
Condensate Observed In Front Half: NONE	

Recovered Sample Fractions

Filter Container No. SO-23-2	marked/sealed: ✓
XAD Module Container No.: SO-23-2	marked/sealed: ✓
Probe (FH) & Back Half Rinse (Acetone) Container No.: SO-23-2	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (Toluene) Container No.:	Liquid level marked/sealed: X
Impinger Contents Container No.: SO-23-2 A+B	Liquid level marked/sealed: ✓
Impinger Rinse (Acetone/MeCl2) Container No.:	Liquid level marked/sealed: X

METHOD 23 CDD/CDF SAMPLE RECOVERY DATA

Plant: GM - SAGINAW		Run No.: SO-23-3
Sample Date: 9/25/97	Filter No.(s): SO-23-3	Job No.: 5414.003
Sample Location: B Cupola Scrubber Outlet		
Recovery Date: 9/25/97	XAD-2 Trap No.(s): SO-23-3	
Sample Recovery Person: RK / BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	—	875.0	694.8	714.2	602.7	932.5	g
Initial wt.	—	475.6	707.3	719.6	595.5	880.3	g
Net wt.	—	399.4	-12.5	-5.4	7.2	52.2	g

Description

Train System: EPA Method 23 / Box ID: N-5 / Total: 440.9

Probe: Clear

Filter: Color - TAN Loading - Medium

Impinger Contents: Clear

Silica Gel: @Grams Used - 300 Color - lt. blue % Spent - 40

Condensate Observed In Front Half: None

Recovered Sample Fractions

Filter Container No. SO-23-3	marked/sealed: ✓
XAD Module Container No.: SO-23-3	marked/sealed: ✓
Probe (FH) & Back Half Rinse (Acetone) Container No.: SO-23-3	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (Toluene) Container No.:	Liquid level marked/sealed:
Impinger Contents Container No.: SO-23-3	Liquid level marked/sealed: ✓
Impinger Rinse (Acetone/~~MeCl2~~ Toluene) Container No.:	Liquid level marked/sealed:

METHOD 23 CDD/CDF SAMPLE RECOVERY DATA

Plant: GM - SAGINAW		Run No.: SD-23-4
Sample Date: 9/25/97	Filter No.(s): SD-23-4	Job No.: 5414.003
Sample Location: B Cupola Scrubber Outlet		
Recovery Date: 9/25/97	XAD-2 Trap No.(s): SD-23-4	
Sample Recovery Person: CK/GE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	—	874.5	690.4	699.1	610.4	949.5	g
Initial wt.	—	473.7	702.7	706.7	604.6	~~929.9~~ 899.4	g
Net wt.	—	400.8	-12.3	-7.6	5.8	50.1	g

Description

Train System: EPA Method 23 / Box N-5 / TOTAL: 436.8

Probe: 7' GLASS

Filter: Color - TAN Loading - MEDIUM

Impinger Contents: Clear

Silica Gel: @Grams Used - 300 Color - H blue % Spent - 60

Condensate Observed In Front Half: NONE

Recovered Sample Fractions

Filter Container No. SD-23-4	marked/sealed: ✓
XAD Module Container No.: SD-23-4	marked/sealed: ✓
Probe (FH) & Back Half Rinse (Acetone) Container No.: SD-23-4	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (Toluene) Container No.:	Liquid level marked/sealed:
Impinger Contents Container No.: SD-23-4	Liquid level marked/sealed: ✓
Impinger Rinse (Acetone/MeCl2) Container No.:	Liquid level marked/sealed:

METHOD 23 CDD/CDF SAMPLE RECOVERY DATA

Plant: GM- Saginaw Michigan		Run No.: FB- 23- 2
Sample Date: 9/26/97	Filter No.(s): FB-23-2	Job No.: 5414.003
Sample Location: Scrubber Outlet - Roof		
Recovery Date: 9/26/97	XAD-2 Trap No.(s): FB-23-2	
Sample Recovery Person: RKelch + B. Elsass		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	—	475.5	706.4	723.6	602.7	861.6	g
Initial wt.	—	475.6	706.3	723.6	602.8	861.4	g
Net wt.	—						g

Description

Train System: EPA Method 23

Probe: 7' effective glass lined- glass nozzle

Filter: Color - NA Loading - NA

Impinger Contents: Type II H_2O

Silica Gel: @Grams Used - 250 Color - Blue/White % Spent - 0

Condensate Observed In Front Half: None

Recovered Sample Fractions

Filter Container No. FB-23-2	marked/sealed: ✓
XAD Module Container No.: FB-23-2	marked/sealed: ✓
Probe (FH) & Back Half Rinse (Acetone) Container No.: FB-23-2	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (Toluene) Container No.:	Liquid level marked/sealed:
Impinger Contents Container No.: ~~FB-23-2~~	Liquid level marked/sealed:
Impinger Rinse (Acetone/MeCl2) Container No.: ~~FB-23-2~~	Liquid level marked/sealed:

PACIFIC ENVIRONMENTAL SERVICES, INC.

Project No.	Page	of
5414.003	1	3

Client: GM- Saginaw Melt Casting Operations

Location: Saginaw Michigan

Prepared By	Date	Checked By	Date	Sheet Title
R Kolde				Master Sample Log

Run No.	Date	Fractions	ID No.
①. FB-0010-1 (MMS)	9/22/97	Filter	1
		XAD trap	2
TARE: 267.4 FINAL: 534.3		Front ½ rinse (Methylene Chloride and Methanol)	3
TARE: 170.0 FINAL: 316.5		Back ½ rinse (Methylene Chloride and Methanol)	4
②. FB-23-1	9/22/97	Filter	5
		XAD trap	6
TARE: 267.0 FINAL: 614.3		Rinse (Acetone + Toluene)	7
③. SO-MMS-1		Filter	8
		XAD trap	9
TARE: 268.0 FINAL: 602.8		Front ½ rinse (Methylene Chloride and Methanol)	10
TARE: 172.2 FINAL: 367.2		Condensate (1st impinger)	11
TARE: 266.6 FINAL: 469.6		Back ½ rinse (Methylene Chloride and Methanol)	12
④. SO-23-1		Filter	13
A / B	A / B	XAD trap	14
TARE: 267.1 / 266.8	FINAL: 611.9 / 456.6	Rinse (Acetone and Toluene)	15A + 15B
TARE: 172.2	FINAL: 322.7	Condensate	16
⑤. SO-MMS-2		Filter	17
		XAD trap	18
TARE: 267.2	FINAL: 589.2	Front ½ rinse (Methylene Chloride and Methanol)	19
TARE: 267.3	FINAL: 719.7	Condensate = Bottle A (500 ml)	20
TARE: 173.5	FINAL: 335.1	Condensate = Bottle B (250 ml)	21
TARE: 269.1	FINAL: 400.1	Back ½ rinse (Methylene Chloride and Methanol)	22
⑥. SO-23-2		Filter	23
		XAD trap	24
TARE: 267.1	FINAL: 622.5	Rinse (Acetone and Toluene)	25
TARE: 267.7	FINAL: 723.6	Condensate = Bottle A (500 ml)	26
TARE: 172.2	FINAL: 309.8	Condensate = Bottle B (250 ml)	27

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PACIFIC ENVIRONMENTAL SERVICES, INC.

Project No.	Page 2 of 3
Client	
Location	

Prepared By	Date	Checked By	Date	Sheet Title

(7). MM5 Blanks		Filter	# 28
		~~XAD trap~~	~~29~~
TARE: 266.3	FINAL: 710.4	Methylene Chloride/Methanol (50:50)	30
TARE: 261.3	FINAL: 707.8	Type II Water	31
(8). M23 Blanks		Filter	32
		~~XAD trap~~	~~33~~
TARE: 268.1	FINAL: 644.5	Acetone	34
TARE: 268.9	FINAL: 668.9	Toluene	35
TARE: 267.4	FINAL: 728.3	Type II Water	36
(9). SO-MM5-3		Filter A	37
		Filter B	38
		XAD trap	39
TARE: 269.6	FINAL: 525.0	Front ½ rinse	40
TARE: 267.2	FINAL: 802.6	Condensate	41
TARE: 267.8	FINAL: 487.9	Back ½ rinse	42
(10) SO-23-3		Filter	43
		XAD trap	44
TARE: 267.7	FINAL: 620.1	Acetone/Toluene Rinse	45
TARE: 267.3	FINAL: 666.7	Condensate	46
(11). SO-23-4		Filter	47
		XAD trap	48
TARE: 268.9	FINAL: 639.8	Acetone/Toluene Rinse	49
TARE: 269.3	FINAL: 669.6	Condensate	50

PACIFIC ENVIRONMENTAL SERVICES, INC.

Project No.	Page 3 of 3
Client	
Location	

Prepared By	Date	Checked By	Date	Sheet Title

				#
(12)	50-MMS-4		Filter	51
			XAD trap	52
Time: 267.2	Final: 505.2		Front ½ rinse (Methylene Chloride/Methanol).	53
Time: 262.6	Final: 677.2		Condensate	54
Time: 264.5	Final: 456.4		Back ½ rinse (Methylene Chloride/Methanol)	55
(13).	FB-23-2		Filter	56
			XAD	57
Time: 265.6	Final: 537.0		Acetone/Toluene Rinse	58

TRIANGLE LABORATORIES, INC. -- LOG IN RECORD/CHAIN OF CUSTODY

Custody Seal : Absent
Chain of Custody : Present
Sample Tags : Absent
Sample Tag Numbers: Not Listed on Chain of Custody
SMO Forms : N/A

Sample Seals: Absent
Container...: Intact

TLI Project Number 43432
Client: PES03 - Pacific Environmental Services

Book 185

Date Received 09/29/97 By [illegible]

Ice Chest ICE Temp 3.0 C

Carrier and Number TOM MCDONALD

Page 6

TLI Number.. mR/H:CPM.	....Client Sample ID..... .....Client COC ID.....*	.....Matrix Location.....	To LAB Date/Init	To STORAGE Date/Init	To LAB Date/Init	To STORAGE Date/Init	To LAB Date/Init	To STORAGE Date/Init	To LAB Date/Init	To STORAGE Date/Init	DISPOSED Date/Init
185-6-1A	SO-M23-1 / SO-M23-1	FILTER / C01	10-9-97	10-9-97							
185-6-1B	SO-M23-1 / SO-M23-1	XAD / C01									
185-6-1C	SO-M23-1 / SO-M23-1	ACE/TOLUENE / C01		USED							
185-6-1D	SO-M23-1 / SO-M23-1	ACE/TOLUENE / C01									
185-6-1E	SO-M23-1 / SO-M23-1	CONDENSATE / C01									
185-6-2A	SO-M23-2 / SO-M23-2	FILTER / C01									
185-6-2B	SO-M23-2 / SO-M23-2	XAD / C01		USED							
185-6-2C	SO-M23-2 / SO-M23-2	ACE/TOLUENE / C01									
185-6-2D	SO-M23-2 / SO-M23-2	CONDENSATE / C01									
185-6-2E	SO-M23-2 / SO-M23-2	CONDENSATE / C01									
185-6-3A	SO-M23-3 / SO-M23-3	FILTER / C01									
185-6-3B	SO-M23-3 / SO-M23-3	XAD / C01		USED							
185-6-3C	SO-M23-3 / SO-M23-3	ACE/TOLUENE / C01									
185-6-3D	SO-M23-3 / SO-M23-3	CONDENSATE / C01									

Receiving Remarks: K 10/22/97 (as per check of bottles on 10/22/97)

Archive Remarks:

Form Revised 05/27/1997 -- Page 1 OF 3

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TRIANGLE LABORATORIES, INC. -- LOG IN RECORD/CHAIN OF CUSTODY

Custody Seal : Absent
Chain of Custody : Present
Sample Tags : Absent
Sample Tag Numbers: Not Listed on Chain of Custody
SMO Forms : N/A

Sample Seals: Absent
Container...: Intact

TLI Project Number 43432
Client: PES03 - Pacific Environmental Services

Book 185

Date Received 09/29/97 By Martin M. Lynch

Page 6

Ice Chest ICE Temp 3.0 C

Carrier and Number TOM MCDONALD

TLI Number.. mR/H:CPM.	Client Sample ID..... Client COC ID.....*	Matrix Location.....	To LAB Date/Init	To STORAGE Date/Init	To LAB Date/Init	To STORAGE Date/Init	To LAB Date/Init	To STORAGE Date/Init	To LAB Date/Init	To STORAGE Date/Init	DISPOSED Date/Init
185-6-4A	SO-M23-4 / SO-M23-4 K 10/22/97	FILTER / C01	10-9-97	10-9-97							
185-6-4B	SO-M23-4 / SO-M23-4	XAD / C01		USED							
185-6-4C	SO-M23-4 / SO-M23-4	ACE/TOLUENE / C01									
185-6-4D	SO-M23-4 / SO-M23-4	CONDENSATE / C01									
185-6-5A	FB1-M23 / FB1-M23	FILTER / C01									
185-6-5B	FB1-M23 / FB1-M23	XAD / C01		USED							
185-6-5C	FB1-M23 / FB1-M23	CONDENSATE / C01									
185-6-6A	FB2-M23 / FB2-M23	FILTER / C01									
185-6-6B	FB2-M23 / FB2-M23	XAD / C01		USED							
185-6-6C	FB2-M23 / FB2-M23	ACE/TOLUENE / C01									
185-6-7A	LAB BLANK M23 / LAB BLANK M23	FILTER / C01									
185-6-7B	LAB BLANK M23 / LAB BLANK M23	XAD / C01		USED							
185-6-7C	LAB BLANK M23 / LAB BLANK M23	ACETONE / C01									
185-6-7D	LAB BLANK M23 / LAB BLANK M23	H20 / C01									

Receiving Remarks:

Archive Remarks:

TRI LABO IES, -- L REC HAIN USTOD

Custody Seal : Absent	Sample Seals: Absent	TLI Project Number 43432	Book
Chain of Custody : Present	Container...: Intact	Client: PES03 - Pacific Environmental Services	
Sample Tags : Absent			185
Sample Tag Numbers: Not Listed on Chain of Custody			
SMO Forms : N/A		Date Received 09/29/97 By [signature]	Page
Ice Chest ICE	Temp 3.0 C	Carrier and Number TOM MCDONALD	6

TLI Number.. mR/H:CPM.	Client Sample ID..... Client COC ID.....*	Matrix Location.....	To LAB Date/Init	To STORAGE Date/Init	To LAB Date/Init	To STORAGE Date/Init	To LAB Date/Init	To STORAGE Date/Init	To LAB Date/Init	To STORAGE Date/Init	DISPOSED Date/Init
185-6-7E	LAB BLANK M23	TOLUENE	[illegible]	0500							
	LAB BLANK M23	C01									
			10-9-97	[illegible] 10-9-97							

Receiving Remarks:

Archive Remarks:

Form Revised 05/27/1997 -- Page 3 OF 3

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TRIANGLE LABORATORIES, INC.
SAMPLE TRACKING AND PROJECT MANAGEMENT FORM

(14) 10/7/97

----------ADMINISTRATIVE INFORMATION----------

TLI Proj#: 43432-	Samples: 7	TurnAround.: ~~20~~ Day(s)
Prod Code: D23061	Matrix.: M23Train	Hold Time..: 30 Day(s)
DetectLim: 0.05 ng	Type...: A	Start Date.: 10~~/01/97~~
	Recvd..: 09/29/97	Ship By....: 10/~~19~~/97
		DWL Due Dt.: 1~~0/09/97~~

revised
10/7/97
10/19/97
10/13/97

Analyte List.: tetra-octa PCDDs/PCDFs

Method.....: Method 23:Tetra-Octa (Tol Combined)
Client Proj..:
Client.....: Pacific Environmental Services (PES03)
P.O. No.....:
Contact.....: Frank Meadows
Proj. Mgr....: Amy J. Boehm

Collect Dt/Tm: 09/22/97
Phone.....: 919-941-0333
Fax.....: 919-941-0234
Sample Origin: NC

----------SPECIAL INSTRUCTIONS / QA REQUIREMENTS----------

Assoc Proj 1: 43433
Assoc Proj 2: 43452
Prep Project: 03927

Prespike Standard: USF-CS
Prespike Amount..: 4.0ng

----------REPORTING REQUIREMENTS----------

Reporting Format: Report Option II

See MILES for Instructions/Communications.

Completed by: Rosie Wood DATE: 10-2-97

Reviewed by: AB DATE: 10/2/97 (PMGT0197)

TRIANGLE LABORATORIES OF RTP, INC.

PROJECT COMMUNICATION TRACKING FORM

page ___ of ___

TLI Project Number: 43432

Use this form to record all exchanges of information between production units as well as personnel handling this project. Decisions, corrective actions and recommendations must also appear on this tracking document.

a	Name	Comment / Decision / Resolution / Action / Observation				
9.97			XAD	FILTER	GLASSWOOL	RINSES
		1	WHITE	DK. BROWN	WHITE	PARTICULATE
		2	WHITE	BROWN	LT YELLOW	"
		3	WHITE	BROWN	WHITE	"
		4	WHITE	TAN BROWN	WHITE	"
		5	WHITE	WHITE	WHITE	CLEAR
		6	WHITE	WHITE	WHITE	"
		7	WHITE	WHITE	WHITE	"

ALL TRAPS AND BLANK FROM PREP PROJECT 03927
USED 30.0 GRAMS SUPELCO XAD LOT# 1047 FOR LCS AND LCSD

Triangle Laboratories, Inc.
TLI PROJECT# 03927
DATE 9/18/97 TLI BLANK
SPIKE 4.0ng USF-C & USF-S
SPIKE 100ug TERPHENYL-D14
SPIKER ___ PREP.
PACIFIC ENV.

BLANK

Date: 10/10/97
Time: 07:26

TRIANGLE LABORATORIES, INC.
Wet Lab MM5/PUF Observations
Project: 43432

PRDPERC v4.00
Page: 1

Sample #	crd	TLI_Number..	Customer.Sample.Id.....	F. No	XAD Color.....	Filter Color.....	Glass Wool Color.....	PUF Color.....	Odor.....	Air Q.No.	Entered.By.....	Date....	Time....	S
000		TLI Blank	TLI Blank	0	WHITE	NA	NA	NA	NA	03927	HILLKT	10/10	07:20	F
001		185-6-1A-D	SO-M23-1 KM 10/22/97	1	WHITE	DK BROWN	WHITE	NA	NONE	03927	HILLKT	10/10	07:20	F
002		185-6-2A-C	SO-M23-2	1	WHITE	BROWN	LT YELLOW	NA	NONE	03927	HILLKT	10/10	07:20	F
003		185-6-3A-C	SO-M23-3	1	WHITE	BROWN	WHITE	NA	NONE	03927	HILLKT	10/10	07:20	F
004		185-6-4A-C	SO-M23-4	1	WHITE	TAN BROWN	WHITE	NA	NONE	03927	HILLKT	10/10	07:20	F
005		185-6-5A-B	FB1-M23	1	WHITE	WHITE	WHITE	NA	NONE	03927	HILLKT	10/10	07:20	F
006		185-6-6A-C	FB2-M23	1	WHITE	WHITE	WHITE	NA	NONE	03927	HILLKT	10/10	07:20	F
007		185-6-7A-C,E	LAB BLANK M23	1	WHITE	WHITE	WHITE	NA	NONE	03927	HILLKT	10/10	07:20	F
008		TLI LCS	TLI LCS	0	LOT 1047	NA	NA	NA	NA	NA	HILLKT	10/10	07:20	F
009		TLI LCSD	TLI LCSD	0	LOT 1047	NA	NA	NA	NA	NA	HILLKT	10/10	07:20	F

*** End of Report ***

TRIANGLE LABORATORIES, INC.

Dioxin Sample Preparation Tracking & Management Form

Project: 43432

Client: Pacific Environmental Services (PES03)

Solvent(s)/Acid(s): TOLUENE / _____ / _____

Lot Numbers: 972118 / _____ / _____

Method: Method 23:Tetra-Octa (Tol Combined) Matrix: M23

Extraction Date: 12/9/97

IS Spike: 40 µl conc: 0.1000 ng/µl

SS Spike: ____ µl conc: __.____ ng/µl

MS Spike: 0 µl conc: 0.0000 ng/µl

LCS Spike: 0 µl conc: 0.0000 ng/µl

OPR Spike: 20 µl conc: 0.01 ng/µl

						LA	LA	SBM		Chemist
						5401J	5233I	5400		Spike #
						USF-I	USF-MX	USF-A		" ID
						07/02/98	12/17/97	07/02/98	/ /	" Expir
						10/9/97	10/9/97	10/15/97	/ /	" Date
						18 : 00	18 : 00	8 : 00	:	" Time
						0.1 ng/µl	0.01 ng/µl	01 ng/µl	ng/µl	" Conc.
						40 µl	40 µl 10x DIL	40 µl	µl	" Vol.
S#.crd	TLI SAMPLE ID /	CLIENT SAMPLE ID	GROSS WEIGHT Before	After	SAMPLE SIZE g / ml					Any Left yes/no
000	TLI Blank	TLI Blank			1	DB		MS		yes/no
001	185-6-1A-D	SO-M23-1			1	DB		MS		yes/no
002	185-6-2A-C	SO-M23-2			1	DB		MS		yes/no
003	185-6-3A-C	SO-M23-3			1	DB		MS		yes/no
004	185-6-4A-C	SO-M23-4			1	DB		MS		yes/no
005	185-6-5A-B	FB1-M23			1	DB		MS		yes/no
006	185-6-6A-C	FB2-M23			1	DB		MS		yes/no
007	185-6-7A-C,E	LAB BLANK M23			1	DB		MS		yes/no
008	TLI LCS	TLI LCS			1	DB	X DB	MS		yes/no
009	TLI LCSD	TLI LCSD			1	DB	X DB	MS		yes/no

Gross weight of sample container + sample before/after aliquot removal.

Comments: _____

Initials: [illegible] Date: 10/9/97

Initials of both SPIKER AND OBSERVER must be entered.

XXXXX = Gross Weight not provided for WATER Samples.

REV 05/27/97 (PSTMF 7)

TRIANGLE LABORATORIES, INC.
DIOXIN SAMPLE EXTRACTION and CLEANUP TRACKING FORM
TLI Project No.: 43432

Ext S#.crd and TLI Number	1	2	4A	6	3	4B	7	8	9		
000 TLI Blank	A 10-9-97	DB 10-9-97 DE	LB	LB	LB	LB	LB	JSY/JT 10/15/97	AJ		
001 185-6-1A-D		SM MS 10.15.97									
002 185-6-2A-C											
003 185-6-3A-C											
004 185-6-4A-C			10/15/97								
005 185-6-5A-B											
006 185-6-6A-C			GWO 10/15/97								
007 185-6-7A-C,E											
008 TLI LCS				10/15/97	10/15/97	10/15/97	10/15/97				
009 TLI LCSD									10/16/97 DSP272v.8		

DSP720v8 V.5 DSP221 v.6

Enter the procedure number below into the box at the top of each column to signify the step performed.
Initial and date each sample for each numbered procedure performed.

#.. .....PROCEDURE.....	DETAILS (circle)
(1) EXTRACTION	ON 1430 OFF__ Soxhlet / Jar / Sep Funnel / Steam Dist / Cont LL / ASE / Waste Dilution
(2) SPIKE AFTER EXTRACTION	DB 10-9-97
(3) ADD TRIDECANE	
(4) ROTOVAP	40mL / 10mL A / Dryness B
5) COMBINE	
(6) DIVIDE / LIPID DETERMINATION	20%/80% 50%/50% 5mL/20mL Other_____
(7) SOLVENT EXCHANGE	
(8) CLEANUP	DSP 260 / DSP 225 / DSP 115 / DSP 215 / DSP 267 / Other _____
(9) TRANSFER	
10) ADDITIONAL CLEANUP	Mod. DSP 260 / DSP 225 / DSP 115 / DSP 215 / DSP 267 / Other _____
11) FINAL TRANSFER	

Comments: Toluene 924861 TRI-1-1-12 ISO-OCTANE 9-15-24

Rev 06/24/97 (PSTMF 4)

TRIANGLE LABORATORIES, INC.
Transfer Chain-of-Custody Form
Project 43432

Transfer From: DWLH5 To: DMS5

	Initials..	Date.....	Time...
Released by:	JLE	10/16/97	17:25
Accepted by:	MD	10/16/97	23:45

MILES.ID.....		TLI_No.....	Cust.Id.....
43432-	-000	TLI Blank	TLI Blank
43432-	-001	185-6-1A-D	SO-M23-1
43432-	-002	185-6-2A-C	SO-M23-2
43432-	-003	185-6-3A-C	SO-M23-3
43432-	-004	185-6-4A-C	SO-M23-4
43432-	-005	185-6-5A-B	FB1-M23
43432-	-006	185-6-6A-C	FB2-M23
43432-	-007	185-6-7A-C,E	LAB BLANK M23
43432-	-008	TLI LCS	TLI LCS
43432-	-009	TLI LCSD	TLI LCSD

XfrCOC (Rev 11/01/94)

Additional comments or instructions:

TRIANGLE LABORATORIES, INC.

Method: Method 23:Tetra-Octa (Tol Combined) HR GC/HRMS ANALYSIS

Required Detection Limit: 0.05 ng

PROJECT: 43432

SAMPLE INFORMATION

RS Conc 20 µl @ 100.0 PG/µl

S#.crd	TLI SAMPLE ID / CLIENT SAMPLE ID	1ST COLUMN GC/MS FILENAME COLUMN: DB1	CONFIRM	2ND COLUMN CONFIRM FILENAME COLUMN DB 225	USF-RS VOLUME SOLN ID	USF-RS INIT. DATE	ANALYSIS COMMENTS
000	TLI Blank / TLI Blank	U973257	N	—	20ul 5296W	BJG 10/17/97	8:00
001	185-6-1A-D / SO-M23-1 (Kw 12/9/97)	U973258	Y	X973636			
002	185-6-2A-C / SO-M23-2	U973259	Y	37			
003	185-6-3A-C / SO-M23-3	U973260	Y	X973638			
004	185-6-4A-C / SO-M23-4	U973261	Y	X973639			
005	185-6-5A-B / FB1-M23	U973262	N	—			
006	185-6-6A-C / FB2-M23	U973263	~~N~~ Y	X973640			
007	185-6-7A-C,E / LAB BLANK M23	U973264	~~N~~ Y	~~X973641~~ not needed			
008	TLI LCS / TLI LCS	U973265	—	—			
009	TLI LCSD / TLI LCSD	5976822	—	—	20ul 5296W	BJG 10/17/97	

Comments:

Type: A

Spike File: SPX23704

Amt of Extract: 50%

REV 03/07/95 (PSTMF 6)

Volume	Co. Typ	Solu	Nan	Ini	quisi	
705	DGS	7458551	TOL	2.0 µl	EPC US 2	EPC US
				RR		10-18-97
				Signature		Date

Filename	Date*	Time*	Project #	Sample#	No.	Client Sample ID	Syr	332	Operator/Date	Comments**
5976 802	10.18.97	19:26	43486	TLI Blank	0	TLI Solid Blank	Auto	2.3 E6	RR 10.18.97	
803		2008		185-60-1A	1	LAW/CA/PCDD/970930/1A		1.8 E6		
804		2047		-2A	2	/971001/1A		2.0 E6		
805		2126		-3A	3	/971002/1A		2.0 E6		
5976806	10/18/97	2216	—	4513	—	8290 ConCal 5.0	M-0 #3	5.6 E6	ML 10/18/97	ΔΣ1L Good F/B
5976807	10/18/97	2307	—	45146	—	M23 ConCal 50	M-0 50	2.9 E6	ML 10/18/97	Good
08	10/18/97	23:59	—	5170B	—	RTCHK	RTCHK	BK	ML 10/18/97	Good
09	10/19/97	00:40	—	5286V	—	RS100	Auto			Clean
10	10.19.97	01:19	43506	TLI Blank	0	TLI M23 Blank				
11		01:58		185-80-1A-C	1	Run #1		3.8 E6		
12		02:38		185-80-2A-C	2	Run #2		4.1 E6		
13		03:17		185-80-3A-D	3	Run #3		0.8 E6		
14		03:57		185-8-4A-D	4	Blank Train		1.0 E7		

* Transcribed from chromatographic data

** Dated initials required

ConCal Due: 23:18 PM

ConCal Due: _____

srvr1/qa/forms/hrrunlog.doc (02/05/97)

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	G/C
705	DB5	74588551	TD2	2.0 µl	EPCAS 2	6pi.15
				Signature		10/18/97 Date

Filename	Date*	Time*	Project #	Sample#	No.	Client Sample ID	Syr	332	Operator/Date	Comments**
5976815	10/18/97	04:36	43506A	TL Blank	0	TL Toluene Blank	Auto	5.8 E6	ML 10/18/97	
16		05:15		185-80-1D	1	RUN #1		6.9 E6		
17		05:55		185-80-2D	2	RUN #2		2.8 E6		
18		06:34		185-80-3E	3	RUN #3		5.2 E6		
19		07:13		185-80-4E	4	Toluene Blank		2.2 E6		
20		07:53		LCS	5	LCS		4.9 E6		
21		08:32		LCSD	6	LCSD		4.3 E6		
22		09:12	43432	LCSD	9	LCSD		2.9 E6		
5976823		10:25	—	5170B	—	RTCHK	RTCHK	20%	IR 10.19.97	Good
824		11:16	—	4513	—	8290-ConCal 50	M-O #3			NG
825		12:14	—	4513	—	8290 ConCal 5.0	M-O #3	2.1 E6		Good
826										
827										

* Transcribed from chromatographic data
** Dated initials required

ConCal Due: 11:07
ConCal Due:

srvr1/qa/forms/hrunlog.doc (02/05/97)

35

Triangle Labs ... Inc.
Run L...

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	G/C
VG70U	DB5	73842158	TO2	2.0 µl	EPCU32	NDB5U3

Signature: [illegible] Date: 10/10/97

Filename	Date*	Time*	Project #	Sample#	No.	Client Sample ID	Syr	332	Operator/Date	Comments**
U973243	10/10/97	1658	—	5170B	—	RTCHK	RTCHK	40%	ML 10/10/97	Top column & tail, still fair resolution
U973244	10/10/97	2054	—	5170B	—	RTCHK	RTCHK	20%	ML 10/10/97	Δ source used
U973245	10/10/97	2221	—	4573	—	3250 Concal 5.0	M-0 93	1.0 EC	ML 10/10/97	NG, low sensitivity
U973246	10/12/97	1713	—	5170B	—	RTCHK	RTCHK	20%	BJG 10/12/97	Δ S+C Good but really low sensitivity BJG 10/14/97
U973247	10-16-97		—	5170B	—	RTCHK	RTCHK	—	GG 10-16-97	low sensitivity GG 10-16-97
U973248	10-16-97		—	5170B	—	RTCHK	RTCHK	—	GG 10-16-97	
U973249	↓		—	5170B	—	RTCHK	RTCHK	—	GG 10-16-97	
U973250	10-17-97		—	5170B	—	RTCHK	RTCHK	20%	GG 10-17-97	Good BJG 10/17/97
U973251	10-17-97	09:51	—	4514G	—	M23 Concal 50	M-0 50	3.1 EC	GG 10-17-97	
U973252	10-17-97	11:17	—	4514G	—	M23 Concal 50	M-0 50	9.5 EC	GG 10-17-97	Good BJG 10/17/97
U973253	10-17-97	12:13	—	5296R	—	RS100	RS100	8.4 EC	GG 10-17-97	CLEAN BJG 10/17/97
U973254	10-17-97	13:26	U3462	185-36-GA-D	6	10059-34F = TEST G RUN 1	U1061	4.8 EC	GG 10-17-97	
U973255	10/17/97	14:15	43462	185-36-7A-D	7	10059-35F = TEST G RUN 2	U1061	4.8 EC	BJG 10/17/97	

* Transcribed from chromatographic data
** Dated initials required

ConCal Due: 7:19 AM
ConCal Due: 23:17 (11:17 PM)

srvr1/qa/forms/hrunlog.doc (02/05/97)

Page: _____

Triangle Labc 'es, Inc.
Run L

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	G/C
70u	DB5	73842154	T02	2.0 ul	EPCUS 2	NDB5US

Signature: [signature] Date: 10/17/97

Filename	Date*	Time*	Project #	Sample#	No.	Client Sample ID	Syr	332	Operator/Date	Comments**
1973256	10/17/97	15:00	43462	185-36-8A-D	8	10059-36f = TEST6 RUN 3	U1061	7.4 EG	BJG 10/17/97	
1973257	10-17-97	15:41	43432	TLI BLANK	0	TLI BLANK	41017	6.2 EG	GG 10-17-97 ~~10-17-97~~	GG 10-17-97
1973258	↓	16:30	43432	185-6-1A-D	1	SO-M23-1	U1071	7.5 EG	BB 10/17/97	
1973259		17:16	43432	185-2A-C	2	SO-M23-2	U1071	5.5 EG	BB 10/17/97	
1973260		18:41	43432	185-6-3A-C	3	SO-M23-3	U1071	3.6 EG	BB 10/17/97	
1973261	10/17/97	19:38	43432	185-6-4A-C	4	SO-M23-4	U1071	4.2 EG	BB 10/17/97	
1973262		20:33	43432	185-6-5A-B	5	FB1-M23	U1071	2.9 EG	BB 10/17/97	
1973263		21:17	43432	185-6-6A-C	6	FB2-M23	U1071	2.7 EG	BB 10/17/97	
1973264		22:01	43432	185-6-7A-C,E	7	Lab Blank M23	U1071	3.0 EG	BB 10/17/97	
1973265		22:49	43432	T02 LCS	8	T02 LCS	U1071	2.3 EG	BB 10/17/97	
66	10/18/97	10:13	—	5170A	—	DFCHK	DFCHK	2.1	WW 10/18/97	A S+L WW 10/18/97
67		11:04	—	4514G	—	H-23 COLUMN 50	H-0 #4	5.6 R 6		GOOD WW 10/18/97
68		12:16	—	5296V	—	RB-1 W	U1071	2.3 RF		NG SOUNDS BAD! GRAPHICS GLOW/NG.

Transcribed from chromatographic data
* Dated initials required

ConCal Due: 23:17 (11:17 pm)
ConCal Due: _____

rvt1/qa/bjma/hrrunlog.doc (02/05/97)

Page: _____

Triangle Laboratories, Inc.
Run Log

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	G/C
70S	DB-5	7458551	TD2	2.0 µL	EPC452	EPC45

Glenn Graham — Signature
10-22-97 — Date

Filename	Date*	Time*	Project #	Sample#	No.	Client Sample ID	Syr	332	Operator/Date	Comments**
5976906	10-23-97	12:51	—	5170	—	RTCHK	RTCHK	11%	GG 10-22-97	
5976907	10-23-97	14:09	—	4514G	—	M23 Concal 50.	M-D #4	9.8E5	GG 10-23-97	
5976908	10-23-97	16:08	—		—	RS100	AMTU	3.1 EG	GG-10-23-97	
5976909	10-23-97	17:16	43432	1856-2A-C	2	SO-M23-P2	S0151	1.5 EG	GO-10-23-97	
5976910	10-23-97	18:52	43432	TCF LCSD	9	LCSD (ROTCDF analyte)	S0151		GO 10/23/97	Retained
5976911	10-23-97	20:58	—	5170	—	Retention/Validation	RTCHK	13%	KAS 10/23/97	
5976912	10-23-97		—	4573	—	8290 Concal 50	M-D #3		KAS 10/23/97	

* Transcribed from chromatographic data
** Dated initials required

ConCal Due: _____
ConCal Due: _____

srvr1/qa/forms/hrrunlog.doc (02/05/97)

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Triangle Laboratories, Inc.
Run Log

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	G/C
70T	DB 225	7526124	TT1	2.0 µl	XCONF-TT	XCONF-TT

Signature: [signature] Date: 10/17/97

Filename	Date*	Time*	Project #	Sample#	No.	Client Sample ID	Syr	332	Operator/Date	Comments**
X973628	10/17/97	20:31	41346 L	185 ~~185~~-36-5AC	X5	10059-33F=Test 6 Run 0	X9241	3.8 EC	KAS 10/17/97	
29	10/17/97	21:26	↓	185 ~~185~~-36-6A-C ~~KAS 10/17/97~~	6	10059-34F=Test 6 Run 1	↓	5.3 EC	↓	
30	10/17/97	22:13	↓	185-36-~~5A~~ 7A-D ~~KAS 10/17/97~~	7	10059-35F=Test 6 Run 2	↓	3.4 EC	↓	
31	10/17/97	22:54	—	41497E	—	Tetra Cal 5.0	Tetra 5.0	7.0 EC	↓	Good ~~Begin~~ End only KAS 10/17/97
X973632	10/18/97	10:55	—	5170B	—	RTCM6	RTCM	14.7	LW 10/18/97	Asst LW 10/18/97
33	1	12:00	—	41497F2	—	TRTPA LOW CAL 5.0	TRTPA 5.0	7.7 EC	1	Good LW 10/18/97
34	1	12:52	—	5296 V	—	RS-100	X9201	6.8 EC	1	CLEAN LW 10/18/97
35	1	13:54	43462	185-36-8A-17	8	10059-36F=TEST 6 RUN 3	1	5.9 EC	1	
36	1	14:45	43432	185-6-16A-1	1	SO-M23-1	1	5.7 EC	1	
37	1	15:37	1	1-2A-2	2	1-2	1	6.3 EC	1	
38	1	16:30	1	1-3A-2	3	1-3	1	2.3 EC	1	
X973639	10/18/97	17:20	43432	185-6-6A-C	4	SO-M23-4	X9261	7.1 EC	BB 10/18/97	
X973640	↓	18:08	43432	185-6-6A-C	6	FB2-M23	X9261	6.2 EC	BB 10/18/97	

* Transcribed from chromatographic data
** Dated initials required

ConCal Due: 1:25
ConCal Due: _____

srvr1/qa/forms/hrrunlog.doc (02/05/97)

Run Log

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	G/C
VG X	DB 225	75261024	TT1	2.0ul	XConf-TT	XCONF-TT

Brenda Bonfello — Signature

10/18/97 — Date

Filename	Date*	Time*	Project #	Sample#	No.	Client Sample ID	Syr	332	Operator/Date	Comments**
X973641	10/18/97	13:55	43432	195-6-7A,C,E	7	Lab Blank M23	X9261	7.1 26	BB 10/18/97	
X973642	↓	20:01	43429r1	195-3-2	2	E.W.R. Eff. 5	X9261	5.0 26	BB 10/18/97	
X973643	↓	20:49	43600	186-75-1	1	HAU/CA/PCDD/97100/1	X9261	4.9 26	BB 10/18/97	
X973644	↓	21:34	43600	186-75-2	2	HAU/CA/PCDD/97100/2	X9261	7.2 26	BB 10/18/97	
X973645	↓	22:21	43600	186-75-3	3	HAU/CA/PCDD/97100B/1	X9261	6.1 26	BB 10/18/97	
X973646	10/18/97	23:06	—	4497 E	—	tetra Conc/50	tetra 5.0	7.6 26	BB 10/18/97	good BB 10/18/97

Cyc 10/19/97

* Transcribed from chromatographic data

** Dated initials required

ConCal Due: 03:00

ConCal Due: _____

srvr1/qa/forms/hrrunlog.doc (02/05/97)

Triangle Laboratories, Inc.
Run Log

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	G/C
VGX	OB225	7526124	TTI	2.0 µL	XCONF_TT	XCONF_TT
				Signature		10-22-97 Date

Filename	Date*	Time*	Project #	Sample#	No.	Client Sample ID	Syr	332	Operator/Date	Comments**
X973675	10-22-97		—	5170B	—	RTCHK	RTCHK		GG 10-22-97	
X973676	10-22-97	11:06	—	4497E	—	TETRACONAL 5.0	TETRA 5.0		GG 10-22-97	
X973677	10-22-97	12:00	—	5296U	—	RS100	X9261	8.8 EG	GG 10-22-97	
X973678	10-22-97	12:47	113134C	182-5-5A	—	GTPS0997 A	X9261	5.3 EG	GG 10-22-97	
X973679	10-22-97	13:46	43388C-1	184-61-23	1D	NBS97B HB04	X9261	8.10 EG	GG 10-22-97	
X973680	10-22-97	14:44	43432	185-66A-C	6	FB2-M23	X9261	8.0 EG	GG 10-22-97	
X973681	10-22-97	15:42	43388B-1	184-61-6	6	NBS97SF004	X9261	1.0 EG	GG 10-22-97	
X973682	10-22-97	16:36	113134C	182-5-5A	2	GTPS0997 A	X9261	5.6 EG	KAS 10-22-97	Fail DL
X973683	10-22-97	1840	43445	185-19-2	2	71805	X9261	7.1 EG	KAS 10-22-97	
X973684	10-22-97	1937	43445	185-19-3	3	71797	X9261	4.7 EG	KAS 10-22-97	
85	10-22-97	2048	43445	185-19-4	4	71806	X9261	7.1 EG	L	
X973686	10-22-97	2136	43445	185-19-5	5	71798	X9261	8.5 EG	ML 10-22-97	
X971687	10-22-97	2226	—	4497E	—	Tetra Conal 5.0	Tetra 5.0	7.7 EG	ML 10-22-97	Good FIB

* Transcribed from chromatographic data
** Dated initials required

ConCal Due: _____
ConCal Due: _____

srvr1/qa/forms/hrrunlog.doc (02/05/97)

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SAMPLE DATA

Triangle Laboratories, Inc.
801 Capitola Drive
Durham, NC 27713-4411
919-544-5729
P.O. Box 13485
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TRIANGLE LABORATORIES, INC.
Sample Result Summary for Project 43432
Method 23X Full Screen Analyses (DB-5)

10/24/97

Data File	U973257	U973258	S976909	U973260
Sample ID	TLI Blank	SO-23-1	SO-23-2	SO-23-3
Units	ng	ng	ng	ng
Extraction Date	10/09/97	10/09/97	10/09/97	10/09/97
Analysis Date	10/17/97	10/17/97	10/23/97	10/17/97
Instrument	U	U	S	U
Matrix	XAD	M23TRAIN	M23TRAIN	M23TRAIN
Extraction Type				
Analytes				
2378-TCDD	(0.004)	{0.05}	0.21	0.13
12378-PeCDD	(0.005)	0.07	0.23	0.10
123478-HxCDD	(0.008)	0.02	0.07	(0.05)
123678-HxCDD	(0.007)	{0.02}	0.08	(0.04)
123789-HxCDD	(0.007)	0.03	0.11	(0.04)
1234678-HpCDD	(0.008)	0.02	{0.12}	(0.04)
OCDD	0.04	0.03 B	{0.09} B	{0.04} B
2378-TCDF	(0.003)	2.4	6.6	4.5
12378-PeCDF	(0.003)	0.36	1.4	0.65
23478-PeCDF	(0.003)	0.38	1.4	0.47
123478-HxCDF	(0.004)	0.16	0.91	0.18
123678-HxCDF	(0.003)	0.07	0.46	0.09
234678-HxCDF	(0.004)	0.05	0.26	0.05
123789-HxCDF	(0.004)	(0.006)	{0.04}	(0.03)
1234678-HpCDF	(0.005)	{0.07}	{0.30}	0.04
1234789-HpCDF	(0.006)	(0.01)	{0.05}	(0.05)
OCDF	(0.008)	{0.01}	0.04	(0.03)
TOTAL TCDD	(0.004)	2.7	6.6	4.1
TOTAL PeCDD	(0.005)	0.84	2.4	0.74
TOTAL HxCDD	(0.007)	0.19	1.1	0.24
TOTAL HpCDD	(0.008)	0.02	0.14	(0.04)
TOTAL TCDF	(0.003)	19.1	60.0	51.2
TOTAL PeCDF	(0.003)	6.1	24.2	10.7
TOTAL HxCDF	(0.004)	0.69	4.7	0.92
TOTAL HpCDF	(0.005)	0.04	0.10	0.04
Other Standards Percent Recovery Summary (% Rec)				
37Cl-TCDD	92.5	93.7	102	85.9
13C12-PeCDF 234	100	95.6	92.0	80.7
13C12-HxCDF 478	92.3	92.0	95.8	88.1
13C12-HxCDD 478	96.7	98.9	85.6	97.6
13C12-HpCDF 789	91.3	101	94.6	97.2
Other Standards Percent Recovery Summary (% Rec)				
13C12-HxCDF 789	68.6	101	107	49.2
13C12-HxCDF 234	81.4	112	116	48.9
Internal Standards Percent Recovery Summary (% Rec)				
13C12-2378-TCDF	79.4	89.8	103	45.9
13C12-2378-TCDD	75.4	85.5	90.5	58.6
13C12-PeCDF 123	96.9	78.8	96.1	77.7
13C12-PeCDD 123	86.6	83.7	103	84.8

TRIANGLE LABORATORIES, INC.
Sample Result Summary for Project 43432
Method 23X Full Screen Analyses (DB-5)

10/24/97

Data File	U973257	U973258	S976909	U973260
Sample ID	TLI Blank	SO-23-1	SO-23-2	SO-23-3
Units	ng	ng	ng	ng
Extraction Date	10/09/97	10/09/97	10/09/97	10/09/97
Analysis Date	10/17/97	10/17/97	10/23/97	10/17/97
Instrument	U	U	S	U
Matrix	XAD	M23TRAIN	M23TRAIN	M23TRAIN
Extraction Type				
Internal Standards Percent Recovery Summary (% Rec)				
13C12-HxCDF 678	123	111	120	62.8
13C12-HxCDD 678	94.9	94.1	106	61.3
13C12-HpCDF 678	92.5	61.3	92.4	47.5
13C12-HpCDD 678	87.5	95.0	89.7	70.9
13C12-OCDD	84.0	63.5	63.8	89.2

TRIANGLE LABORATORIES, INC.
Sample Result Summary for Project 43432
Method 23X Full Screen Analyses (DB-5)

10/24/97

Data File	U973261	U973262	U973263	U973264
Sample ID	SO-23-4	FB1-M23	FB2-M23	LAB BLANK M23
Units	ng	ng	ng	ng
Extraction Date	10/09/97	10/09/97	10/09/97	10/09/97
Analysis Date	10/17/97	10/17/97	10/17/97	10/17/97
Instrument	U	U	U	U
Matrix	M23TRAIN	M23TRAIN	M23TRAIN	M23TRAIN
Extraction Type				
Analytes				
2378-TCDD	0.12	(0.007)	(0.006)	(0.003)
12378-PeCDD	0.10	(0.008)	(0.008)	(0.004)
123478-HxCDD	{0.02}	(0.01)	(0.01)	(0.006)
123678-HxCDD	0.03	(0.01)	(0.009)	(0.005)
123789-HxCDD	0.04	(0.01)	(0.009)	(0.005)
1234678-HpCDD	{0.03}	(0.01)	(0.01)	(0.005)
OCDD	0.08 B	(0.01)	(0.01)	0.01 B
2378-TCDF	4.1	(0.009)	{0.03}	(0.003)
12378-PeCDF	0.61	(0.007)	(0.007)	(0.003)
23478-PeCDF	0.52	(0.007)	(0.006)	(0.003)
123478-HxCDF	0.26	(0.008)	(0.007)	(0.003)
123678-HxCDF	0.11	(0.006)	(0.005)	(0.003)
234678-HxCDF	0.06	(0.007)	(0.006)	(0.003)
123789-HxCDF	(0.01)	(0.008)	(0.007)	(0.003)
1234678-HpCDF	0.07	(0.01)	(0.008)	(0.004)
1234789-HpCDF	(0.02)	(0.01)	(0.01)	(0.004)
OCDF	(0.01)	(0.01)	(0.01)	(0.004)
TOTAL TCDD	4.6	(0.007)	(0.006)	(0.003)
TOTAL PeCDD	1.3	(0.008)	(0.008)	(0.004)
TOTAL HxCDD	0.41	(0.01)	(0.01)	(0.005)
TOTAL HpCDD	0.03	(0.01)	(0.01)	(0.005)
TOTAL TCDF	43.0	(0.009)	{0.03}	(0.003)
TOTAL PeCDF	11.3	(0.007)	(0.006)	(0.003)
TOTAL HxCDF	1.2	(0.007)	(0.006)	(0.003)
TOTAL HpCDF	0.07	(0.01)	(0.009)	(0.004)
Other Standards Percent Recovery Summary (% Rec)				
37Cl-TCDD	91.1	85.8	89.0	94.1
13C12-PeCDF 234	95.4	97.7	94.4	98.5
13C12-HxCDF 478	99.0	88.3	95.3	93.1
13C12-HxCDD 478	101	94.3	99.6	96.8
13C12-HpCDF 789	105	98.3	88.0	92.4
Other Standards Percent Recovery Summary (% Rec)				
13C12-HxCDF 789	75.3	79.9	93.3	95.3
13C12-HxCDF 234	82.5	91.8	104	104
Internal Standards Percent Recovery Summary (% Rec)				
13C12-2378-TCDF	69.7	57.6	78.9	85.0
13C12-2378-TCDD	83.5	86.4	90.2	82.3
13C12-PeCDF 123	96.0	93.5	87.5	101
13C12-PeCDD 123	110	109	100	118

Data File	U973261	U973262	U973263	U973264
Sample ID	SO-23-4	FB1-M23	FB2-M23	LAB BLANK M23
Units	ng	ng	ng	ng
Extraction Date	10/09/97	10/09/97	10/09/97	10/09/97
Analysis Date	10/17/97	10/17/97	10/17/97	10/17/97
Instrument	U	U	U	U
Matrix	M23TRAIN	M23TRAIN	M23TRAIN	M23TRAIN
Extraction Type				

Internal Standards Percent Recovery Summary (% Rec)

13C12-HxCDF 678	85.6	110	102	105
13C12-HxCDD 678	87.7	102	101	95.7
13C12-HpCDF 678	65.1	80.5	82.1	90.0
13C12-HpCDD 678	84.5	99.6	94.8	102
13C12-OCDD	95.2	99.7	95.1	104

{Estimated Maximum Possible Concentration}, (Detection Limit).

TRIANGLE LABORATORIES, INC.
Sample Result Summary for Project 43432
Method 23X (DB-225)

10/23/97

Data File	X973636	X973637	X973638	X973639
Sample ID	SO-23-1	SO-23-2	SO-23-3	SO-23-4
Units	ng	ng	ng	ng
Extraction Date	10/09/97	10/09/97	10/09/97	10/09/97
Analysis Date	10/18/97	10/18/97	10/18/97	10/18/97
Instrument	X	X	X	X
Matrix	M23TRAIN	M23TRAIN	M23TRAIN	M23TRAIN
Extraction Type				
Analytes				
2378-TCDF	0.72	2.3	1.8	1.3
Internal Standards Percent Recovery Summary (% Rec)				
13C12-2378-TCDF	95.4	102	58.9	87.9

Data File	X973680
Sample ID	FB2-M23
Units	ng
Extraction Date	10/09/97
Analysis Date	10/22/97
Instrument	X
Matrix	M23TRAIN
Extraction Type	

Analytes	
2378-TCDF	(0.01)

Internal Standards	Percent Recovery Summary (% Rec)
13C12-2378-TCDF	81.8

(Detection Limit).

Pacific Environmental Services

TLI Project: **43432** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **TLI Blank** Analysis File: **U973257**

Client Project:	**Saginaw, MI**				
Sample Matrix:	**XAD**	Date Received:	/ /	Spike File:	**SPX23704**
TLI ID:	**TLI Blank**	Date Extracted:	**10/09/97**	ICal:	**UF59167**
		Date Analyzed:	**10/17/97**	ConCal:	**U973252**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U973257**	% Lipid:	**n/a**
GC Column:	**DB-5**	Analyst:	**GG**	% Solids:	**n/a**

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	ND	0.004				—
1,2,3,7,8-PeCDD	ND	0.005				—
1,2,3,4,7,8-HxCDD	ND	0.008				—
1,2,3,6,7,8-HxCDD	ND	0.007				—
1,2,3,7,8,9-HxCDD	ND	0.007				—
1,2,3,4,6,7,8-HpCDD	ND	0.008				—
1,2,3,4,6,7,8,9-OCDD	0.04			0.90	36:26	—
2,3,7,8-TCDF	ND	0.003				—
1,2,3,7,8-PeCDF	ND	0.003				—
2,3,4,7,8-PeCDF	ND	0.003				—
1,2,3,4,7,8-HxCDF	ND	0.004				—
1,2,3,6,7,8-HxCDF	ND	0.003				—
2,3,4,6,7,8-HxCDF	ND	0.004				—
1,2,3,7,8,9-HxCDF	ND	0.004				—
1,2,3,4,6,7,8-HpCDF	ND	0.005				—
1,2,3,4,7,8,9-HpCDF	ND	0.006				—
1,2,3,4,6,7,8,9-OCDF	ND	0.008				—

Totals	Amt. (ng)	Number	DL	EMPC	Flags
Total TCDD	ND		0.004		—
Total PeCDD	ND		0.005		—
Total HxCDD	ND		0.007		—
Total HpCDD	ND		0.008		—
Total TCDF	ND		0.003		—
Total PeCDF	ND		0.003		—
Total HxCDF	ND		0.004		—
Total HpCDF	ND		0.005		—

X237_PSR v2.00, LARS 6.10.04

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Printed: 20:00 10/21/97

Pacific Environmental Services

TLI Project: **43432** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **TLI Blank** Analysis File: **U973257**

Internal Standards	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	3.2	79.4	40%-130%	0.77	21:32	—
$^{13}C_{12}$-2,3,7,8-TCDD	3.0	75.4	40%-130%	0.80	22:27	—
$^{13}C_{12}$-1,2,3,7,8-PeCDF	3.9	96.9	40%-130%	1.43	26:16	—
$^{13}C_{12}$-1,2,3,7,8-PeCDD	3.5	86.6	40%-130%	1.50	27:28	—
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	4.9	123	40%-130%	0.50	30:14	—
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	3.8	94.9	40%-130%	1.26	30:59	—
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	3.7	92.5	25%-130%	0.42	33:01	—
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	3.5	87.5	25%-130%	1.02	33:53	—
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	6.7	84.0	25%-130%	0.77	36:26	—

Surrogate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	3.7	92.5	70%-140%		22:28	—
$^{13}C_{12}$-2,3,4,7,8-PeCDF	4.0	100	70%-140%	1.48	27:05	—
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	3.7	92.3	70%-140%	0.52	30:07	—
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	3.9	96.7	70%-140%	1.26	30:53	—
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	3.7	91.3	70%-140%	0.41	34:14	—

Alternate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	2.7	68.6	40%-130%	0.50	31:30	—
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	3.3	81.4	40%-130%	0.51	30:46	—

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.82	22:14	—
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.22	31:17	—

Data Reviewer: VC 10/21/97

X237_PSR v2.00, LARS 6.10.04

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Printed: 20:00 10/21/97

Initial ....Date...

Data Review By: Calculated Noise Area: 2.59

The Total Area for each peak with an ion abundance ratio outside ratio limits has been recalculated according to method requirements.

Page No. 1 Listing of U973257B.dbf
10/21/97 Matched GC Peaks / Ratio / Ret. Time

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
TCDF						0.65-0.89				0.813-1.106			
304-306	DC	NL		0:00		0.86	14.56			0.000			
	DC	SN		18:55	RO	0.55	21.17			0.878			
304-306			0	Peaks			0.00						
13C12-TCDF						0.65-0.89				0.954-1.046			
316-318	DC	NL		0:00	RO	0.93	1.82			0.000			
				21:03		0.72	45.19	18.91	26.28	0.978			
				21:32		0.77	7,668.75	3,328.24	4,340.51	1.000	13C12-2378-TCDF	ISO	
	DC	SN		21:53	RO	3.46	10.73			1.016			
				22:06		0.71	81.38	33.71	47.67	1.026			
				22:27	RO	0.99	33.93	18.99	19.17	1.043			
316-318			4	Peaks			7,829.25						

---------- Above: TCDF / TCDD Follows ----------

TCDD						0.65-0.89				0.848-1.061			
320-322	DC	NL		0:00	RO	1.18	2.42			0.000			
	DC	SN		19:15	RO	1.32	0.94			0.857			
	DC	SN		20:45	RO	4.96	0.94			0.924			
	DC	SN		21:31	RO	1.11	6.99			0.958			
	DC	SN		22:22	RO	0.52	1.93			0.996			
	DC	SN		22:30	RO	0.26	6.55			1.002			
	DC	SN		22:47	RO	1.63	1.19			1.015			
	DC	SN		23:28		0.75	3.93			1.045			
320-322			0	Peaks			0.00						
37Cl-TCDD										0.911-1.089			
328	DC	NL		0:00			0.97			0.000			
				20:43			23.95	23.95		0.923			
				22:28			5,076.57	5,076.57		1.001	37Cl-TCDD	SUR1	
				22:48			13.46	13.46		1.016			
	DC	SN		22:53			8.86			1.019			
				22:58			13.40	13.40		1.023			
	DC	SN		23:03			7.92			1.027			
				23:11			13.02	13.02		1.033			
				23:18			16.16	16.16		1.038			
	DC	SN		23:22			5.52			1.041			
				23:28			17.39	17.39		1.045			
	DC	SN		23:38			10.26			1.053			
	DC	SN		23:46			6.77			1.059			
	DC	SN		23:51			10.42			1.062			
				23:59			11.27	11.27		1.068			
	DC	SN		24:11			6.45			1.077			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
	DC	SN		24:14			5.36			1.079			
328			8	Peaks			5,185.22						
13C12-TCDD					0.65-0.89					0.911-1.089			
332-334	DC	NL		0:00	RO	1.99	3.54			0.000			
				21:00		0.88	36.73	17.21	19.52	0.935			
				22:14		0.82	6,952.75	3,134.57	3,818.18	0.990	13C12-1234-TCDD	RS1	
				22:27		0.80	5,811.53	2,588.02	3,223.51	1.000	13C12-2378-TCDD	IS1	
				22:53	RO	0.95	137.39	73.82	77.62	1.019			
	DC	SN		23:02	RO	0.63	16.99			1.026			
	DC	SN		23:08	RO	4.21	8.99			1.030			
				23:41	RO	1.04	46.41	27.26	26.22	1.055			
	DC	SN		23:51	RO	0.42	21.61			1.062			
	DC	SN		23:58	RO	0.54	24.44			1.068			
	DC	SN		24:12	RO	1.50	15.74			1.078			
332-334			5	Peaks			12,984.81						

---------- Above: TCDD / PeCDF Follows ----------

PeCDF					1.32-1.78					0.906-1.077			
340-342	DC	NL		0:00		1.33	7.75			0.000			
	DC	SN		24:06	RO	1.21	4.56			0.918			
	DC	SN		25:17	RO	3.92	11.65			0.963			
	DC	SN		25:43	RO	0.81	5.81			0.979			
	DC	SN		26:14	RO	1.95	12.55			0.999			
	DC	SN		27:18	RO	0.45	2.55			1.039			
	DC	SN		27:27	RO	0.18	0.94			1.045			
340-342			0	Peaks			0.00						
13C12-PeCDF					1.32-1.78					0.848-1.152			
352-354	DC	NL		0:00	RO	0.97	2.11			0.000			
				25:19		1.68	117.04	73.34	43.70	0.964			
	DC	SN		25:52	RO	2.12	15.38			0.985			
				26:16		1.43	7,371.87	4,337.08	3,034.79	1.000	13C12-PeCDF 123	IS2	
				26:35		1.72	88.99	56.33	32.66	1.012			
	DC	SN		26:50	RO	8.63	9.08			1.022			
				27:05		1.48	7,170.47	4,283.39	2,887.08	1.031	13C12-PeCDF 234	SUR2	
				27:26	RO	0.52	23.90	14.53	28.03	1.044			
				27:36	RO	0.55	22.60	13.74	25.14	1.051			
				27:48	RO	1.04	23.64	14.37	13.78	1.058			
	DC	SN		28:03	RO	0.69	9.38			1.068			
352-354			7	Peaks			14,818.51						

---------- Above: PeCDF / PeCDD Follows ----------

PeCDD					1.32-1.78					0.921-1.025			
356-358	DC	NL		0:00		1.61	2.51			0.000			
	DC	SN		25:29	RO	0.26	2.42			0.928			
	DC	SN		26:16	RO	1.94	5.97			0.956			
	DC	SN		26:36	RO	1.18	2.88			0.968			
	DC	SN		26:46	RO	2.11	2.70			0.975			
	DC	SN		28:07	RO	0.67	1.45			1.024			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
	DC		WH	28:13	RO	2.08	1.56			1.027			
	DC		WH	28:19	RO	1.18	3.49			1.031			
	DC		WH	28:29	RO	0.55	0.99			1.037			
356-358		0	Peaks				0.00						
13C12-PeCDD				1.32-1.78						0.855-1.145			
368-370	DC		NL	0:00	RO	1.27	2.04			0.000			
	DC		SN	25:20		1.54	3.20			0.922			
	DC		SN	25:56		1.42	2.40			0.944			
	DC		SN	26:16	RO	0.92	7.81			0.956			
	DC		SN	26:37	RO	3.95	2.86			0.969			
	DC		SN	27:06	RO	1.84	6.83			0.987			
	DC		SN	27:13		1.43	2.92			0.991			
				27:28		1.50	3,610.79	2,168.94	1,441.85	1.000	13C12-PeCDD 123	IS3	
				27:38		1.49	407.88	244.22	163.66	1.006			
	DC		SN	27:51	RO	2.33	17.93			1.014			
				27:59	RO	0.83	24.35	14.80	17.93	1.019			
				28:14	RO	1.04	22.08	13.42	12.89	1.028			
	DC		SN	28:22	RO	2.71	12.57			1.033			
	DC		SN	28:29	RO	2.31	19.53			1.037			
368-370		4	Peaks				4,065.10						
---------- Above: PeCDD / HxCDF Follows ----------													
HxCDF				1.05-1.43						0.958-1.051			
374-376	DC		NL	0:00		1.21	8.78			0.000			
	DC		SN	30:47	RO	1.02	9.12			1.018	234678-HxCDF	AN	
374-376		0	Peaks				0.00						
13C12-HxCDF				0.43-0.59						0.868-1.132			
384-386	DC		NL	0:00		0.54	85.95			0.000			
				30:07		0.52	4,902.39	1,675.31	3,227.08	0.996	13C12-HxCDF 478	SUR3	
				30:14		0.50	5,452.11	1,811.01	3,641.10	1.000	13C12-HxCDF 678	IS4	
				30:21		0.51	61.72	20.89	40.83	1.004			
				30:26	RO	1.16	32.80	25.27	21.72	1.007			
				30:28	RO	0.89	42.78	25.29	28.33	1.008			
				30:46		0.51	3,387.59	1,150.74	2,236.85	1.018	13C12-HxCDF 234	ALT2	
				31:30		0.50	2,685.45	898.85	1,786.60	1.042	13C12-HxCDF 789	ALT1	
384-386		7	Peaks				16,564.84						
---------- Above: HxCDF / HxCDD Follows ----------													
HxCDD				1.05-1.43						0.952-1.015			
390-392	DC		NL	0:00		1.17	5.68			0.000			
	DC		SN	30:02	RO	1.45	1.05			0.969			
	DC		SN	30:08	RO	1.96	6.63			0.973			
	DC		SN	30:14	RO	1.78	5.64			0.976			
	DC		SN	30:46	RO	1.72	4.82			0.993			
	DC		SN	30:53		1.36	3.82			0.997	123478-HxCDD	AN	
	DC		WH	31:31		1.15	3.21			1.017			
390-392		0	Peaks				0.00						

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
13C12-HxCDD				1.05-1.43						0.968-1.032			
402-404	DC	NL		0:00		1.25	5.70			0.000			
	DC	SN		30:20	RO	0.91	16.91			0.979			
				30:53		1.26	3,174.01	1,768.08	1,405.93	0.997	13C12-HxCDD	478	SUR4
				30:59		1.26	3,660.40	2,038.93	1,621.47	1.000	13C12-HxCDD	678	IS5
				31:11	RO	2.25	57.48	57.69	25.66	1.006			
				31:17		1.22	4,011.35	2,204.68	1,806.67	1.010	13C12-HxCDD	789	RS2
				31:27	RO	2.89	31.79	41.00	14.19	1.015			
				31:32	RO	0.96	101.45	56.16	58.77	1.018			
	DC	SN		31:37	RO	6.88	18.66			1.020			
402-404			6	Peaks			11,036.48						

---------- Above: HxCDD / HpCDF Follows ----------

HpCDF				0.88-1.20						0.996-1.043			
408-410	DC	NL		0:00		1.16	7.87			0.000			
	DC	SN		33:01		1.14	17.17			1.000	1234678-HpCDF		AN
	DC	SN		33:21	RO	1.50	11.22			1.010			
	DC	SN		33:37	RO	2.30	4.04			1.018			
	DC	SN		33:50	RO	0.73	3.37			1.025			
	DC	SN		33:55	RO	2.89	1.31			1.027			
408-410			0	Peaks			0.00						
13C12-HpCDF				0.37-0.51						0.939-1.121			
418-420	DC	NL		0:00	RO	0.59	18.78			0.000			
				33:01		0.42	3,536.24	1,050.52	2,485.72	1.000	13C12-HpCDF	678	IS6
				33:12	RO	0.57	88.57	35.25	61.51	1.006			
				33:25	RO	0.55	58.77	22.50	40.81	1.012			
				34:14		0.41	2,850.98	822.48	2,028.50	1.037	13C12-HpCDF	789	SUR5
418-420			4	Peaks			6,534.56						

---------- Above: HpCDF / HpCDD Follows ----------

HpCDD				0.88-1.20						0.977-1.005			
424-426	DC	NL		0:00	RO	0.85	3.83			0.000			
	DC	SN		33:17		1.14	14.41			0.982			
	DC	SN		33:53	RO	0.78	14.26			1.000	1234678-HpCDD		AN
	DC	WH		34:14		1.13	7.42			1.010			
424-426			0	Peaks			0.00						
13C12-HpCDD				0.88-1.20						0.971-1.029			
436-438	DC	NL		0:00	RO	0.85	9.81			0.000			
	DC	SN		33:17		1.13	12.93			0.982			
				33:53		1.02	3,220.59	1,623.47	1,597.12	1.000	13C12-HpCDD	678	IS7
				34:04		0.88	152.18	71.32	80.86	1.005			
436-438			2	Peaks			3,372.77						

---------- Above: HpCDD / Octa-CDD and CDF Follows ----------

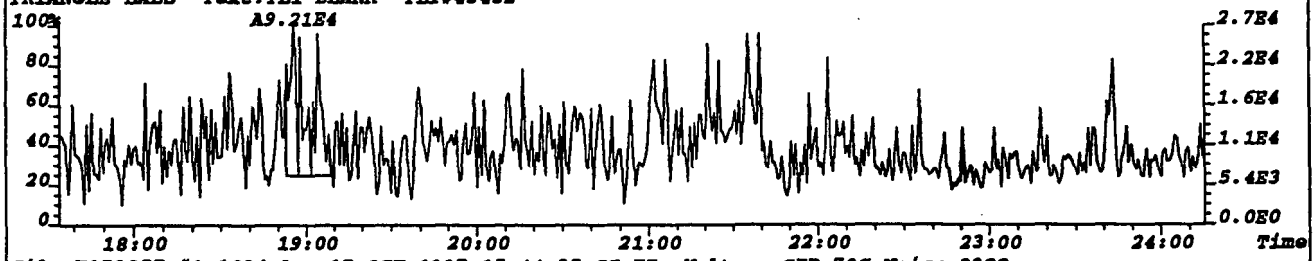
OCDF				0.76-1.02						0.890-1.110			
442-444	DC	NL		0:00		0.90	6.75			0.000			
	DC	SN		32:59	RO	0.38	6.39			0.905			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
		DC	SN	35:17	RO	1.21	7.65			0.968			
		DC	SN	35:26		1.00	5.61			0.973			
		DC	SN	35:42	RO	3.72	1.02			0.980			
		DC	SN	35:43	RO	2.02	0.83			0.980			
		DC	SN	36:32		0.82	15.04			1.003	OCDF		AN
		DC	SN	36:58	RO	0.40	1.04			1.015			
		DC	SN	37:09	RO	0.68	2.61			1.020			
		DC	SN	37:20	RO	2.10	1.91			1.025			
		DC	SN	37:39	RO	1.81	1.57			1.033			
		DC	SN	37:45		0.89	1.80			1.036			
		DC	SN	38:36	RO	1.16	4.95			1.059			
		DC	SN	38:45	RO	0.58	4.76			1.064			
442-444			0	Peaks			0.00						
OCDD						0.76-1.02				0.890-1.110			
458-460		DC	NL	0:00		0.86	7.59			0.000			
	M			36:26		0.90	26.40	12.50	13.90	1.000	OCDD		AN
		DC	SN	36:36		0.84	3.90			1.005			
		DC	SN	36:53	RO	1.84	3.57			1.012			
458-460			1	Peak			26.40						
13C12-OCDD						0.76-1.02				0.995-1.005			
470-472		DC	NL	0:00	RO	0.70	3.53			0.000			
				36:26		0.77	5,141.90	2,243.66	2,898.24	1.000	13C12-OCDD		IS8
470-472			1	Peak			5,141.90						

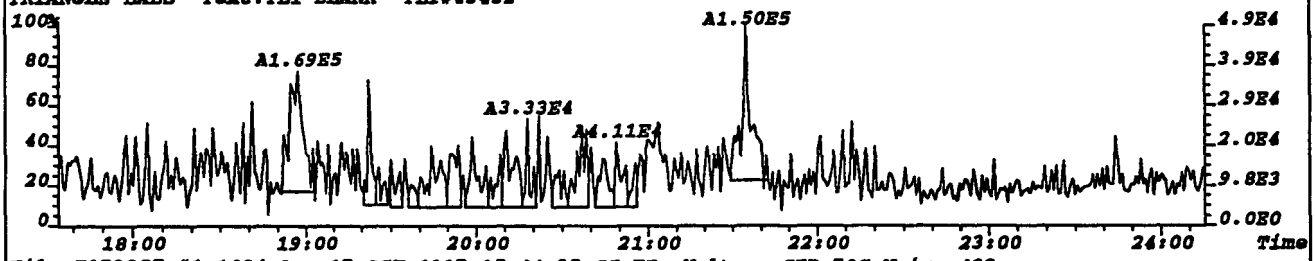
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside Limits	<M-Below Method Detection Limit	T-Time Changed
Rel.RT-Relative Retention Time	NL-Channel Specific Noise Level	M-Peak Area Changed
		N-Name Changed
		E-Ether Interference

*** End of Report ***

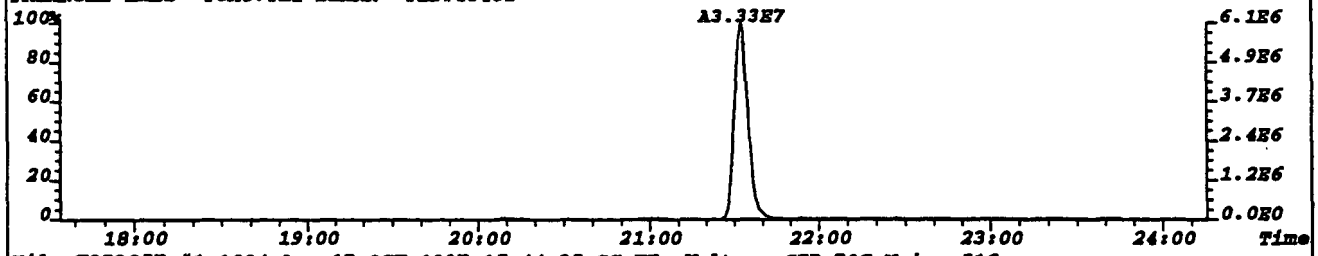
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:3362
303.9016 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,13448.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



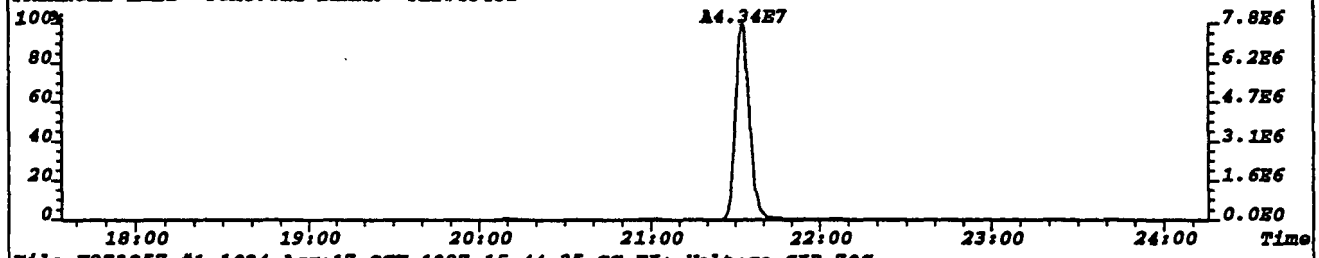
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:3922
305.8987 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,15688.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



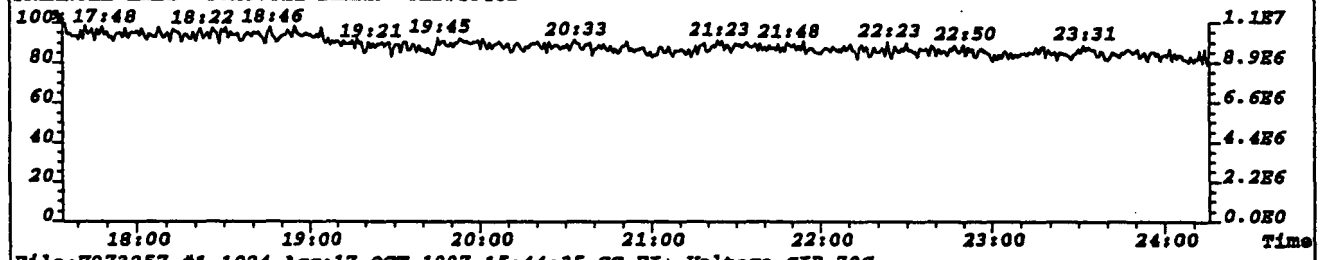
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:482
315.9419 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,1928.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



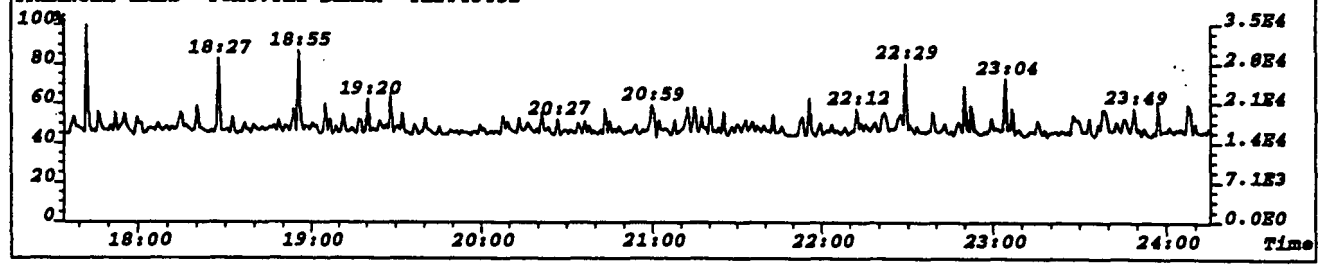
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:516
317.9389 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,2064.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



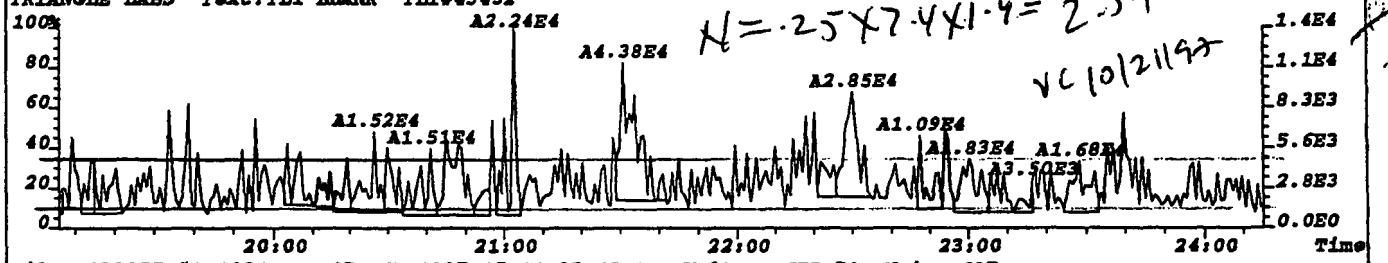
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S
375.8364 F:2 Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



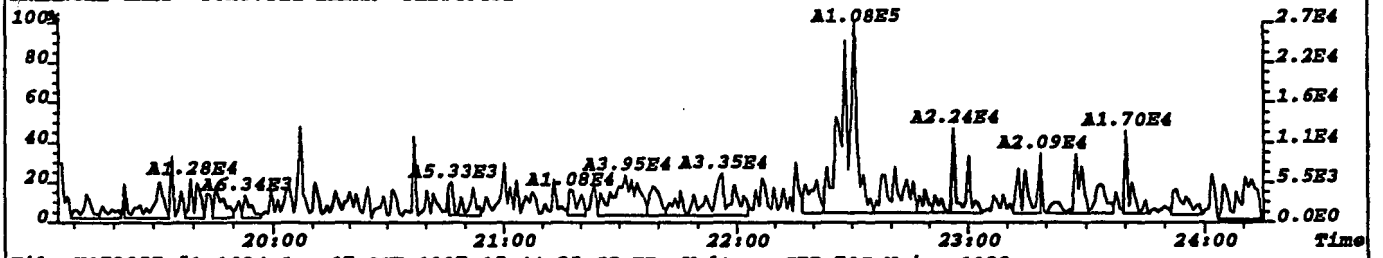
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:811
319.8965 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3244.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432

H = .25 X 7.4 X 1.4 = 2.59

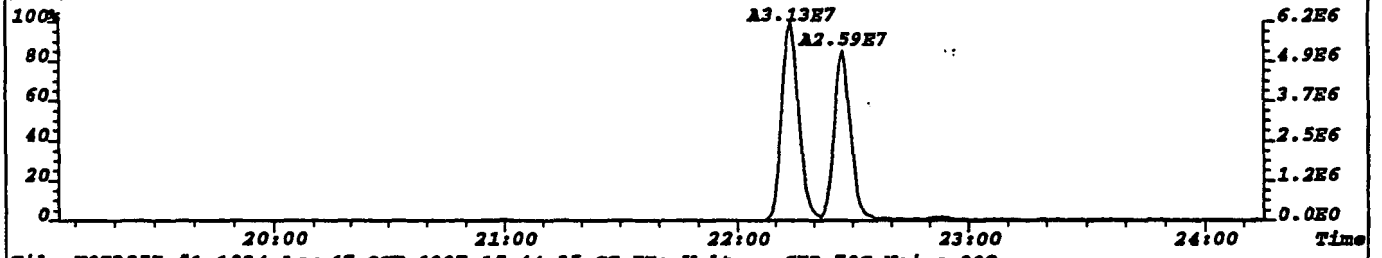
VC 10/21/97



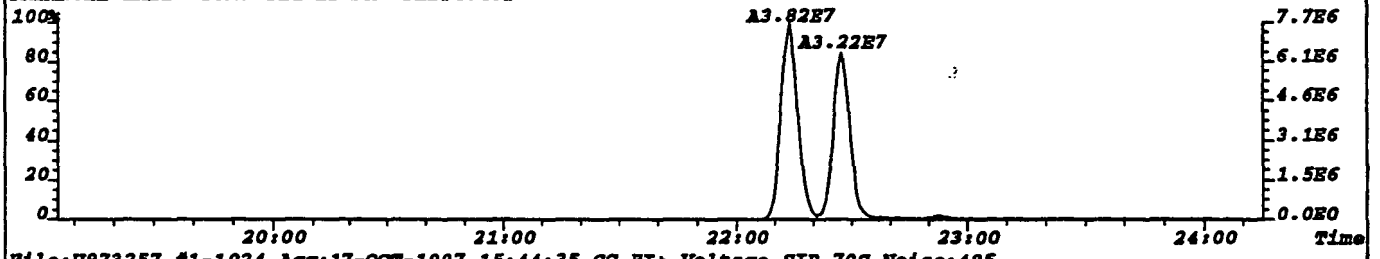
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:687
321.8936 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2748.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



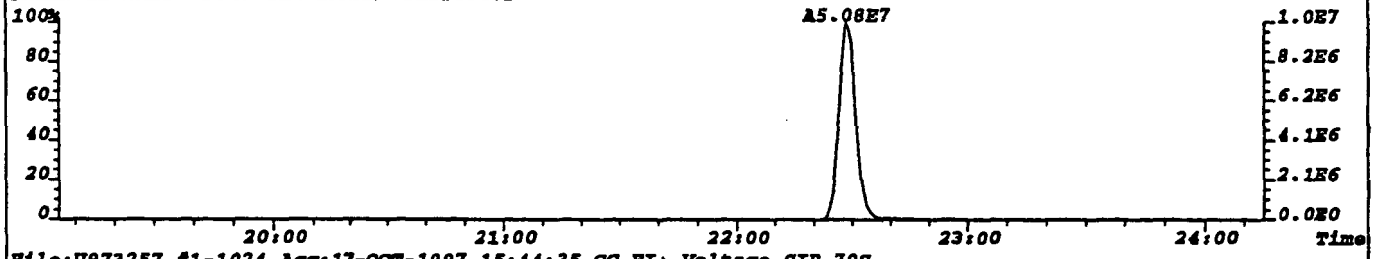
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:1992
331.9368 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7968.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



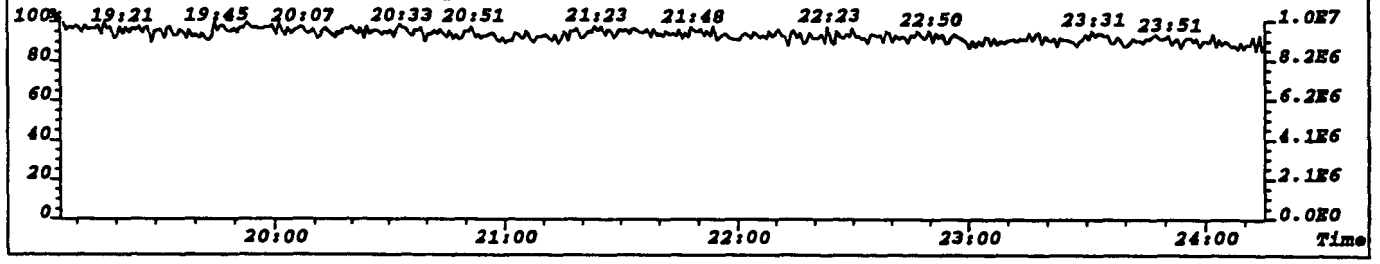
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:998
333.9338 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3992.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



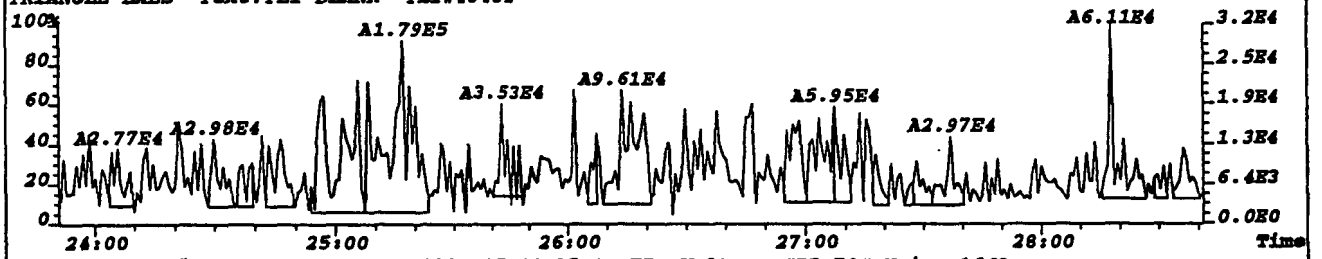
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:485
327.8847 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1940.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



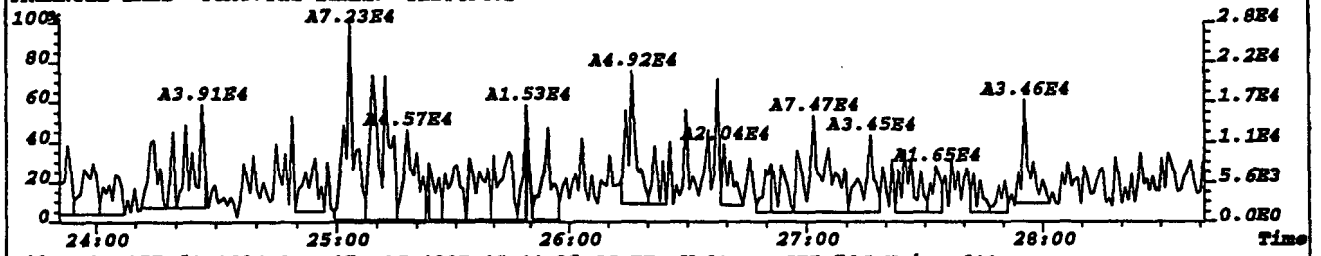
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



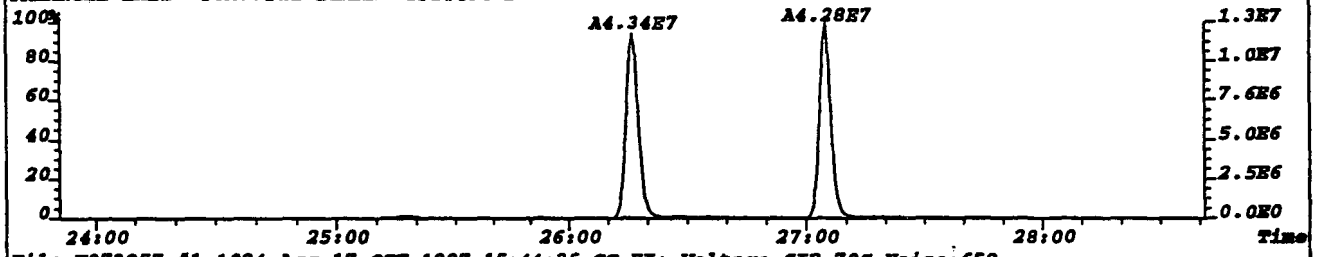
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:2210
339.8597 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,8840.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



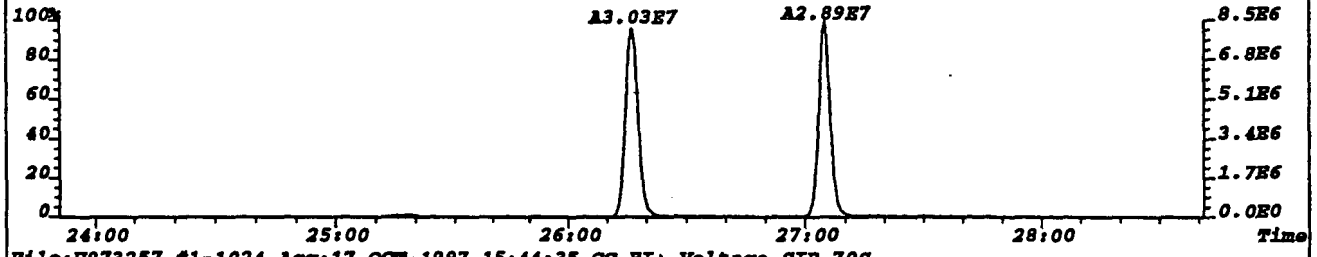
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:1663
341.8567 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6652.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



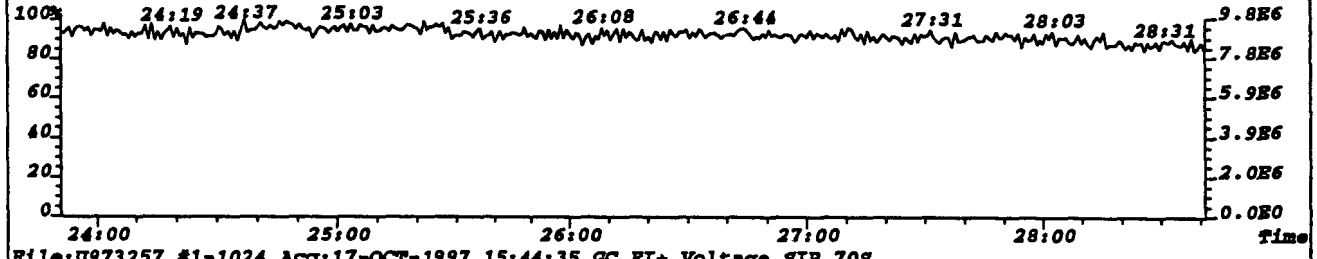
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:641
351.9000 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2564.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



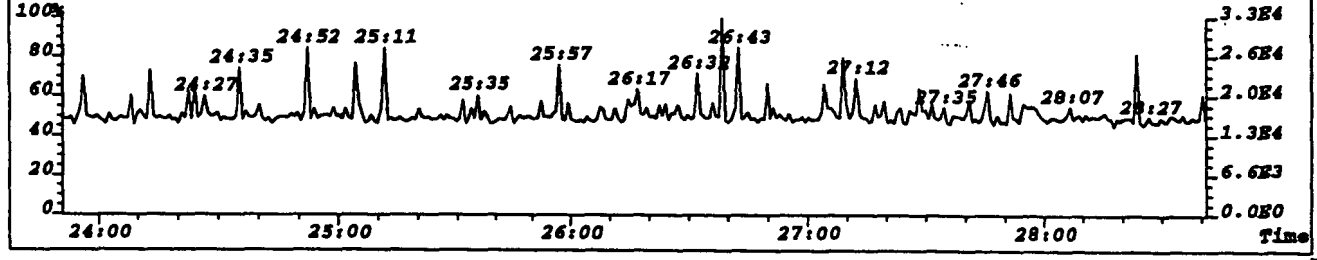
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:658
353.8970 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2632.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



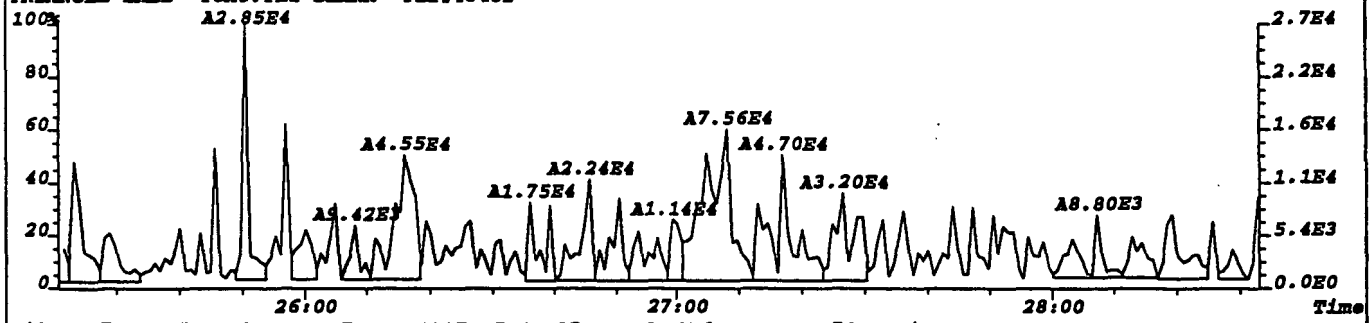
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



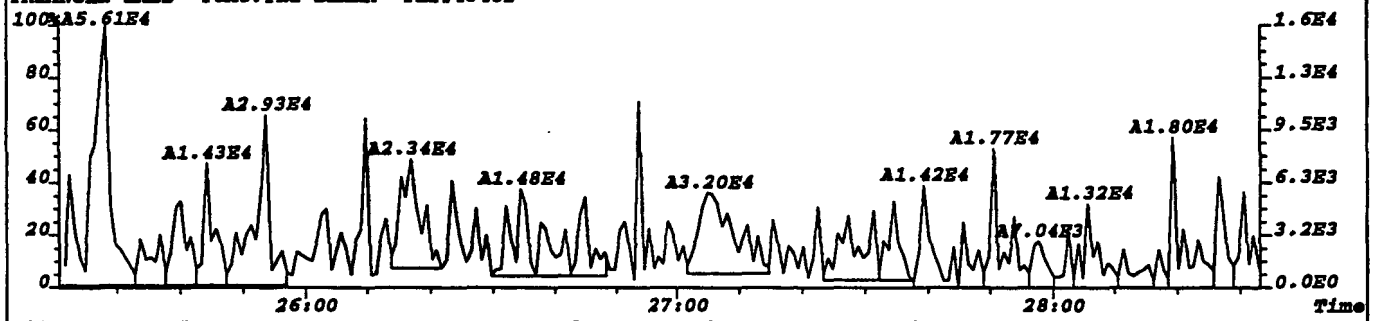
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S
409.7974 F:2 Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



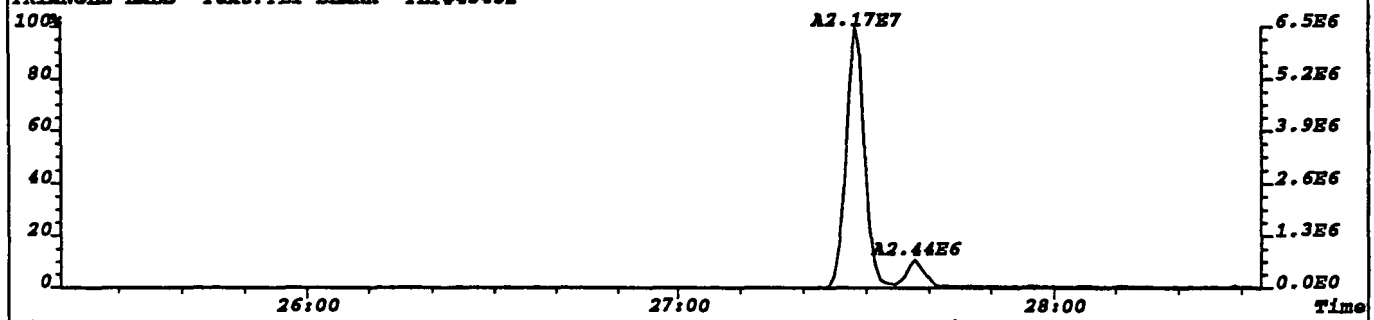
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:777
355.8546 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,3108.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:482
357.8516 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,1928.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432

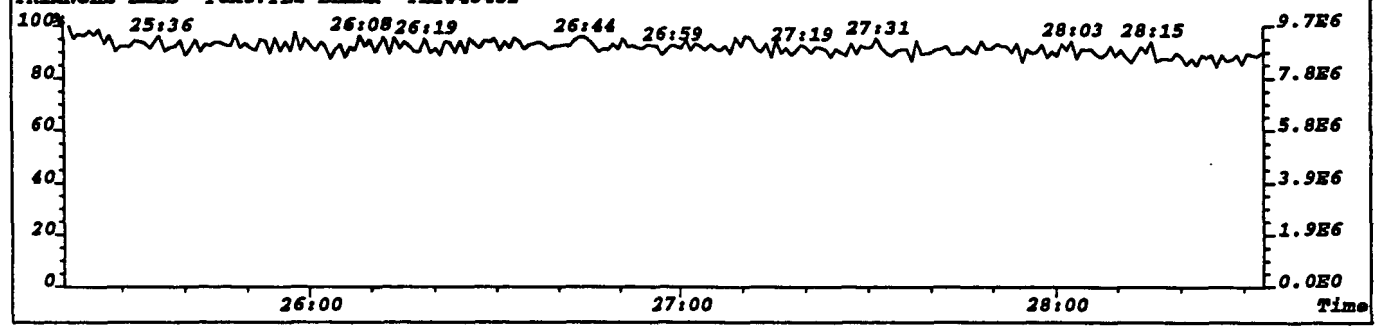


File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:618
367.8949 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,2472.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432

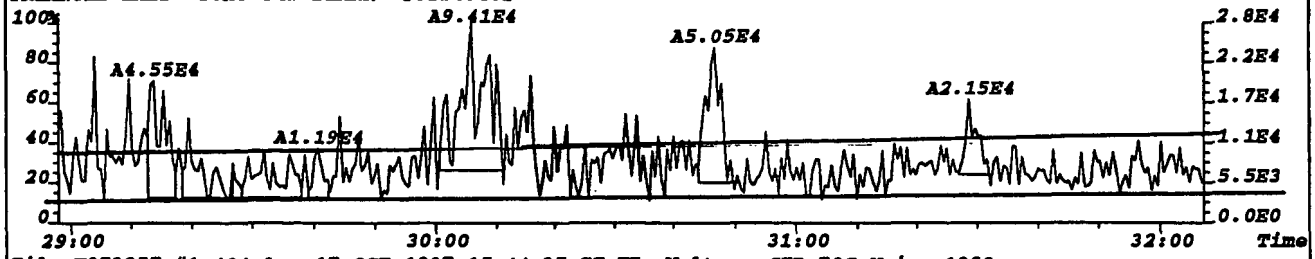


File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:492
369.8919 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,1968.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432

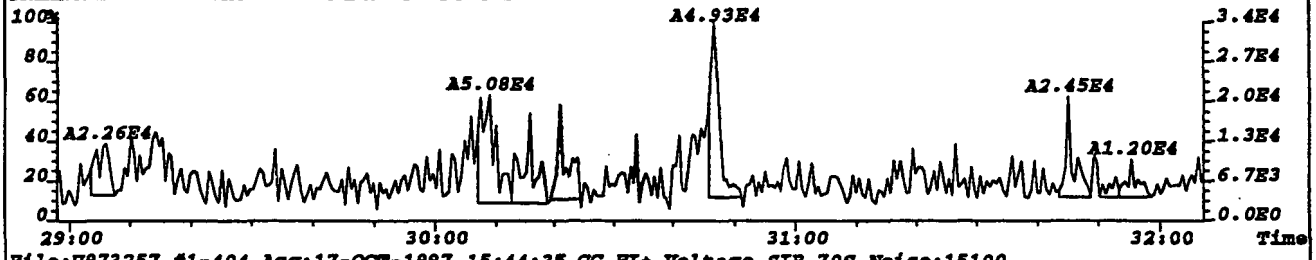
File:U973257 #1-1024 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



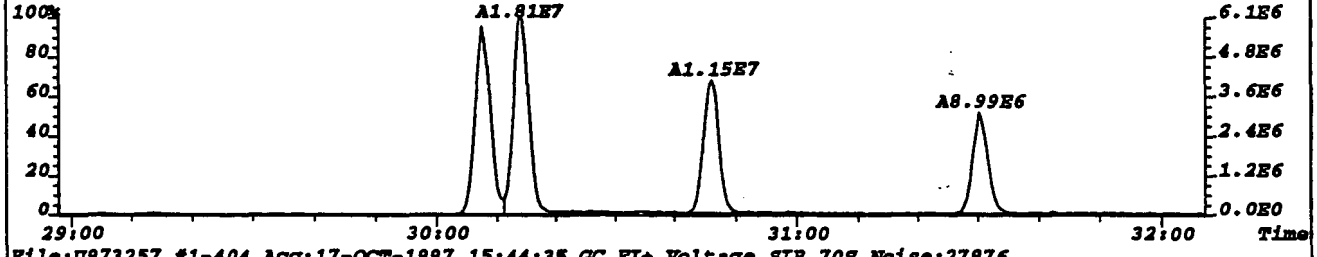
File:U973257 #1-404 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:2400
373.8208 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,9600.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



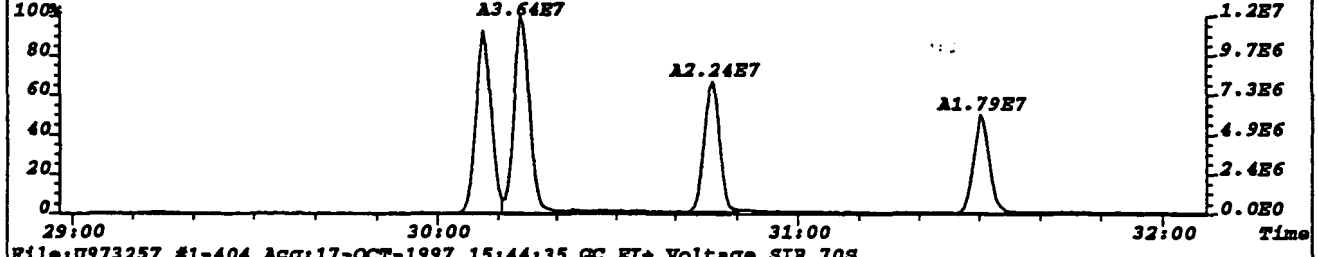
File:U973257 #1-404 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:1988
375.8178 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7952.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



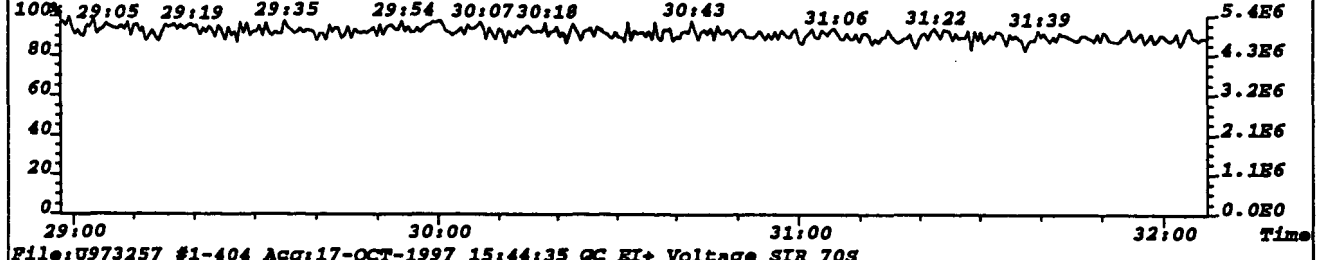
File:U973257 #1-404 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:15100
383.8639 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,60400.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



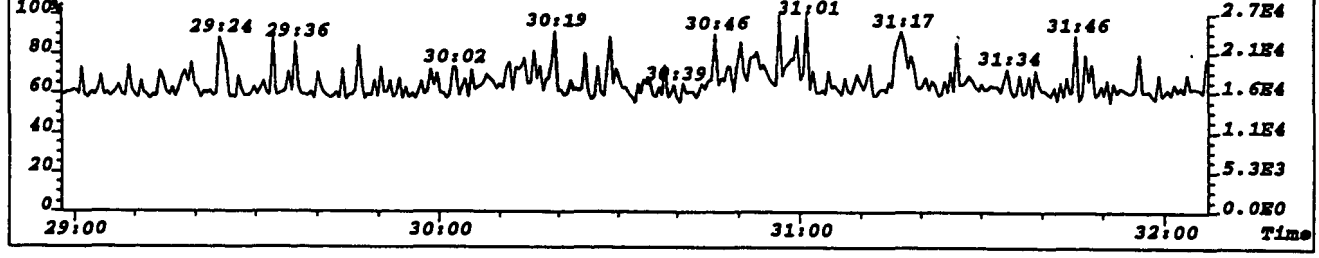
File:U973257 #1-404 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:27876
385.8610 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,111504.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



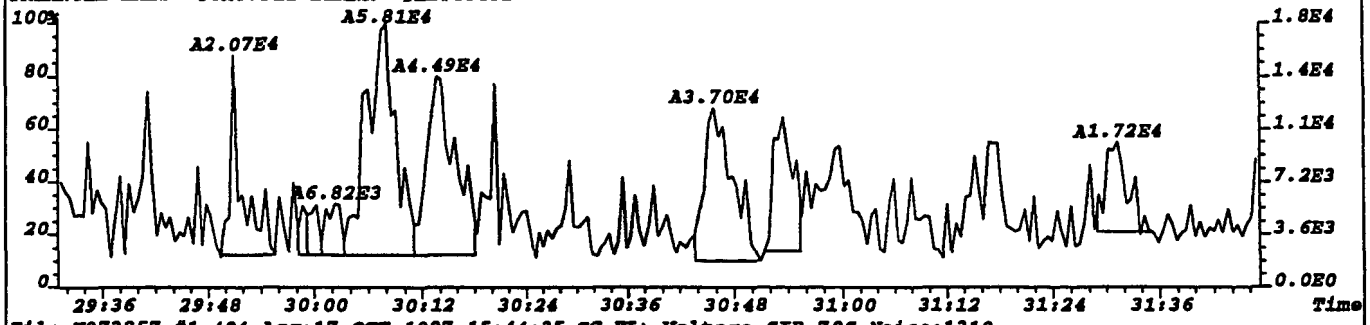
File:U973257 #1-404 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S
392.9760 F:3 Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



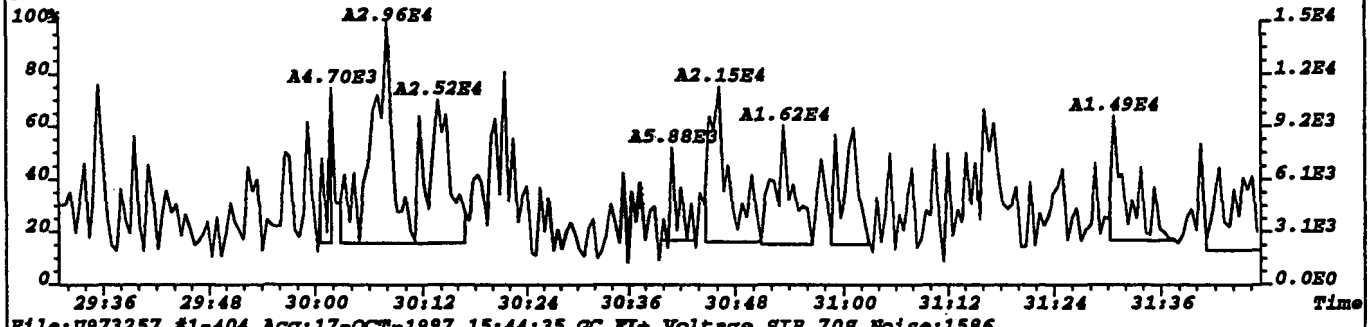
File:U973257 #1-404 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S
445.7555 F:3 Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



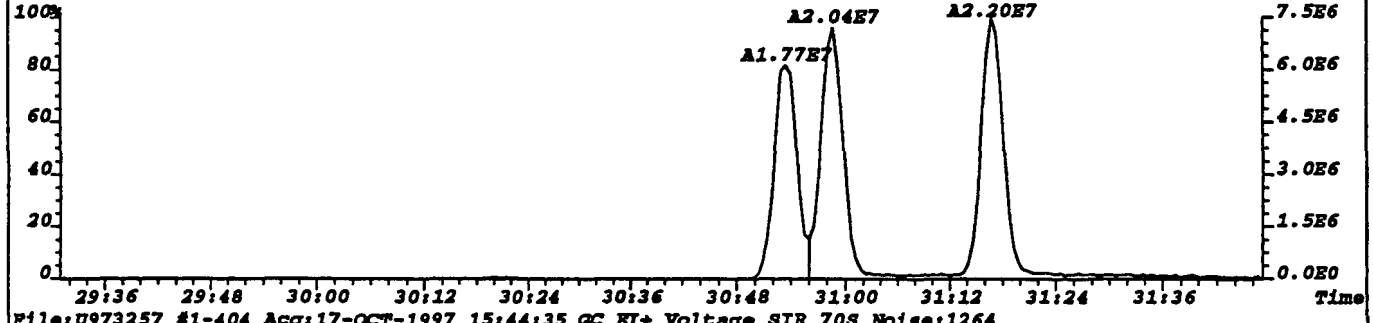
File:U973257 #1-404 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:1531
389.8156 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6124.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



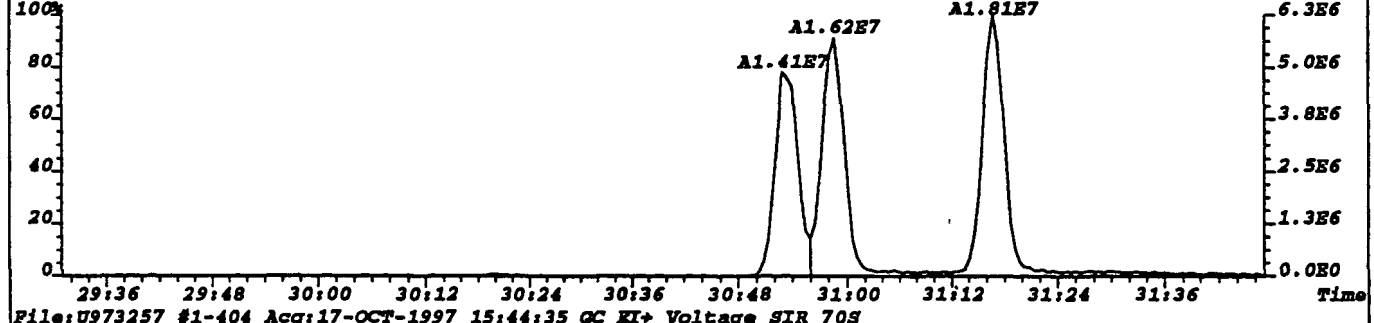
File:U973257 #1-404 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:1310
391.8127 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5240.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



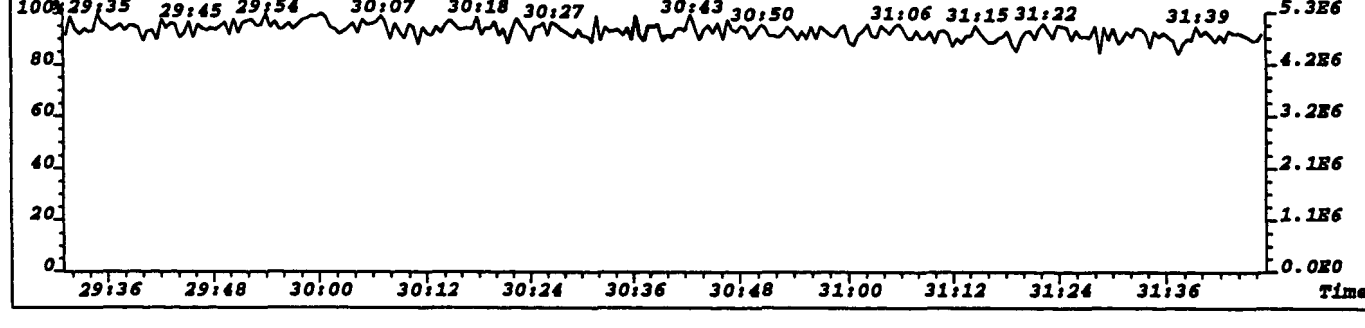
File:U973257 #1-404 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:1586
401.8558 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6344.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



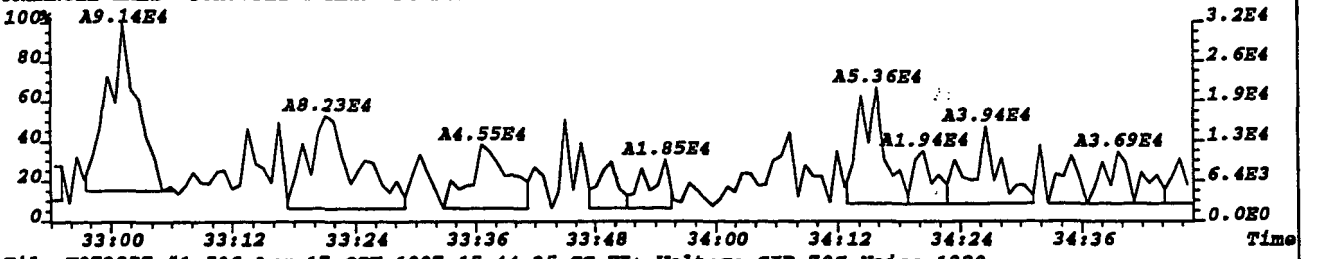
File:U973257 #1-404 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:1264
403.8529 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5056.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



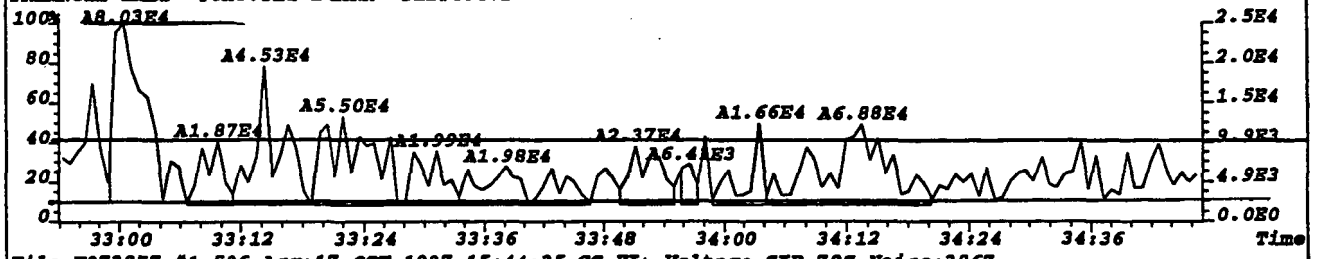
File:U973257 #1-404 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S
392.9760 F:3 Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



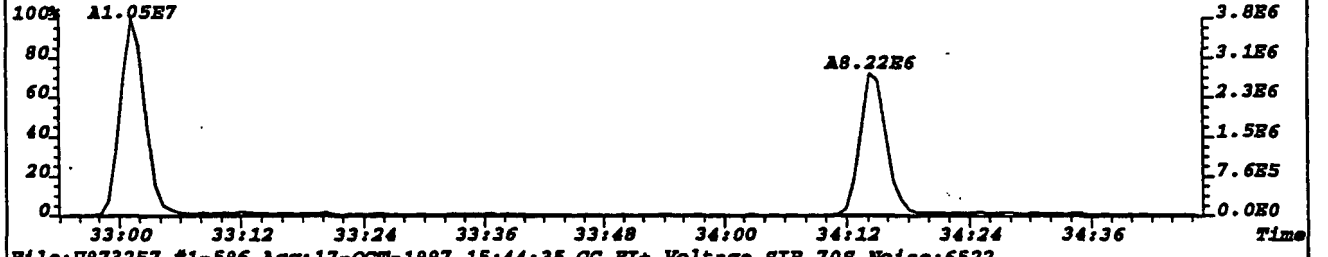
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:2117
407.7818 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,8468.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



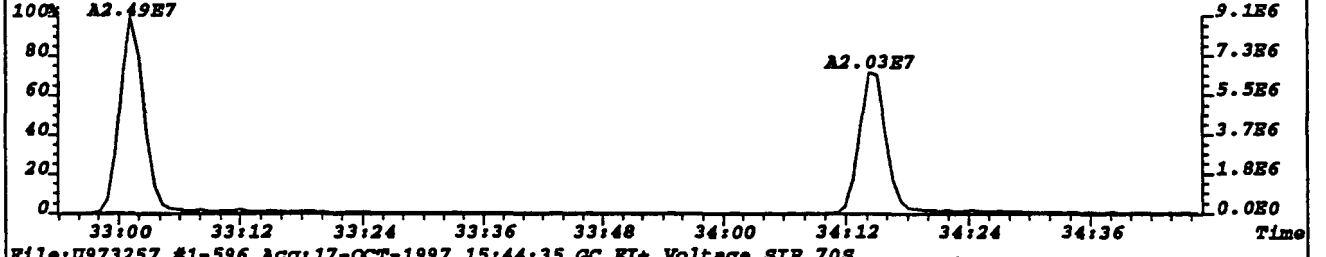
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:1820
409.7789 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7280.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



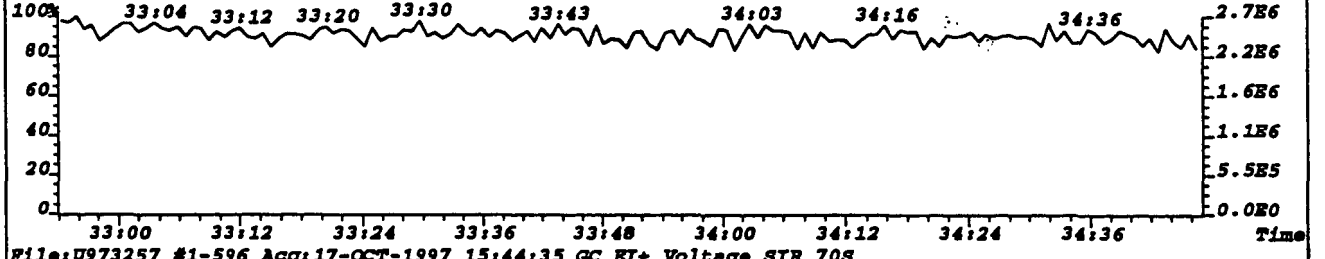
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:3867
417.8253 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,15468.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



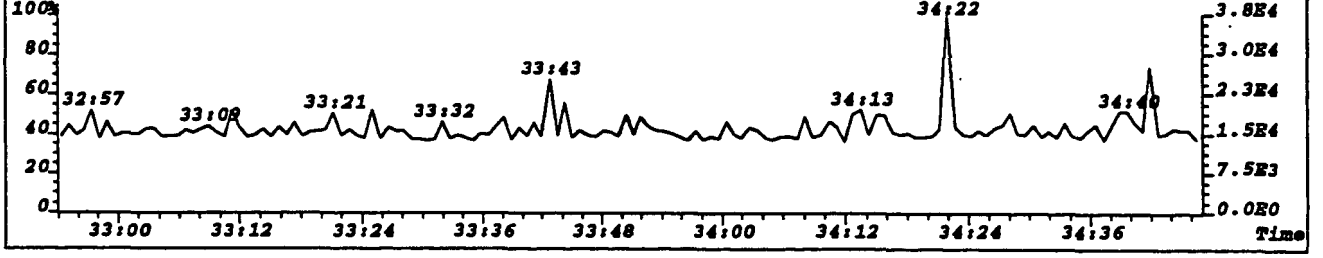
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:6522
419.8220 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,26088.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



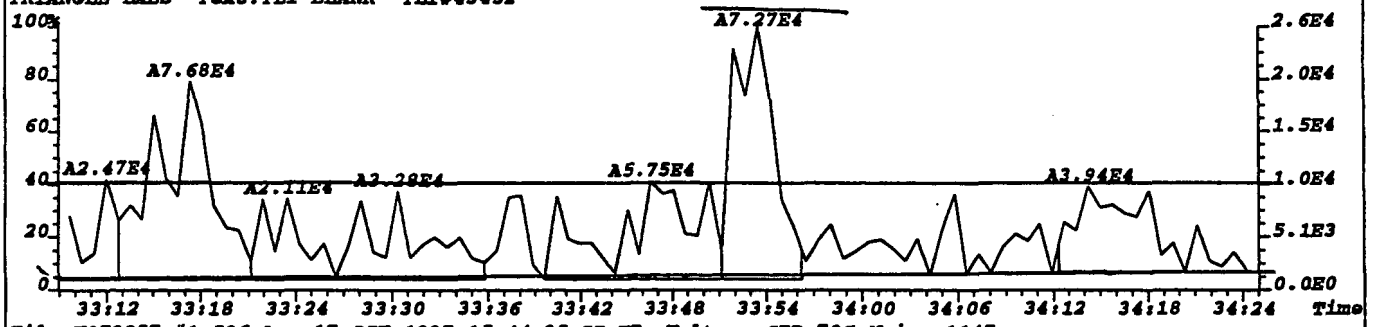
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



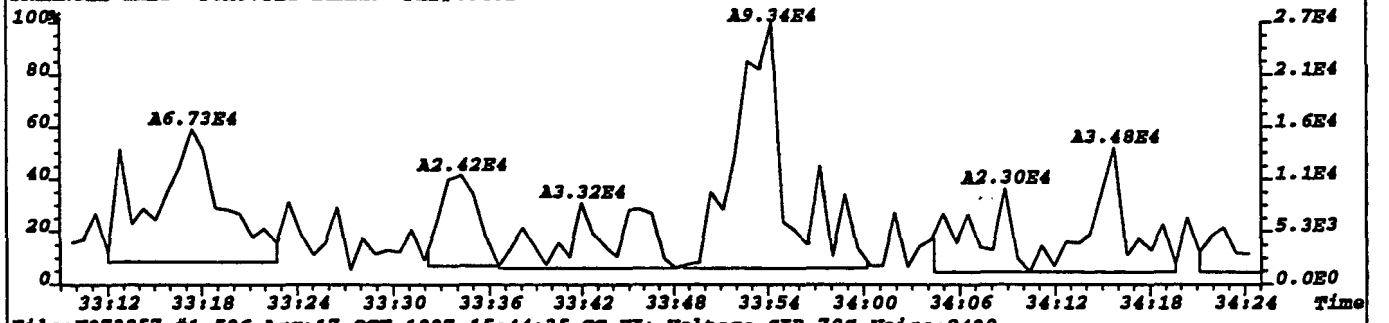
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S
479.7165 F:4 Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



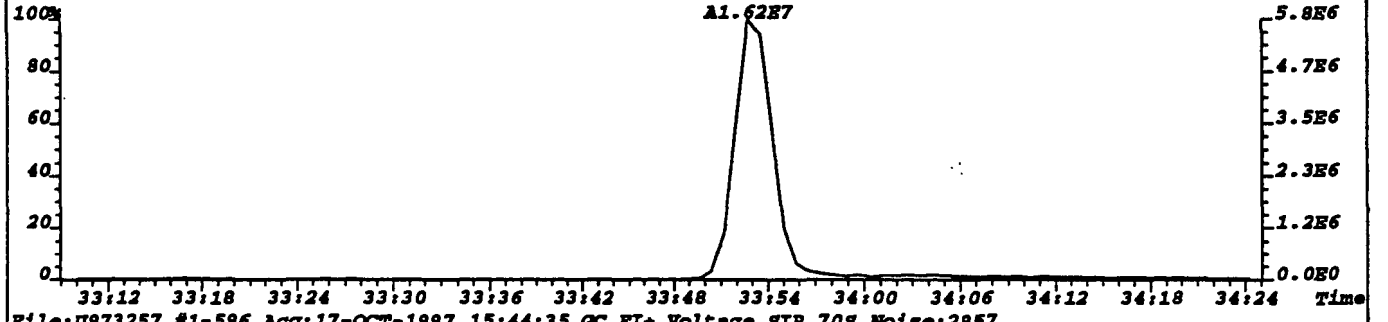
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:973
423.7766 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3892.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



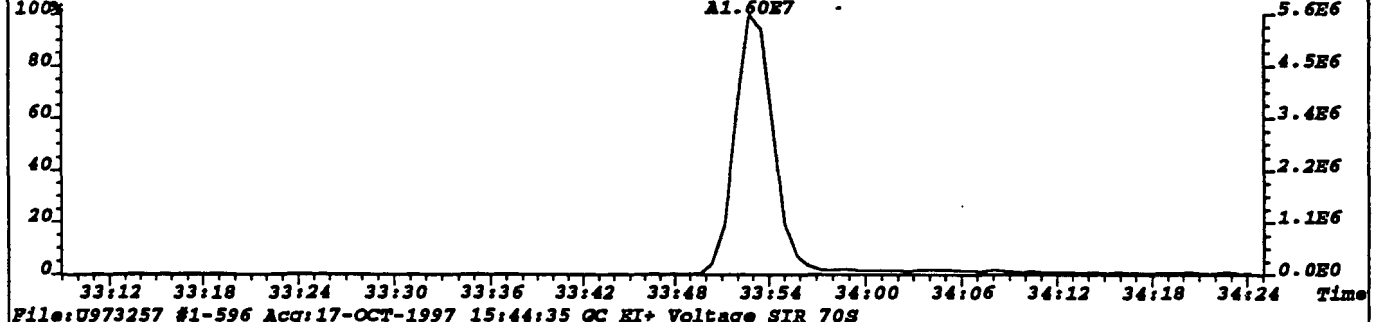
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:1147
425.7737 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4588.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



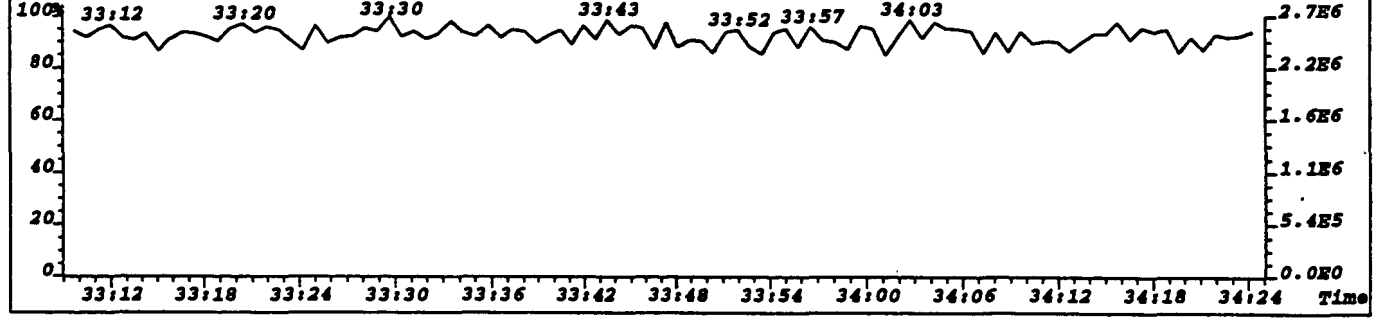
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:2499
435.8169 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,9996.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



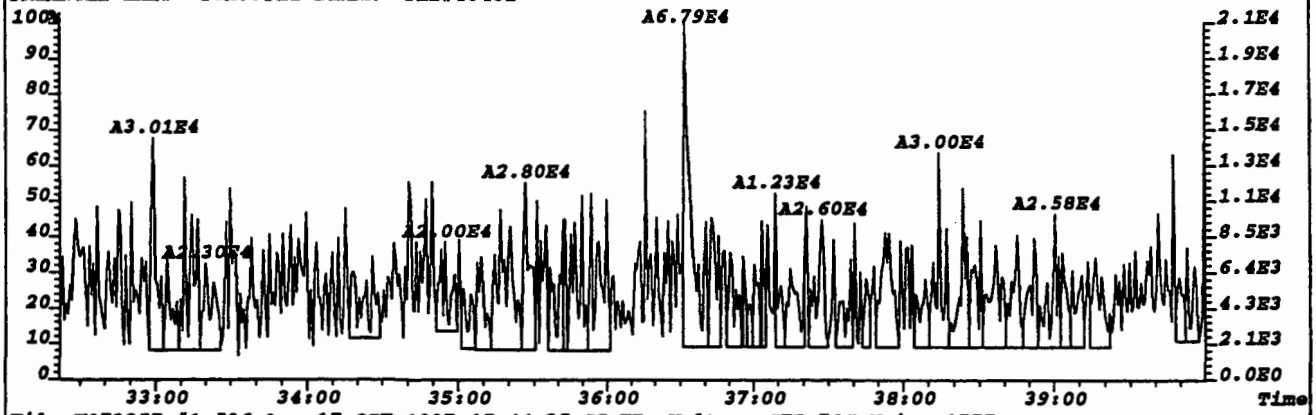
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:2957
437.8140 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,11828.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



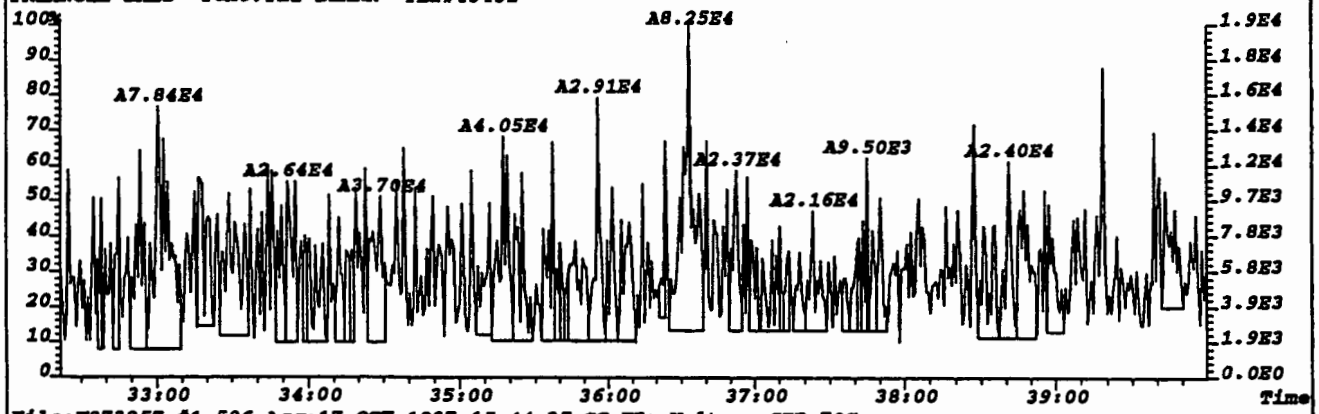
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



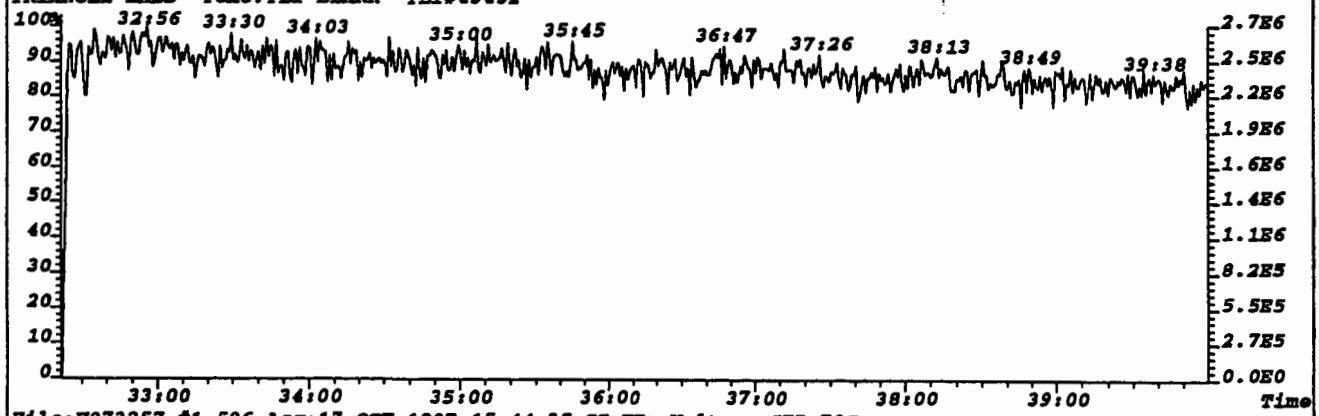
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:1598
441.7428 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6392.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



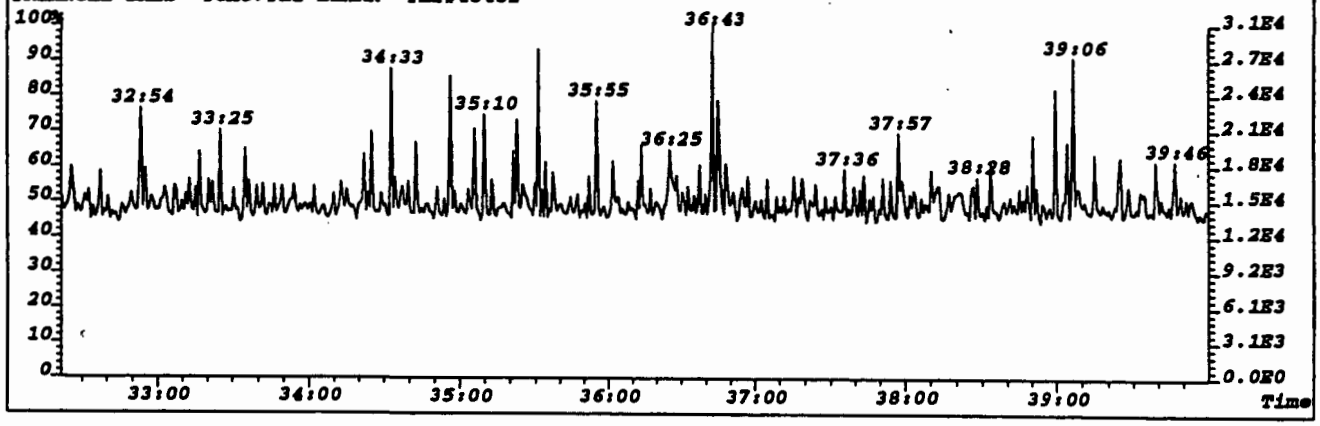
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:1777
443.7399 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7108.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



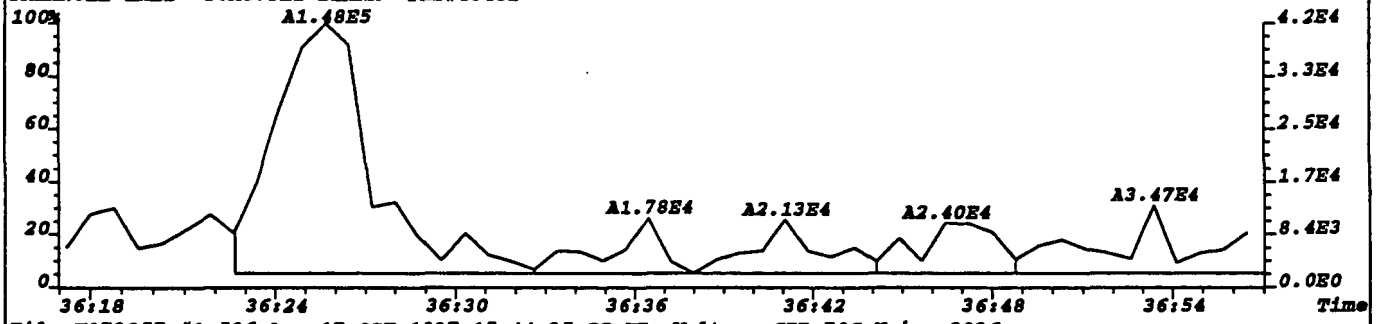
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



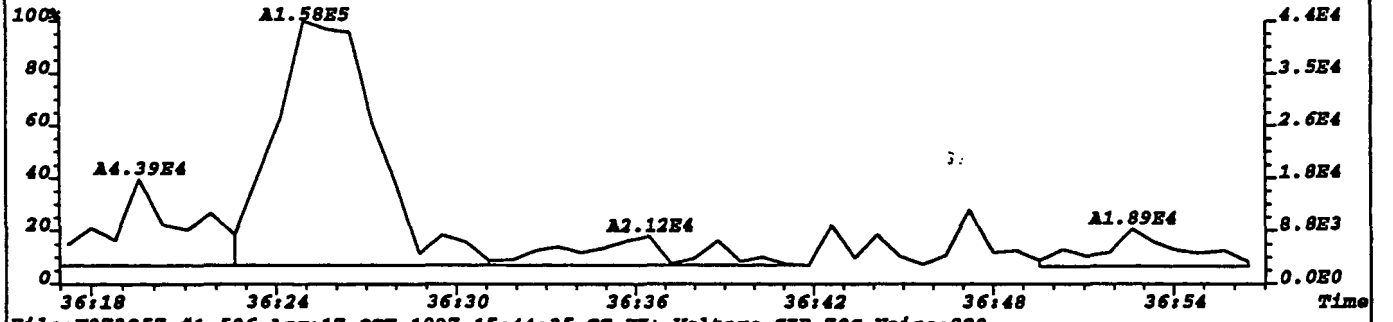
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S
513.6775 F:4 Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



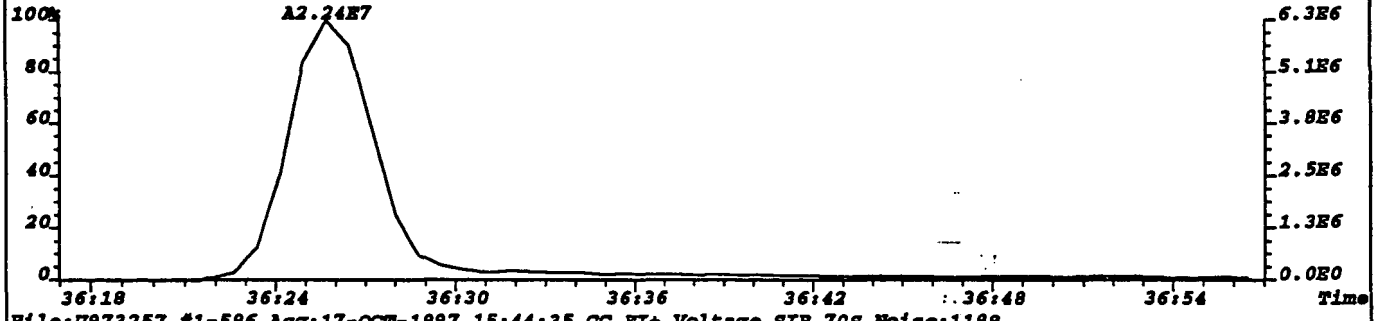
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:1759
457.7377 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7036.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



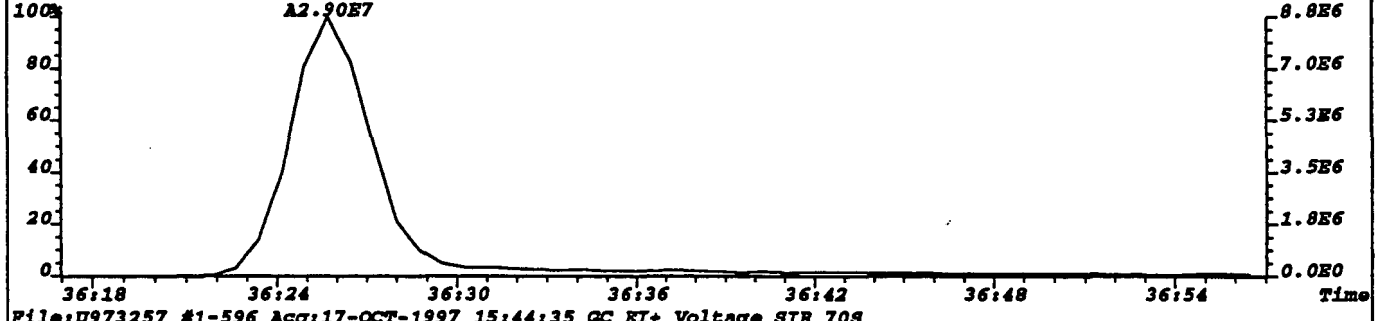
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:2036
459.7348 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,8144.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



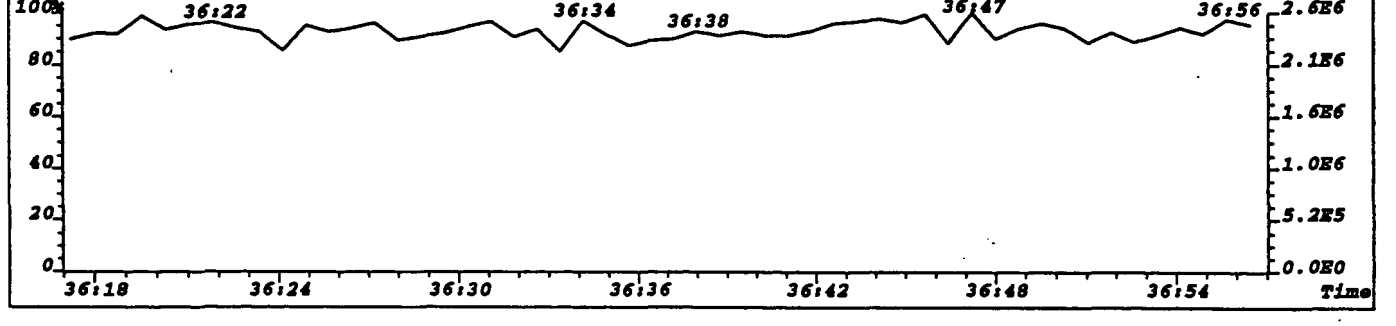
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:829
469.7779 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3316.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432



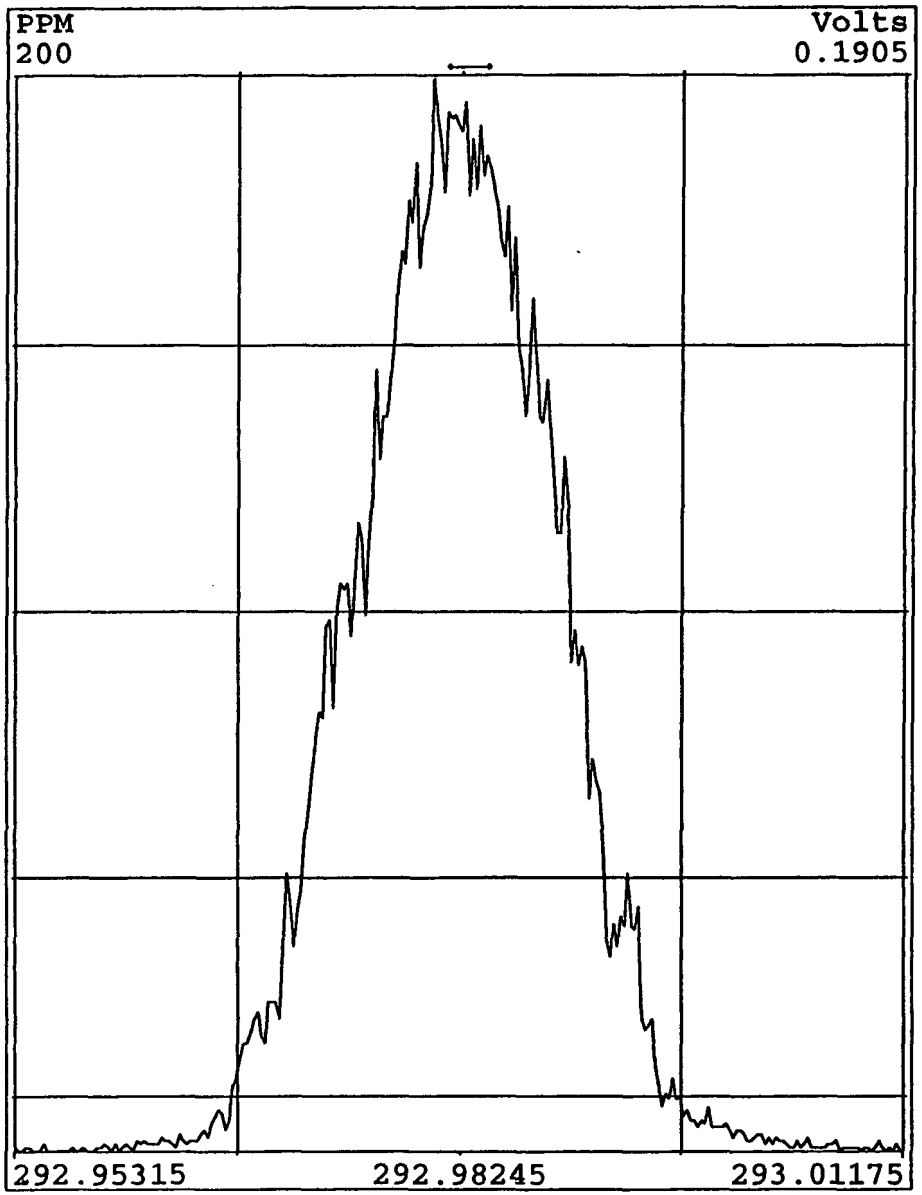
File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S Noise:1188
471.7750 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4752.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432

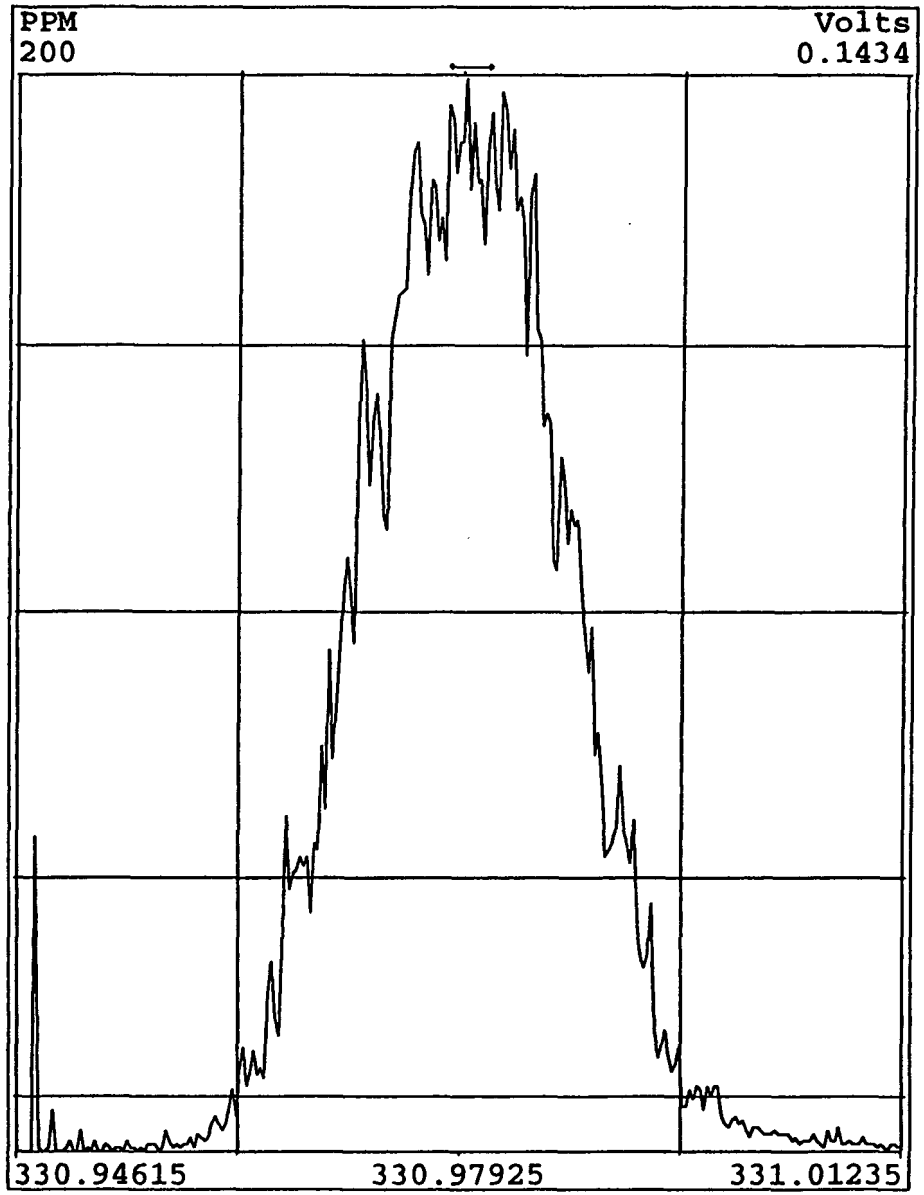


File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:TLI BLANK TLI#43432

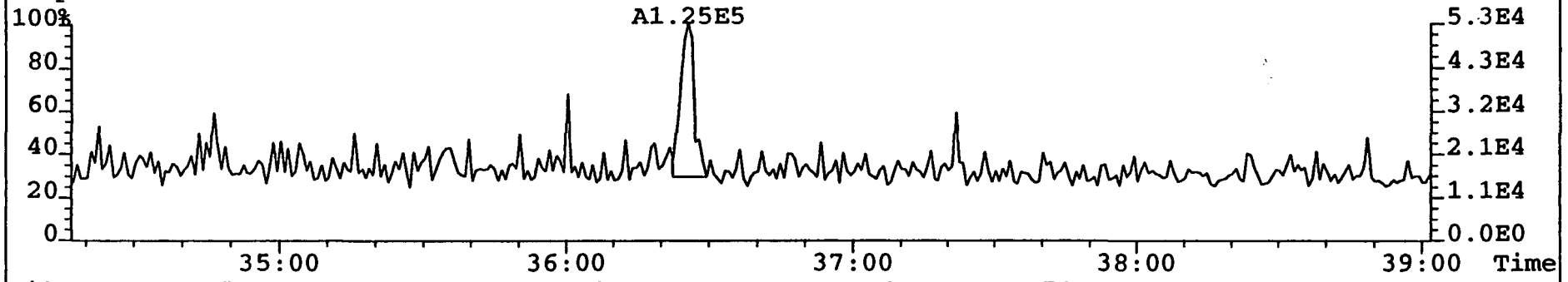


Peak Locate Examination:17-OCT-1997:15:43 File:U973257
Experiment:EPCUS2 Function:2 Reference:PFK

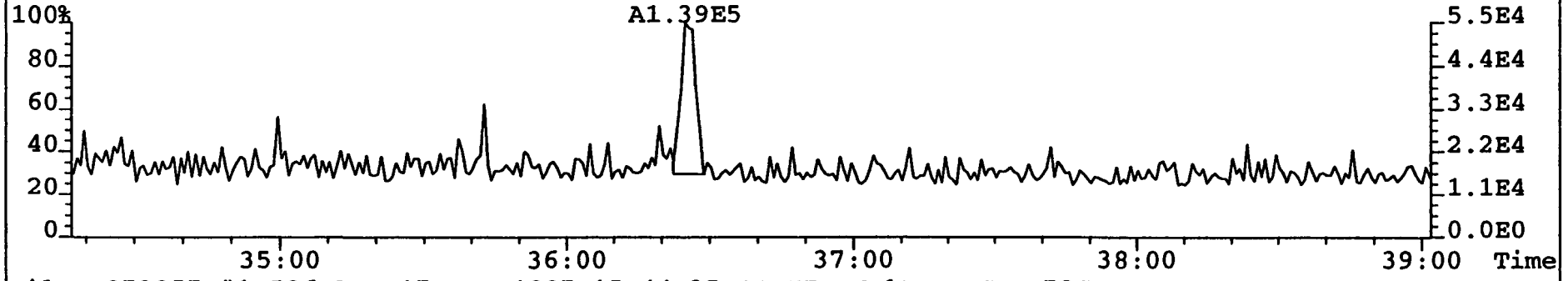




File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S
457.7377 F:4 Exp:EPCUS2
Sample Text:TLI BLANK TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973257 #1-596 Acq:17-OCT-1997 15:44:35 GC EI+ Voltage SIR 70S
459.7348 F:4 Exp:EPCUS2
Sample Text:TLI BLANK TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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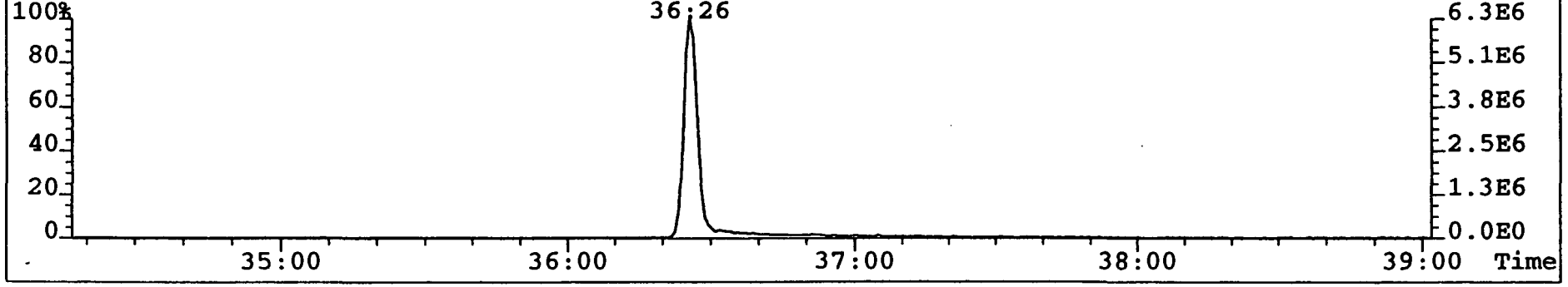
469.7779 F:4 Exp:EPCUS2
Sample Text:TLI BLANK TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



Pacific Environmental Services

TLI Project: **43432** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **SO-23-1** Analysis File: **U973258**

Client Project:	**Saginaw, MI**				
Sample Matrix:	**M23TRAIN**	Date Received:	**09/29/97**	Spike File:	**SPX23704**
TLI ID:	**185-6-1A-D**	Date Extracted:	**10/09/97**	ICal:	**UF59167**
		Date Analyzed:	**10/17/97**	ConCal:	**U973252**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U973257**	% Lipid:	**n/a**
GC Column:	**DB-5**	Analyst:	**BB**	% Solids:	**n/a**

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	EMPC		0.05			
1,2,3,7,8-PeCDD	0.07			1.68	27:29	
1,2,3,4,7,8-HxCDD	0.02			1.23	30:55	
1,2,3,6,7,8-HxCDD	EMPC		0.02			
1,2,3,7,8,9-HxCDD	0.03			1.32	31:18	
1,2,3,4,6,7,8-HpCDD	0.02			1.08	33:54	
1,2,3,4,6,7,8,9-OCDD	0.03			0.88	36:27	B
2,3,7,8-TCDF	2.4			0.74	21:34	
1,2,3,7,8-PeCDF	0.36			1.47	26:17	
2,3,4,7,8-PeCDF	0.38			1.54	27:06	
1,2,3,4,7,8-HxCDF	0.16			1.32	30:08	
1,2,3,6,7,8-HxCDF	0.07			1.36	30:14	
2,3,4,6,7,8-HxCDF	0.05			1.27	30:46	
1,2,3,7,8,9-HxCDF	ND	0.006				
1,2,3,4,6,7,8-HpCDF	EMPC		0.07			PR
1,2,3,4,7,8,9-HpCDF	ND	0.01				
1,2,3,4,6,7,8,9-OCDF	EMPC		0.01			

Totals	Amt. (ng)	Number	DL	EMPC	Flags
Total TCDD	2.7	10		2.8	
Total PeCDD	0.84	8		1.3	
Total HxCDD	0.19	4		0.27	
Total HpCDD	0.02	1		0.03	
Total TCDF	19.1	16			
Total PeCDF	6.1	13		6.1	
Total HxCDF	0.69	9		0.72	
Total HpCDF	0.04	2		0.11	

X237_PSR v2.00. LARS 6.10.04

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Printed: 23:13 10/23/97

Pacific Environmental Services

TLI Project: 43432 — Method 23 PCDD/PCDF Analysis (a)

Client Sample: SO-23-1 — Analysis File: U973258

Internal Standards	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	3.6	89.8	40%-130%	0.77	21:32	—
$^{13}C_{12}$-2,3,7,8-TCDD	3.4	85.5	40%-130%	0.82	22:28	—
$^{13}C_{12}$-1,2,3,7,8-PeCDF	3.2	78.8	40%-130%	1.51	26:16	—
$^{13}C_{12}$-1,2,3,7,8-PeCDD	3.3	83.7	40%-130%	1.44	27:28	—
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	4.4	111	40%-130%	0.51	30:14	—
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	3.8	94.1	40%-130%	1.21	30:59	—
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	2.5	61.3	25%-130%	0.38	33:01	—
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	3.8	95.0	25%-130%	1.04	33:54	—
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	5.1	63.5	25%-130%	0.87	36:26	—

Surrogate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	3.7	93.7	70%-140%		22:29	—
$^{13}C_{12}$-2,3,4,7,8-PeCDF	3.8	95.6	70%-140%	1.48	27:05	—
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	3.7	92.0	70%-140%	0.51	30:08	—
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	4.0	98.9	70%-140%	1.22	30:54	—
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	4.0	101	70%-140%	0.38	34:14	—

Alternate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	4.0	101	40%-130%	0.50	31:30	—
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	4.5	112	40%-130%	0.50	30:46	—

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.81	22:15	—
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.20	31:17	—

Data Reviewer: VC 10/23/97

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Initial ....Date...

Data Review By: VC 10 23 97 Calculated Noise Area: 5.22

The Total Area for each peak with an ion abundance ratio outside ratio limits has been recalculated according to method requirements.

Page No. 1 Listing of U973258B.dbf
10/23/97 Matched GC Peaks / Ratio / Ret. Time

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
TCDF						0.65-0.89				0.813-1.106			
304-306		DC	NL	0:00	RO	1.40	6.51			0.000			
				17:41		0.75	2,553.72	1,091.14	1,462.58	0.821			
				18:14		0.74	1,584.24	675.10	909.14	0.847			
				18:28		0.72	1,121.96	470.34	651.62	0.858			
				18:54		0.75	8,898.98	3,822.61	5,076.37	0.878			
				19:16		0.75	5,706.43	2,445.54	3,260.89	0.895			
				19:48		0.75	5,505.12	2,355.78	3,149.34	0.920			
				20:11		0.75	4,401.39	1,885.53	2,515.86	0.937			
				20:36		0.77	4,028.35	1,750.79	2,277.56	0.957			
				20:44		0.77	1,875.96	818.32	1,057.64	0.963			
				21:01		0.75	2,601.20	1,118.99	1,482.21	0.976			
				21:20		0.74	2,245.63	953.39	1,292.24	0.991			
	TN			21:34		0.74	6,391.04	2,712.86	3,678.18	1.002	2378-TCDF		AN
				22:08		0.74	2,499.99	1,065.03	1,434.96	1.028			
				22:24		0.75	1,477.95	634.25	843.70	1.040			
				22:40		0.88	249.33	116.81	132.52	1.053			
				23:41		0.79	151.02	66.77	84.25	1.100			
304-306			16	Peaks			51,292.31						
13C12-TCDF						0.65-0.89				0.954-1.046			
316-318		DC	NL	0:00	RO	2.29	3.22			0.000			
		DC	WL	20:09		0.78	83.29			0.936			
				21:00		0.79	56.08	24.74	31.34	0.975			
				21:32		0.77	9,962.59	4,331.81	5,630.78	1.000	13C12-2378-TCDF		ISO
		DC	SN	22:16	RO	0.64	14.11			1.034			
		DC	SN	22:32	RO	1.79	12.83			1.046			
		DC	WH	22:42	RO	3.16	5.10			1.054			
		DC	WH	22:45	RO	1.08	6.09			1.057			
		DC	WH	23:36	RO	0.47	24.44			1.096			
		DC	WH	23:46	RO	3.88	4.25			1.104			
316-318			2	Peaks			10,018.67						

---------- Above: TCDF / TCDD Follows ----------

TCDD						0.65-0.89				0.848-1.061			
320-322		DC	NL	0:00	RO	2.03	2.14			0.000			
				19:10		0.77	1,588.49	689.88	898.61	0.853			
				19:40		0.79	803.32	353.66	449.66	0.875			
				20:04		0.77	400.85	174.31	226.54	0.893			
				20:59		0.78	1,142.44	502.09	640.35	0.934			
				21:20		0.78	662.34	289.49	372.85	0.950			
				21:49		0.72	315.08	132.21	182.87	0.971			
	D	D	CO	22:14		0.78	346.90			0.990			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
	TM			22:21		0.76	998.00	430.00	568.00	0.995			
	AN			22:28	RO	0.59	121.60	52.90	89.70	1.000	2378-TCDD	AN	
				22:41		0.73	134.83	56.79	78.04	1.010			
				22:54		0.80	201.94	89.57	112.37	1.019			
				23:10	RO	0.91	54.85	28.26	30.99	1.031			
		DC	SN	23:24	RO	1.82	3.66			1.042			
		DC	SN	23:33		0.74	5.51			1.048			
				23:41		0.74	49.68	21.12	28.56	1.054			
		DC	WH	23:58	RO	5.28	1.19			1.067			
320-322			12	Peaks			6,473.42						
37Cl-TCDD										0.911-1.089			
328		DC	NL	0:00			2.04			0.000			
		DC	WL	19:09			9.01			0.852			
		DC	WL	19:23			4.47			0.863			
		DC	WL	19:32			34.09			0.869			
		DC	WL	19:42			35.09			0.877			
				20:45			1,154.25	1,154.25		0.924			
		DC	SN	21:00			7.41			0.935			
				22:29			6,698.67	6,698.67		1.001	37Cl-TCDD	SUR1	
				22:44			13.01	13.01		1.012			
				22:50			14.27	14.27		1.016			
				23:00			190.30	190.30		1.024			
				23:20			33.98	33.98		1.039			
				23:30			35.88	35.88		1.046			
		DC	SN	23:48			2.39			1.059			
		DC	SN	23:51			2.92			1.062			
		DC	SN	23:52			2.56			1.062			
		DC	SN	23:56			11.49			1.065			
		DC	SN	24:05			12.00			1.072			
328			7	Peaks			8,140.36						
13C12-TCDD						0.65-0.89				0.911-1.089			
332-334		DC	NL	0:00	RO	2.56	1.68			0.000			
				22:15		0.81	7,980.42	3,580.03	4,400.39	0.990	13C12-1234-TCDD	RS1	
				22:28		0.82	7,569.82	3,418.87	4,150.95	1.000	13C12-2378-TCDD	IS1	
				22:53	RO	0.94	182.13	96.73	102.90	1.019			
				23:20	RO	1.09	28.74	17.71	16.24	1.039			
				23:29	RO	1.84	30.16	31.34	17.04	1.045			
				23:48	RO	1.25	31.84	22.45	17.99	1.059			
		DC	SN	23:56	RO	1.07	11.89			1.065			
		DC	SN	24:10	RO	0.53	16.25			1.076			
332-334			6	Peaks			15,823.11						

---------- Above: TCDD / PeCDF Follows ----------

PeCDF						1.32-1.78				0.906-1.077			
340-342		DC	NL	0:00		1.45	4.65			0.000			
				23:59		1.58	1,467.60	898.62	568.98	0.913			
		DC	SN	24:25	RO	4.10	4.79			0.930			
		DC	SN	24:34	RO	1.92	4.51			0.935			
		DC	SN	24:46	RO	2.11	26.19			0.943			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
	DC	SN		24:52	RO	3.99	3.49			0.947			
				25:09		1.53	744.06	450.23	293.83	0.957			
				25:19		1.53	3,638.16	2,198.98	1,439.18	0.964			
				25:30		1.58	790.08	483.91	306.17	0.971			
				25:45		1.51	397.26	239.12	158.14	0.980			
				25:58		1.61	1,196.37	737.82	458.55	0.989			
A				26:12		1.38	276.00	160.00	116.00	0.997			
M				26:17		1.47	678.00	404.00	274.00	1.001	12378-PeCDF	AN	
				26:28		1.58	534.92	327.30	207.62	1.008			
				26:37		1.49	670.53	401.61	268.92	1.013			
				27:06		1.54	741.14	449.02	292.12	1.032	23478-PeCDF	AN	
				27:15		1.50	574.00	344.77	229.23	1.037			
				27:35	RO	1.28	80.83	49.13	38.26	1.050			
	DC	SN		27:42		1.41	15.61			1.055			
	DC	SN		28:00	RO	1.02	11.38			1.066			
				28:09		1.49	59.02	35.36	23.66	1.072			
340-342			14	Peaks			11,847.97						
13C12-PeCDF				1.32-1.78					0.848-1.152				
352-354	DC	NL		0:00	RO	1.08	1.83			0.000			
				25:19		1.50	126.98	76.23	50.75	0.964			
	DC	SN		25:53		1.66	30.07			0.985			
				26:16		1.51	6,879.94	4,137.36	2,742.58	1.000	13C12-PeCDF 123	IS2	
				26:36	RO	1.23	86.19	52.39	42.53	1.013			
	DC	SN		26:46	RO	0.54	9.30			1.019			
				27:05		1.48	6,377.82	3,803.77	2,574.05	1.031	13C12-PeCDF 234	SUR2	
	DC	SN		27:25	RO	0.55	18.52			1.044			
	DC	SN		27:41	RO	4.40	15.63			1.054			
	DC	SN		28:08	RO	0.50	15.89			1.071			
352-354			4	Peaks			13,470.93						

---------- Above: PeCDF / PeCDD Follows ----------

PeCDD				1.32-1.78					0.921-1.025				
356-358	DC	NL		0:00	RO	1.30	2.43			0.000			
				25:28	RO	0.92	485.32	295.00	321.84	0.927			
				26:00		1.70	60.81	38.28	22.53	0.947			
				26:17		1.53	368.66	223.06	145.60	0.957			
				26:26		1.49	97.67	58.47	39.20	0.962			
				26:39		1.50	281.41	168.91	112.50	0.970			
				26:50		1.46	55.30	32.85	22.45	0.977			
				26:56		1.50	103.50	62.08	41.42	0.981			
				27:09		1.39	107.42	62.45	44.97	0.988			
				27:18	RO	1.05	51.66	31.40	29.92	0.994			
				27:29		1.68	94.24	59.13	35.11	1.001	12378-PeCDD	AN	
				27:39	RO	1.96	46.51	35.80	18.24	1.007			
				27:59	RO	1.84	45.65	32.85	17.90	1.019			
	DC	WH		28:12	RO	1.95	2.70			1.027			
356-358			12	Peaks			1,798.15						
13C12-PeCDD				1.32-1.78					0.855-1.145				
368-370	DC	NL		0:00	RO	1.07	1.32			0.000			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
		DC	SN	26:17		1.71	8.48			0.957			
		DC	SN	26:25		1.38	6.77			0.962			
		DC	SN	26:47		1.42	2.35			0.975			
				27:28		1.44	4,005.78	2,361.06	1,644.72	1.000	13C12-PeCDD 123	IS3	
				27:38		1.44	420.09	248.08	172.01	1.006			
		DC	SN	27:58		1.38	27.02			1.018			
		DC	SN	28:11	RO	7.43	8.03			1.026			
		DC	SN	28:19		1.32	24.22			1.031			
		DC	SN	28:28		1.57	17.31			1.036			
368-370			2	Peaks			4,425.87						
---------- Above: PeCDD / HxCDF Follows ----------													
HxCDF						1.05-1.43				0.958-1.051			
374-376		DC	NL	0:00		1.11	11.73			0.000			
				29:06		1.25	159.87	88.97	70.90	0.963			
				29:15		1.23	537.06	296.33	240.73	0.967			
				29:25		1.16	66.70	35.79	30.91	0.973			
				29:34		1.39	76.45	44.43	32.02	0.978			
				29:45	RO	1.01	34.94	19.34	19.11	0.984			
		DC	SN	29:56		1.25	6.11			0.990			
				30:08		1.32	334.38	190.17	144.21	0.997	123478-HxCDF	AN	
				30:14		1.36	189.25	109.06	80.19	1.000	123678-HxCDF	AN	
				30:22		1.42	41.57	24.36	17.21	1.004			
				30:34		1.41	88.22	51.62	36.60	1.011			
				30:46		1.27	107.22	59.94	47.28	1.018	234678-HxCDF	AN	
		DC	SN	31:31	RO	1.47	8.29			1.042	123789-HxCDF	AN	
	K			31:36	RO	1.53	21.24	14.47	9.48	1.045			
374-376			11	Peaks			1,656.90						
13C12-HxCDF						0.43-0.59				0.868-1.132			
384-386		DC	NL	0:00	RO	0.41	88.26			0.000			
				30:08		0.51	6,342.46	2,136.79	4,205.67	0.997	13C12-HxCDF 478	SUR3	
				30:14		0.51	7,074.93	2,377.66	4,697.27	1.000	13C12-HxCDF 678	IS4	
				30:46		0.50	6,744.22	2,261.64	4,482.58	1.018	13C12-HxCDF 234	ALT2	
				31:30		0.50	5,717.46	1,906.91	3,810.55	1.042	13C12-HxCDF 789	ALT1	
384-386			4	Peaks			25,879.07						
---------- Above: HxCDF / HxCDD Follows ----------													
HxCDD						1.05-1.43				0.952-1.015			
390-392		DC	NL	0:00	RO	0.62	3.32			0.000			
				29:39		1.05	49.79	25.48	24.31	0.957			
				30:08		1.24	129.21	71.49	57.72	0.973			
		DC	SN	30:14	RO	0.87	7.57			0.976			
				30:22	RO	1.44	84.96	54.66	37.93	0.980			
		DC	SN	30:32		1.30	14.90			0.985			
		DC	SN	30:40		1.40	3.00			0.990			
		DC	SN	30:46	RO	1.60	8.04			0.993			
	K			30:55		1.23	21.35	11.76	9.59	0.998	123478-HxCDD	AN	
				31:00	RO	0.93	25.27	13.99	14.98	1.001	123678-HxCDD	AN	
		DC	SN	31:04	RO	2.49	1.55			1.003			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
				31:18		1.32	44.49	25.29	19.20	1.010	123789-HxCDD	AN	
390-392			6	Peaks			355.07						
13C12-HxCDD				1.05-1.43					0.968-1.032				
402-404	DC	NL		0:00	RO	0.68	3.65			0.000			
	DC	SN		30:21		1.21	24.85			0.980			
				30:54		1.22	4,662.16	2,562.36	2,099.80	0.997	13C12-HxCDD 478	SUR4	
				30:59		1.21	5,253.10	2,878.93	2,374.17	1.000	13C12-HxCDD 678	IS5	
				31:08		1.07	109.84	56.67	53.17	1.005			
				31:17		1.20	5,802.06	3,160.17	2,641.89	1.010	13C12-HxCDD 789	RS2	
				31:33		1.28	44.18	24.79	19.39	1.018			
				31:35	RO	0.70	24.84	13.75	19.58	1.019			
	DC	SN		31:37	RO	4.61	25.92			1.020			
402-404			6	Peaks			15,896.18						

---------- Above: HxCDD / HpCDF Follows ----------

HpCDF				0.88-1.20					0.996-1.043				
408-410	DC	NL		0:00	RO	1.48	5.41			0.000			
	M			33:02	RO	1.22	86.70	51.70	42.50	1.001	1234678-HpCDF	AN	
	K			33:16		1.02	23.50	11.84	11.66	1.008			
	K			33:23		0.94	20.19	9.79	10.40	1.011			
	DC	SN		34:15	RO	0.77	13.16			1.037	1234789-HpCDF	AN	
	DC	SN		34:22	RO	1.77	4.57			1.041			
	DC	WH		34:38	RO	1.62	2.88			1.049			
408-410			3	Peaks			130.39						
13C12-HpCDF				0.37-0.51					0.939-1.121				
418-420	DC	NL		0:00	RO	0.65	14.73			0.000			
				33:01		0.38	3,390.65	938.25	2,452.40	1.000	13C12-HpCDF 678	IS6	
				33:13	RO	1.20	27.85	23.29	19.34	1.006			
				34:14		0.38	3,017.10	834.73	2,182.37	1.037	13C12-HpCDF 789	SUR5	
	DC	SN		34:26	RO	0.09	20.98			1.043			
418-420			3	Peaks			6,435.60						

---------- Above: HpCDF / HpCDD Follows ----------

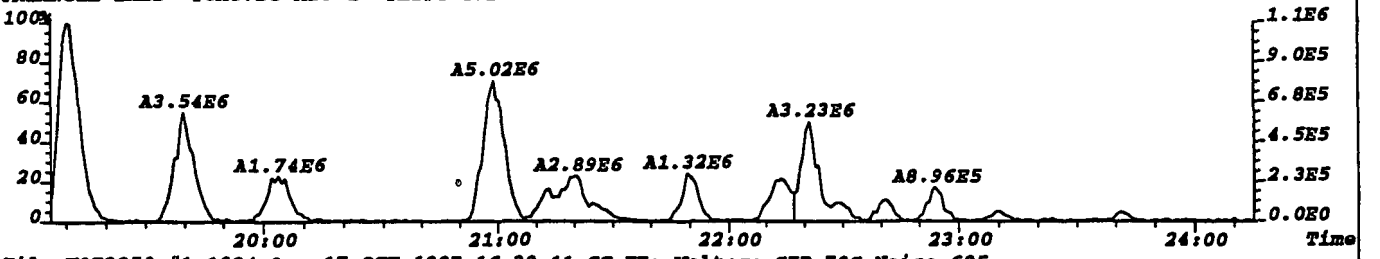
HpCDD				0.88-1.20					0.977-1.005				
424-426	DC	NL		0:00	RO	1.24	3.00			0.000			
	MK			33:17	RO	0.83	17.18	8.76	10.50	0.982			
	DC	SN		33:31	RO	1.84	1.69			0.989			
	M			33:54		1.08	24.80	12.90	11.90	1.000	1234678-HpCDD	AN	
	DC	WH		34:11	RO	2.95	1.67			1.008			
	DC	WH		34:15	RO	1.40	7.06			1.010			
	DC	WH		34:21	RO	2.76	1.94			1.013			
424-426			2	Peaks			41.98						
13C12-HpCDD				0.88-1.20					0.971-1.029				
436-438	DC	NL		0:00		1.20	12.35			0.000			
	DC	SN		33:17		1.09	19.21			0.982			
				33:54		1.04	5,057.51	2,582.80	2,474.71	1.000	13C12-HpCDD 678	IS7	
				34:16	RO	1.43	51.88	36.32	25.43	1.011			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
436-438			2 Peaks				5,109.39						
---------- Above: HpCDD / Octa-CDD and CDF Follows ----------													
OCDF						0.76-1.02				0.890-1.110			
442-444		DC	NL	0:00		0.91	5.82			0.000			
		DC	SN	34:43	RO	0.27	2.68			0.953			
		DC	SN	34:49	RO	1.36	6.50			0.956			
		DC	SN	36:20	RO	1.03	2.85			0.997			
	MK			36:33	RO	0.73	11.66	5.49	7.51	1.003	OCDF		AN
		DC	SN	36:50	RO	1.92	3.12			1.011			
		DC	SN	36:57	RO	1.18	4.27			1.014			
		DC	SN	37:49	RO	2.46	2.06			1.038			
		DC	SN	37:54	RO	1.33	1.25			1.040			
		DC	SN	38:11	RO	1.51	4.69			1.048			
442-444			1 Peak				11.66						
OCDD						0.76-1.02				0.890-1.110			
458-460		DC	NL	0:00	RO	1.86	2.38			0.000			
	MK			36:27		0.88	22.80	10.70	12.10	1.000	OCDD		AN
		DC	SN	36:36	RO	0.37	0.85			1.005			
		DC	SN	36:38	RO	0.34	0.81			1.005			
		DC	SN	36:40	RO	0.36	4.03			1.006			
458-460			1 Peak				22.80						
13C12-OCDD						0.76-1.02				0.995-1.005			
470-472		DC	NL	0:00		0.95	1.97			0.000			
				36:26		0.87	5,622.50	2,617.42	3,005.08	1.000	13C12-OCDD		IS8
		DC	WH	36:52	RO	1.81	36.19			1.012			
470-472			1 Peak				5,622.50						

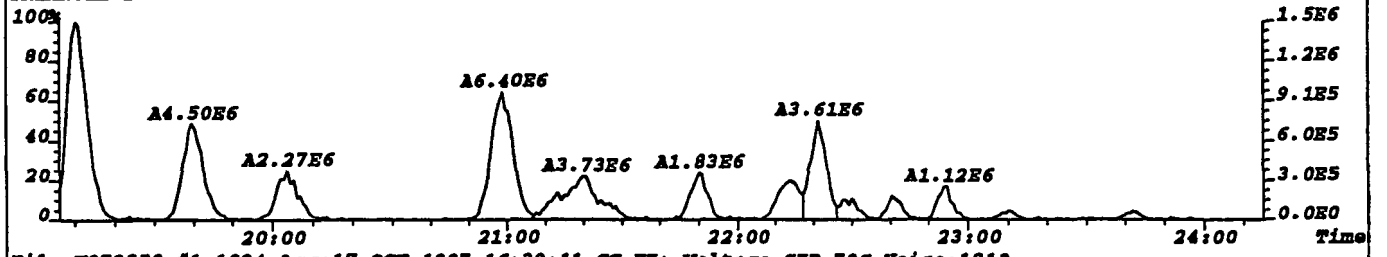
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside Limits	<M-Below Method Detection Limit	T-Time Changed
Rel.RT-Relative Retention Time	NL-Channel Specific Noise Level	M-Peak Area Changed
		N-Name Changed
		E-Ether Interference

*** End of Report ***

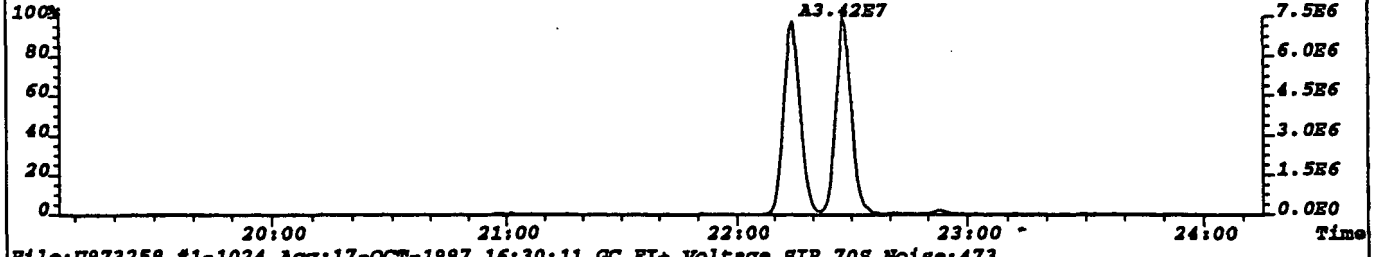
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:1230
319.8965 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4920.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



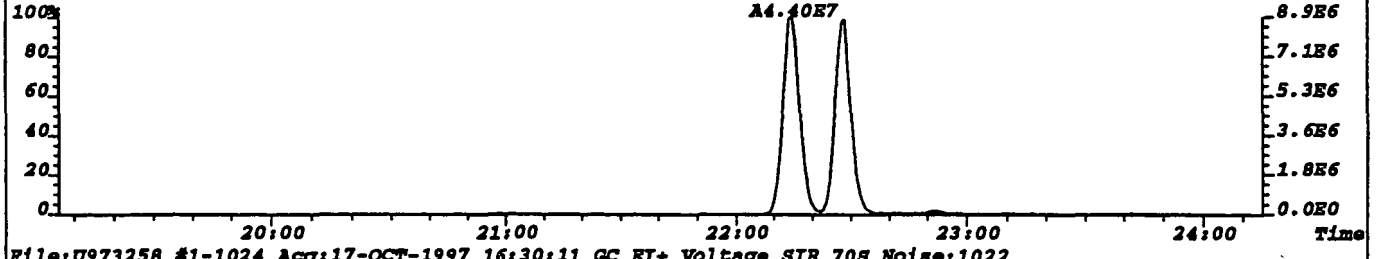
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:605
321.8936 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2420.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



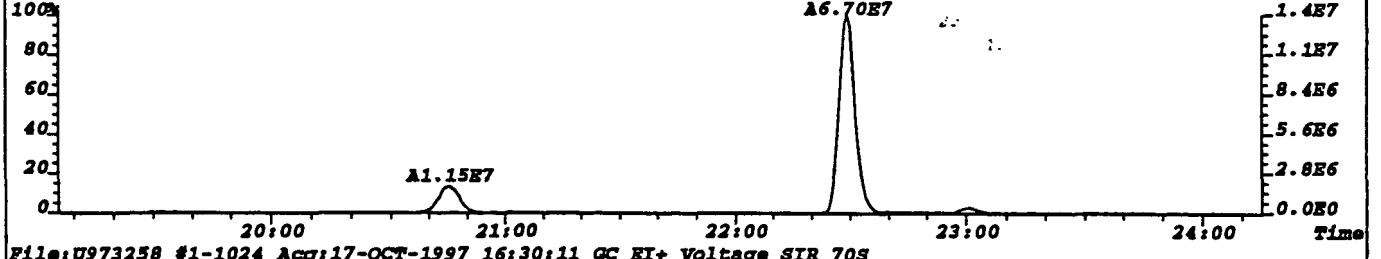
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:1213
331.9368 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4852.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



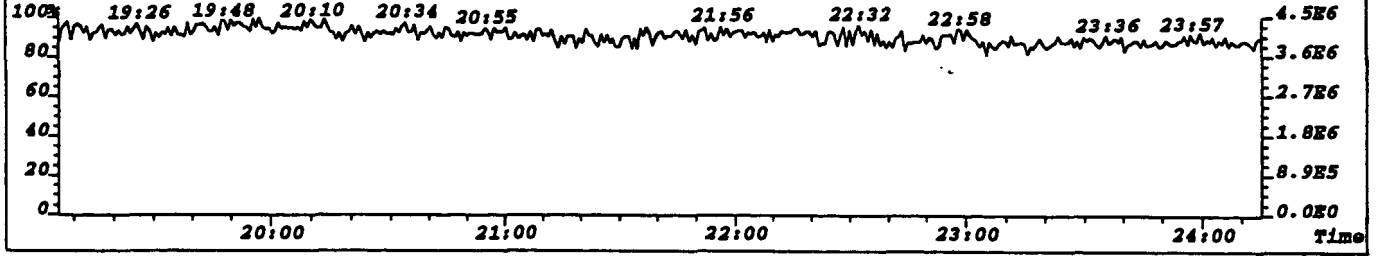
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:473
333.9338 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1892.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



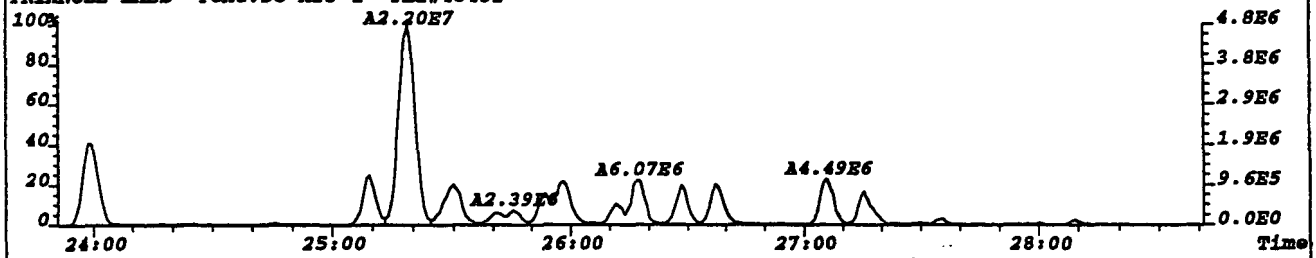
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:1022
327.8847 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4088.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



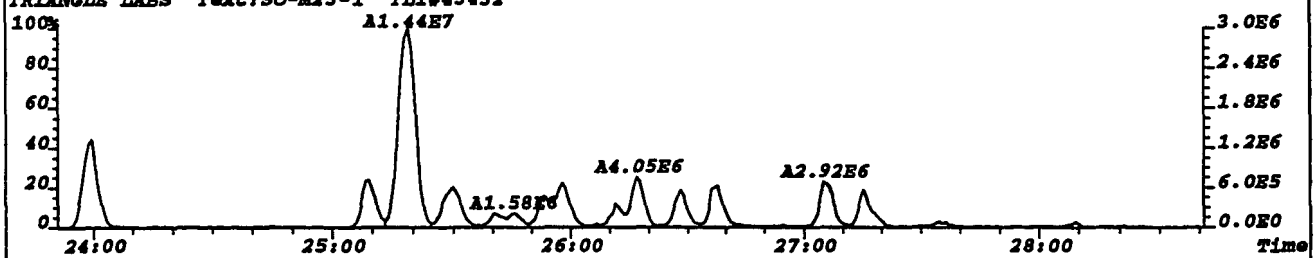
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



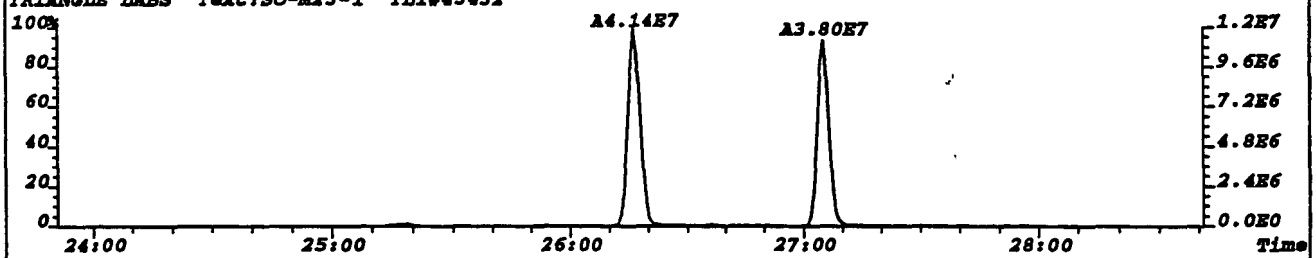
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:1374
339.8597 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5496.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



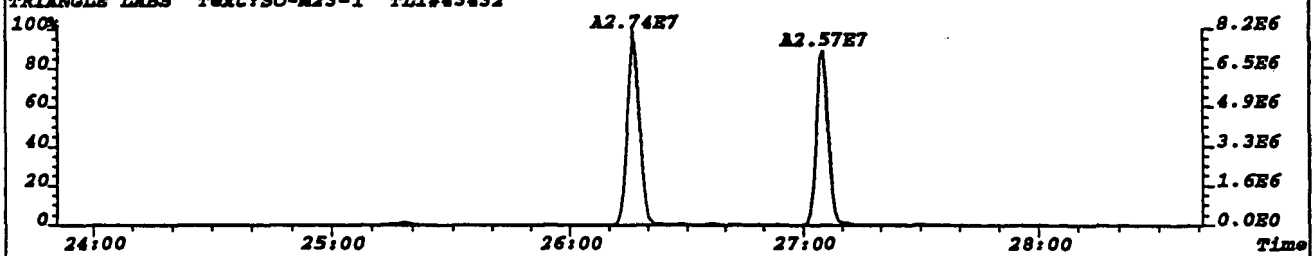
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:948
341.8567 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3792.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



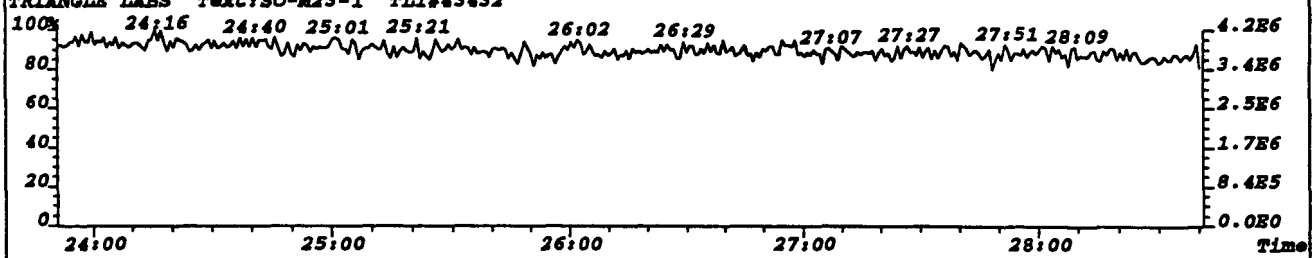
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:557
351.9000 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2228.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



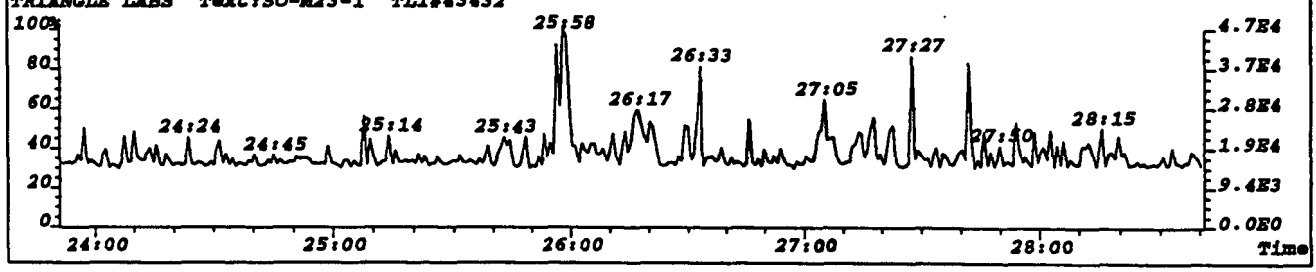
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:515
353.8970 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2060.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



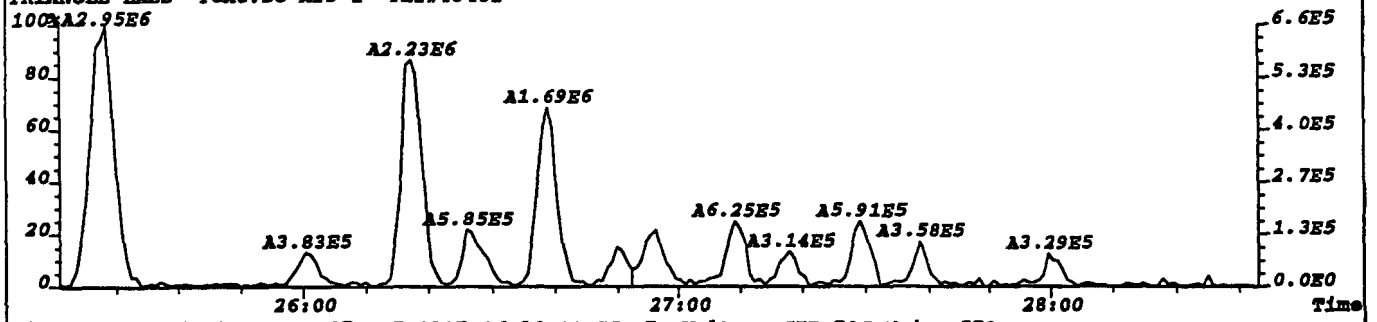
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



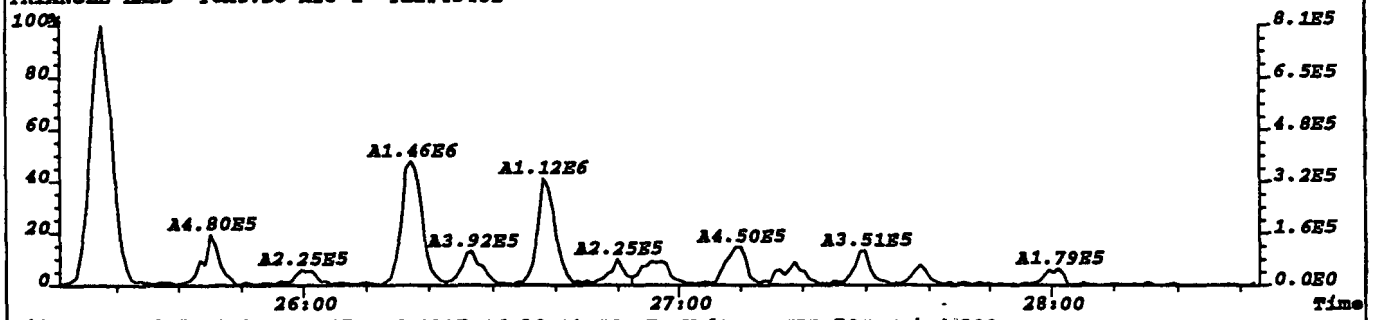
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
409.7974 F:2 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



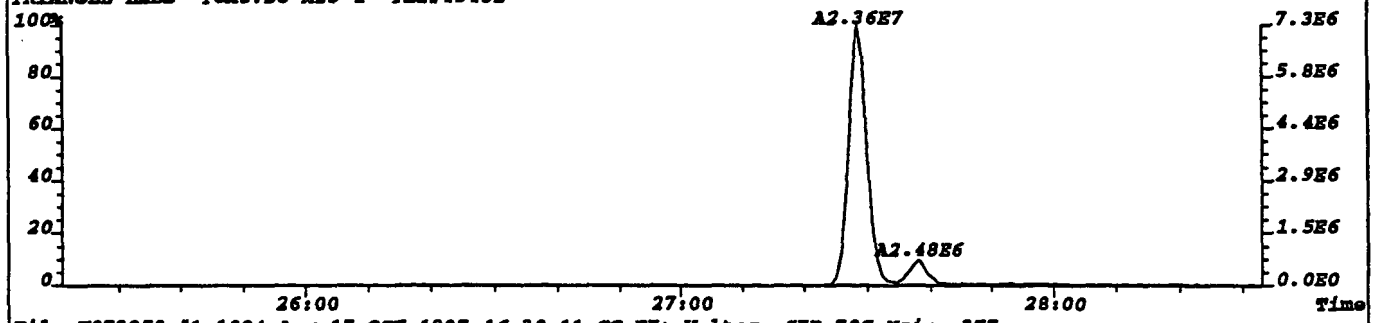
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:741
355.8546 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,2964.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



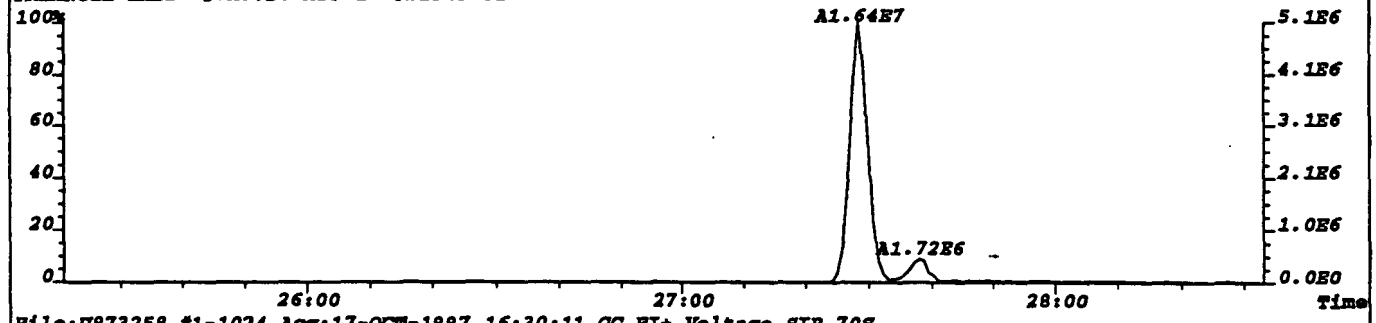
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:572
357.8516 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,2288.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



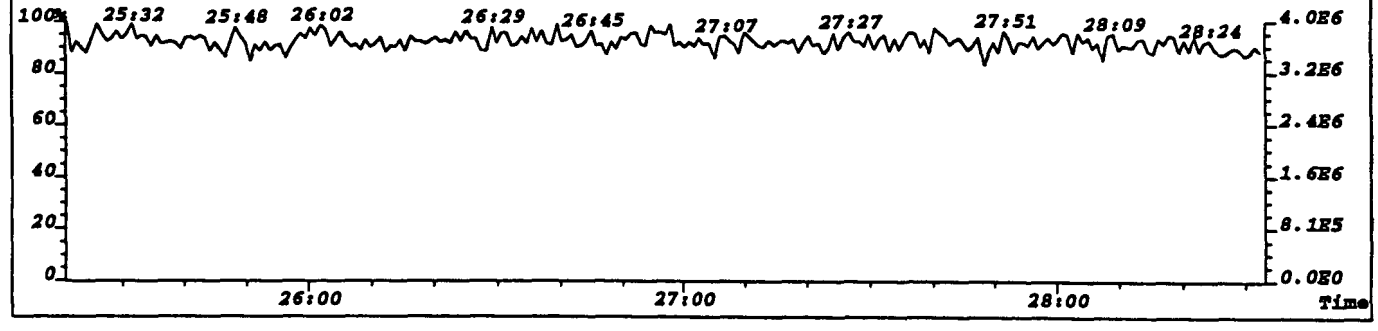
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:399
367.8949 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,1596.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



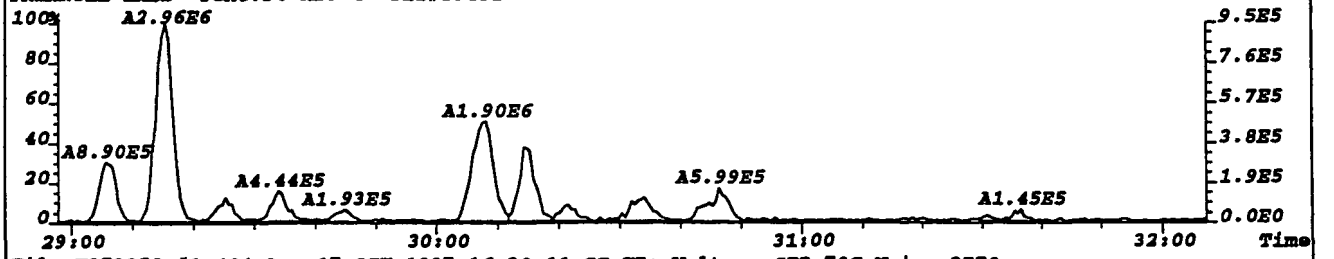
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:377
369.8919 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,1508.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



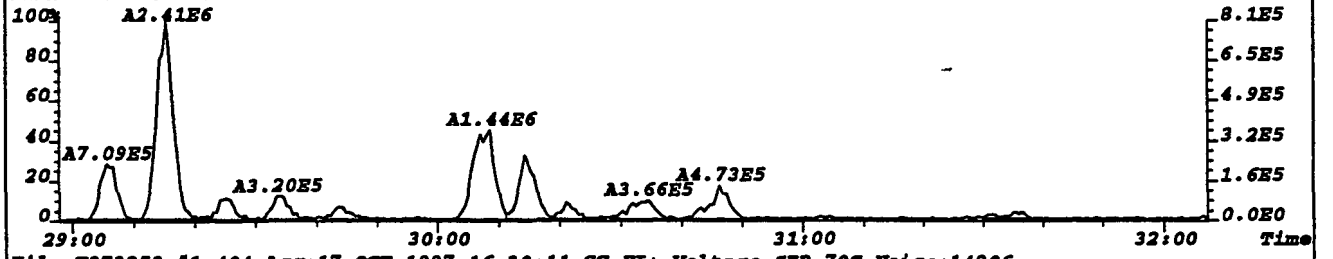
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



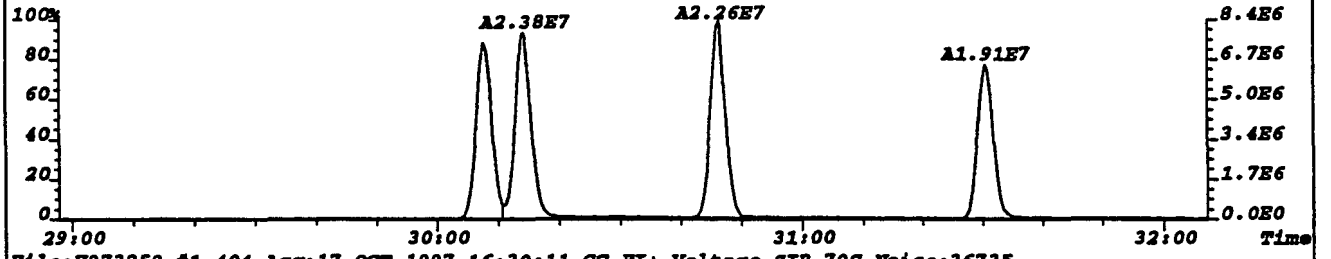
File:U973258 #1-404 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:3086
373.8208 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,12344.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



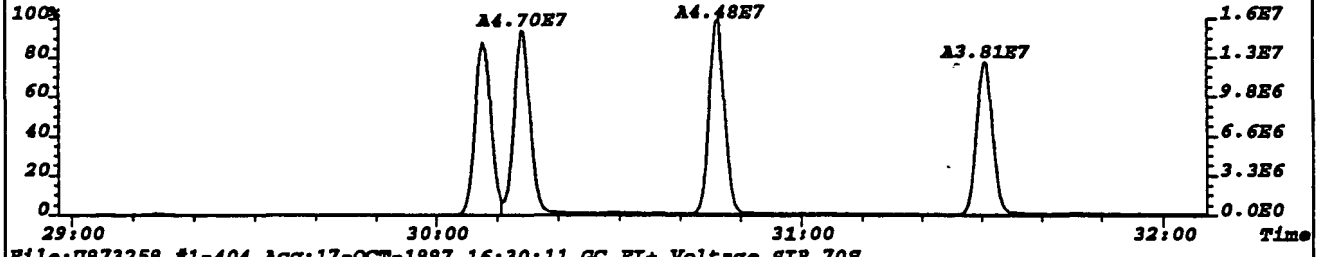
File:U973258 #1-404 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:2779
375.8178 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,11116.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



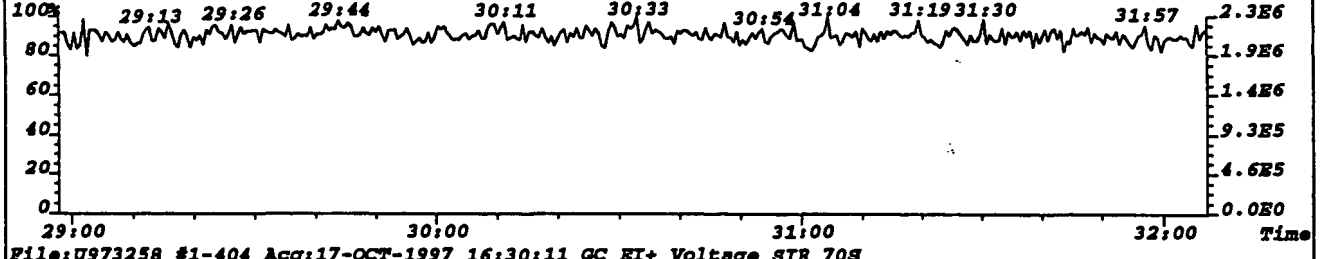
File:U973258 #1-404 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:14906
383.8639 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,59624.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



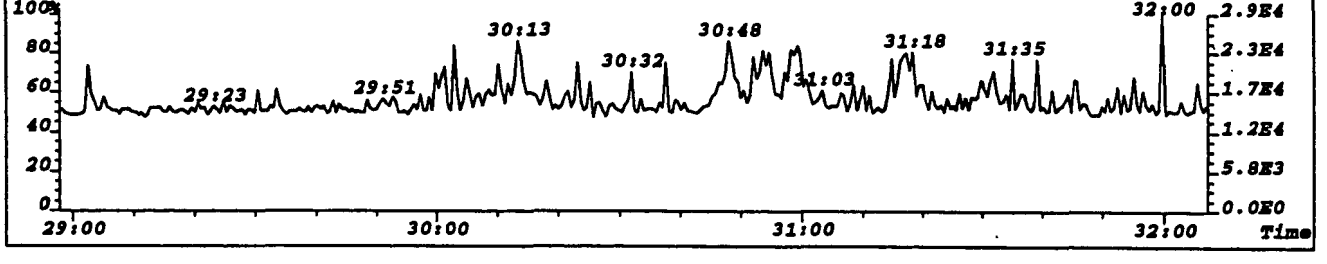
File:U973258 #1-404 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:36735
385.8610 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,146940.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



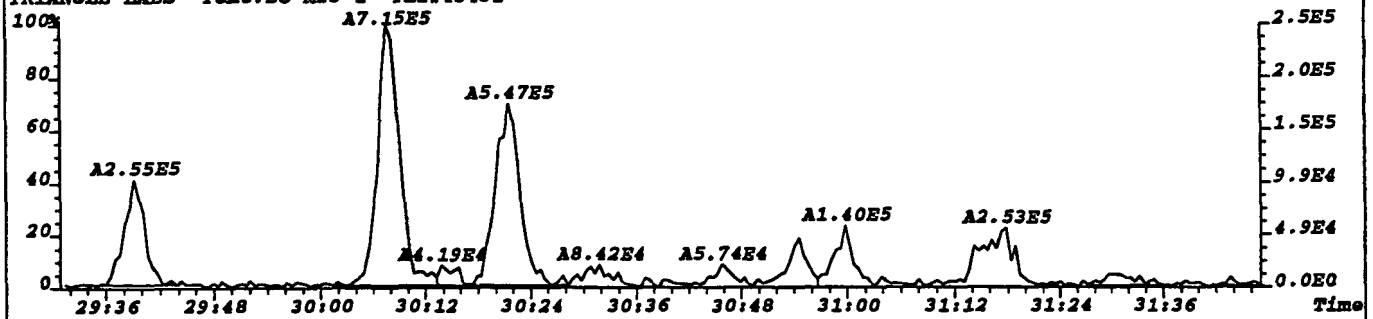
File:U973258 #1-404 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
392.9760 F:3 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



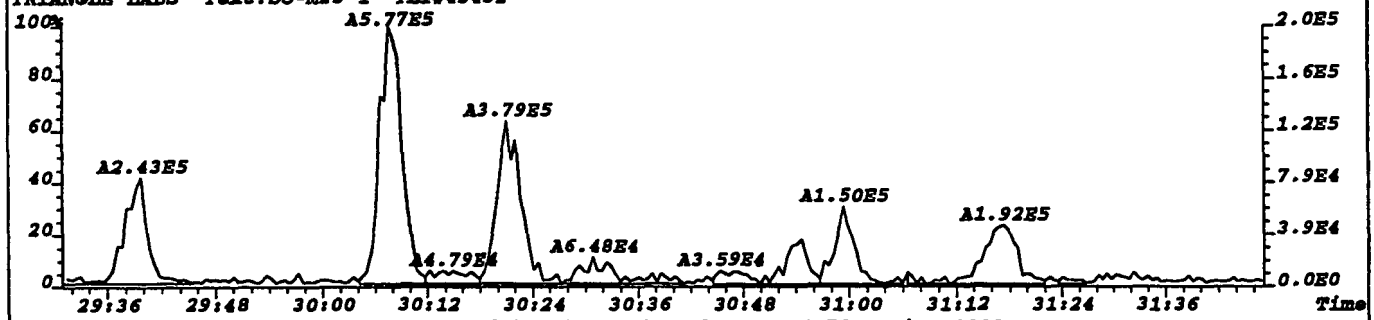
File:U973258 #1-404 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
445.7555 F:3 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



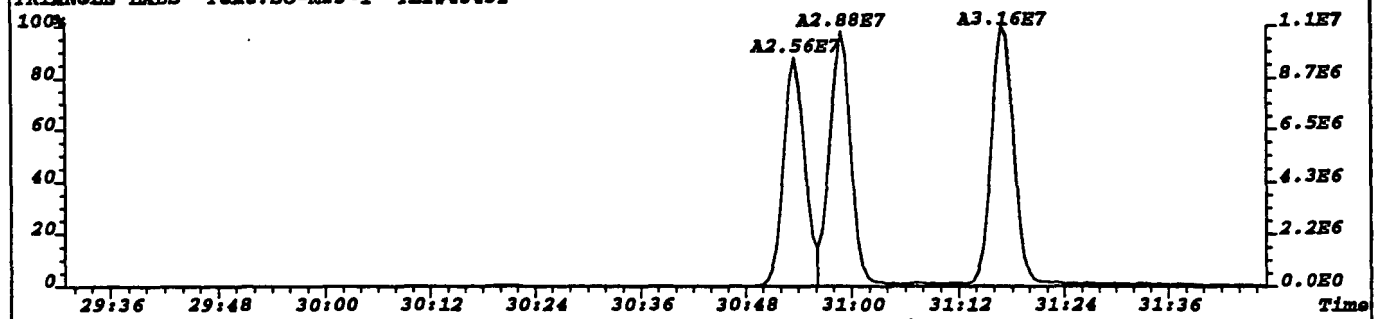
File:U973258 #1-404 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:919
389.8156 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3676.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



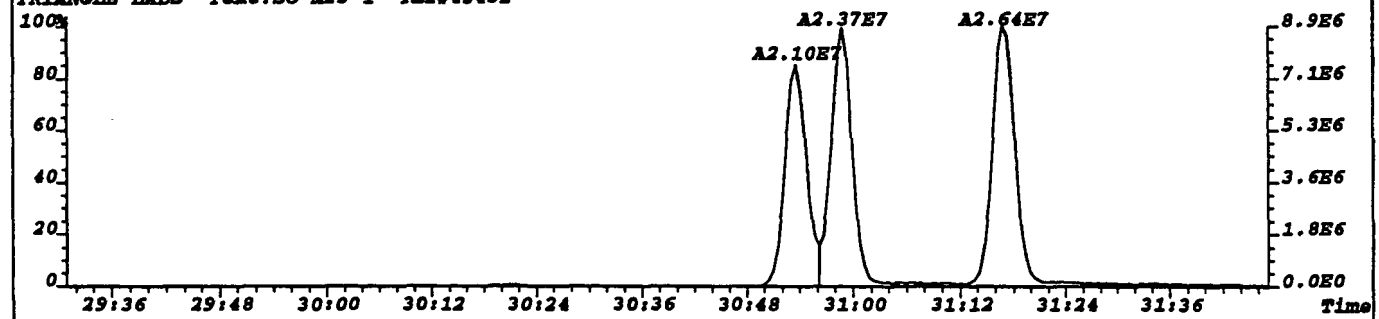
File:U973258 #1-404 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:1478
391.8127 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5912.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



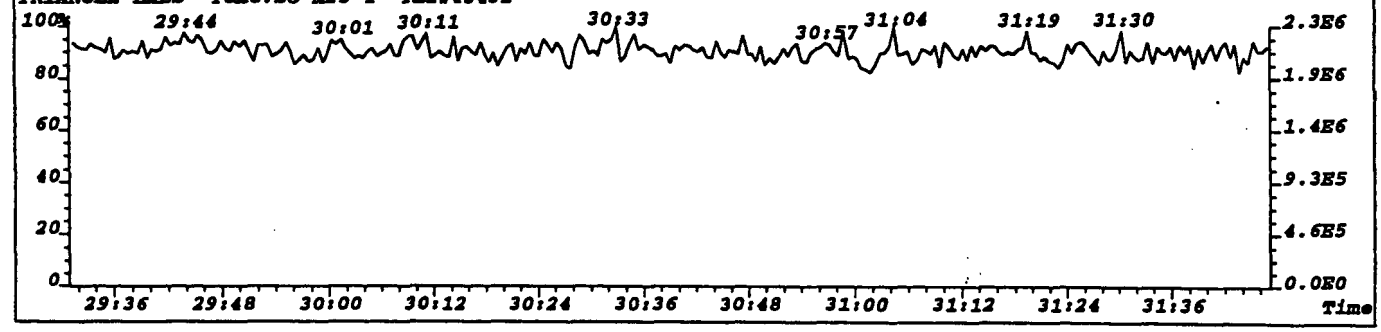
File:U973258 #1-404 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:1008
401.8558 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4032.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



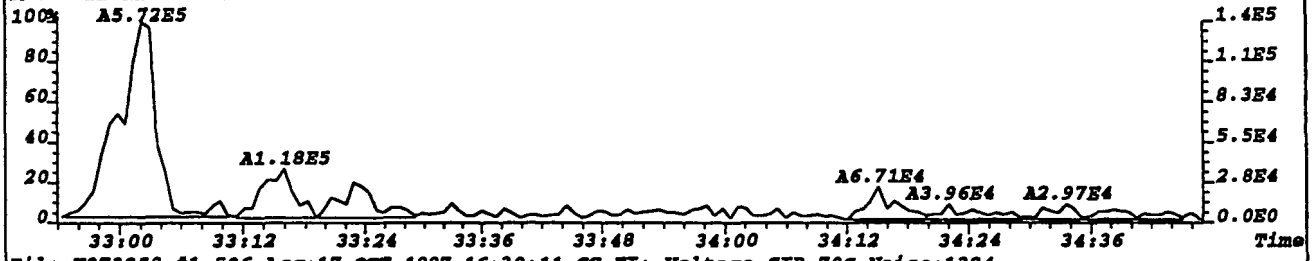
File:U973258 #1-404 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:1477
403.8529 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5908.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



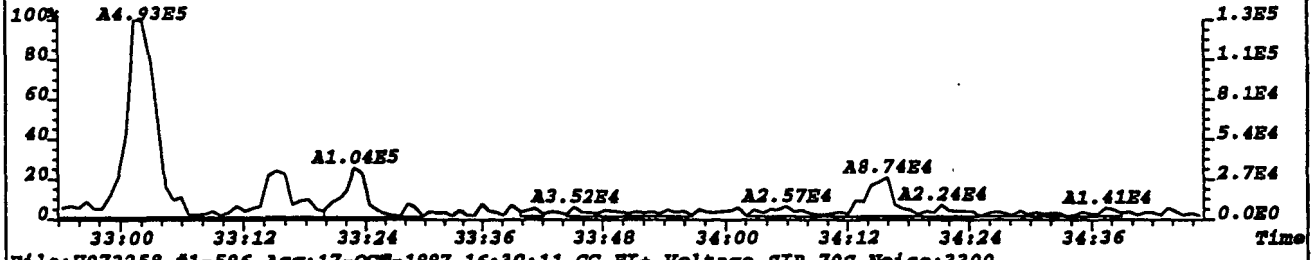
File:U973258 #1-404 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
392.9760 F:3 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



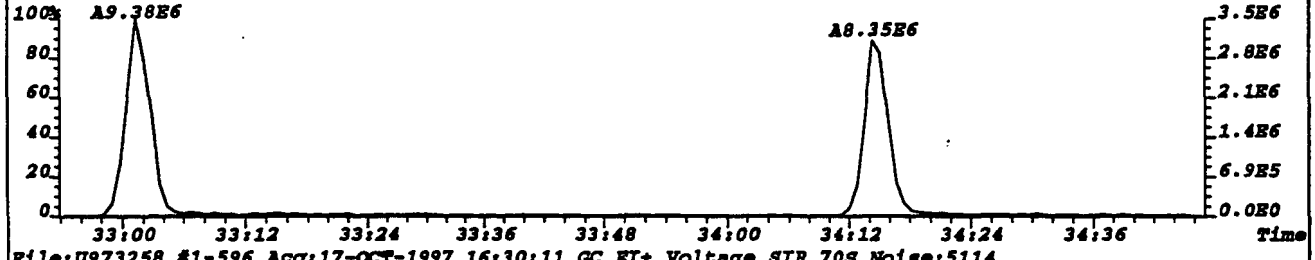
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:1965
407.7818 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7860.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



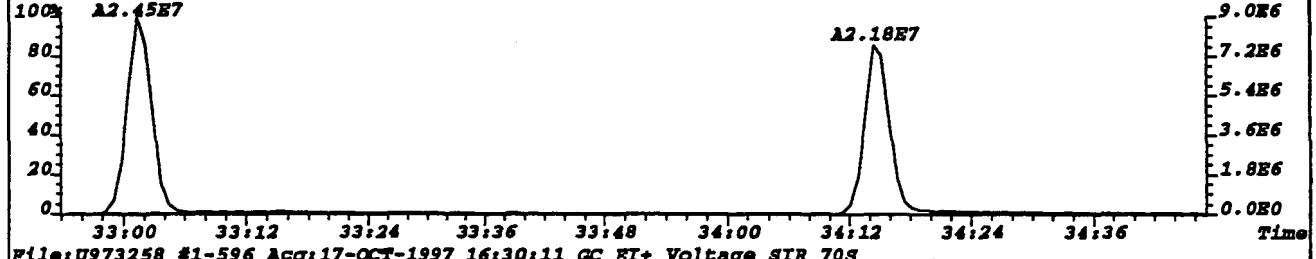
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:1324
409.7789 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5296.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



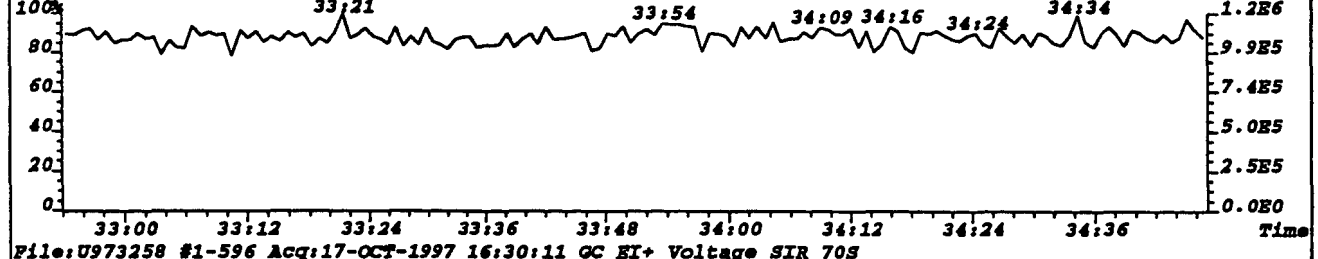
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:3300
417.8253 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,13200.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



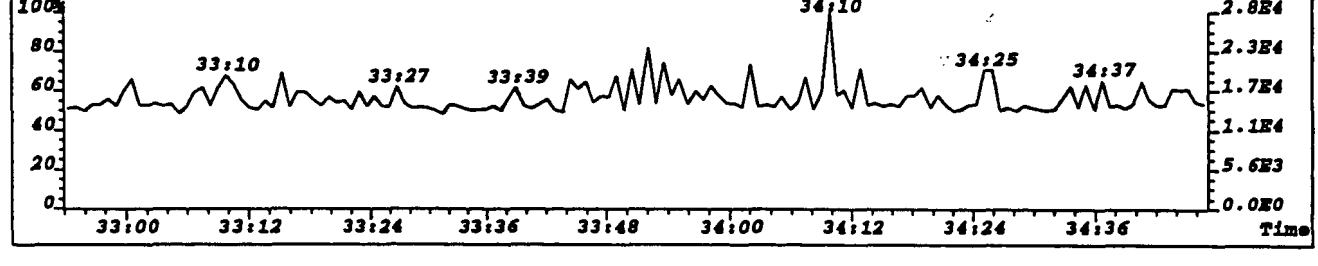
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:5114
419.8220 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,20456.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



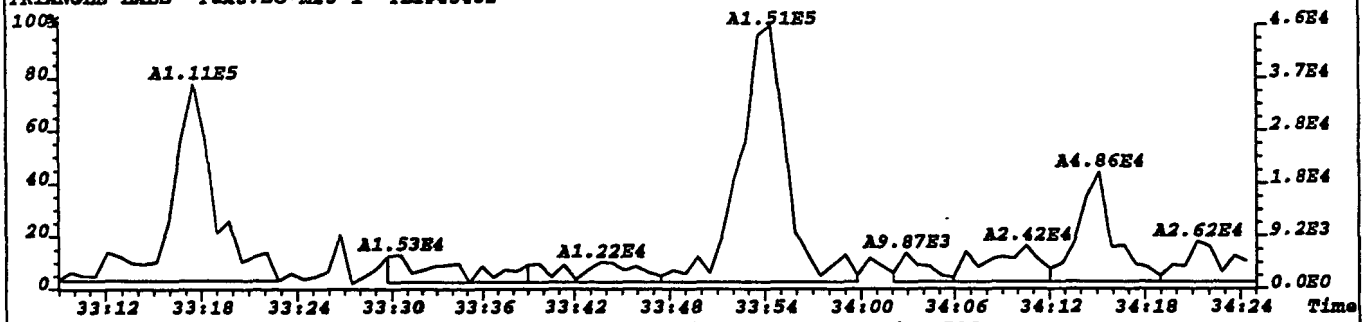
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



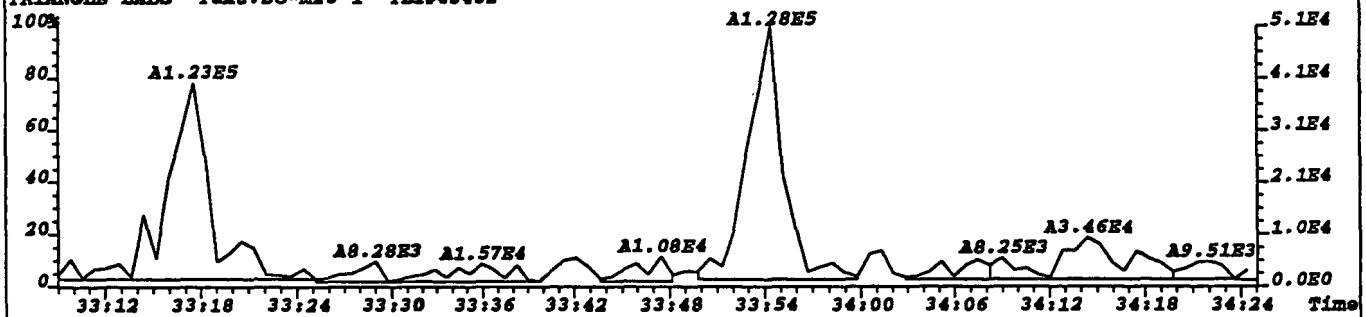
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
479.7165 F:4 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



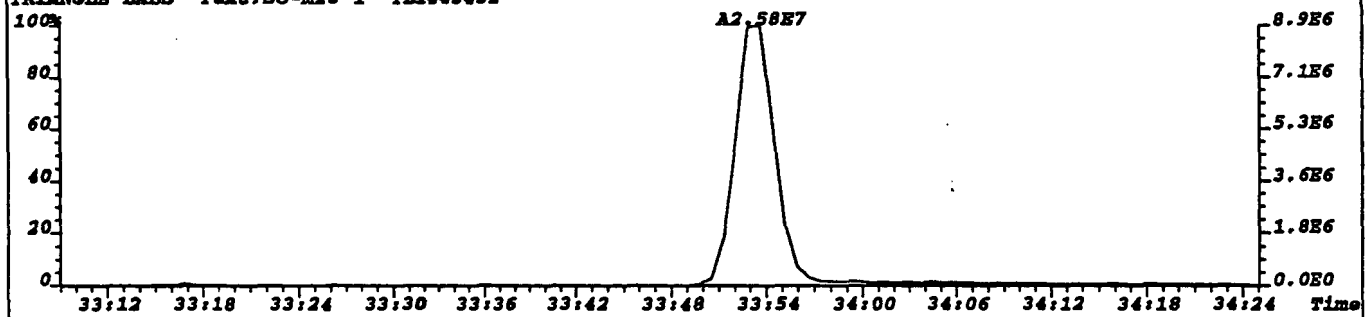
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:914
423.7766 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3656.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



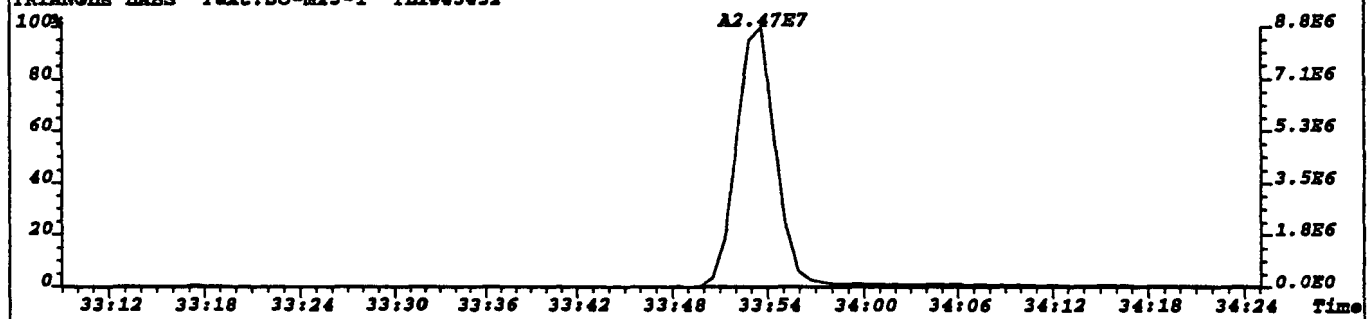
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:735
425.7737 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2940.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



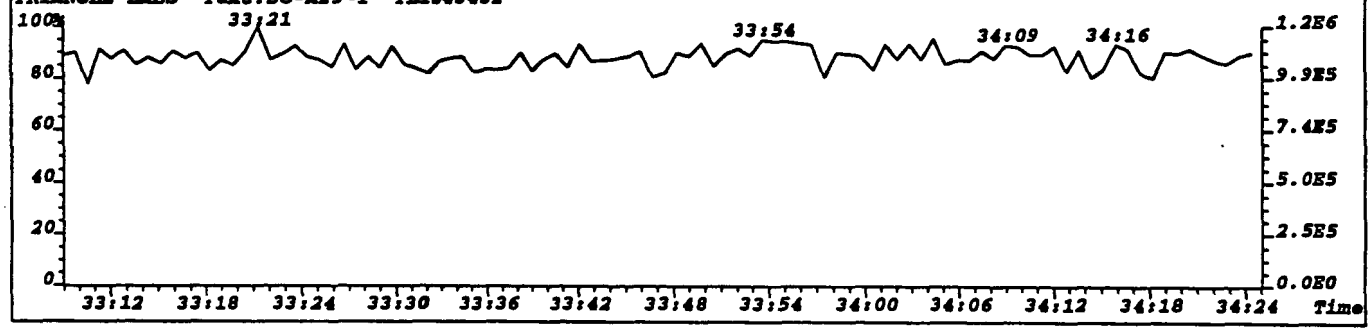
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:3365
435.8169 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,13460.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



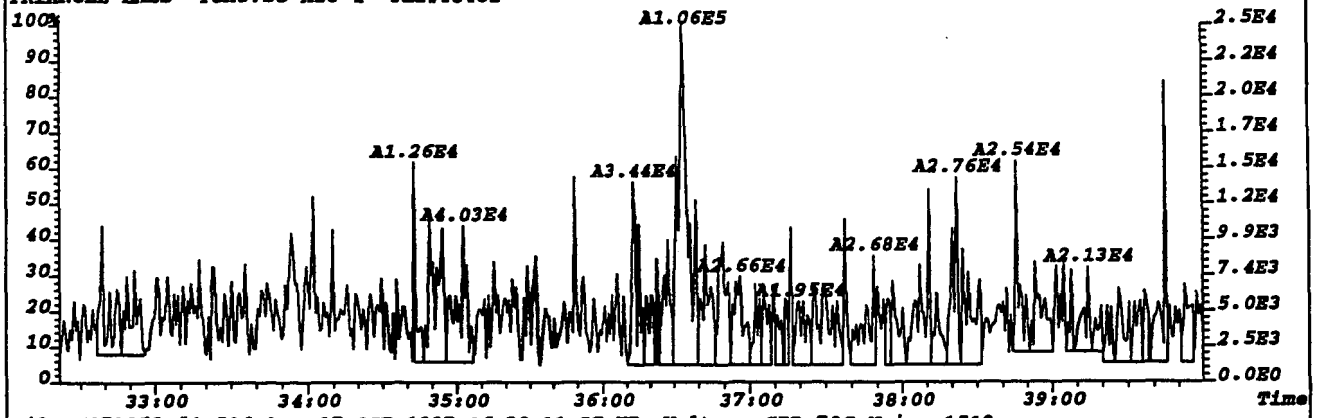
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:2810
437.8140 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,11240.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



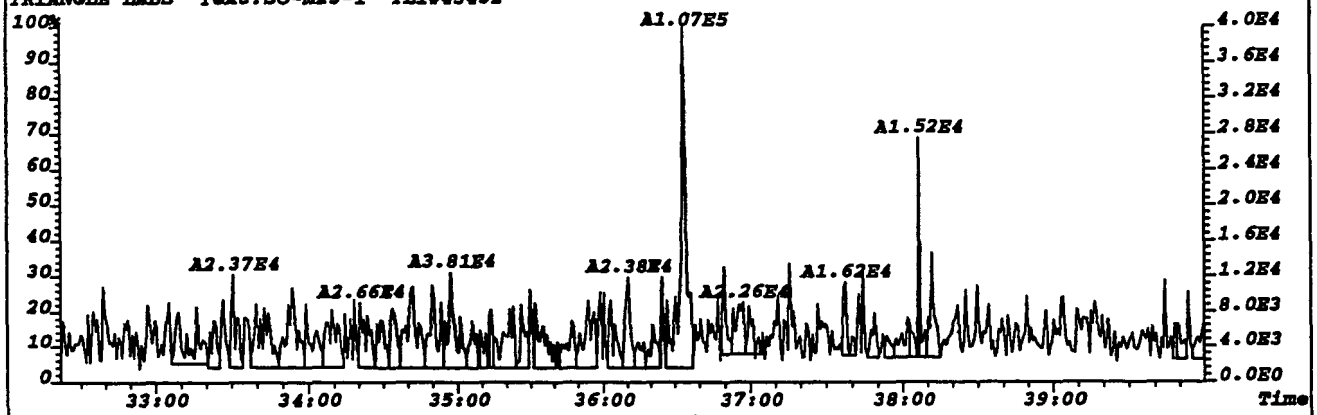
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



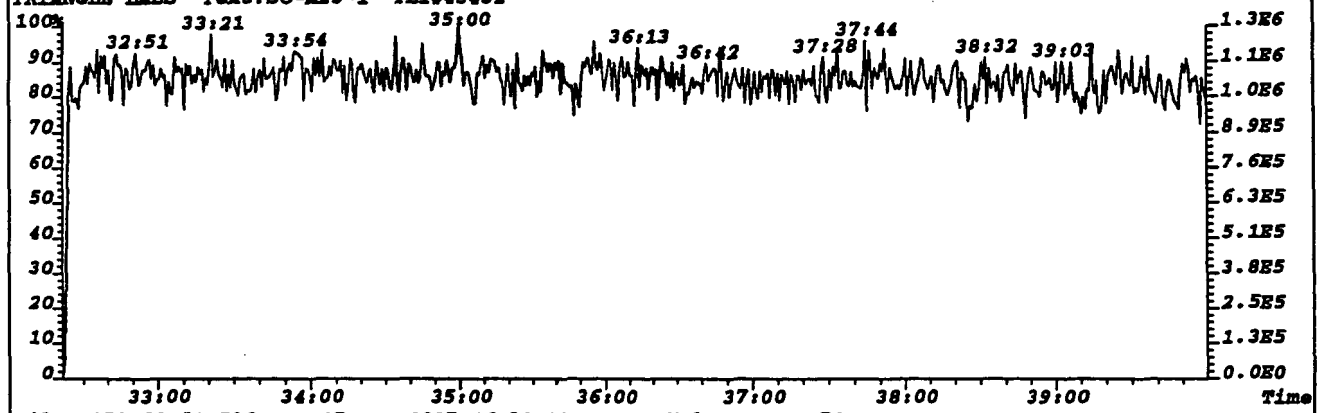
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:1390
441.7428 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5560.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



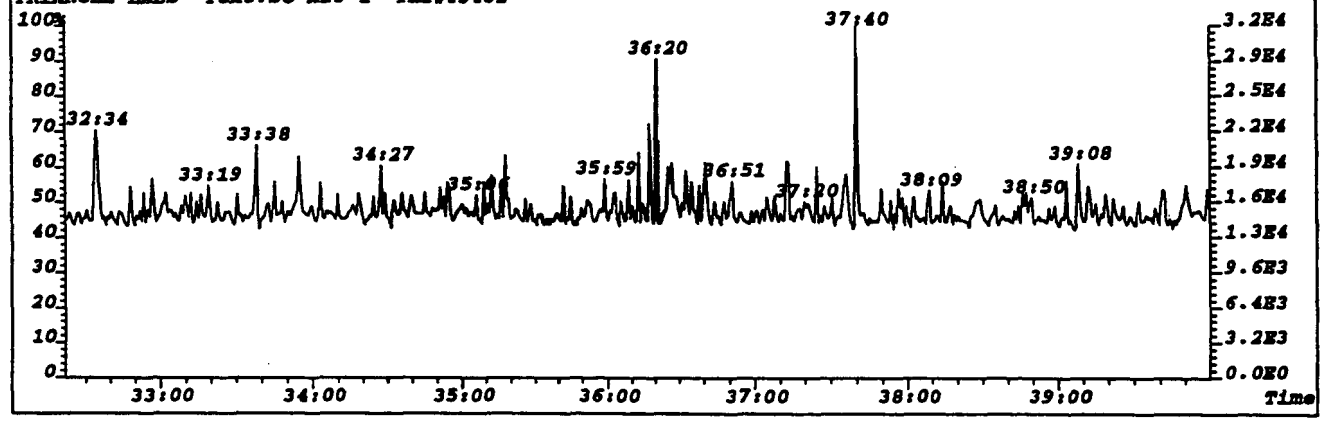
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:1519
443.7399 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6076.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



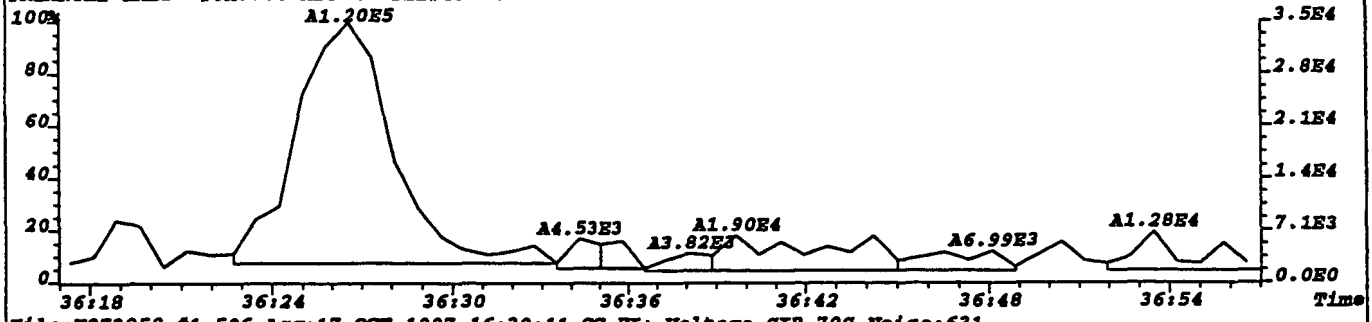
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



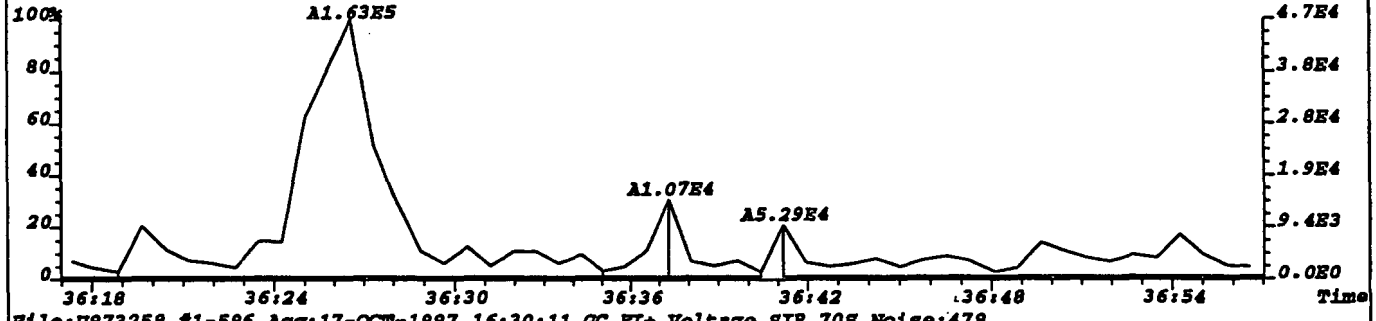
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
513.6775 F:4 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



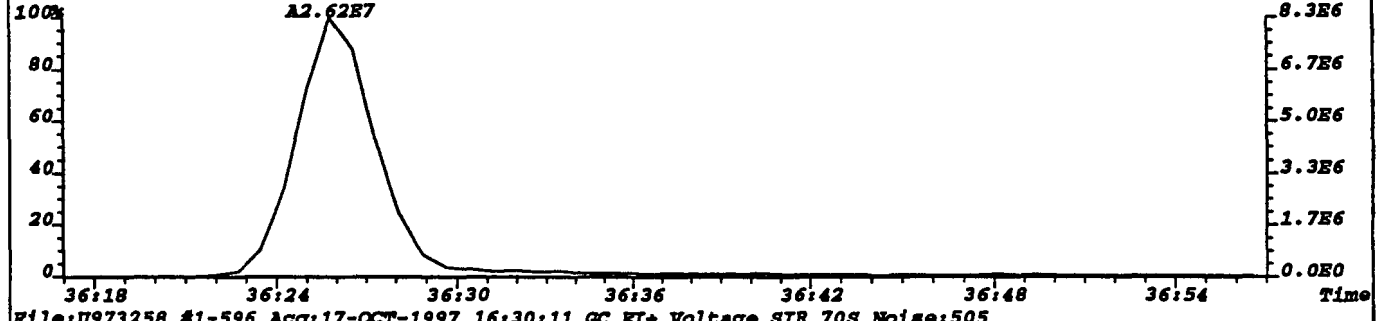
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:1170
457.7377 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4680.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



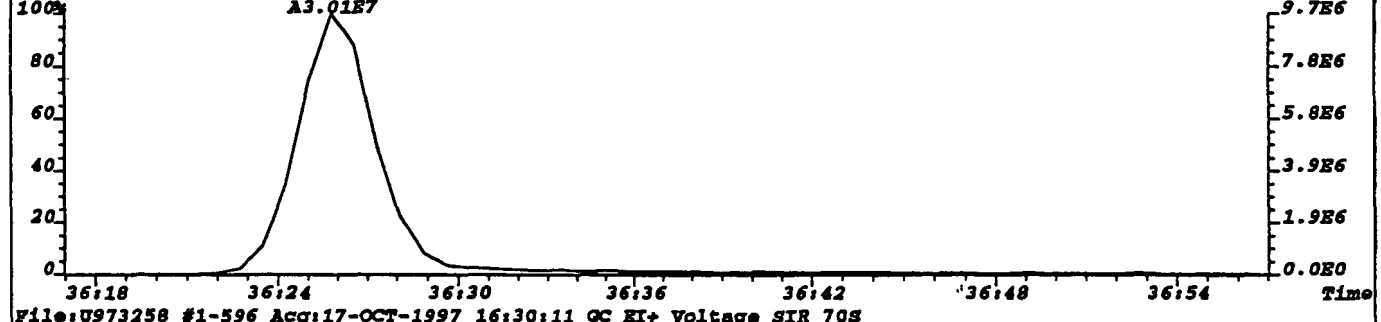
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:631
459.7348 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2524.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



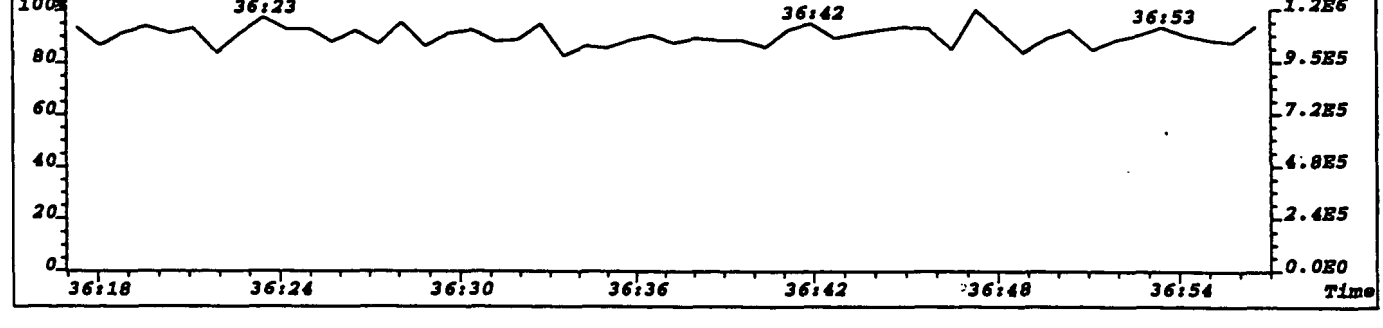
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:479
469.7779 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1916.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432



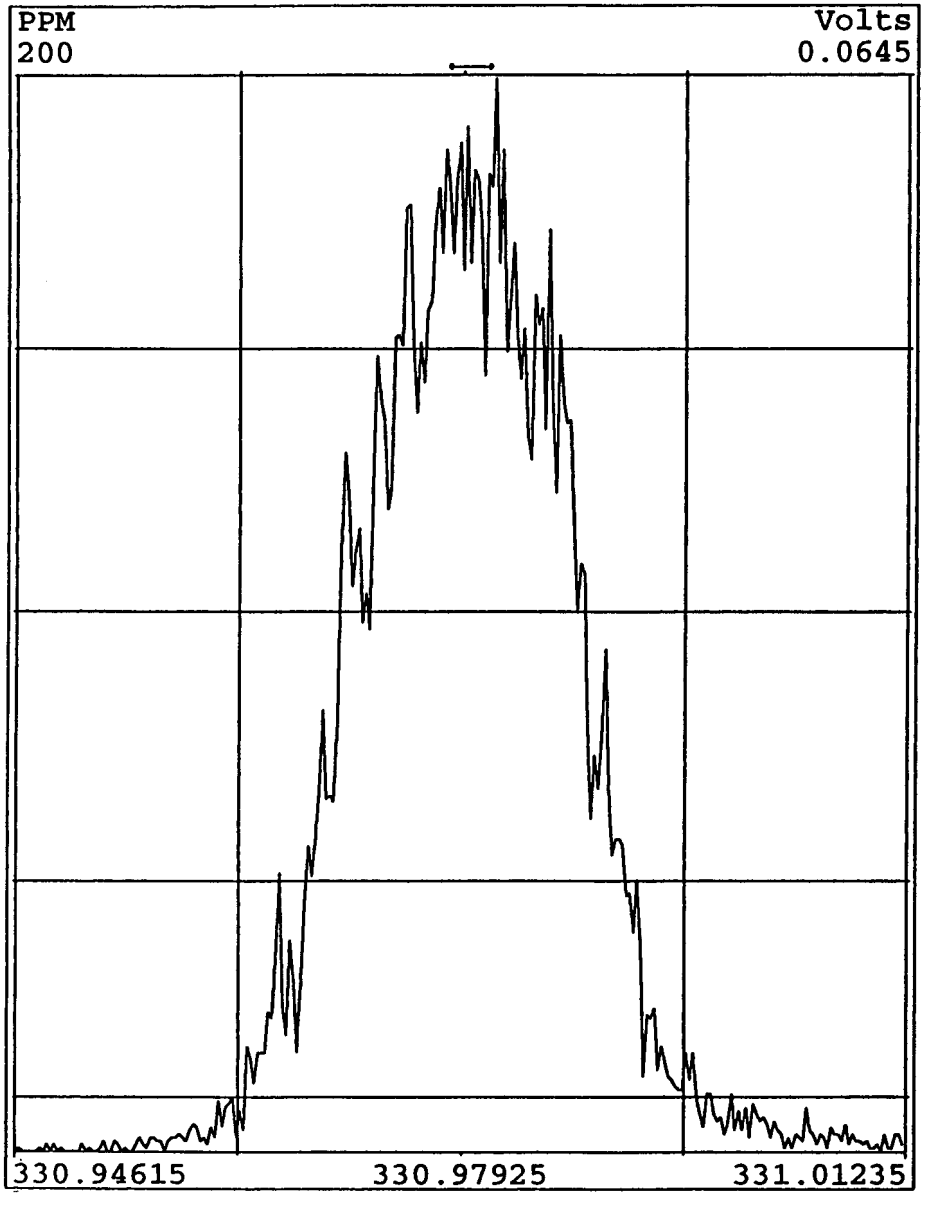
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S Noise:505
471.7750 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2020.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432

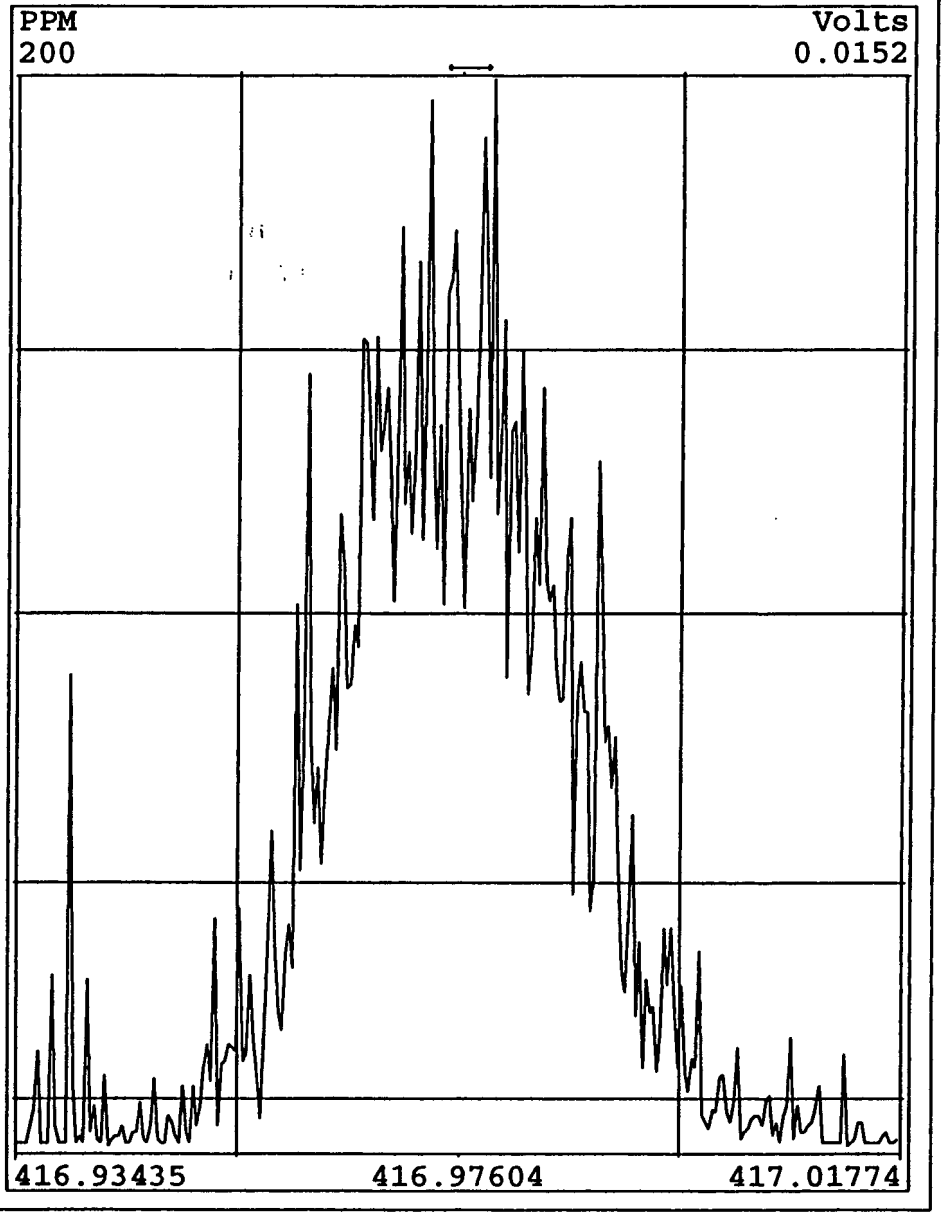


File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-1 TLI#43432

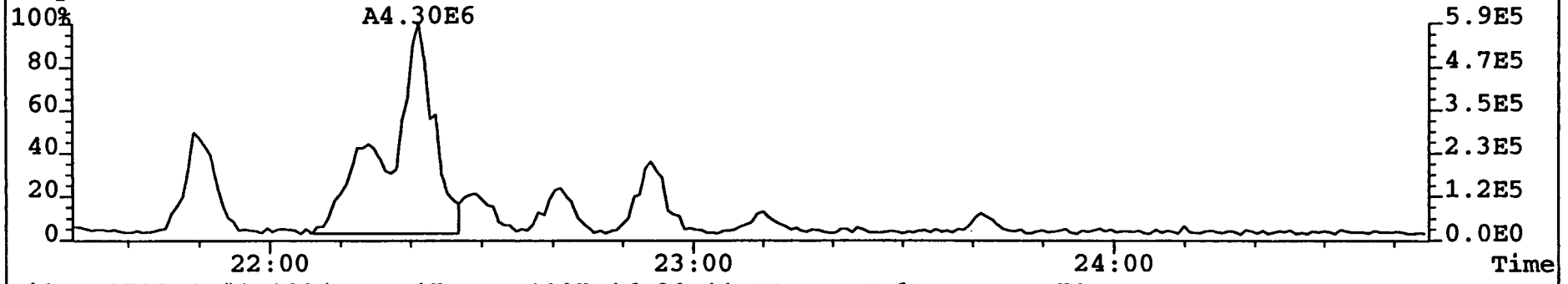


Peak Locate Examination:17-OCT-1997:16:28 File:U973258
Experiment:EPCUS2 Function:2 Reference:PFK

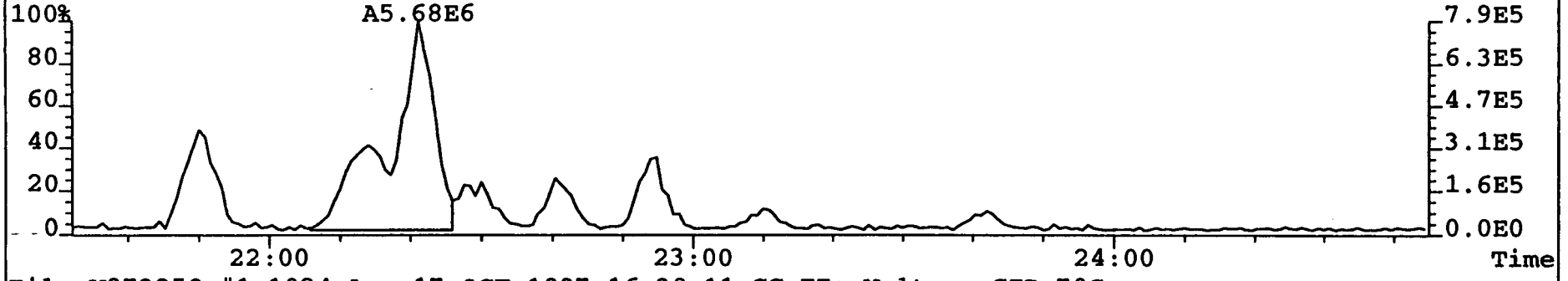




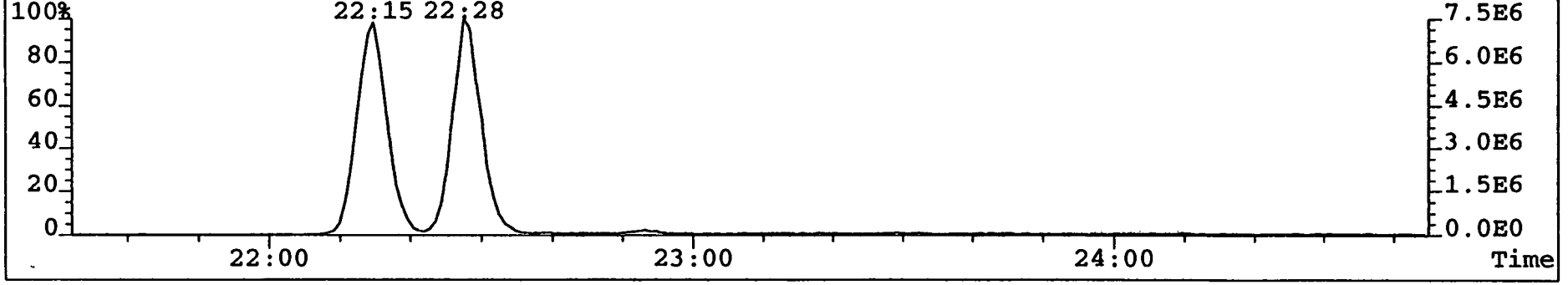
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
319.8965 F:2 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



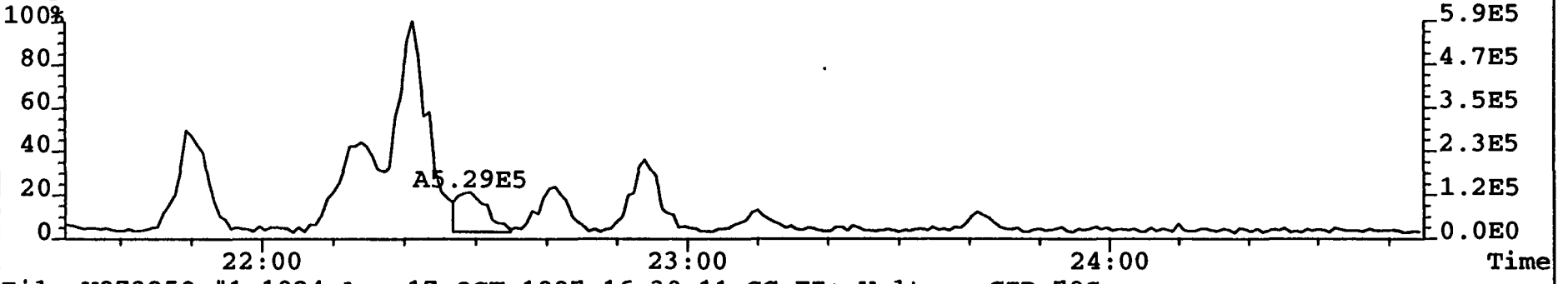
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
321.8936 F:2 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



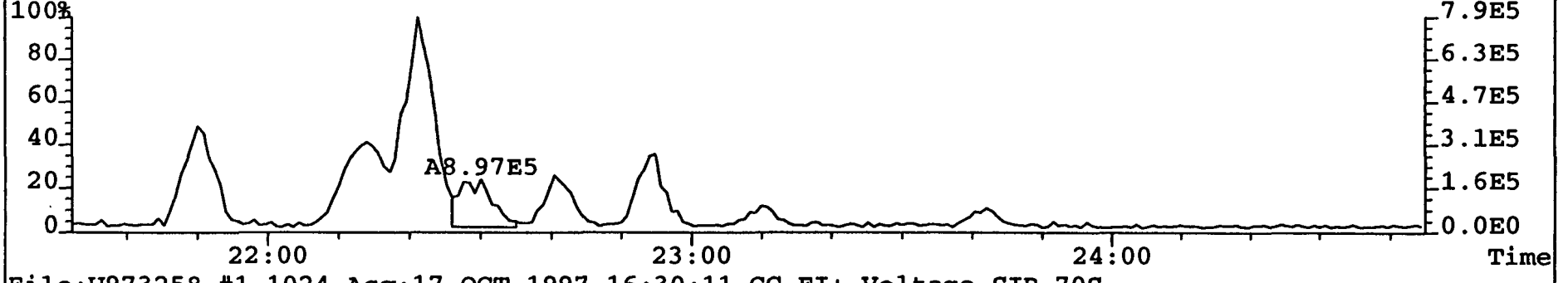
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
331.9368 F:2 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



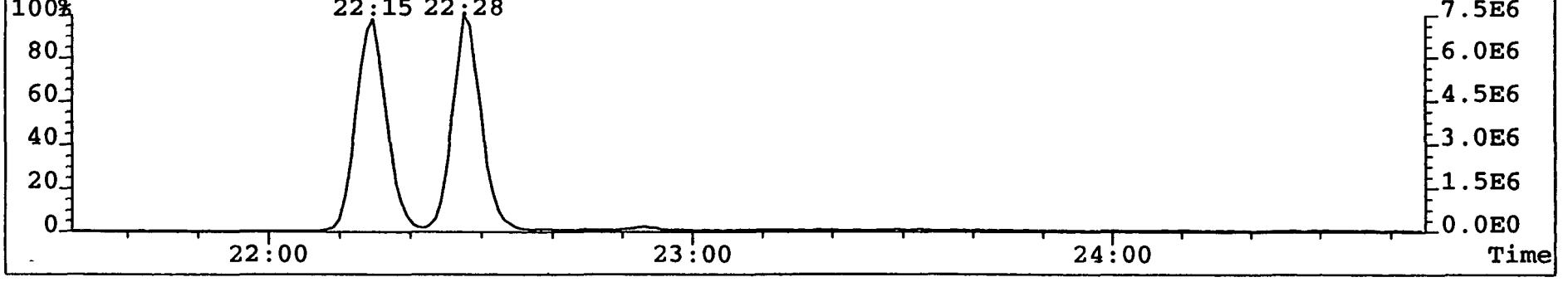
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
319.8965 F:2 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



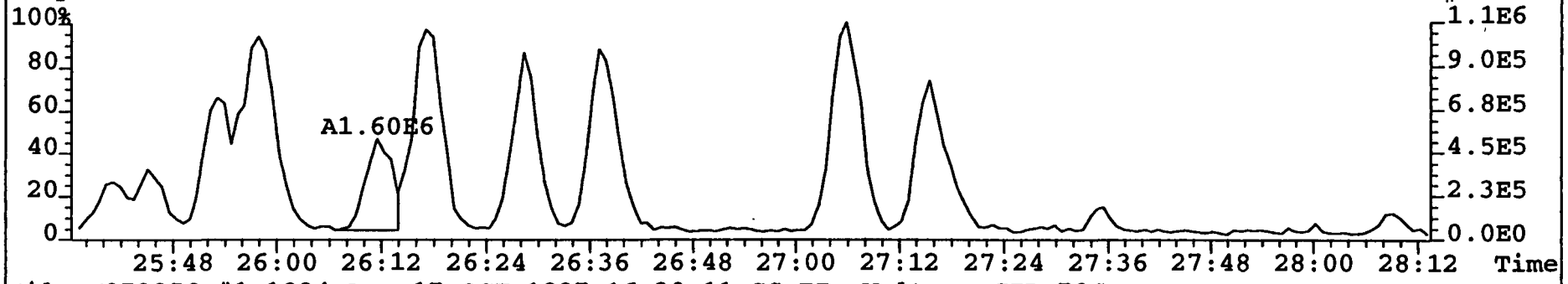
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
321.8936 F:2 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



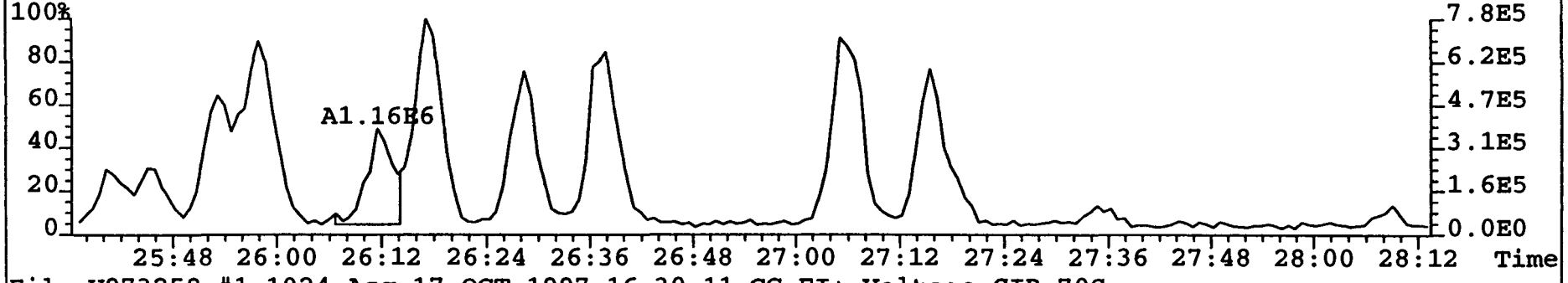
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
331.9368 F:2 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



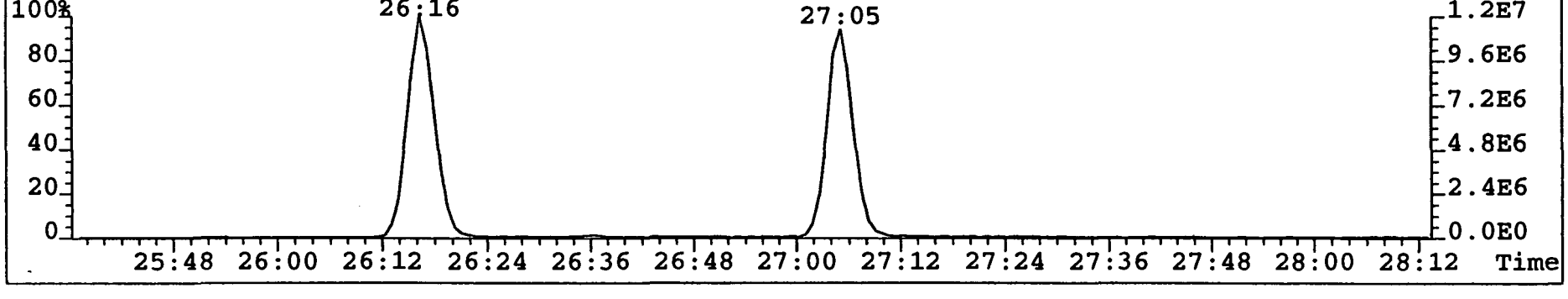
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
339.8597 F:2 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



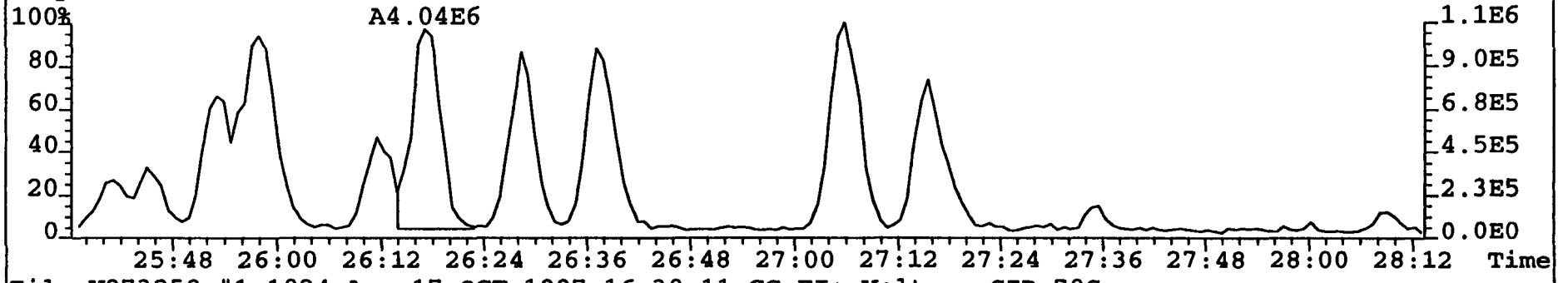
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
341.8567 F:2 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



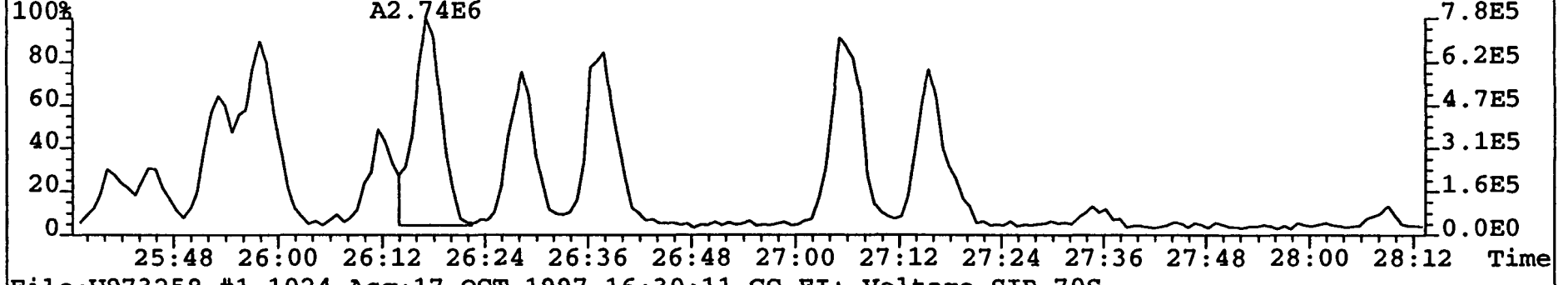
File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
351.9000 F:2 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
339.8597 F:2 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973258 #1-1024 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
341.8567 F:2 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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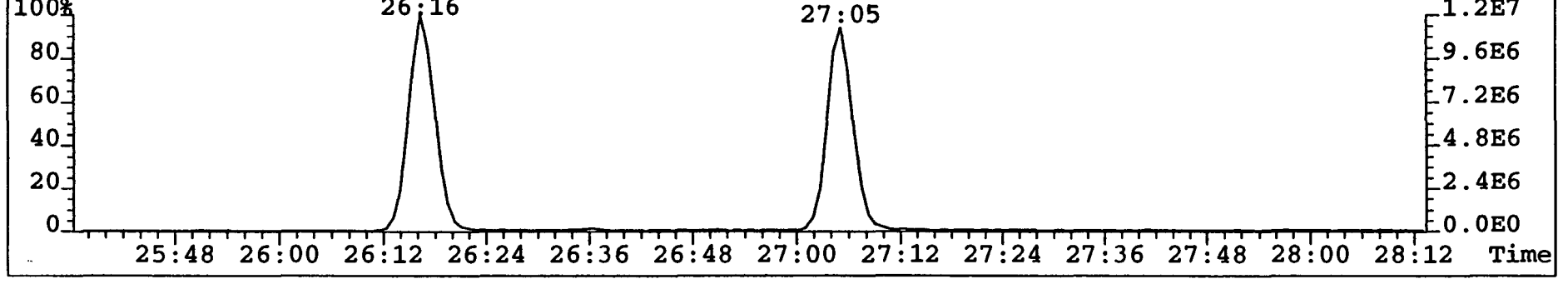
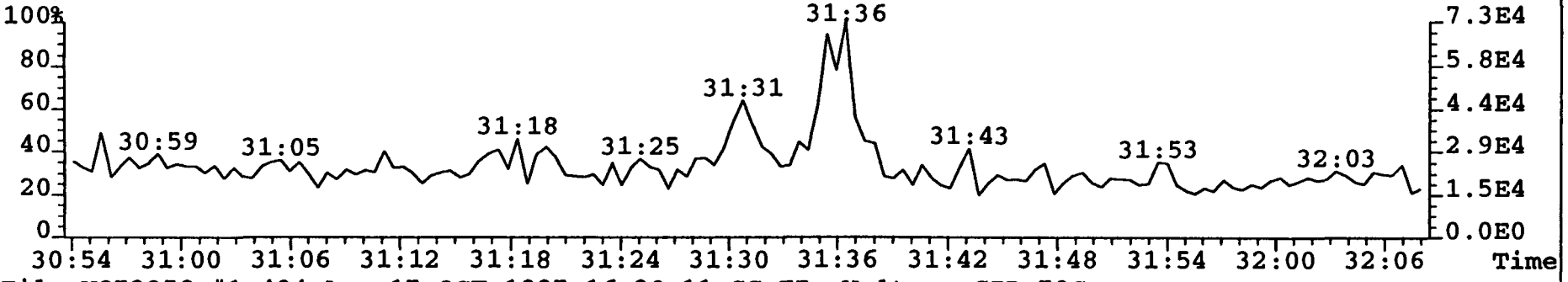
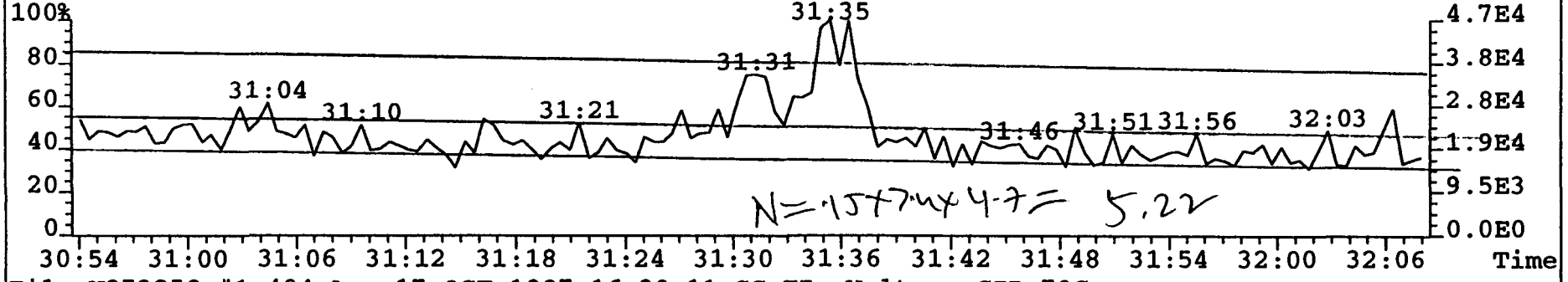
351.9000 F:2 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973258 #1-404 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
373.8208 F:3 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.

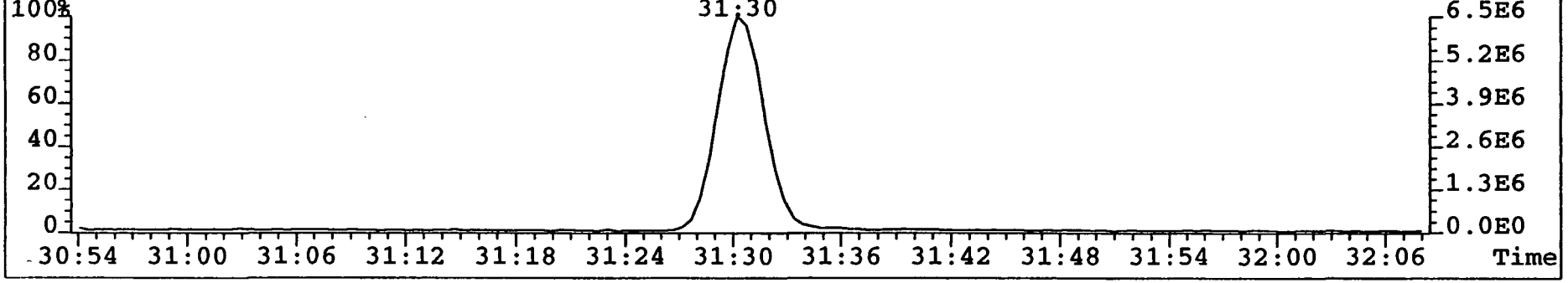


File:U973258 #1-404 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
375.8178 F:3 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



N=157.4/4.7= 5.22

File:U973258 #1-404 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
383.8639 F:3 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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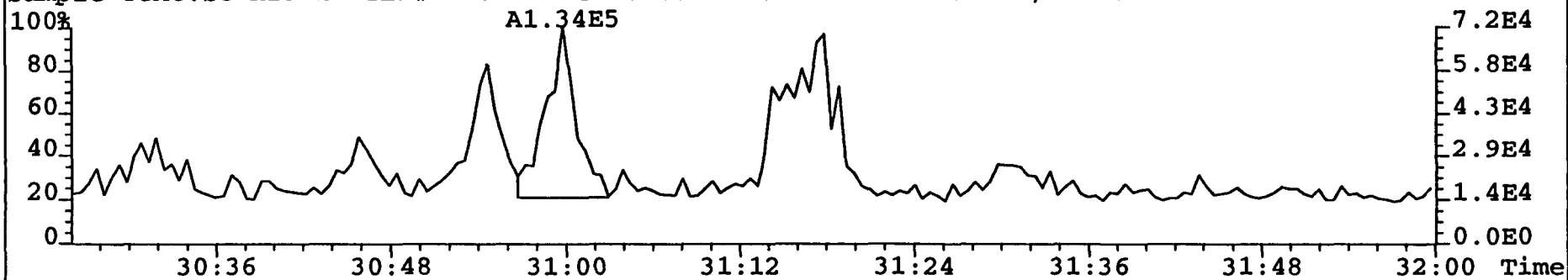
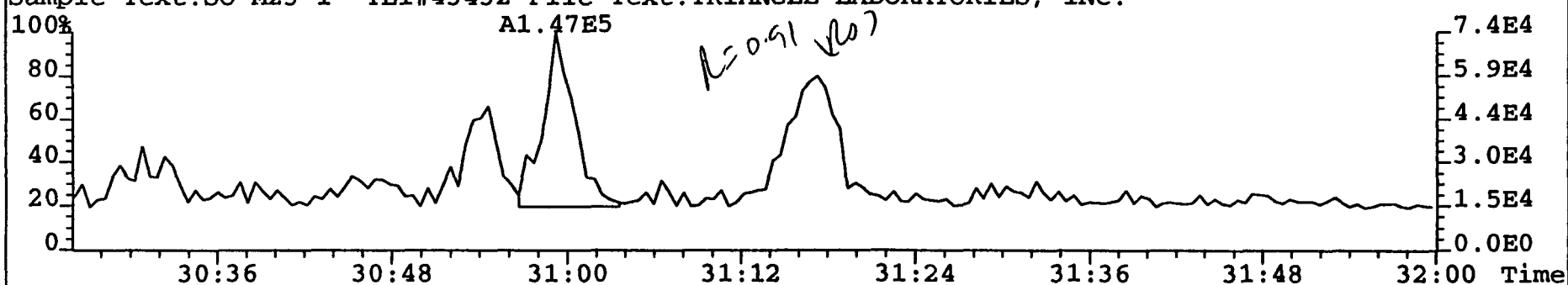
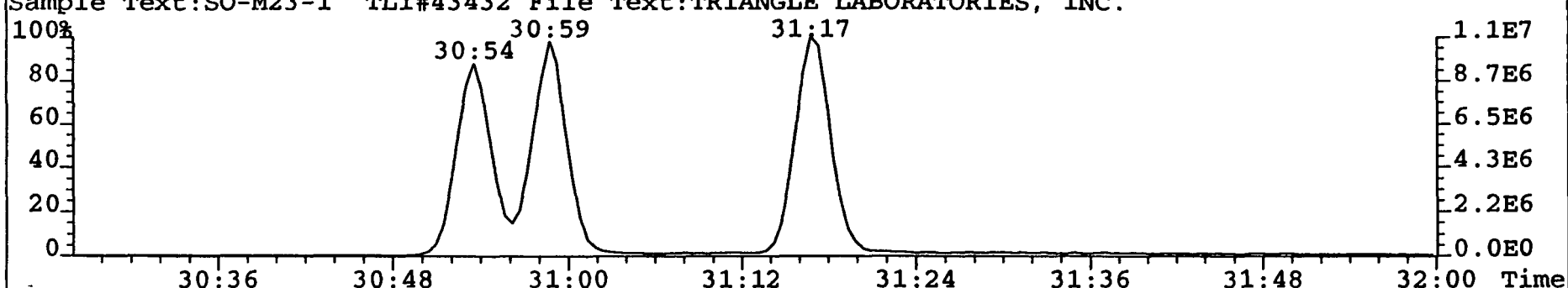
389.8156 F:3 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



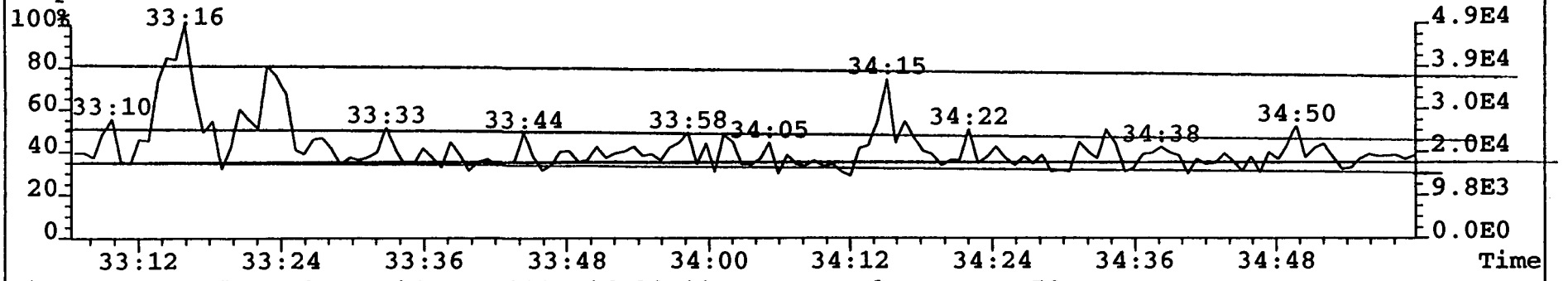
File:U973258 #1-404 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
391.8127 F:3 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



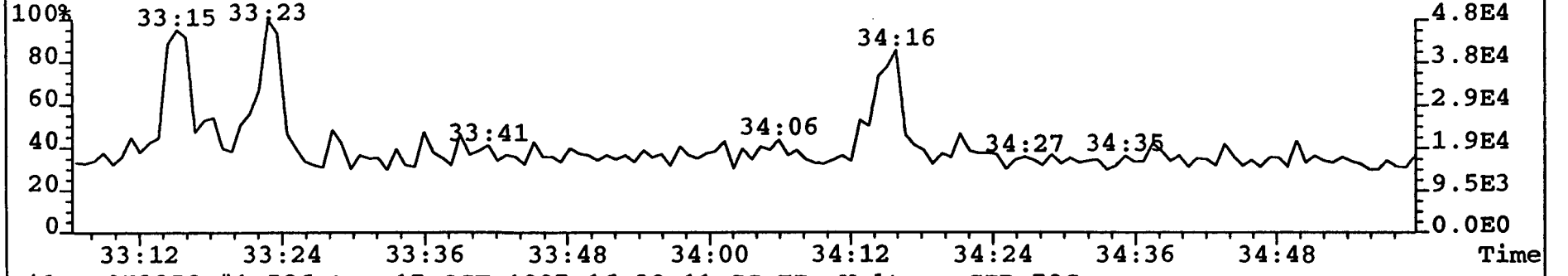
File:U973258 #1-404 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
401.8558 F:3 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



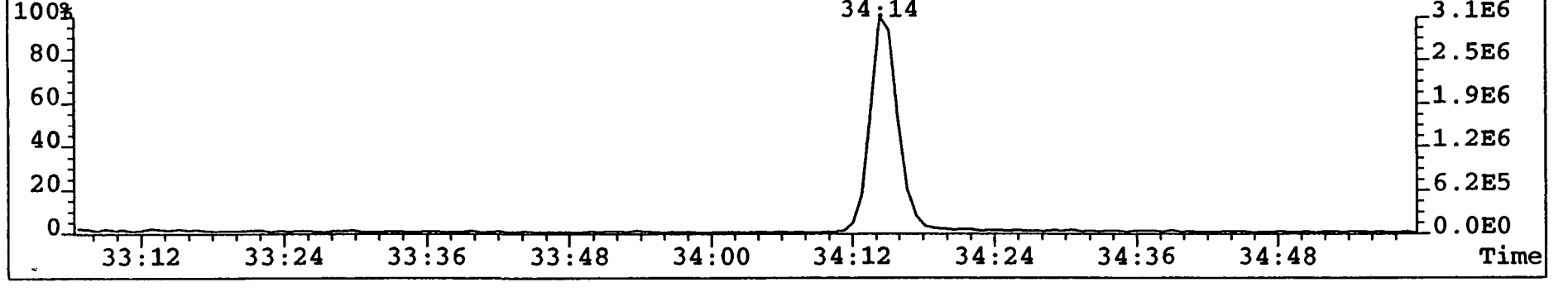
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
407.7818 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



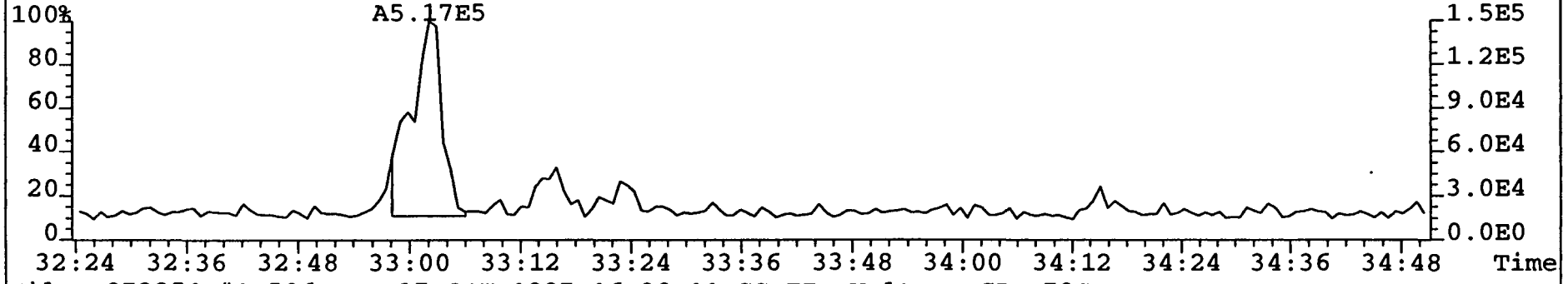
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
409.7789 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



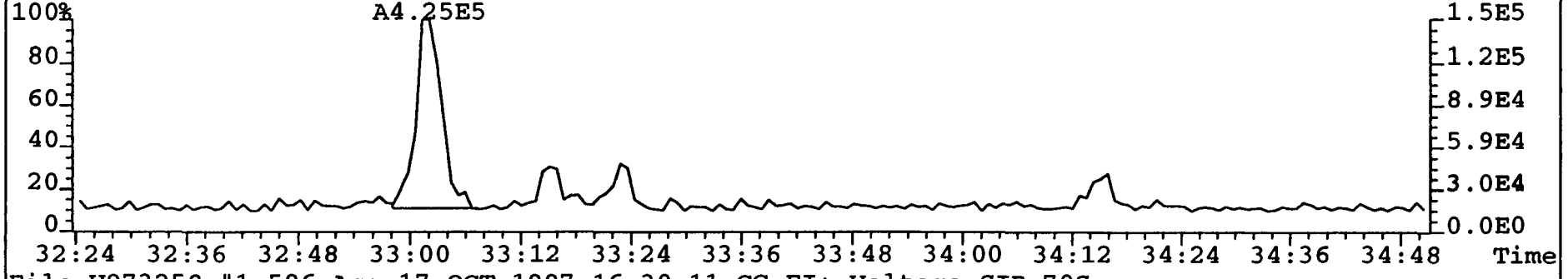
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
417.8253 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



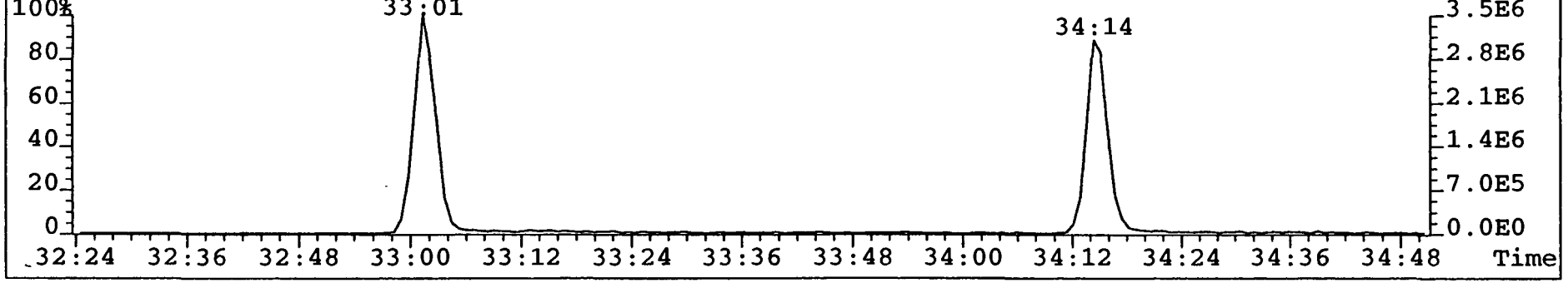
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
407.7818 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



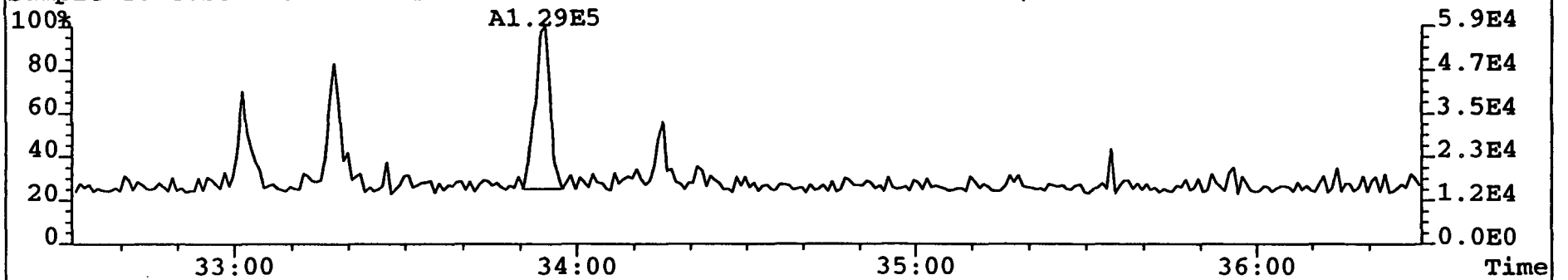
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
409.7789 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



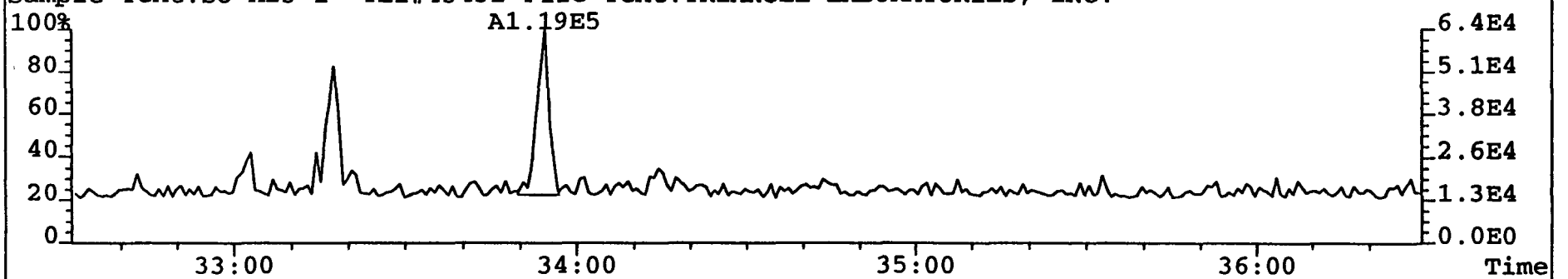
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
417.8253 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



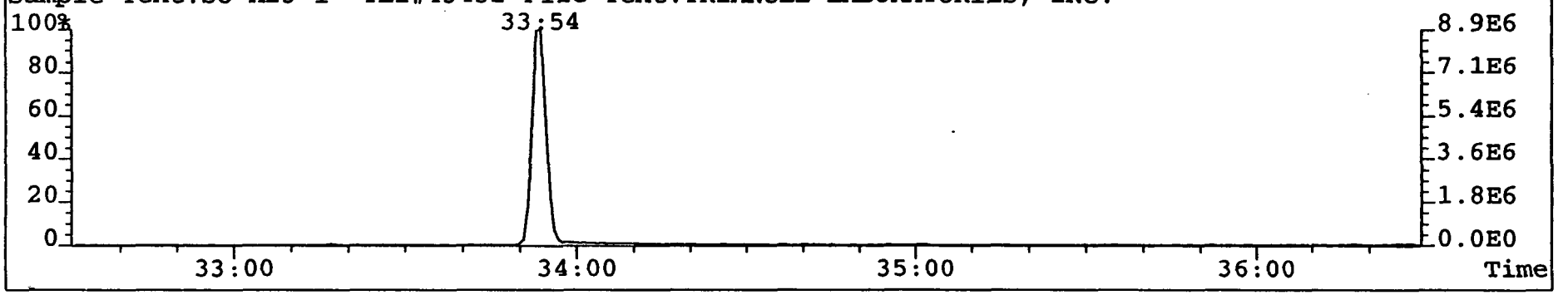
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
423.7766 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



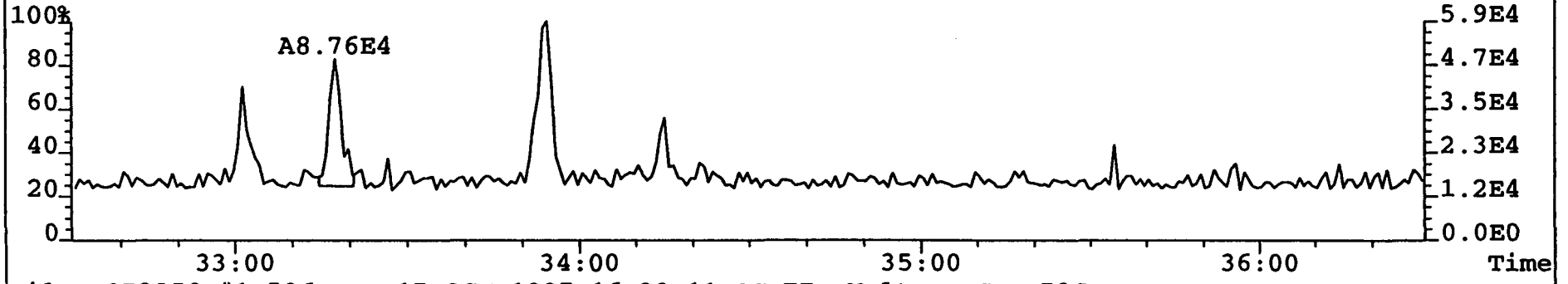
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
425.7737 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



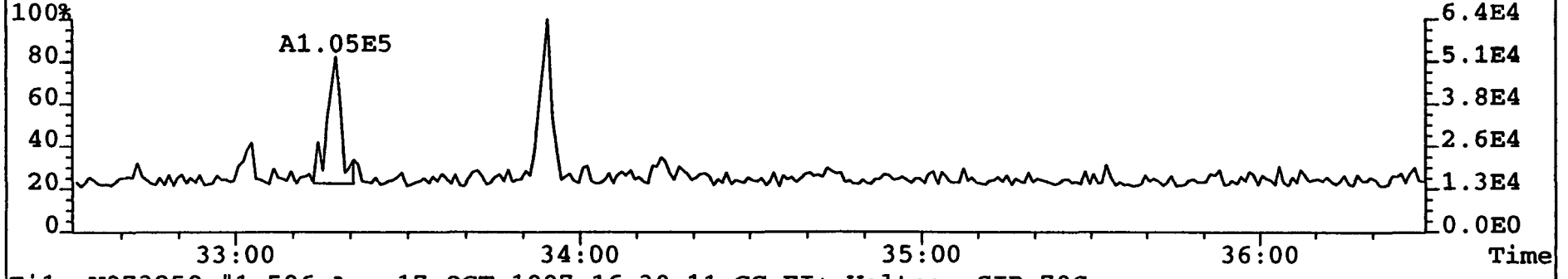
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
435.8169 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



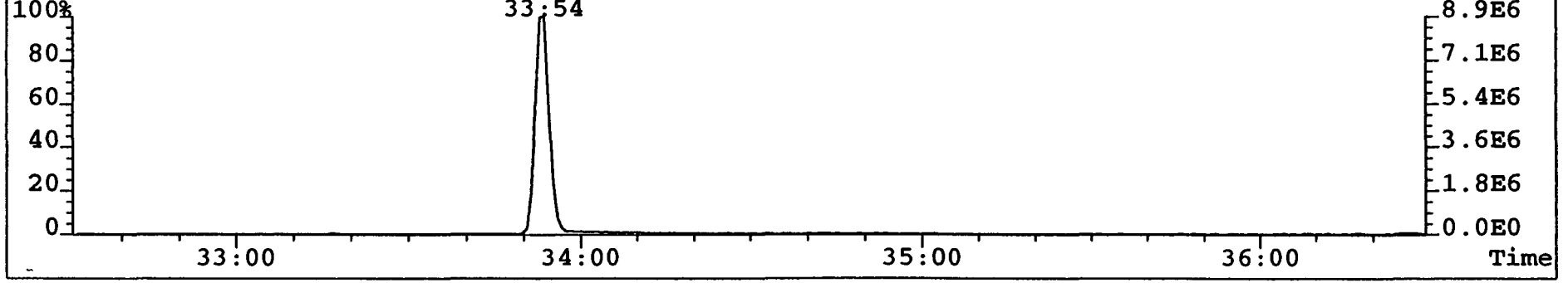
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
423.7766 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



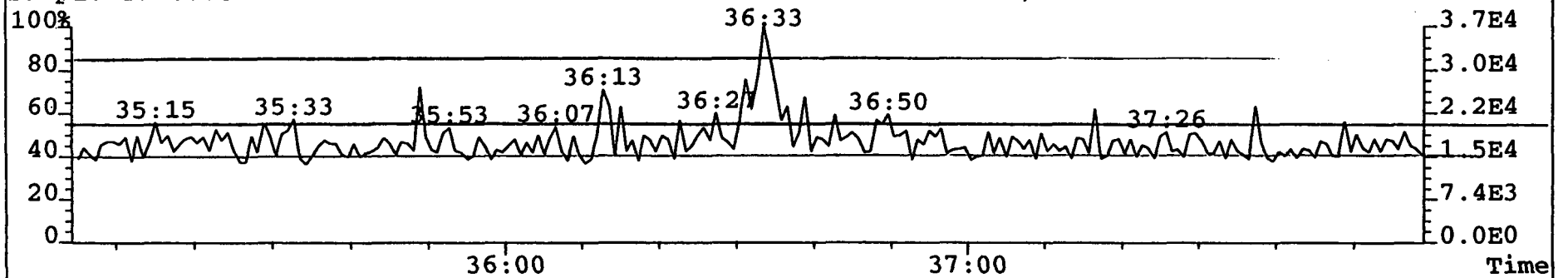
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
425.7737 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



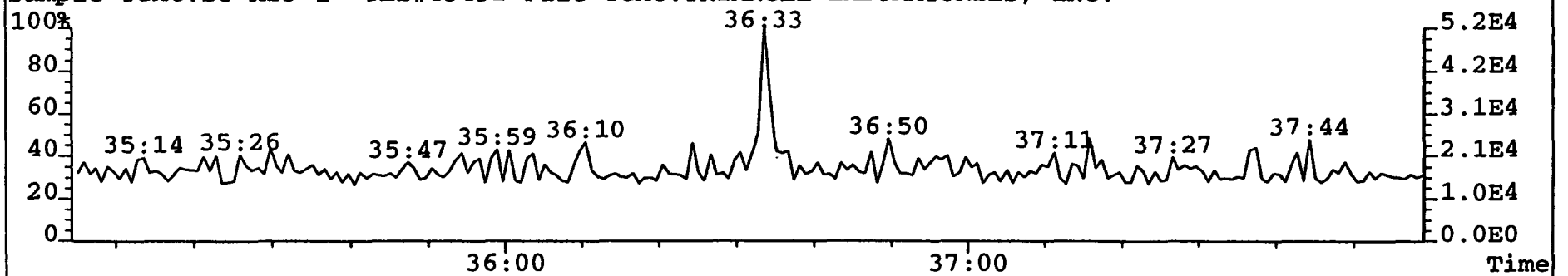
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
435.8169 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



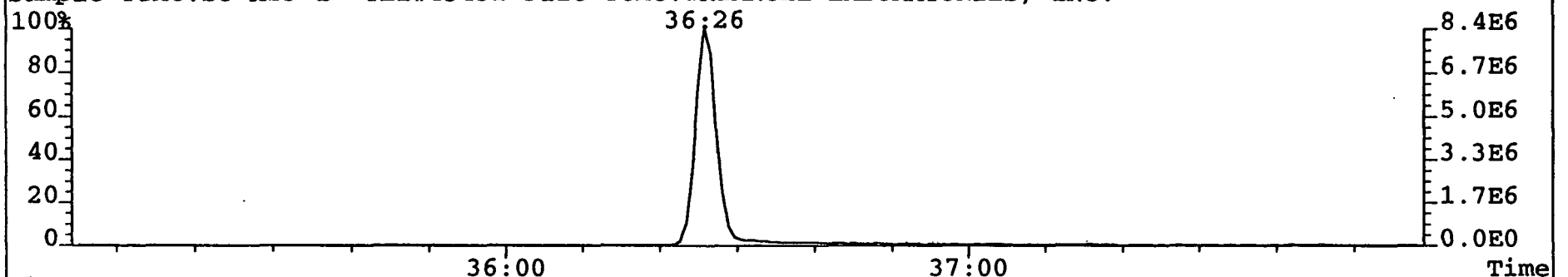
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
441.7428 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



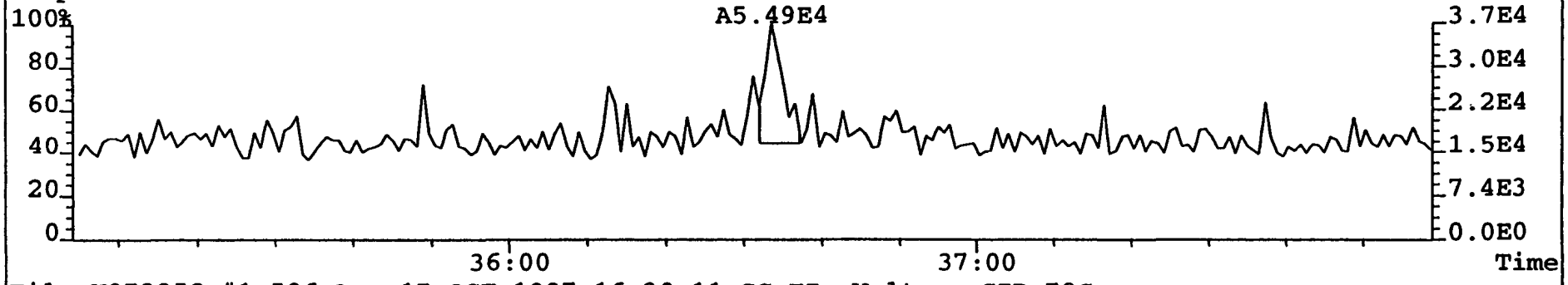
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
443.7399 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



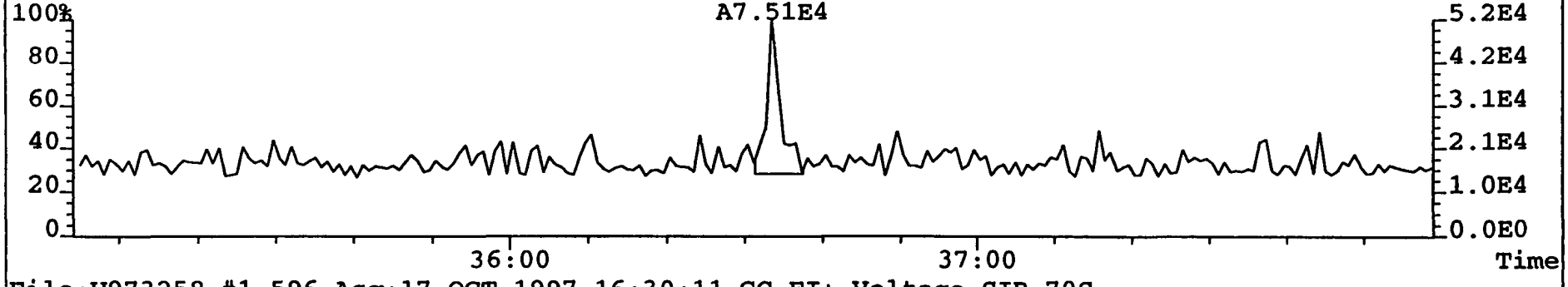
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
469.7779 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



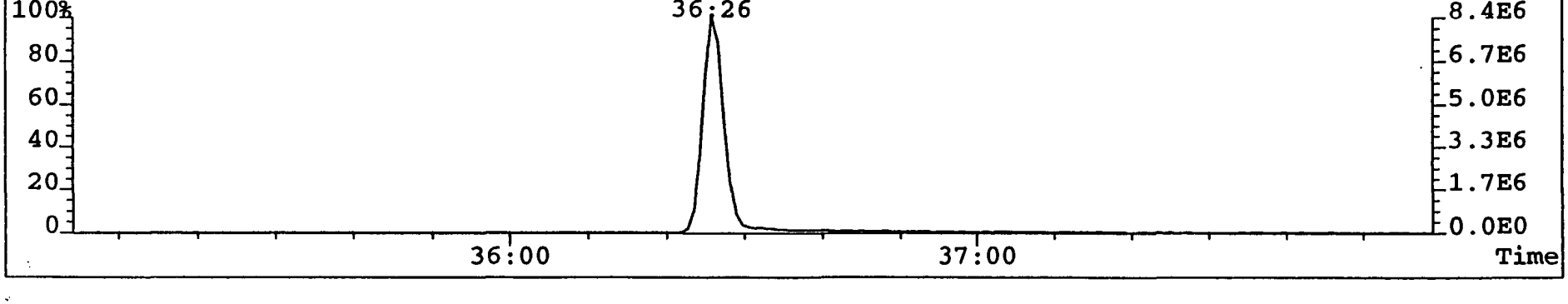
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
441.7428 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



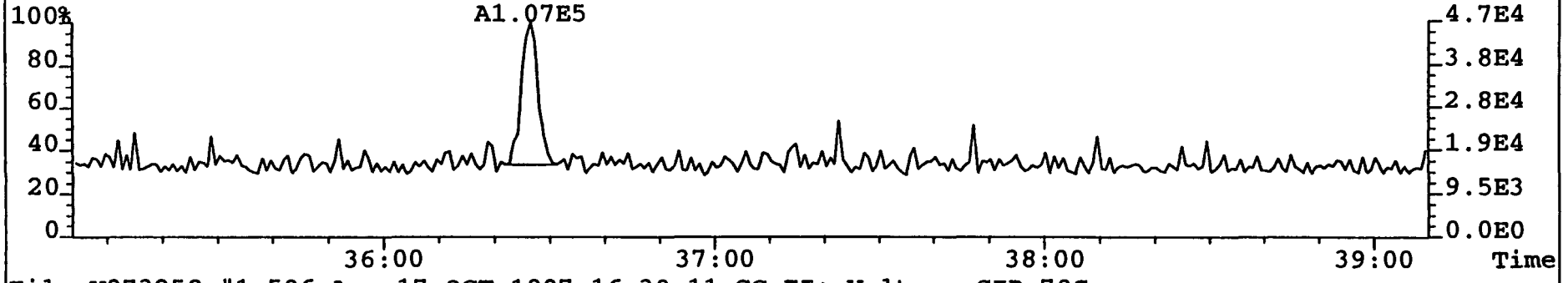
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
443.7399 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



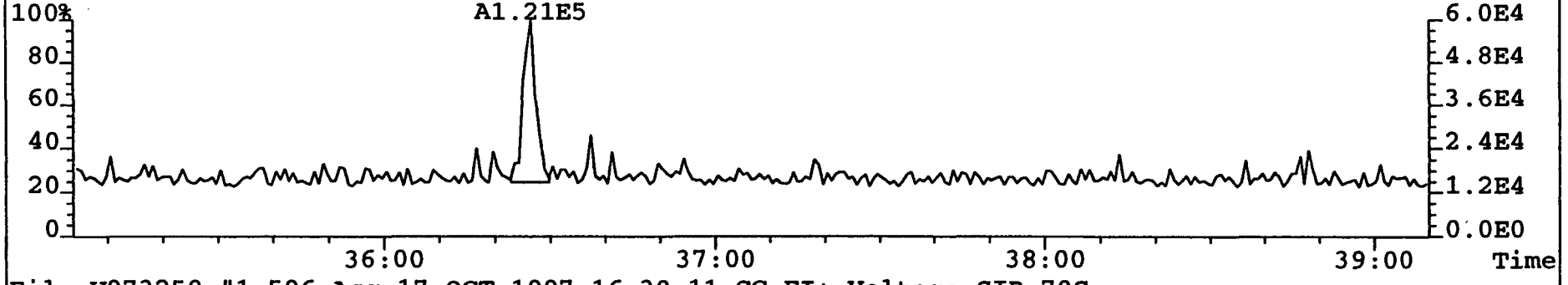
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
469.7779 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



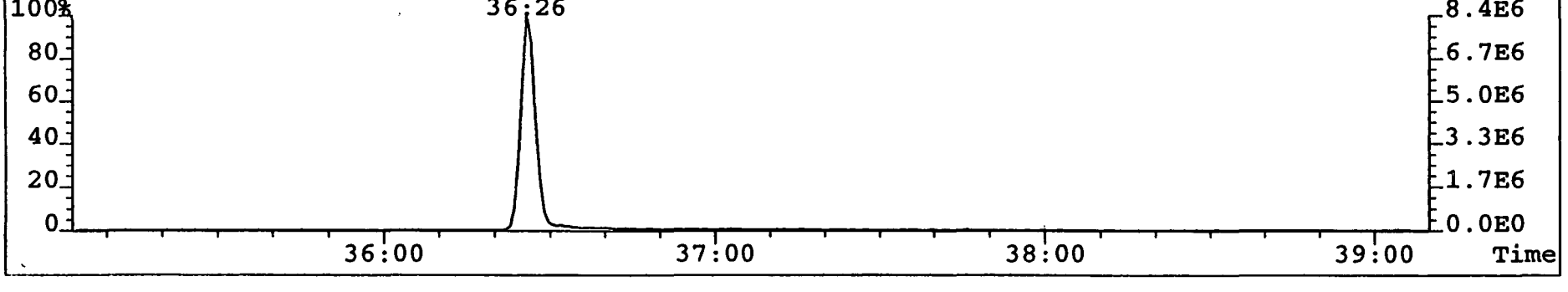
File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
457.7377 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
459.7348 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973258 #1-596 Acq:17-OCT-1997 16:30:11 GC EI+ Voltage SIR 70S
469.7779 F:4 Exp:EPCUS2
Sample Text:SO-M23-1 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



Pacific Environmental Services

TLI Project: **43432** Method 23 TCDD/TCDF Analysis (DB-225)
Client Sample: **SO-23-1** Analysis File: **X973636**

Client Project:	**Saginaw, MI**				
Sample Matrix:	**M23TRAIN**	Date Received:	**09/29/97**	Spike File:	**SPC2NF04**
TLI ID:	**185-6-1A-D**	Date Extracted:	**10/09/97**	ICal:	**XF24087**
		Date Analyzed:	**10/18/97**	ConCal:	**X973633**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U973257**	% Lipid:	**n/a**
GC Column:	**DB-225**	Analyst:	**WK**	% Solids:	**n/a**

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDF	0.72			0.81	24:33	—

Internal Standard	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	3.8	95.4	40%-130%	0.81	24:32	—

Recovery Standard	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.85	23:20	—

Data Reviewer: VC 10/23/97

C2NF_PSR v2.00, LARS 6.10.04

Triangle Laboratories, Inc.®
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Printed: 23:34 10/23/97

Initial ....Date...

Data Review By: VC 10/21/97 Calculated Noise Area: n/a

The Total Area for each peak with an ion abundance ratio outside ratio limits has been recalculated according to method requirements.

Page No. 1 Listing of X973636B.dbf
10/21/97 Matched GC Peaks / Ratio / Ret. Time

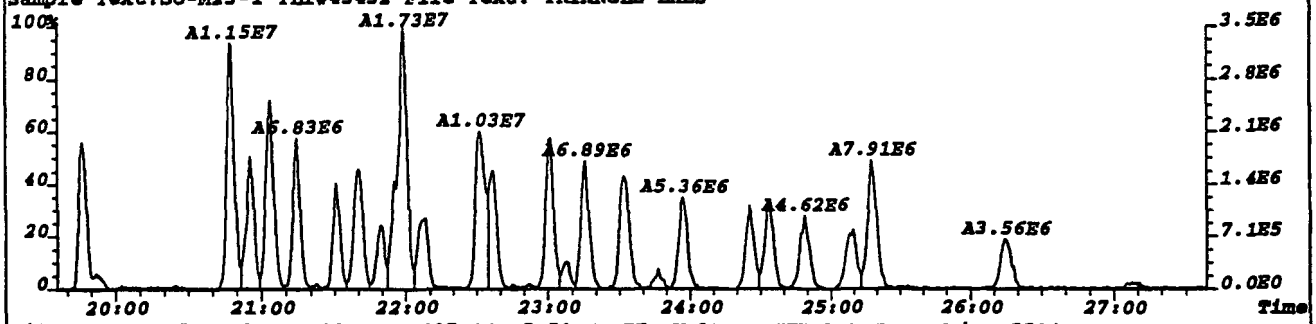
Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
TCDF				0.65-0.89						0.798-1.112			
304-306	DC	NL		0:00		0.70	18.97			0.000			
				19:46		0.88	1,726.96	809.44	917.52	0.806			
	DC	SN		19:59		0.78	6.73			0.815			
	DC	SN		20:02		0.84	16.96			0.817			
				20:47		0.81	2,571.89	1,153.29	1,418.60	0.847			
				20:55		0.78	1,470.27	643.09	827.18	0.853			
				21:04		0.80	2,126.51	942.10	1,184.41	0.859			
				21:14		0.79	1,549.13	683.08	866.05	0.865			
	DC	SN		21:22	RO	1.20	29.81			0.871			
				21:30		0.79	1,097.19	483.64	613.55	0.876			
				21:40		0.78	1,646.18	723.37	922.81	0.883			
				21:49		0.77	746.28	325.00	421.28	0.889			
				21:59		0.82	3,844.10	1,733.01	2,111.09	0.896			
				22:08		0.77	1,090.97	474.33	616.64	0.902			
	DC	SN		22:15	RO	2.77	5.58			0.907			
				22:31		0.88	2,199.30	1,027.79	1,171.51	0.918			
				22:37		0.68	1,490.17	602.04	888.13	0.922			
	DC	SN		22:45	RO	1.22	20.73			0.927			
				23:01		0.82	1,705.74	767.88	937.86	0.938			
				23:08	RO	0.95	267.71	142.99	151.25	0.943			
				23:16		0.80	1,555.01	689.42	865.59	0.948			
				23:32		0.80	1,651.14	735.20	915.94	0.959			
				23:46		0.80	200.92	89.41	111.51	0.969			
				23:57		0.80	1,203.24	536.12	667.12	0.976			
				24:25		0.73	1,066.83	449.75	617.08	0.995			
				24:33		0.81	1,157.80	517.91	639.89	1.001	2378-TCDF		AN
				24:48		0.80	1,038.14	461.91	576.23	1.011			
				25:09		0.81	938.20	420.59	517.61	1.025			
				25:18		0.80	1,785.89	791.16	994.73	1.031			
	DC	SN		25:41	RO	1.04	5.54			1.047			
				26:14		0.82	789.84	355.86	433.98	1.069			
	DC	SN		26:34		0.81	5.38			1.083			
	DC	SN		26:44		0.74	4.69			1.090			
	DC	SN		26:47		0.75	6.17			1.092			
	DC	SN		26:52	RO	0.95	7.49			1.095			
	DC	SN		26:57	RO	2.08	4.14			1.099			
	DC	SN		27:01		0.84	9.04			1.101			
	DC	SN		27:07		0.65	106.01			1.105			
304-306		24	Peaks				34,919.41						
13C12-TCDF				0.65-0.89						0.959-1.041			
316-318	DC	NL		0:00	RO	0.63	15.59			0.000			
	DC	WL		19:56	RO	1.21	12.92			0.813			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
		DC	WL	20:46	RO	1.04	10.35			0.846			
		DC	WL	22:48	RO	0.57	5.08			0.929			
		DC	WL	22:53	RO	0.54	8.14			0.933			
		DC	WL	23:00	RO	0.62	40.66			0.938			
		DC	WL	23:14	RO	1.16	58.29			0.947			
				24:32		0.81	6,657.81	2,987.98	3,669.83	1.000	13C12-2378-TCDF	IS0	
		DC	WH	26:58		0.65	67.57			1.099			
316-318			1	Peak			6,657.81						
---------- Above: TCDF / TCDD Follows ----------													
13C12-TCDD						0.65-0.89				0.913-1.087			
332-334		DC	NL	0:00	RO	2.23	7.26			0.000			
		DC	SN	21:51	RO	0.28	9.63			0.950			
		DC	SN	22:37	RO	1.06	6.28			0.983			
		DC	SN	22:44	RO	2.05	1.40			0.988			
				23:00		0.79	4,515.84	1,995.41	2,520.43	1.000	13C12-2378-TCDD	IS1	
				23:20		0.85	5,011.54	2,301.28	2,710.26	1.014	13C12-1234-TCDD	RS1	
		DC	SN	23:58	RO	1.18	8.27			1.042			
		DC	SN	24:05		0.72	71.30			1.047			
		DC	SN	24:34	RO	0.61	4.34			1.068			
		DC	SN	24:45	RO	0.56	7.31			1.076			
		DC	WH	25:12		0.70	11.36			1.096			
		DC	WH	25:18	RO	1.00	8.07			1.100			
		DC	WH	25:22	RO	9.79	1.42			1.103			
		DC	WH	25:27	RO	1.50	8.16			1.107			
		DC	WH	25:55	RO	1.79	3.91			1.127			
		DC	WH	26:01	RO	4.50	2.96			1.131			
		DC	WH	26:08		0.66	26.47			1.136			
		DC	WH	26:12	RO	0.60	13.29			1.139			
332-334			2	Peaks			9,527.38						

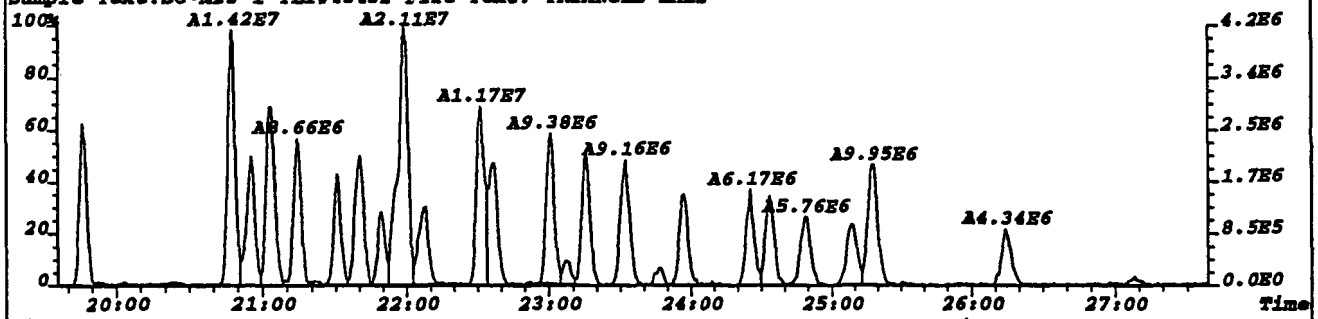
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside Limits	<M-Below Method Detection Limit	T-Time Changed
Rel.RT-Relative Retention Time	NL-Channel Specific Noise Level	M-Peak Area Changed
		N-Name Changed
		E-Ether Interference

*** End of Report ***

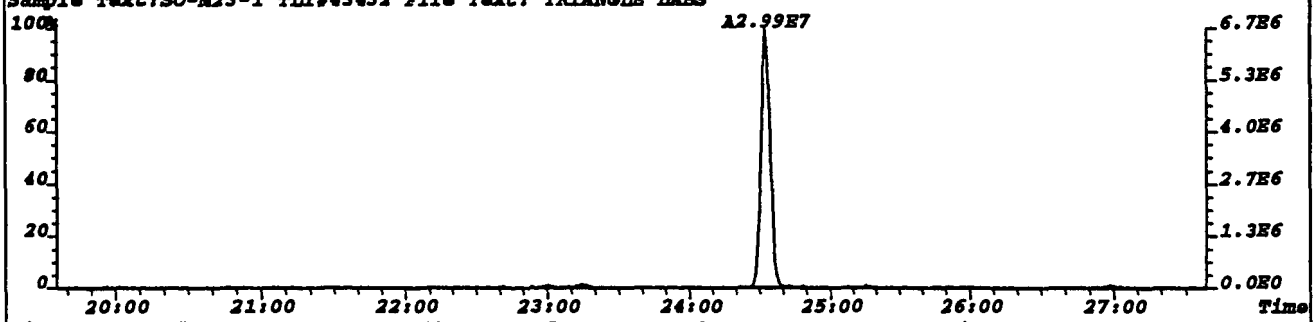
File:X973636 #1-803 Acq:18-OCT-1997 14:45:51 GC EI+ Voltage SIR AutoSpec Noise:3902
303.9016 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,15608.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-1 TLI#43432 File Text: TRIANGLE LABS



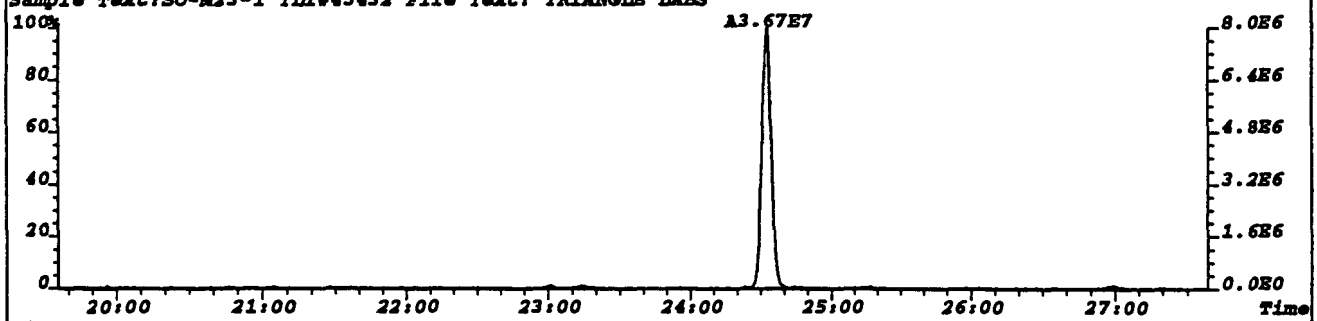
File:X973636 #1-803 Acq:18-OCT-1997 14:45:51 GC EI+ Voltage SIR AutoSpec Noise:5584
305.8987 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,22336.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-1 TLI#43432 File Text: TRIANGLE LABS



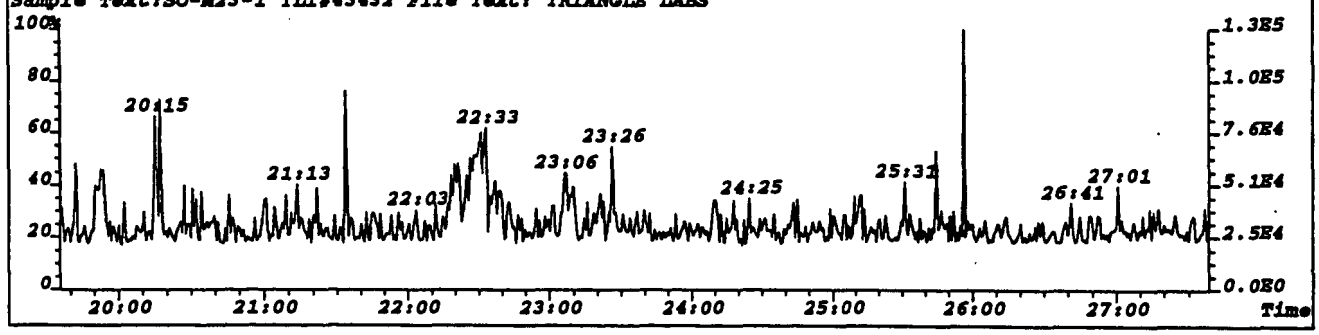
File:X973636 #1-803 Acq:18-OCT-1997 14:45:51 GC EI+ Voltage SIR AutoSpec Noise:3390
315.9419 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,13560.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-1 TLI#43432 File Text: TRIANGLE LABS



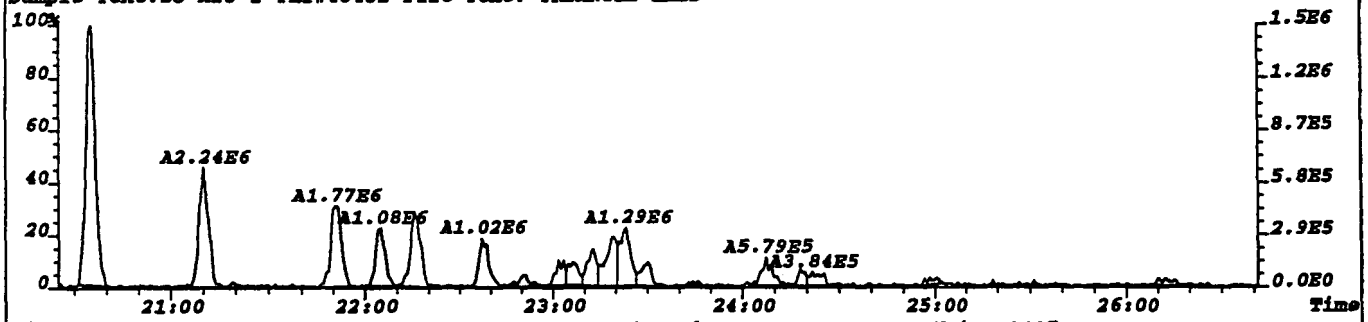
File:X973636 #1-803 Acq:18-OCT-1997 14:45:51 GC EI+ Voltage SIR AutoSpec Noise:5396
317.9389 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,21584.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-1 TLI#43432 File Text: TRIANGLE LABS



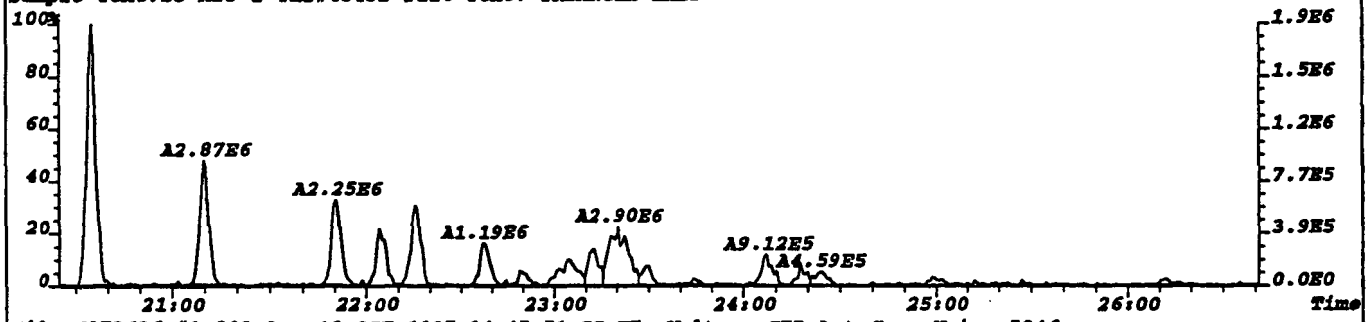
File:X973636 #1-803 Acq:18-OCT-1997 14:45:51 GC EI+ Voltage SIR AutoSpec
375.8364 Exp:XCONF_TT
Sample Text:SO-M23-1 TLI#43432 File Text: TRIANGLE LABS



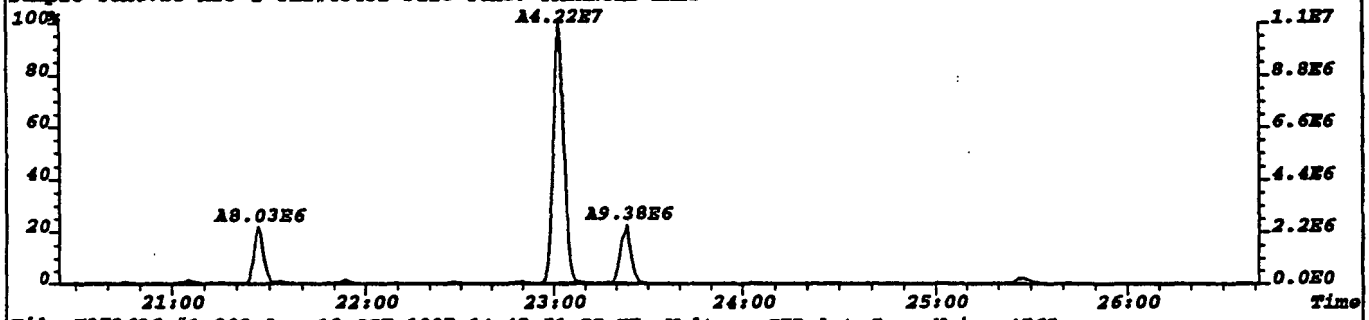
File:X973636 #1-803 Acq:18-OCT-1997 14:45:51 GC EI+ Voltage SIR AutoSpec Noise:2288
319.8965 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,9152.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-1 TLI#43432 File Text: TRIANGLE LABS



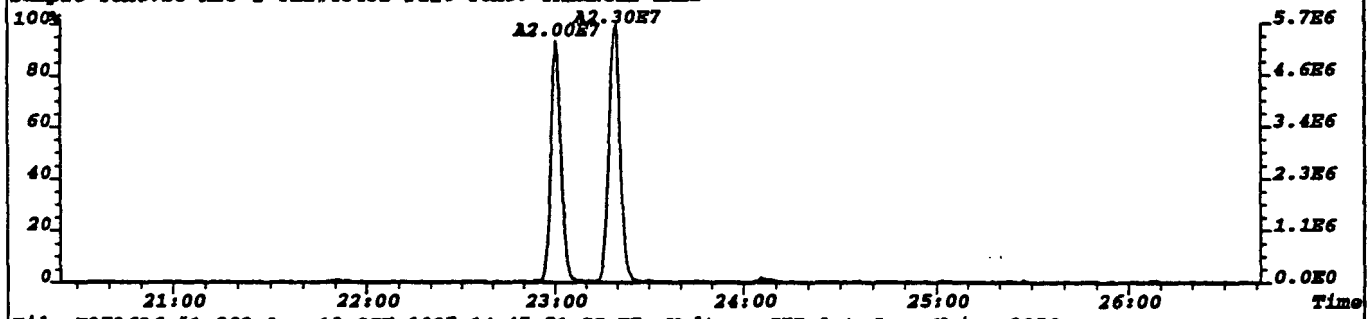
File:X973636 #1-803 Acq:18-OCT-1997 14:45:51 GC EI+ Voltage SIR AutoSpec Noise:2407
321.8936 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,9628.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-1 TLI#43432 File Text: TRIANGLE LABS



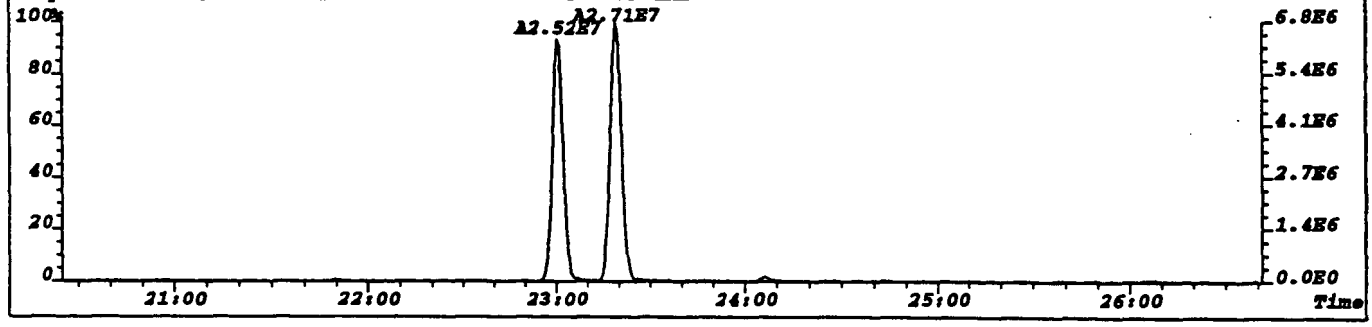
File:X973636 #1-803 Acq:18-OCT-1997 14:45:51 GC EI+ Voltage SIR AutoSpec Noise:5846
327.8847 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,23384.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-1 TLI#43432 File Text: TRIANGLE LABS



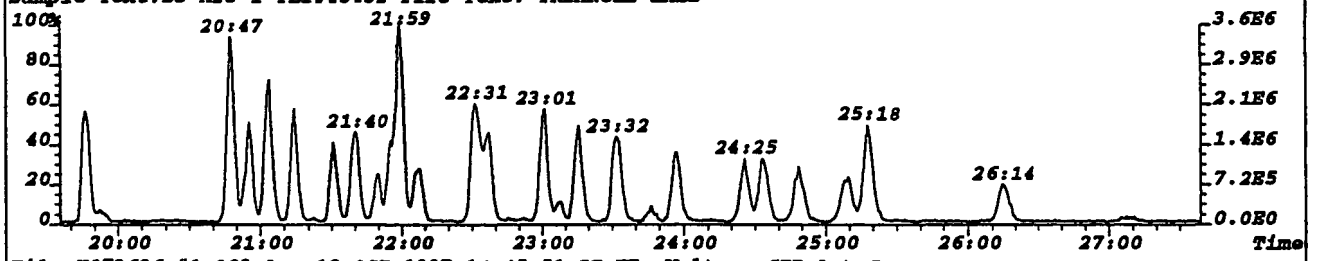
File:X973636 #1-803 Acq:18-OCT-1997 14:45:51 GC EI+ Voltage SIR AutoSpec Noise:4563
331.9368 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,18252.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-1 TLI#43432 File Text: TRIANGLE LABS



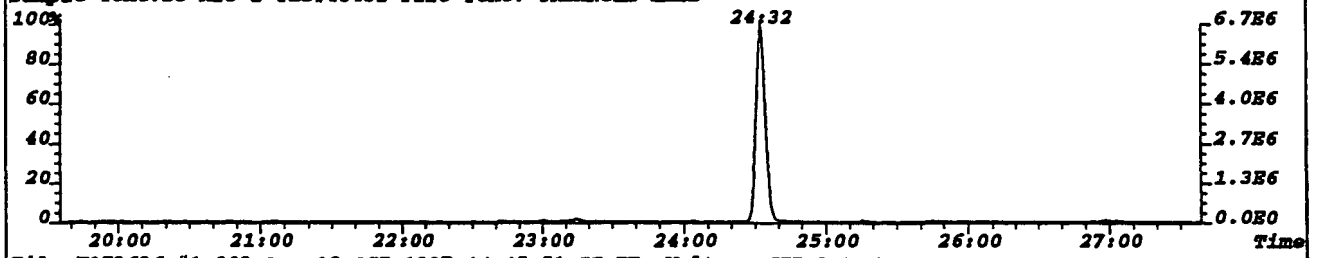
File:X973636 #1-803 Acq:18-OCT-1997 14:45:51 GC EI+ Voltage SIR AutoSpec Noise:2050
333.9338 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,8200.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-1 TLI#43432 File Text: TRIANGLE LABS



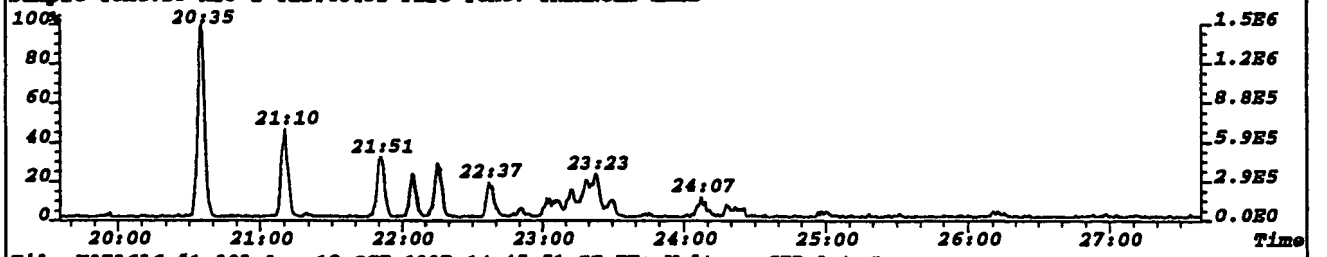
File:X973636 #1-803 Acq:18-OCT-1997 14:45:51 GC EI+ Voltage SIR AutoSpec
303.9016 Exp:XCONF_TT
Sample Text:SO-M23-1 TLI#43432 File Text: TRIANGLE LABS



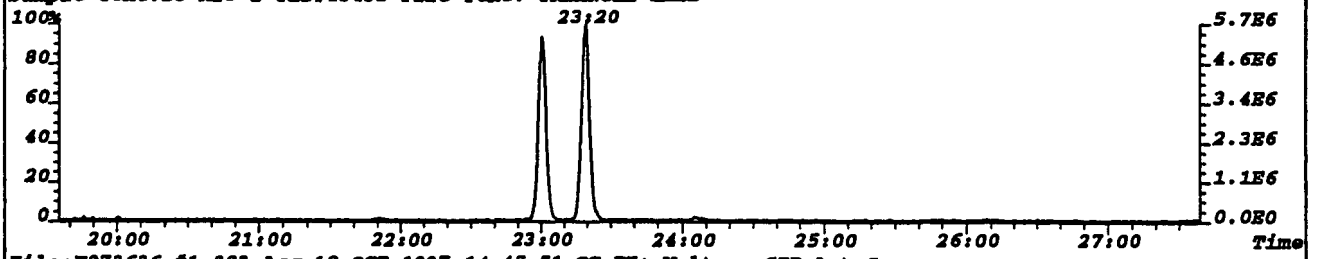
File:X973636 #1-803 Acq:18-OCT-1997 14:45:51 GC EI+ Voltage SIR AutoSpec
315.9419 Exp:XCONF_TT
Sample Text:SO-M23-1 TLI#43432 File Text: TRIANGLE LABS



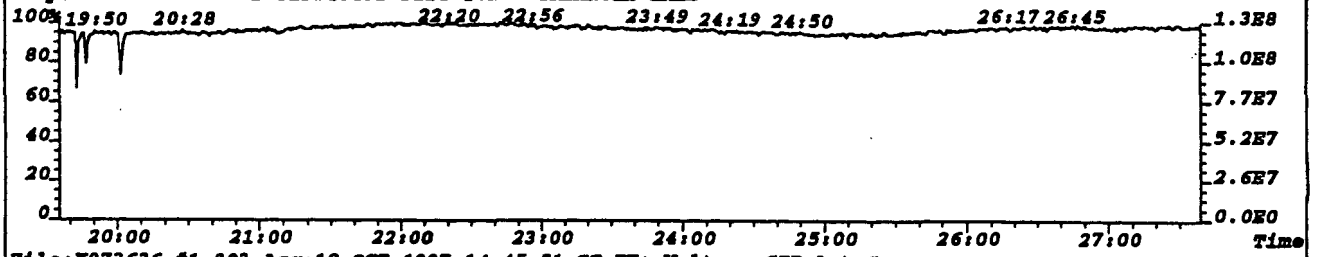
File:X973636 #1-803 Acq:18-OCT-1997 14:45:51 GC EI+ Voltage SIR AutoSpec
319.8965 Exp:XCONF_TT
Sample Text:SO-M23-1 TLI#43432 File Text: TRIANGLE LABS



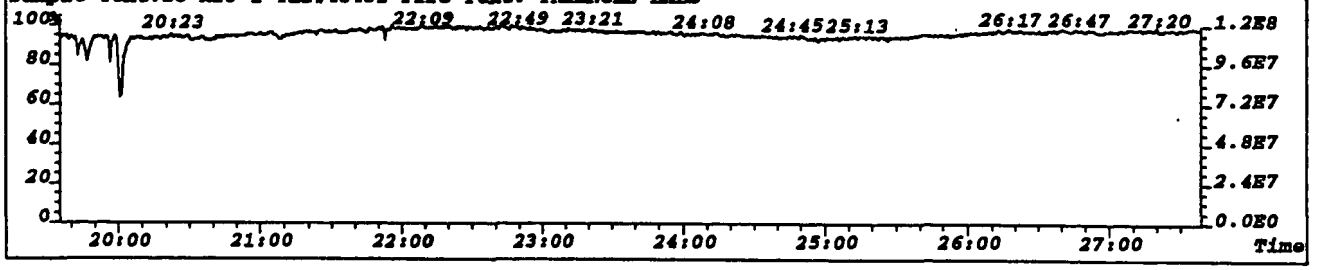
File:X973636 #1-803 Acq:18-OCT-1997 14:45:51 GC EI+ Voltage SIR AutoSpec
331.9368 Exp:XCONF_TT
Sample Text:SO-M23-1 TLI#43432 File Text: TRIANGLE LABS



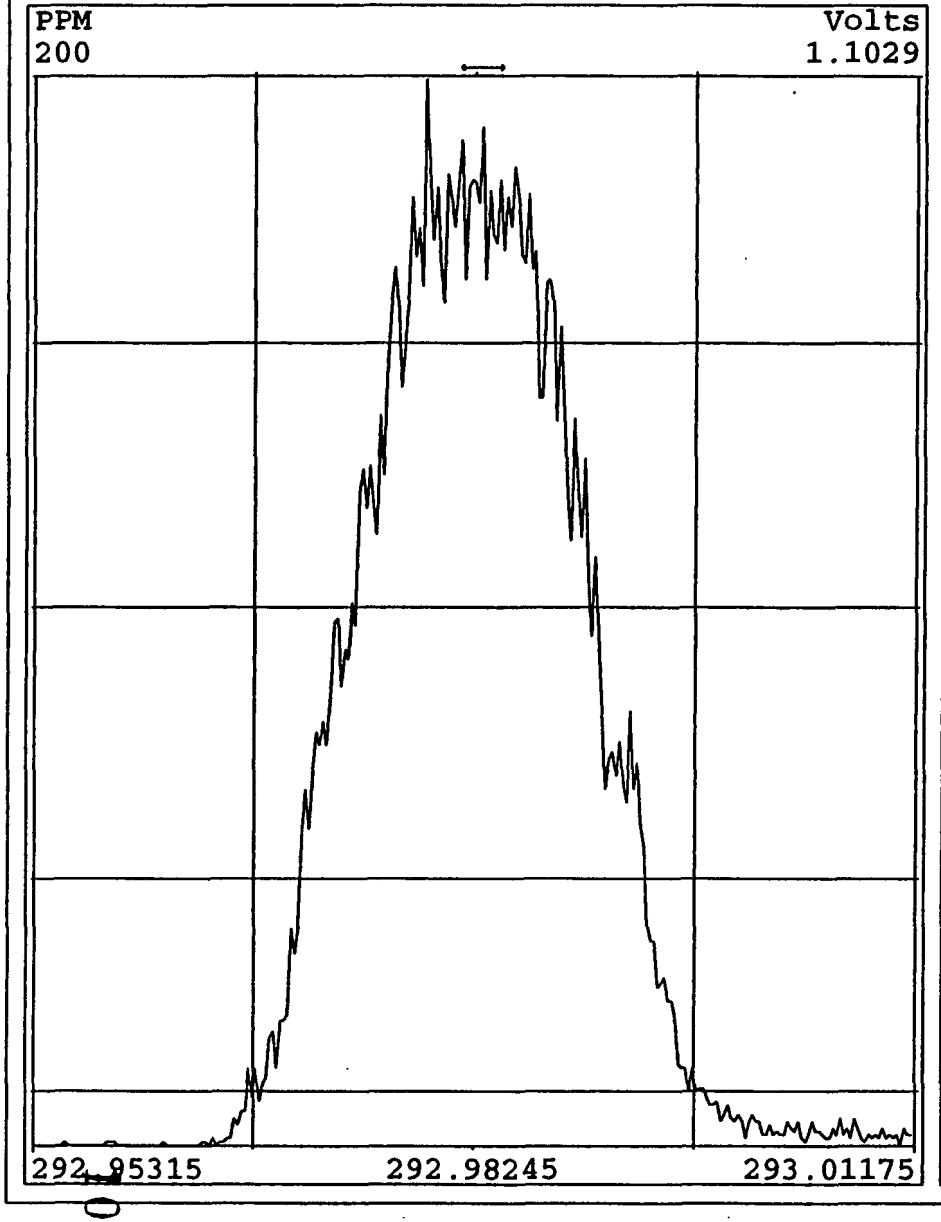
File:X973636 #1-803 Acq:18-OCT-1997 14:45:51 GC EI+ Voltage SIR AutoSpec
292.9825 Exp:XCONF_TT
Sample Text:SO-M23-1 TLI#43432 File Text: TRIANGLE LABS

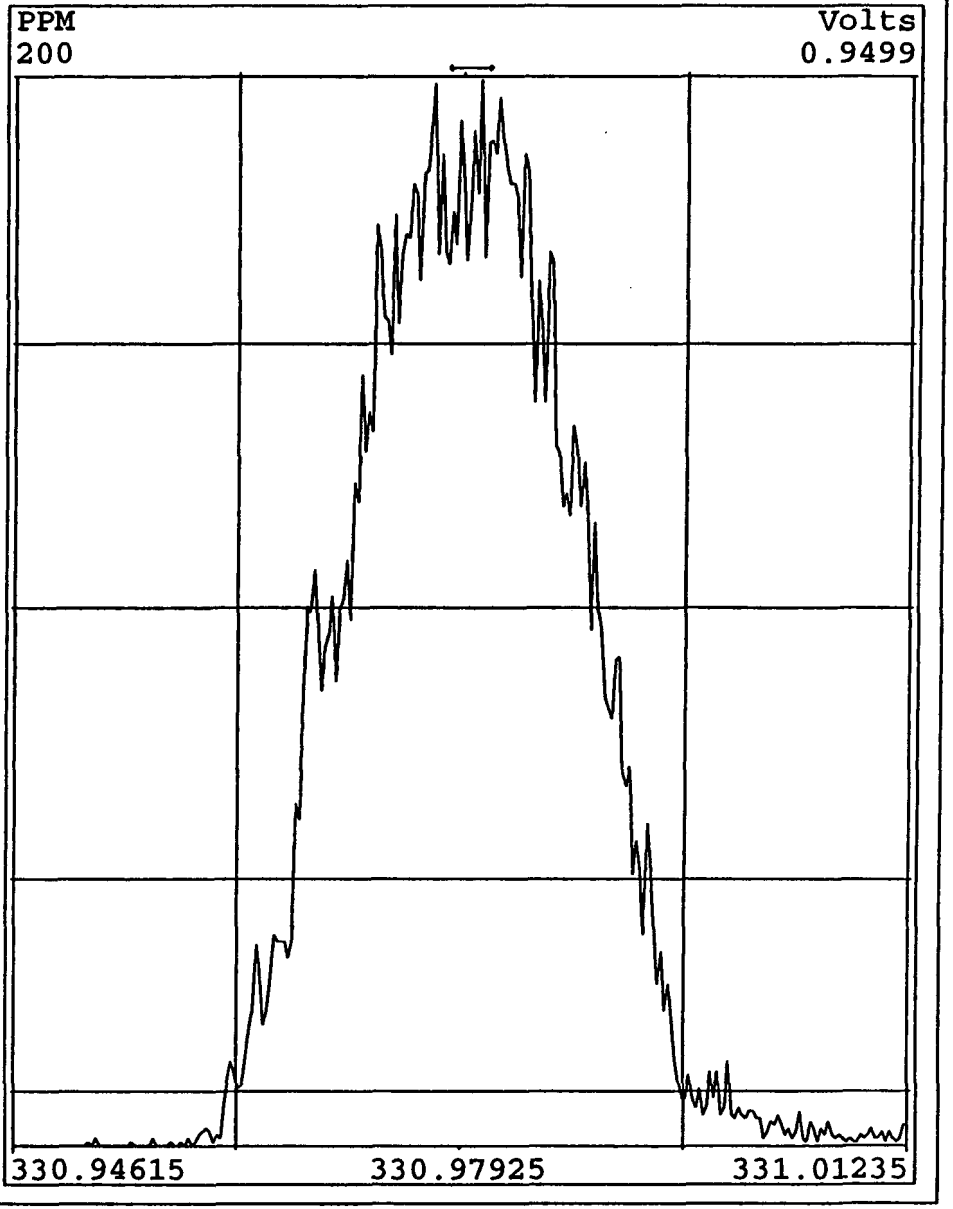


File:X973636 #1-803 Acq:18-OCT-1997 14:45:51 GC EI+ Voltage SIR AutoSpec
330.9792 Exp:XCONF_TT
Sample Text:SO-M23-1 TLI#43432 File Text: TRIANGLE LABS



Peak Locate Examination:18-OCT-1997:14:45 File:X973636
Experiment:XCONF_TT Function:1 Reference:PFK





Pacific Environmental Services

TLI Project: 43432 — Method 23 PCDD/PCDF Analysis (a)
Client Sample: SO-23-2 — Analysis File: S976909

Client Project:	Saginaw, MI				
Sample Matrix:	M23TRAIN	Date Received:	09/29/97	Spike File:	SPX23704
TLI ID:	185-6-2A-C	Date Extracted:	10/09/97	ICal:	SF56117
		Date Analyzed:	10/23/97	ConCal:	S976907
Sample Size:	1.000	Dilution Factor:	n/a	% Moisture:	n/a
Dry Weight:	n/a	Blank File:	U973257	% Lipid:	n/a
GC Column:	DB-5	Analyst:	GO	% Solids:	n/a

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	0.21			0.68	21:33	
1,2,3,7,8-PeCDD	0.23			1.54	26:06	
1,2,3,4,7,8-HxCDD	0.07			1.28	29:20	
1,2,3,6,7,8-HxCDD	0.08			1.26	29:25	
1,2,3,7,8,9-HxCDD	0.11			1.18	29:42	PR
1,2,3,4,6,7,8-HpCDD	EMPC		0.12			
1,2,3,4,6,7,8,9-OCDD	EMPC		0.09			B
2,3,7,8-TCDF	6.6			0.82	20:47	
1,2,3,7,8-PeCDF	1.4			1.45	24:59	
2,3,4,7,8-PeCDF	1.4			1.40	25:44	
1,2,3,4,7,8-HxCDF	0.91			1.26	28:35	
1,2,3,6,7,8-HxCDF	0.46			1.27	28:41	
2,3,4,6,7,8-HxCDF	0.26			1.25	29:12	PR
1,2,3,7,8,9-HxCDF	EMPC		0.04			
1,2,3,4,6,7,8-HpCDF	EMPC		0.30			
1,2,3,4,7,8,9-HpCDF	EMPC		0.05			
1,2,3,4,6,7,8,9-OCDF	0.04			0.98	34:49	

Totals	Amt. (ng)	Number	DL	EMPC	Flags
Total TCDD	6.6	13			
Total PeCDD	2.4	8		3.6	
Total HxCDD	1.1	6		1.1	
Total HpCDD	0.14	1		0.26	
Total TCDF	60.0	13		60.3	
Total PeCDF	24.2	15			
Total HxCDF	4.7	11		4.7	
Total HpCDF	0.10	1		0.51	

X237_PSR v2.00, LARS 6.10.04

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Printed: 13:29 10/24/97

Pacific Environmental Services

TLI Project: 43432 — Method 23 PCDD/PCDF Analysis (a)
Client Sample: SO-23-2 — Analysis File: S976909

Internal Standards	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	4.1	103	40%-130%	0.76	20:44	—
$^{13}C_{12}$-2,3,7,8-TCDD	3.6	90.5	40%-130%	0.80	21:32	—
$^{13}C_{12}$-1,2,3,7,8-PeCDF	3.8	96.1	40%-130%	1.47	24:58	—
$^{13}C_{12}$-1,2,3,7,8-PeCDD	4.1	103	40%-130%	1.53	26:05	—
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	4.8	120	40%-130%	0.52	28:41	—
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	4.3	106	40%-130%	1.19	29:24	—
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	3.7	92.4	25%-130%	0.43	31:23	—
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	3.6	89.7	25%-130%	0.99	32:14	—
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	5.1	63.8	25%-130%	0.91	34:43	—

Surrogate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	4.1	102	70%-140%		21:33	—
$^{13}C_{12}$-2,3,4,7,8-PeCDF	3.7	92.0	70%-140%	1.53	25:43	—
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	3.8	95.8	70%-140%	0.51	28:35	—
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	3.4	85.6	70%-140%	1.25	29:19	—
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	3.8	94.6	70%-140%	0.41	32:34	—

Alternate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	4.3	107	40%-130%	0.51	29:55	—
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	4.6	116	40%-130%	0.52	29:12	—

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.81	21:20	—
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.20	29:41	—

Data Reviewer: CM 10/24/97

X237_PSR v2.00, LARS 6.10.04

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Initial ....Date...

Data Review By: VC 10/23/97 Calculated Noise Area: n/a

The Total Area for each peak with an ion abundance ratio outside ratio limits has been recalculated according to method requirements.

Page No. 1 Listing of S976909B.dbf
10/23/97 Matched GC Peaks / Ratio / Ret. Time

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
TCDF					0.65-0.89					0.828-1.098			
304-306		DC	NL	0:00	RO	1.45	2.37			0.000			
				17:21		0.80	1,985.05	883.80	1,101.25	0.837			
				17:51		0.80	1,022.23	453.46	568.77	0.861			
				18:05		0.82	588.58	264.81	323.77	0.872			
				18:29		0.81	6,142.53	2,751.22	3,391.31	0.891			
				18:49		0.82	3,951.40	1,777.89	2,173.51	0.908			
				19:19		0.81	3,253.75	1,456.94	1,796.81	0.932			
				19:37		0.80	2,733.29	1,213.42	1,519.87	0.946			
				19:57		0.84	2,991.29	1,364.20	1,627.09	0.962			
				20:18		0.82	1,510.30	682.53	827.77	0.979			
				20:34		0.82	1,207.88	543.15	664.73	0.992			
	N			20:47		0.82	3,460.28	1,557.61	1,902.67	1.002	2378-TCDF		AN
				21:02	RO	1.14	9.88	6.37	5.58	1.014			
				21:14		0.81	1,433.00	641.22	791.78	1.024			
				21:27		0.80	1,060.16	471.92	588.24	1.035			
				21:43	RO	0.96	141.21	76.75	79.78	1.047			
				22:01	RO	0.91	16.60	8.52	9.38	1.062			
	D	D	SN	22:16	RO	1.68	2.25			1.074			
		DC	WH	22:54		0.67	34.12			1.105			
304-306				16 Peaks			31,507.43						
13C12-TCDF					0.65-0.89					0.952-1.048			
316-318		DC	NL	0:00	RO	2.63	1.77			0.000			
				20:17	RO	0.59	9.08	3.95	6.72	0.978			
				20:44		0.76	1,670.99	721.14	949.85	1.000	13C12-2378-TCDF		ISO
316-318				2 Peaks			1,680.07						

---------- Above: TCDF / TCDD Follows ----------

TCDD					0.65-0.89					0.862-1.057			
320-322		DC	NL	0:00		0.73	3.19			0.000			
				18:44		0.77	464.71	202.38	262.33	0.870			
				19:10		0.83	243.13	110.22	132.91	0.890			
				19:30		0.73	127.66	53.79	73.87	0.906			
				20:15		0.79	460.67	203.31	257.36	0.940			
				20:32		0.80	267.81	119.28	148.53	0.954			
				20:58		0.82	119.68	53.86	65.82	0.974			
				21:20		0.69	140.59	57.26	83.33	0.991			
				21:26		0.83	228.91	103.57	125.34	0.995			
				21:33		0.68	73.15	29.70	43.45	1.001	2378-TCDD		AN
				21:43		0.87	51.92	24.14	27.78	1.009			
				21:54		0.73	119.67	50.31	69.36	1.017			
				22:08		0.80	29.00	12.87	16.13	1.028			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
				22:37		0.89	22.91	10.77	12.14	1.050			
320-322			13	Peaks			2,349.81						
37Cl-TCDD										0.907-1.093			
328	DC	NL		0:00			0.31			0.000			
	DC	WL		18:43			4.72			0.869			
	DC	WL		19:04			7.19			0.885			
	DC	WL		19:11			8.56			0.891			
	DC	WL		19:18			0.60			0.896			
				20:03			350.21	350.21		0.931			
				20:18			4.64	4.64		0.943			
				20:30			2.43	2.43		0.952			
				20:47			2.75	2.75		0.965			
	DC	SN		20:57			1.10			0.973			
				21:33			1,019.56	1,019.56		1.001	37Cl-TCDD		SUR1
				21:43			1.96	1.96		1.009			
				21:51			1.70	1.70		1.015			
				22:00			60.62	60.62		1.022			
				22:43			2.30	2.30		1.055			
	DC	SN		22:49			0.69			1.060			
328			9	Peaks			1,446.17						
13C12-TCDD						0.65-0.89				0.907-1.093			
332-334	DC	NL		0:00	RO	1.19	0.48			0.000			
	DC	WL		18:55	RO	4.20	0.44			0.878			
	DC	WL		19:10	RO	1.95	2.35			0.890			
	DC	SN		19:43	RO	1.38	1.84			0.916			
				20:16	RO	1.39	7.77	6.10	4.39	0.941			
				21:20		0.81	1,233.72	553.95	679.77	0.991	13C12-1234-TCDD		RS1
				21:32		0.80	1,190.18	529.88	660.30	1.000	13C12-2378-TCDD		IS1
				21:53		0.74	21.80	9.25	12.55	1.016			
	DC	SN		22:09	RO	1.65	0.41			1.029			
	DC	SN		22:15	RO	3.79	0.60			1.033			
	DC	SN		22:37		0.67	1.55			1.050			
	DC	SN		22:51		0.79	0.75			1.061			
	DC	SN		22:53		0.66	1.23			1.063			
332-334			4	Peaks			2,453.47						

---------- Above: TCDD / PeCDF Follows ----------

PeCDF						1.32-1.78				0.909-1.076			
340-342		DC	NL	0:00	RO	0.80	0.33			0.000			
	D	D	SN	22:44	RO	2.03	3.29			0.911			
				22:53		1.58	1,182.44	724.07	458.37	0.917			
	D	D	SN	23:08	RO	0.83	14.77			0.927			
				23:35		1.44	26.94	15.90	11.04	0.945			
				23:56		1.55	681.11	413.73	267.38	0.959			
				24:05		1.50	2,867.11	1,721.02	1,146.09	0.965			
				24:15		1.49	704.25	421.67	282.58	0.971			
				24:30		1.44	349.28	206.28	143.00	0.981			
				24:42		1.53	724.11	437.60	286.51	0.989			
	A			24:56		1.59	174.30	107.00	67.30	0.999			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
M				24:59		1.45	526.00	311.00	215.00	1.001	12378-PeCDF	AN	
				25:09		1.50	367.13	220.33	146.80	1.007			
				25:18		1.51	469.27	282.15	187.12	1.013			
D	D		SN	25:32	RO	0.80	2.94			1.023			
				25:44		1.40	534.91	312.00	222.91	1.031	23478-PeCDF	AN	
				25:52		1.65	368.08	229.11	138.97	1.036			
				26:11		1.49	40.96	24.50	16.46	1.049			
	DC		SN	26:36	RO	0.49	1.61			1.065			
				26:43		1.58	45.09	27.59	17.50	1.070			
340-342			15	Peaks			9,060.98						
13C12-PeCDF				1.32-1.78					0.840-1.160				
352-354	DC		NL	0:00	RO	1.09	0.39			0.000			
	DC		SN	23:01	RO	1.00	1.30			0.922			
	DC		SN	23:44	RO	1.86	2.37			0.951			
				24:05		1.55	14.48	8.81	5.67	0.965			
				24:58		1.47	1,343.24	799.83	543.41	1.000	13C12-PeCDF 123	IS2	
				25:16	RO	0.74	7.49	4.55	6.13	1.012			
				25:43		1.53	1,198.20	724.67	473.53	1.030	13C12-PeCDF 234	SUR2	
	DC		SN	26:32	RO	1.20	0.81			1.063			
	DC		SN	26:42	RO	0.42	1.83			1.069			
352-354			4	Peaks			2,563.41						

---------- Above: PeCDF / PeCDD Follows ----------

PeCDD				1.32-1.78					0.923-1.026				
356-358	DC		NL	0:00		1.45	0.54			0.000			
				24:13	RO	1.08	259.23	157.57	145.90	0.928			
	DC		SN	24:27	RO	0.04	1.40			0.937			
				24:43		1.38	30.24	17.56	12.68	0.948			
				24:59		1.62	168.45	104.14	64.31	0.958			
				25:08		1.58	70.22	43.02	27.20	0.964			
				25:19		1.62	118.90	73.50	45.40	0.971			
M				25:35		1.36	88.40	50.90	37.50	0.981			
				25:47		1.51	51.28	30.81	20.47	0.988			
				25:55	RO	1.02	23.02	13.99	13.71	0.994			
				26:06		1.54	58.13	35.22	22.91	1.001	12378-PeCDD	AN	
				26:14	RO	1.86	28.84	21.09	11.31	1.006			
	DC		SN	26:24	RO	1.00	0.56			1.012			
				26:35		1.61	24.45	15.10	9.35	1.019			
	DC		WH	26:48	RO	4.25	0.61			1.027			
356-358			11	Peaks			921.16						
13C12-PeCDD				1.32-1.78					0.847-1.153				
368-370	DC		NL	0:00	RO	1.09	0.41			0.000			
	DC		SN	24:41	RO	4.06	1.35			0.946			
	DC		SN	24:56	RO	3.11	1.17			0.956			
	DC		SN	25:04	RO	2.33	1.40			0.961			
	DC		SN	25:36	RO	1.06	1.25			0.981			
	DC		SN	25:48		1.35	1.41			0.989			
				26:05		1.53	806.89	487.35	319.54	1.000	13C12-PeCDD 123	IS3	
				26:14		1.53	77.43	46.80	30.63	1.006			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
	DC	SN		26:36	RO	0.46	0.90			1.020			
368-370			2	Peaks			884.32						
---------- Above: PeCDD / HxCDF Follows ----------													
HxCDF				1.05-1.43					0.956-1.052				
374-376	DC	NL		0:00		1.19	3.26			0.000			
				27:36		1.42	163.15	95.83	67.32	0.962			
				27:45		1.34	584.98	334.47	250.51	0.967			
				27:54		1.27	78.00	43.61	34.39	0.973			
				28:03		1.26	94.29	52.51	41.78	0.978			
				28:13		1.38	33.03	19.16	13.87	0.984			
				28:35		1.26	312.14	173.72	138.42	0.997	123478-HxCDF	AN	
				28:41		1.27	203.49	113.76	89.73	1.000	123678-HxCDF	AN	
				28:48		1.26	45.19	25.20	19.99	1.004			
				29:00		1.25	93.38	51.79	41.59	1.011			
				29:12		1.25	91.66	50.95	40.71	1.018	234678-HxCDF	AN	
				29:55	RO	0.98	11.31	6.26	6.42	1.043	123789-HxCDF	AN	
				30:00		1.28	18.93	10.64	8.29	1.046			
374-376			12	Peaks			1,729.55						
13C12-HxCDF				0.43-0.59					0.861-1.139				
384-386	DC	NL		0:00	RO	1.74	0.53			0.000			
	DC	SN		27:35	RO	0.37	1.27			0.962			
				27:44	RO	0.77	4.68	2.38	3.10	0.967			
				28:35		0.51	1,035.31	348.88	686.43	0.997	13C12-HxCDF 478	SUR3	
				28:41		0.52	1,127.29	384.21	743.08	1.000	13C12-HxCDF 678	IS4	
	DC	SN		29:01	RO	0.17	1.10			1.012			
				29:12		0.52	1,009.48	346.56	662.92	1.018	13C12-HxCDF 234	ALT2	
	DC	SN		29:23	RO	0.14	0.33			1.024			
	DC	SN		29:38		0.44	1.76			1.033			
				29:55		0.51	812.31	273.37	538.94	1.043	13C12-HxCDF 789	ALT1	
	DC	SN		30:09		0.58	1.31			1.051			
	DC	SN		30:23	RO	1.46	1.09			1.059			
384-386			5	Peaks			3,989.07						
---------- Above: HxCDF / HxCDD Follows ----------													
HxCDD				1.05-1.43					0.951-1.015				
390-392	DC	NL		0:00	RO	0.60	0.54			0.000			
	DC	SN		27:59	RO	0.64	0.54			0.952			
				28:08		1.23	37.82	20.87	16.95	0.957			
	DC	SN		28:14	RO	0.42	0.42			0.960			
	DC	SN		28:24		1.10	0.65			0.966			
	DC	SN		28:29	RO	0.42	0.25			0.969			
				28:35		1.10	76.30	39.94	36.36	0.972			
				28:48		1.24	69.43	38.37	31.06	0.980			
				28:57	RO	0.78	5.20	2.88	3.70	0.985			
	DC	SN		29:16	RO	0.73	0.72			0.995			
				29:20		1.28	13.08	7.34	5.74	0.998	123478-HxCDD	AN	
				29:25		1.26	18.98	10.59	8.39	1.001	123678-HxCDD	AN	
				29:42		1.18	25.75	13.92	11.83	1.010	123789-HxCDD	AN	

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
		DC	SN	29:49	RO	0.43	0.40			1.014			
		DC	WH	29:53	RO	0.24	0.27			1.016			
		DC	WH	30:01	RO	0.67	0.11			1.021			
390-392			7	Peaks			246.56						
13C12-HxCDD				1.05-1.43						0.966-1.034			
402-404		DC	NL	0:00	RO	0.79	0.40			0.000			
		DC	WL	28:14		1.27	0.68			0.960			
				28:48	RO	0.75	3.76	2.08	2.77	0.980			
		DC	SN	29:12	RO	0.67	0.65			0.993			
				29:19		1.25	690.11	382.85	307.26	0.997	13C12-HxCDD 478	SUR4	
				29:24		1.19	828.75	450.31	378.44	1.000	13C12-HxCDD 678	IS5	
				29:41		1.20	782.11	427.38	354.73	1.010	13C12-HxCDD 789	RS2	
		DC	SN	29:55	RO	1.64	0.63			1.018			
		DC	SN	30:02	RO	1.95	0.94			1.022			
		DC	SN	30:09	RO	0.37	0.42			1.026			
402-404			4	Peaks			2,304.73						

---------- Above: HxCDD / HpCDF Follows ----------

HpCDF				0.88-1.20						0.995-1.044			
408-410		DC	NL	0:00	RO	3.42	0.49			0.000			
	M			31:23	RO	1.23	73.24	44.30	35.90	1.000	1234678-HpCDF	AN	
				31:36		0.93	22.64	10.92	11.72	1.007			
				31:43	RO	0.84	12.30	6.27	7.50	1.011			
		DC	SN	32:22	RO	2.13	0.98			1.031			
		DC	SN	32:24	RO	6.30	0.67			1.032			
				32:36	RO	1.67	9.98	8.17	4.89	1.039	1234789-HpCDF	AN	
		DC	SN	32:44	RO	1.77	2.04			1.043			
		DC	WH	32:54	RO	7.48	0.55			1.048			
		DC	WH	33:03	RO	7.90	0.61			1.053			
408-410			4	Peaks			118.16						
13C12-HpCDF				0.37-0.51						0.936-1.127			
418-420		DC	NL	0:00	RO	0.78	0.39			0.000			
				31:23		0.43	640.83	192.53	448.30	1.000	13C12-HpCDF 678	IS6	
		DC	SN	32:08	RO	1.00	1.31			1.024			
				32:34		0.41	467.44	136.01	331.43	1.038	13C12-HpCDF 789	SUR5	
		DC	SN	32:46	RO	3.12	1.18			1.044			
418-420			2	Peaks			1,108.27						

---------- Above: HpCDF / HpCDD Follows ----------

HpCDD				0.88-1.20						0.977-1.006			
424-426		DC	NL	0:00		1.05	0.45			0.000			
				31:39		1.08	21.22	11.00	10.22	0.982			
		DC	SN	31:53	RO	2.82	1.00			0.989			
		DC	SN	32:00	RO	0.71	1.26			0.993			
				32:14	RO	0.77	17.93	9.14	11.94	1.000	1234678-HpCDD	AN	
		DC	WH	32:29	RO	1.55	0.67			1.008			
		DC	WH	32:36	RO	4.19	0.63			1.011			
424-426			2	Peaks			39.15						

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
13C12-HpCDD						0.88-1.20				0.969-1.031			
436-438	DC	NL		0:00	RO	1.39	0.47			0.000			
	DC	SN		31:38	RO	1.35	2.02			0.981			
	DC	SN		31:56	RO	0.63	0.75			0.991			
	DC	SN		32:05	RO	0.87	1.61			0.995			
				32:14		0.99	571.53	284.61	286.92	1.000	13C12-HpCDD	678	IS7
	DC	SN		32:27	RO	2.09	1.14			1.007			
	DC	SN		32:40	RO	0.77	1.10			1.013			
436-438			1	Peak			571.53						

---------- Above: HpCDD / Octa-CDD and CDF Follows ----------

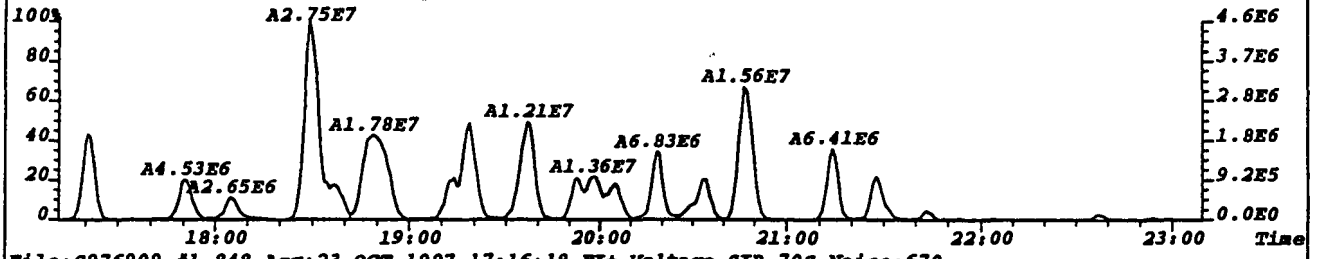
OCDF						0.76-1.02				0.885-1.115			
442-444	DC	NL		0:00	RO	1.67	0.34			0.000			
	DC	SN		31:36	RO	10.00	0.21			0.910			
	DC	SN		32:05	RO	0.30	0.87			0.924			
	DC	SN		32:55	RO	2.13	0.72			0.948			
	DC	SN		33:07	RO	5.88	0.15			0.954			
	DC	SN		33:15	RO	0.66	0.57			0.958			
	DC	SN		33:31	RO	0.43	0.91			0.965			
	DC	SN		33:42	RO	0.16	0.40			0.971			
	DC	SN		33:52	RO	4.78	0.17			0.976			
	DC	SN		34:02	RO	0.61	1.34			0.980			
	DC	SN		34:21		0.92	1.59			0.989			
	DC	SN		34:25	RO	3.61	0.62			0.991			
	DC	SN		34:30	RO	1.64	0.53			0.994			
	DC	SN		34:42	RO	2.68	0.76			1.000			
	M			34:49		0.98	3.91	1.94	1.97	1.003	OCDF		AN
	DC	SN		34:59	RO	0.27	0.40			1.008			
	DC	SN		35:34	RO	3.86	0.68			1.024			
	DC	SN		35:45	RO	2.97	0.70			1.030			
	DC	SN		35:57	RO	0.60	1.13			1.036			
442-444			1	Peak			3.91						
OCDD						0.76-1.02				0.885-1.115			
458-460	DC	NL		0:00		0.91	0.42			0.000			
	M			34:44	RO	1.23	6.29	4.11	3.33	1.000	OCDD		AN
	DC	SN		35:06	RO	1.70	0.38			1.011			
	DC	SN		35:15	RO	0.61	0.53			1.015			
458-460			1	Peak			6.29						
13C12-OCDD						0.76-1.02				0.995-1.005			
470-472	DC	NL		0:00		0.83	0.42			0.000			
				34:43		0.91	517.94	246.14	271.80	1.000	13C12-OCDD		IS8
	DC	SN		34:53	RO	1.17	1.95			1.005			
	DC	WH		35:16	RO	1.32	1.70			1.016			
470-472			1	Peak			517.94						

Compound/
M_Z.... QC.Log Omit Why ..RT. OK Ratio Total.Area... Area.Peak.1.. Area.Peak.2.. Rel.RT Compound.Name.. ID.. Flags.

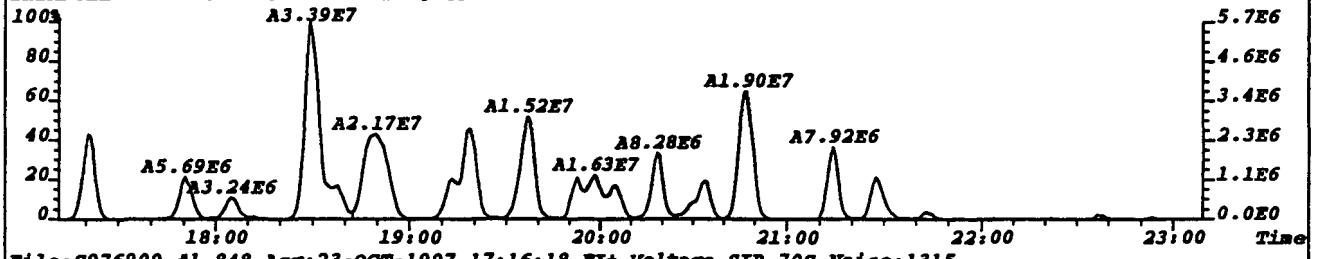
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside Limits	<M-Below Method Detection Limit	T-Time Changed
Rel.RT-Relative Retention Time	NL-Channel Specific Noise Level	M-Peak Area Changed
		N-Name Changed
		E-Ether Interference

*** End of Report ***

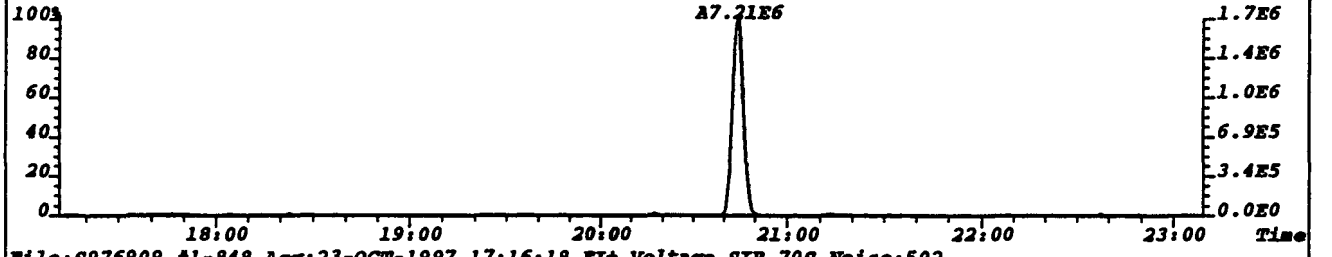
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:968
303.9016 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,3872.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



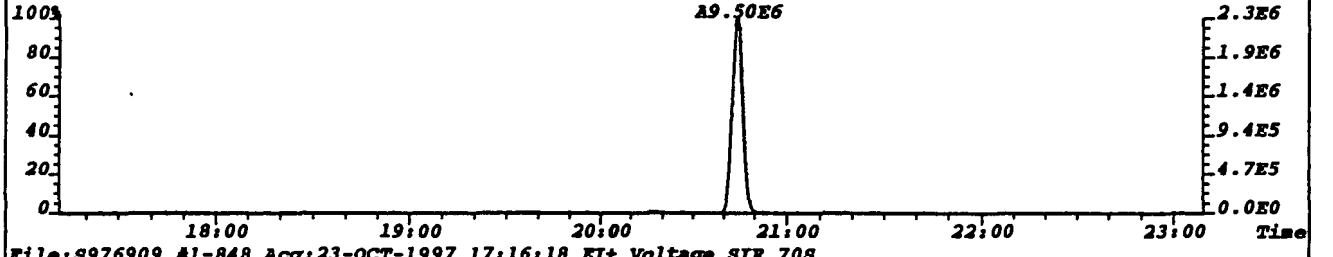
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:670
305.8987 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,2680.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



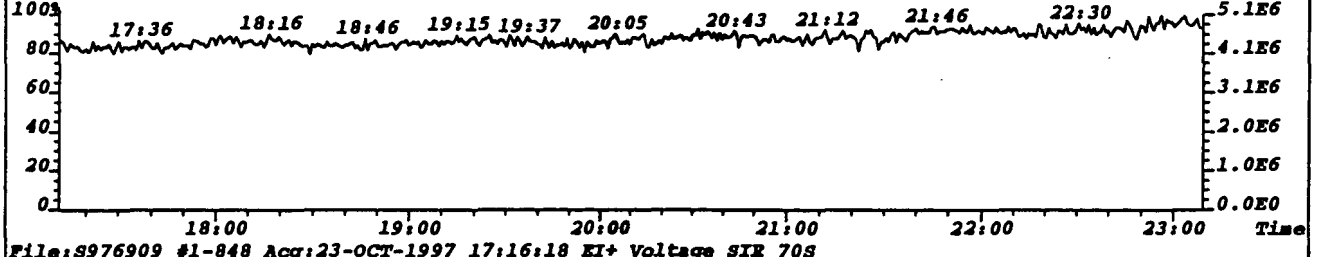
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:1315
315.9419 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,5260.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



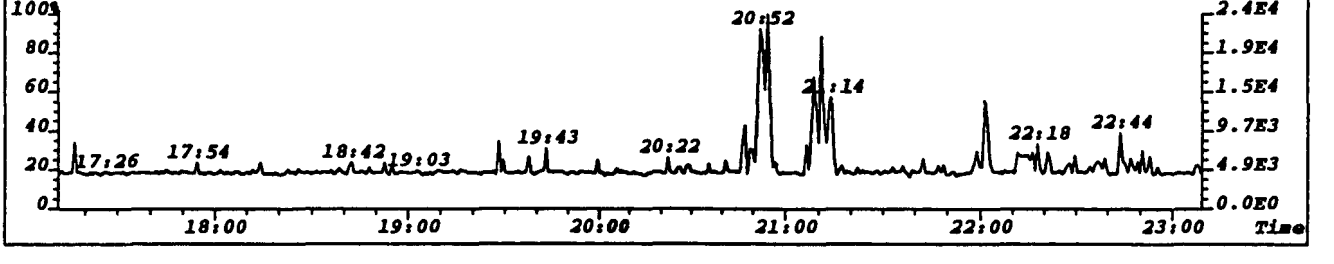
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:502
317.9389 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,2008.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



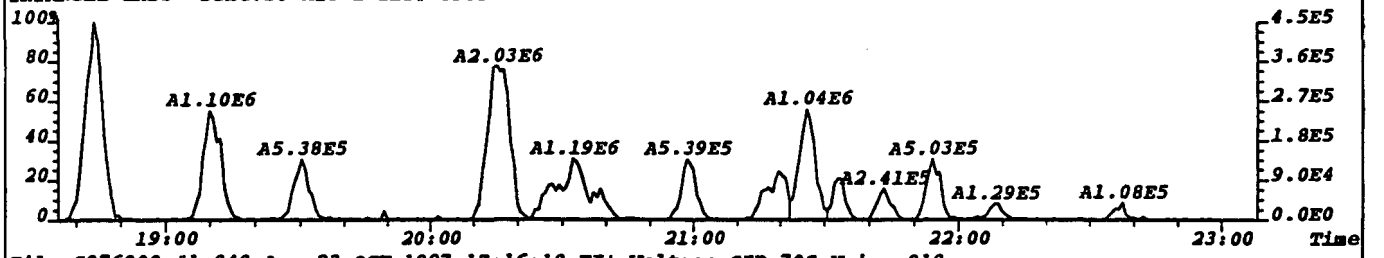
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



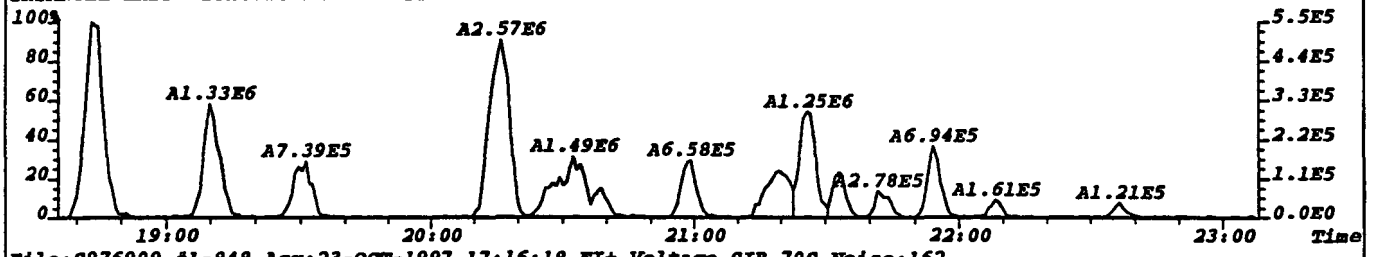
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
375.8364 F:2 Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



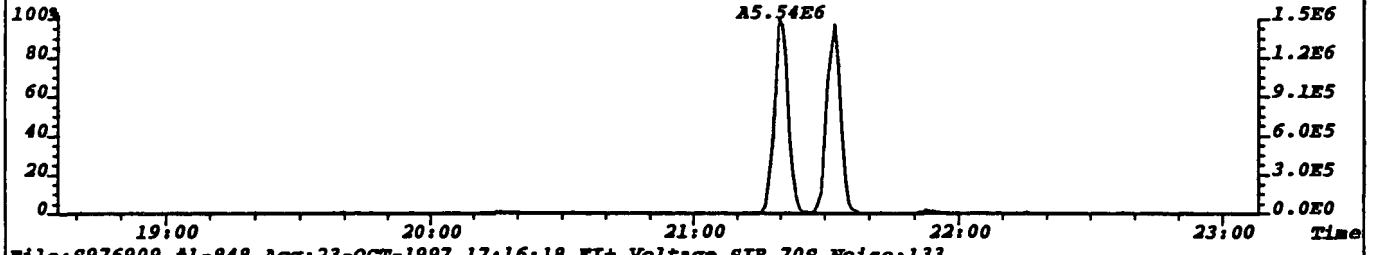
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:675
319.8965 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,2700.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



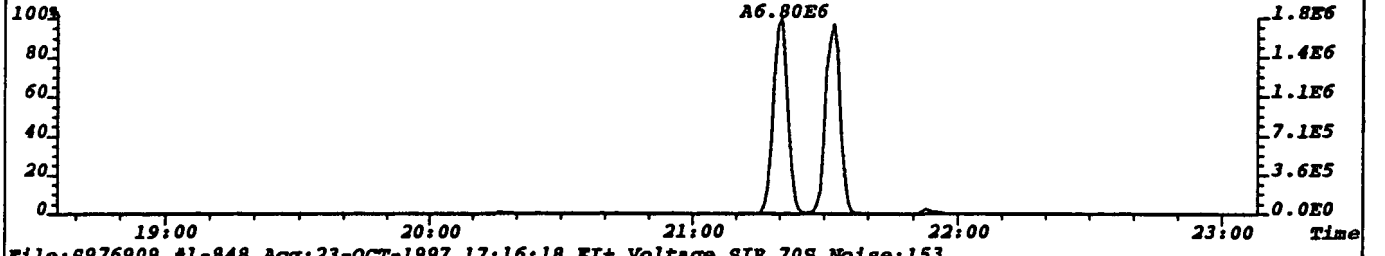
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:918
321.8936 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,3672.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



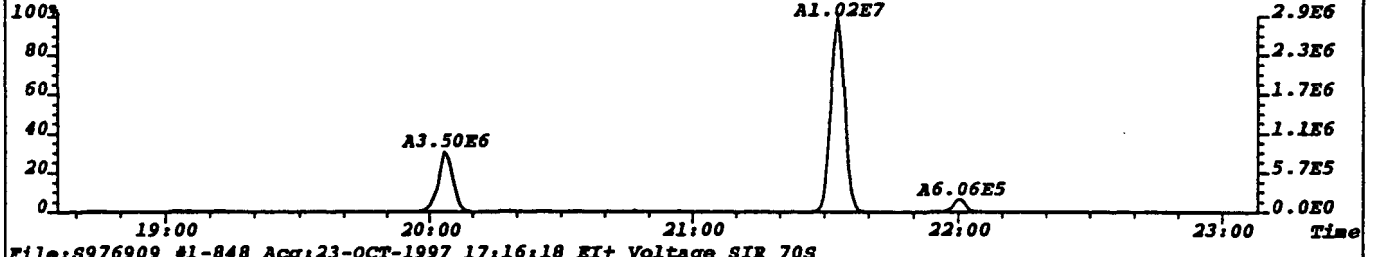
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:162
331.9368 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,648.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



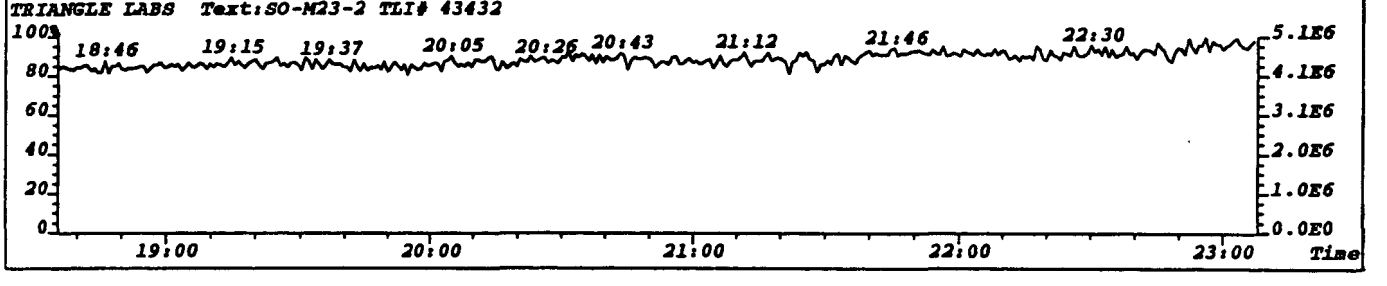
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:133
333.9338 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,532.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



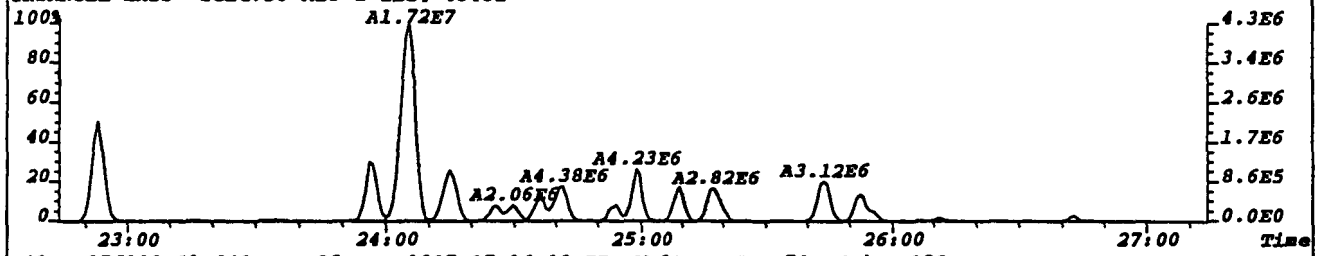
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:153
327.8847 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,612.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



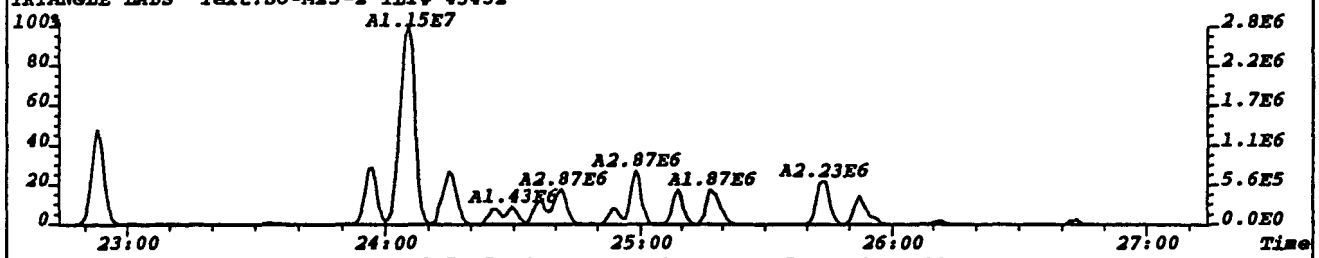
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



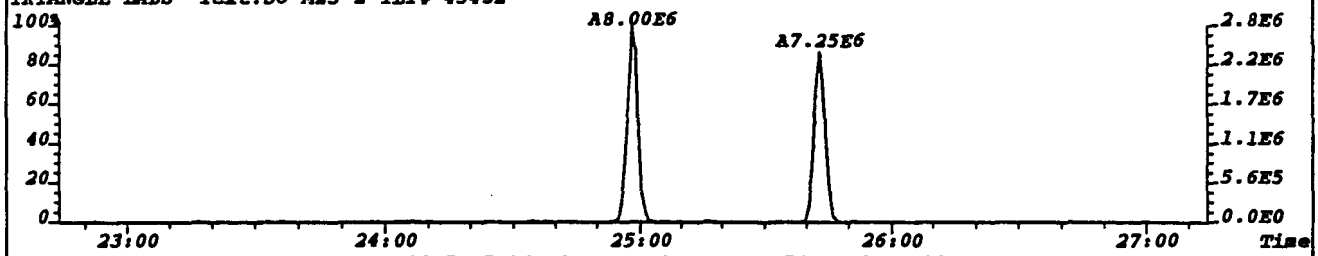
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:98
339.8597 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,392.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



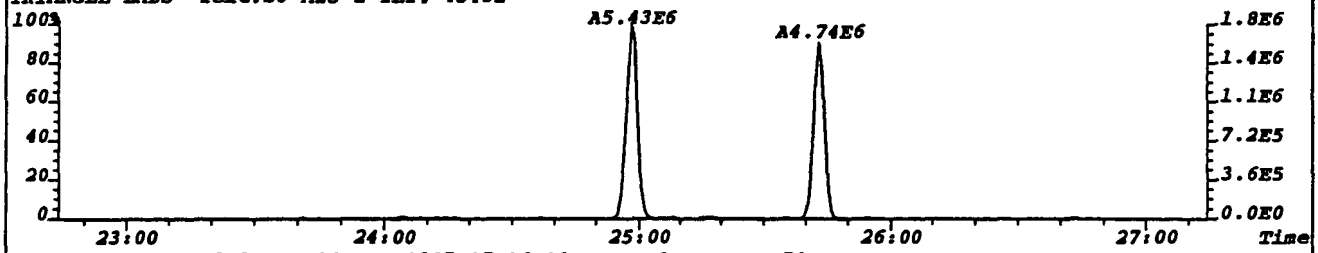
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:123
341.8567 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,492.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



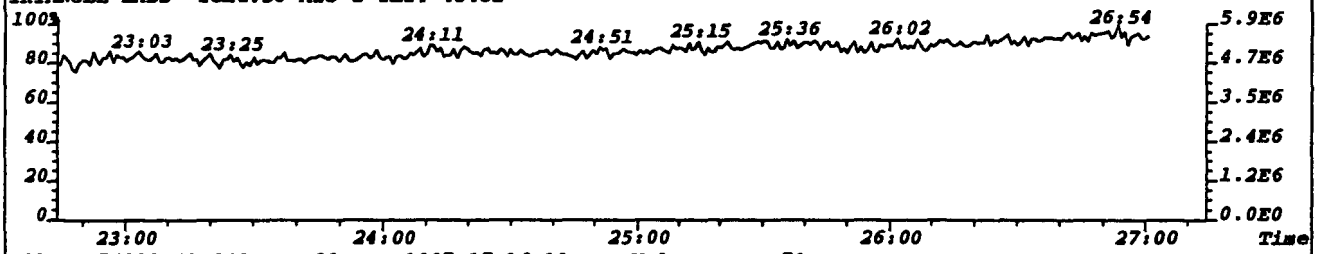
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:122
351.9000 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,488.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



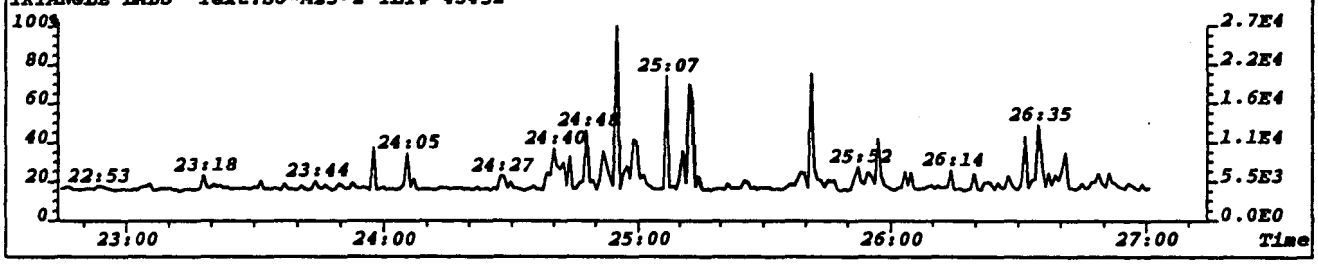
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:110
353.8970 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,440.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



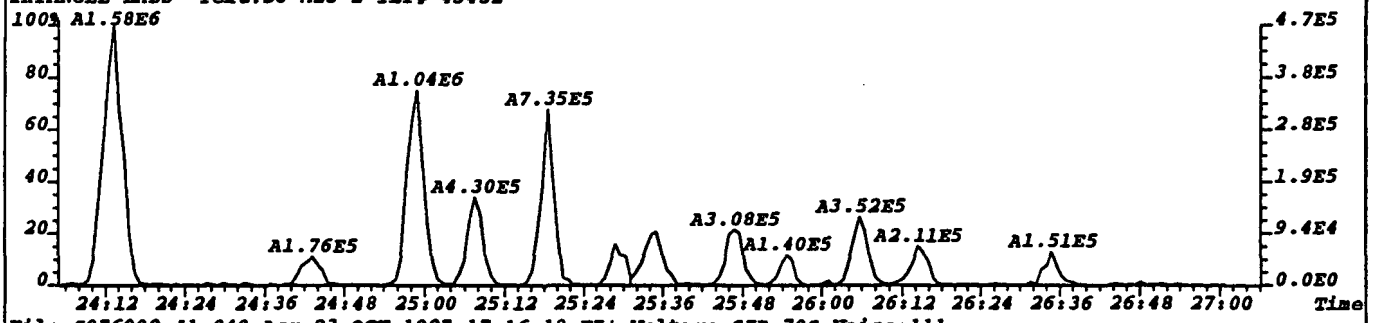
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



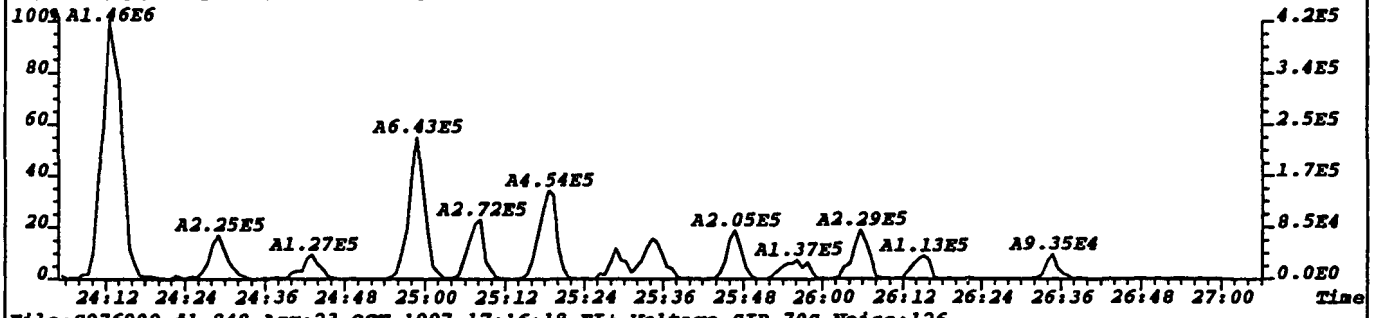
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
409.7974 F:2 Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



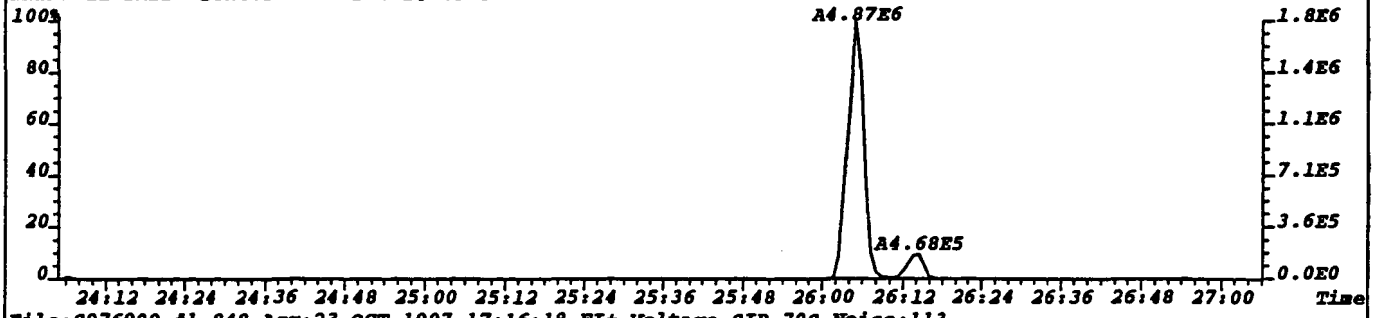
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:160
355.8546 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,640.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



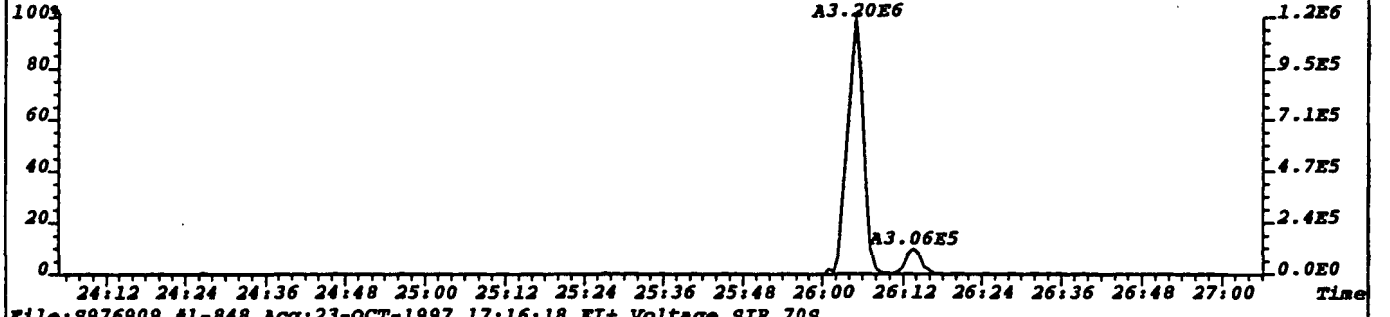
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:111
357.8516 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,444.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



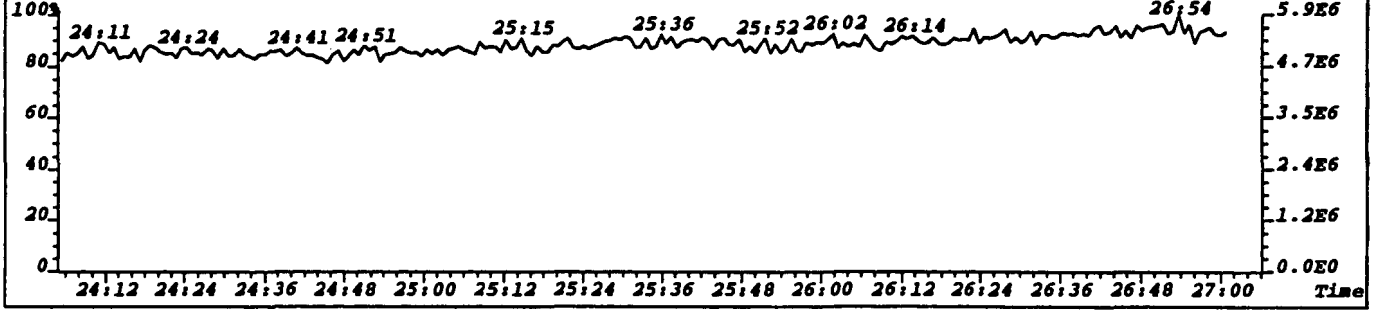
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:126
367.8949 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,504.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



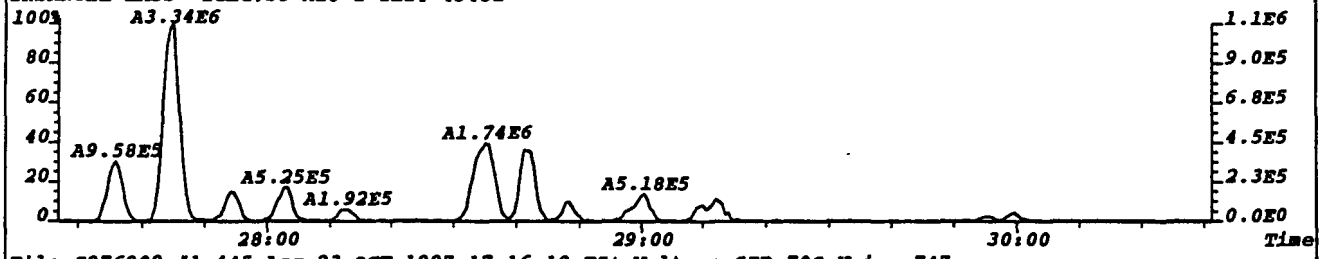
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:113
369.8919 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,452.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



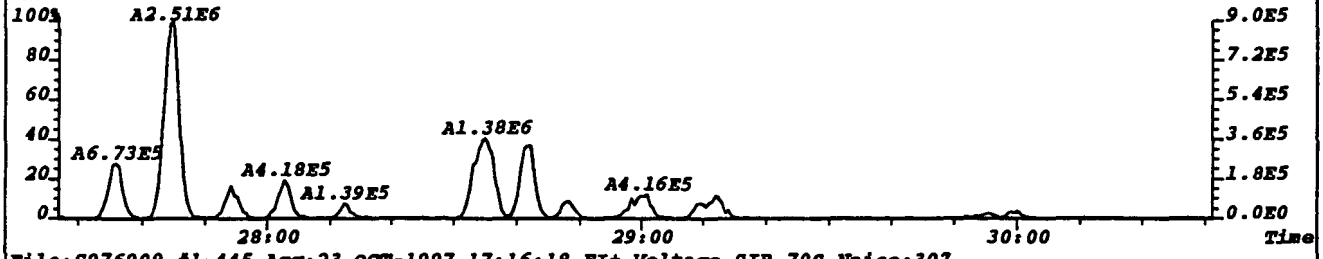
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



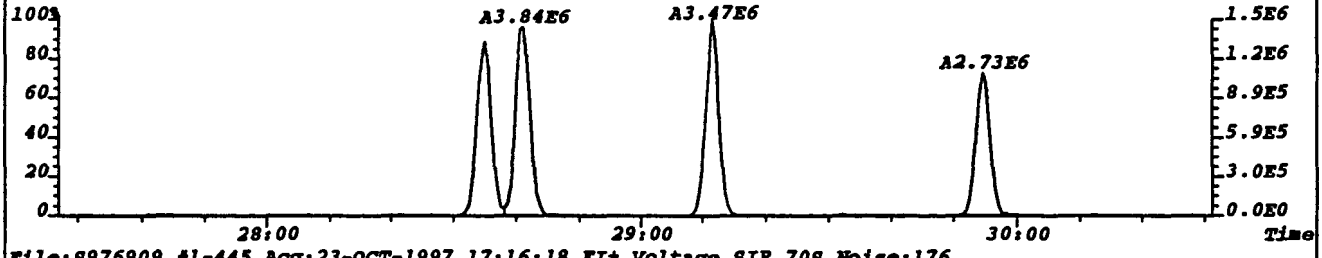
File:S976909 #1-445 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:886
373.8208 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,3544.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



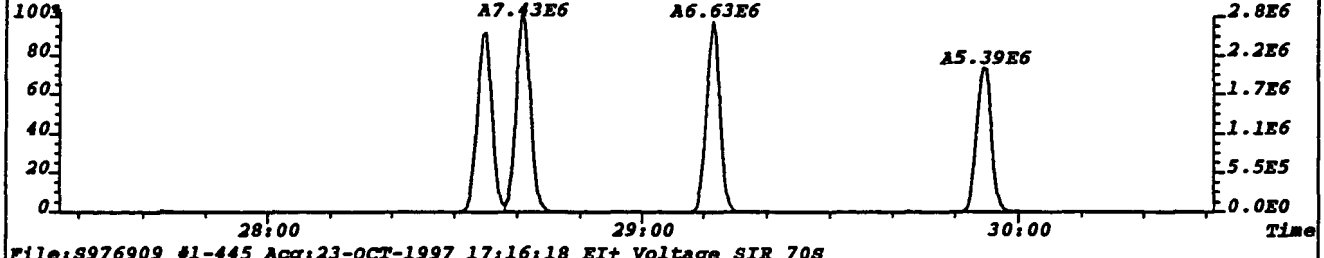
File:S976909 #1-445 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:747
375.8178 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,2988.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



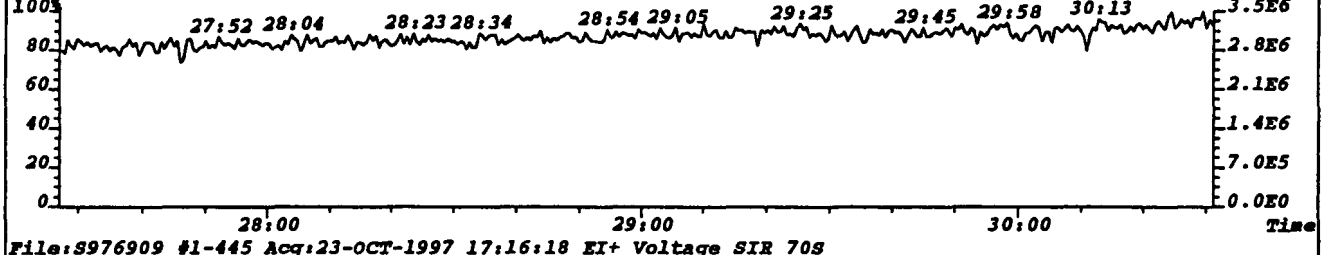
File:S976909 #1-445 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:307
383.8639 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,1228.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



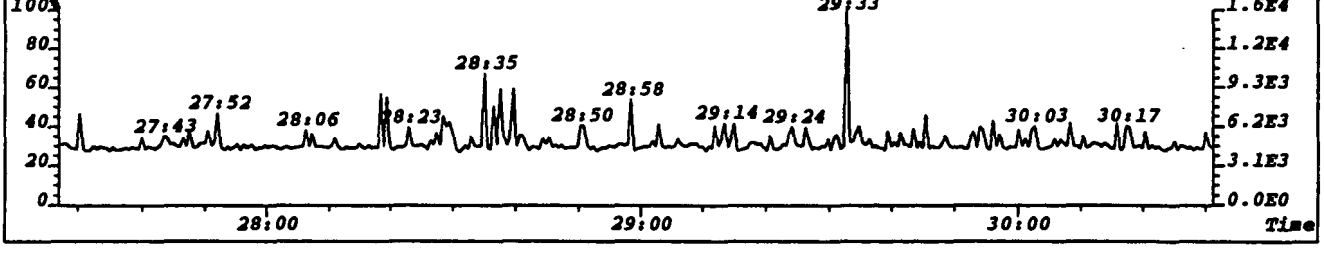
File:S976909 #1-445 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:176
385.8610 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,704.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



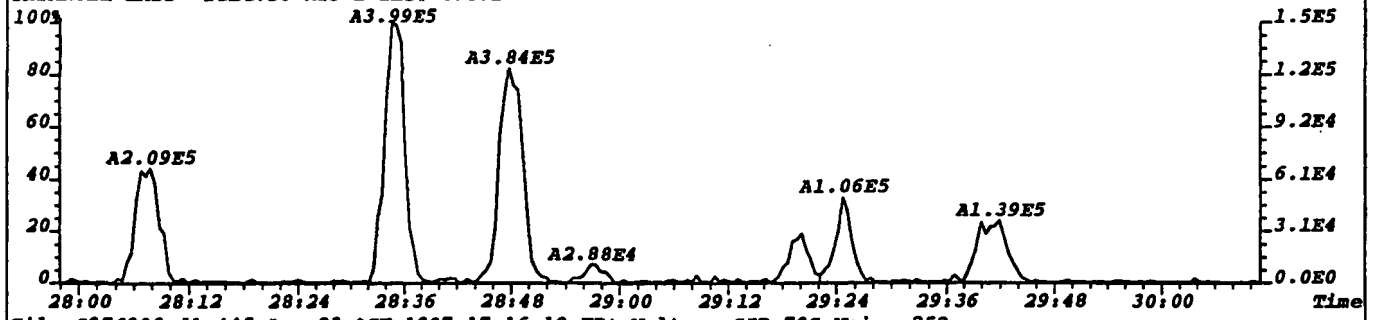
File:S976909 #1-445 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
392.9760 F:3 Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



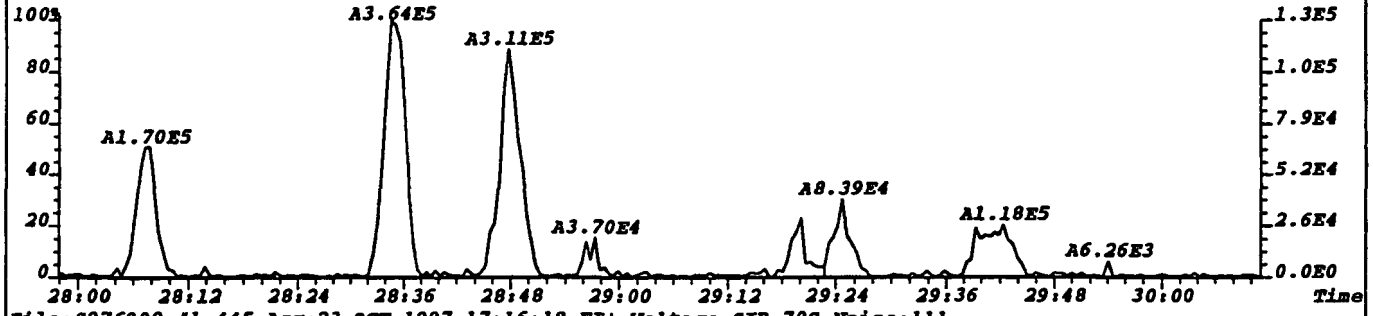
File:S976909 #1-445 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
445.7555 F:3 Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



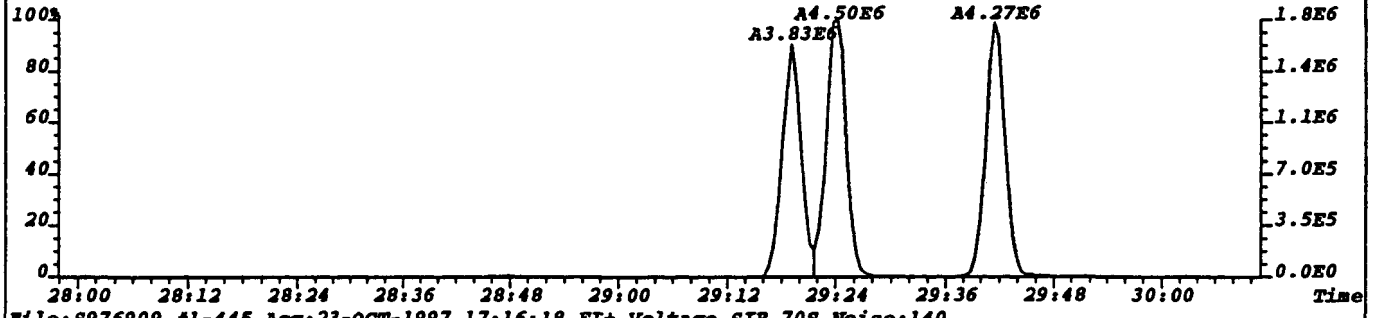
File:S976909 #1-445 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:150
389.8156 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,600.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



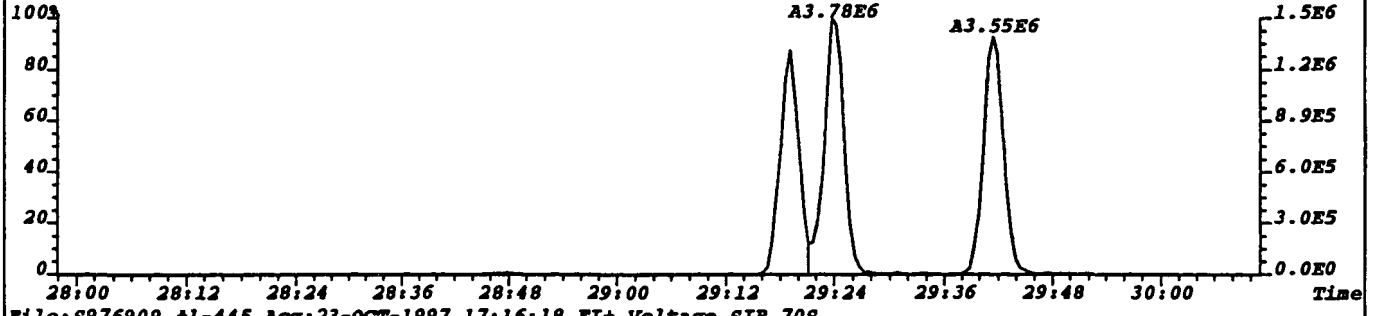
File:S976909 #1-445 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:252
391.8127 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,1008.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



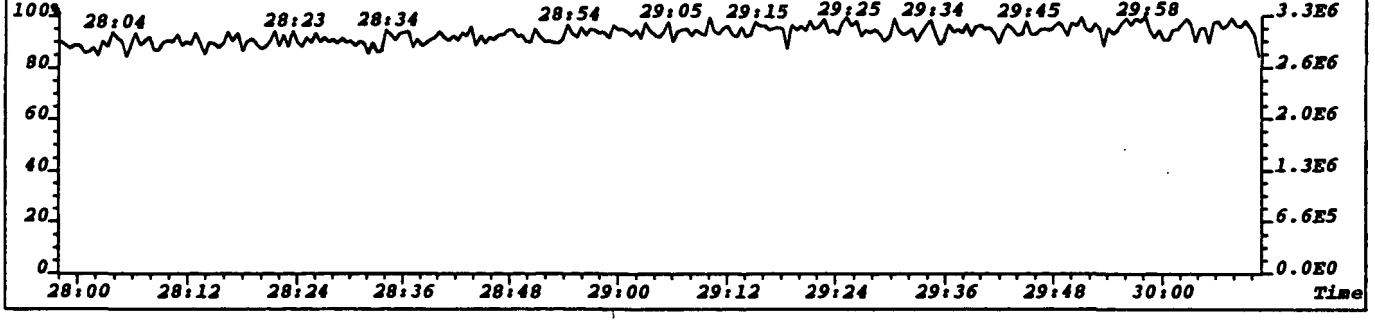
File:S976909 #1-445 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:111
401.8558 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,444.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



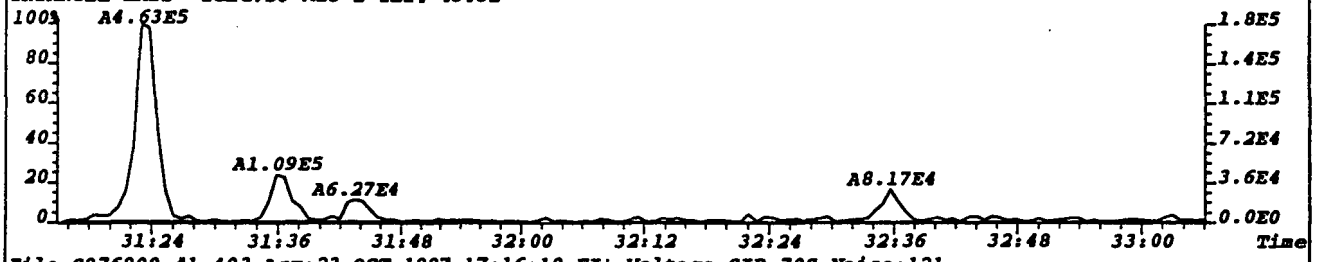
File:S976909 #1-445 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:140
403.8529 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,560.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



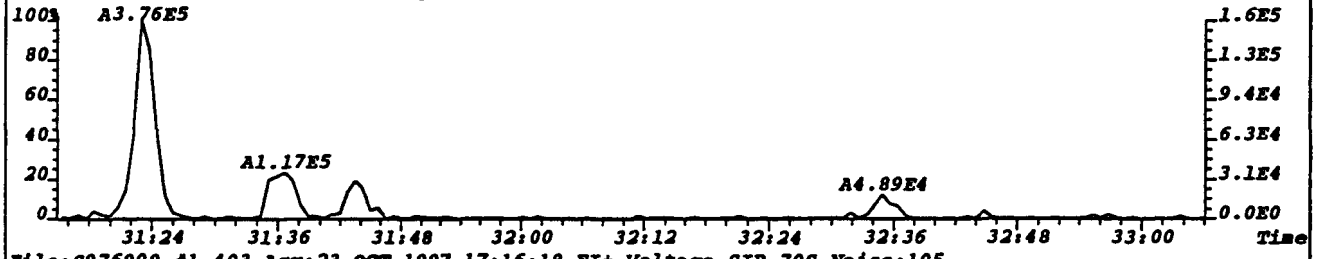
File:S976909 #1-445 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
392.9760 F:3 Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



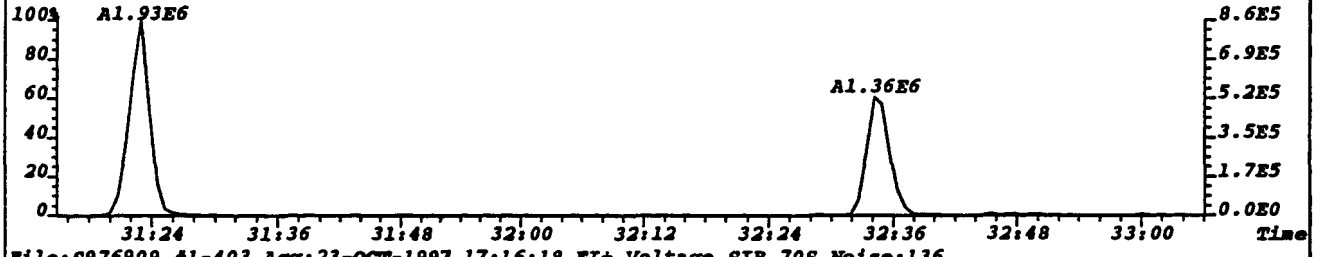
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:408
407.7818 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,1632.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



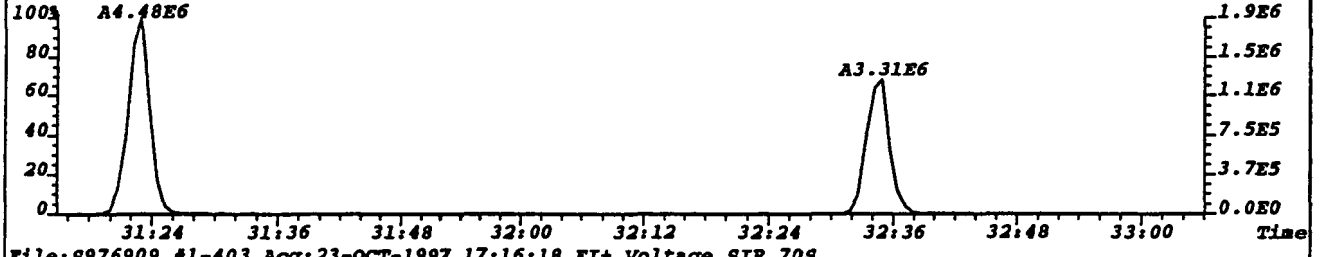
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:121
409.7789 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,484.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



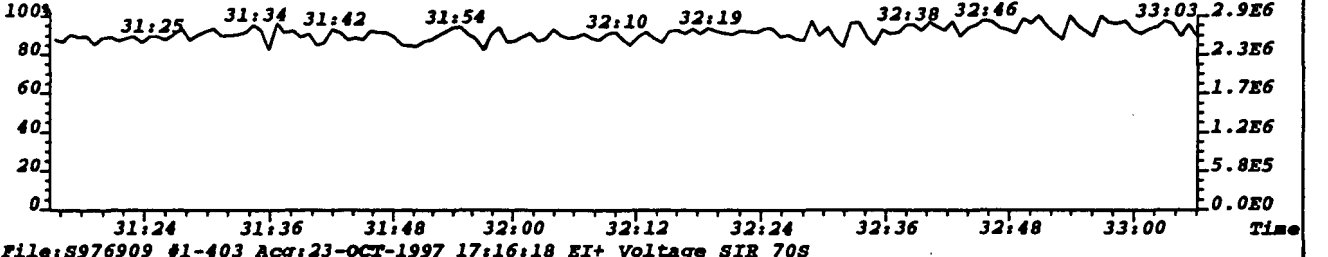
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:105
417.8253 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,420.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



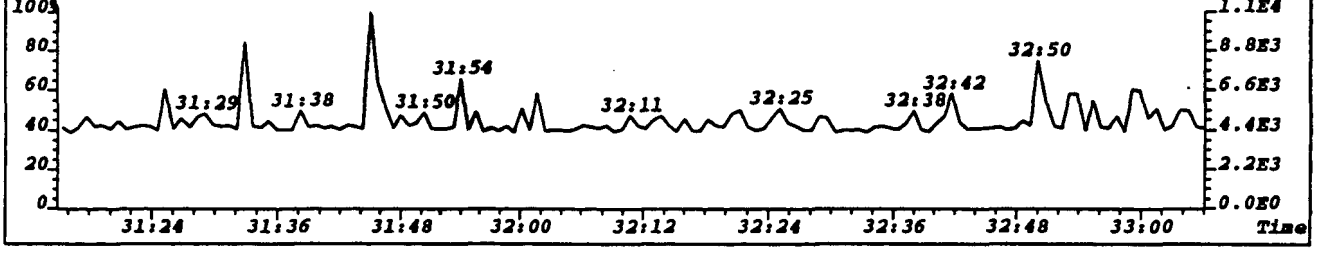
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:136
419.8220 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,544.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



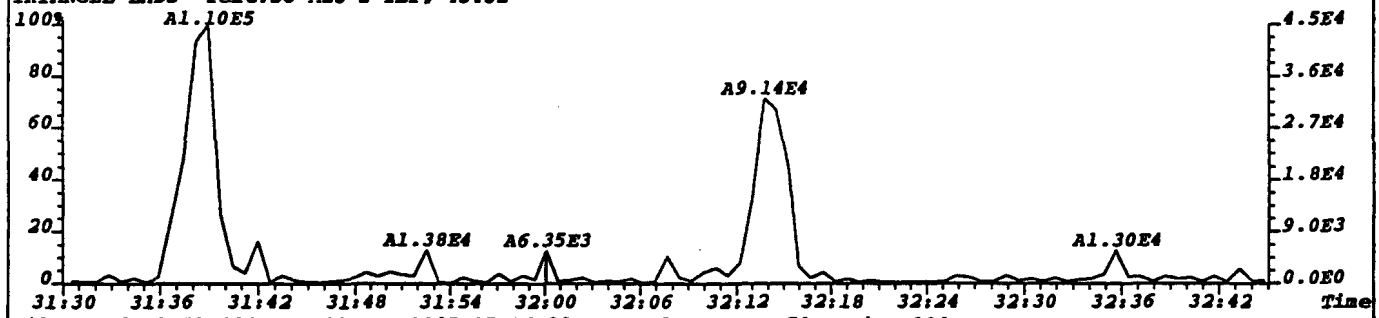
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



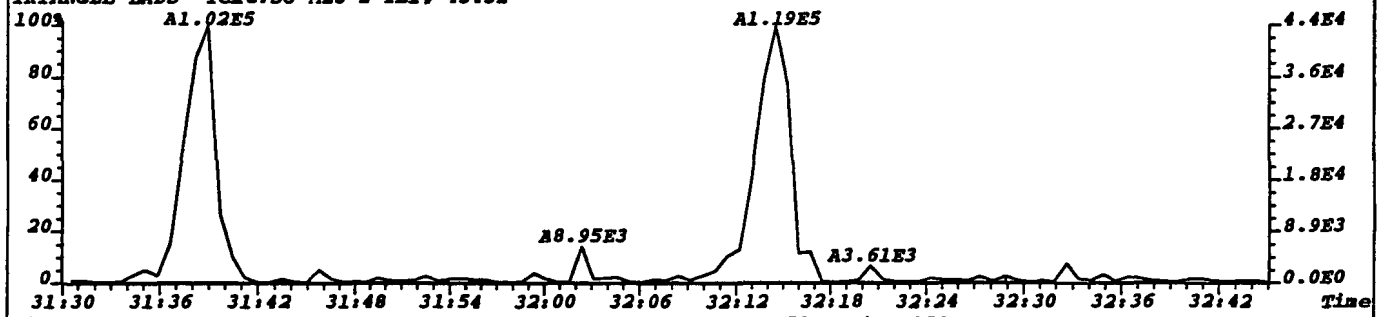
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
479.7165 F:4 Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



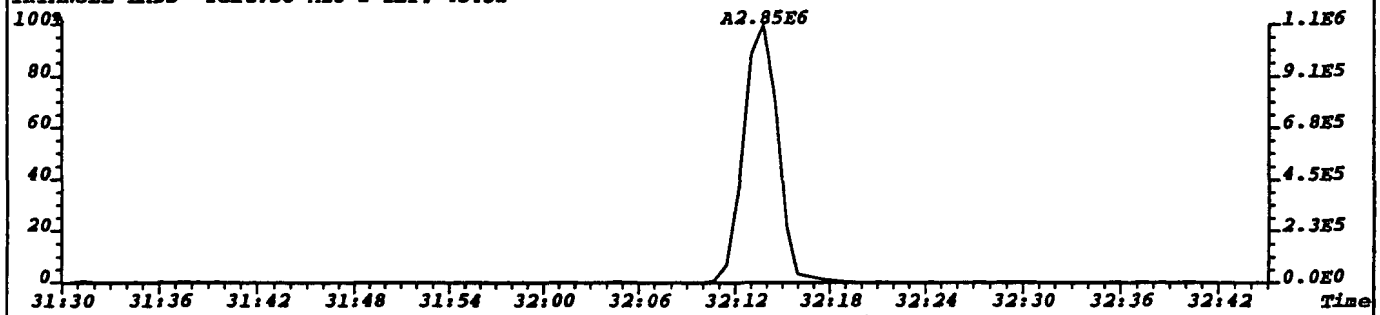
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:115
423.7766 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,460.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



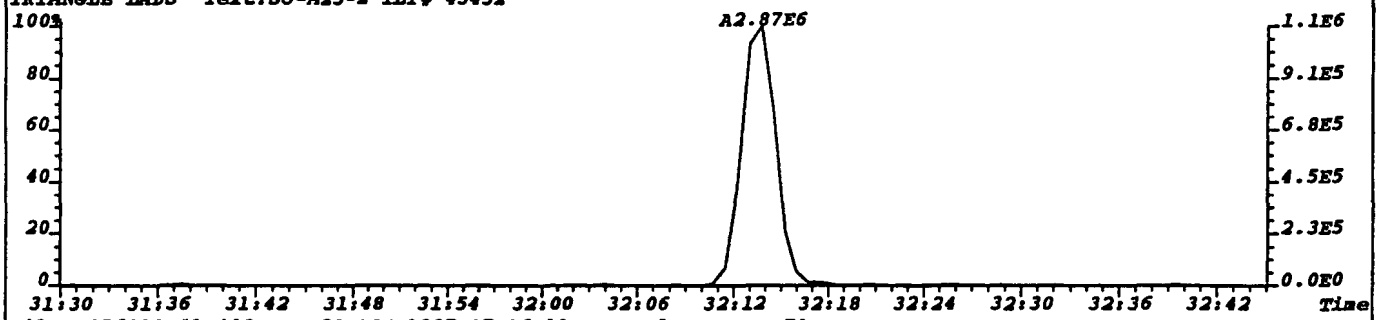
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:110
425.7737 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,440.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



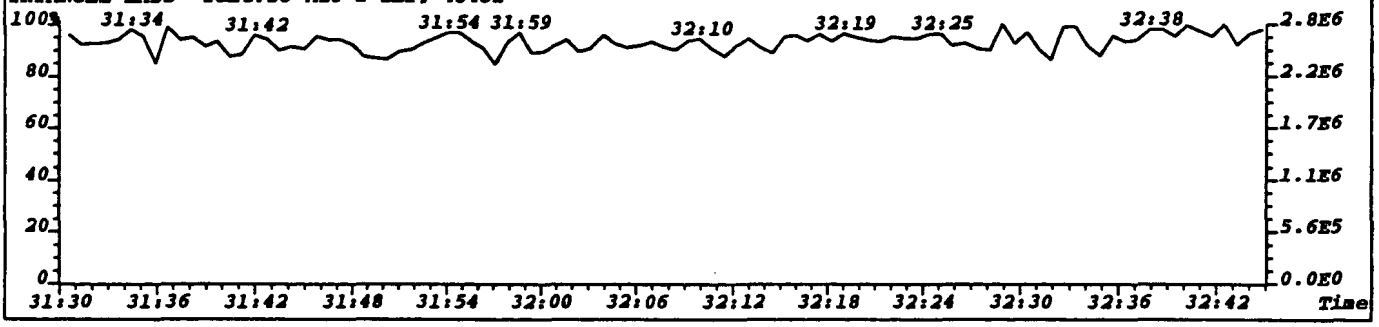
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:159
435.8169 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,636.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



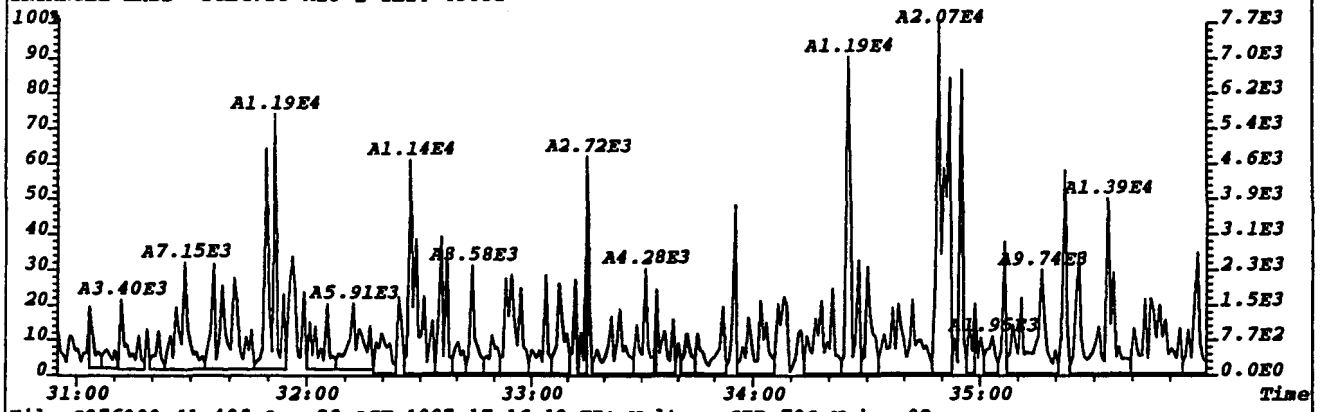
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:115
437.8140 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,460.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



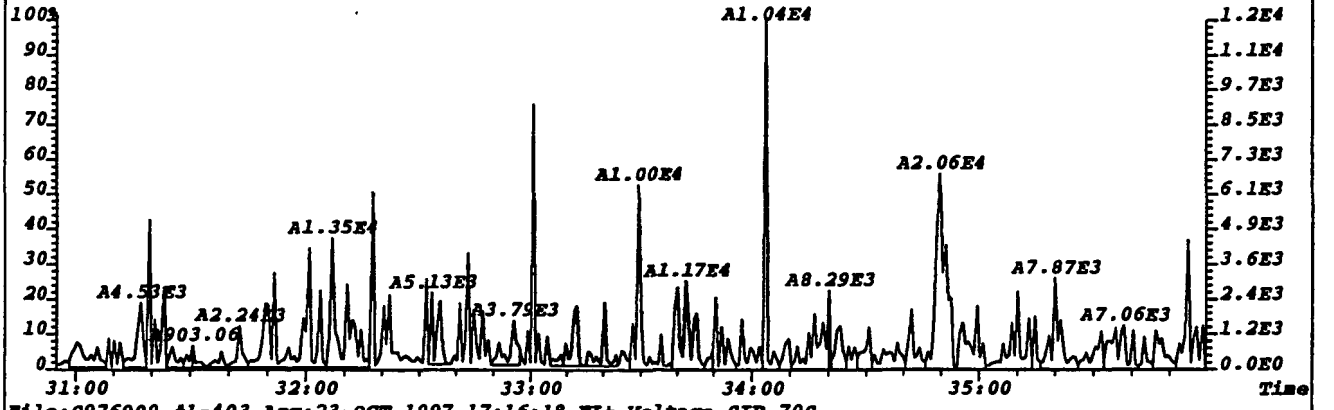
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



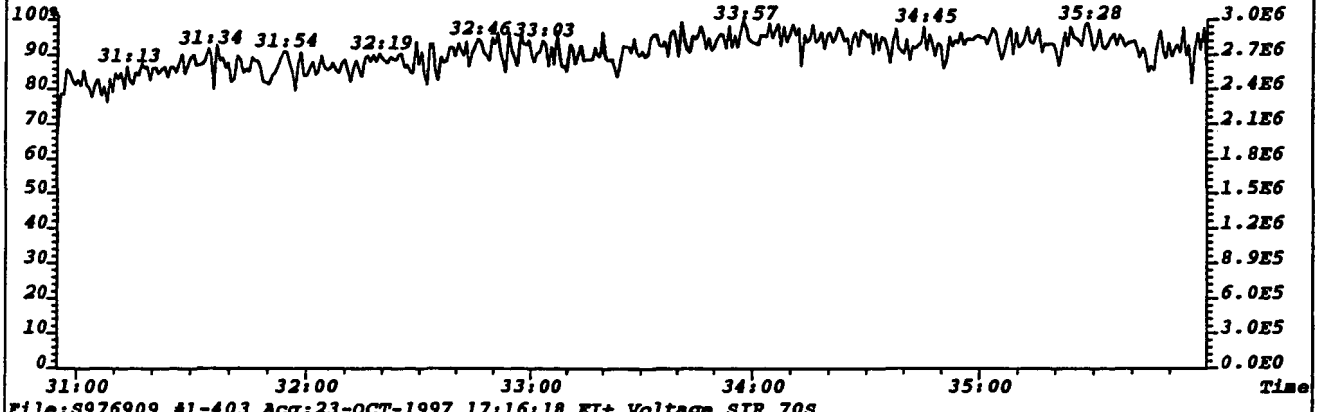
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:150
441.7428 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,600.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



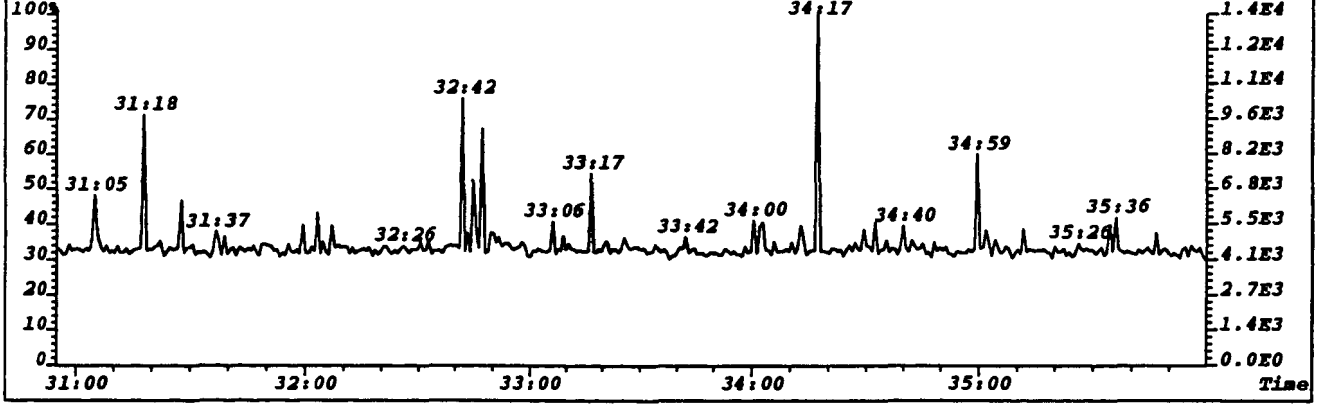
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:92
443.7399 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,368.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



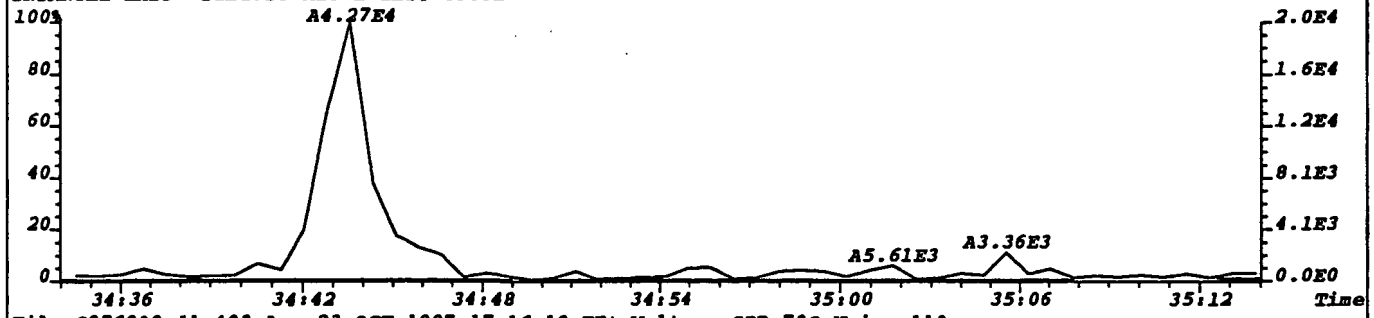
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



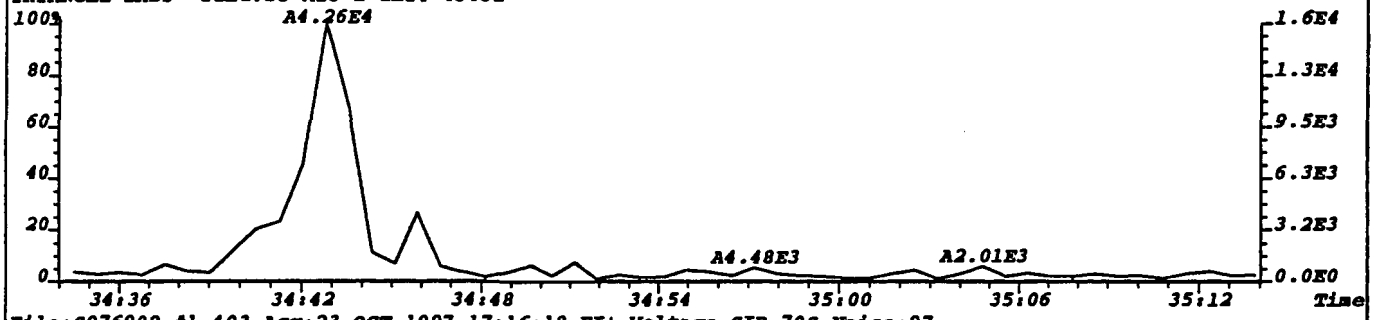
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
513.6775 F:4 Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



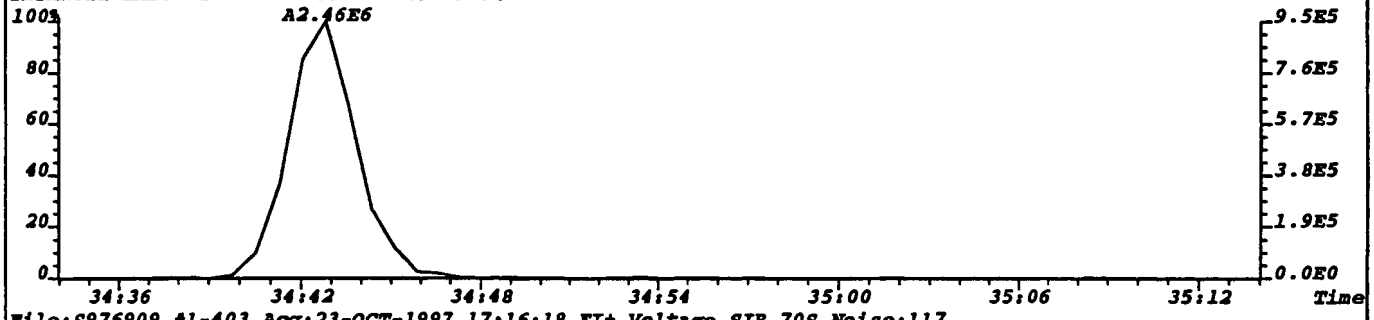
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:102
457.7377 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,408.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



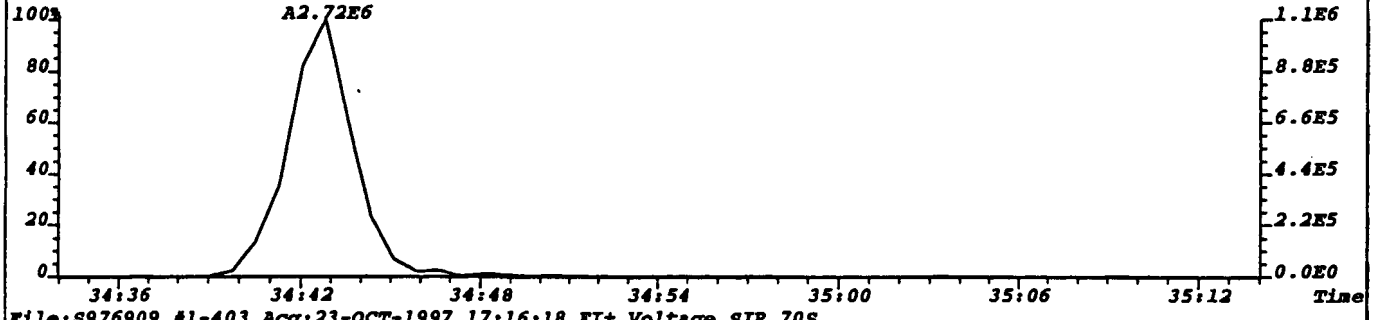
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:110
459.7348 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,440.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432



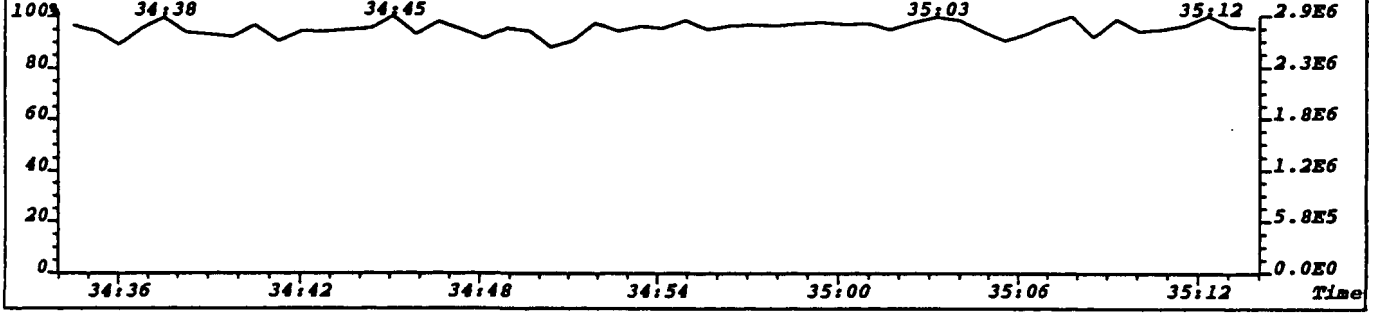
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:97
469.7779 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,388.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432

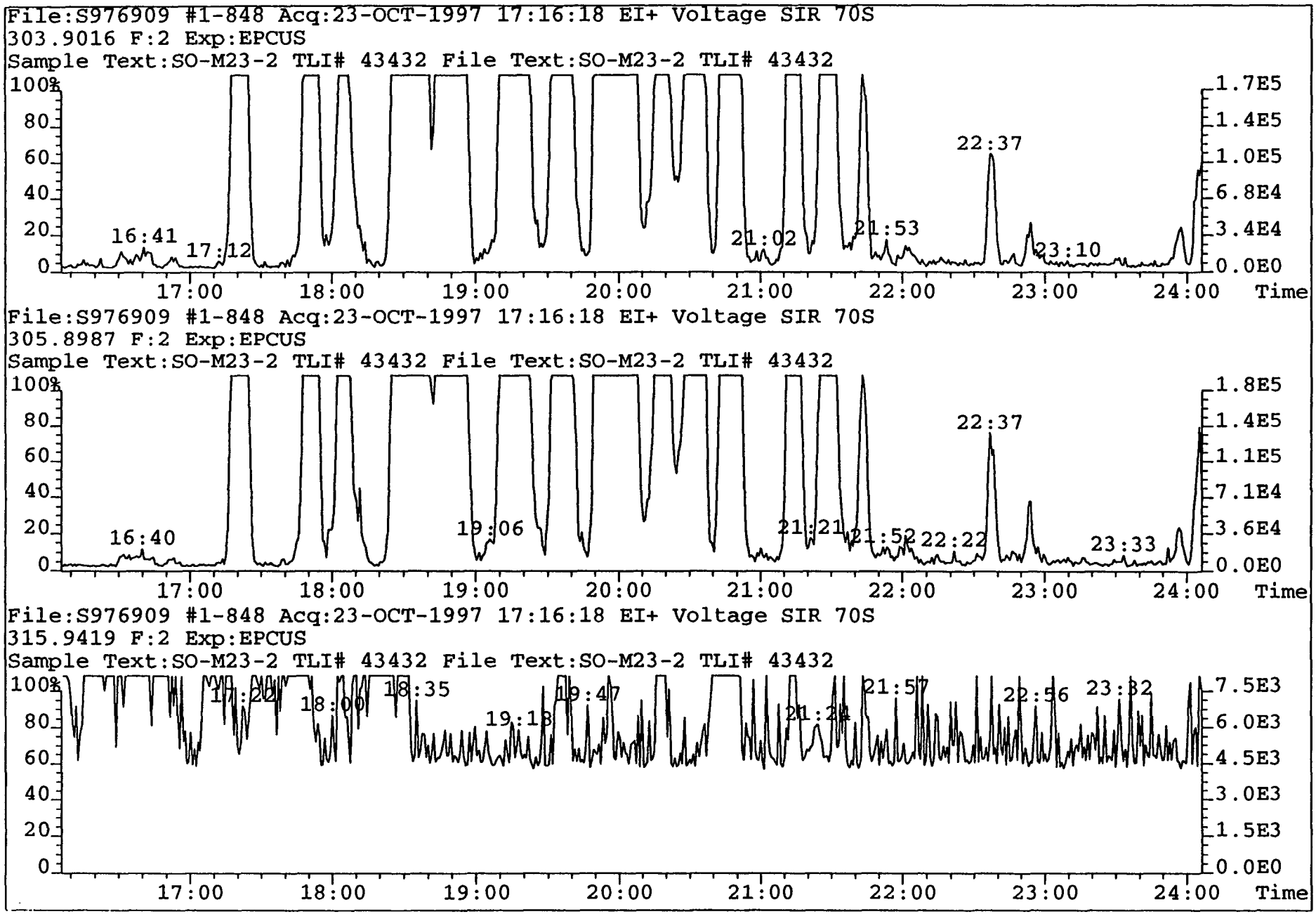


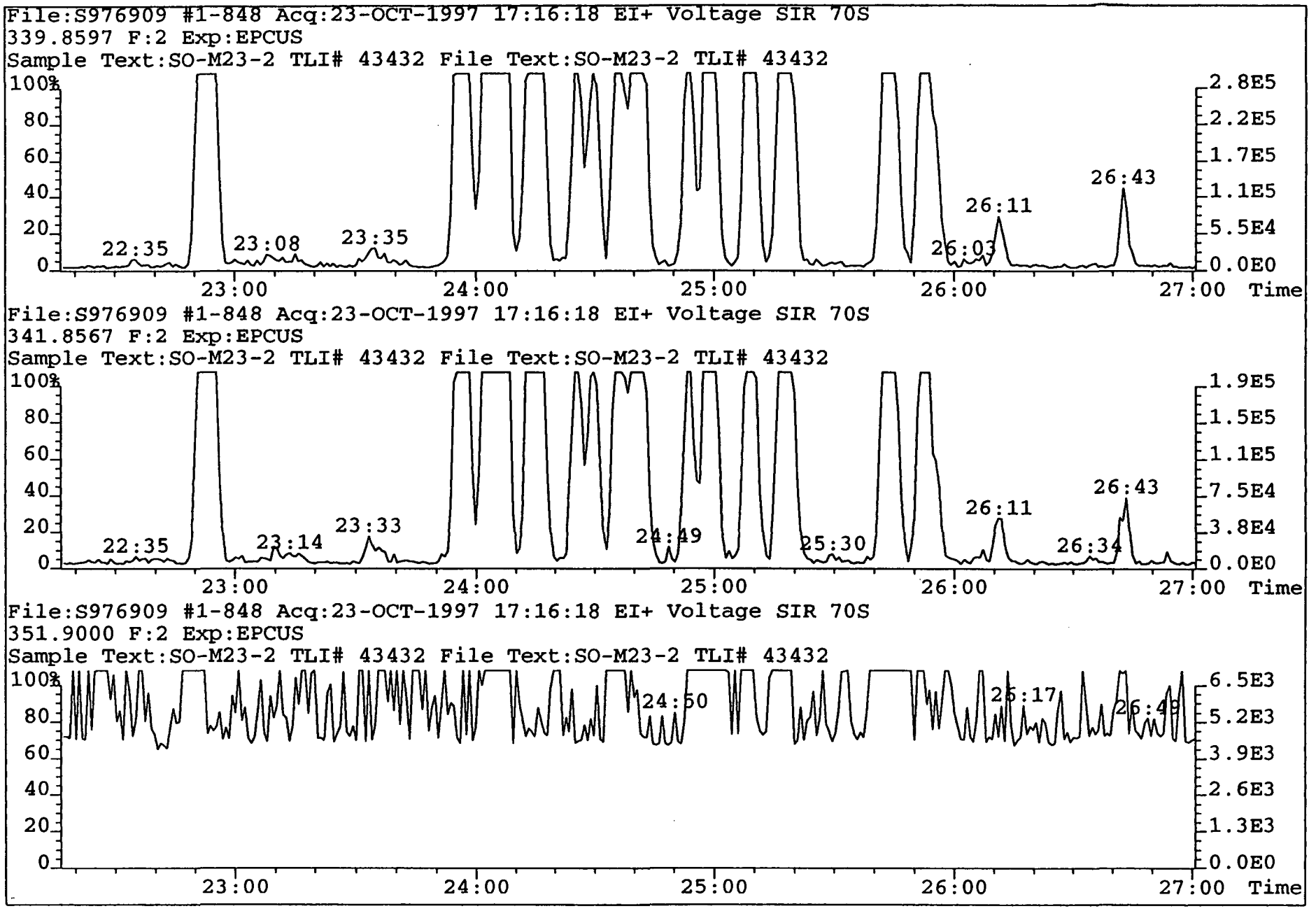
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S Noise:117
471.7750 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,468.0,1.00%,F,T) Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432

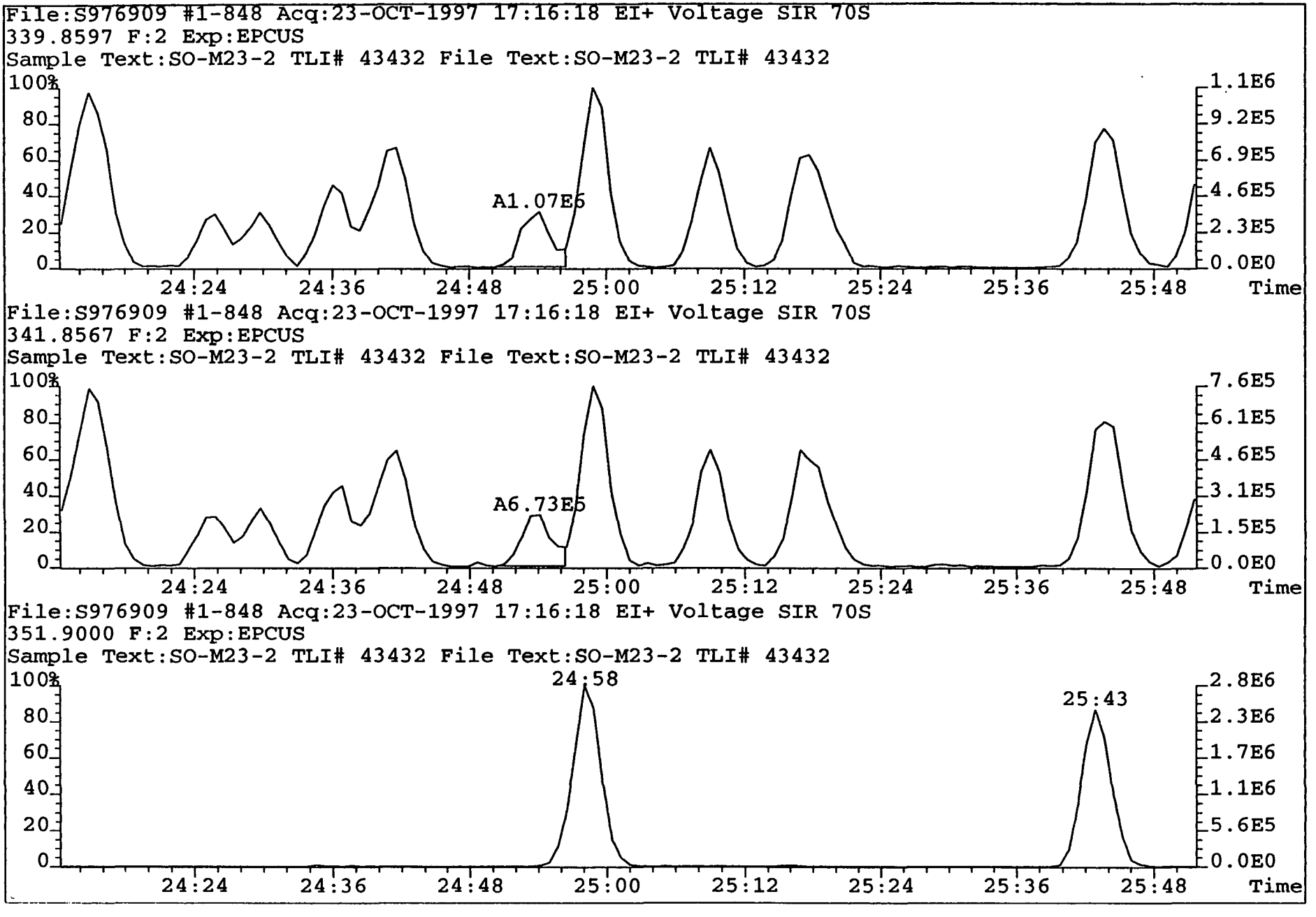


File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS
TRIANGLE LABS Text:SO-M23-2 TLI# 43432

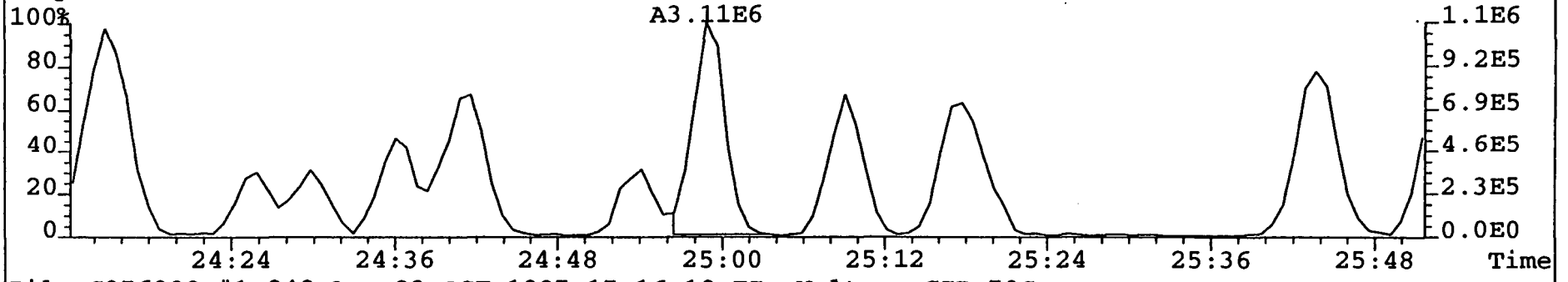



File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
303.9016 F:2 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432
100%
80
60
40
20
0
16:41
17:12
21:02
21:53
22:37
23:10
1.7E5
1.4E5
1.0E5
6.8E4
3.4E4
0.0E0
17:00
18:00
19:00
20:00
21:00
22:00
23:00
24:00
Time
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
305.8987 F:2 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432
100%
80
60
40
20
0
16:40
19:06
21:21
21:52
22:22
22:37
23:33
1.8E5
1.4E5
1.1E5
7.1E4
3.6E4
0.0E0
17:00
18:00
19:00
20:00
21:00
22:00
23:00
24:00
Time
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
315.9419 F:2 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432
100%
80
60
40
20
0
17:22
18:00
18:35
19:13
19:47
21:21
21:57
22:56
23:32
7.5E3
6.0E3
4.5E3
3.0E3
1.5E3
0.0E0
17:00
18:00
19:00
20:00
21:00
22:00
23:00
24:00
Time

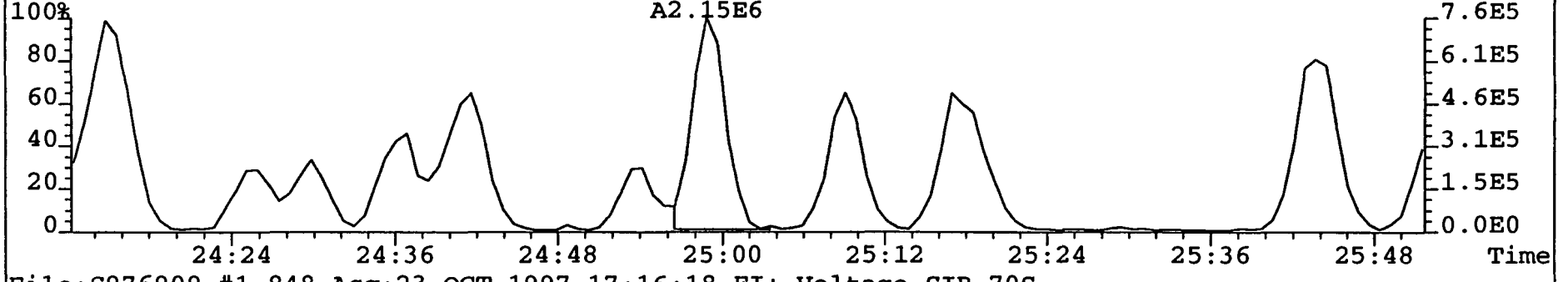

File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
339.8597 F:2 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432
100%
80
60
40
20
0
22:35
23:08
23:35
26:03
26:11
26:43
2.8E5
2.2E5
1.7E5
1.1E5
5.5E4
0.0E0
23:00
24:00
25:00
26:00
27:00
Time
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
341.8567 F:2 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432
100%
80
60
40
20
0
22:35
23:14
23:33
24:49
25:30
26:11
26:34
26:43
1.9E5
1.5E5
1.1E5
7.5E4
3.8E4
0.0E0
23:00
24:00
25:00
26:00
27:00
Time
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
351.9000 F:2 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432
100%
80
60
40
20
0
24:50
25:17
26:49
6.5E3
5.2E3
3.9E3
2.6E3
1.3E3
0.0E0
23:00
24:00
25:00
26:00
27:00
Time


File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
339.8597 F:2 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432
100%
80
60
40
20
0
A1.07E6
1.1E6
9.2E5
6.9E5
4.6E5
2.3E5
0.0E0
24:24
24:36
24:48
25:00
25:12
25:24
25:36
25:48
Time
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
341.8567 F:2 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432
100%
80
60
40
20
0
A6.73E5
7.6E5
6.1E5
4.6E5
3.1E5
1.5E5
0.0E0
24:24
24:36
24:48
25:00
25:12
25:24
25:36
25:48
Time
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
351.9000 F:2 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432
100%
80
60
40
20
0
24:58
25:43
2.8E6
2.3E6
1.7E6
1.1E6
5.6E5
0.0E0
24:24
24:36
24:48
25:00
25:12
25:24
25:36
25:48
Time

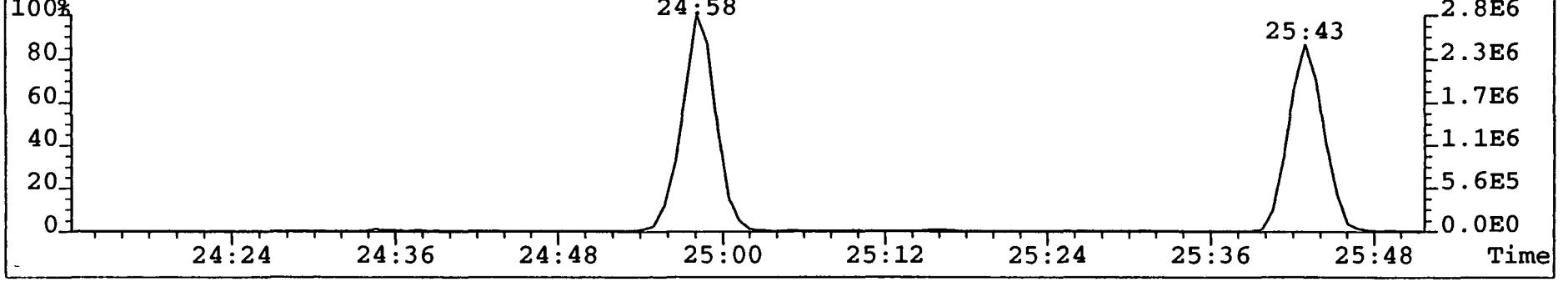
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
339.8597 F:2 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432

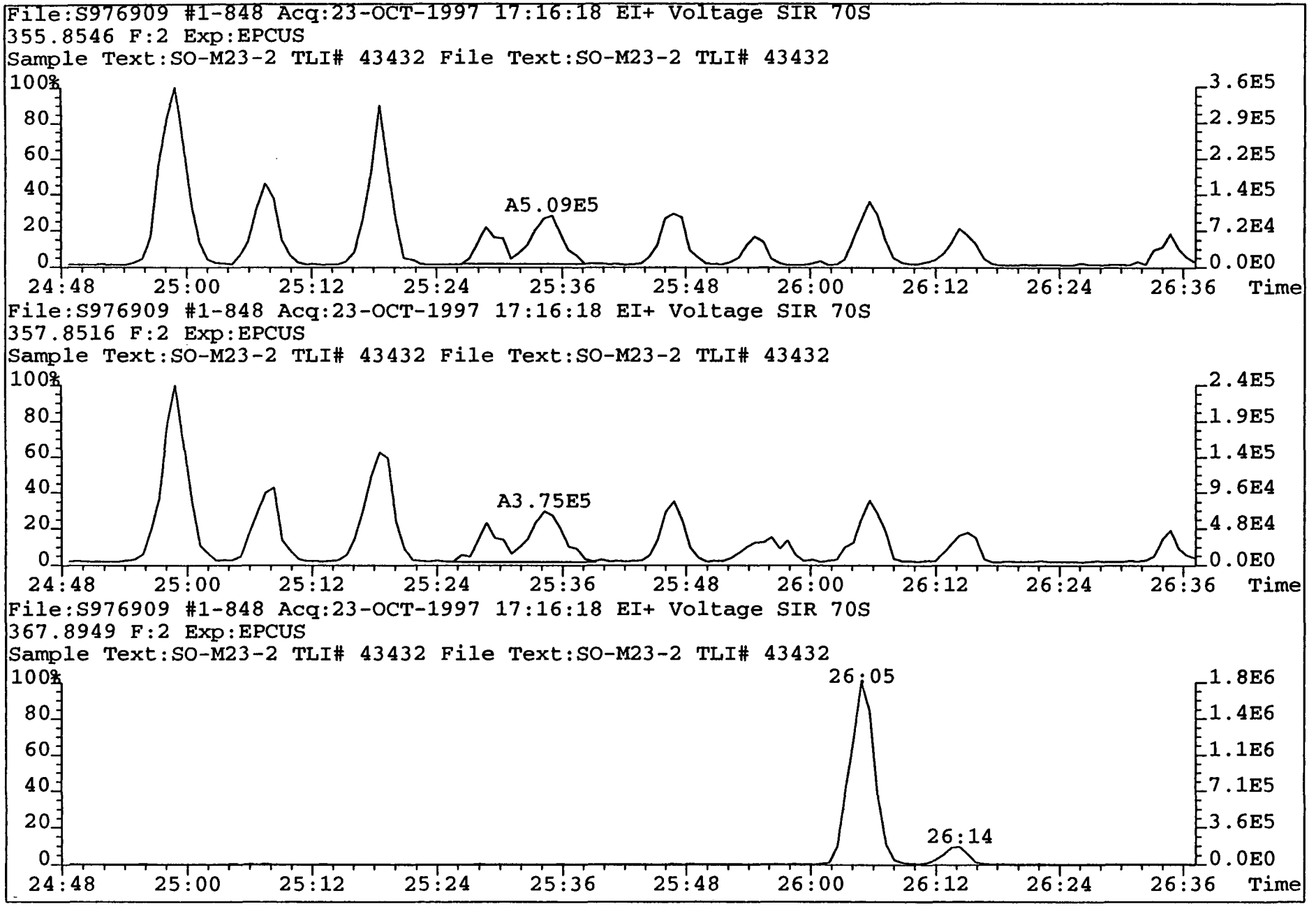


File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
341.8567 F:2 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432

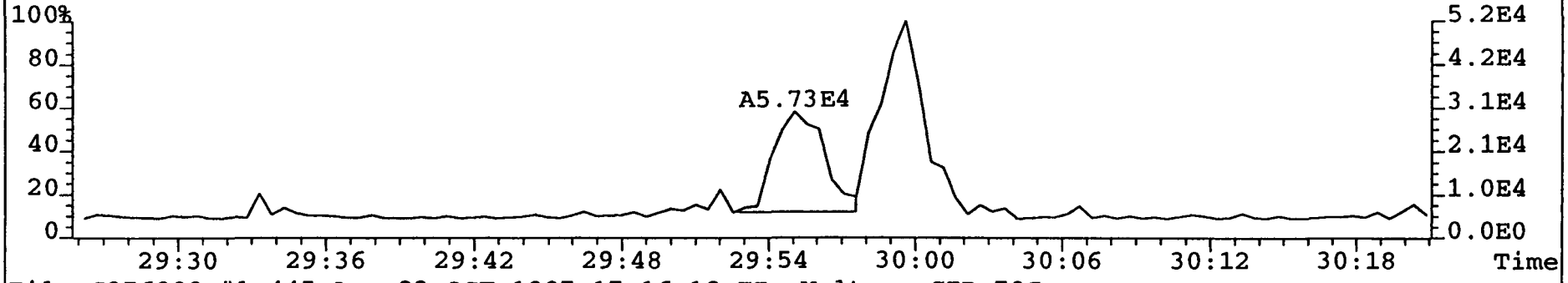


File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
351.9000 F:2 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432

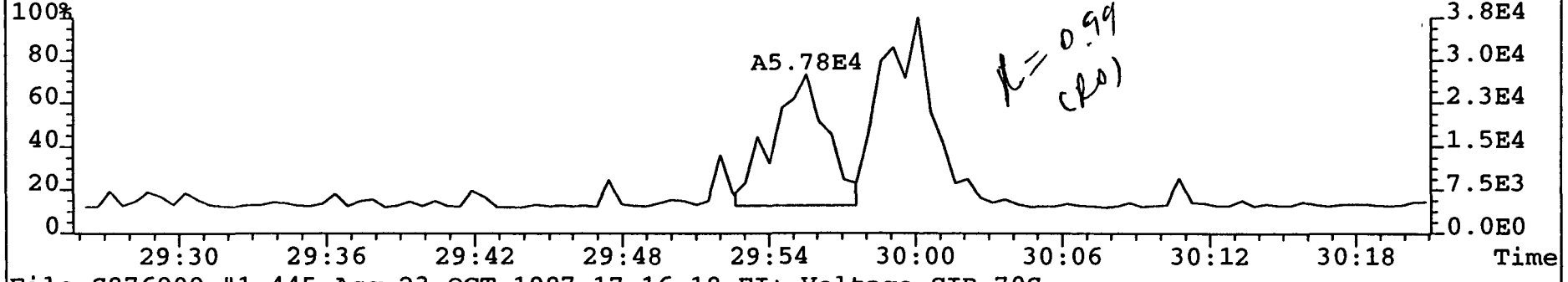



File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
355.8546 F:2 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432
100%
80
60
40
20
0
A5.09E5
3.6E5
2.9E5
2.2E5
1.4E5
7.2E4
0.0E0
24:48
25:00
25:12
25:24
25:36
25:48
26:00
26:12
26:24
26:36
Time
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
357.8516 F:2 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432
100%
80
60
40
20
0
A3.75E5
2.4E5
1.9E5
1.4E5
9.6E4
4.8E4
0.0E0
24:48
25:00
25:12
25:24
25:36
25:48
26:00
26:12
26:24
26:36
Time
File:S976909 #1-848 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
367.8949 F:2 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432
100%
80
60
40
20
0
26:05
26:14
1.8E6
1.4E6
1.1E6
7.1E5
3.6E5
0.0E0
24:48
25:00
25:12
25:24
25:36
25:48
26:00
26:12
26:24
26:36
Time

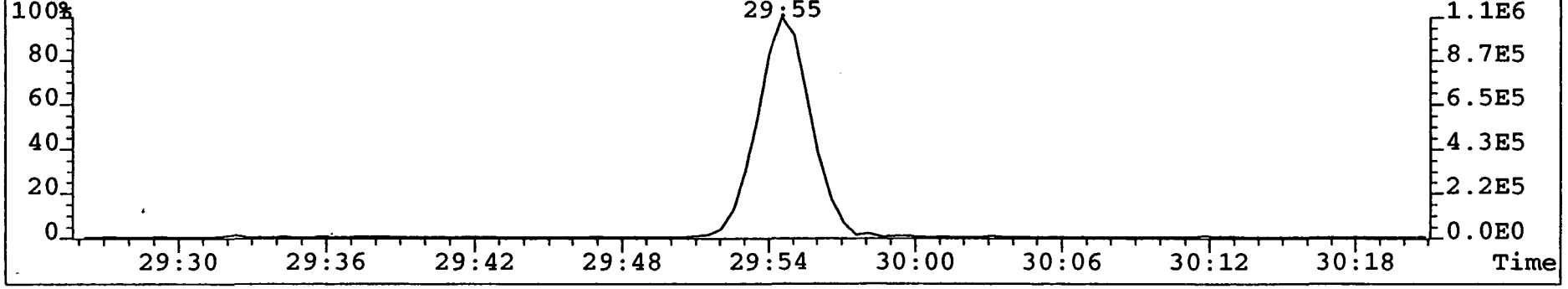
File:S976909 #1-445 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
373.8208 F:3 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432

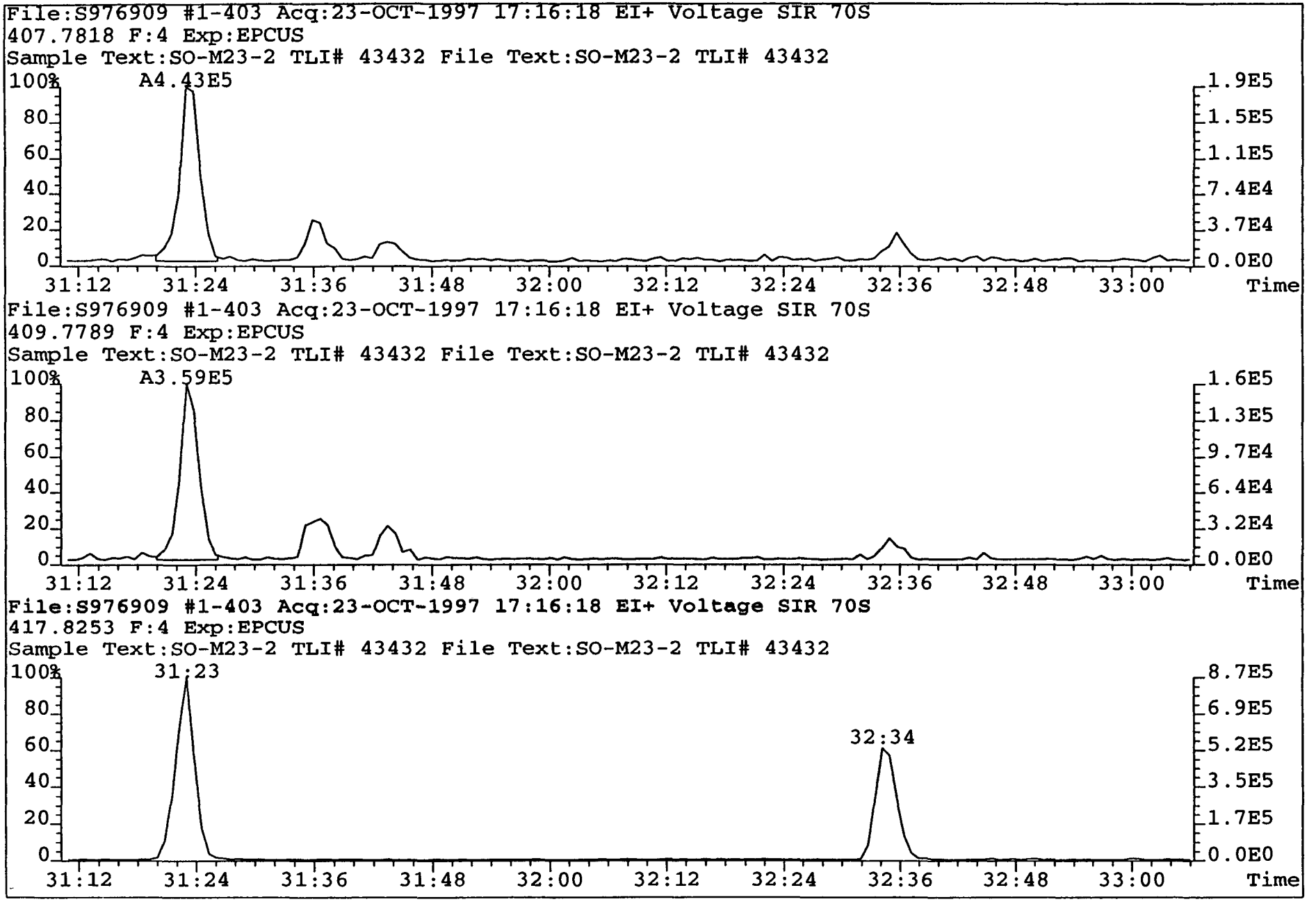


File:S976909 #1-445 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
375.8178 F:3 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432

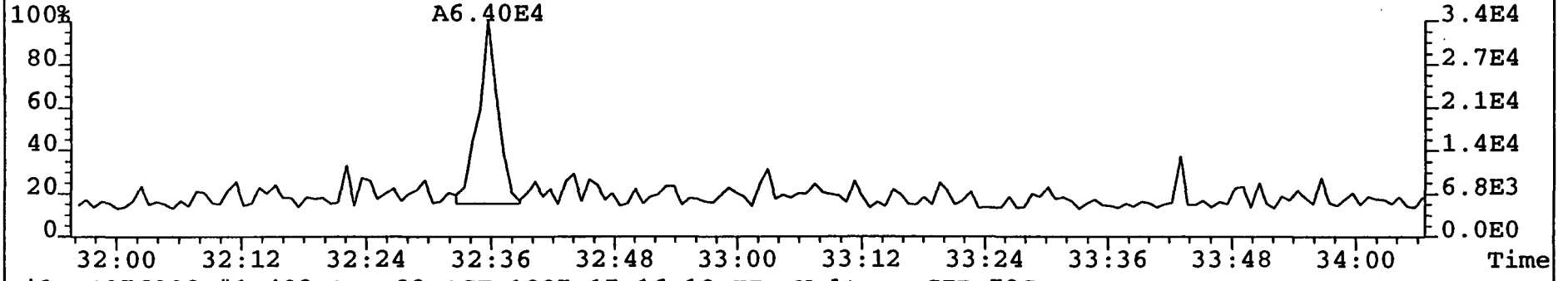


File:S976909 #1-445 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
383.8639 F:3 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432

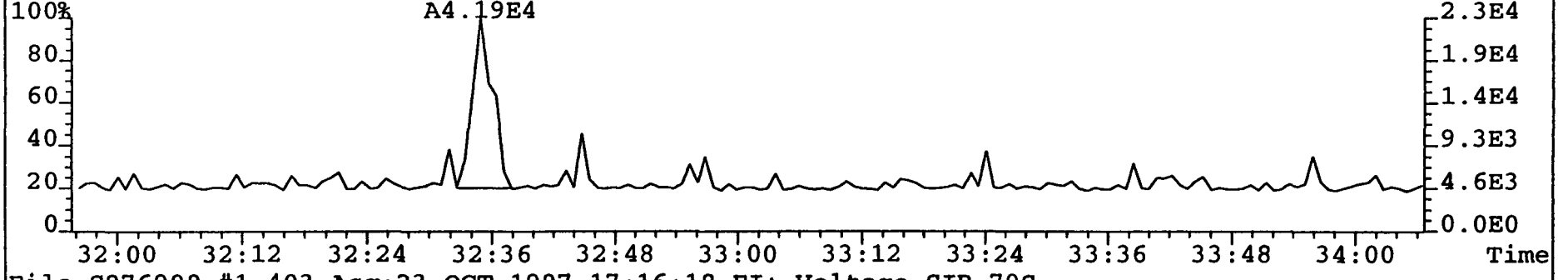



File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
407.7818 F:4 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432
A4.43E5
100%
80
60
40
20
0
1.9E5
1.5E5
1.1E5
7.4E4
3.7E4
0.0E0
31:12
31:24
31:36
31:48
32:00
32:12
32:24
32:36
32:48
33:00
Time
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
409.7789 F:4 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432
A3.59E5
100%
80
60
40
20
0
1.6E5
1.3E5
9.7E4
6.4E4
3.2E4
0.0E0
31:12
31:24
31:36
31:48
32:00
32:12
32:24
32:36
32:48
33:00
Time
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
417.8253 F:4 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432
31:23
32:34
100%
80
60
40
20
0
8.7E5
6.9E5
5.2E5
3.5E5
1.7E5
0.0E0
31:12
31:24
31:36
31:48
32:00
32:12
32:24
32:36
32:48
33:00
Time

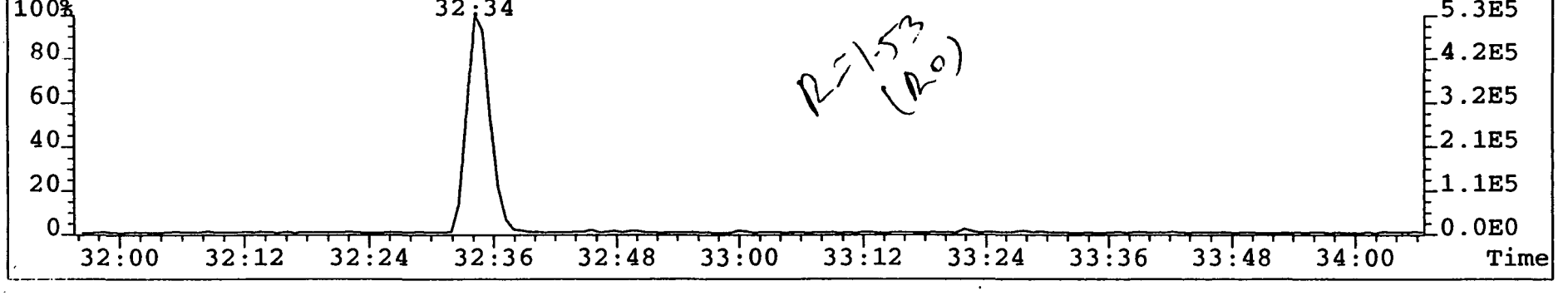
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
407.7818 F:4 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432



File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
409.7789 F:4 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432

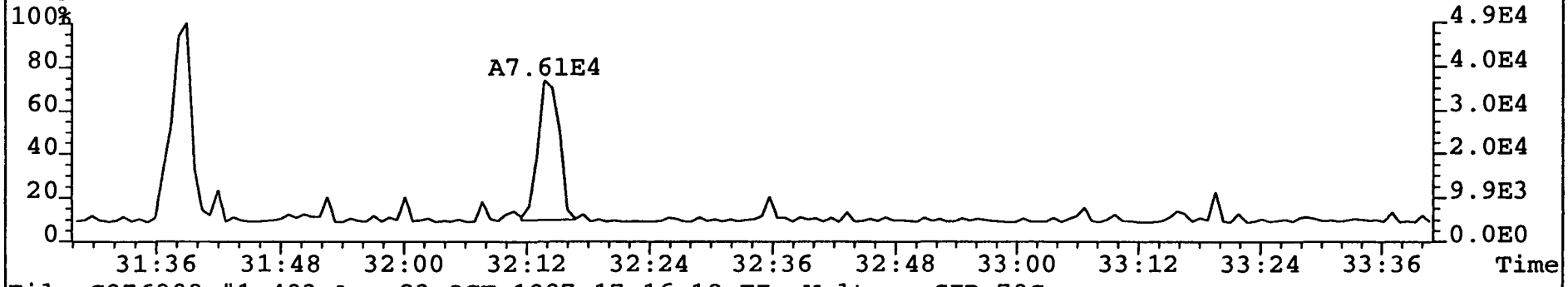


File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
417.8253 F:4 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432

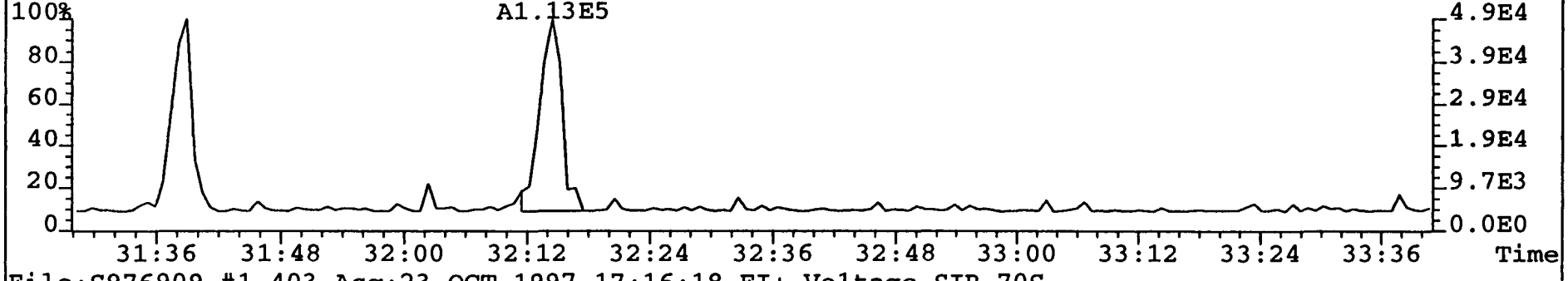


R=1.53
(R0)

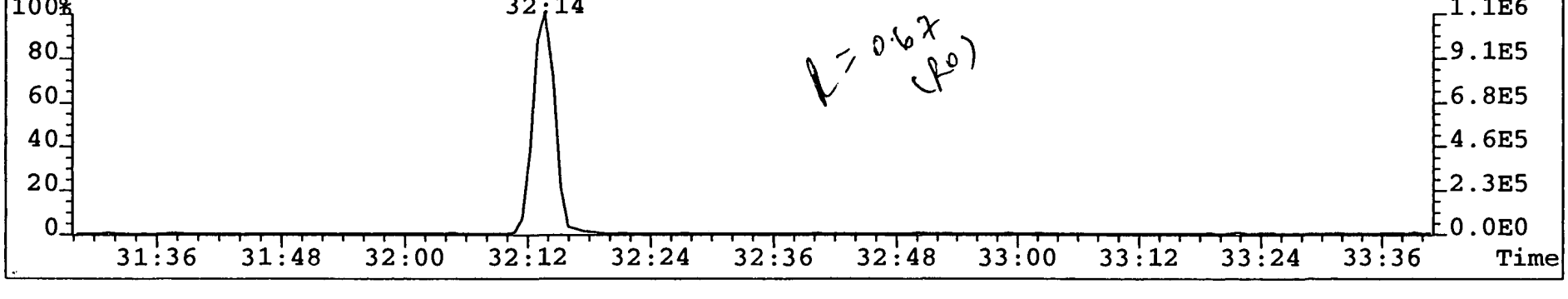
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
423.7766 F:4 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432



File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
425.7737 F:4 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432

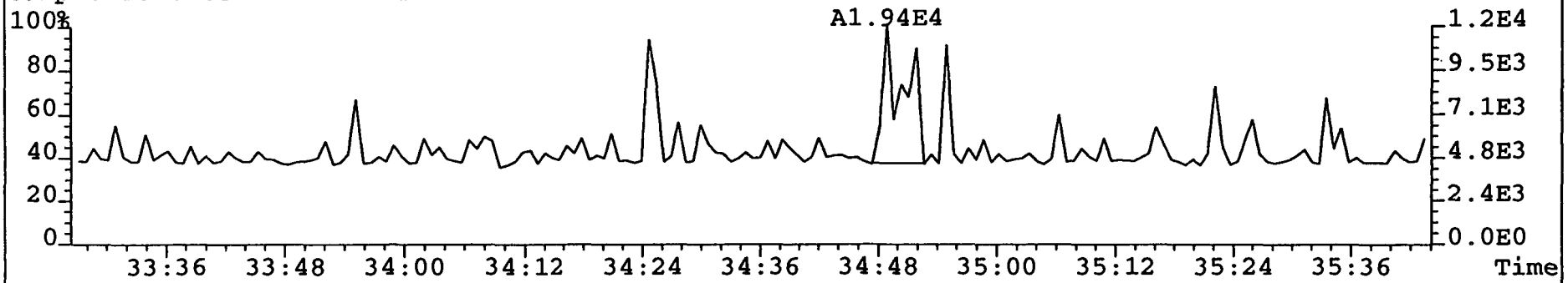


File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
435.8169 F:4 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432

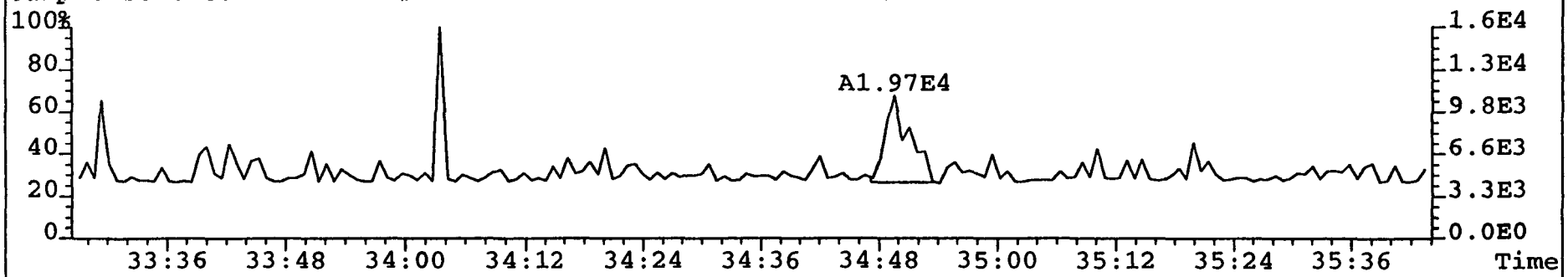


R = 0.67 (Ro)

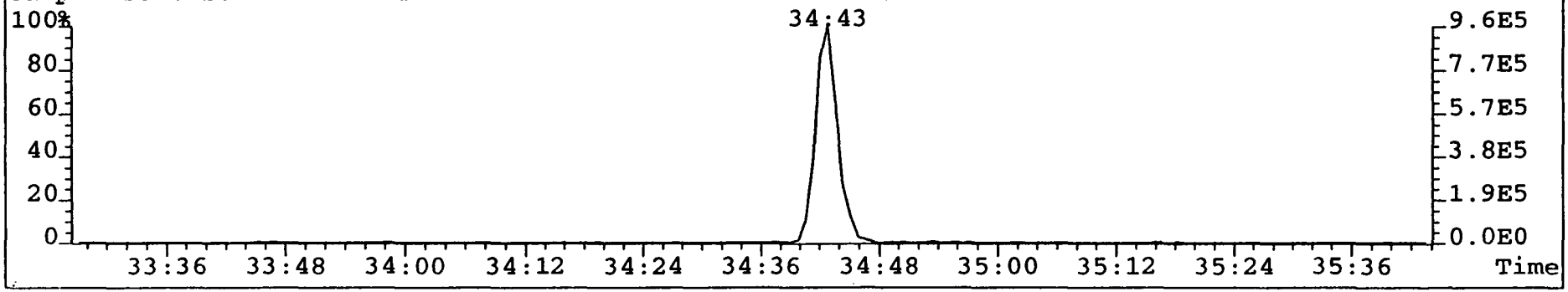
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
441.7428 F:4 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432



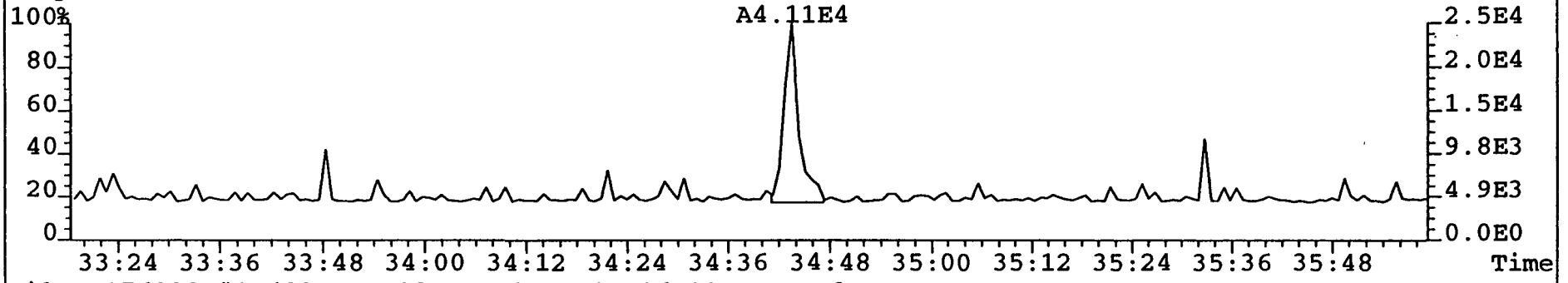
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
443.7399 F:4 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432



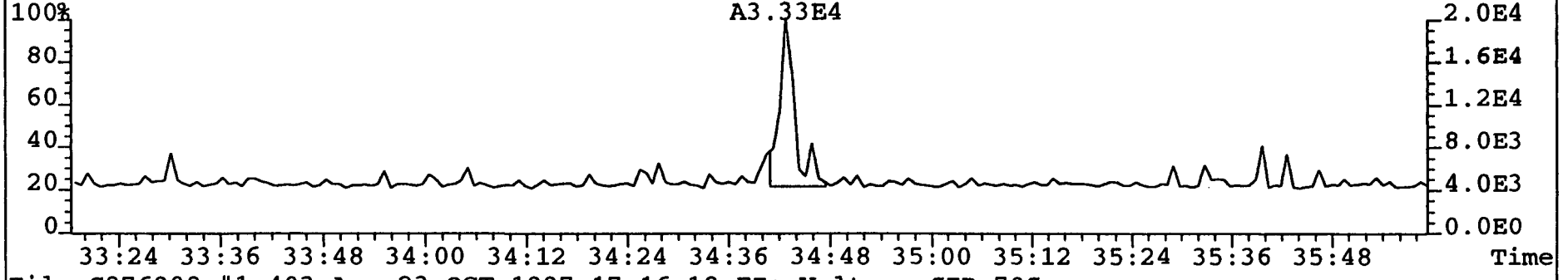
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
469.7779 F:4 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432



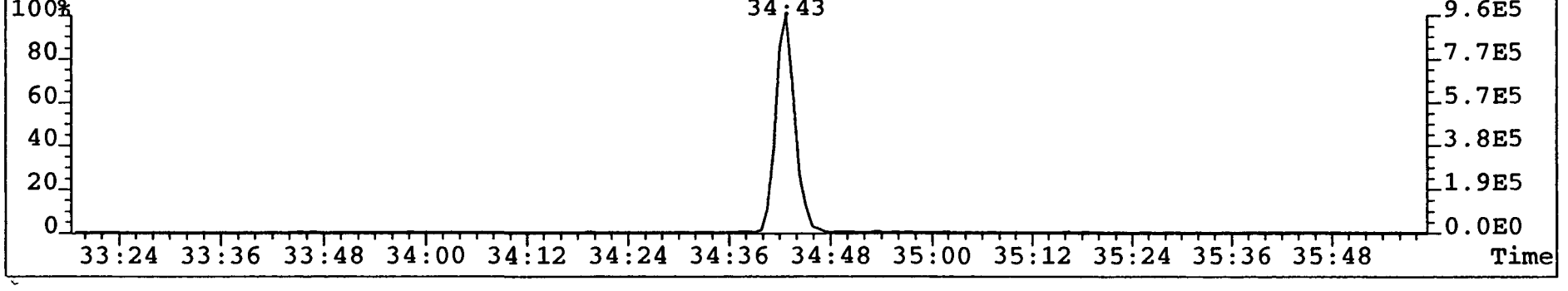
File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
457.7377 F:4 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432



File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
459.7348 F:4 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432



File:S976909 #1-403 Acq:23-OCT-1997 17:16:18 EI+ Voltage SIR 70S
469.7779 F:4 Exp:EPCUS
Sample Text:SO-M23-2 TLI# 43432 File Text:SO-M23-2 TLI# 43432



Pacific Environmental Services

TLI Project: **43432** Method 23 TCDD/TCDF Analysis (DB-225)
Client Sample: **SO-23-2** Analysis File: **X973637**

Client Project:	**Saginaw, MI**				
Sample Matrix:	**M23TRAIN**	Date Received:	**09/29/97**	Spike File:	**SPC2NF04**
TLI ID:	**185-6-2A-C**	Date Extracted:	**10/09/97**	ICal:	**XF24087**
		Date Analyzed:	**10/18/97**	ConCal:	**X973633**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U973257**	% Lipid:	**n/a**
GC Column:	**DB-225**	Analyst:	**WK**	% Solids:	**n/a**

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDF	2.3			0.81	24:34	—

Internal Standard	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	4.1	102	40%-130%	0.81	24:32	—

Recovery Standard	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.77	23:19	—

Data Reviewer: VC 10/23/97

C2NF_PSR v2.00, LARS 6.10.04

Triangle Laboratories, Inc.®
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Printed: 23:35 10/23/97

Initial ....Date...

Data Review By: VC 10/21/97 Calculated Noise Area: n/a

The Total Area for each peak with an ion abundance ratio outside ratio limits has been recalculated according to method requirements.

Page No. 1 Listing of X973637B.dbf
10/21/97 Matched GC Peaks / Ratio / Ret. Time

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
TCDF						0.65-0.89				0.798-1.112			
304-306	DC	NL		0:00		0.66	21.56			0.000			
				19:46		0.80	8,495.70	3,766.87	4,728.83	0.806			
	DC	SN		19:53	RO	3.00	62.55			0.810			
	DC	SN		20:02	RO	1.01	73.76			0.817			
	DC	SN		20:14	RO	0.60	39.58			0.825			
	DC	SN		20:24	RO	1.34	148.95			0.832			
				20:47		0.79	13,320.82	5,869.09	7,451.73	0.847			
				20:55		0.77	7,752.27	3,377.05	4,375.22	0.853			
				21:03		0.78	8,644.06	3,782.61	4,861.45	0.858			
				21:14		0.78	7,099.25	3,117.04	3,982.21	0.865			
	DC	SN		21:21		0.72	169.50			0.870			
				21:30		0.76	4,675.95	2,021.87	2,654.08	0.876			
				21:39		0.79	6,195.78	2,728.44	3,467.34	0.882			
				21:49		0.78	2,341.81	1,023.23	1,318.58	0.889			
				21:59		0.78	15,202.73	6,682.46	8,520.27	0.896			
				22:06		0.76	4,162.71	1,800.26	2,362.45	0.901			
	DC	SN		22:14		0.80	78.00			0.906			
	DC	SN		22:20	RO	0.61	43.40			0.910			
				22:31		0.75	7,726.96	3,314.63	4,412.33	0.918			
				22:36		0.77	5,226.59	2,281.35	2,945.24	0.921			
	DC	SN		22:44		0.81	104.58			0.927			
				23:00		0.79	6,044.28	2,664.57	3,379.71	0.938			
				23:07		0.73	1,175.93	494.50	681.43	0.942			
				23:15		0.79	5,631.71	2,485.71	3,146.00	0.948			
				23:31		0.79	5,798.13	2,553.03	3,245.10	0.959			
				23:46		0.82	707.60	317.89	389.71	0.969			
				23:57		0.77	4,023.08	1,750.34	2,272.74	0.976			
				24:25		0.80	3,633.01	1,611.11	2,021.90	0.995			
				24:34		0.81	4,152.48	1,852.31	2,300.17	1.001	2378-TCDF		AN
				24:48		0.81	3,185.56	1,428.29	1,757.27	1.011			
				25:07		0.78	2,895.64	1,270.67	1,624.97	1.024			
				25:17		0.78	6,382.38	2,788.82	3,593.56	1.031			
	DC	SN		25:55		0.76	11.19			1.056			
				26:14		0.78	3,455.95	1,517.73	1,938.22	1.069			
	DC	SN		26:23	RO	0.91	19.52			1.075			
	DC	SN		26:58	RO	1.23	17.75			1.099			
				27:06		0.80	391.69	173.82	217.87	1.105			
	DC	WH		27:21	RO	0.43	4.30			1.115			
	DC	WH		27:33	RO	3.24	7.01			1.123			
304-306			25	Peaks			138,322.07						
13C12-TCDF						0.65-0.89				0.959-1.041			
316-318	DC	NL		0:00		0.77	19.98			0.000			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
	DC	WL		21:04	RO	2.38	4.53			0.859			
	DC	WL		22:59	RO	1.18	29.06			0.937			
	DC	WL		23:14	RO	0.26	11.98			0.947			
	DC	WL		23:20	RO	1.04	8.16			0.951			
	DC	SN		23:37	RO	1.19	5.20			0.963			
				24:32		0.81	7,632.04	3,415.57	4,216.47	1.000	13C12-2378-TCDF	IS0	
	DC	SN		24:45	RO	0.20	6.34			1.009			
	DC	SN		25:16	RO	0.21	10.44			1.030			
	DC	WH		26:59	RO	1.19	70.78			1.100			
316-318			1	Peak			7,632.04						

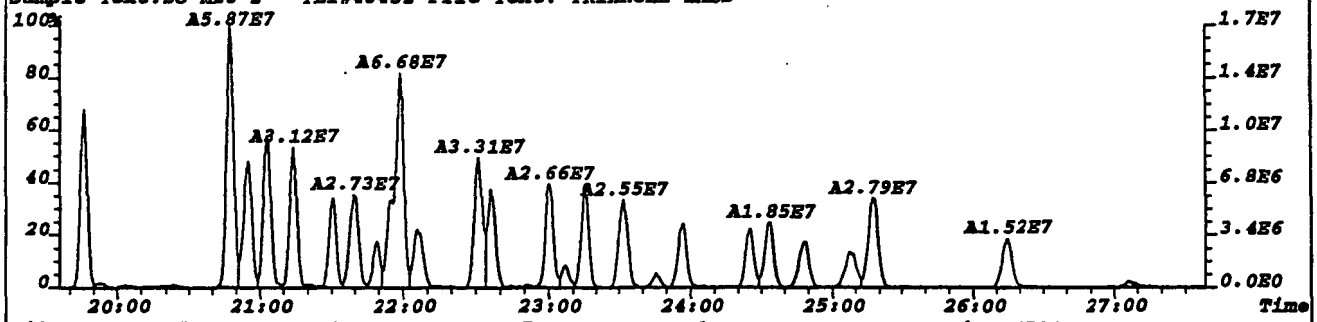
---------- Above: TCDF / TCDD Follows ----------

13C12-TCDD					0.65-0.89					0.913-1.087			
332-334	DC	NL		0:00	RO	1.63	7.59			0.000			
	DC	SN		21:03	RO	2.41	4.80			0.915			
	DC	SN		22:00	RO	1.09	6.58			0.957			
				23:00		0.80	5,214.85	2,316.60	2,898.25	1.000	13C12-2378-TCDD	IS1	
				23:19		0.77	5,391.44	2,347.91	3,043.53	1.014	13C12-1234-TCDD	RS1	
	DC	SN		23:32	RO	1.00	30.64			1.023			
	DC	SN		23:37	RO	0.53	3.31			1.027			
	DC	SN		24:05	RO	0.59	53.79			1.047			
	DC	SN		24:15	RO	0.59	3.56			1.054			
	DC	SN		24:39	RO	4.03	2.57			1.072			
	DC	SN		24:42	RO	0.49	8.32			1.074			
	DC	SN		24:45	RO	2.22	6.85			1.076			
	DC	SN		24:59		0.80	7.32			1.086			
	DC	WH		25:25	RO	8.21	2.19			1.105			
	DC	WH		26:03	RO	0.50	7.65			1.133			
	DC	WH		26:11	RO	1.64	6.99			1.138			
	DC	WH		26:24	RO	2.46	3.56			1.148			
	DC	WH		26:41	RO	1.38	6.00			1.160			
332-334			2	Peaks			10,606.29						

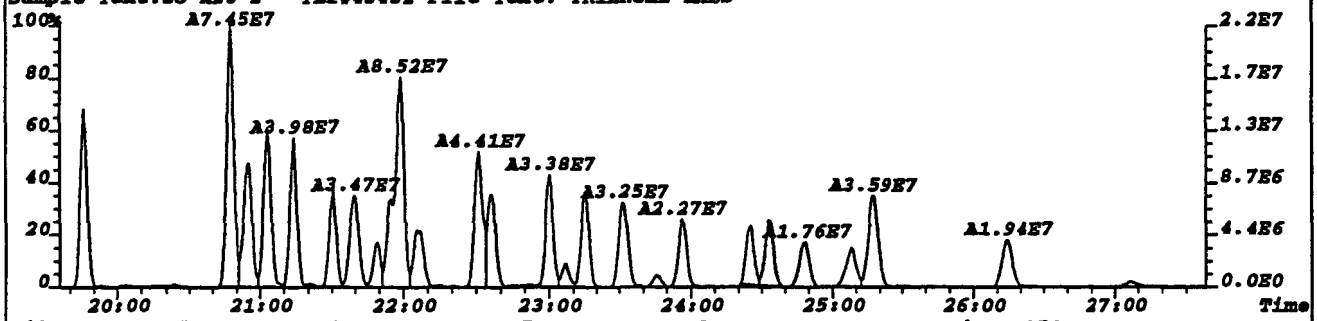
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside Limits	<M-Below Method Detection Limit	T-Time Changed
Rel.RT-Relative Retention Time	NL-Channel Specific Noise Level	M-Peak Area Changed
		N-Name Changed
		E-Ether Interference

*** End of Report ***

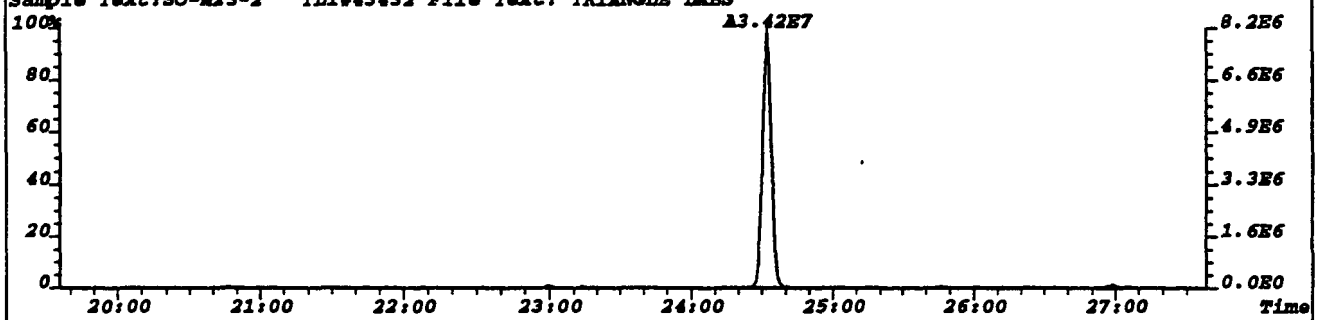
File:X973637 #1-803 Acq:18-OCT-1997 15:37:41 GC EI+ Voltage SIR AutoSpec Noise:4274
303.9016 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,17096.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-2 TLI#43432 File Text: TRIANGLE LABS



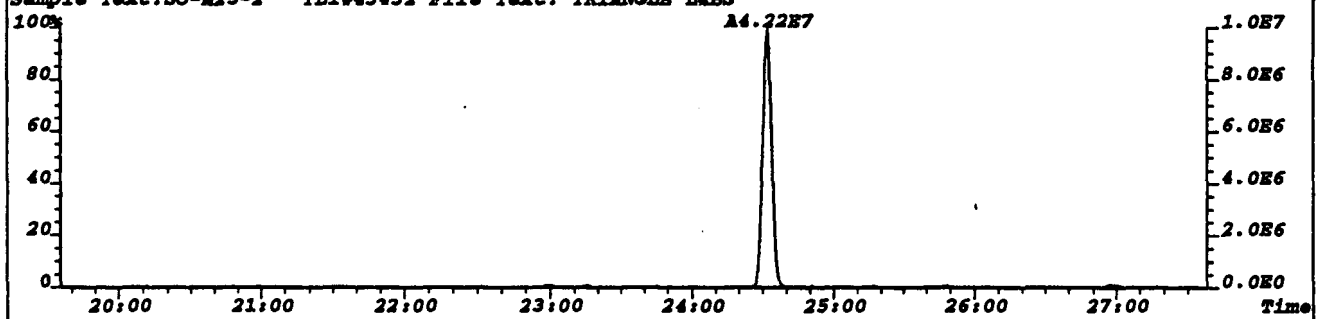
File:X973637 #1-803 Acq:18-OCT-1997 15:37:41 GC EI+ Voltage SIR AutoSpec Noise:6504
305.8987 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,26016.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-2 TLI#43432 File Text: TRIANGLE LABS



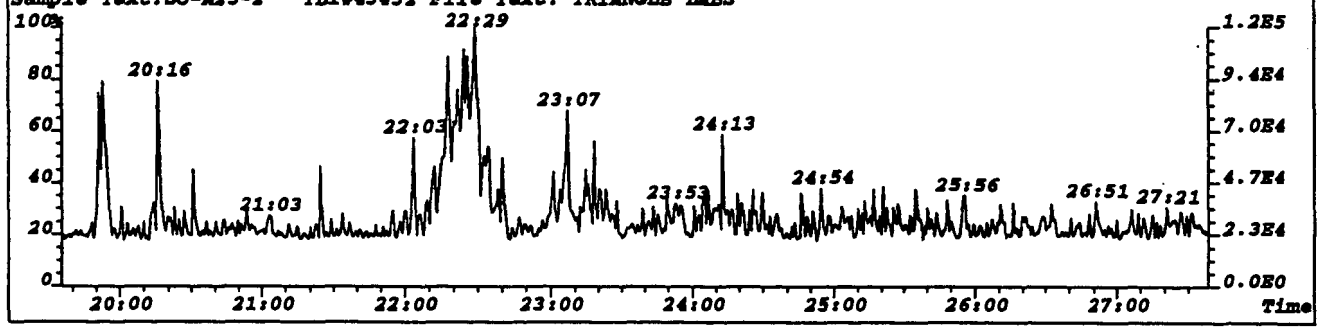
File:X973637 #1-803 Acq:18-OCT-1997 15:37:41 GC EI+ Voltage SIR AutoSpec Noise:4359
315.9419 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,17436.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-2 TLI#43432 File Text: TRIANGLE LABS



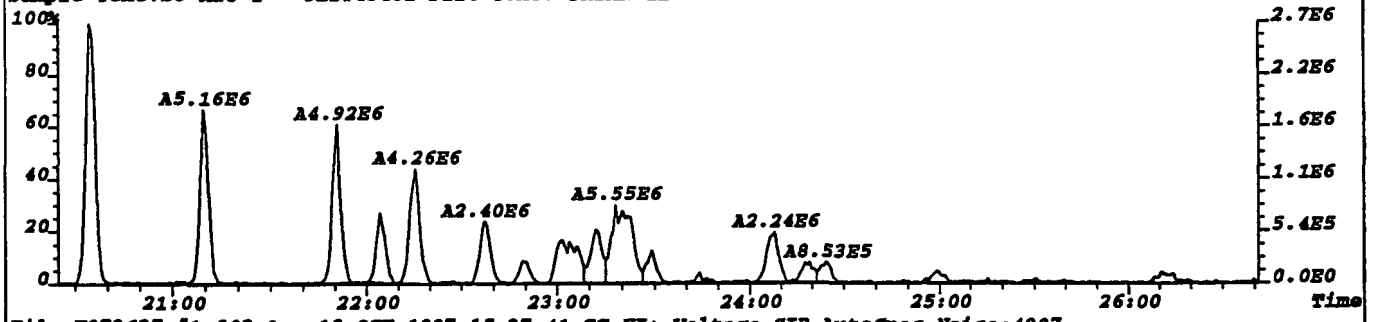
File:X973637 #1-803 Acq:18-OCT-1997 15:37:41 GC EI+ Voltage SIR AutoSpec Noise:5629
317.9389 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,22516.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-2 TLI#43432 File Text: TRIANGLE LABS



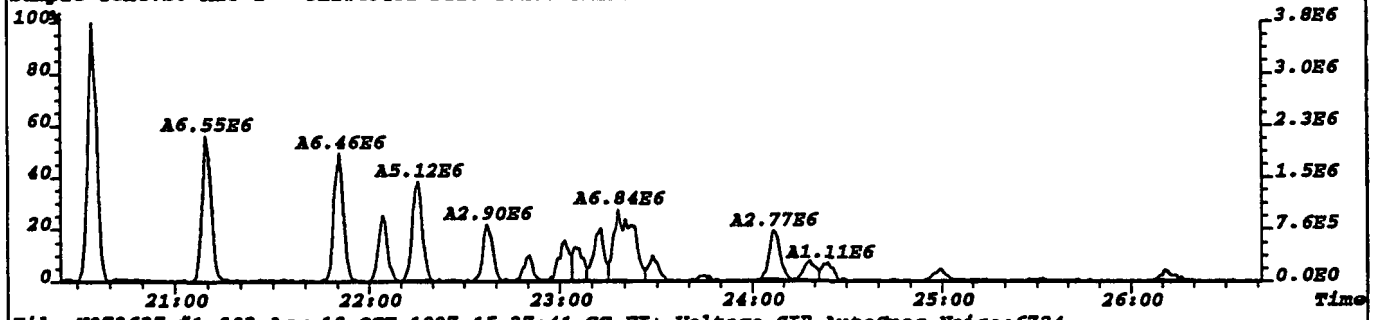
File:X973637 #1-803 Acq:18-OCT-1997 15:37:41 GC EI+ Voltage SIR AutoSpec
375.8364 Exp:XCONF_TT
Sample Text:SO-M23-2 TLI#43432 File Text: TRIANGLE LABS



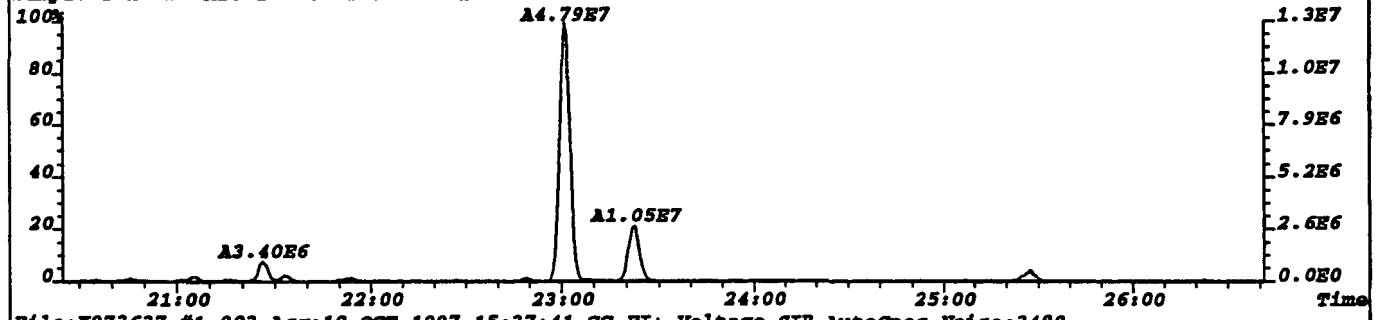
File:X973637 #1-803 Acq:18-OCT-1997 15:37:41 GC EI+ Voltage SIR AutoSpec Noise:2162
319.8965 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,8648.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-2 TLI#43432 File Text: TRIANGLE LABS



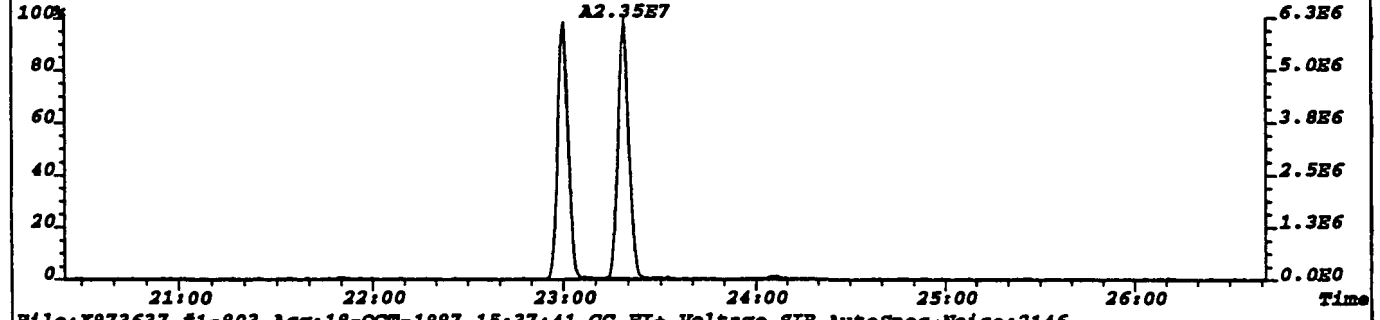
File:X973637 #1-803 Acq:18-OCT-1997 15:37:41 GC EI+ Voltage SIR AutoSpec Noise:4907
321.8936 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,19628.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-2 TLI#43432 File Text: TRIANGLE LABS



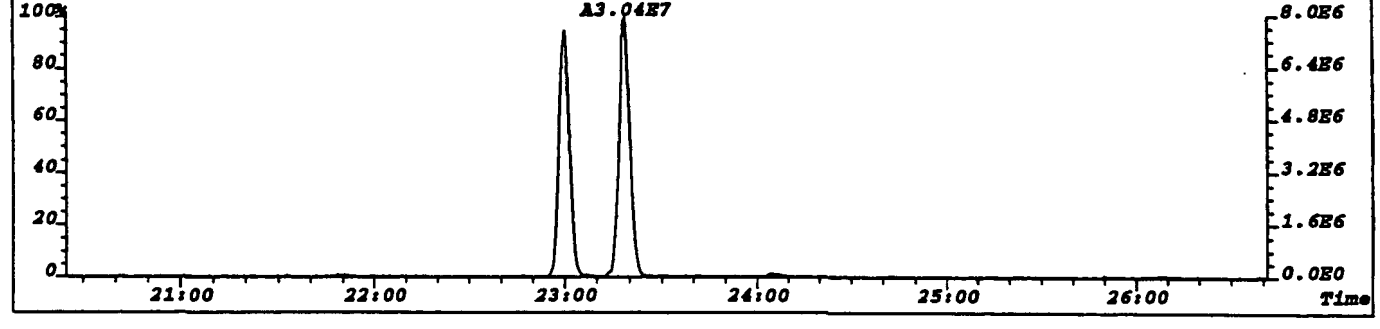
File:X973637 #1-803 Acq:18-OCT-1997 15:37:41 GC EI+ Voltage SIR AutoSpec Noise:6724
327.8847 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,26896.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-2 TLI#43432 File Text: TRIANGLE LABS



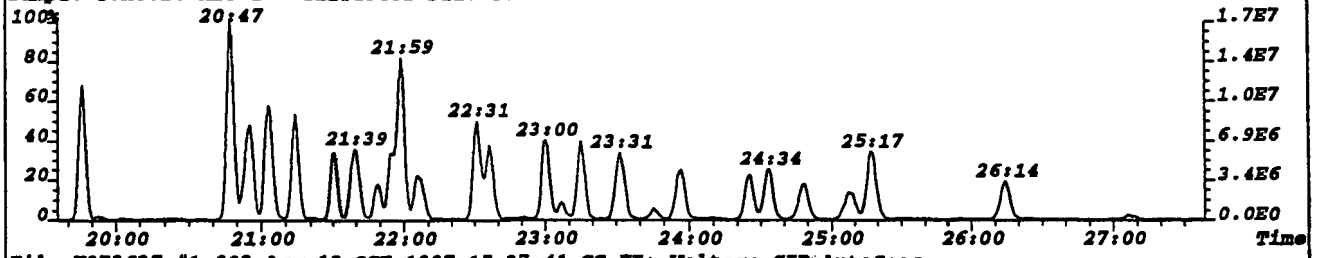
File:X973637 #1-803 Acq:18-OCT-1997 15:37:41 GC EI+ Voltage SIR AutoSpec Noise:3488
331.9368 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,13952.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-2 TLI#43432 File Text: TRIANGLE LABS



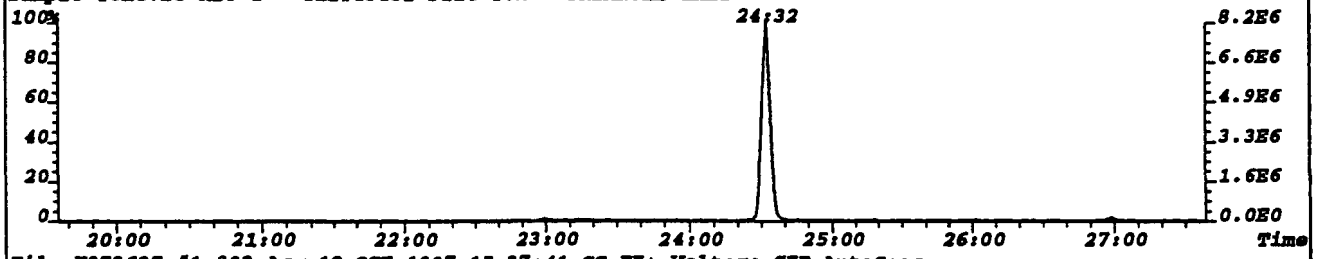
File:X973637 #1-803 Acq:18-OCT-1997 15:37:41 GC EI+ Voltage SIR AutoSpec Noise:2146
333.9338 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,8584.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-2 TLI#43432 File Text: TRIANGLE LABS



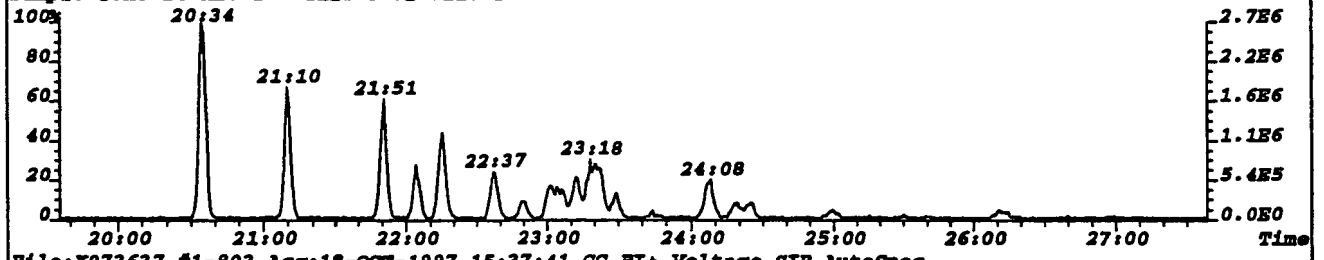
File:X973637 #1-803 Acq:18-OCT-1997 15:37:41 GC EI+ Voltage SIR AutoSpec
303.9016 Exp:XCONF_TT
Sample Text:SO-M23-2 TLI#43432 File Text: TRIANGLE LABS



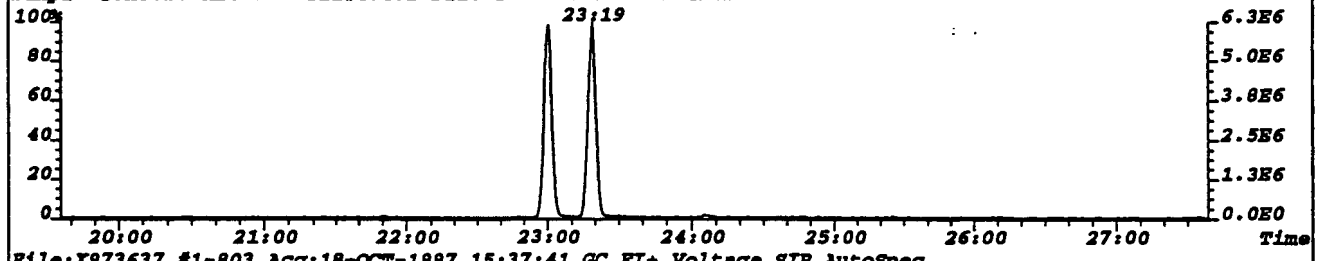
File:X973637 #1-803 Acq:18-OCT-1997 15:37:41 GC EI+ Voltage SIR AutoSpec
315.9419 Exp:XCONF_TT
Sample Text:SO-M23-2 TLI#43432 File Text: TRIANGLE LABS



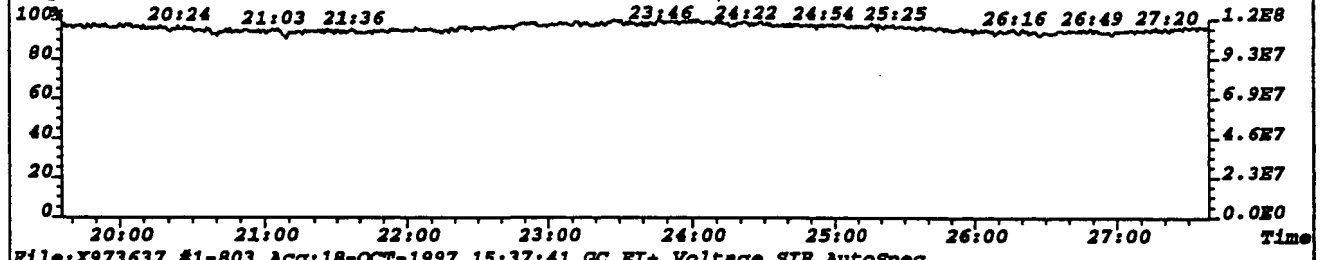
File:X973637 #1-803 Acq:18-OCT-1997 15:37:41 GC EI+ Voltage SIR AutoSpec
319.8965 Exp:XCONF_TT
Sample Text:SO-M23-2 TLI#43432 File Text: TRIANGLE LABS



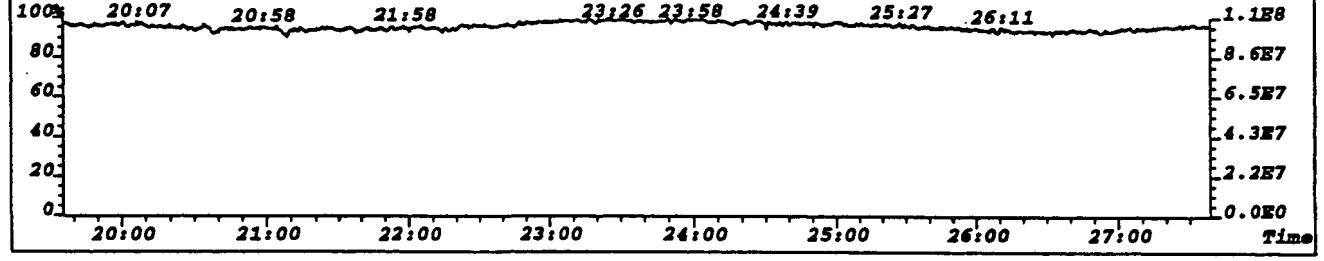
File:X973637 #1-803 Acq:18-OCT-1997 15:37:41 GC EI+ Voltage SIR AutoSpec
331.9368 Exp:XCONF_TT
Sample Text:SO-M23-2 TLI#43432 File Text: TRIANGLE LABS



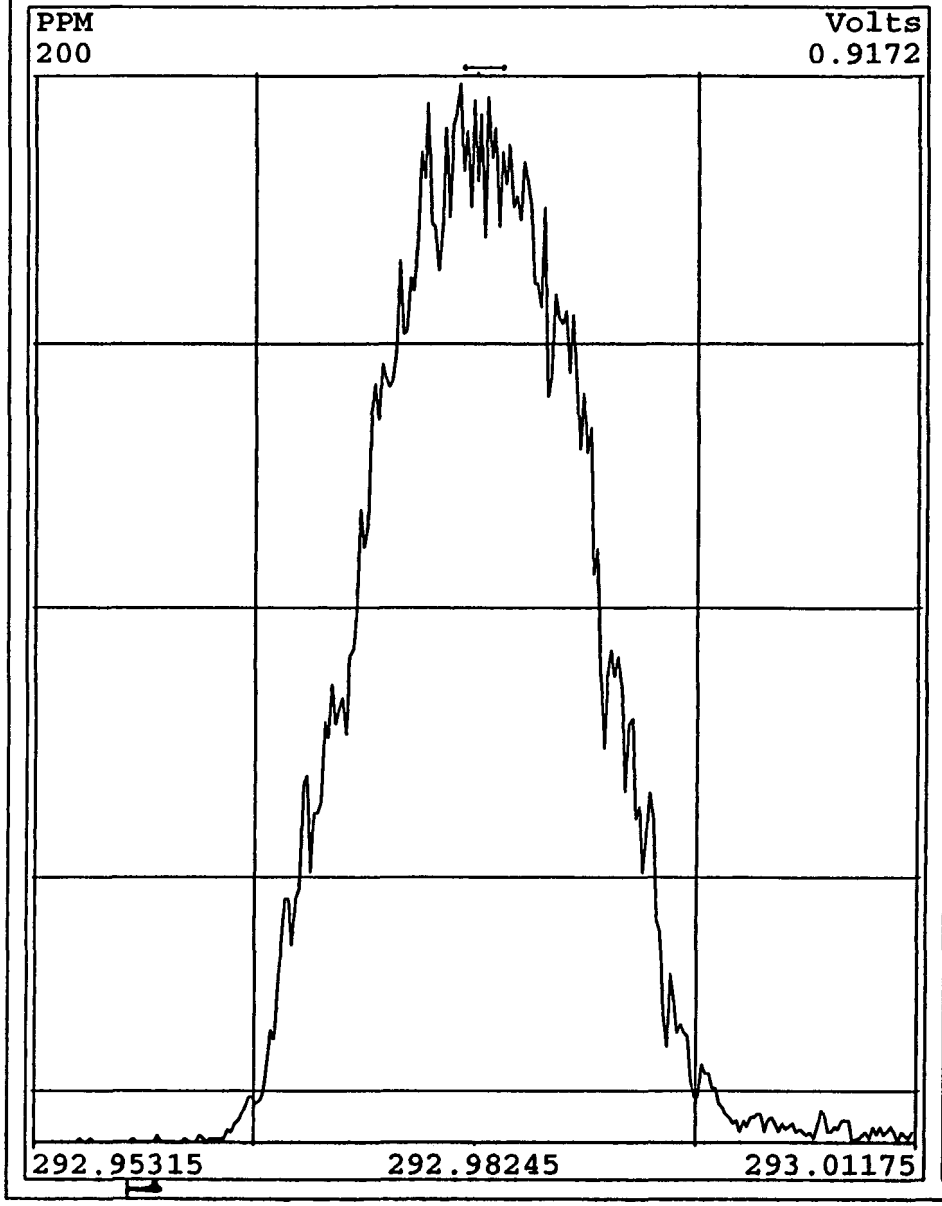
File:X973637 #1-803 Acq:18-OCT-1997 15:37:41 GC EI+ Voltage SIR AutoSpec
292.9825 Exp:XCONF_TT
Sample Text:SO-M23-2 TLI#43432 File Text: TRIANGLE LABS

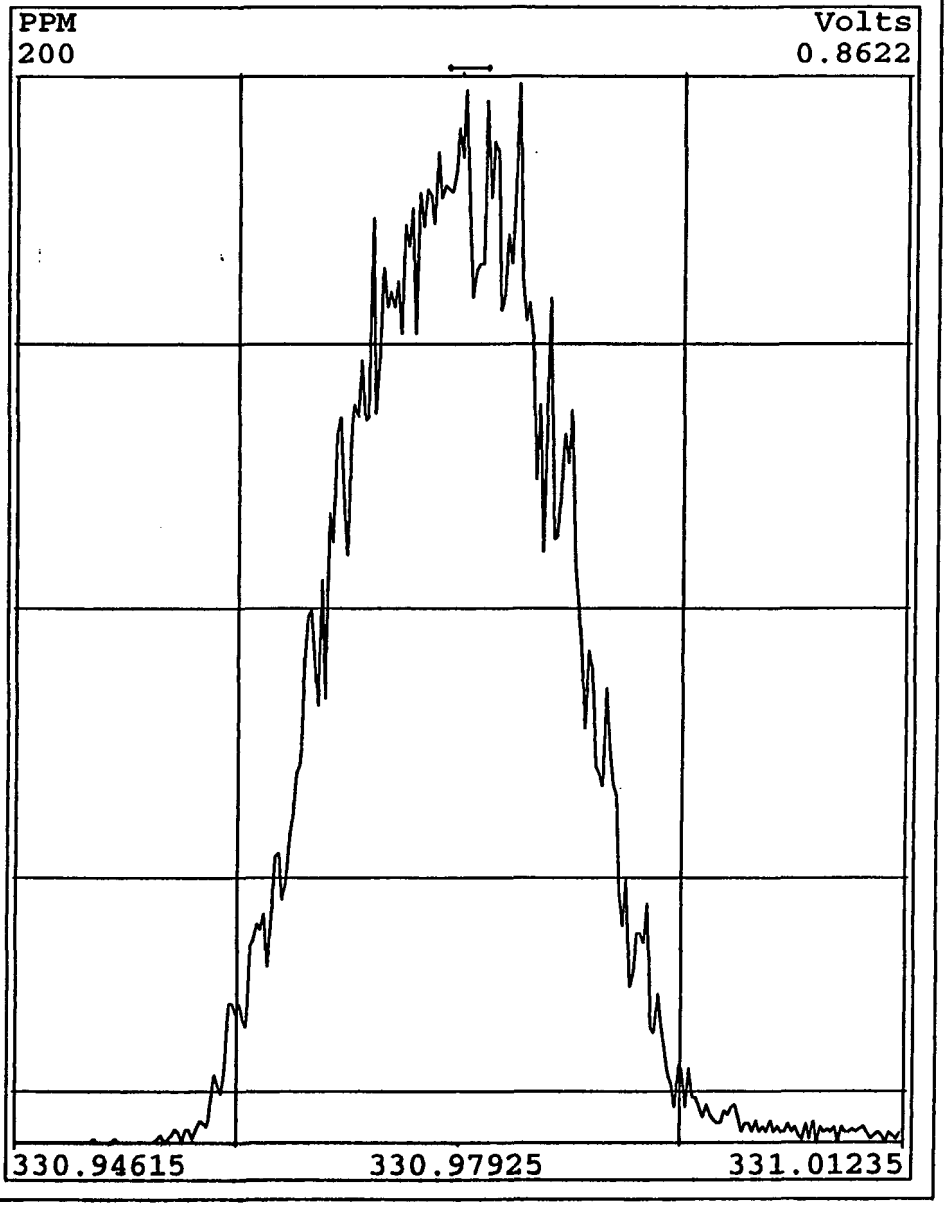


File:X973637 #1-803 Acq:18-OCT-1997 15:37:41 GC EI+ Voltage SIR AutoSpec
330.9792 Exp:XCONF_TT
Sample Text:SO-M23-2 TLI#43432 File Text: TRIANGLE LABS



Peak Locate Examination:18-OCT-1997:15:37 File:X973637
Experiment:XCONF_TT Function:1 Reference:PFK





Pacific Environmental Services

TLI Project: **43432** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **SO-23-3** Analysis File: **U973260**

Client Project:	Saginaw, MI				
Sample Matrix:	M23TRAIN	Date Received:	09/29/97	Spike File:	SPX23704
TLI ID:	185-6-3A-C	Date Extracted:	10/09/97	ICal:	UF59167
		Date Analyzed:	10/17/97	ConCal:	U973252
Sample Size:	1.000	Dilution Factor:	n/a	% Moisture:	n/a
Dry Weight:	n/a	Blank File:	U973257	% Lipid:	n/a
GC Column:	DB-5	Analyst:	BB	% Solids:	n/a

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	0.13			0.87	22:32	___
1,2,3,7,8-PeCDD	0.10			1.63	27:30	___
1,2,3,4,7,8-HxCDD	ND	0.05				___
1,2,3,6,7,8-HxCDD	ND	0.04				___
1,2,3,7,8,9-HxCDD	ND	0.04				___
1,2,3,4,6,7,8-HpCDD	ND	0.04				___
1,2,3,4,6,7,8,9-OCDD	EMPC		0.04			B___
2,3,7,8-TCDF	4.5			0.74	21:39	___
1,2,3,7,8-PeCDF	0.65			1.50	26:20	___
2,3,4,7,8-PeCDF	0.47			1.36	27:08	___
1,2,3,4,7,8-HxCDF	0.18			1.24	30:09	___
1,2,3,6,7,8-HxCDF	0.09			1.23	30:15	___
2,3,4,6,7,8-HxCDF	0.05			1.25	30:47	___
1,2,3,7,8,9-HxCDF	ND	0.03				___
1,2,3,4,6,7,8-HpCDF	0.04			1.04	33:03	___
1,2,3,4,7,8,9-HpCDF	ND	0.05				___
1,2,3,4,6,7,8,9-OCDF	ND	0.03				___

Totals	Amt. (ng)	Number	DL	EMPC	Flags
Total TCDD	4.1	10		4.1	___
Total PeCDD	0.74	7		1.7	___
Total HxCDD	0.24	3			___
Total HpCDD	ND		0.04		___
Total TCDF	51.2	13		51.4	___
Total PeCDF	10.7	13		10.8	___
Total HxCDF	0.92	8		0.94	___
Total HpCDF	0.04	1			___

X237_PSR v2.00, LARS 6.10.04

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Printed: 23:14 10/23/97

Pacific Environmental Services

TLI Project: **43432** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **SO-23-3** Analysis File: **U973260**

Internal Standards	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	1.8	45.9	40%-130%	0.73	21:36	___
$^{13}C_{12}$-2,3,7,8-TCDD	2.3	58.6	40%-130%	0.78	22:32	___
$^{13}C_{12}$-1,2,3,7,8-PeCDF	3.1	77.7	40%-130%	1.45	26:18	___
$^{13}C_{12}$-1,2,3,7,8-PeCDD	3.4	84.8	40%-130%	1.41	27:30	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	2.5	62.8	40%-130%	0.50	30:15	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	2.5	61.3	40%-130%	1.14	30:59	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	1.9	47.5	25%-130%	0.42	33:03	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	2.8	70.9	25%-130%	0.96	33:54	___
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	7.1	89.2	25%-130%	0.84	36:26	___

Surrogate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	3.4	85.9	70%-140%		22:32	___
$^{13}C_{12}$-2,3,4,7,8-PeCDF	3.2	80.7	70%-140%	1.46	27:07	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	3.5	88.1	70%-140%	0.53	30:09	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	3.9	97.6	70%-140%	1.25	30:55	___
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	3.9	97.2	70%-140%	0.43	34:16	___

Alternate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	2.0	49.2	40%-130%	0.51	31:31	___
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	2.0	48.9	40%-130%	0.52	30:47	___

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.80	22:17	___
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.17	31:18	___

Data Reviewer: _____ 10/23/97

X237_PSR v2.00, LARS 6.10.04

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Printed: 23:14 10/23/97

Initial ....Date...

Data Review By: VC 10/21/97 Calculated Noise Area: 7.22

The Total Area for each peak with an ion abundance ratio outside ratio limits has been recalculated according to method requirements.

Page No. 1 Listing of U973260B.dbf
10/21/97 Matched GC Peaks / Ratio / Ret. Time

Compound/ M_Z....	QC.	Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
TCDF							0.65-0.89				0.813-1.106			
304-306	DC	NL			0:00	RO	1.34	9.27			0.000			
					17:44		0.71	2,831.28	1,179.33	1,651.95	0.821			
					18:17		0.75	1,243.82	532.84	710.98	0.846			
					18:33		0.74	577.11	246.22	330.89	0.859			
					18:57		0.73	7,721.50	3,265.44	4,456.06	0.877			
					19:19		0.74	4,752.79	2,019.10	2,733.69	0.894			
					19:52		0.74	3,941.26	1,672.04	2,269.22	0.920			
					20:15		0.78	2,728.83	1,191.72	1,537.11	0.938			
					20:41		0.74	3,085.78	1,315.78	1,770.00	0.958			
					21:05		0.74	1,796.14	765.67	1,030.47	0.976			
					21:23		0.76	1,312.02	567.37	744.65	0.990			
					21:39		0.74	3,061.36	1,305.04	1,756.32	1.002	2378-TCDF		AN
					22:11		0.73	1,218.59	513.33	705.26	1.027			
					22:26		0.79	696.24	308.03	388.21	1.039			
					22:49	RO	0.97	76.84	42.24	43.41	1.052			
					23:44	RO	1.21	38.30	26.17	21.64	1.099			
304-306				15	Peaks			35,081.86						
13C12-TCDF							0.65-0.89				0.954-1.046			
316-318	DC	NL			0:00	RO	1.15	8.04			0.000			
	DC	WL			18:49	RO	1.21	3.63			0.871			
	DC	WL			18:56		0.78	7.62			0.877			
	DC	WL			19:00	RO	0.40	8.80			0.880			
	DC	SN			21:05	RO	0.49	15.15			0.976			
					21:36		0.73	2,536.01	1,071.86	1,464.15	1.000	13C12-2378-TCDF		ISO
	DC	SN			21:54	RO	1.22	7.27			1.014			
	DC	SN			22:20	RO	0.44	5.45			1.034			
	DC	SN			22:24	RO	0.30	2.09			1.037			
	DC	SN			22:26	RO	1.45	8.99			1.039			
	DC	WH			22:56	RO	1.01	9.13			1.062			
316-318				1	Peak			2,536.01						

---------- Above: TCDF / TCDD Follows ----------

TCDD							0.65-0.89				0.848-1.061			
320-322	DC	NL			0:00	RO	1.07	5.77			0.000			
					19:15		0.75	723.32	310.56	412.76	0.854			
					19:43		0.74	414.15	176.78	237.37	0.875			
					20:08		0.72	156.31	65.35	90.96	0.893			
					21:03		0.72	632.93	264.91	368.02	0.934			
	M				21:22		0.74	295.00	125.00	170.00	0.948			
					21:52		0.69	171.36	69.74	101.62	0.970			
	M				22:24		0.80	507.00	225.00	282.00	0.994			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
	M			22:32		0.87	99.00	46.10	52.90	1.000	2378-TCDD	AN	
				22:43		0.74	62.31	26.52	35.79	1.008			
				22:57		0.84	124.14	56.79	67.35	1.018			
	K			23:12	RO	0.52	26.80	11.66	22.22	1.030			
		DC	SN	23:22		0.86	5.87			1.037			
		DC	SN	23:44		0.80	26.20			1.053			
		DC	WH	24:08		0.66	3.28			1.071			
		DC	WH	24:13	RO	2.42	3.49			1.075			
320-322			11	Peaks			3,212.32						
37Cl-TCDD										0.911-1.089			
328		DC	NL	0:00			4.82			0.000			
		DC	WL	19:36			12.91			0.870			
		DC	WL	19:45			9.23			0.876			
		DC	WL	19:53			3.66			0.882			
		DC	WL	20:02			1.74			0.889			
		DC	WL	20:14			1.29			0.898			
		DC	WL	20:15			1.26			0.899			
		DC	WL	20:21			3.49			0.903			
		DC	WL	20:30			3.77			0.910			
				20:48			411.94	411.94		0.923			
		DC	SN	21:04			7.18			0.935			
		DC	SN	21:12			6.18			0.941			
		DC	SN	21:18			3.72			0.945			
		DC	SN	21:36			5.80			0.959			
		DC	SN	21:39			1.10			0.961			
				22:32			2,095.49	2,095.49		1.000	37Cl-TCDD	SUR1	
				23:03			49.33	49.33		1.023			
		DC	SN	23:12			3.85			1.030			
		DC	SN	23:21			8.68			1.036			
		DC	SN	23:34			8.06			1.046			
		DC	SN	23:45			5.75			1.054			
		DC	SN	23:51			12.25			1.058			
		DC	SN	24:06			4.14			1.070			
		DC	SN	24:09			3.04			1.072			
328			3	Peaks			2,556.76						
13C12-TCDD					0.65-0.89					0.911-1.089			
332-334		DC	NL	0:00	RO	2.24	6.53			0.000			
		DC	WL	19:23	RO	3.37	2.50			0.860			
		DC	WL	19:29	RO	3.21	3.56			0.865			
				22:17		0.80	3,973.84	1,767.61	2,206.23	0.989	13C12-1234-TCDD	RS1	
				22:32		0.78	2,582.73	1,128.21	1,454.52	1.000	13C12-2378-TCDD	IS1	
				22:55		0.88	86.42	40.33	46.09	1.017			
		DC	SN	23:18	RO	0.49	6.23			1.034			
		DC	SN	23:25	RO	4.02	4.60			1.039			
		DC	SN	23:28	RO	1.17	13.52			1.041			
		DC	SN	23:57	RO	0.46	8.78			1.063			
		DC	SN	24:06	RO	0.25	6.69			1.070			
332-334			3	Peaks			6,642.99						

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
				25:30	RO	0.91	346.44	210.58	231.06	0.927			
		DC	SN	25:45	RO	0.22	12.80			0.936			
				26:02		1.47	43.00	25.57	17.43	0.947			
				26:19	RO	1.29	207.37	126.05	97.80	0.957			
				26:28		1.51	86.05	51.80	34.25	0.962			
				26:40		1.51	169.49	101.87	67.62	0.970			
				26:52	RO	0.95	27.24	16.56	17.42	0.977			
				26:58	RO	1.30	63.34	38.50	29.54	0.981			
				27:11		1.61	78.52	48.48	30.04	0.988			
				27:20		1.78	38.38	24.55	13.83	0.994			
				27:30		1.63	68.47	42.41	26.06	1.000	12378-PeCDD	AN	
				27:40	RO	1.89	36.80	27.24	14.43	1.006			
	K			28:02		1.68	31.57	19.80	11.77	1.019			
		DC	WH	28:22		1.65	5.41			1.032			
		DC	WH	28:28	RO	1.91	3.65			1.035			
		DC	WH	28:39	RO	0.67	5.77			1.042			
356-358				12 Peaks			1,196.67						
13C12-PeCDD				1.32-1.78					0.855-1.145				
368-370		DC	NL	0:00		1.60	7.98			0.000			
		DC	SN	25:35	RO	4.46	3.90			0.930			
		DC	SN	26:19		1.68	6.89			0.957			
		DC	SN	27:21	RO	1.79	6.68			0.995			
				27:30		1.41	2,022.65	1,182.19	840.46	1.000	13C12-PeCDD 123	IS3	
				27:40	RO	1.82	198.11	141.32	77.69	1.006			
		DC	SN	28:02		1.36	23.24			1.019			
		DC	SN	28:12	RO	2.12	14.74			1.025			
368-370				2 Peaks			2,220.76						

---------- Above: PeCDD / HxCDF Follows ----------

HxCDF				1.05-1.43					0.958-1.051				
374-376		DC	NL	0:00	RO	0.92	8.35			0.000			
				29:07		1.35	65.54	37.68	27.86	0.963			
				29:17		1.14	210.58	112.30	98.28	0.968			
				29:26		1.34	32.20	18.41	13.79	0.973			
				29:35		1.15	33.99	18.18	15.81	0.978			
		DC	SN	29:45	RO	1.48	10.21			0.983			
				30:09		1.24	103.82	57.53	46.29	0.997	123478-HxCDF	AN	
				30:15		1.23	64.46	35.60	28.86	1.000	123678-HxCDF	AN	
	K			30:23	RO	1.64	13.22	9.70	5.90	1.004			
	K			30:35		1.07	24.63	12.71	11.92	1.011			
				30:47		1.25	28.79	15.98	12.81	1.018	234678-HxCDF	AN	
		DC	SN	30:53	RO	0.35	1.41			1.021			
374-376				9 Peaks			577.23						
13C12-HxCDF				0.43-0.59					0.868-1.132				
384-386		DC	NL	0:00		0.50	24.69			0.000			
				30:09		0.53	1,607.85	559.51	1,048.34	0.997	13C12-HxCDF 478	SUR3	
				30:15		0.50	1,872.93	623.88	1,249.05	1.000	13C12-HxCDF 678	IS4	
				30:47		0.52	1,372.74	469.24	903.50	1.018	13C12-HxCDF 234	ALT2	
				31:31		0.51	1,300.14	437.48	862.66	1.042	13C12-HxCDF 789	ALT1	

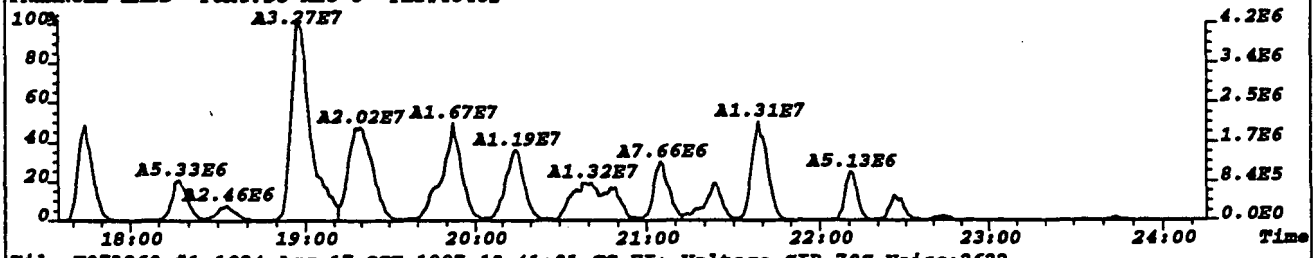
Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
384-386			4 Peaks				6,153.66						
---------- Above: HxCDF / HxCDD Follows ----------													
HxCDD				1.05-1.43						0.952-1.015			
390-392	DC	NL		0:00	RO	0.64	4.46			0.000			
K				29:40		1.39	20.51	11.94	8.57	0.958			
				30:09		1.12	45.98	24.29	21.69	0.973			
K				30:22		1.34	28.27	16.20	12.07	0.980			
	DC	SN		30:56		1.17	10.94			0.998	123478-HxCDD	AN	
	DC	SN		31:00	RO	0.94	8.96			1.001	123678-HxCDD	AN	
	DC	SN		31:11	RO	0.69	2.17			1.006			
	DC	SN		31:19		1.35	14.71			1.011	123789-HxCDD	AN	
	DC	WH		31:36		1.09	3.64			1.020			
	DC	WH		31:41	RO	0.34	1.84			1.023			
	DC	WH		31:47	RO	2.93	1.37			1.026			
390-392			3 Peaks				94.76						
13C12-HxCDD				1.05-1.43						0.968-1.032			
402-404	DC	NL		0:00		1.43	8.61			0.000			
	DC	WL		29:45	RO	0.31	1.39			0.960			
				30:55		1.25	1,398.49	775.88	622.61	0.998	13C12-HxCDD 478	SUR4	
				30:59		1.14	1,597.71	852.68	745.03	1.000	13C12-HxCDD 678	IS5	
	DC	SN		31:11		1.23	11.60			1.006			
				31:18		1.17	2,707.98	1,461.46	1,246.52	1.010	13C12-HxCDD 789	RS2	
				31:29	RO	0.47	24.26	13.43	28.51	1.016			
	DC	SN		31:36	RO	0.19	15.75			1.020			
402-404			4 Peaks				5,728.44						
---------- Above: HxCDD / HpCDF Follows ----------													
HpCDF				0.88-1.20						0.996-1.043			
408-410	DC	NL		0:00		1.11	5.58			0.000			
MK				33:03		1.04	16.84	8.59	8.25	1.000	1234678-HpCDF	AN	
	DC	SN		33:16	RO	1.70	8.34			1.007			
	DC	SN		34:16	RO	1.23	6.81			1.037	1234789-HpCDF	AN	
408-410			1 Peak				16.84						
13C12-HpCDF				0.37-0.51						0.939-1.121			
418-420	DC	NL		0:00	RO	0.84	9.88			0.000			
				33:03		0.42	1,226.83	363.96	862.87	1.000	13C12-HpCDF 678	IS6	
	DC	SN		33:21	RO	0.73	18.53			1.009			
				34:16		0.43	1,053.28	314.82	738.46	1.037	13C12-HpCDF 789	SUR5	
418-420			2 Peaks				2,280.11						
---------- Above: HpCDF / HpCDD Follows ----------													
HpCDD				0.88-1.20						0.977-1.005			
424-426	DC	NL		0:00	RO	1.33	3.81			0.000			
	DC	SN		33:18	RO	0.76	13.61			0.982			
	DC	SN		33:54	RO	0.62	8.89			1.000	1234678-HpCDD	AN	
	DC	WH		34:08	RO	0.59	1.79			1.007			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
424-426			0 Peaks				0.00						
13C12-HpCDD				0.88-1.20						0.971-1.029			
436-438	DC	NL		0:00	RO	1.30	9.85			0.000			
				33:54		0.96	1,763.70	863.44	900.26	1.000	13C12-HpCDD	678	IS7
	DC	SN		34:24	RO	2.18	5.30			1.015			
436-438			1 Peak				1,763.70						
---------- Above: HpCDD / Octa-CDD and CDF Follows ----------													
OCDF				0.76-1.02						0.890-1.110			
442-444	DC	NL		0:00		1.01	8.20			0.000			
	DC	SN		33:34	RO	2.16	2.76			0.921			
	DC	SN		36:07	RO	1.09	6.58			0.991			
	DC	SN		37:14	RO	3.08	2.46			1.022			
	DC	SN		37:17	RO	1.55	2.14			1.023			
	DC	SN		37:27	RO	0.63	5.80			1.028			
	DC	SN		37:32	RO	0.72	8.96			1.030			
	DC	SN		37:38	RO	1.16	5.52			1.033			
	DC	SN		37:51	RO	0.15	2.14			1.039			
	DC	SN		37:54	RO	0.32	3.27			1.040			
	DC	SN		38:49	RO	2.96	1.68			1.065			
	DC	SN		39:17	RO	0.74	11.09			1.078			
	DC	SN		39:40		1.01	16.74			1.089			
	DC	SN		39:49	RO	1.37	2.31			1.093			
	DC	SN		39:55	RO	1.89	2.46			1.096			
442-444			0 Peaks				0.00						
OCDD				0.76-1.02						0.890-1.110			
458-460	DC	NL		0:00		0.97	6.02			0.000			
M				36:27	RO	0.63	19.35	9.11	14.50	1.000	OCDD		AN
	DC	SN		36:47	RO	3.39	0.83			1.010			
	DC	SN		36:58		0.99	4.10			1.015			
458-460			1 Peak				19.35						
13C12-OCDD				0.76-1.02						0.995-1.005			
470-472	DC	NL		0:00		0.97	6.52			0.000			
				36:26		0.84	3,686.48	1,678.82	2,007.66	1.000	13C12-OCDD		IS8
	DC	WH		36:49	RO	1.49	26.52			1.011			
	DC	WH		36:58	RO	0.43	18.56			1.015			
470-472			1 Peak				3,686.48						

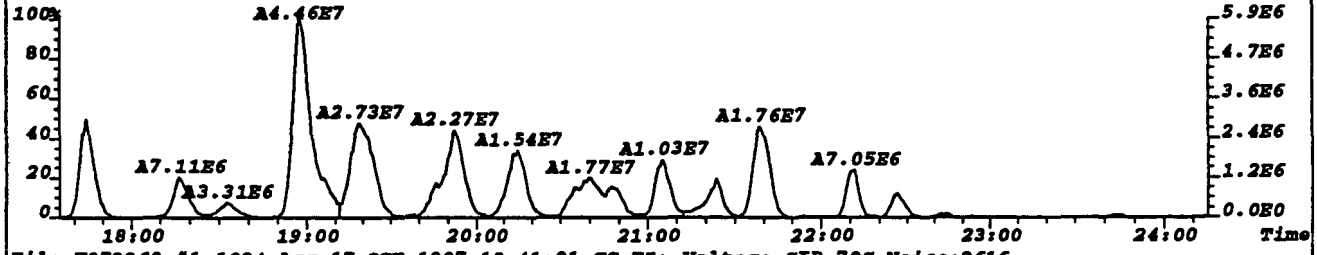
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside Limits	<M-Below Method Detection Limit	T-Time Changed
Rel.RT-Relative Retention Time	NL-Channel Specific Noise Level	M-Peak Area Changed
		N-Name Changed
		E-Ether Interference

*** End of Report ***

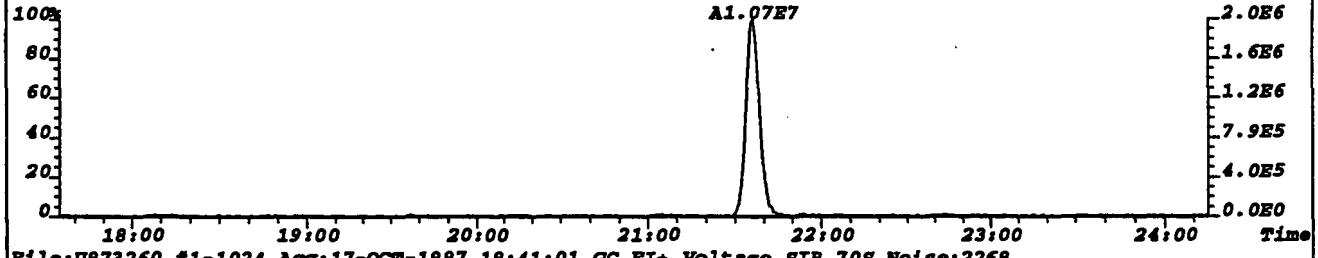
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:3503
303.9016 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,14012.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



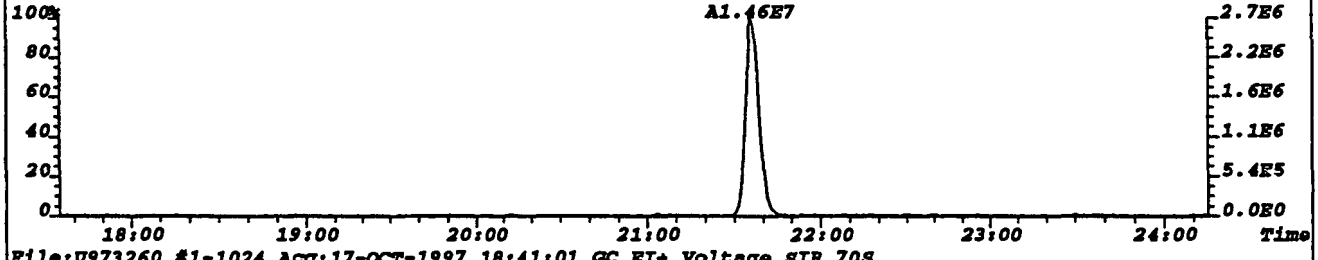
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:2622
305.8987 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,10488.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



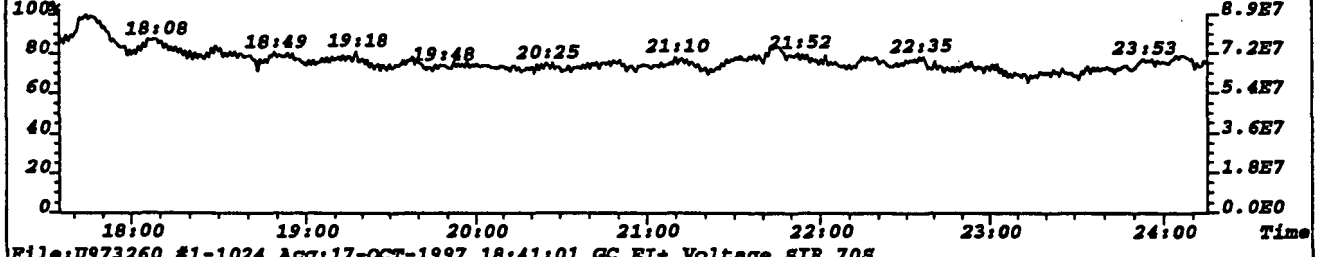
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:2616
315.9419 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,10464.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



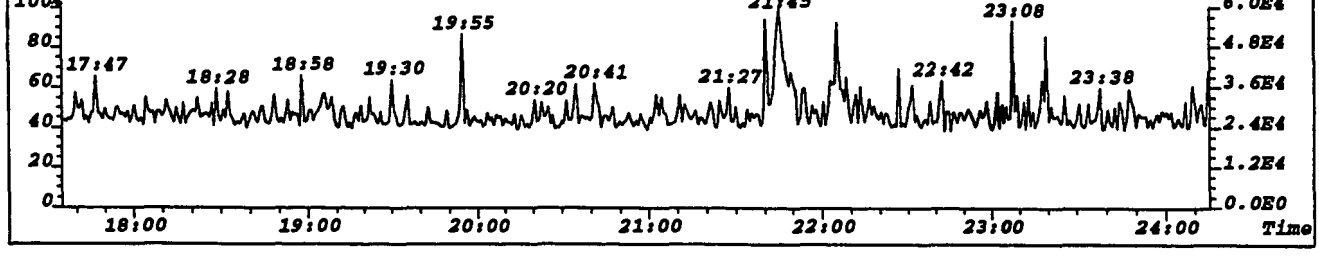
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:2268
317.9389 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,9072.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



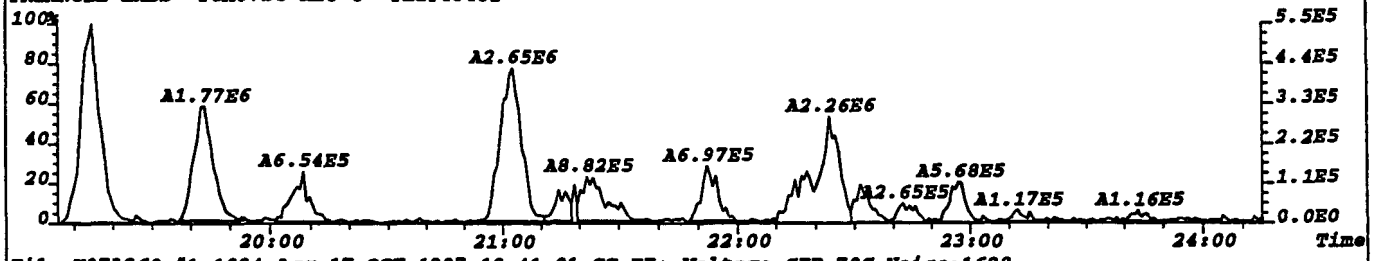
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



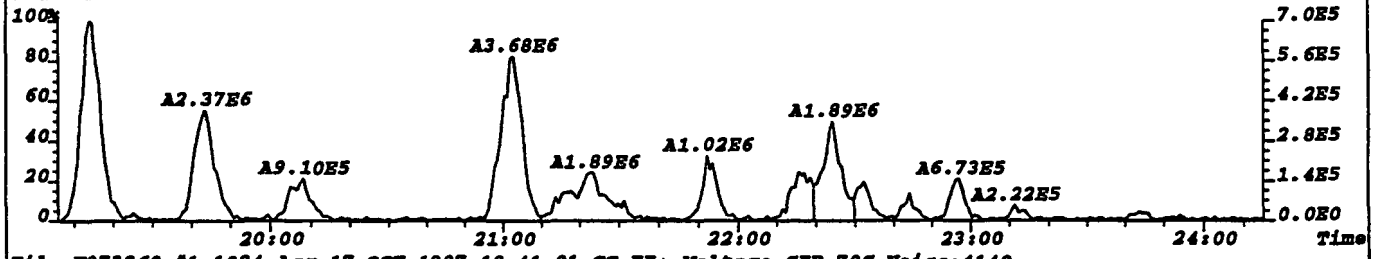
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
375.8364 F:2 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



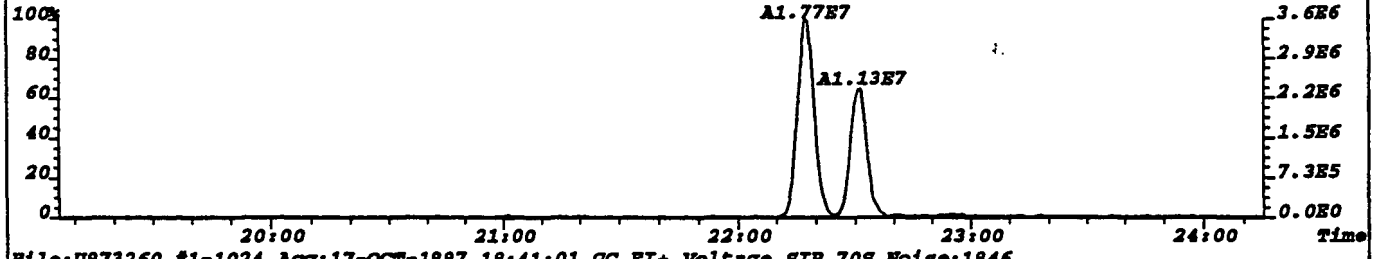
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:1742
319.8965 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6968.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



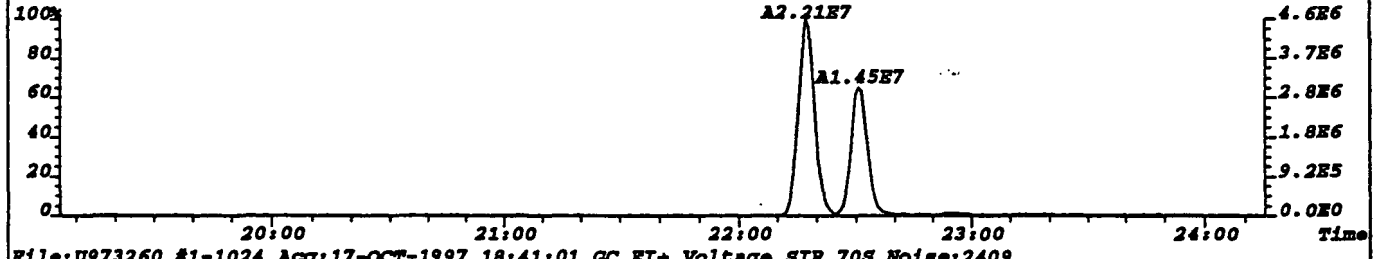
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:1628
321.8936 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6512.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



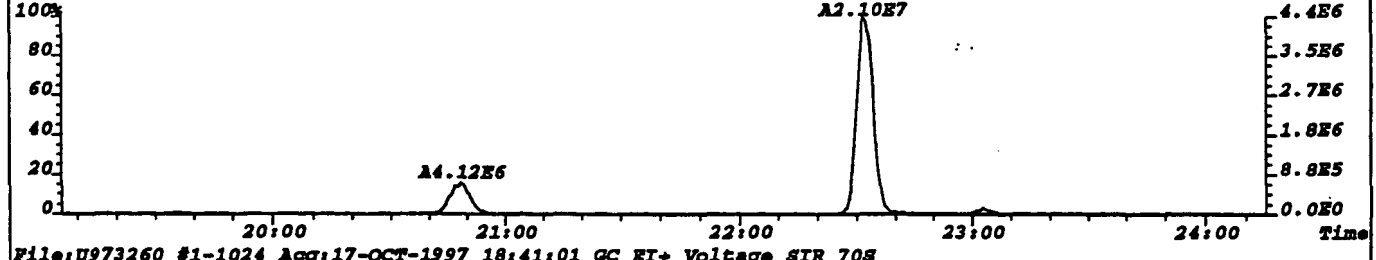
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:4140
331.9368 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,16560.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



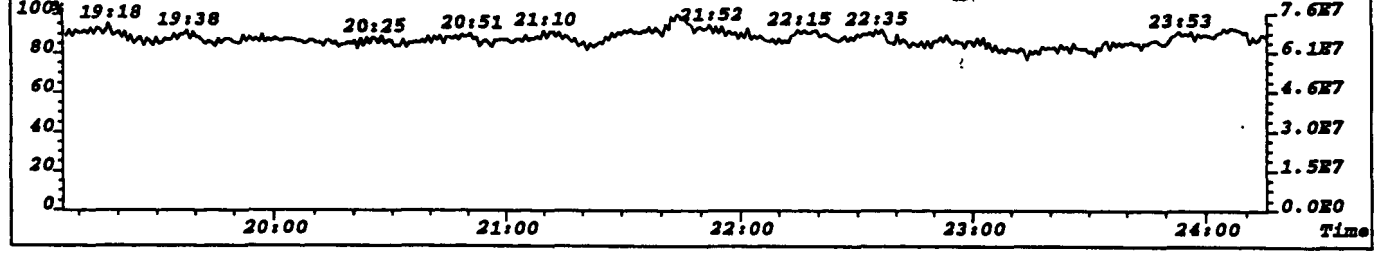
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:1846
333.9338 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7384.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



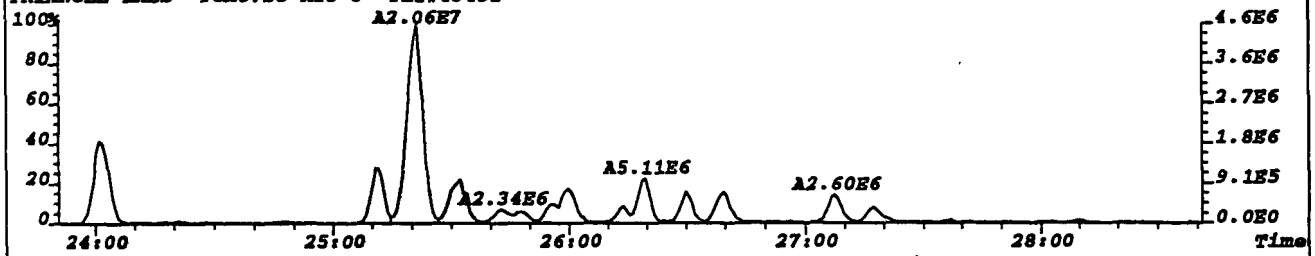
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:2409
327.8847 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,9636.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



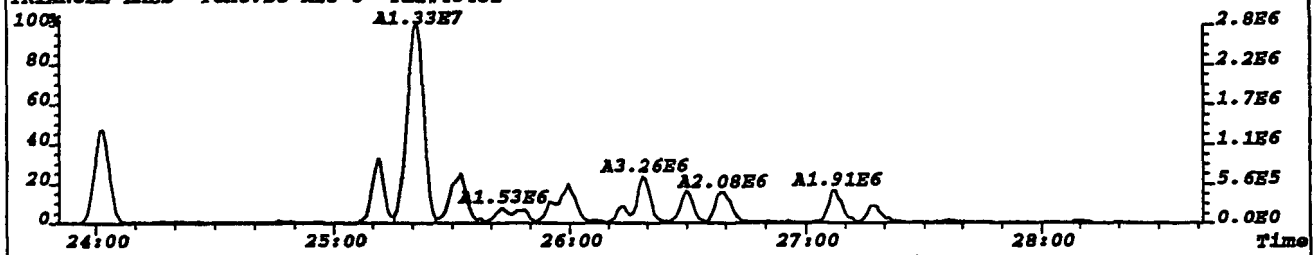
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



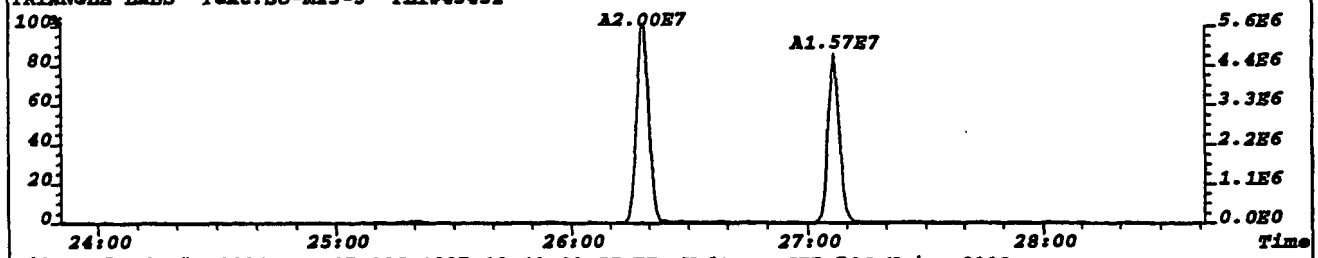
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:1843
339.8597 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7372.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



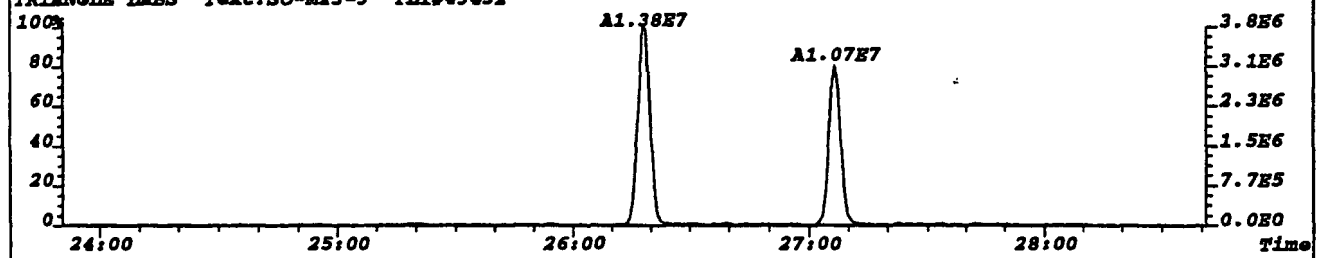
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:2130
341.8567 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,8520.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



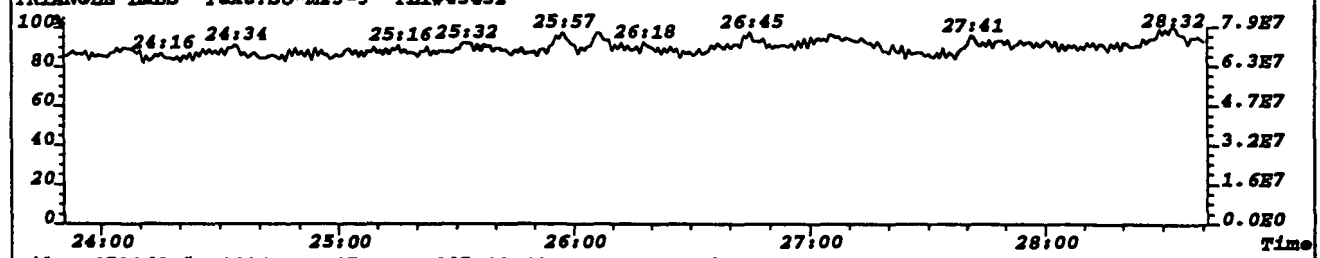
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:1223
351.9000 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4892.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



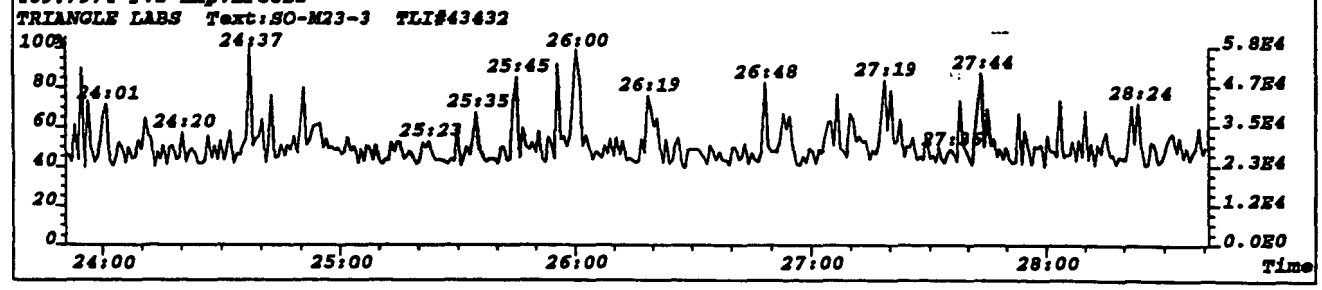
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:2113
353.8970 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,8452.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



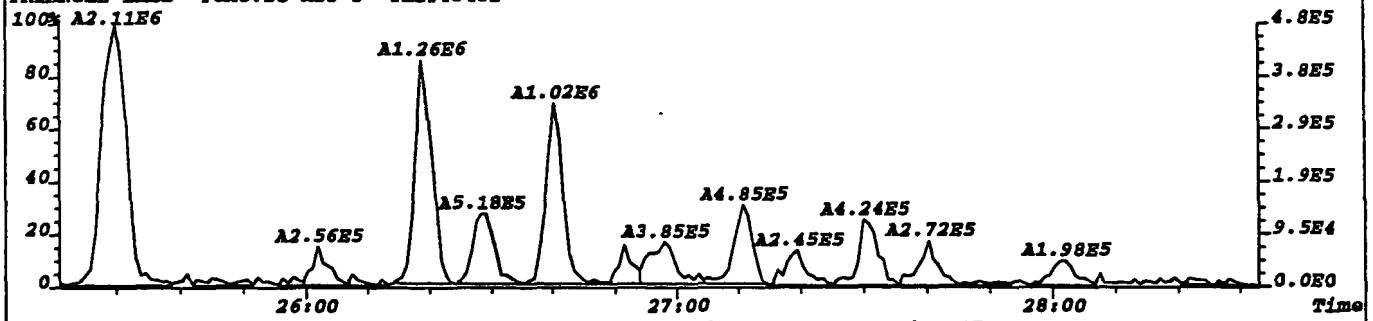
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



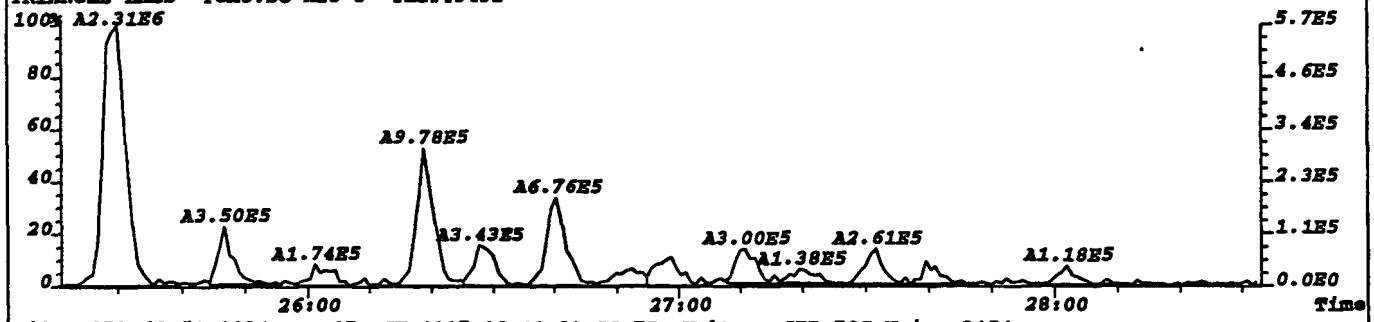
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
409.7974 F:2 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:2359
355.8546 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,9436.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432

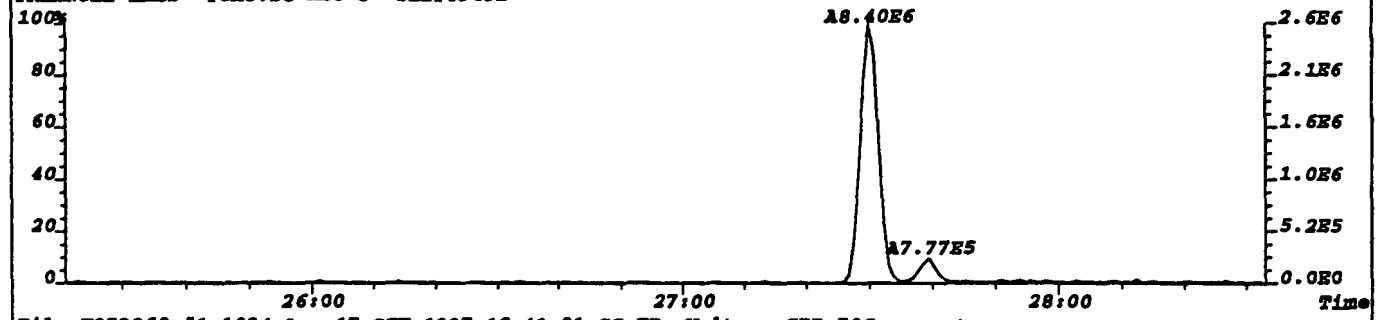


File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:1799
357.8516 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,7196.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432

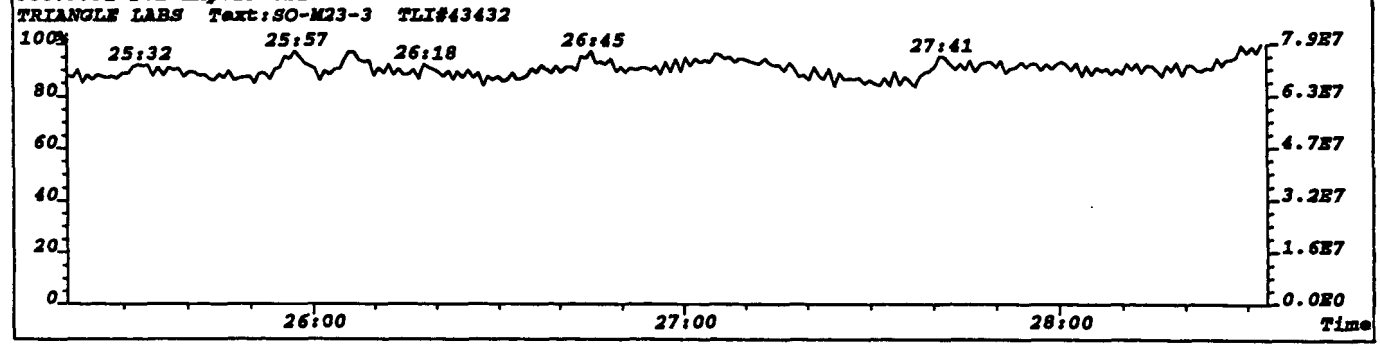


File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:2454
367.8949 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,9816.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432

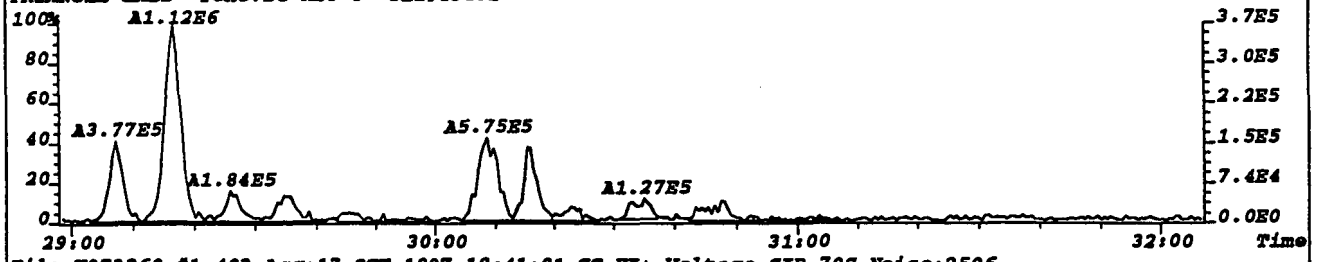
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:1537
369.8919 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,6148.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



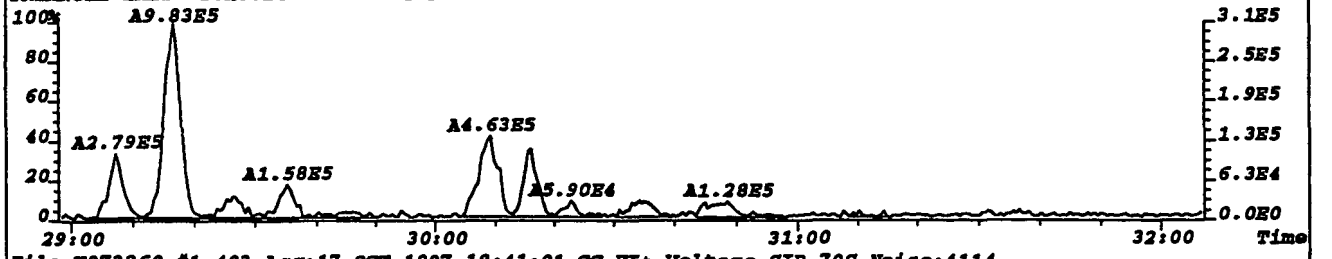
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



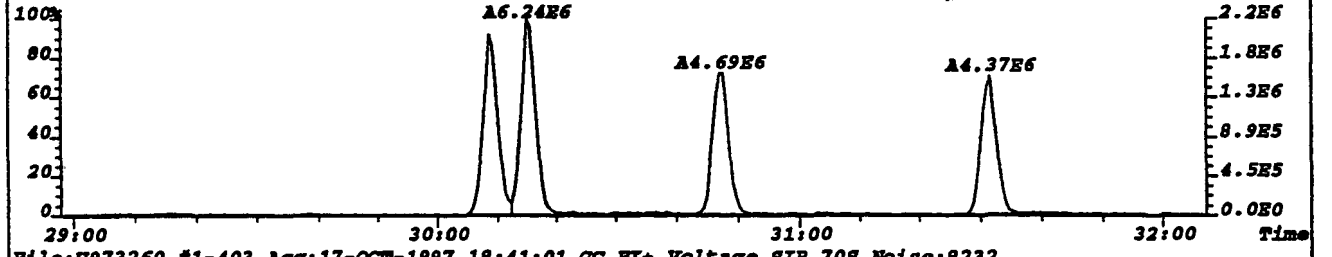
File:U973260 #1-403 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:2308
373.8208 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,9232.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



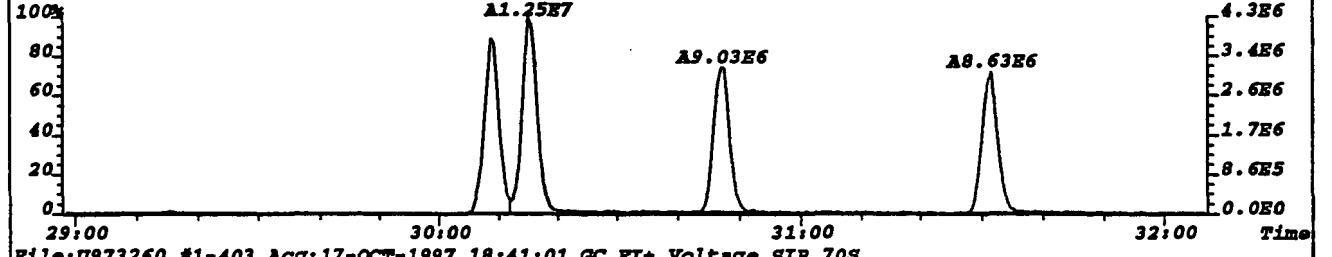
File:U973260 #1-403 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:2506
375.8178 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,10024.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



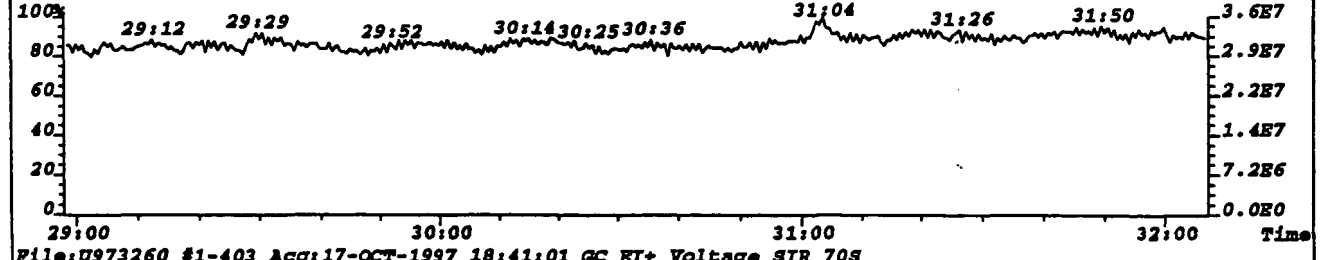
File:U973260 #1-403 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:4114
383.8639 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,16456.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



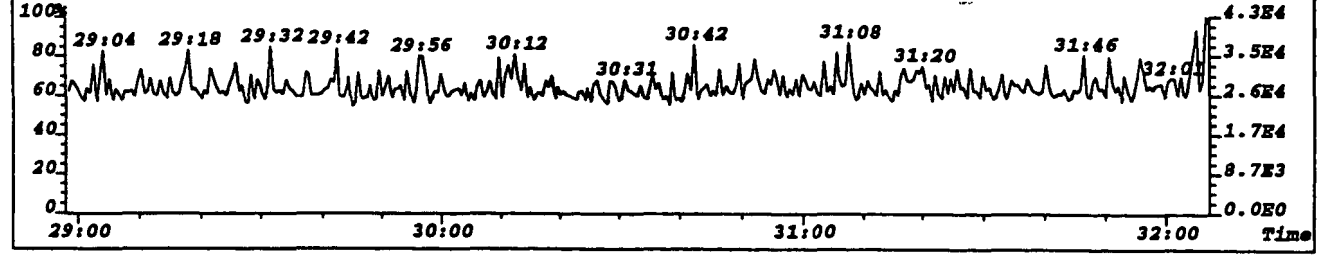
File:U973260 #1-403 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:8232
385.8610 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,32928.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



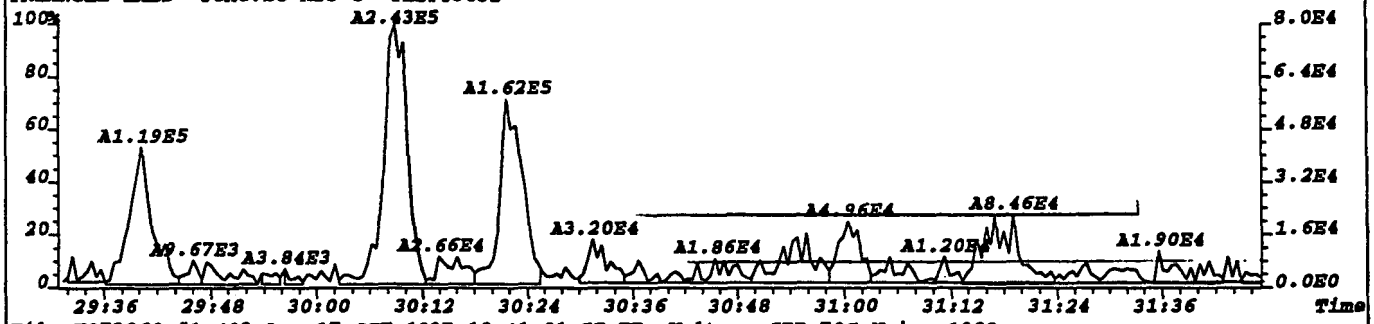
File:U973260 #1-403 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
392.9760 F:3 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



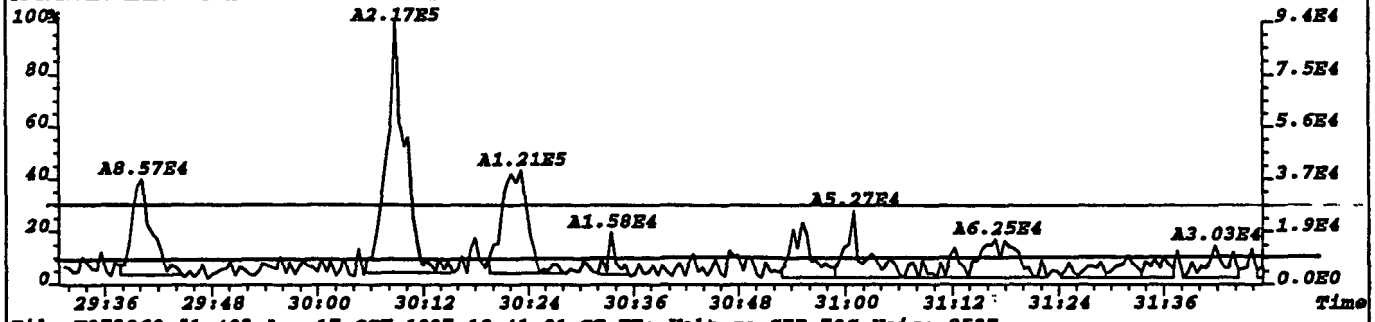
File:U973260 #1-403 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
445.7555 F:3 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



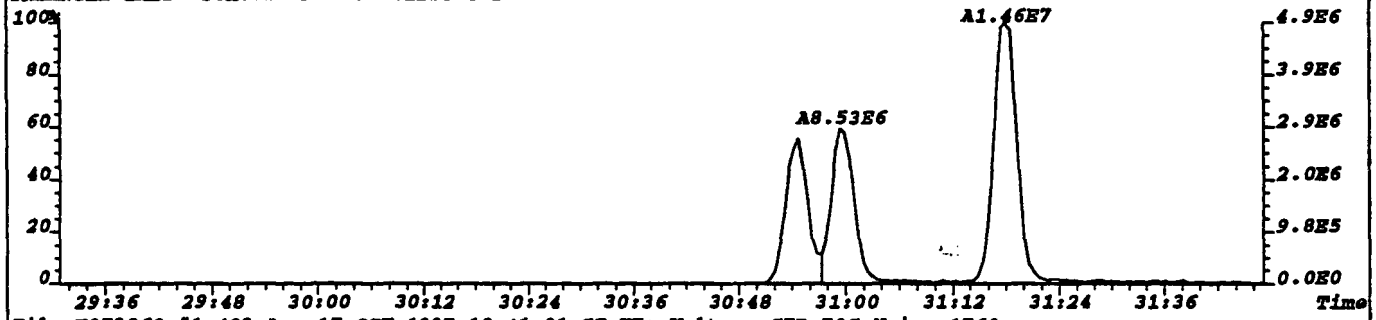
File:U973260 #1-403 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:1235
389.8156 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4940.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



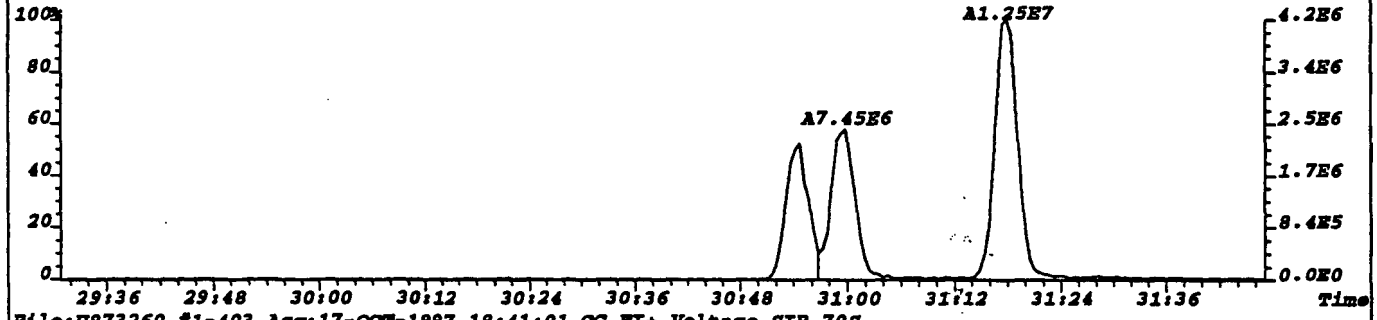
File:U973260 #1-403 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:1923
391.8127 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7692.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



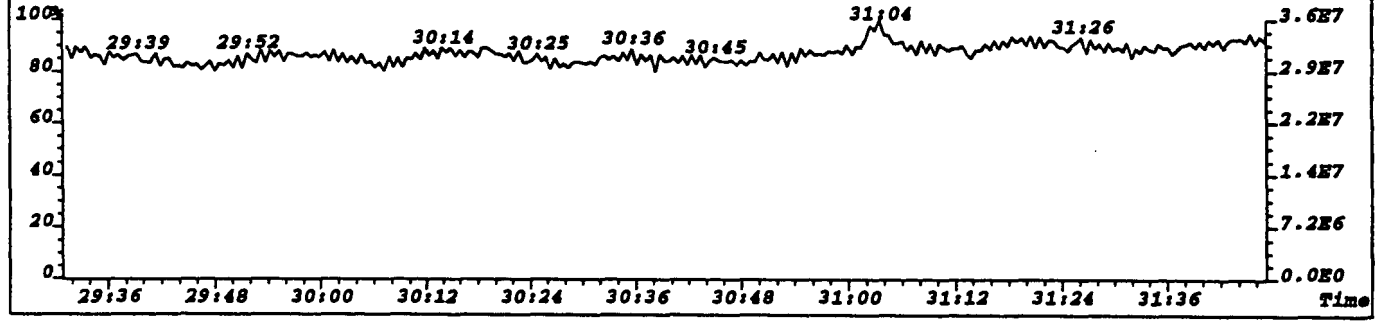
File:U973260 #1-403 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:2537
401.8558 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,10148.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



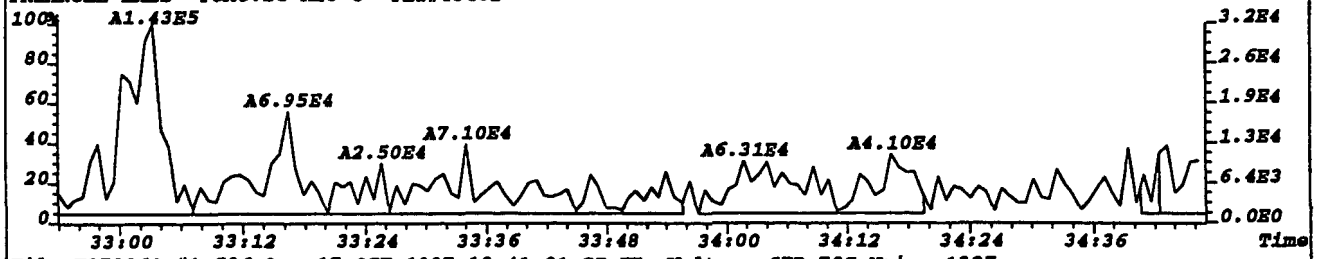
File:U973260 #1-403 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:1769
403.8529 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7076.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



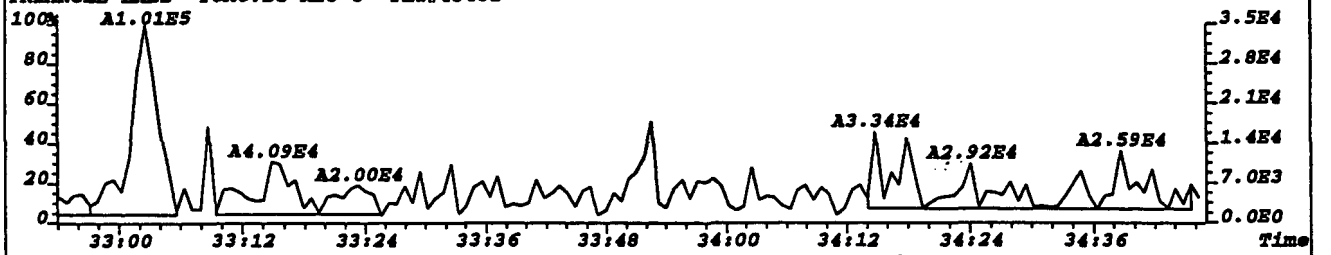
File:U973260 #1-403 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
392.9760 F:3 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



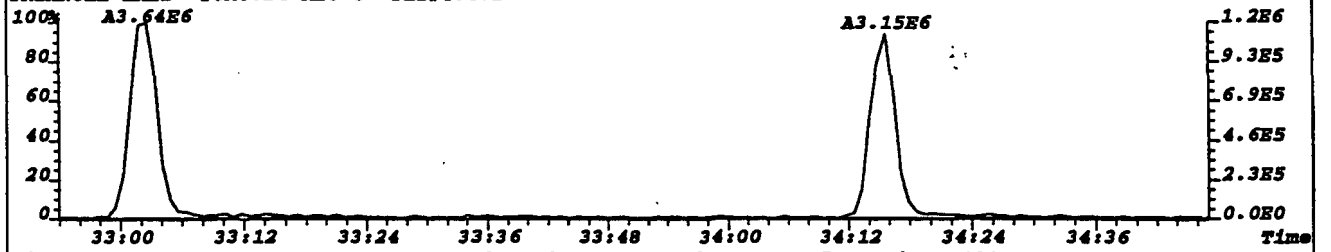
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:1463
407.7818 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5852.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



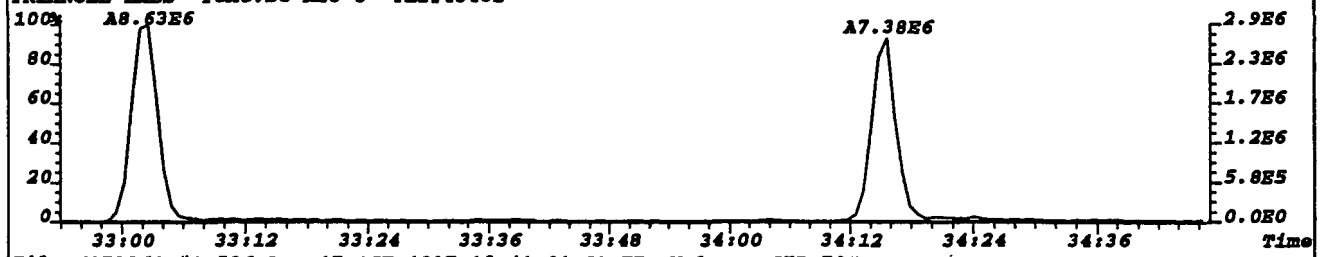
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:1327
409.7789 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5308.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



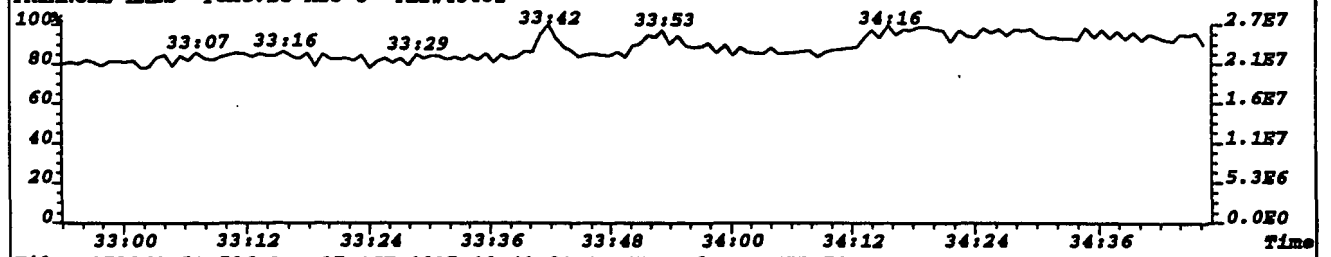
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:2868
417.8253 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,11472.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



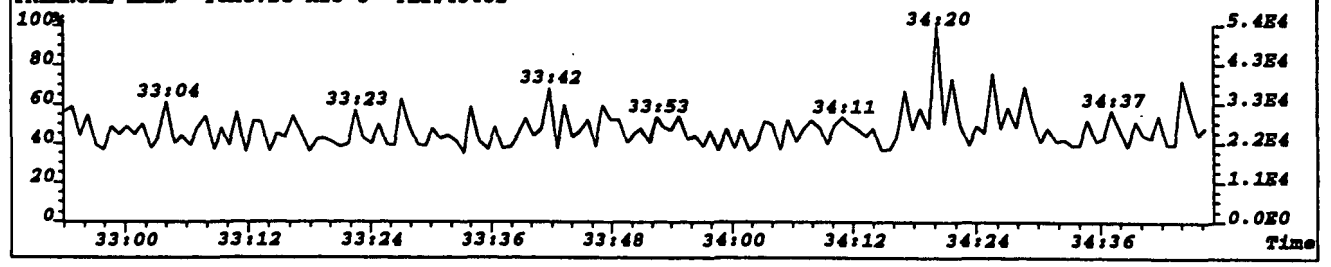
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:3430
419.8220 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,13720.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



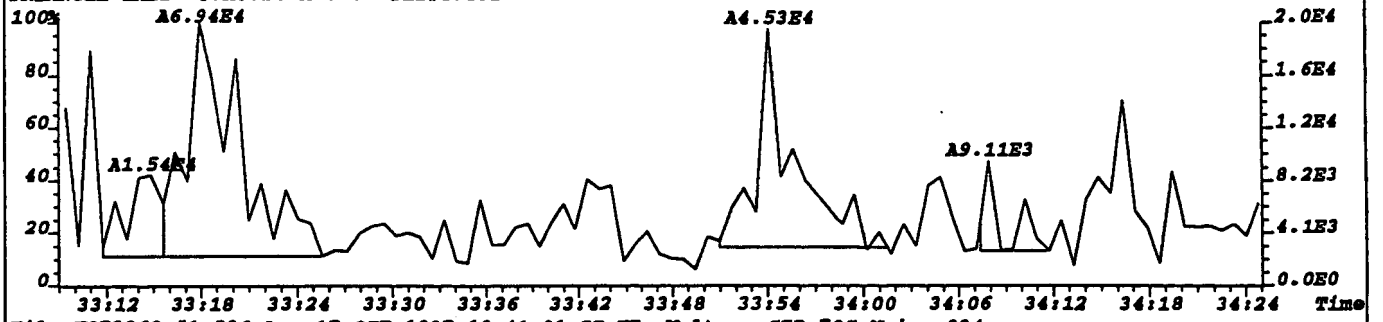
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



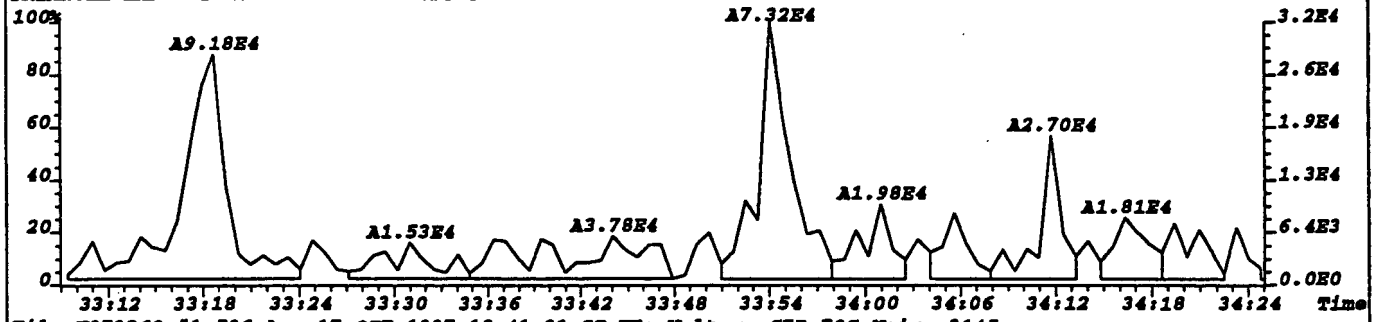
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
479.7165 F:4 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



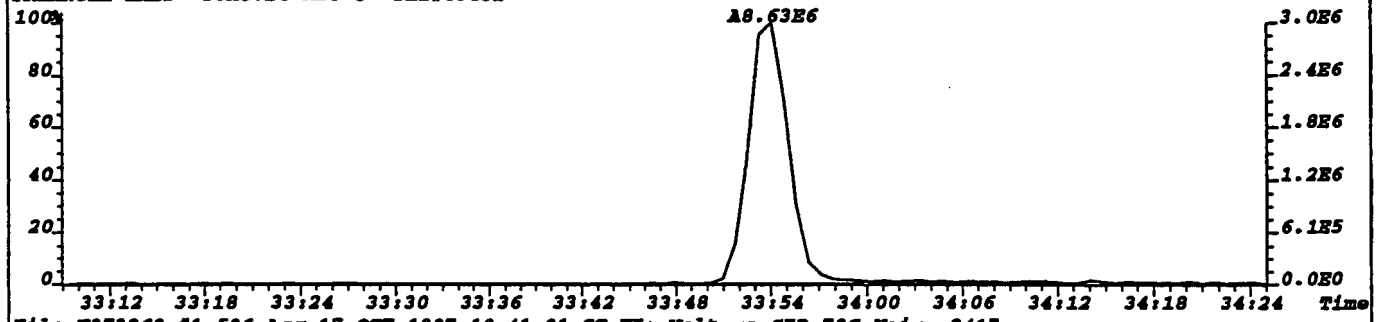
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:1246
423.7766 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4984.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



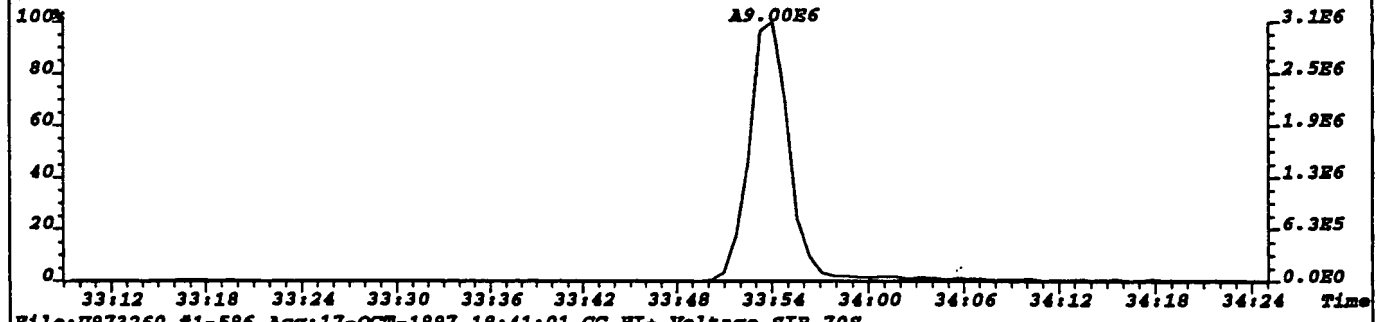
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:934
425.7737 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3736.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



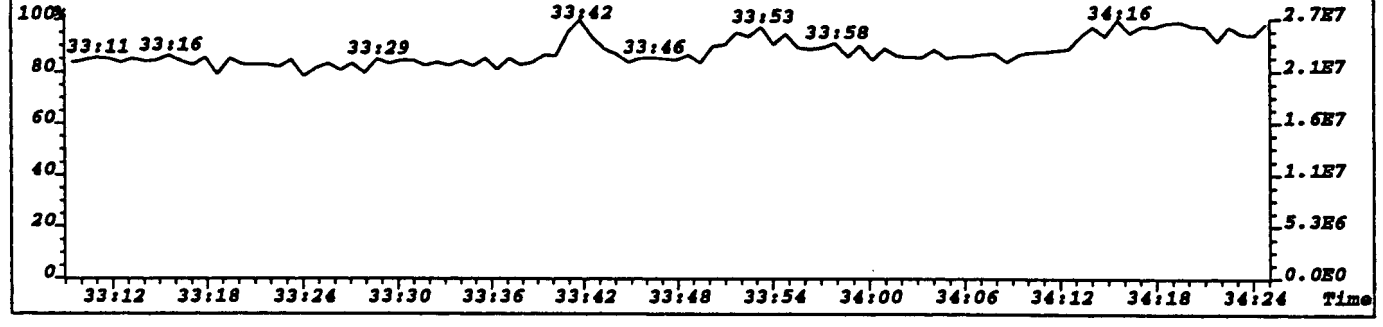
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:3145
435.8169 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,12580.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



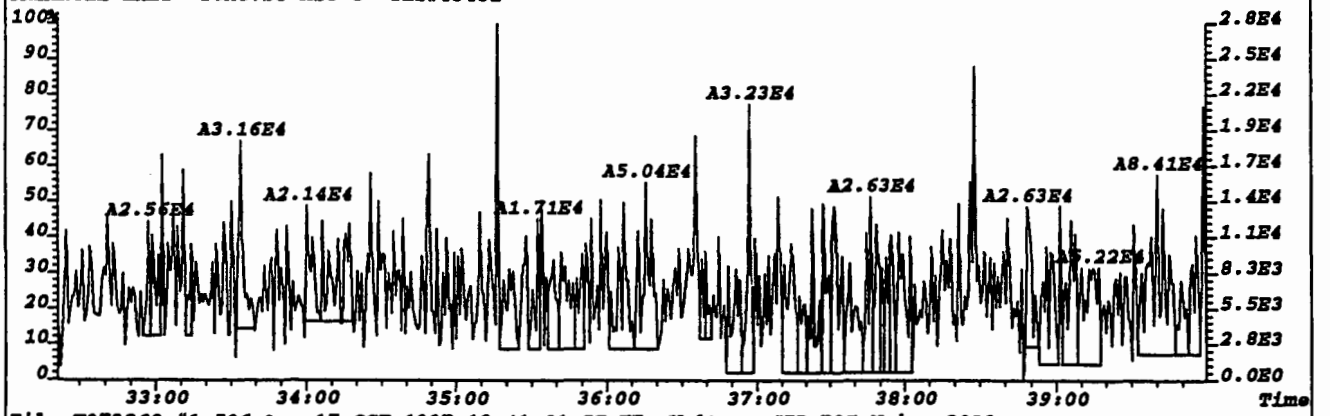
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:2417
437.8140 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,9668.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



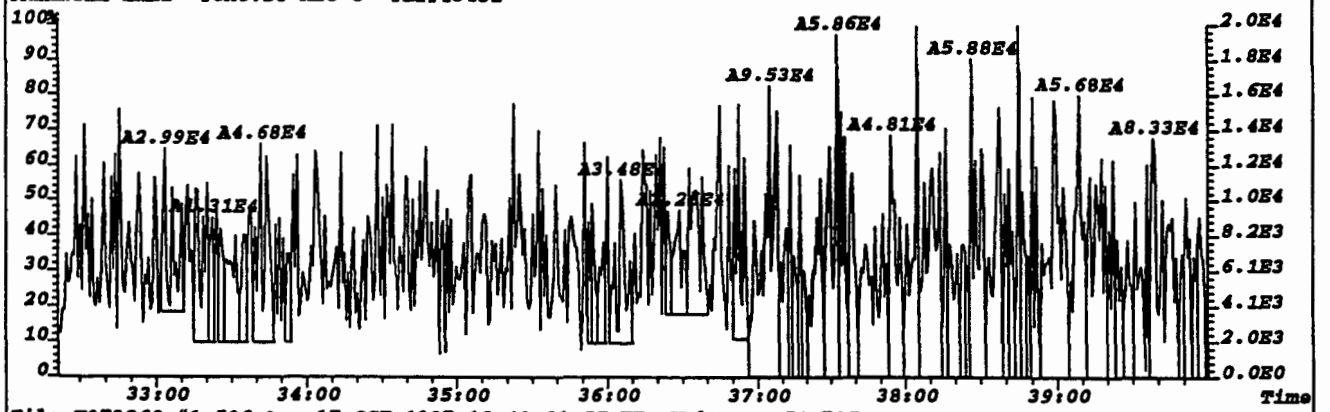
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



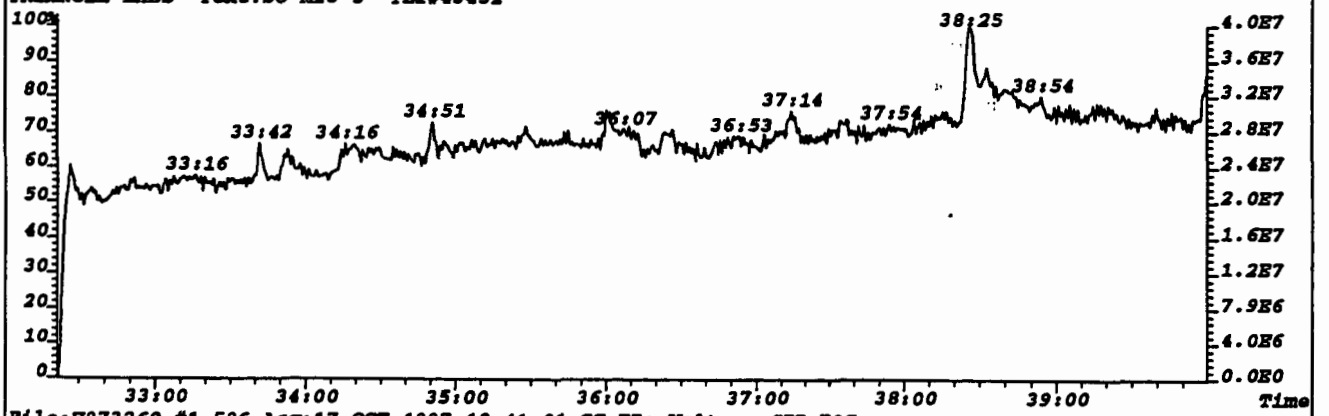
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:2067
441.7428 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,8268.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



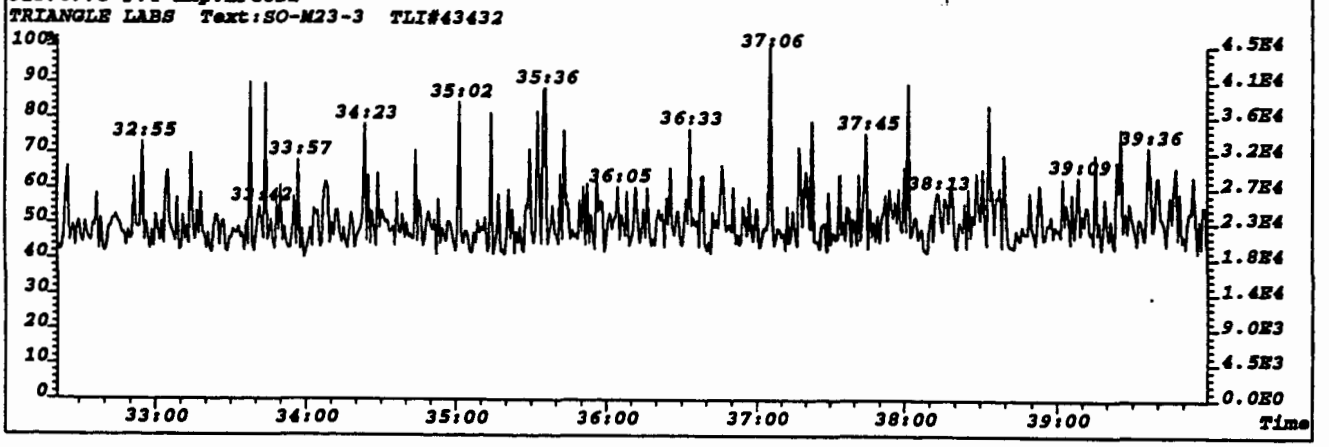
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:2033
443.7399 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,8132.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



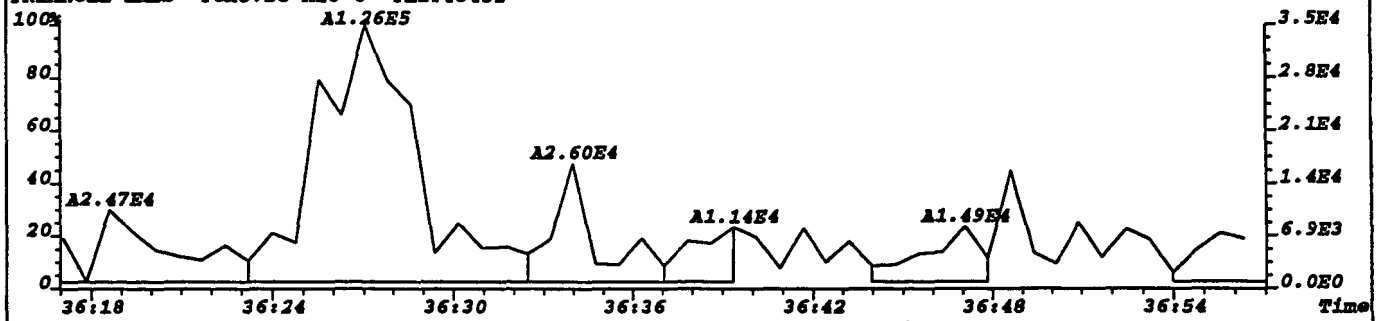
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



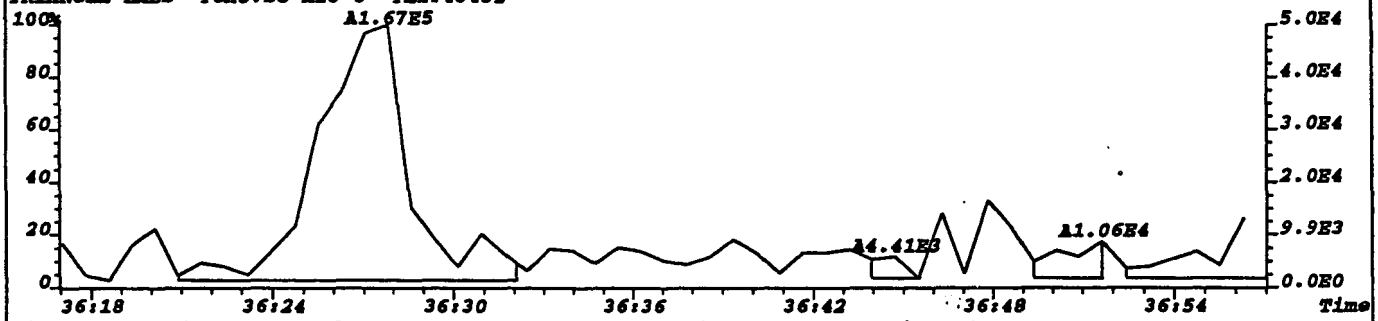
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
513.6775 F:4 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



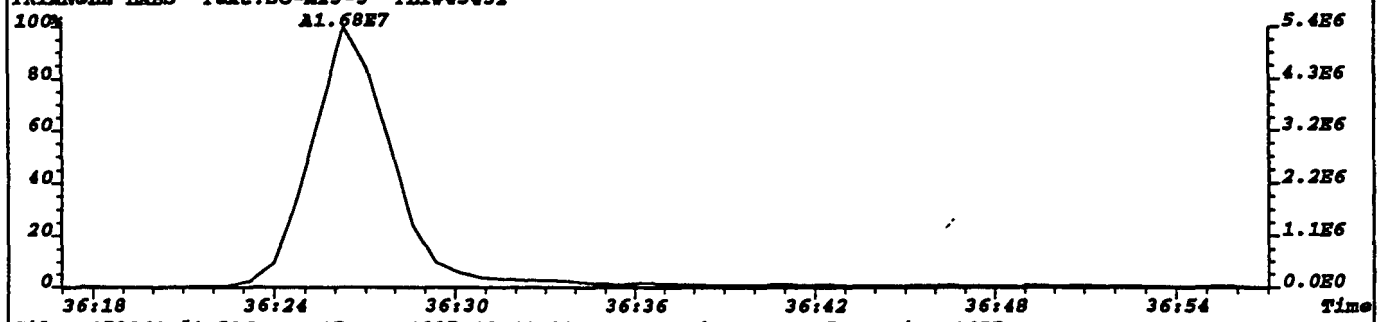
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:1481
457.7377 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5924.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



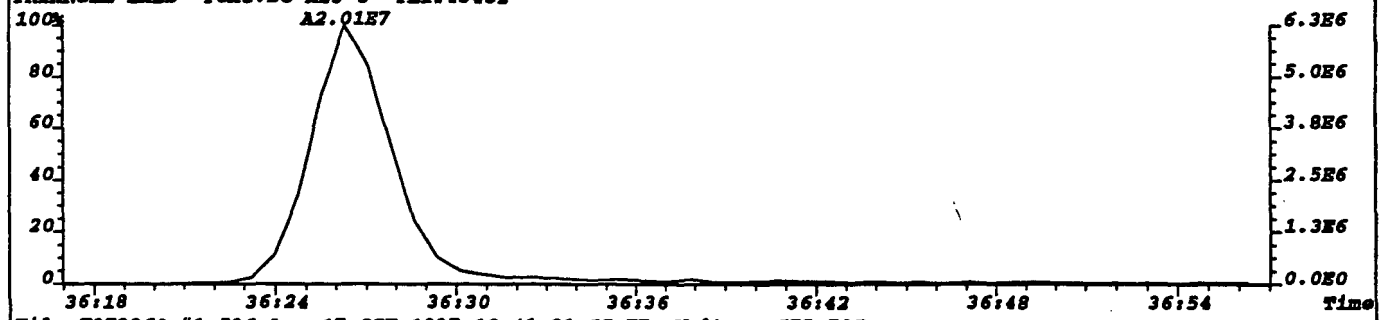
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:1531
459.7348 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6124.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



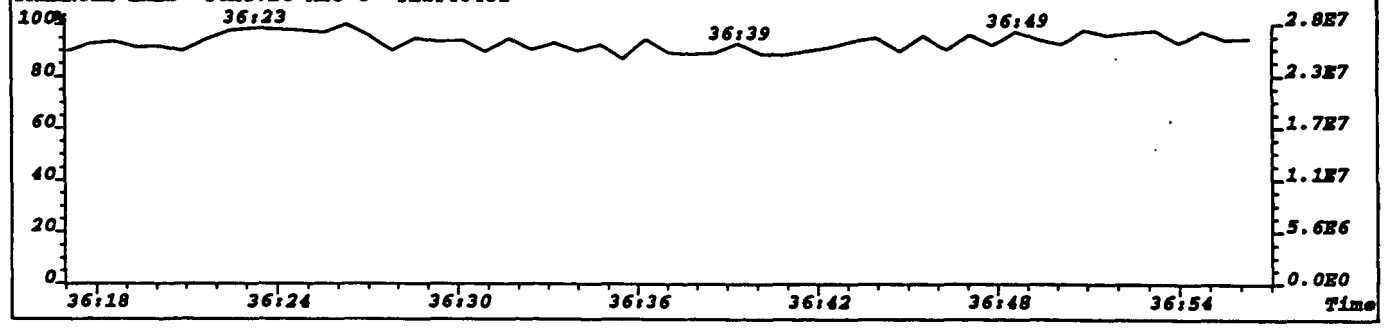
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:1603
469.7779 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6412.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



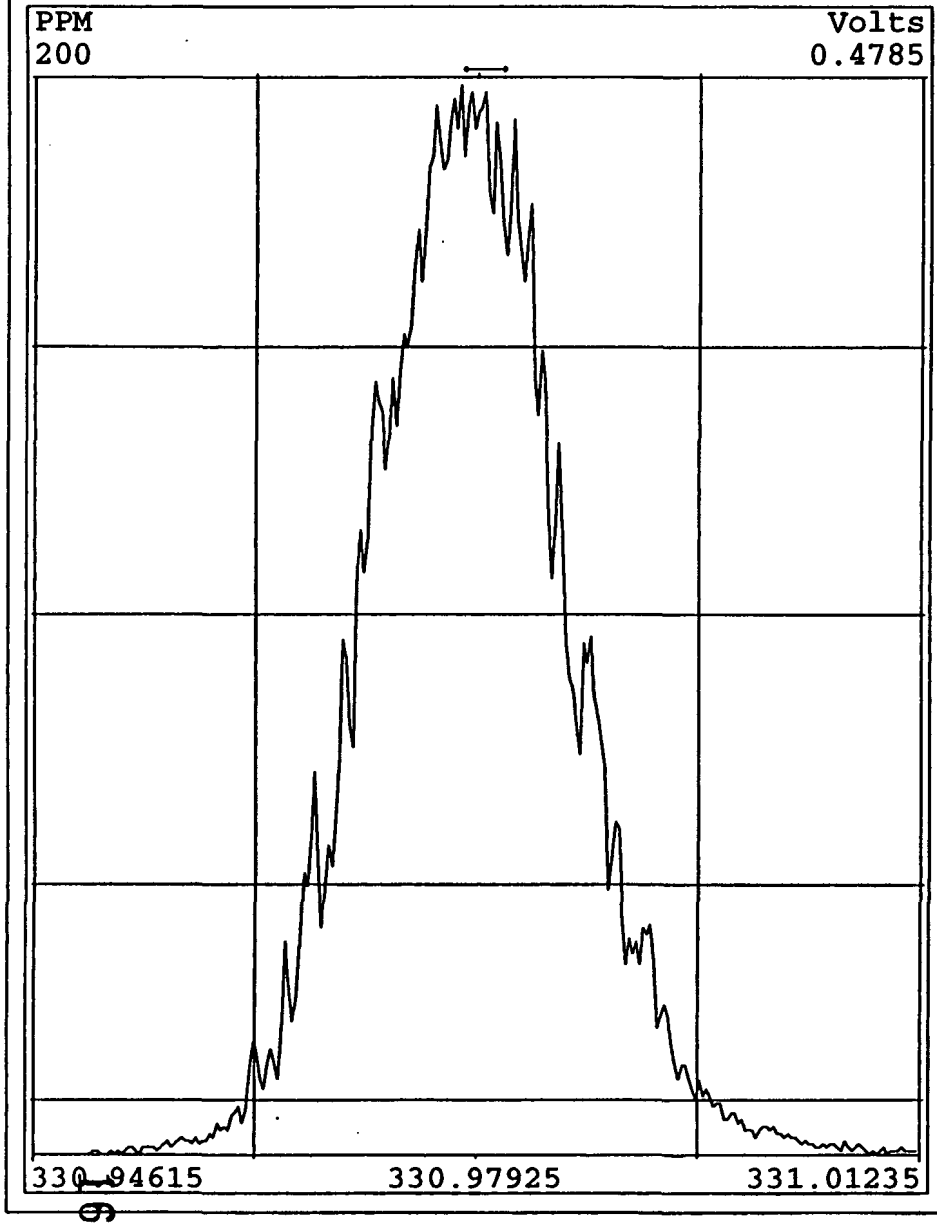
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S Noise:1655
471.7750 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6620.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432

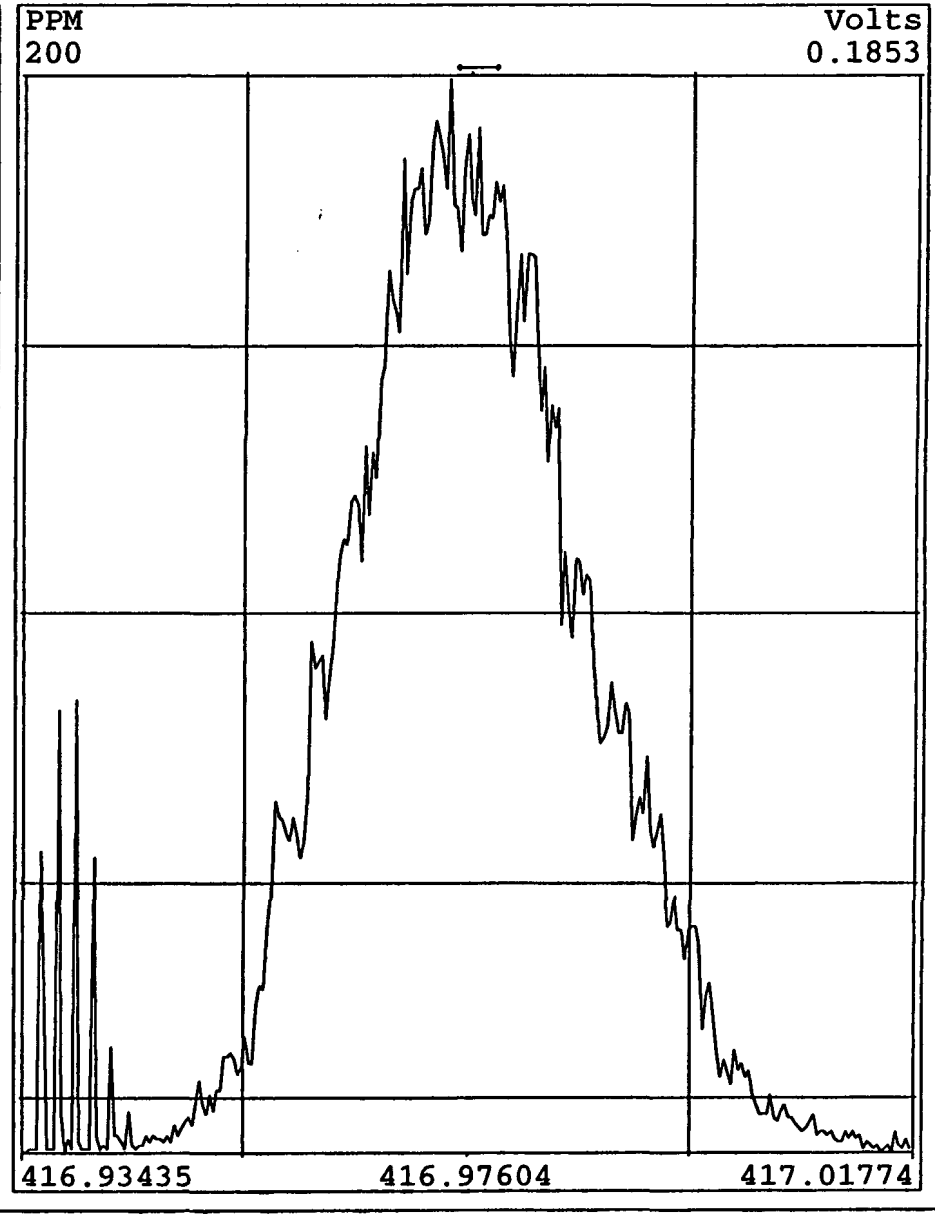


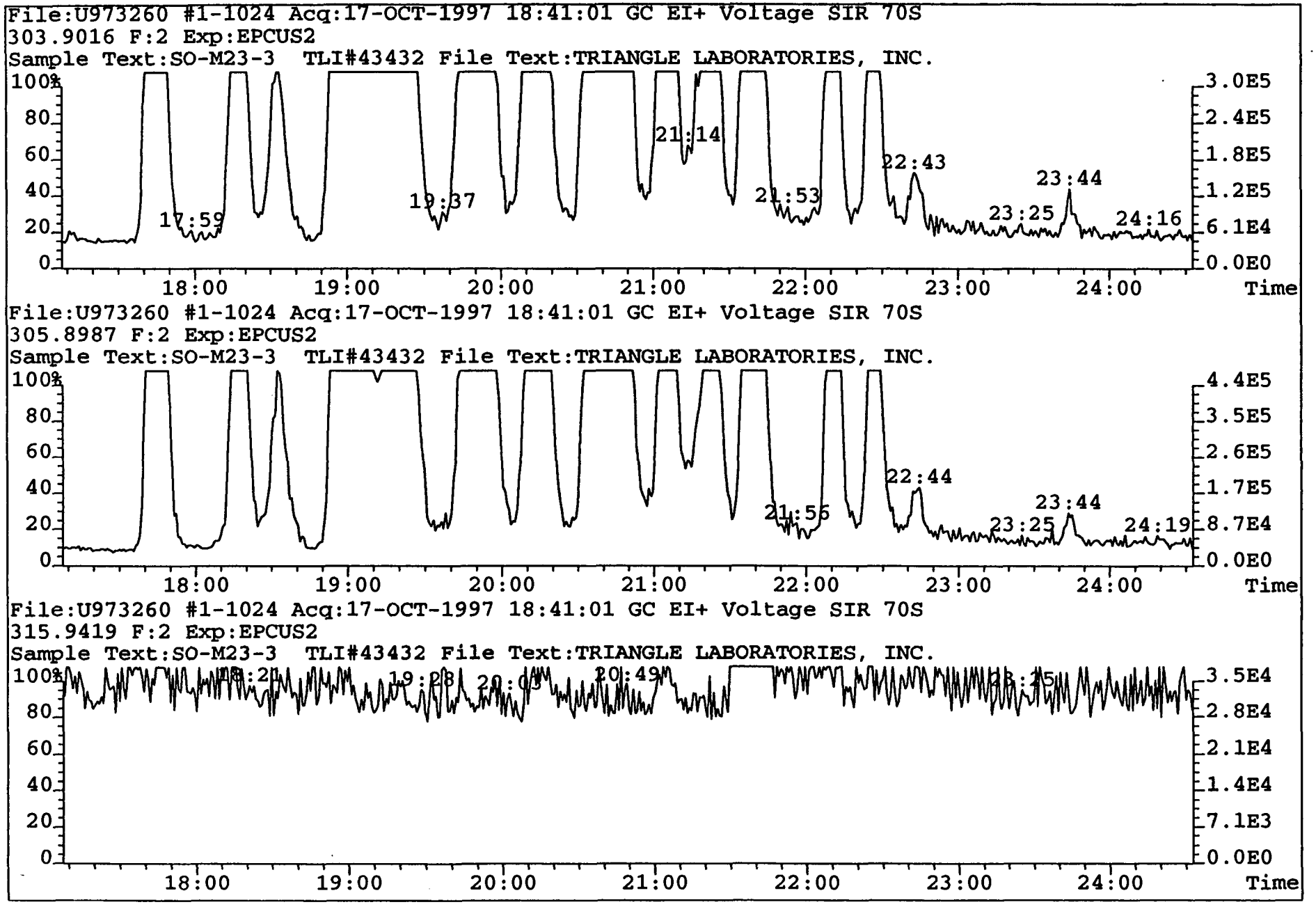
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-3 TLI#43432



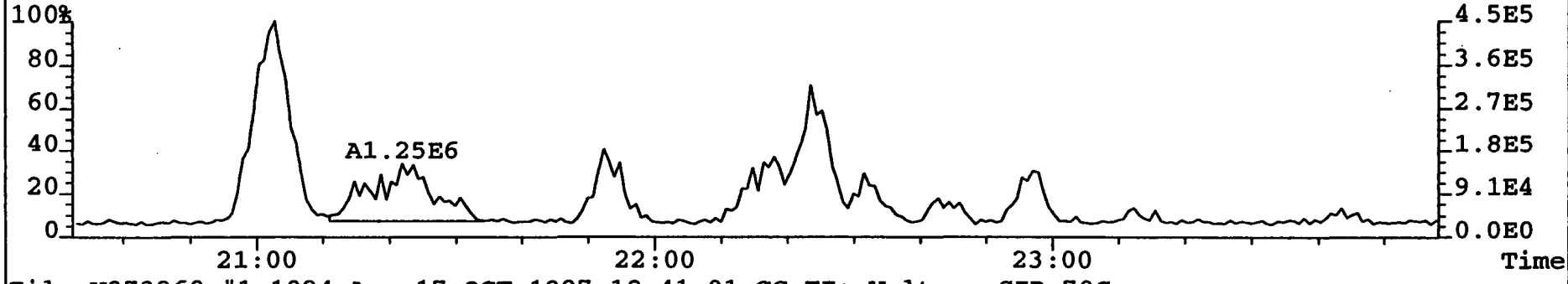
Peak Locate Examination:17-OCT-1997:18:40 File:U973260
Experiment:EPCUS2 Function:2 Reference:PFK



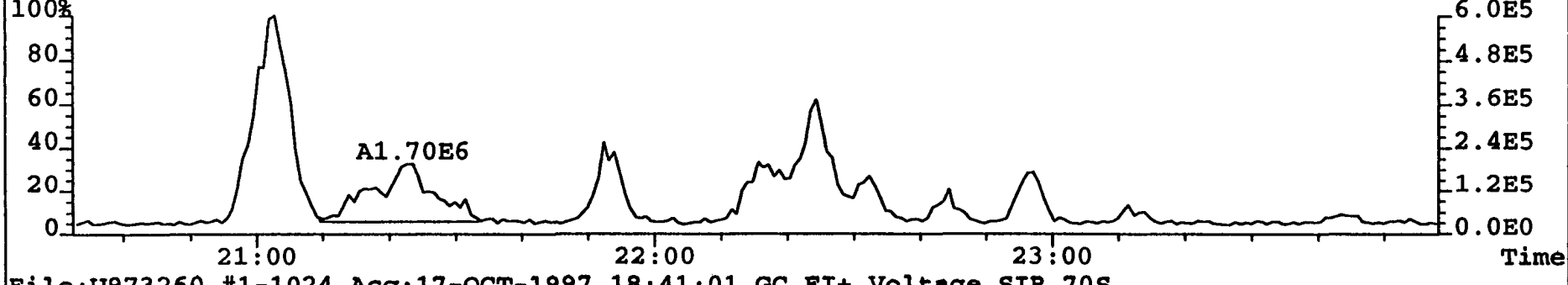



File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
303.9016 F:2 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.
17:59
19:37
21:14
21:53
22:43
23:25
23:44
24:16
100%
80
60
40
20
0
3.0E5
2.4E5
1.8E5
1.2E5
6.1E4
0.0E0
18:00
19:00
20:00
21:00
22:00
23:00
24:00
Time
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
305.8987 F:2 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.
21:56
22:44
23:25
23:44
24:19
100%
80
60
40
20
0
4.4E5
3.5E5
2.6E5
1.7E5
8.7E4
0.0E0
18:00
19:00
20:00
21:00
22:00
23:00
24:00
Time
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
315.9419 F:2 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.
19:28
20:49
100%
80
60
40
20
0
3.5E4
2.8E4
2.1E4
1.4E4
7.1E3
0.0E0
18:00
19:00
20:00
21:00
22:00
23:00
24:00
Time

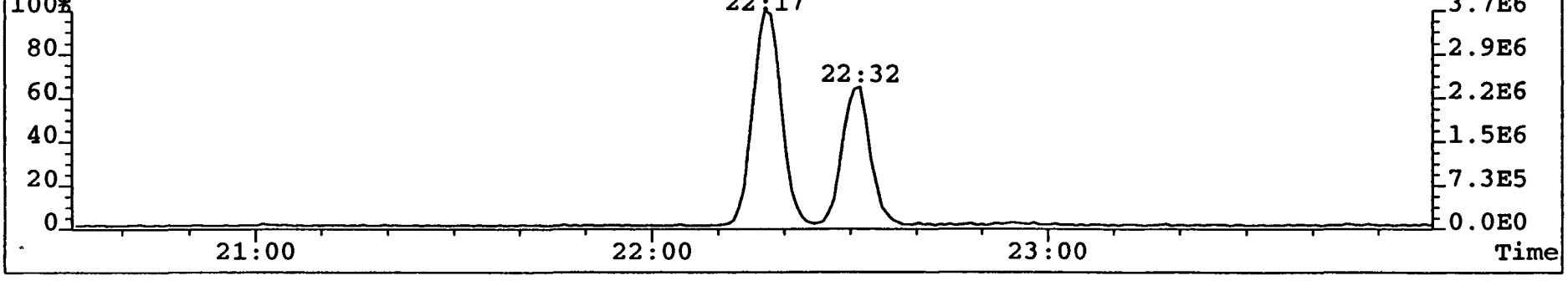
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
319.8965 F:2 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



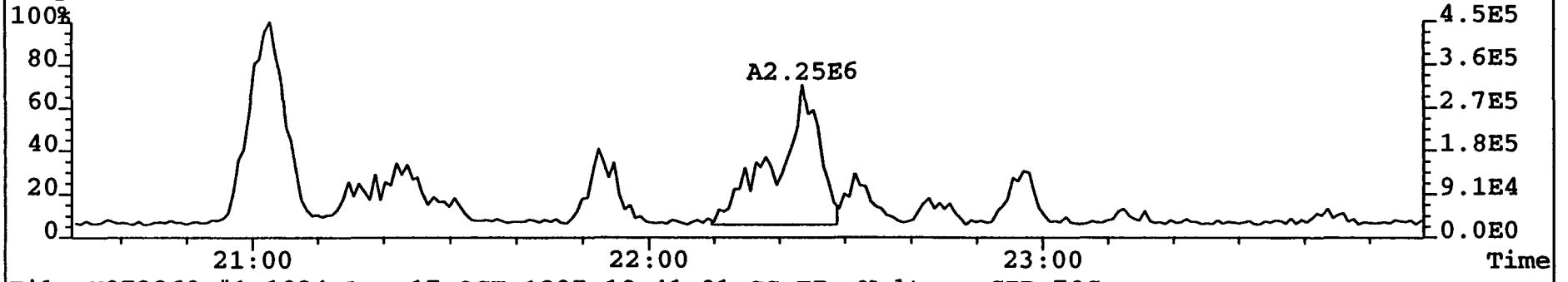
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
321.8936 F:2 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



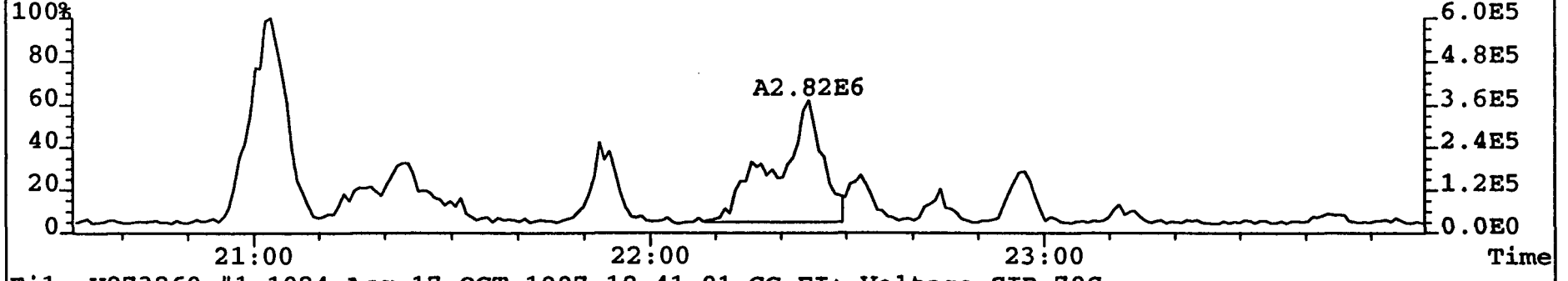
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
331.9368 F:2 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



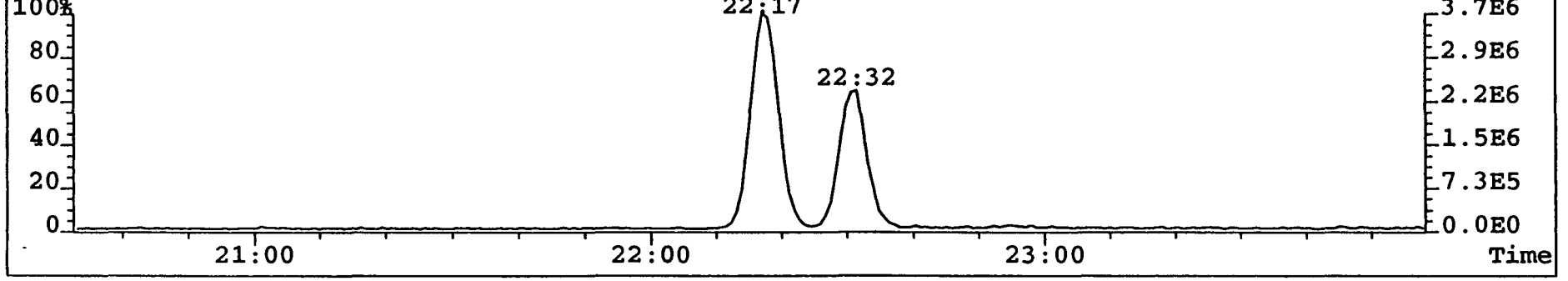
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
319.8965 F:2 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



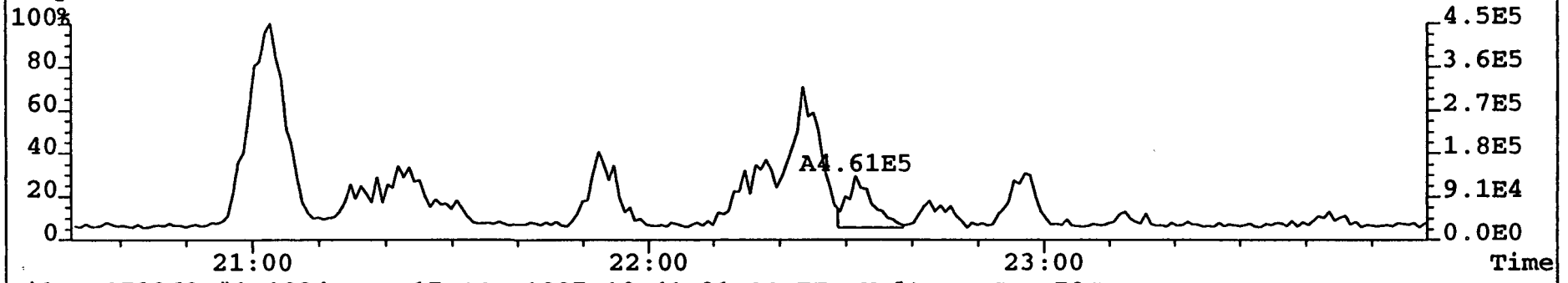
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
321.8936 F:2 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



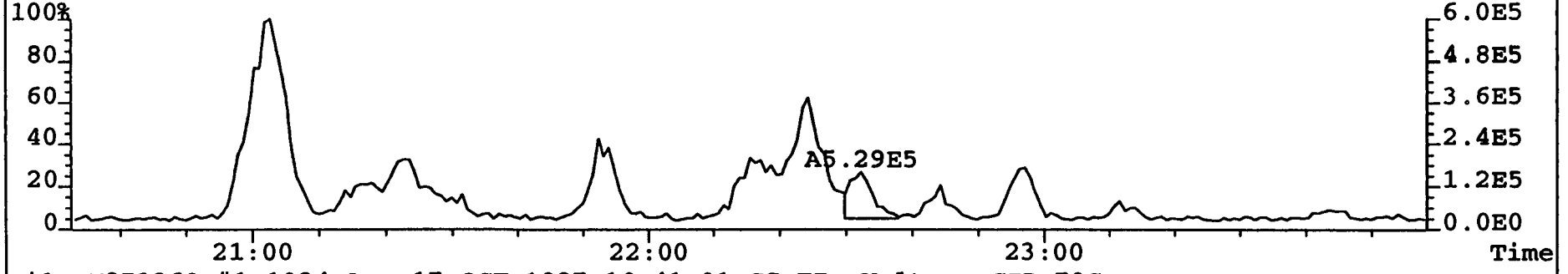
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
331.9368 F:2 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



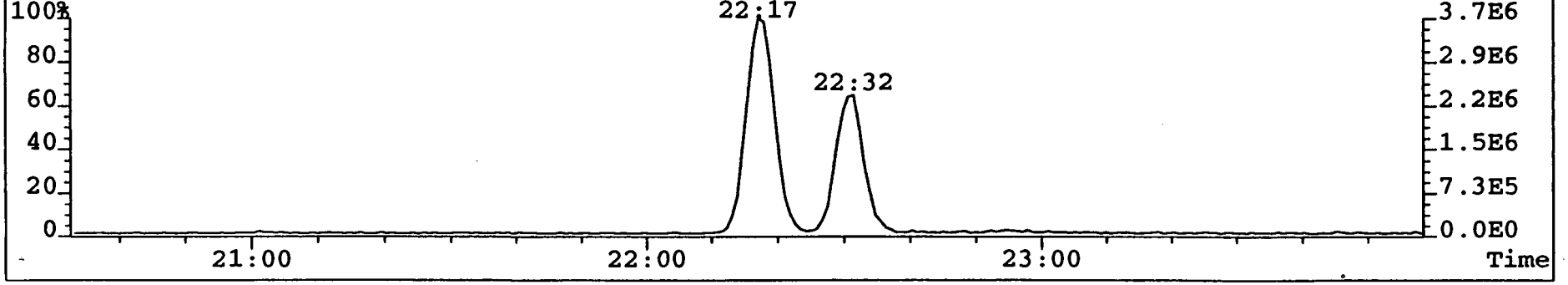
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
319.8965 F:2 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



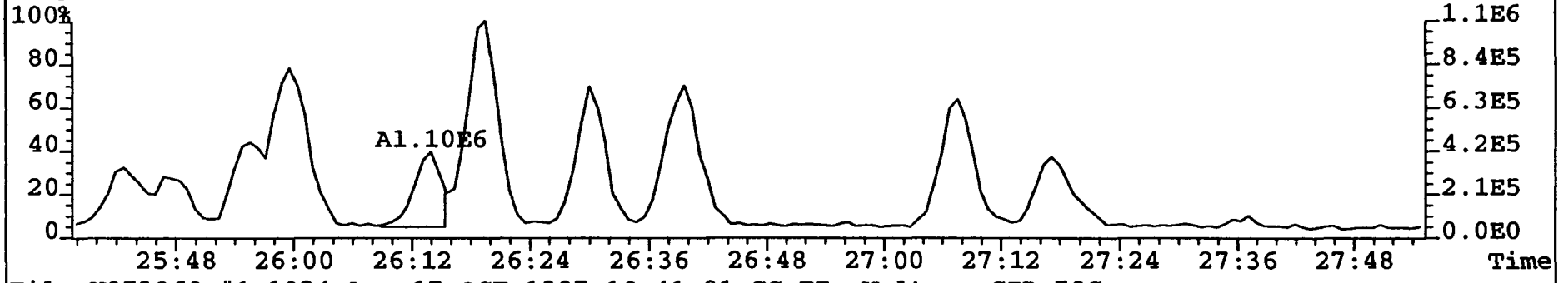
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
321.8936 F:2 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



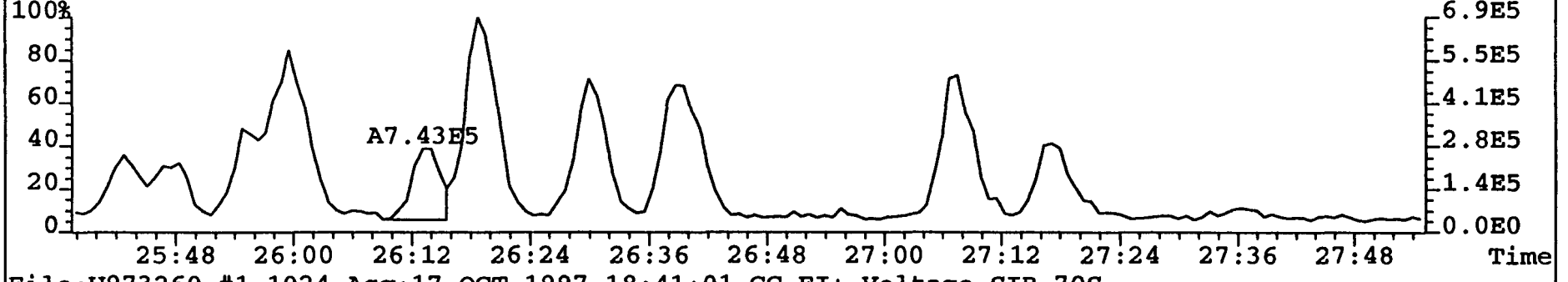
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
331.9368 F:2 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



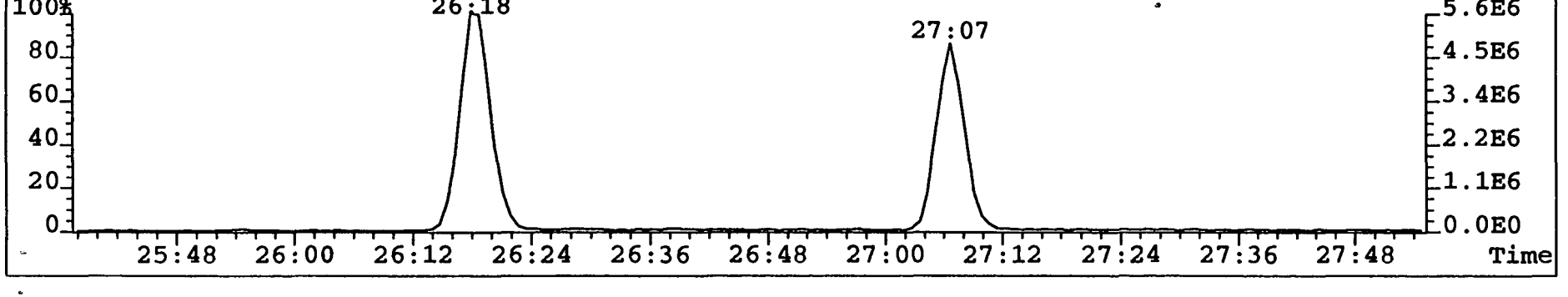
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
339.8597 F:2 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



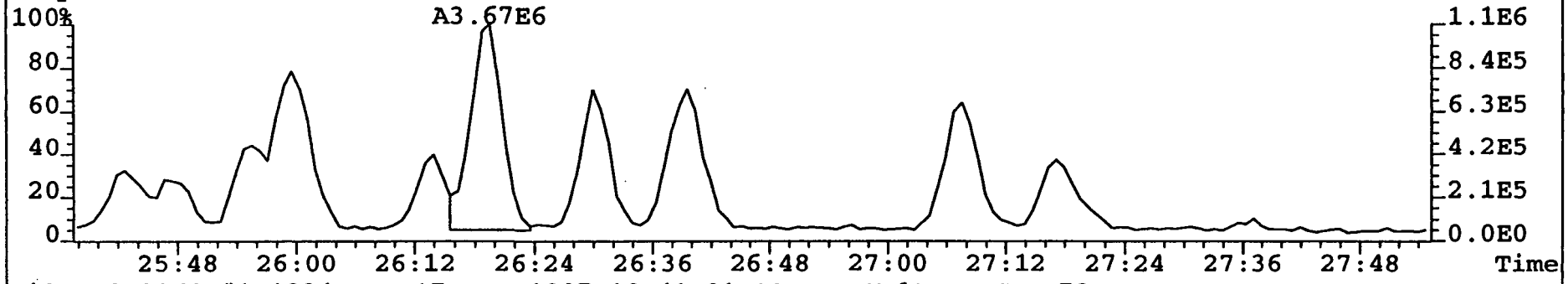
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
341.8567 F:2 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



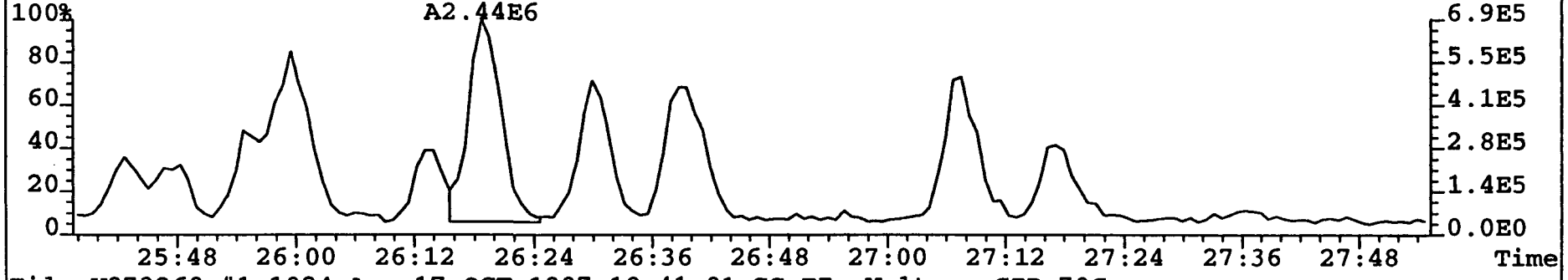
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
351.9000 F:2 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



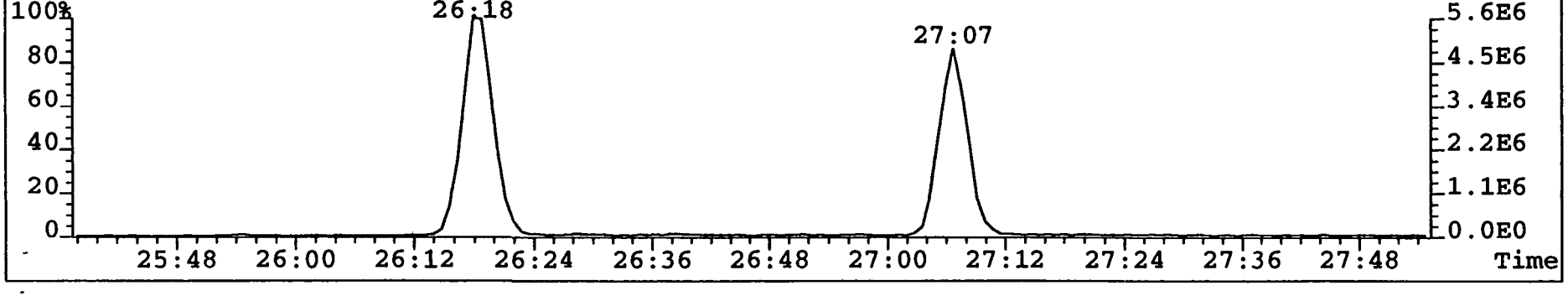
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
339.8597 F:2 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



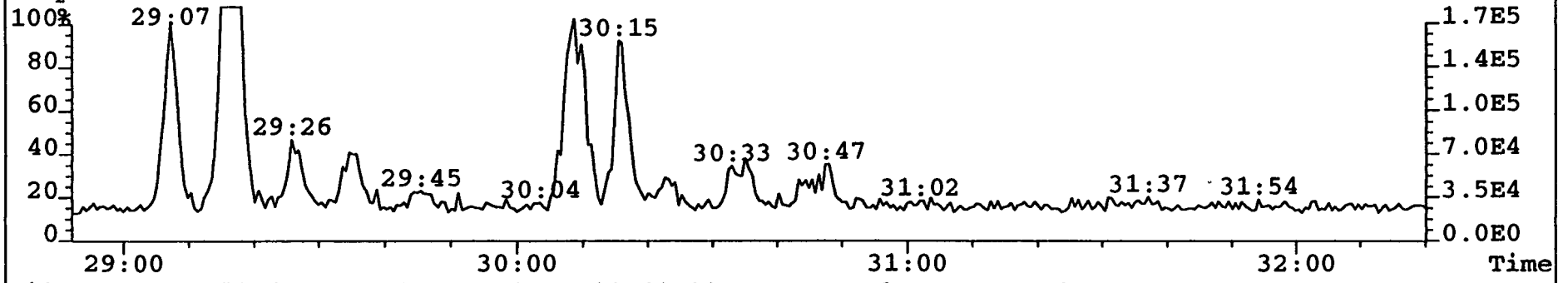
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
341.8567 F:2 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



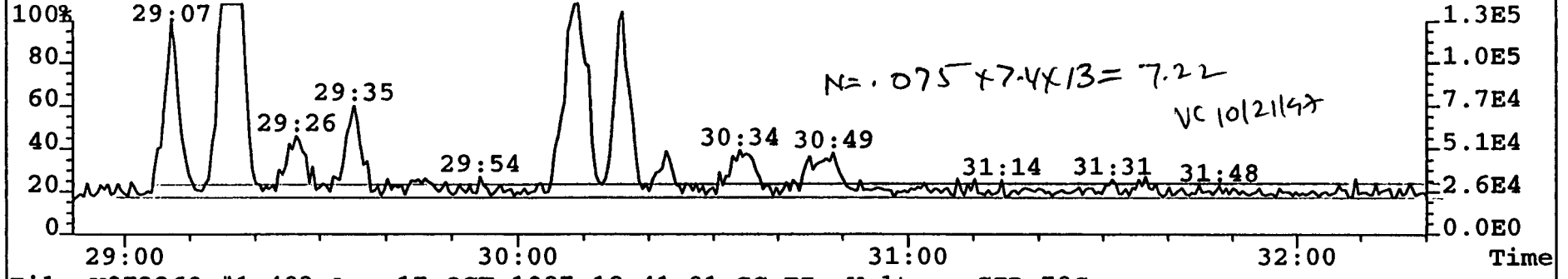
File:U973260 #1-1024 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
351.9000 F:2 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



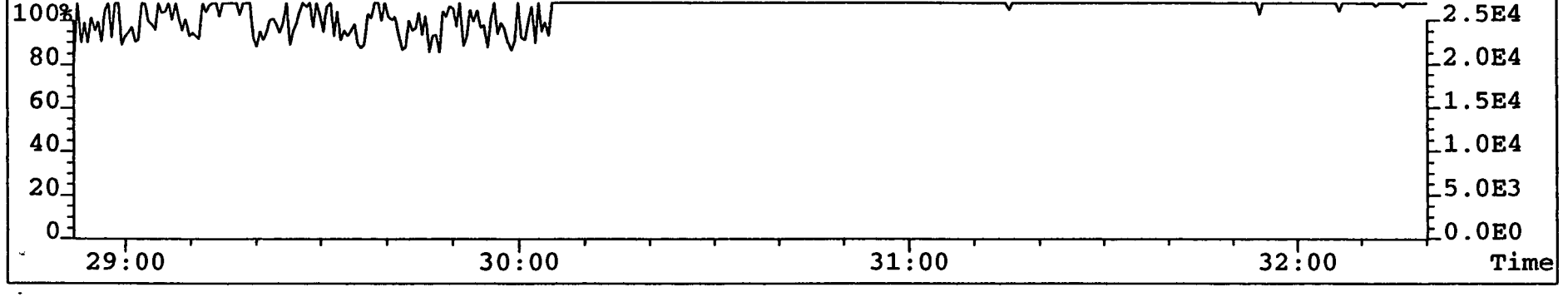
File:U973260 #1-403 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
373.8208 F:3 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



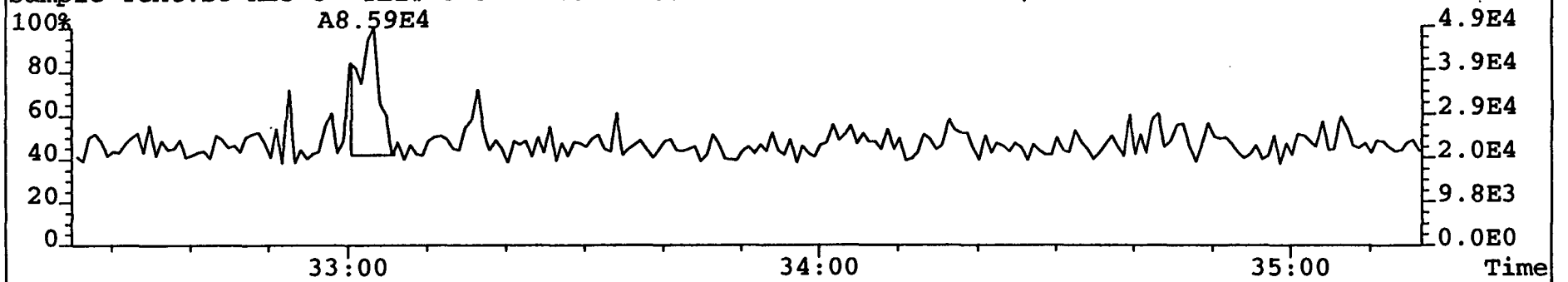
File:U973260 #1-403 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
375.8178 F:3 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



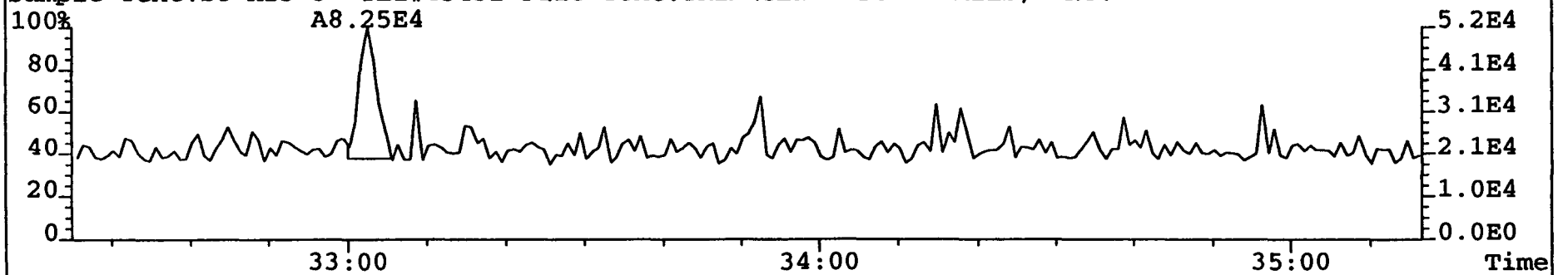
File:U973260 #1-403 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
383.8639 F:3 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



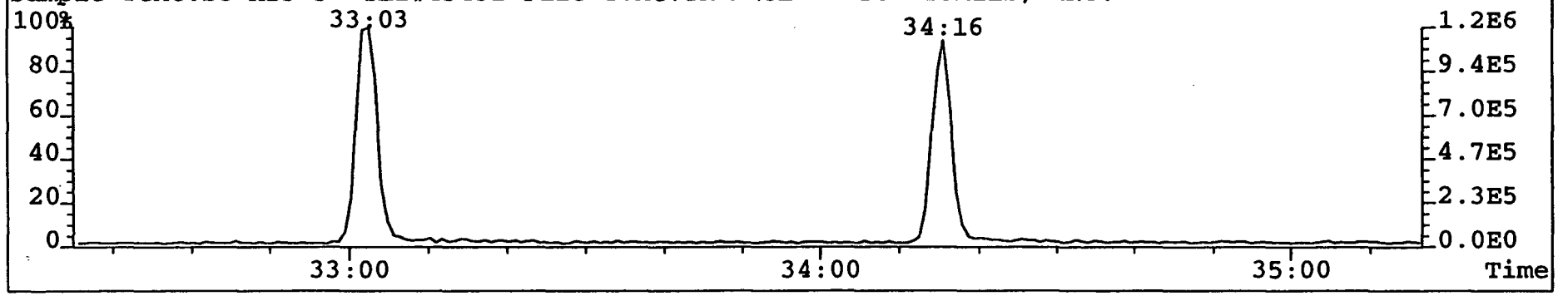
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
407.7818 F:4 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



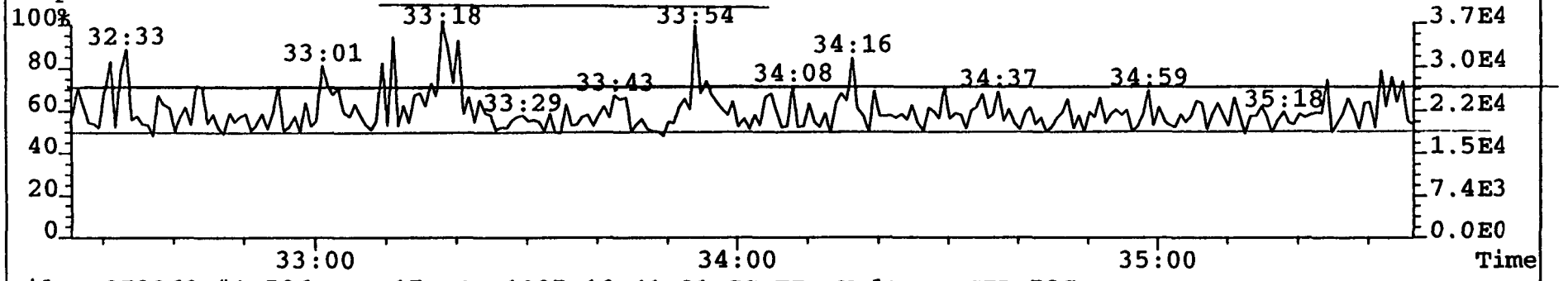
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
409.7789 F:4 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



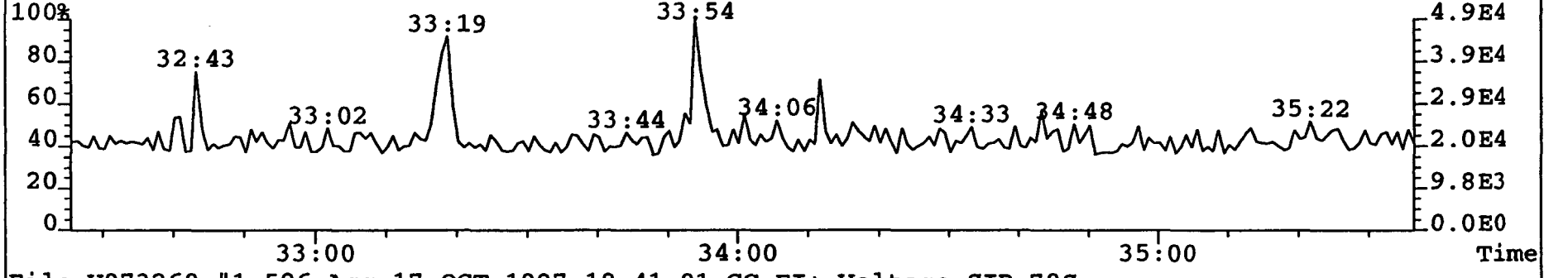
File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
417.8253 F:4 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
423.7766 F:4 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
425.7737 F:4 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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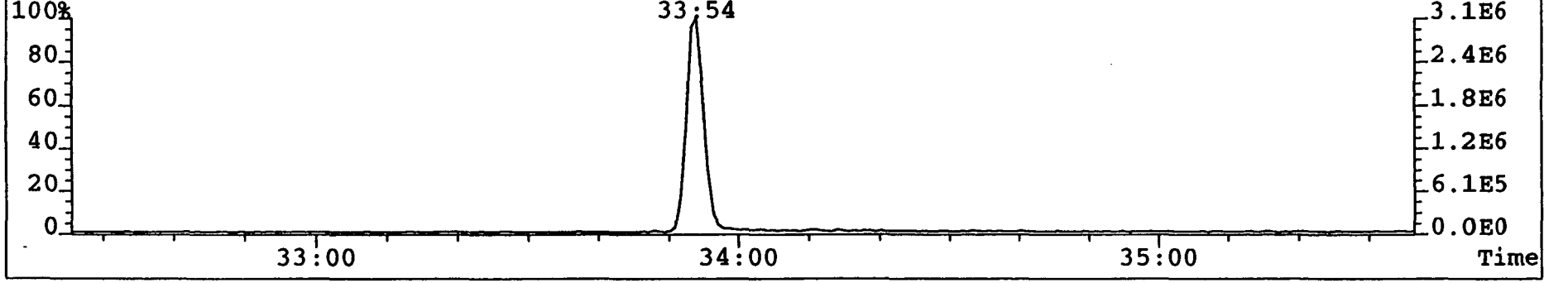
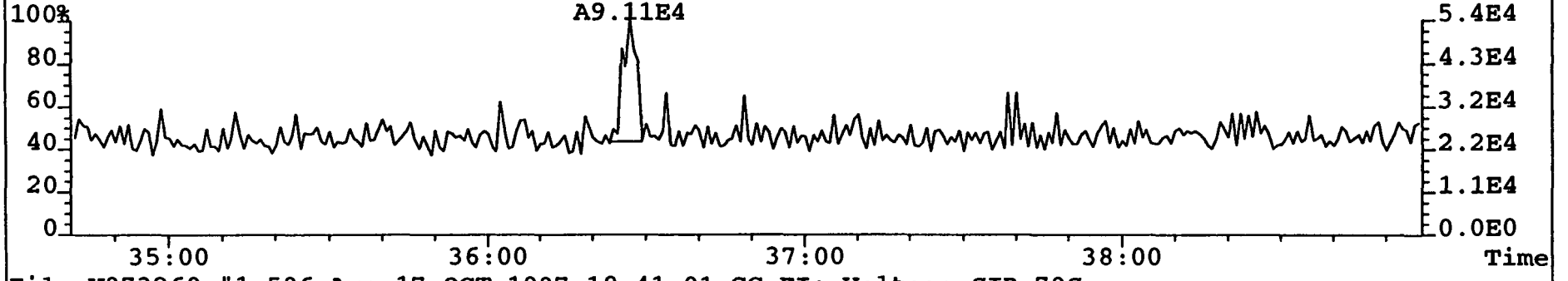
435.8169 F:4 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973260 #1-596 Acq:17-OCT-1997 18:41:01 GC EI+ Voltage SIR 70S
457.7377 F:4 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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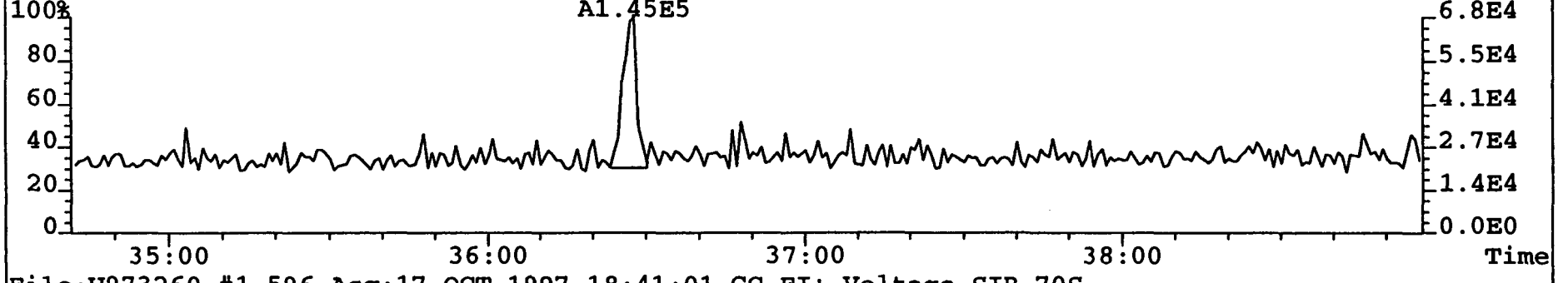
459.7348 F:4 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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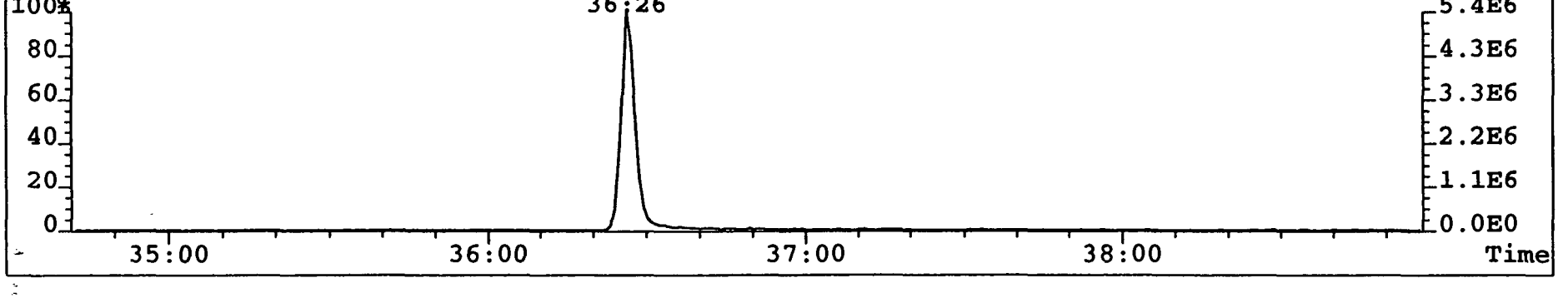
469.7779 F:4 Exp:EPCUS2
Sample Text:SO-M23-3 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



Pacific Environmental Services

TLI Project: **43432** Method 23 TCDD/TCDF Analysis (DB-225)
Client Sample: **SO-23-3** Analysis File: **X973638**

Client Project:	**Saginaw, MI**				
Sample Matrix:	**M23TRAIN**	Date Received:	**09/29/97**	Spike File:	**SPC2NF04**
TLI ID:	**185-6-3A-C**	Date Extracted:	**10/09/97**	ICal:	**XF24087**
		Date Analyzed:	**10/18/97**	ConCal:	**X973633**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U973257**	% Lipid:	**n/a**
GC Column:	**DB-225**	Analyst:	**WK**	% Solids:	**n/a**

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDF	1.8			0.79	24:34	—

Internal Standard	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	2.4	58.9	40%-130%	0.83	24:32	—

Recovery Standard	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.81	23:19	—

Data Reviewer: VC 10/23/97

C2NF_PSR v2.00, LARS 6.10.04

Triangle Laboratories, Inc.®
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Printed: 23:35 10/23/97

Initial ....Date...

Data Review By: VC 10/21/97 Calculated Noise Area: n/a

The Total Area for each peak with an ion abundance ratio outside ratio limits has been recalculated according to method requirements.

Page No. 1 Listing of X973638B.dbf
10/21/97 Matched GC Peaks / Ratio / Ret. Time

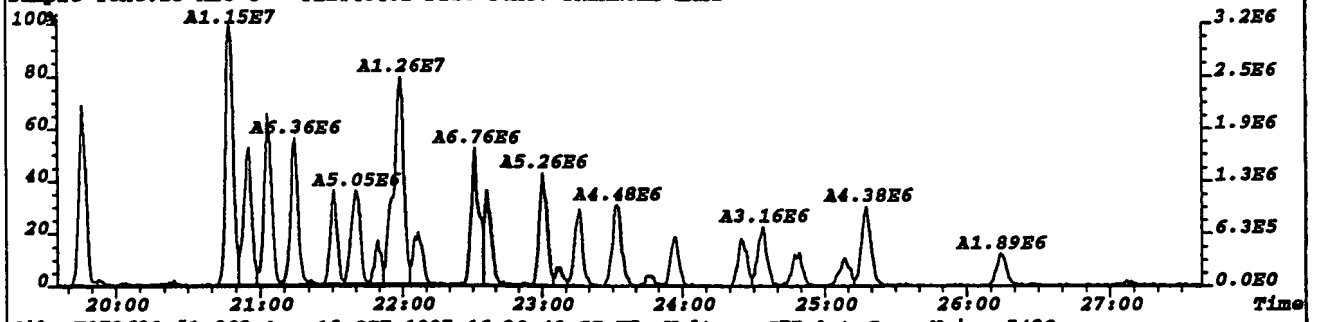
Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
TCDF				0.65-0.89						0.798-1.112			
304-306	DC	NL		0:00	RO	0.57	14.27			0.000			
				19:46		0.77	1,661.40	723.10	938.30	0.806			
				20:04	RO	1.42	9.10	7.29	5.14	0.818			
				20:47		0.78	2,612.58	1,145.05	1,467.53	0.847			
				20:56		0.77	1,488.78	649.22	839.56	0.853			
				21:03		0.81	1,672.95	750.51	922.44	0.858			
				21:14		0.88	1,355.79	636.30	719.49	0.865			
				21:31		0.78	833.10	366.13	466.97	0.877			
				21:40		0.76	1,173.28	504.75	668.53	0.883			
				21:49		0.69	402.29	164.27	238.02	0.889			
				21:59		0.79	2,854.09	1,256.38	1,597.71	0.896			
				22:06		0.79	680.65	300.19	380.46	0.901			
				22:31		0.83	1,485.58	675.67	809.91	0.918			
				22:36		0.70	915.08	375.48	539.60	0.921			
				22:43	RO	1.39	7.29	5.71	4.12	0.926			
				23:00		0.77	1,214.31	526.40	687.91	0.938			
				23:06		0.67	200.26	80.14	120.12	0.942			
				23:16		0.79	821.83	361.63	460.20	0.948			
				23:32		0.75	1,049.31	448.33	600.98	0.959			
				23:45		0.86	126.58	58.66	67.92	0.968			
				23:57		0.79	549.02	242.40	306.62	0.976			
				24:25		0.86	538.17	249.06	289.11	0.995			
				24:34		0.79	718.21	316.28	401.93	1.001	2378-TCDF		AN
				24:49		0.83	442.56	200.83	241.73	1.012			
				25:09		0.75	379.69	162.93	216.76	1.025			
				25:18		0.79	994.30	438.01	556.29	1.031			
				26:14		0.83	415.57	188.51	227.06	1.069			
				26:41		0.82	7.79	3.50	4.29	1.088			
				26:45	RO	1.99	2.89	3.25	1.63	1.090			
				26:50		0.66	5.76	2.28	3.48	1.094			
				27:07	RO	3.76	11.81	25.06	6.67	1.105			
304-306			30	Peaks			24,630.02						
13C12-TCDF				0.65-0.89						0.959-1.041			
316-318	DC	NL		0:00	RO	0.60	12.67			0.000			
	DC	WL		19:39	RO	0.32	3.93			0.801			
	DC	WL		21:09	RO	2.00	7.65			0.862			
	DC	WL		23:16	RO	0.96	5.86			0.948			
	DC	WL		23:21	RO	0.97	3.96			0.952			
				24:32		0.83	1,648.32	746.51	901.81	1.000	13C12-2378-TCDF		ISO
				24:45	RO	0.33	4.30	1.87	5.68	1.009			
	DC	WH		26:57	RO	1.91	15.03			1.099			
316-318			2	Peaks			1,652.62						

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
---------- Above: TCDF / TCDD Follows ----------													
13C12-TCDD						0.65-0.89				0.913-1.087			
332-334	DC	NL		0:00	RO	2.45	6.27			0.000			
				21:11	RO	2.46	2.78	3.87	1.57	0.921			
				21:47	RO	1.14	9.27	5.99	5.24	0.947			
	DC	SN		21:55	RO	3.70	1.35			0.953			
				23:00		0.81	1,295.55	577.93	717.62	1.000	13C12-2378-TCDD	IS1	
				23:19		0.81	2,009.51	898.65	1,110.86	1.014	13C12-1234-TCDD	RS1	
				23:27	RO	0.46	9.08	3.95	8.67	1.020			
				23:38	RO	1.15	5.52	3.58	3.12	1.028			
	DC	SN		25:00	RO	3.06	1.13			1.087			
	DC	WH		25:09	RO	0.18	2.34			1.093			
	DC	WH		25:43	RO	0.44	5.72			1.118			
	DC	WH		26:14	RO	1.86	6.00			1.141			
	DC	WH		26:18	RO	0.58	5.54			1.143			
	DC	WH		26:27		0.85	6.05			1.150			
	DC	WH		26:35	RO	1.36	3.79			1.156			
332-334			6 Peaks				3,331.71						

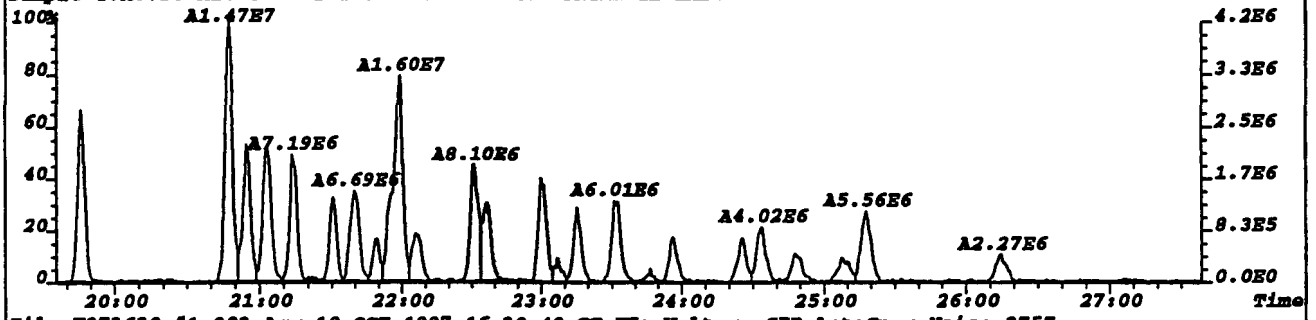
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside Limits	<M-Below Method Detection Limit	T-Time Changed
Rel.RT-Relative Retention Time	NL-Channel Specific Noise Level	M-Peak Area Changed
		N-Name Changed
		E-Ether Interference

*** End of Report ***

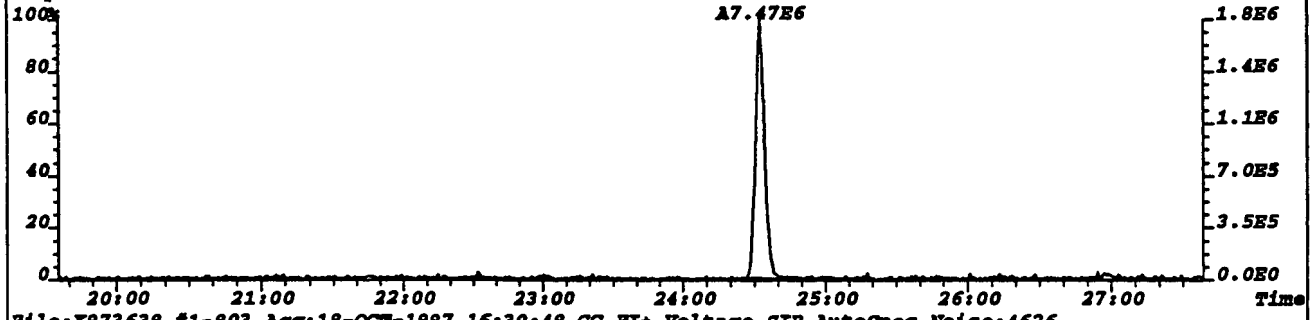
File:X973638 #1-803 Acq:18-OCT-1997 16:30:48 GC EI+ Voltage SIR AutoSpec Noise:3107
303.9016 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,12428.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



File:X973638 #1-803 Acq:18-OCT-1997 16:30:48 GC EI+ Voltage SIR AutoSpec Noise:5422
305.8987 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,21688.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



File:X973638 #1-803 Acq:18-OCT-1997 16:30:48 GC EI+ Voltage SIR AutoSpec Noise:2757
315.9419 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,11028.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



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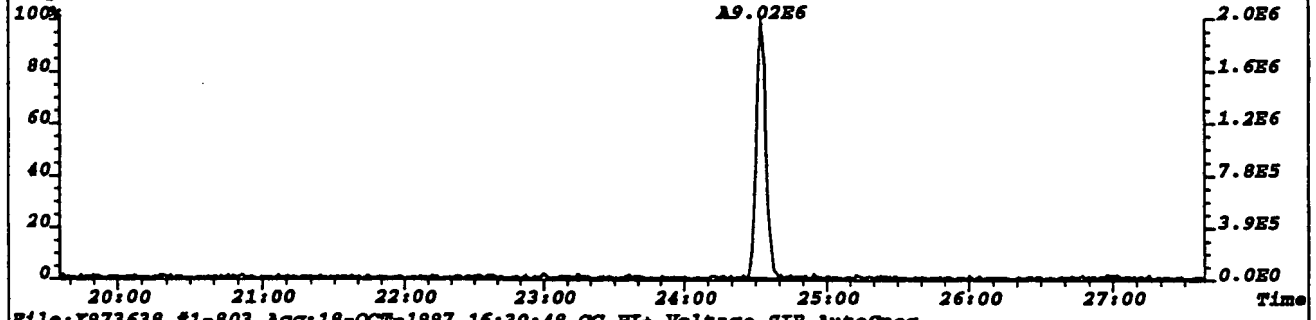
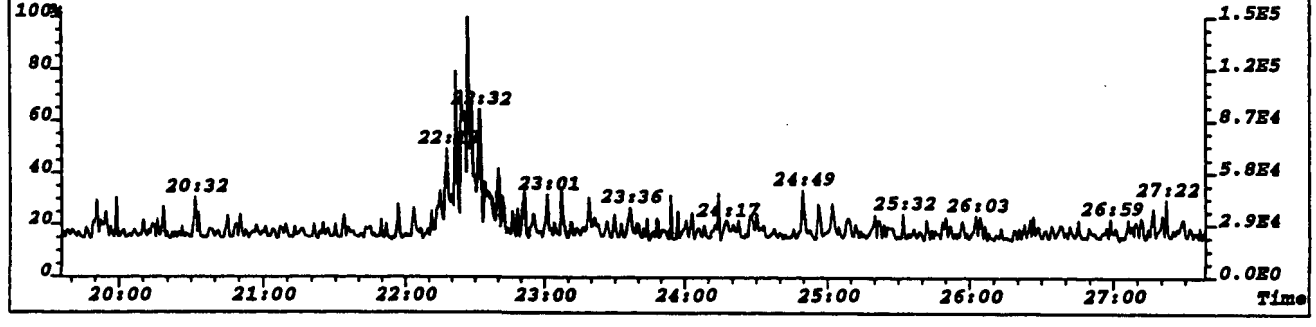
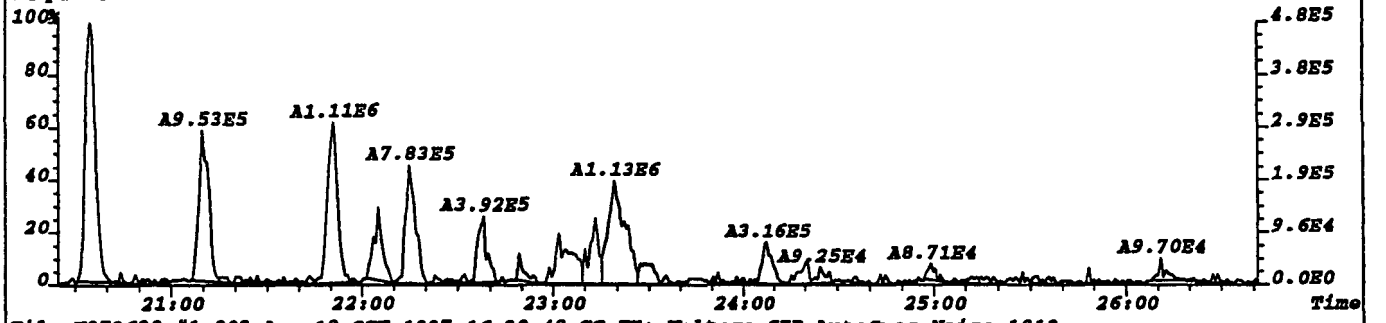
317.9389 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,18504.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



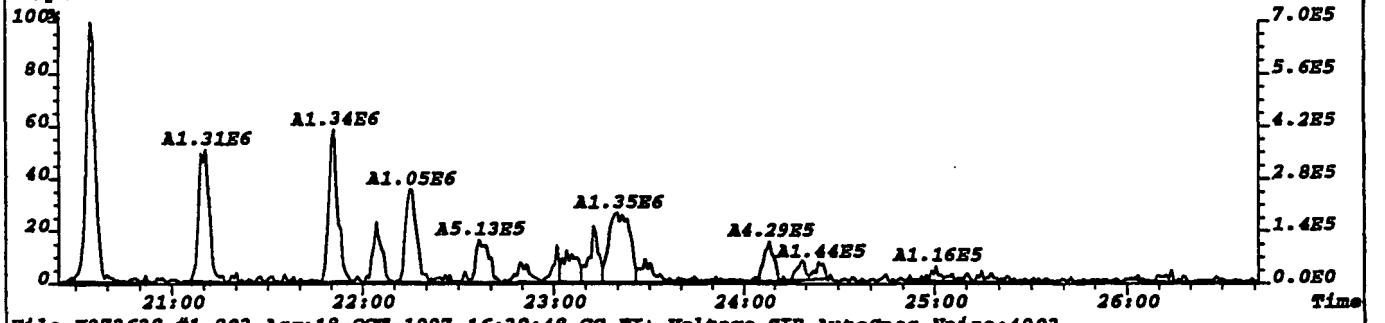
File:X973638 #1-803 Acq:18-OCT-1997 16:30:48 GC EI+ Voltage SIR AutoSpec
375.8364 Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



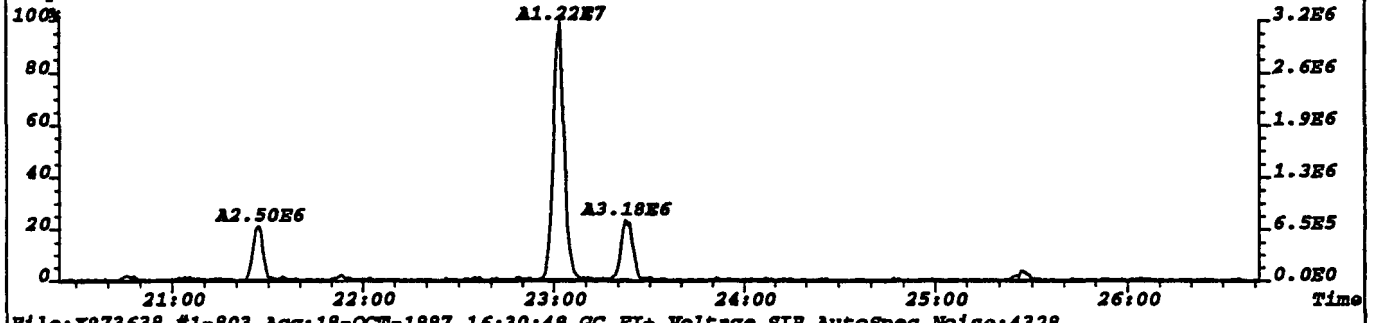
File:X973638 #1-803 Acq:18-OCT-1997 16:30:48 GC EI+ Voltage SIR AutoSpec Noise:1701
319.8965 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,6804.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



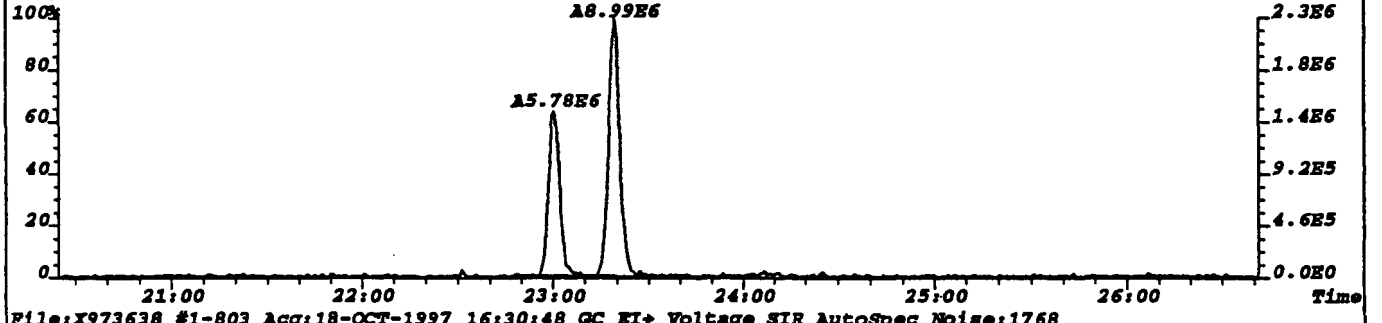
File:X973638 #1-803 Acq:18-OCT-1997 16:30:48 GC EI+ Voltage SIR AutoSpec Noise:1813
321.8936 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,7252.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



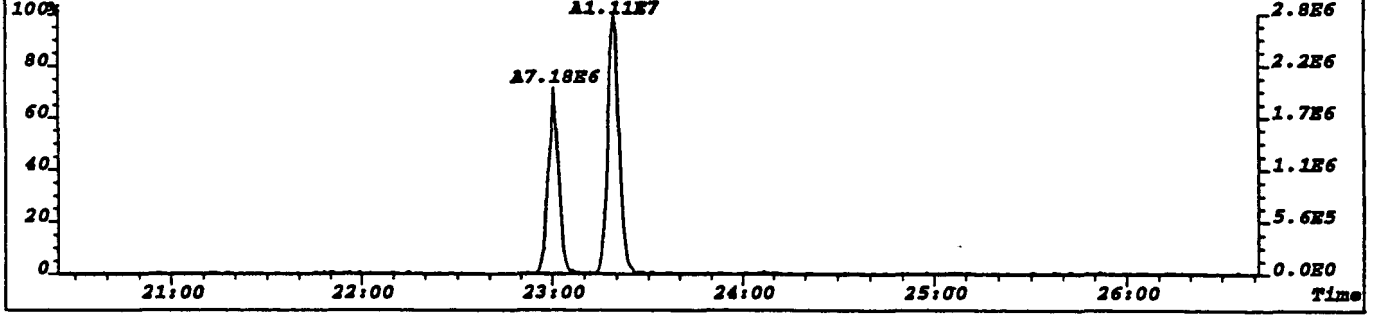
File:X973638 #1-803 Acq:18-OCT-1997 16:30:48 GC EI+ Voltage SIR AutoSpec Noise:4903
327.8847 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,19612.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



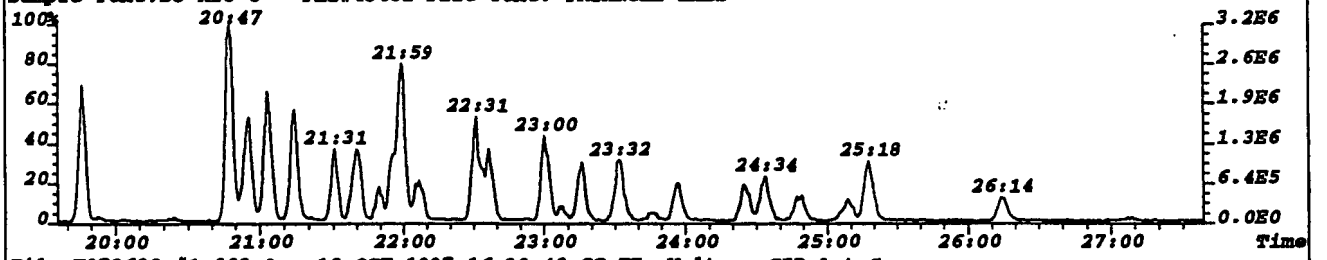
File:X973638 #1-803 Acq:18-OCT-1997 16:30:48 GC EI+ Voltage SIR AutoSpec Noise:4328
331.9368 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,17312.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



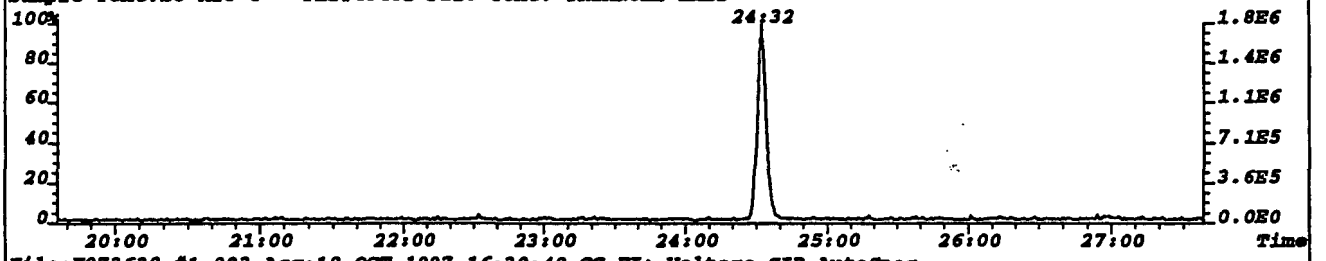
File:X973638 #1-803 Acq:18-OCT-1997 16:30:48 GC EI+ Voltage SIR AutoSpec Noise:1768
333.9338 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,7072.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



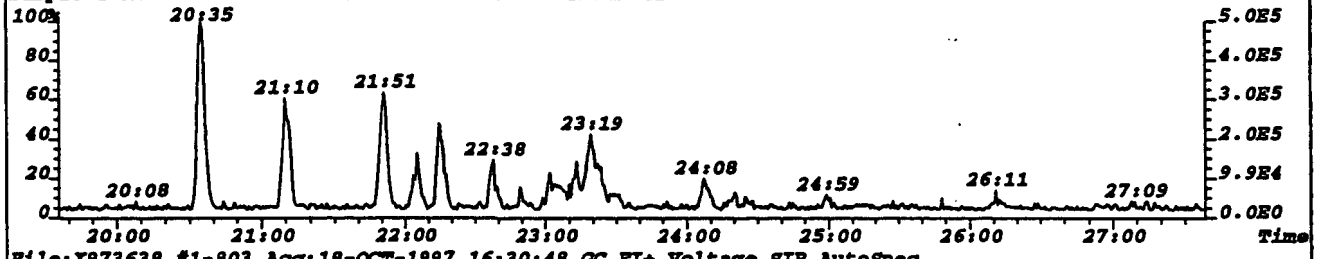
File:X973638 #1-803 Acq:18-OCT-1997 16:30:48 GC EI+ Voltage SIR AutoSpec
303.9016 Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



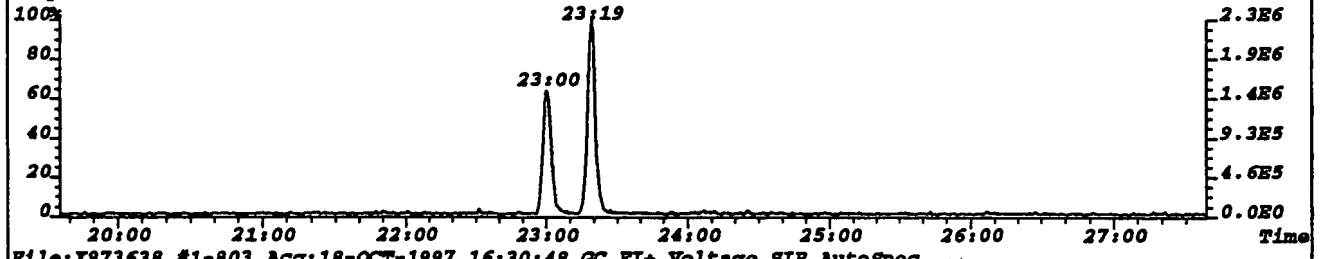
File:X973638 #1-803 Acq:18-OCT-1997 16:30:48 GC EI+ Voltage SIR AutoSpec
315.9419 Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



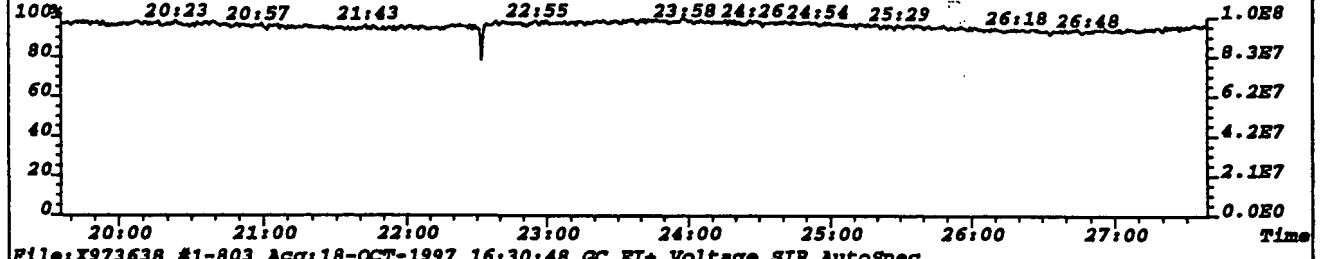
File:X973638 #1-803 Acq:18-OCT-1997 16:30:48 GC EI+ Voltage SIR AutoSpec
319.8965 Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



File:X973638 #1-803 Acq:18-OCT-1997 16:30:48 GC EI+ Voltage SIR AutoSpec
331.9368 Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



File:X973638 #1-803 Acq:18-OCT-1997 16:30:48 GC EI+ Voltage SIR AutoSpec
292.9825 Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



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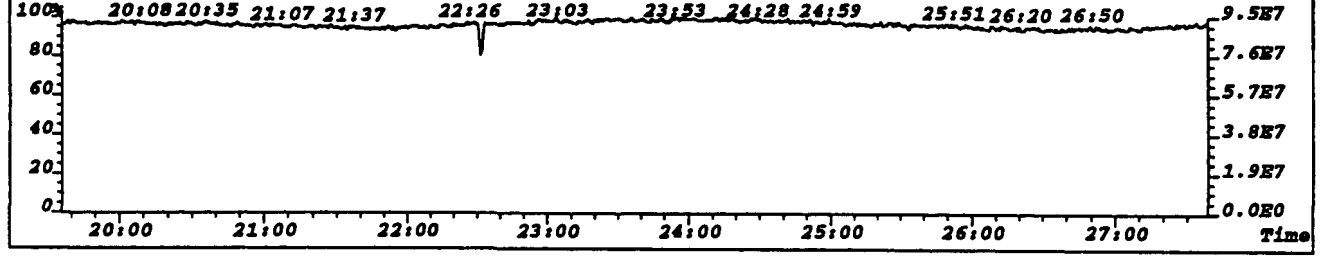
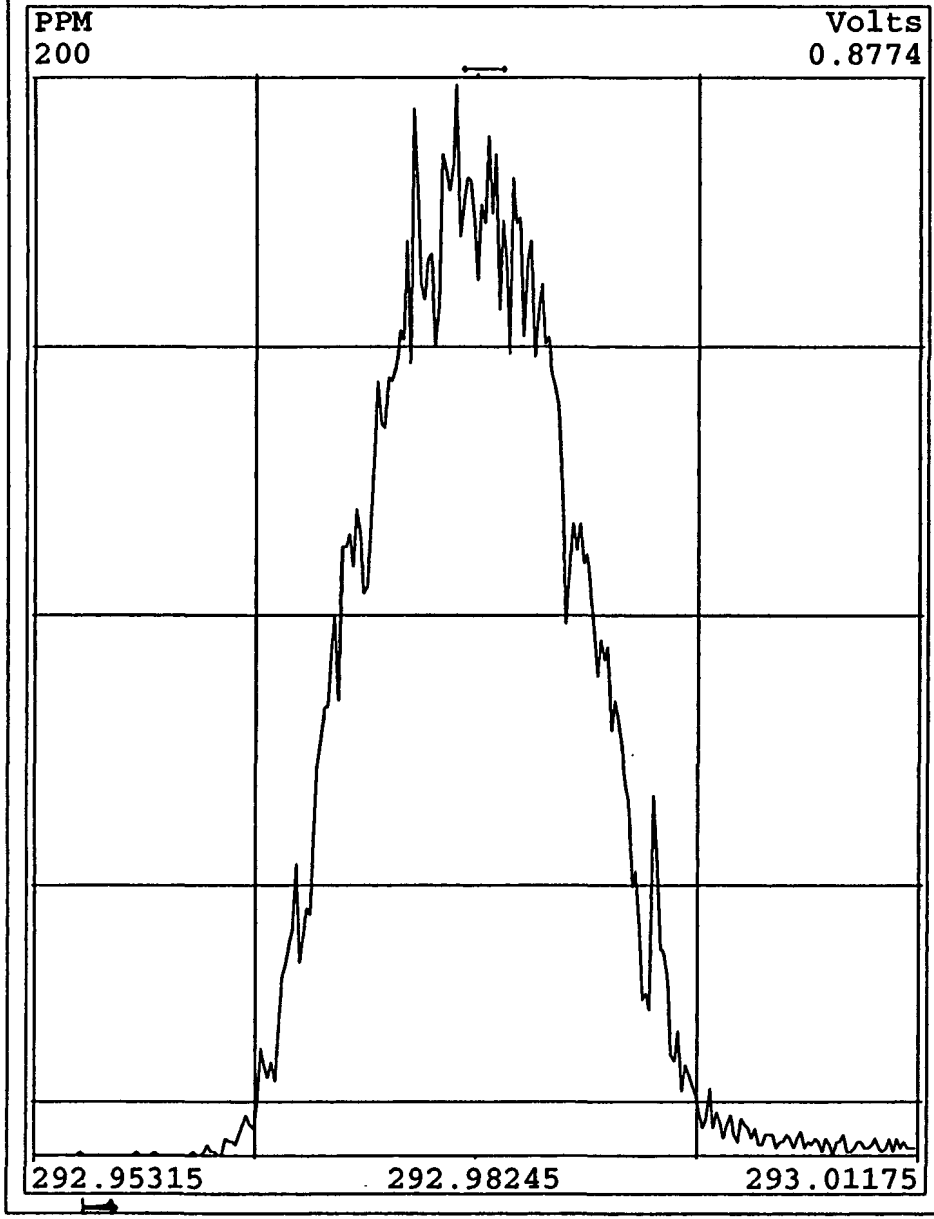
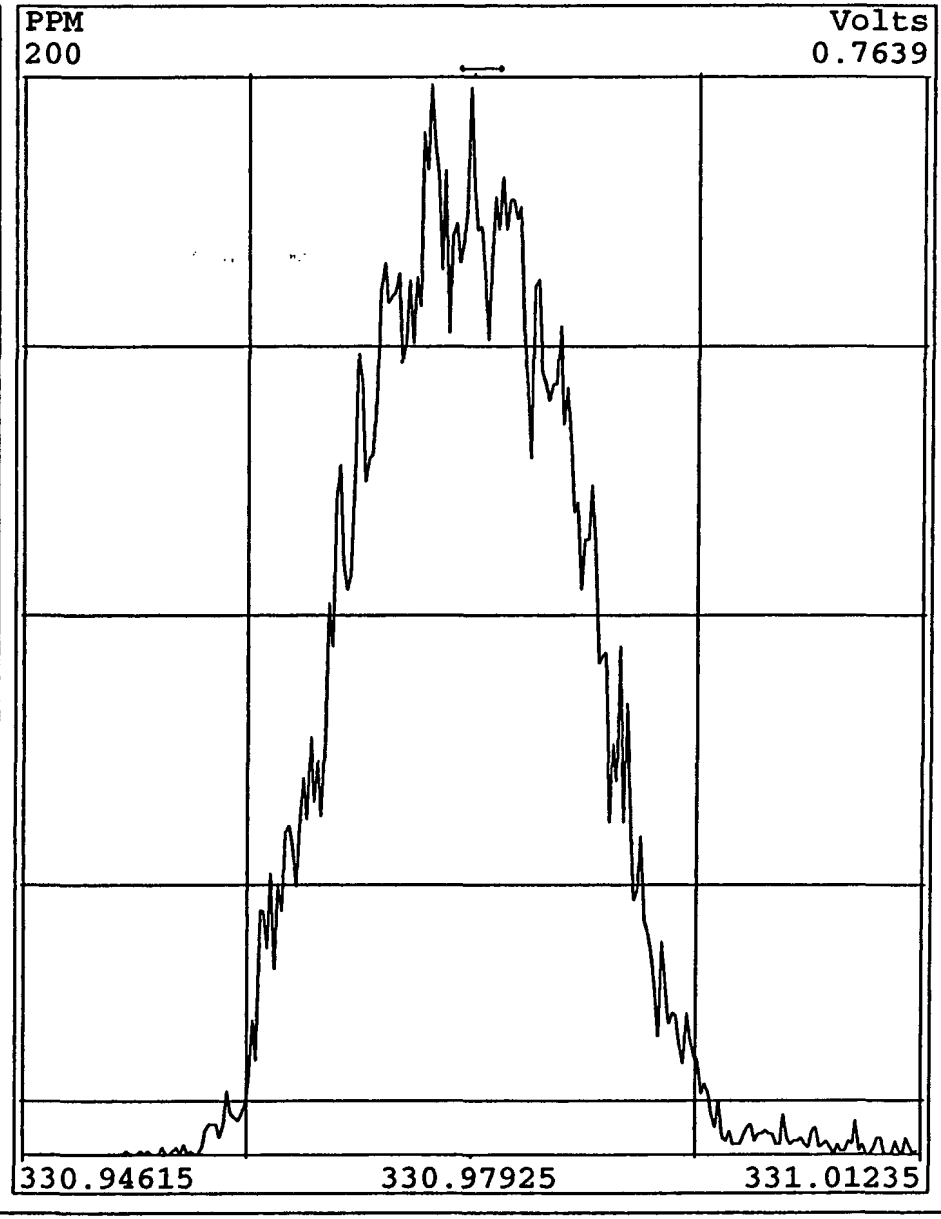


Peak Locate Examination:18-OCT-1997:16:30 File:X973638
Experiment:XCONF_TT Function:1 Reference:PFK





Pacific Environmental Services

TLI Project: **43432** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **SO-23-4** Analysis File: **U973261**

Client Project:	**Saginaw, MI**				
Sample Matrix:	**M23TRAIN**	Date Received:	**09/29/97**	Spike File:	**SPX23704**
TLI ID:	**185-6-4A-C**	Date Extracted:	**10/09/97**	ICal:	**UF59167**
		Date Analyzed:	**10/17/97**	ConCal:	**U973252**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U973257**	% Lipid:	**n/a**
GC Column:	**DB-5**	Analyst:	**BB**	% Solids:	**n/a**

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	0.12			0.74	22:30	—
1,2,3,7,8-PeCDD	0.10			1.49	27:31	—
1,2,3,4,7,8-HxCDD	EMPC		0.02			—
1,2,3,6,7,8-HxCDD	0.03			1.26	31:00	—
1,2,3,7,8,9-HxCDD	0.04			1.22	31:18	—
1,2,3,4,6,7,8-HpCDD	EMPC		0.03			—
1,2,3,4,6,7,8,9-OCDD	0.08			0.80	36:27	B
2,3,7,8-TCDF	4.1			0.74	21:38	—
1,2,3,7,8-PeCDF	0.61			1.46	26:19	—
2,3,4,7,8-PeCDF	0.52			1.50	27:07	—
1,2,3,4,7,8-HxCDF	0.26			1.22	30:09	—
1,2,3,6,7,8-HxCDF	0.11			1.19	30:16	—
2,3,4,6,7,8-HxCDF	0.06			1.27	30:47	—
1,2,3,7,8,9-HxCDF	ND	0.01				—
1,2,3,4,6,7,8-HpCDF	0.07			1.05	33:03	RR
1,2,3,4,7,8,9-HpCDF	ND	0.02				—
1,2,3,4,6,7,8,9-OCDF	ND	0.01				—

Totals	Amt. (ng)	Number	DL	EMPC	Flags
Total TCDD	4.6	13			—
Total PeCDD	1.3	9		2.1	—
Total HxCDD	0.41	5		0.43	—
Total HpCDD	0.03	1		0.05	—
Total TCDF	43.0	15			—
Total PeCDF	11.3	14		11.3	—
Total HxCDF	1.2	10			—
Total HpCDF	0.07	1			—

X237_PSR v2.00, LARS 6.10.04

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Printed: 23:14 10/23/97

Pacific Environmental Services

TLI Project: **43432** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **SO-23-4** Analysis File: **U973261**

Internal Standards	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	2.8	69.7	40%-130%	0.75	21:35	___
$^{13}C_{12}$-2,3,7,8-TCDD	3.3	83.5	40%-130%	0.79	22:30	___
$^{13}C_{12}$-1,2,3,7,8-PeCDF	3.8	96.0	40%-130%	1.49	26:18	___
$^{13}C_{12}$-1,2,3,7,8-PeCDD	4.4	110	40%-130%	1.45	27:30	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	3.4	85.6	40%-130%	0.51	30:15	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	3.5	87.7	40%-130%	1.22	31:00	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	2.6	65.1	25%-130%	0.42	33:02	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	3.4	84.5	25%-130%	1.03	33:54	___
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	7.6	95.2	25%-130%	0.85	36:26	___

Surrogate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	3.6	91.1	70%-140%		22:32	___
$^{13}C_{12}$-2,3,4,7,8-PeCDF	3.8	95.4	70%-140%	1.55	27:06	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	4.0	99.0	70%-140%	0.51	30:09	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	4.1	101	70%-140%	1.19	30:54	___
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	4.2	105	70%-140%	0.42	34:15	___

Alternate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	3.0	75.3	40%-130%	0.52	31:31	___
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	3.3	82.5	40%-130%	0.51	30:47	___

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.78	22:16	___
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.20	31:18	___

Data Reviewer: VC 10/23/97

X237_PSR v2.00, LARS 6.10.04

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Printed: 23:14 10/23/97

Initial ....Date...

Data Review By: VC 10/21/97 Calculated Noise Area: 4.66

The Total Area for each peak with an ion abundance ratio outside ratio limits has been recalculated according to method requirements.

Page No. 1 Listing of U973261B.dbf
10/21/97 Matched GC Peaks / Ratio / Ret. Time

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
TCDF				0.65-0.89						0.813-1.106			
304-306	DC	NL		0:00	RO	1.53	9.04			0.000			
				17:43		0.73	4,217.43	1,785.67	2,431.76	0.821			
				18:15		0.72	1,838.77	772.23	1,066.54	0.846			
				18:31		0.68	982.99	397.93	585.06	0.858			
				18:57		0.74	10,891.24	4,617.98	6,273.26	0.878			
				19:18		0.74	6,806.53	2,891.33	3,915.20	0.894			
				19:51		0.76	5,162.02	2,224.15	2,937.87	0.920			
				20:14		0.75	4,093.17	1,748.84	2,344.33	0.937			
	M			20:39		0.70	4,560.00	1,880.00	2,680.00	0.957			
				21:04		0.73	2,215.57	934.04	1,281.53	0.976			
				21:22		0.74	1,738.07	739.48	998.59	0.990			
				21:38		0.74	4,754.83	2,023.95	2,730.88	1.002	2378-TCDF	AN	
				22:10		0.78	1,752.93	766.91	986.02	1.027			
				22:26		0.78	1,116.57	491.02	625.55	1.039			
				22:42		0.72	187.32	78.21	109.11	1.052			
				23:43		0.73	97.84	41.23	56.61	1.099			
304-306			15	Peaks			50,415.28						
13C12-TCDF				0.65-0.89						0.954-1.046			
316-318	DC	NL		0:00	RO	1.42	7.12			0.000			
	DC	WL		18:50	RO	3.49	3.58			0.873			
	DC	WL		18:57	RO	1.95	5.56			0.878			
				21:35		0.75	4,350.31	1,867.59	2,482.72	1.000	13C12-2378-TCDF	ISO	
				22:08	RO	0.43	29.70	12.92	30.27	1.025			
	DC	WH		22:50	RO	0.45	22.14			1.058			
316-318			2	Peaks			4,380.01						

---------- Above: TCDF / TCDD Follows ----------

TCDD				0.65-0.89						0.848-1.061			
320-322	DC	NL		0:00	RO	1.00	6.46			0.000			
				19:13		0.75	1,430.78	612.34	818.44	0.854			
				19:42		0.79	781.91	345.72	436.19	0.876			
				20:07		0.73	307.44	129.51	177.93	0.894			
				21:02		0.73	1,033.81	436.04	597.77	0.935			
	M			21:24		0.75	517.00	221.00	296.00	0.951			
				21:52		0.79	274.43	121.05	153.38	0.972			
				22:17		0.81	336.15	150.93	185.22	0.990			
				22:24		0.66	505.18	200.74	304.44	0.996			
				22:30		0.74	155.26	66.13	89.13	1.000	2378-TCDD	AN	
				22:43		0.75	107.31	46.04	61.27	1.010			
				22:56		0.78	181.17	79.46	101.71	1.019			
				23:13		0.81	66.26	29.72	36.54	1.032			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
				23:44		0.84	42.27	19.28	22.99	1.055			
	DC		WH	23:54	RO	0.40	4.18			1.062			
320-322			13	Peaks			5,738.97						
37Cl-TCDD										0.911-1.089			
328	DC		NL	0:00			5.42			0.000			
	DC		WL	19:11			10.98			0.853			
	DC		WL	19:20			3.13			0.859			
	DC		WL	19:36			20.57			0.871			
	DC		WL	19:44			18.75			0.877			
				20:46			411.21	411.21		0.923			
	DC		SN	20:59			11.46			0.933			
	DC		SN	21:08			2.23			0.939			
	DC		SN	21:34			8.59			0.959			
	DC		SN	21:46			2.42			0.967			
	DC		SN	21:50			6.12			0.970			
	DC		SN	22:02			1.84			0.979			
				22:32			3,570.97	3,570.97		1.001	37Cl-TCDD	SUR1	
	DC		SN	22:45			3.94			1.011			
	DC		SN	22:47			4.54			1.013			
	DC		SN	22:50			4.44			1.015			
				23:02			89.32	89.32		1.024			
	DC		SN	23:13			5.43			1.032			
	DC		SN	23:22			11.78			1.039			
	DC		SN	23:27			8.65			1.042			
	DC		SN	23:35			6.49			1.048			
	DC		SN	23:42			9.81			1.053			
	DC		SN	23:45			1.50			1.056			
	DC		SN	23:48			4.35			1.058			
	DC		SN	23:53			6.83			1.061			
	DC		SN	24:02			2.81			1.068			
	DC		SN	24:13			5.58			1.076			
	DC		SN	24:18			3.64			1.080			
328			3	Peaks			4,071.50						
13C12-TCDD						0.65-0.89				0.911-1.089			
332-334	DC		NL	0:00	RO	2.73	4.87			0.000			
				22:16		0.78	4,488.34	1,970.01	2,518.33	0.990	13C12-1234-TCDD	RS1	
				22:30		0.79	4,154.02	1,838.72	2,315.30	1.000	13C12-2378-TCDD	IS1	
				22:55		0.69	89.02	36.37	52.65	1.019			
				23:13		0.70	36.43	14.96	21.47	1.032			
	DC		SN	23:16	RO	1.92	17.68			1.034			
	DC		SN	23:42	RO	1.22	15.33			1.053			
	DC		SN	24:00	RO	4.96	5.89			1.067			
332-334			4	Peaks			8,767.81						

---------- Above: TCDD / PeCDF Follows ----------

PeCDF						1.32-1.78				0.906-1.077			
340-342	DC		NL	0:00	RO	1.00	6.15			0.000			
				24:01		1.51	2,163.54	1,302.44	861.10	0.913			
	DC		SN	24:18	RO	1.05	16.37			0.924			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
		DC	SN	24:24		1.66	28.37			0.928			
		DC	SN	24:34	RO	5.34	4.46			0.934			
				24:47		1.58	58.76	35.98	22.78	0.942			
		DC	SN	24:54	RO	3.25	9.00			0.947			
				25:10		1.50	1,093.16	655.13	438.03	0.957			
				25:20		1.49	4,822.60	2,888.73	1,933.87	0.963			
				25:32		1.59	1,107.39	679.96	427.43	0.971			
				25:42		1.56	536.44	326.58	209.86	0.977			
				25:59		1.47	1,342.12	798.24	543.88	0.988			
	A			26:12		1.50	330.00	198.00	132.00	0.996			
	M			26:19		1.46	803.00	476.00	327.00	1.001	12378-PeCDF	AN	
				26:30		1.54	625.42	379.66	245.76	1.008			
				26:38		1.60	733.24	451.36	281.88	1.013			
		DC	SN	26:54	RO	0.52	12.83			1.023			
				27:07		1.50	695.59	417.56	278.03	1.031	23478-PeCDF	AN	
				27:17		1.46	530.94	314.85	216.09	1.037			
				27:36		1.61	88.45	54.55	33.90	1.049			
				28:10	RO	1.29	62.12	37.76	29.28	1.071			
		DC	WH	28:21	RO	1.17	13.05			1.078			
340-342			15	Peaks			14,992.77						
13C12-PeCDF				1.32-1.78						0.848-1.152			
352-354		DC	NL	0:00	RO	0.85	3.22			0.000			
				25:19	RO	0.96	46.85	28.48	29.59	0.963			
		DC	SN	25:54	RO	0.95	20.55			0.985			
				26:18		1.49	4,711.36	2,818.45	1,892.91	1.000	13C12-PeCDF 123	IS2	
		DC	SN	26:28	RO	4.13	12.75			1.006			
				26:38	RO	1.06	37.49	22.79	21.53	1.013			
				27:06		1.55	4,361.63	2,653.12	1,708.51	1.030	13C12-PeCDF 234	SUR2	
		DC	SN	27:20		1.41	28.51			1.039			
		DC	SN	27:26		1.72	18.25			1.043			
		DC	SN	27:31	RO	0.90	18.46			1.046			
		DC	SN	28:06	RO	1.07	15.30			1.068			
352-354			4	Peaks			9,157.33						

---------- Above: PeCDF / PeCDD Follows ----------

PeCDD				1.32-1.78						0.921-1.025			
356-358		DC	NL	0:00		1.36	7.16			0.000			
				25:29	RO	1.26	662.61	402.76	318.43	0.927			
				26:02		1.58	75.49	46.20	29.29	0.947			
				26:18		1.49	411.65	246.51	165.14	0.956			
				26:28		1.65	129.07	80.31	48.76	0.962			
				26:40		1.54	287.74	174.34	113.40	0.970			
				26:51		1.74	57.67	36.65	21.02	0.976			
				26:58		1.43	104.00	61.14	42.86	0.981			
				27:10		1.48	129.67	77.38	52.29	0.988			
				27:19	RO	1.10	52.89	32.15	29.33	0.993			
				27:31		1.49	106.91	64.01	42.90	1.001	12378-PeCDD	AN	
				27:40		1.36	61.62	35.53	26.09	1.006			
		DC	SN	27:50	RO	2.85	5.89			1.012			
				28:02	RO	1.83	41.11	29.55	16.12	1.019			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
		DC	SN	28:07	RO	1.80	7.22			1.022			
		DC	WH	28:15	RO	0.67	3.60			1.027			
356-358			12	Peaks			2,120.43						
13C12-PeCDD				1.32-1.78						0.855-1.145			
368-370		DC	NL	0:00		1.53	4.70			0.000			
		DC	SN	26:19		1.53	6.97			0.957			
		DC	SN	26:39	RO	5.61	1.84			0.969			
		DC	SN	26:50	RO	2.15	2.96			0.976			
		DC	SN	27:15	RO	2.17	3.24			0.991			
				27:30		1.45	2,950.88	1,746.08	1,204.80	1.000	13C12-PeCDD 123	IS3	
				27:39		1.43	322.08	189.57	132.51	1.005			
		DC	SN	27:50	RO	0.93	12.49			1.012			
		DC	SN	28:06	RO	1.22	12.96			1.022			
		DC	SN	28:14	RO	3.93	5.84			1.027			
368-370			2	Peaks			3,272.96						

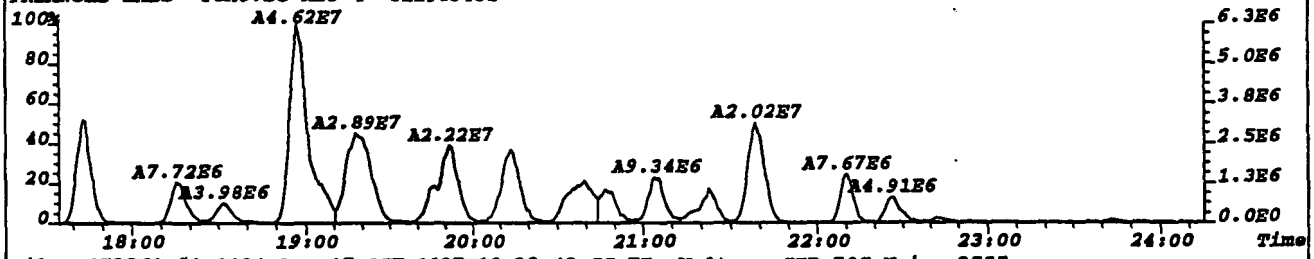
---------- Above: PeCDD / HxCDF Follows ----------

HxCDF				1.05-1.43						0.958-1.051			
374-376		DC	NL	0:00	RO	1.50	10.08			0.000			
				29:07		1.17	145.01	78.09	66.92	0.963			
				29:16		1.31	424.79	240.83	183.96	0.967			
				29:26		1.30	53.75	30.37	23.38	0.973			
				29:35		1.28	60.36	33.83	26.53	0.978			
		DC	SN	29:46		1.42	18.55			0.984			
				30:09		1.22	249.31	136.84	112.47	0.997	123478-HxCDF	AN	
				30:16		1.19	133.93	72.78	61.15	1.001	123678-HxCDF	AN	
				30:22		1.16	28.91	15.50	13.41	1.004			
				30:35		1.33	60.83	34.74	26.09	1.011			
				30:47		1.27	64.93	36.27	28.66	1.018	234678-HxCDF	AN	
	A			31:36		1.34	14.25	8.15	6.10	1.045			
374-376			10	Peaks			1,236.07						
13C12-HxCDF				0.43-0.59						0.868-1.132			
384-386		DC	NL	0:00		0.50	20.11			0.000			
				30:09		0.51	3,062.15	1,037.43	2,024.72	0.997	13C12-HxCDF 478	SUR3	
				30:15		0.51	3,175.81	1,069.26	2,106.55	1.000	13C12-HxCDF 678	IS4	
				30:27	RO	0.75	27.63	13.71	18.30	1.007			
				30:47		0.51	2,880.40	971.03	1,909.37	1.018	13C12-HxCDF 234	ALT2	
				31:31		0.52	2,475.69	841.83	1,633.86	1.042	13C12-HxCDF 789	ALT1	
384-386			5	Peaks			11,621.68						

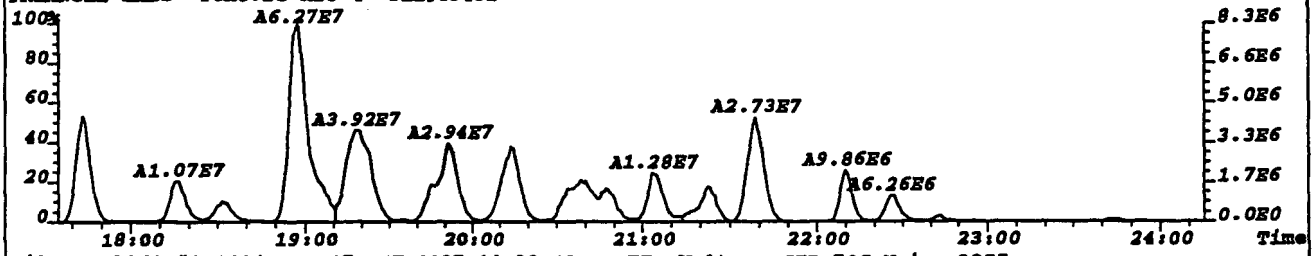
---------- Above: HxCDF / HxCDD Follows ----------

HxCDD				1.05-1.43						0.952-1.015			
390-392		DC	NL	0:00	RO	0.81	3.74			0.000			
				29:41		1.29	43.87	24.71	19.16	0.958			
		DC	SN	29:46	RO	1.78	2.28			0.960			
				30:09		1.15	116.14	62.07	54.07	0.973			
		DC	SN	30:16	RO	1.71	4.12			0.976			
				30:22		1.09	79.73	41.62	38.11	0.980			

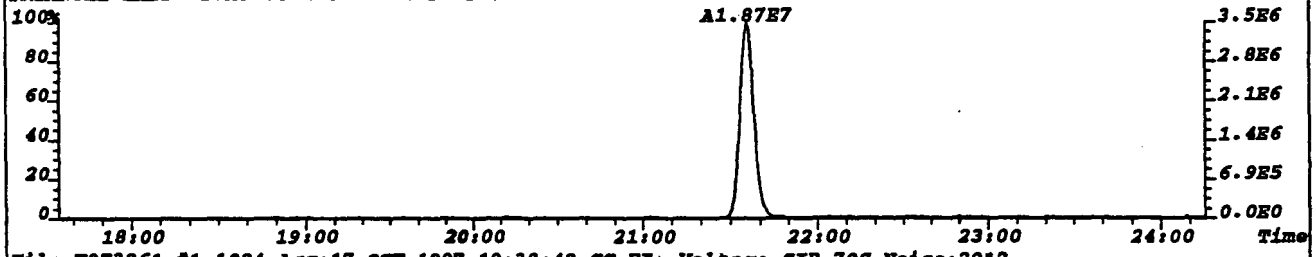
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:3913
303.9016 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,15652.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



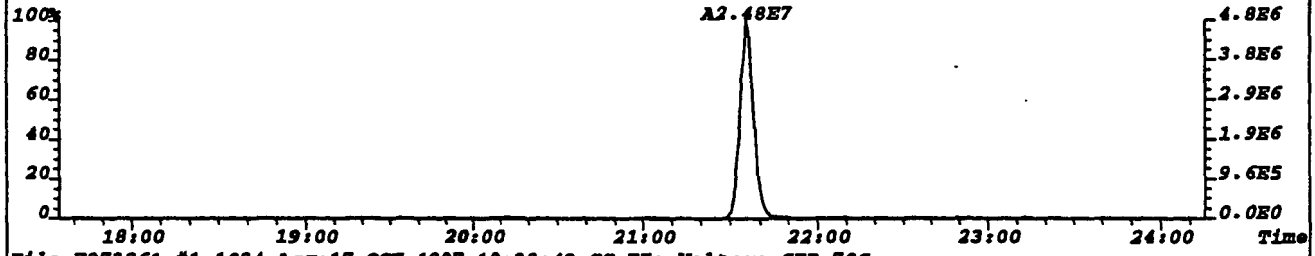
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:2555
305.8987 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,10220.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



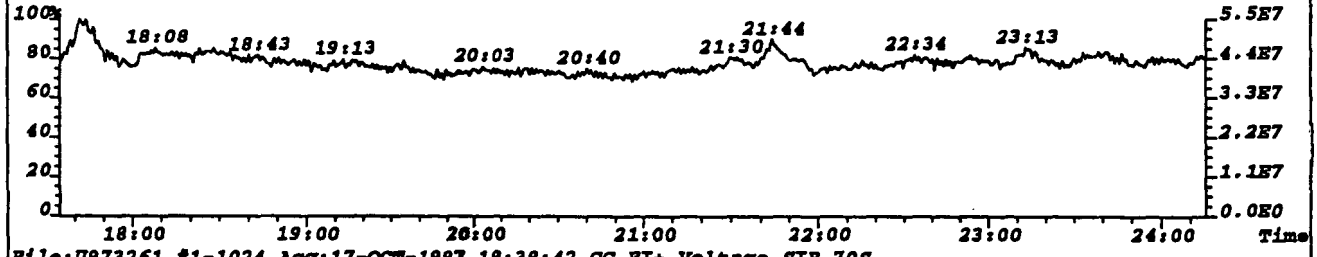
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:2855
315.9419 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,11420.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



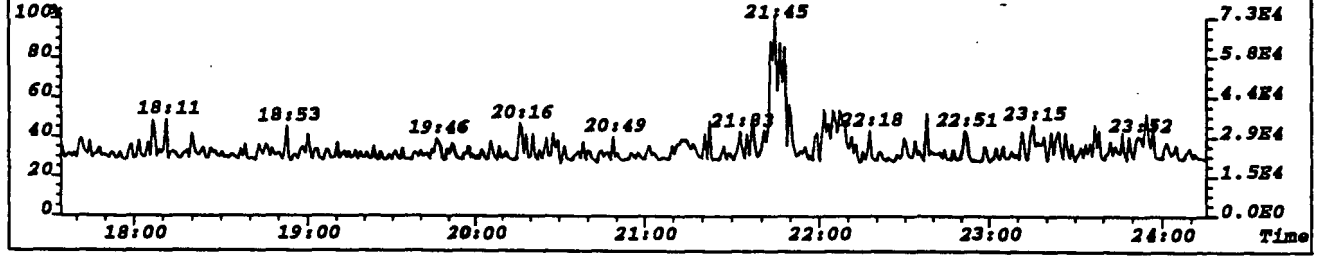
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:2012
317.9389 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,8048.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



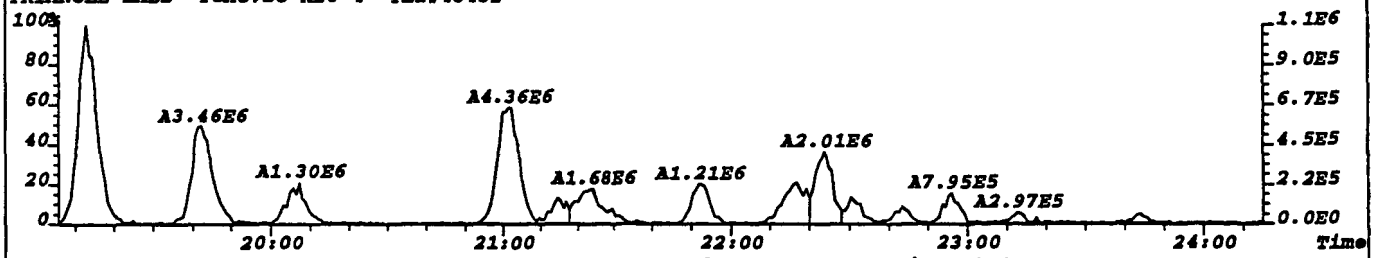
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



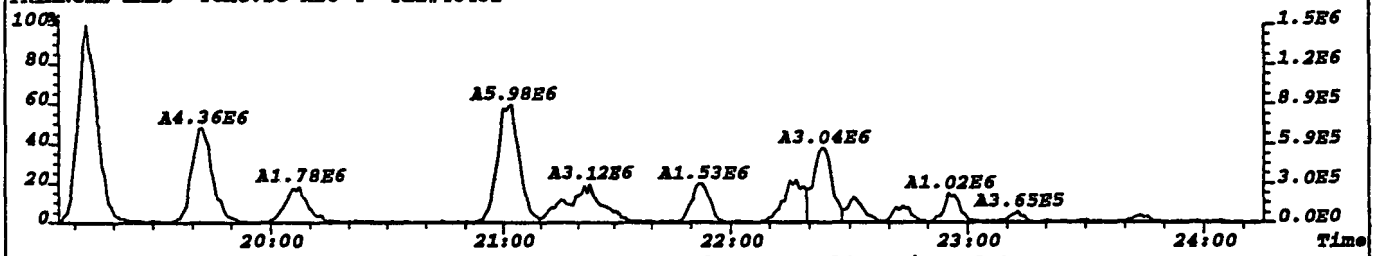
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
375.8364 F:2 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



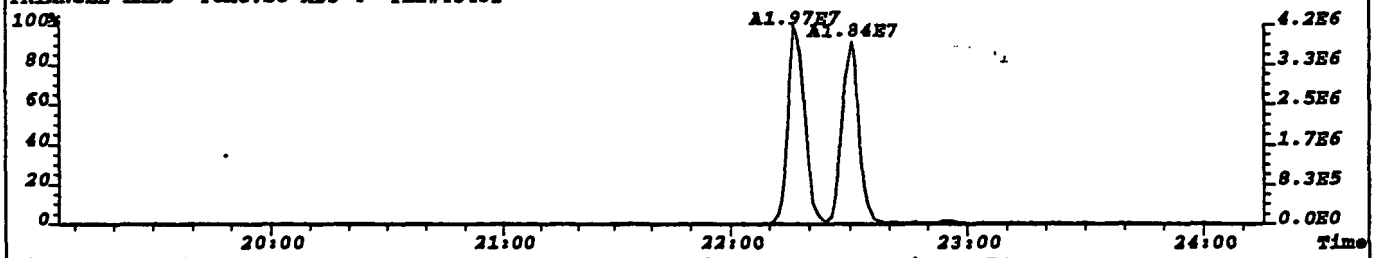
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:1821
319.8965 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7284.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



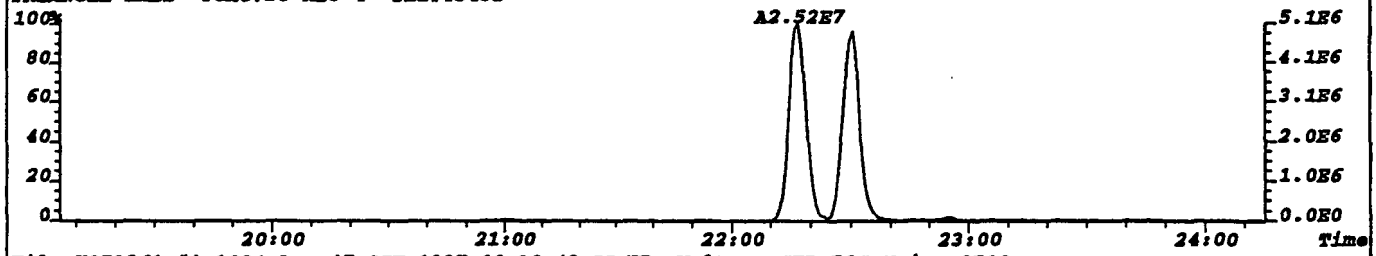
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:1826
321.8936 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7304.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



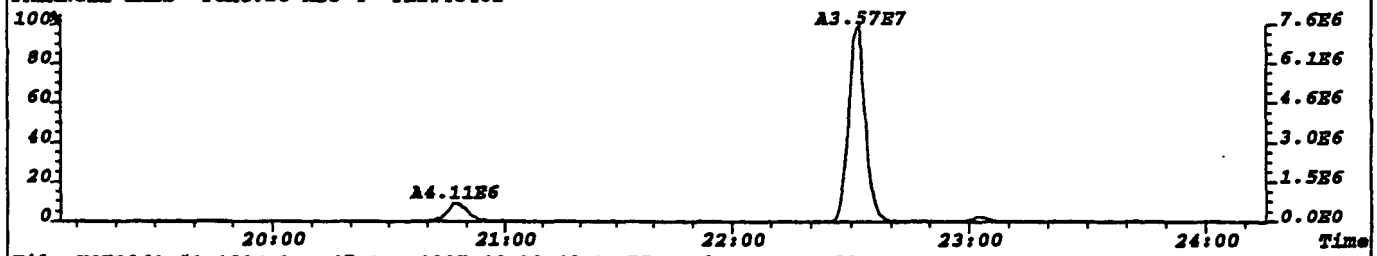
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:3762
331.9368 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,15048.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



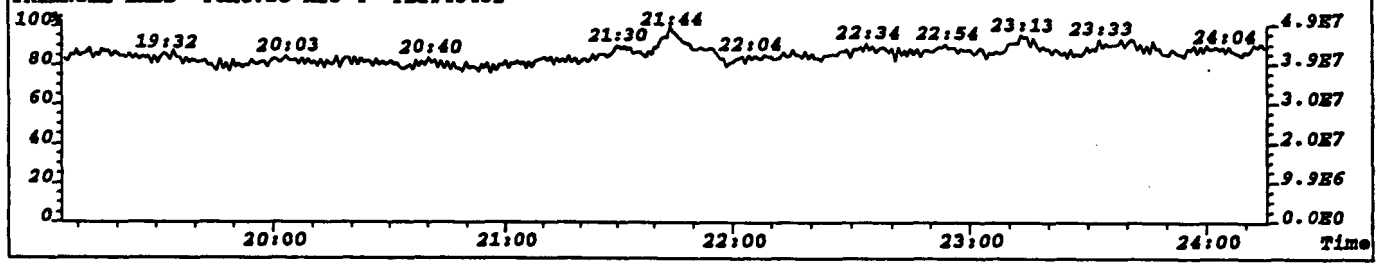
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:1374
333.9338 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5496.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



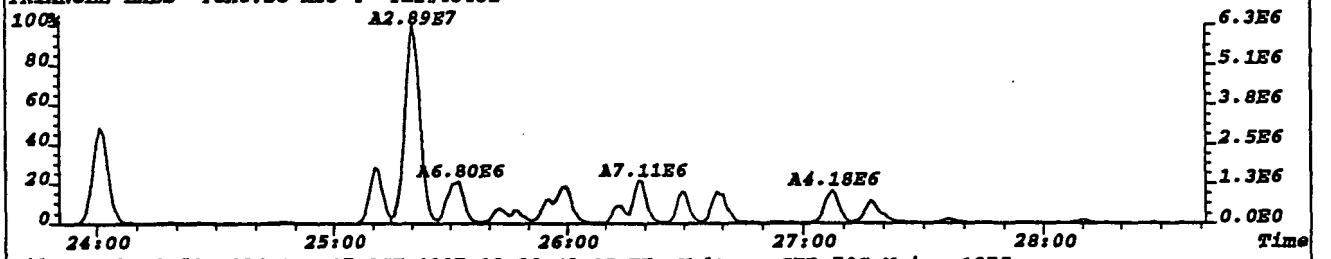
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:2712
327.8847 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,10848.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



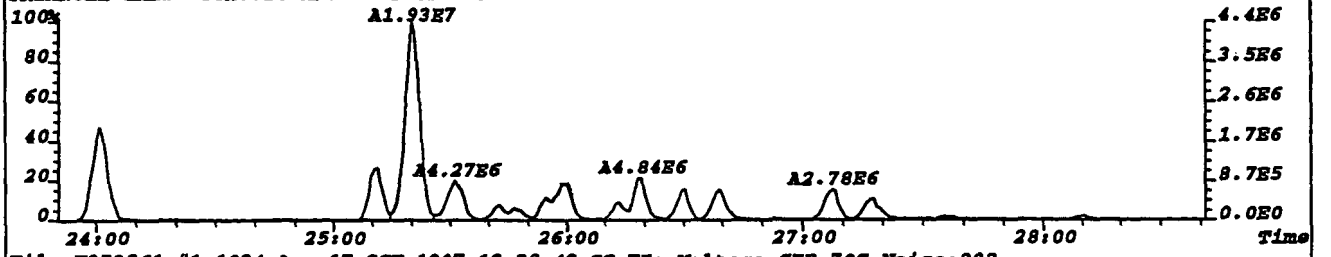
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



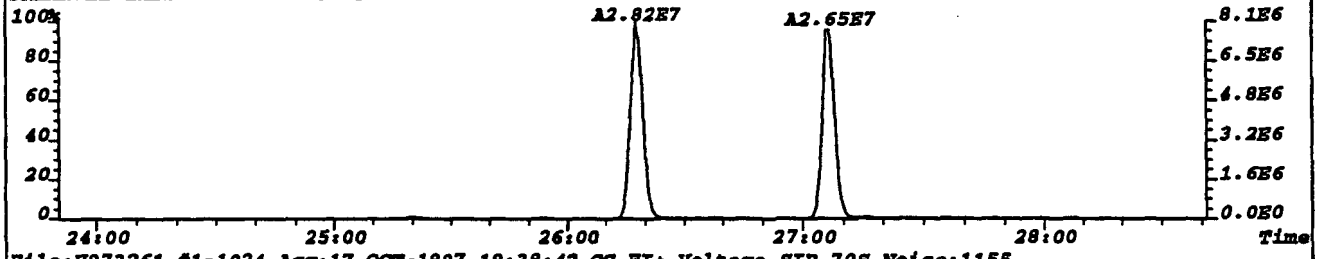
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:1869
339.8597 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7476.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



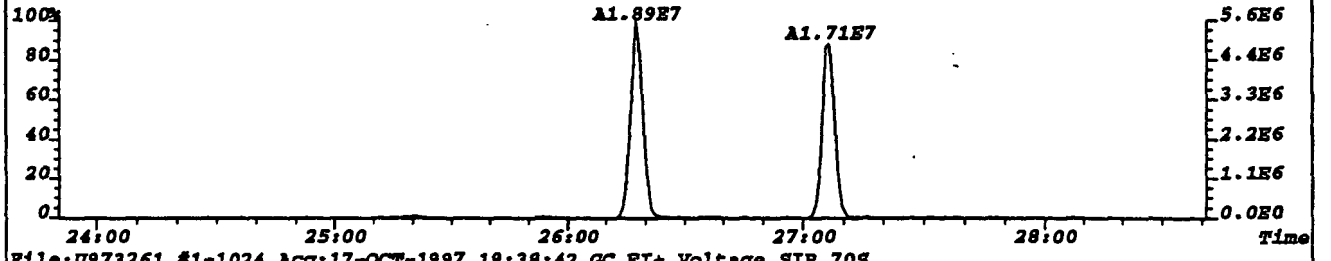
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:1875
341.8567 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7500.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



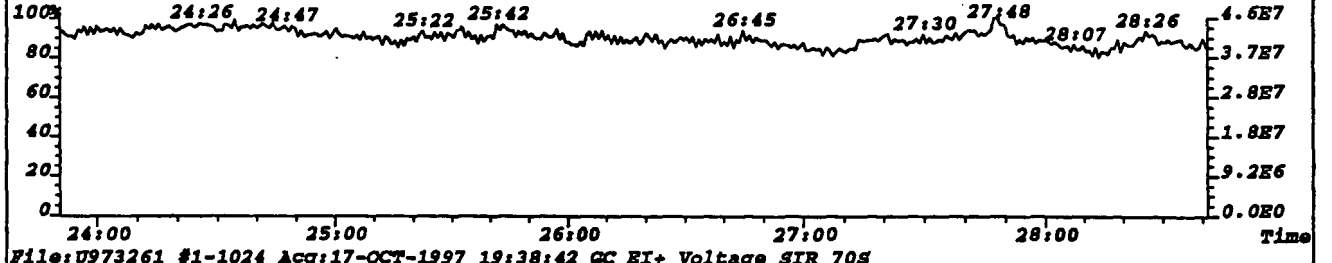
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:982
351.9000 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3928.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



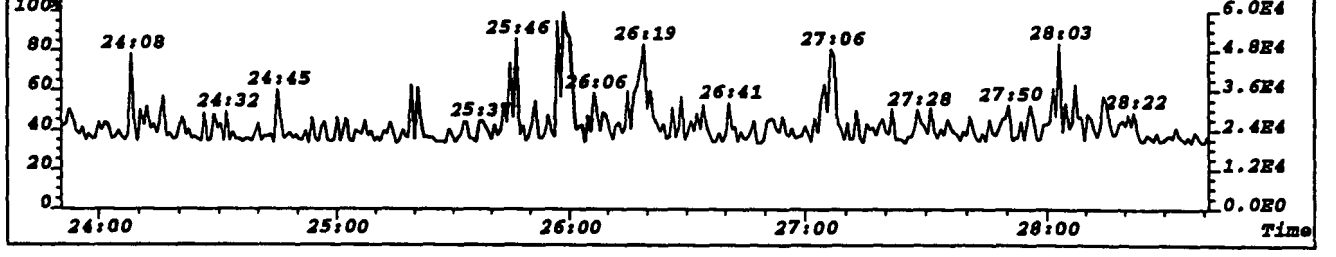
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:1155
353.8970 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4620.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



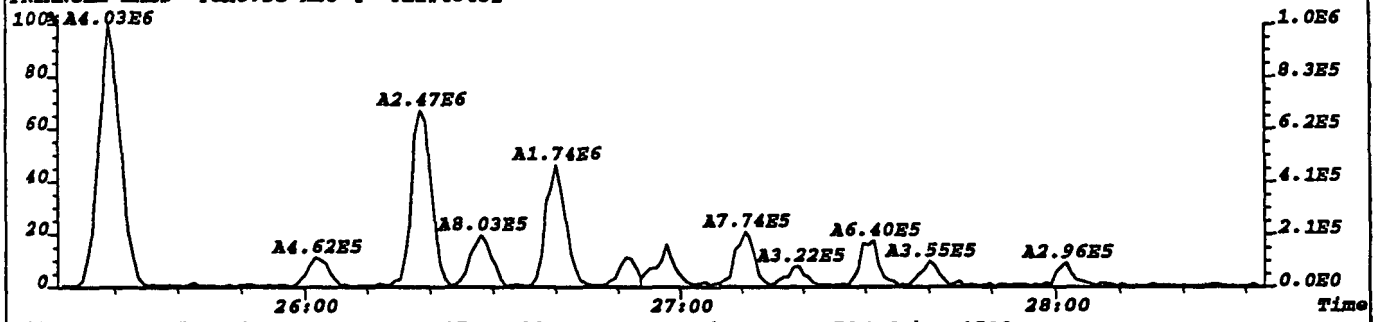
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



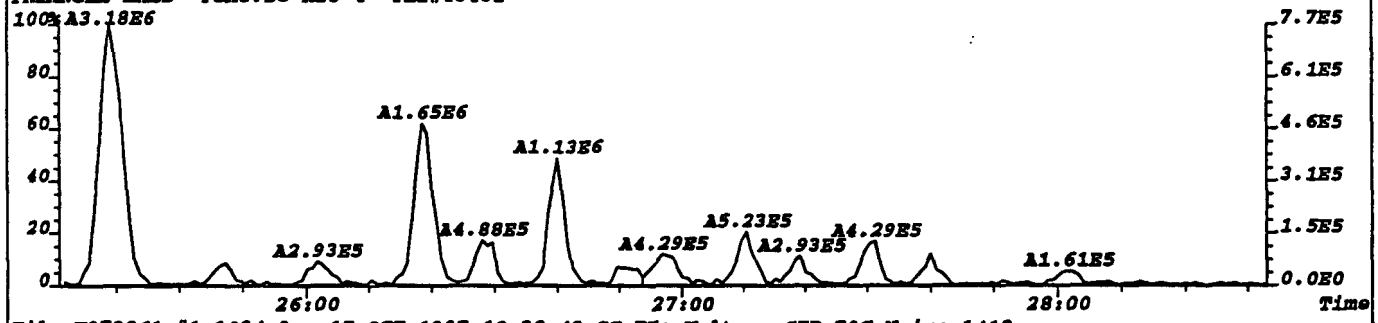
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
409.7974 F:2 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



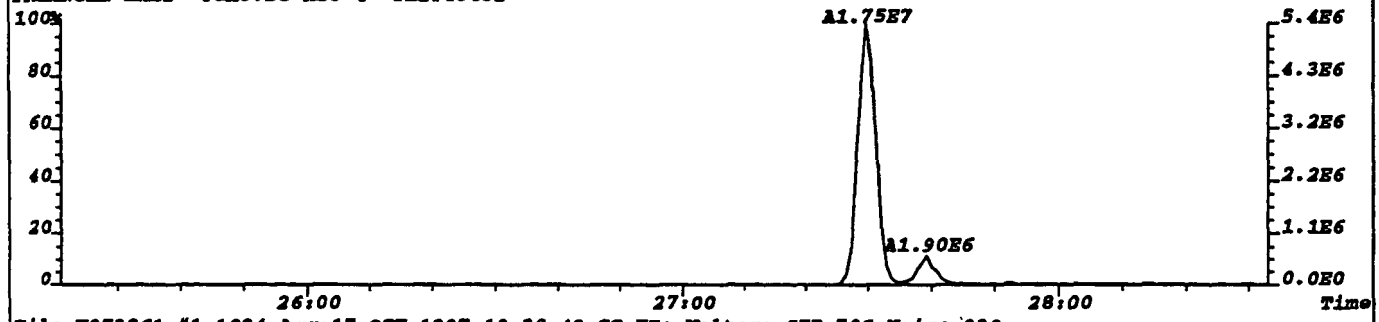
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:2058
355.8546 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,8232.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:1520
357.8516 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,6080.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432

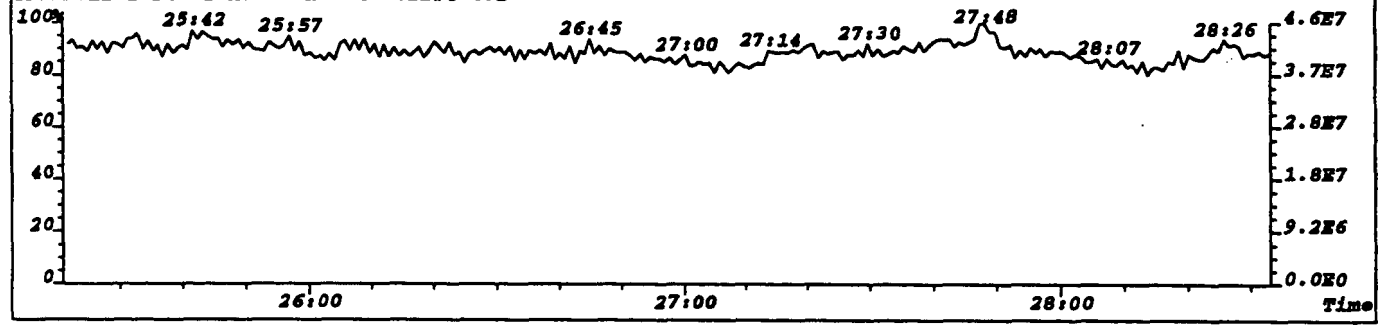


File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:1419
367.8949 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,5676.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432

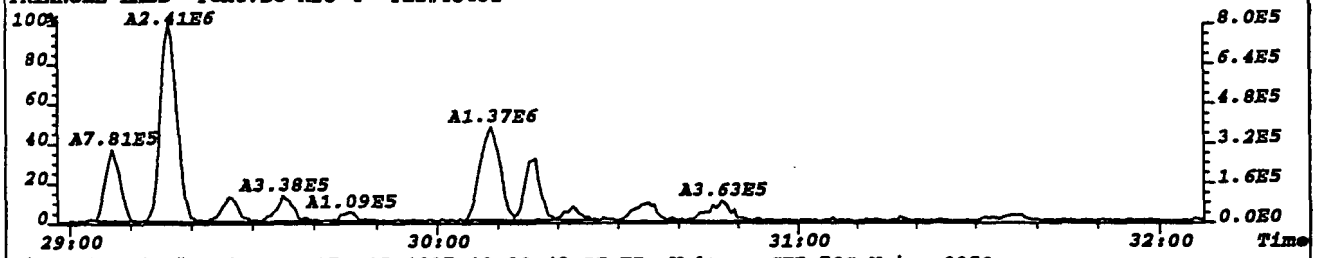


File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:930
369.8919 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,3720.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432

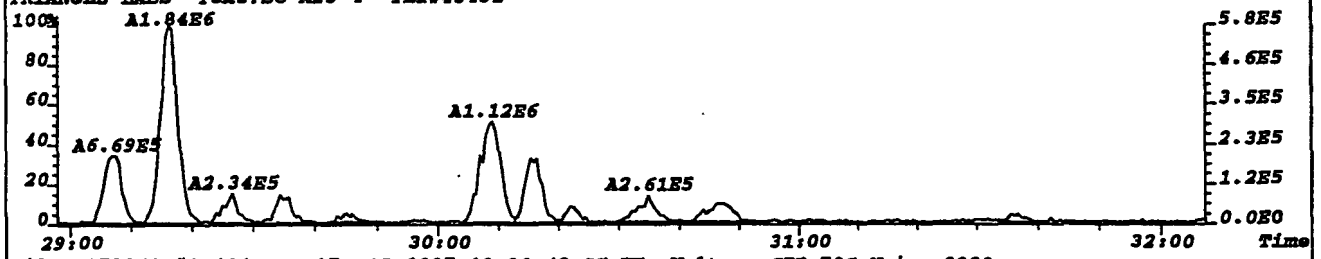
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



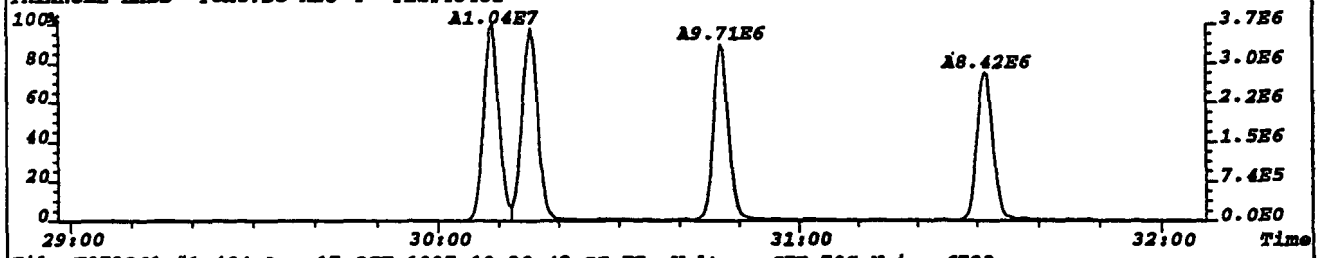
File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:3365
373.8208 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,13460.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



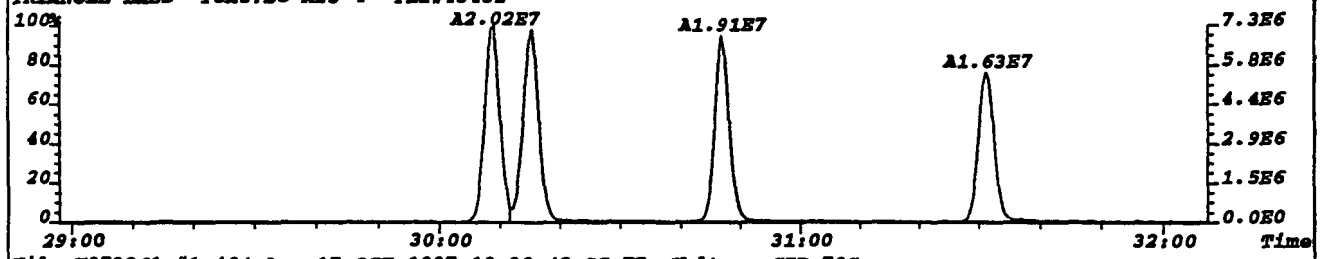
File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:2250
375.8178 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,9000.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



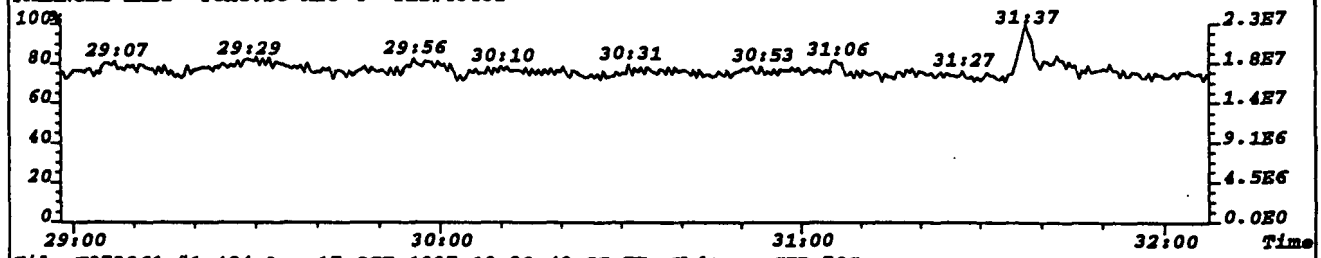
File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:3329
383.8639 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,13316.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



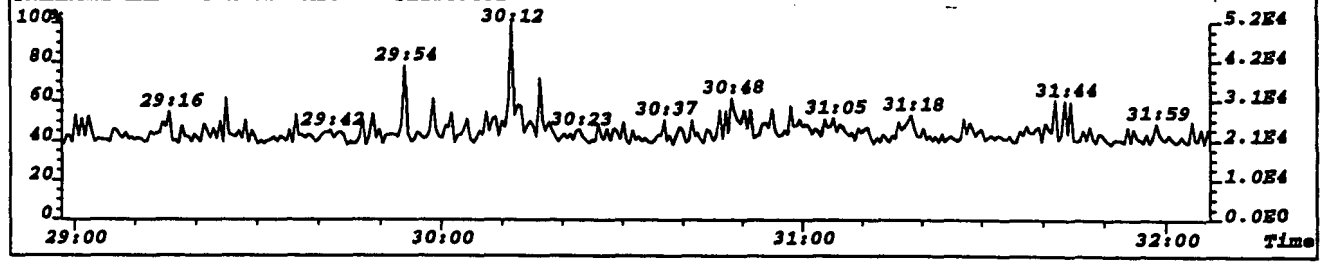
File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:6723
385.8610 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,26892.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



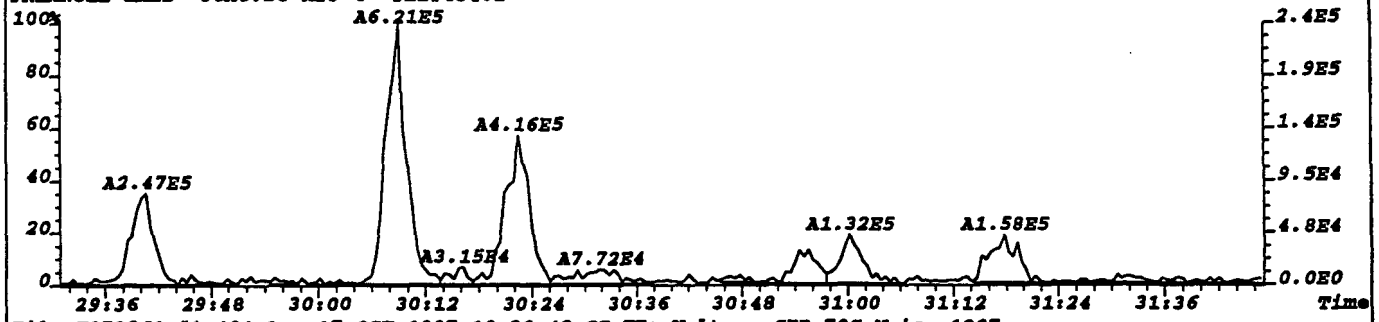
File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
392.9760 F:3 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



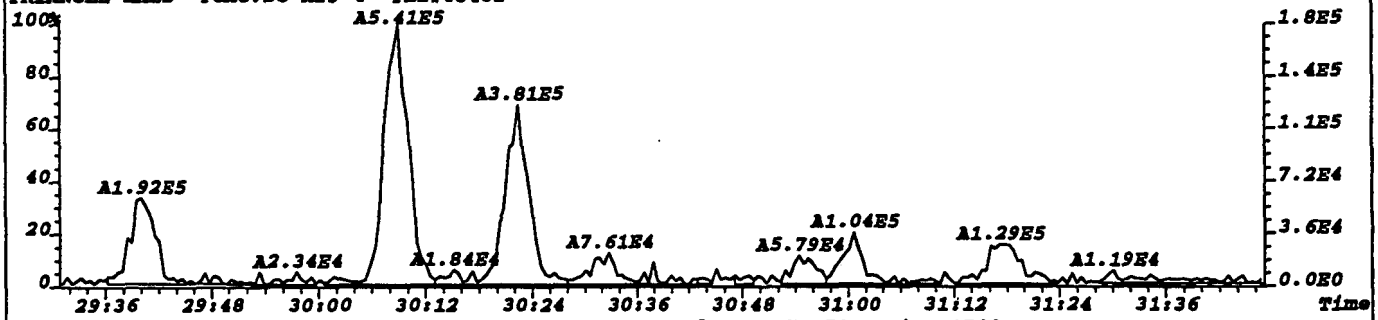
File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
445.7555 F:3 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



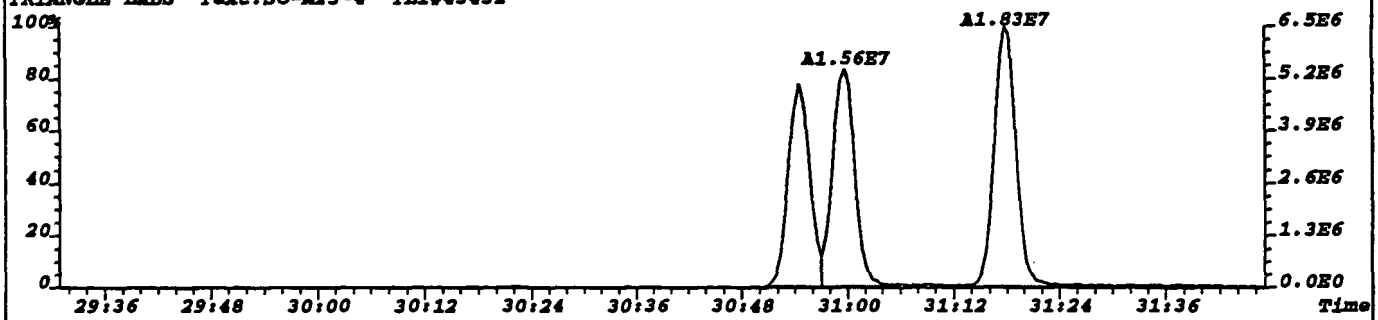
File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:1034
389.8156 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4136.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



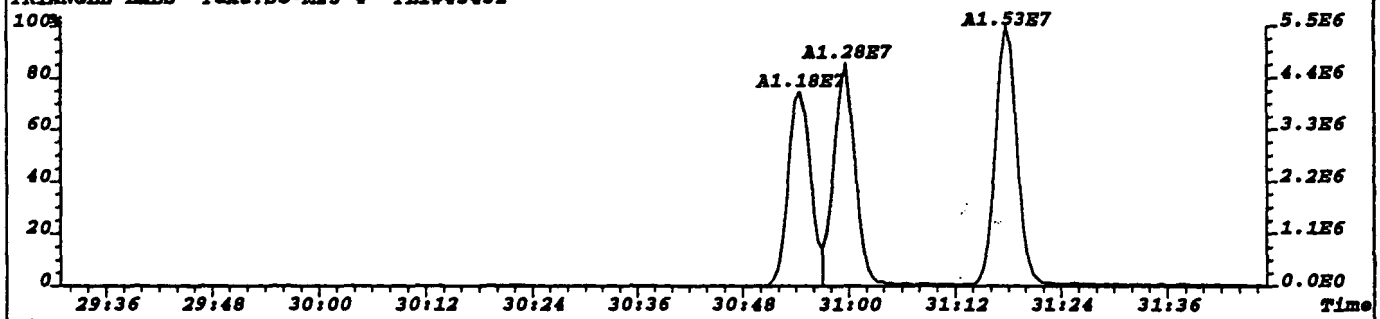
File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:1287
391.8127 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5148.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



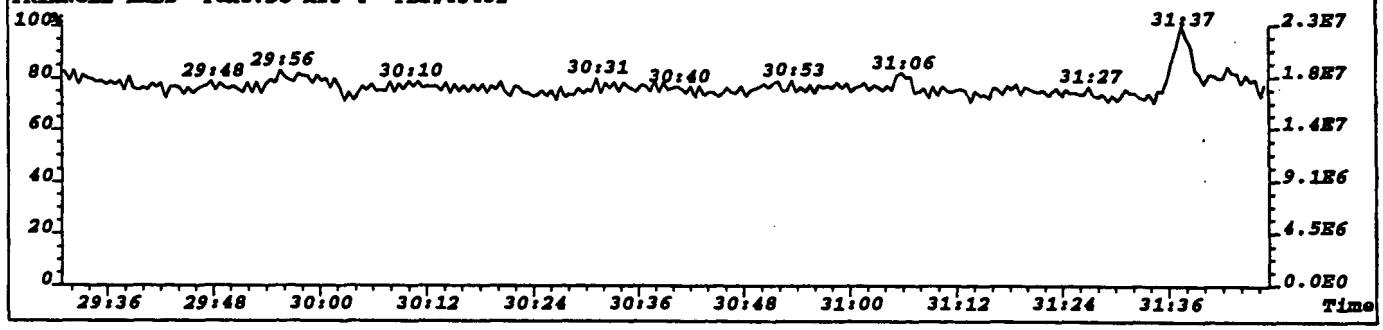
File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:1700
401.8558 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6800.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



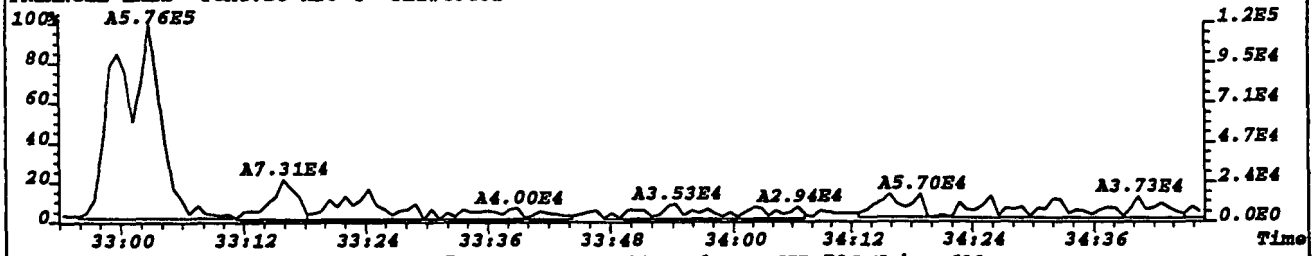
File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:1653
403.8529 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6612.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



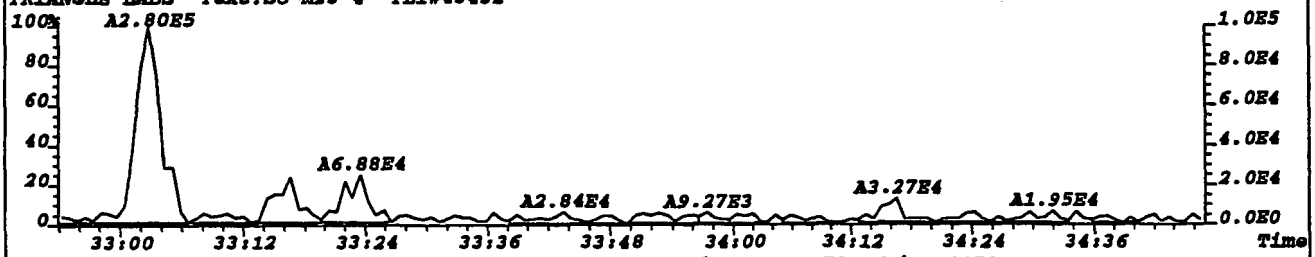
File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
392.9760 F:3 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



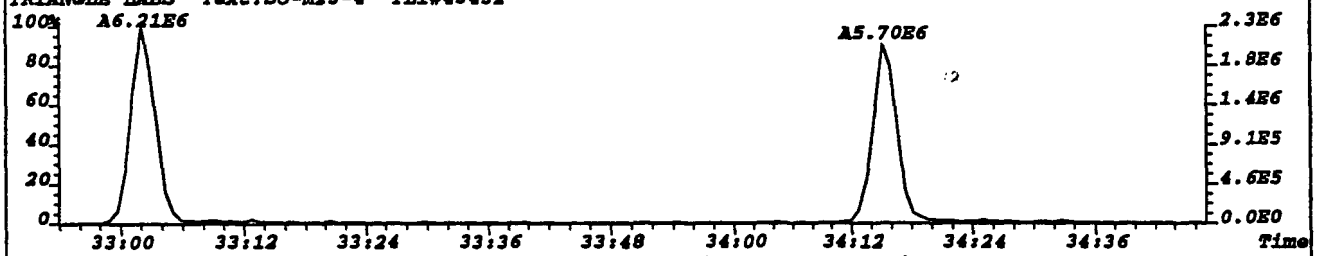
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:1500
407.7818 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6000.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



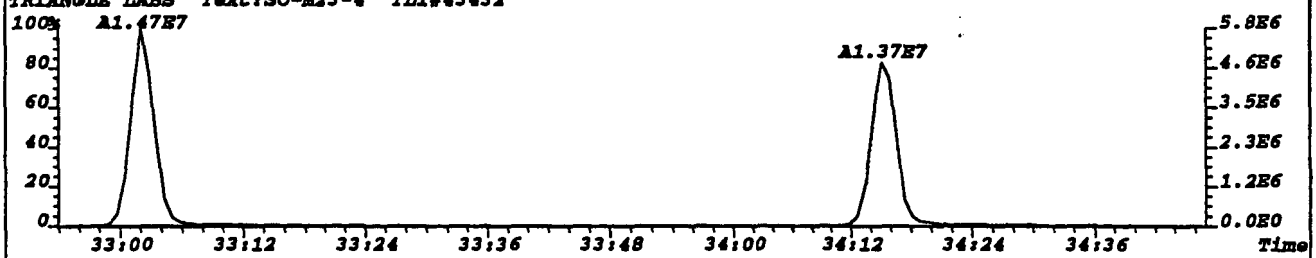
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:699
409.7789 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2796.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



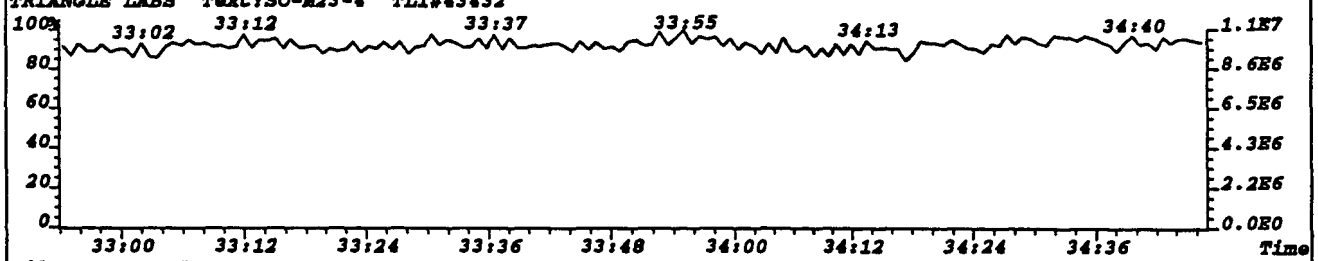
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:2179
417.8253 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,8716.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



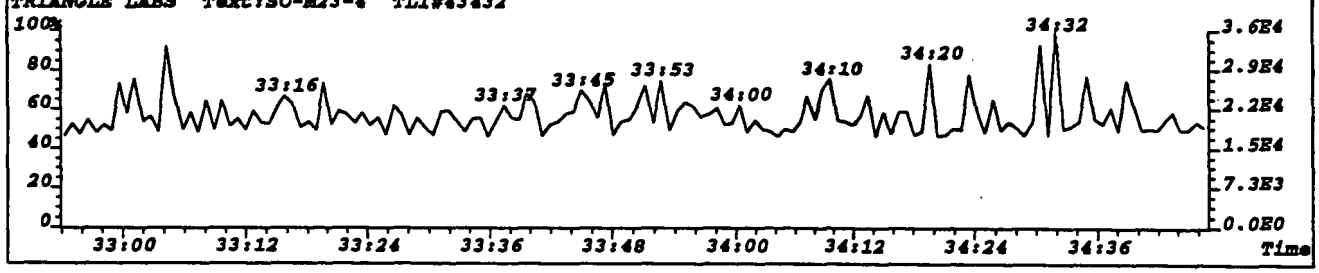
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:3439
419.8220 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,13756.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



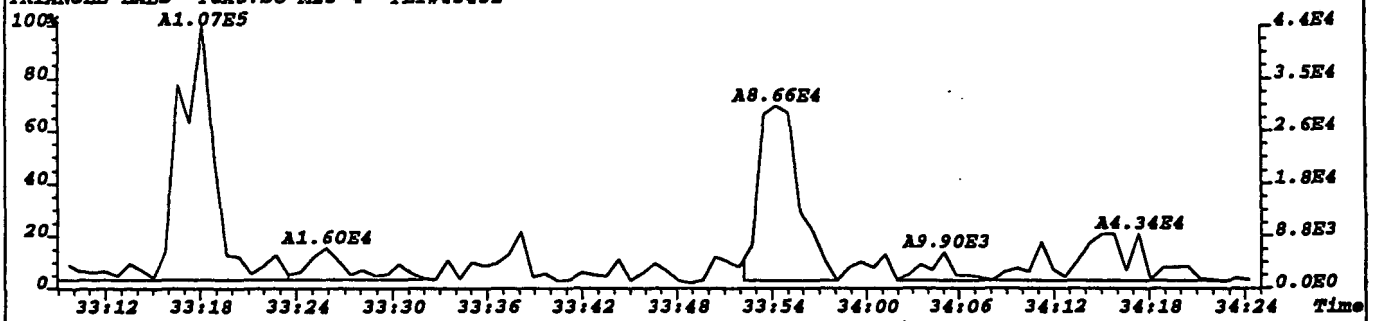
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



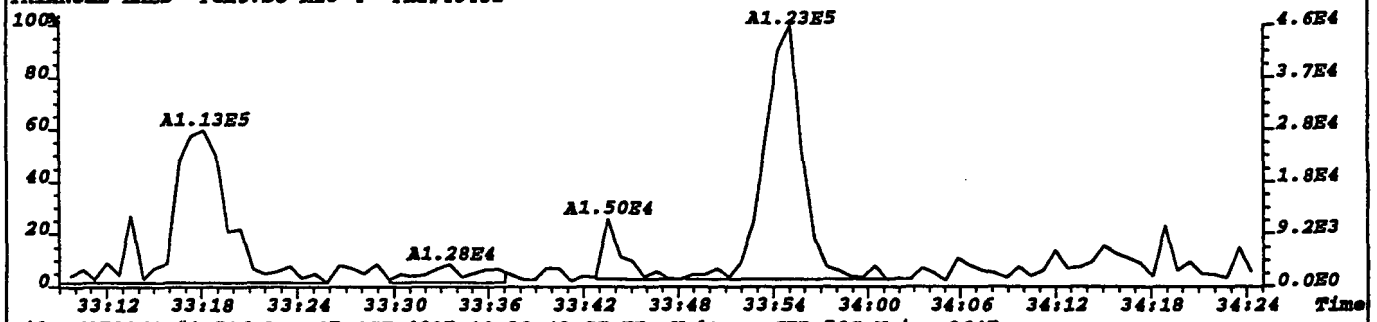
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
479.7165 F:4 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



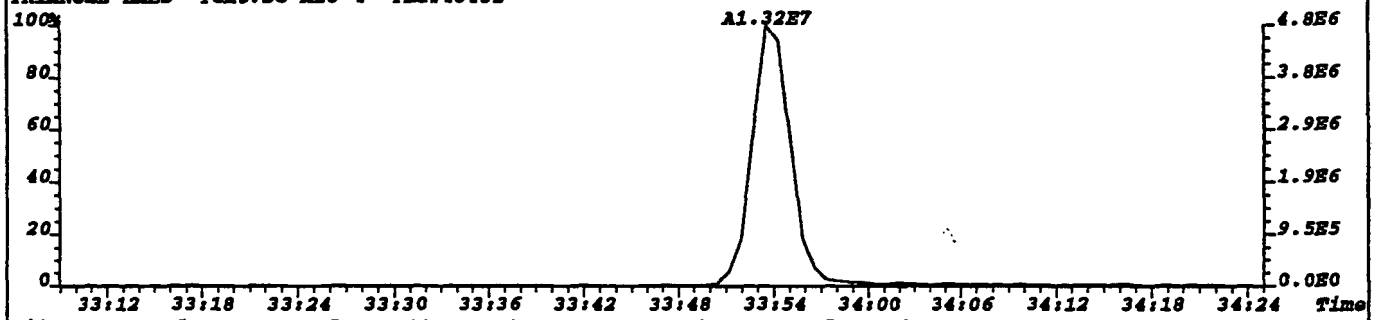
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:742
423.7766 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2968.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



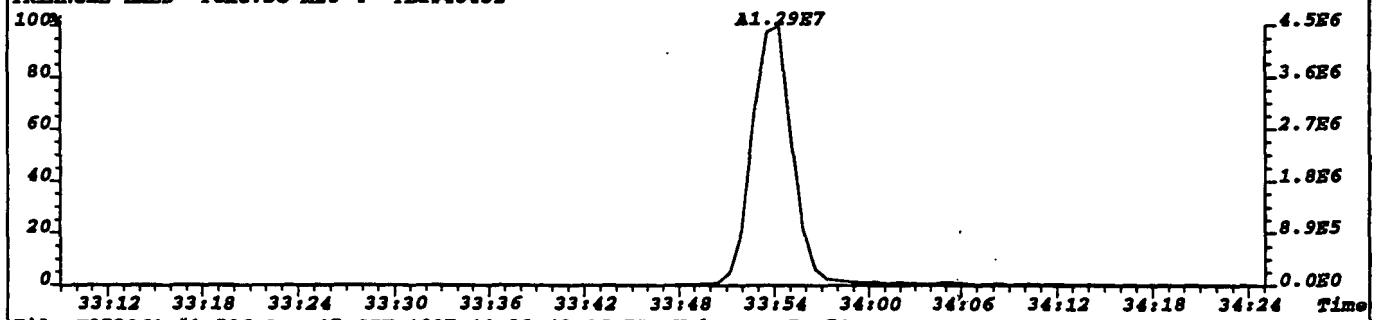
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:691
425.7737 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2764.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



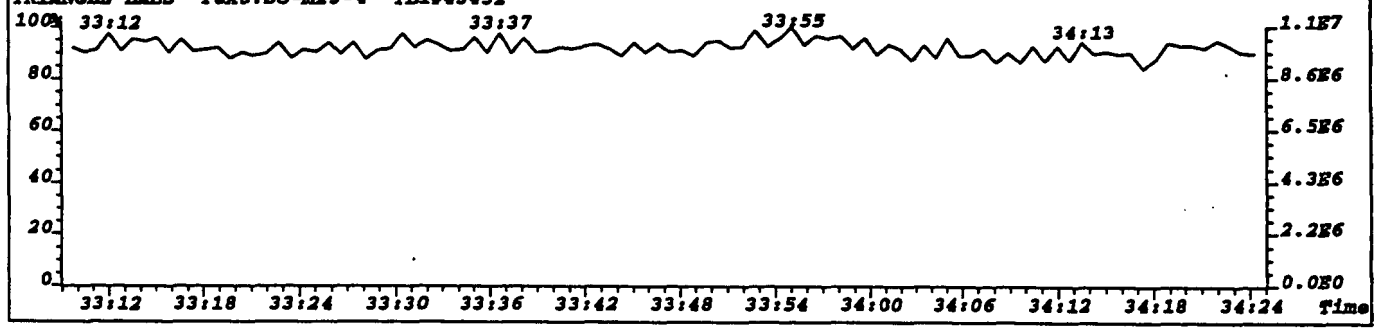
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:2647
435.8169 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,10588.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



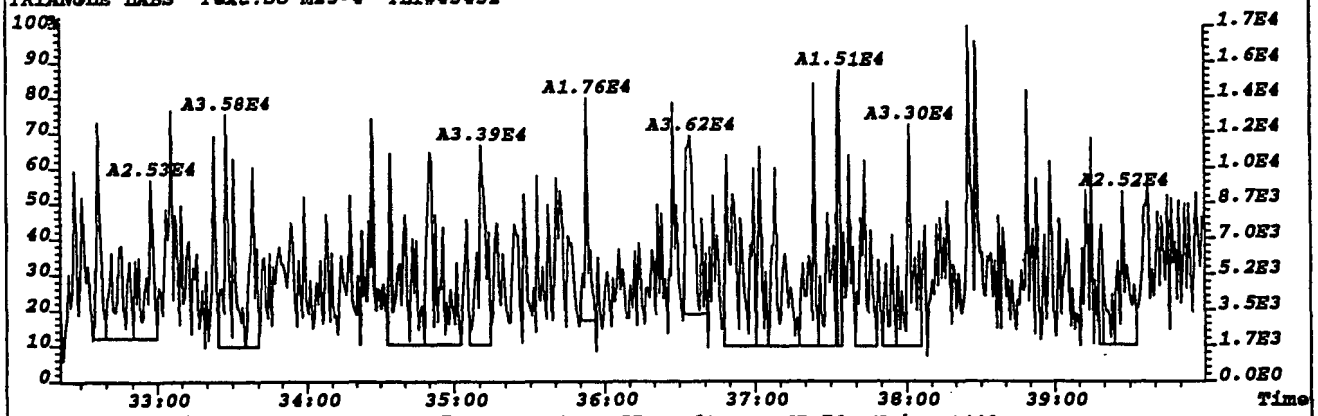
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:2239
437.8140 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,8956.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



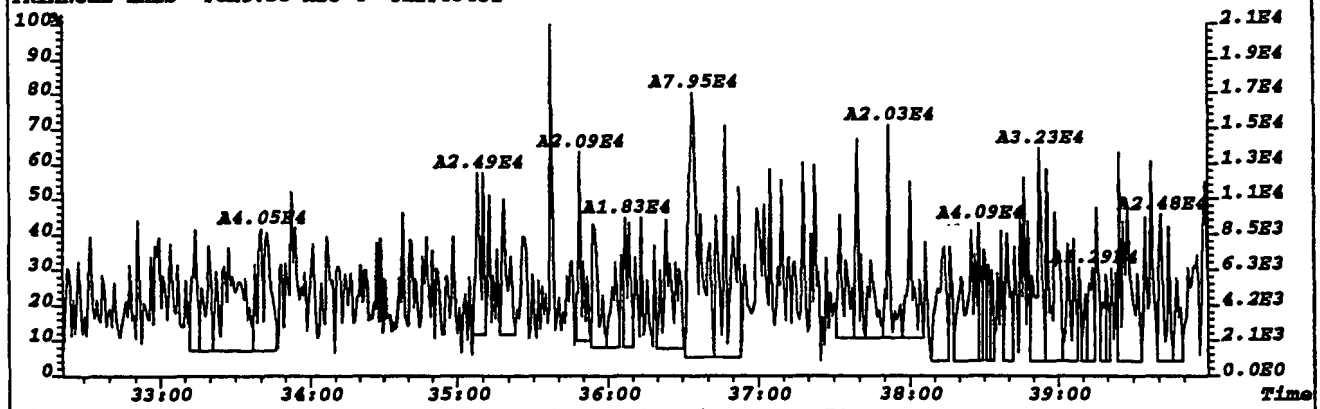
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



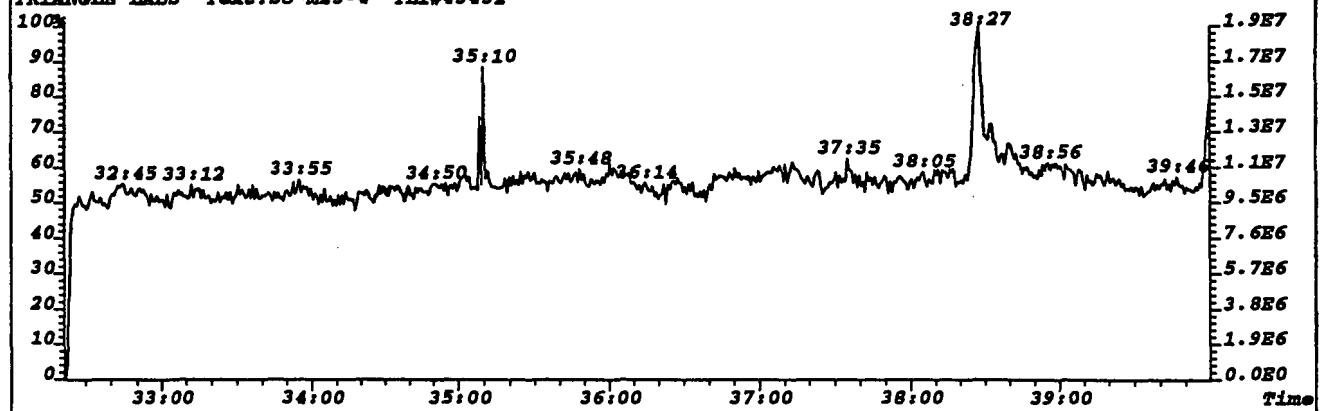
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:1430
441.7428 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5720.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



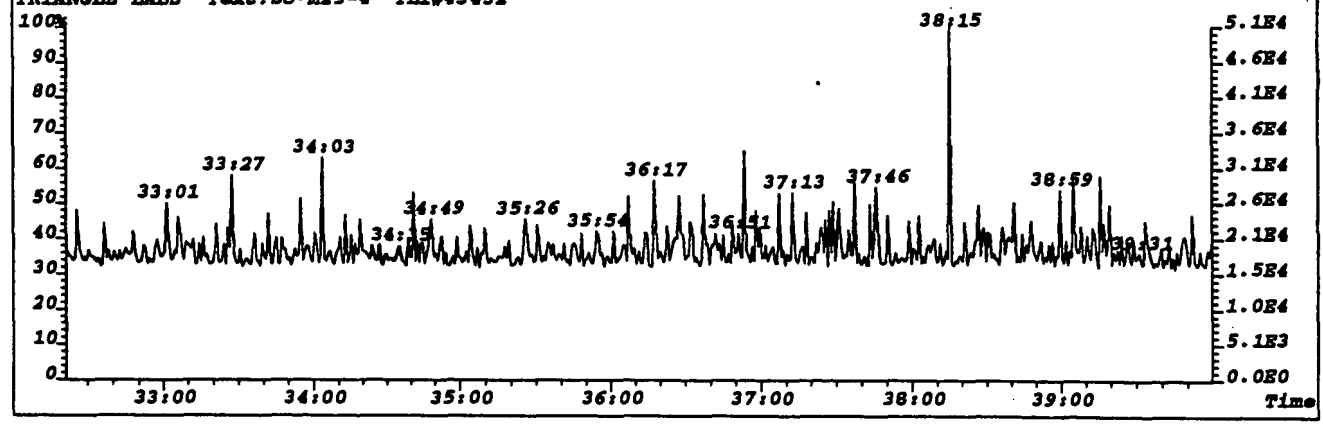
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:1440
443.7399 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5760.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
513.6775 F:4 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432

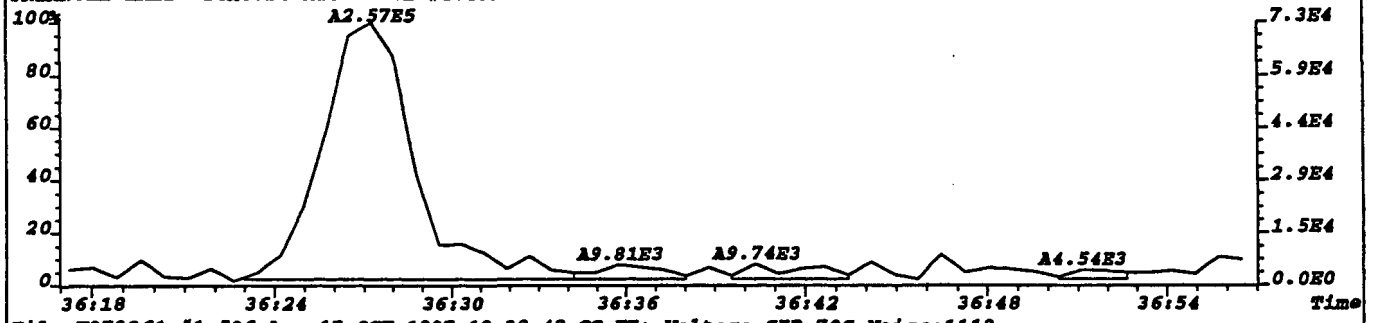


Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
13C12-HpCDD				0.88-1.20						0.971-1.029			
436-438	DC	NL		0:00		1.18	9.77			0.000			
				33:54		1.03	2,610.01	1,321.34	1,288.67	1.000	13C12-HpCDD	678	IS7
	DC	SN		34:05	RO	0.31	9.44			1.005			
	DC	SN		34:25	RO	6.59	2.84			1.015			
436-438			1	Peak			2,610.01						
---------- Above: HpCDD / Octa-CDD and CDF Follows ----------													
OCDF				0.76-1.02						0.890-1.110			
442-444	DC	NL		0:00		0.99	5.74			0.000			
	DC	SN		33:27	RO	0.66	7.60			0.918			
	DC	SN		33:38	RO	0.46	3.99			0.923			
	DC	SN		35:10	RO	1.36	4.71			0.965			
	DC	SN		35:53		0.86	3.81			0.985			
	DC	SN		36:34	RO	0.46	7.69			1.004	OCDF		AN
	DC	SN		36:49		0.97	11.34			1.011			
	DC	SN		37:33	RO	0.70	3.21			1.031			
	DC	SN		37:43	RO	1.95	2.84			1.035			
	DC	SN		37:54	RO	0.58	2.51			1.040			
	DC	SN		38:01	RO	1.39	4.50			1.043			
	DC	SN		39:19		0.93	1.54			1.079			
	DC	SN		39:19	RO	1.36	1.06			1.079			
	DC	SN		39:27	RO	0.55	5.35			1.083			
442-444			0	Peaks			0.00						
OCDD				0.76-1.02						0.890-1.110			
458-460	DC	NL		0:00		1.01	4.50			0.000			
M				36:27		0.80	55.20	24.50	30.70	1.000	OCDD		AN
	DC	SN		36:40	RO	0.38	2.06			1.006			
458-460			1	Peak			55.20						
13C12-OCDD				0.76-1.02						0.995-1.005			
470-472	DC	NL		0:00	RO	1.10	2.95			0.000			
				36:26		0.85	4,889.16	2,253.07	2,636.09	1.000	13C12-OCDD		IS8
	DC	WH		36:53		1.02	27.89			1.012			
470-472			1	Peak			4,889.16						

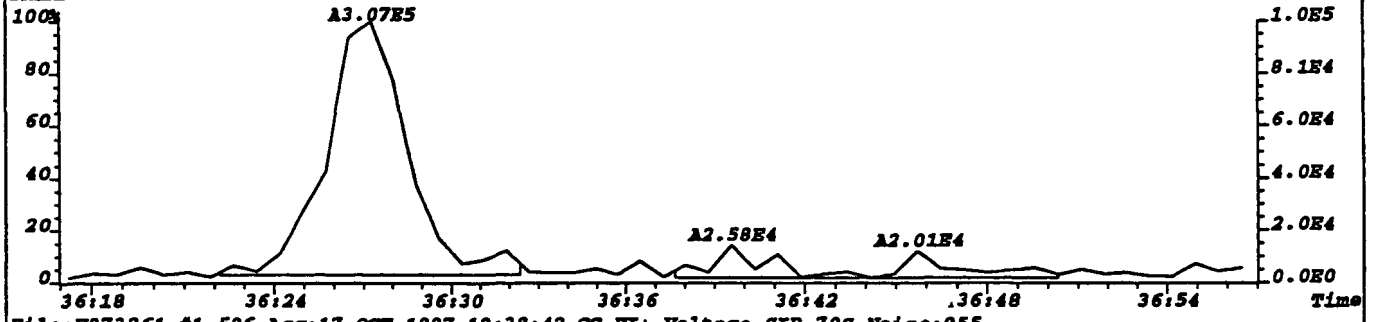
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside Limits	<M-Below Method Detection Limit	T-Time Changed
Rel.RT-Relative Retention Time	NL-Channel Specific Noise Level	M-Peak Area Changed
		N-Name Changed
		E-Ether Interference

*** End of Report ***

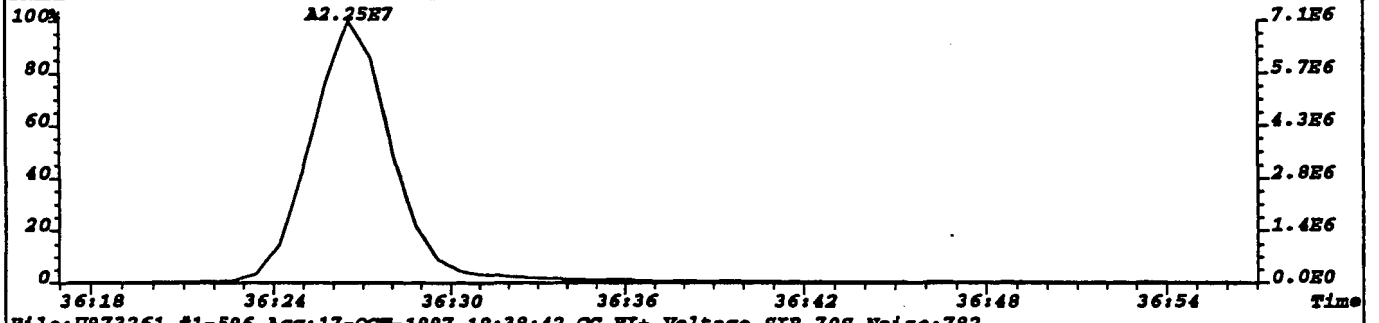
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:1131
457.7377 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4524.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



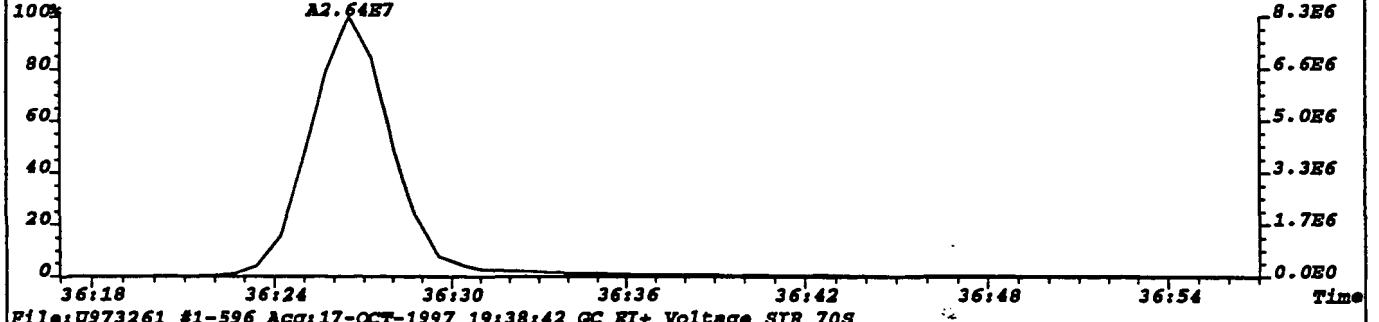
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:1119
459.7348 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4476.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



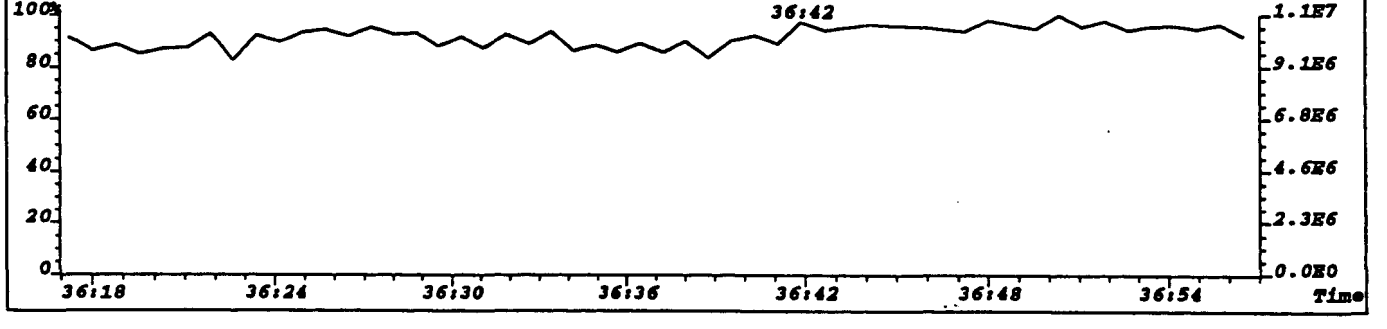
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:855
469.7779 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3420.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432



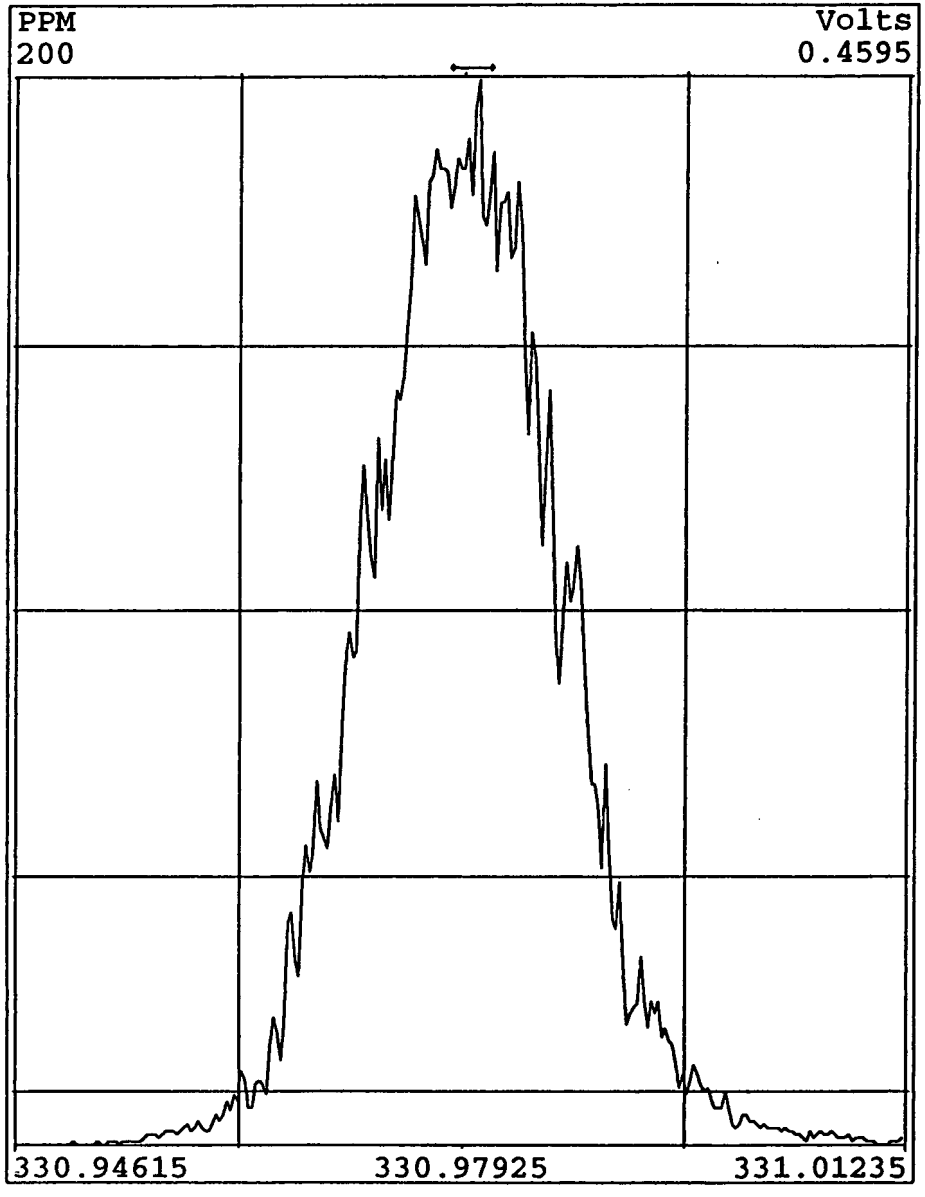
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S Noise:782
471.7750 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3128.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432

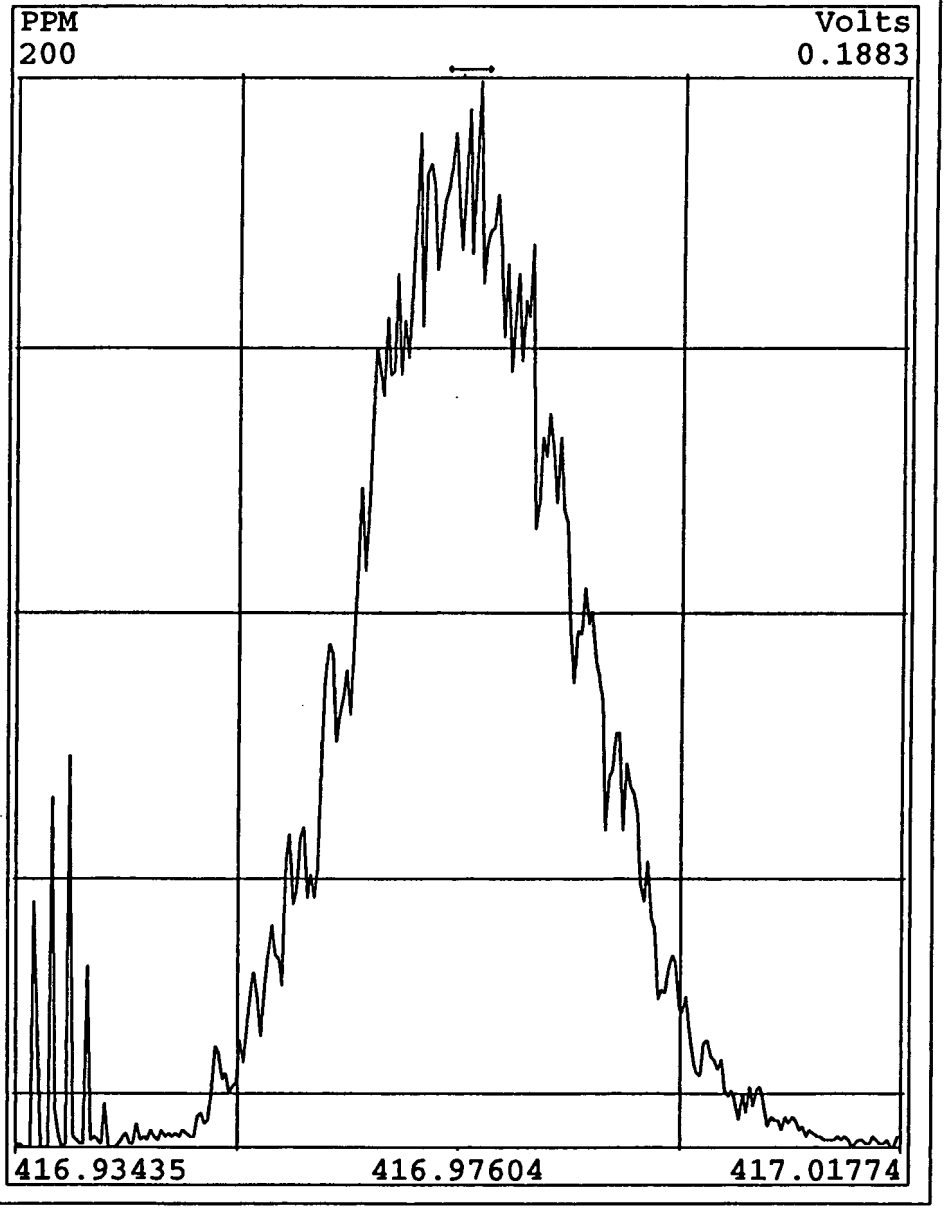


File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:SO-M23-4 TLI#43432

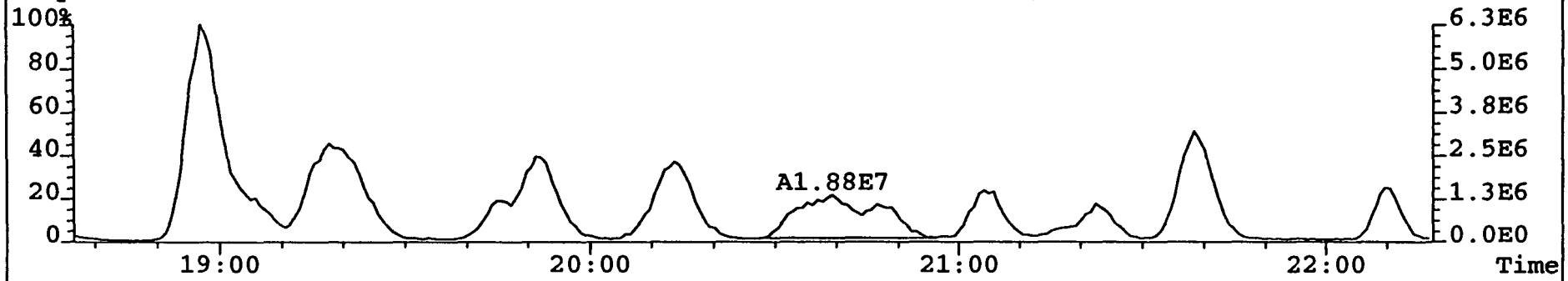


Peak Locate Examination:17-OCT-1997:19:37 File:U973261
Experiment:EPCUS2 Function:2 Reference:PFK

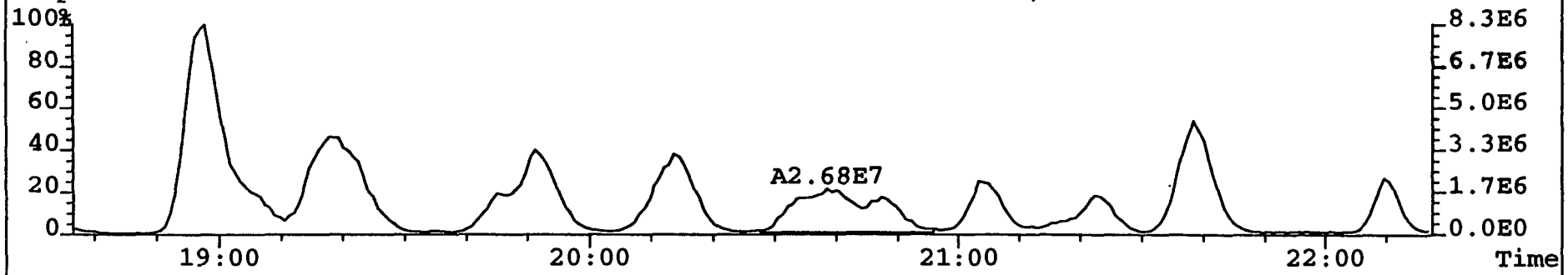




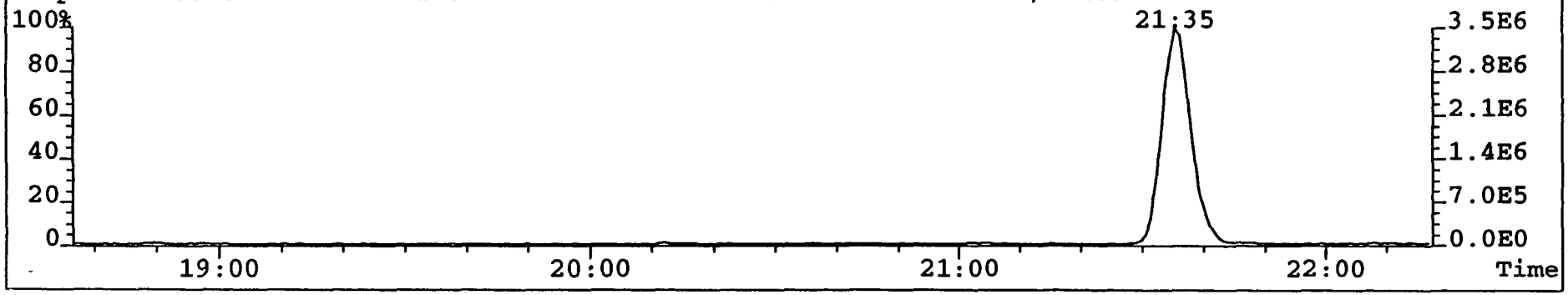
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
303.9016 F:2 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



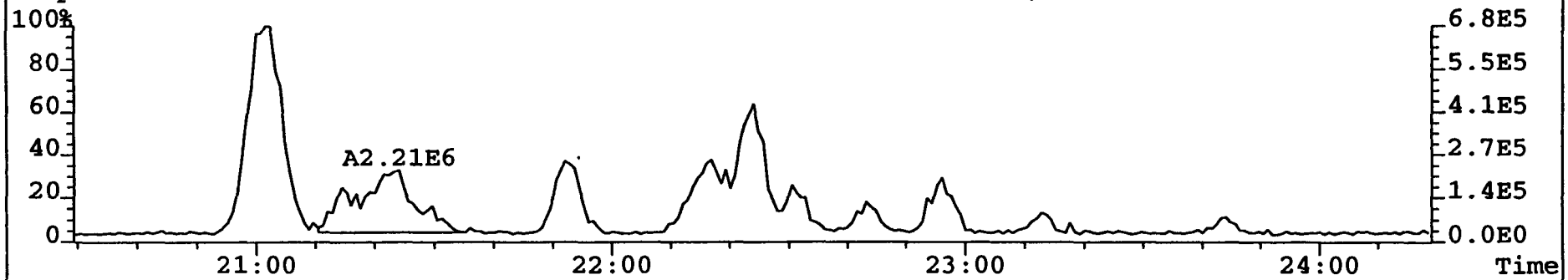
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
305.8987 F:2 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



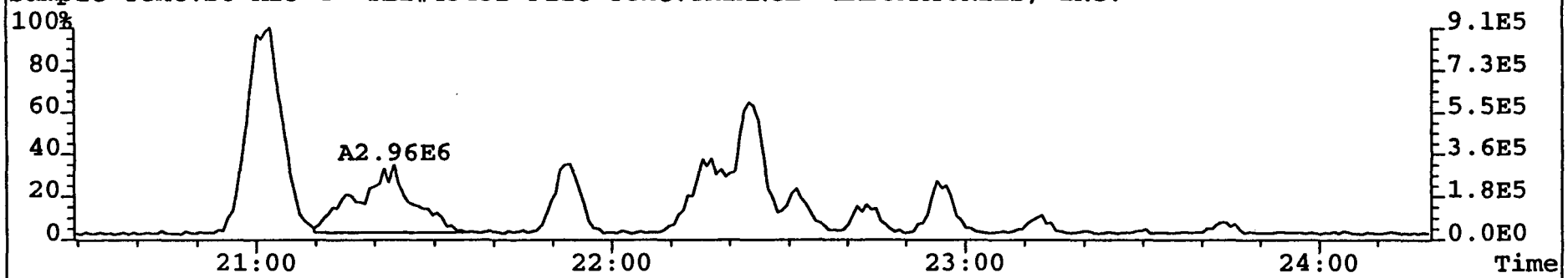
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
315.9419 F:2 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



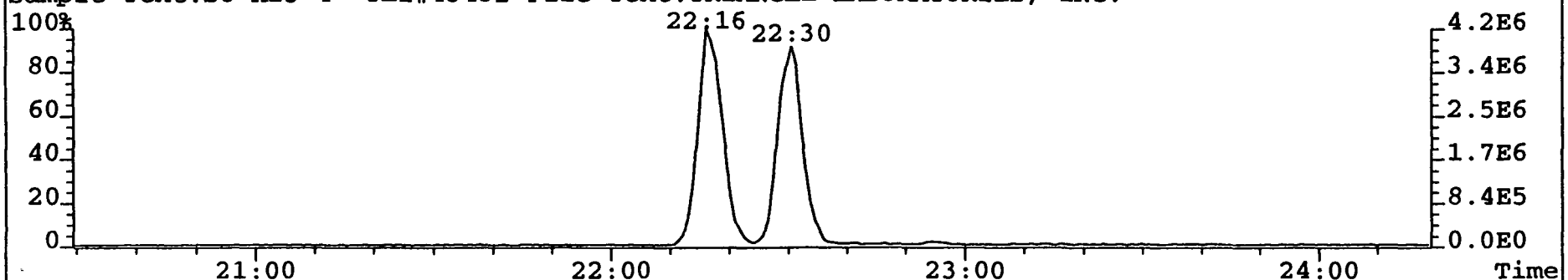
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
319.8965 F:2 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



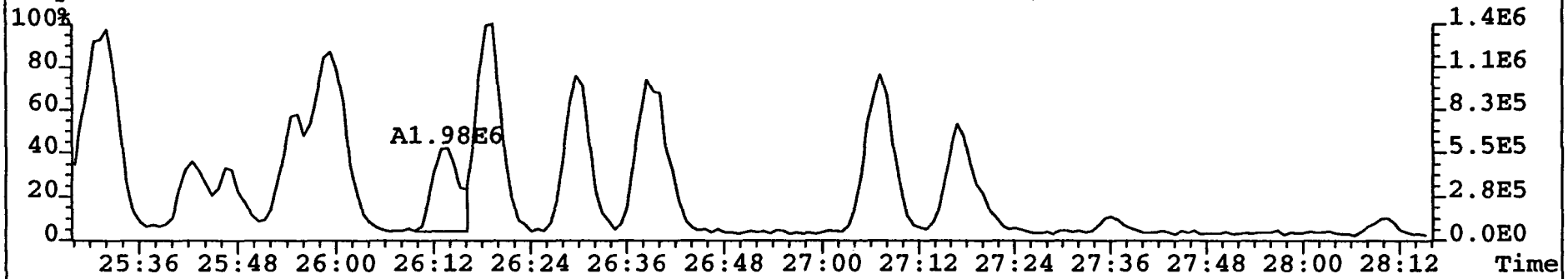
File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
321.8936 F:2 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
331.9368 F:2 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
339.8597 F:2 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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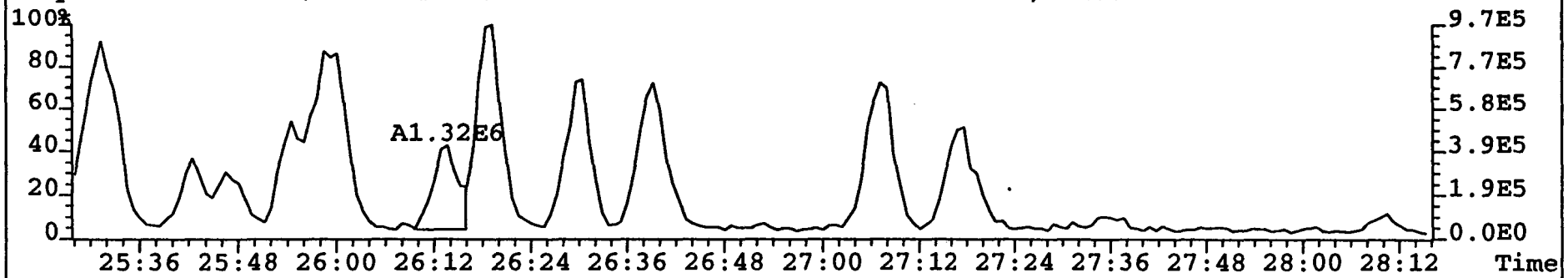
341.8567 F:2 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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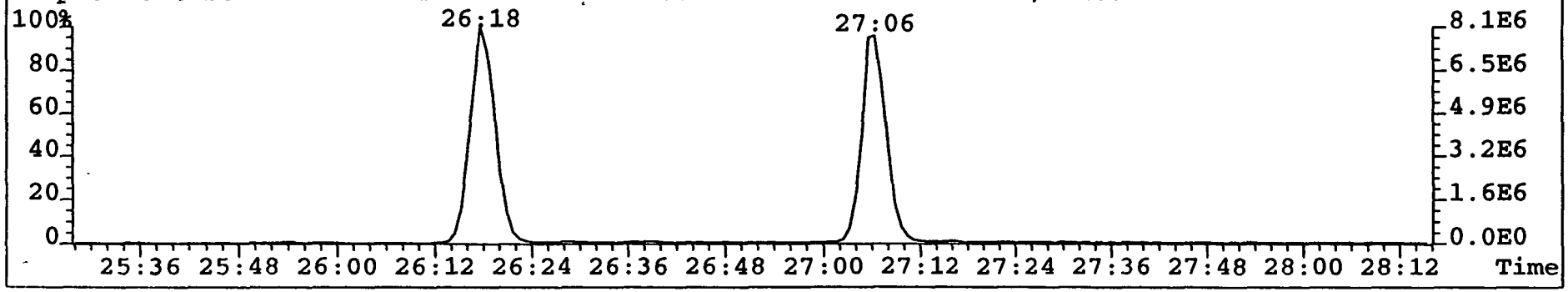
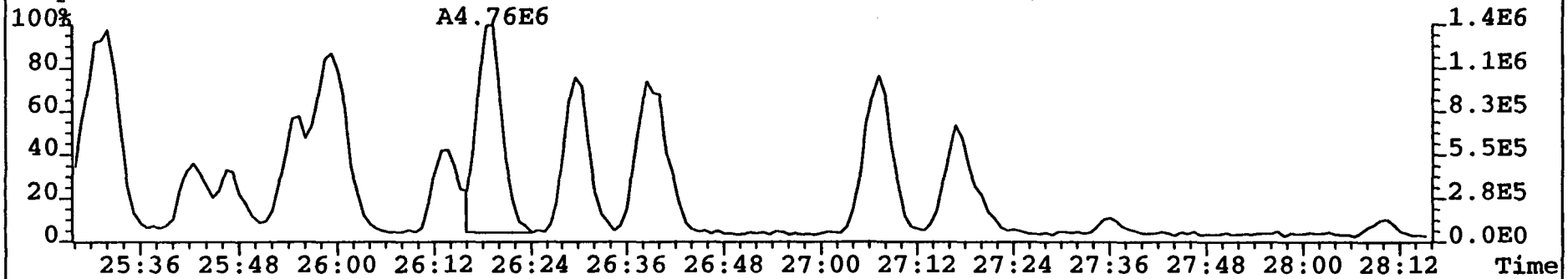
351.9000 F:2 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973261 #1-1024 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
339.8597 F:2 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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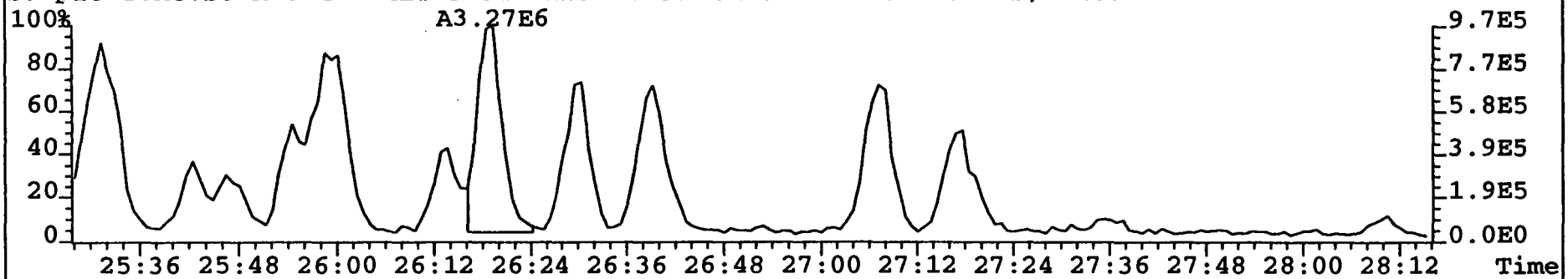
341.8567 F:2 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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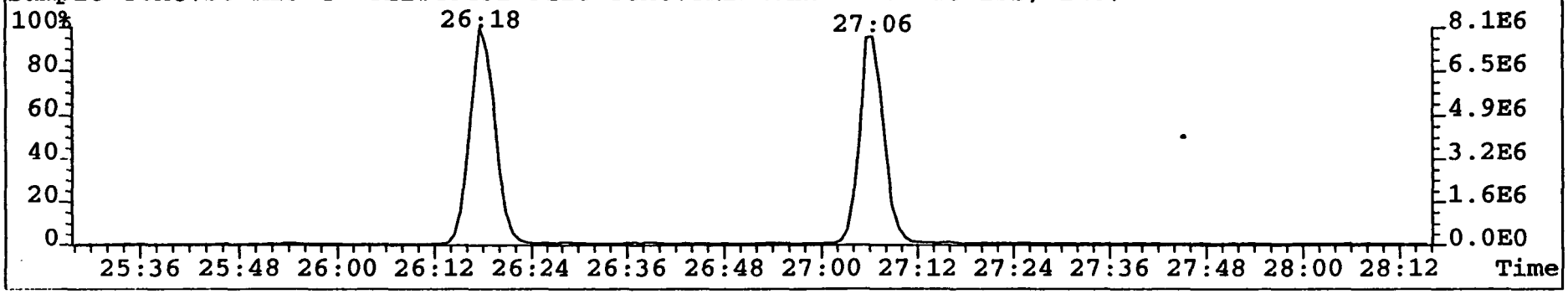
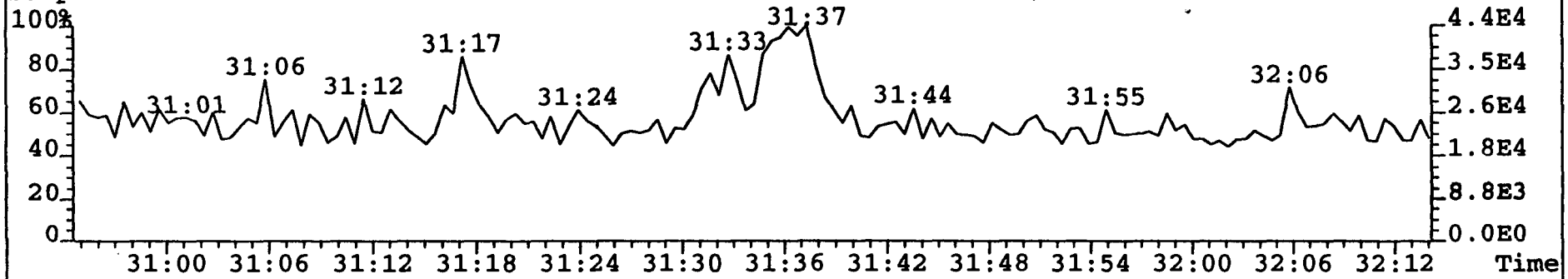
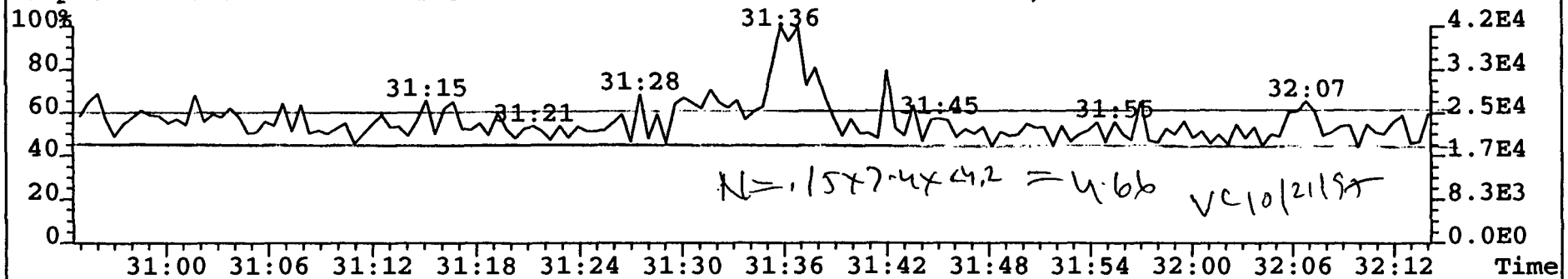
351.9000 F:2 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
373.8208 F:3 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
375.8178 F:3 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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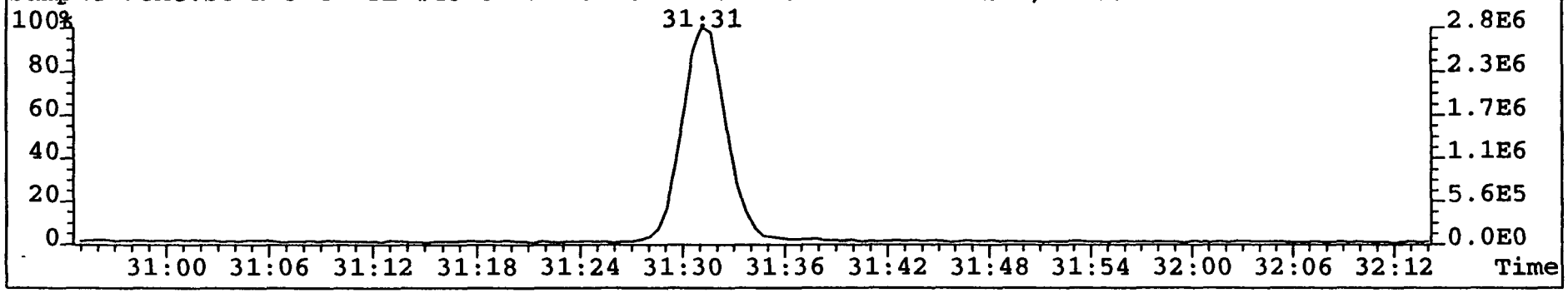
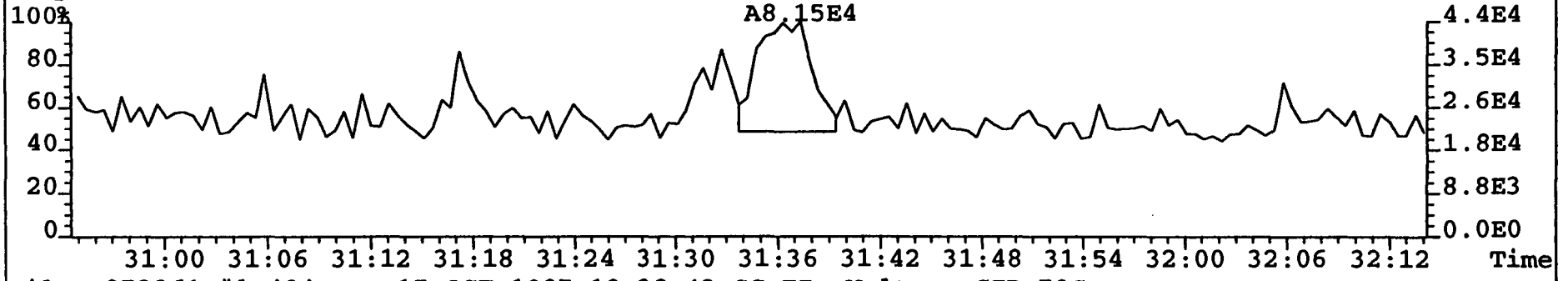
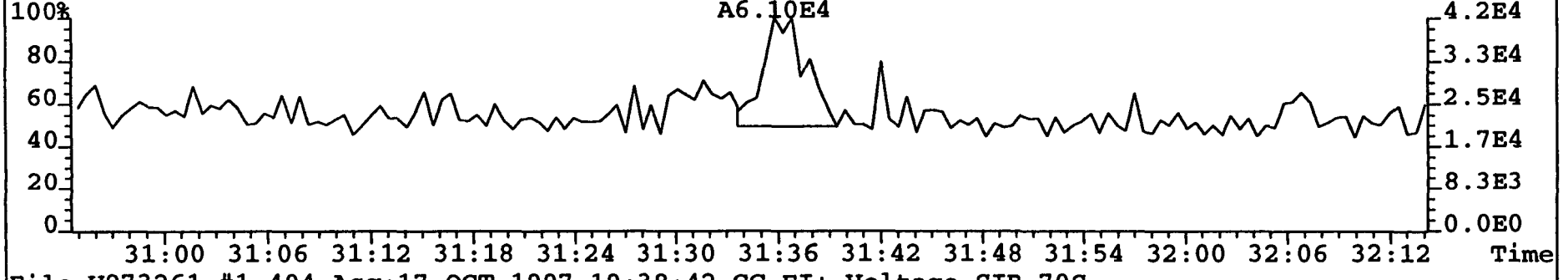
File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
383.8639 F:3 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



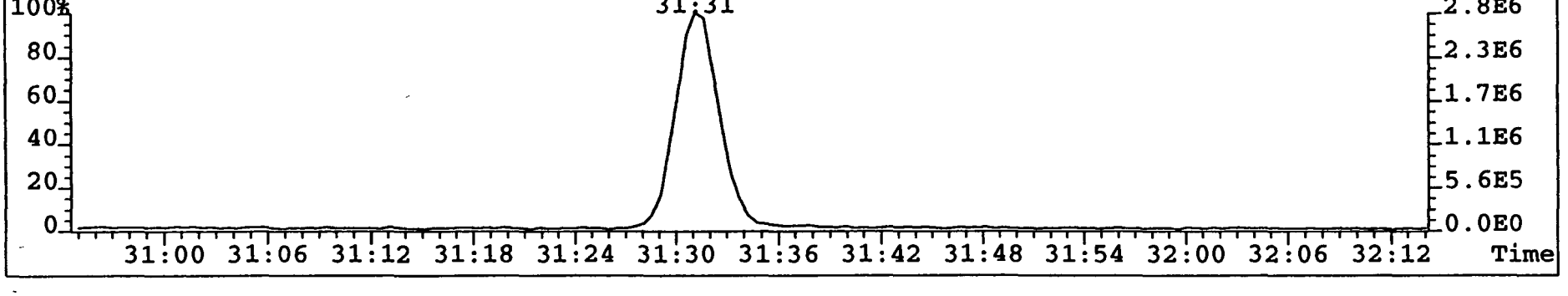
File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
373.8208 F:3 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



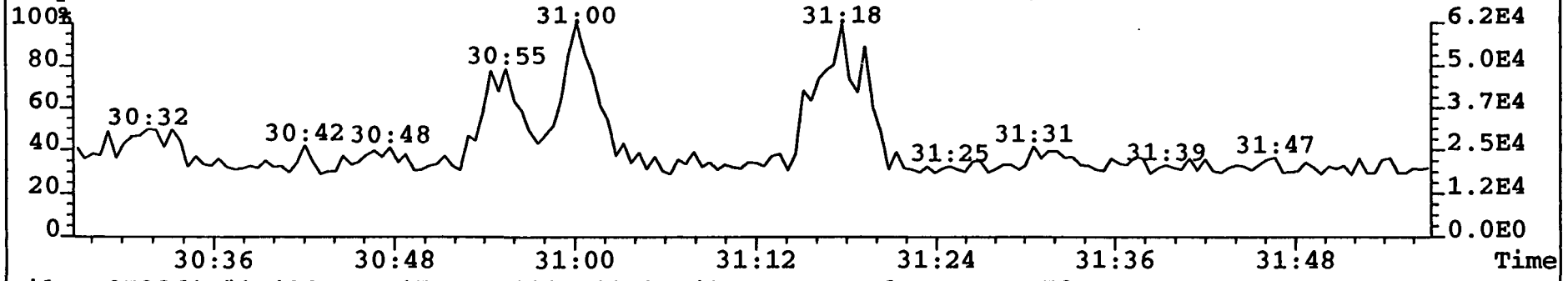
File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
375.8178 F:3 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



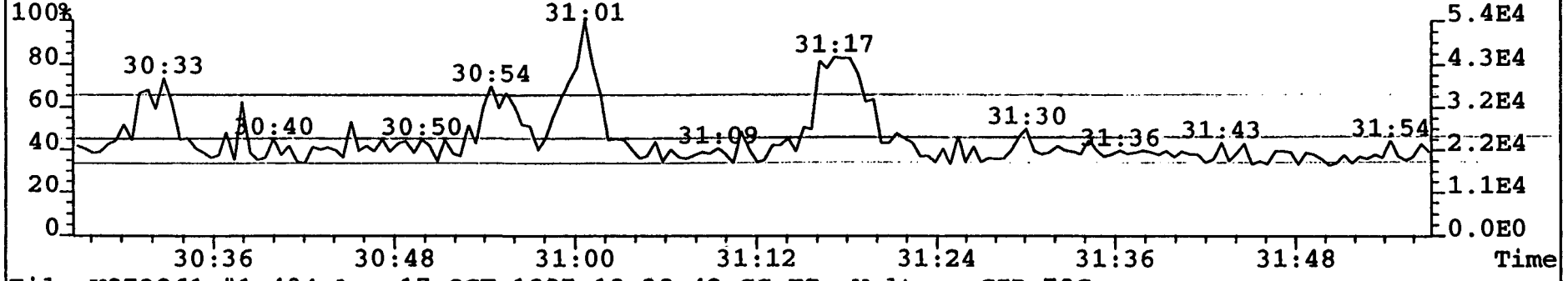
File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
383.8639 F:3 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



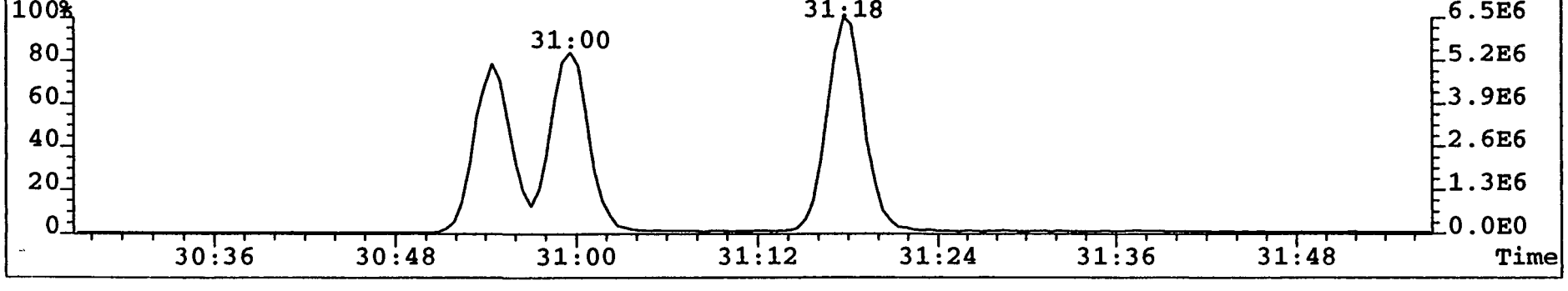
File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
389.8156 F:3 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
391.8127 F:3 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973261 #1-404 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
401.8558 F:3 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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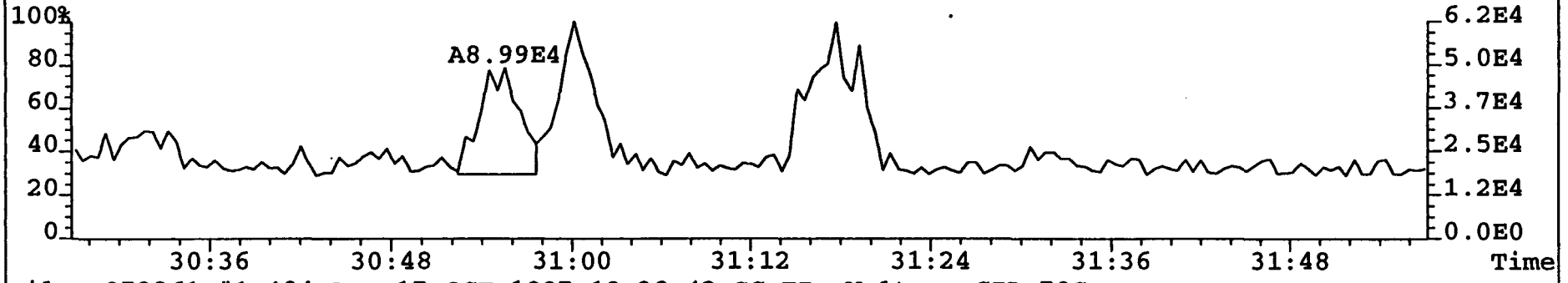
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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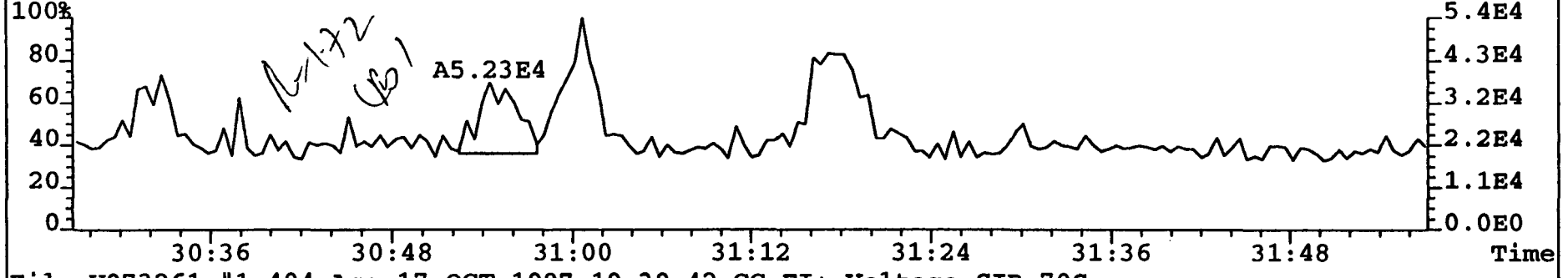
391.8127 F:3 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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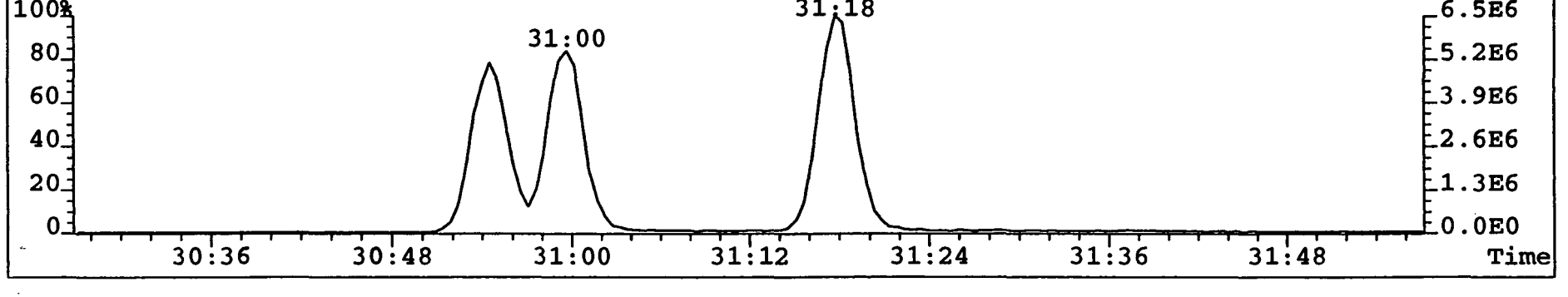
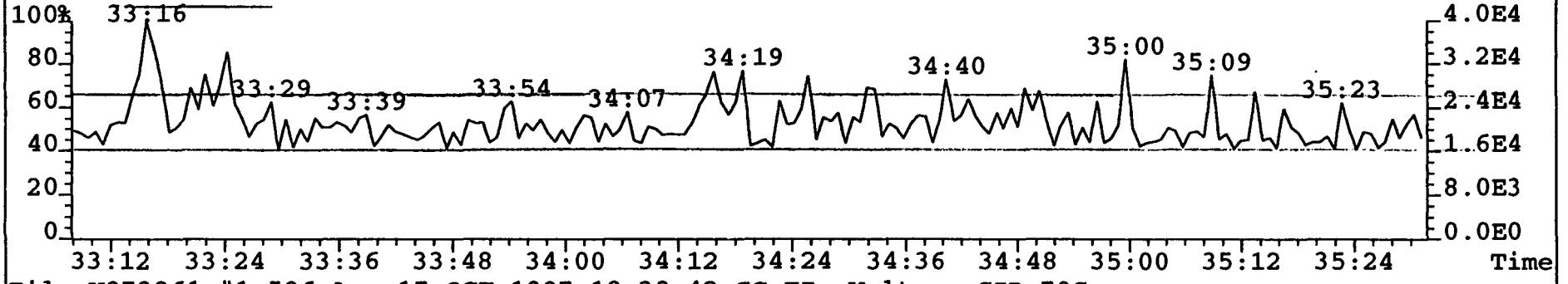
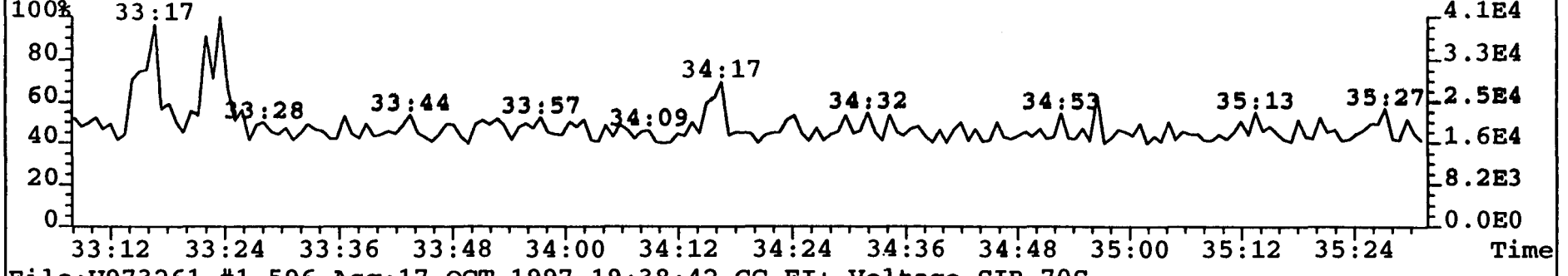
401.8558 F:3 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



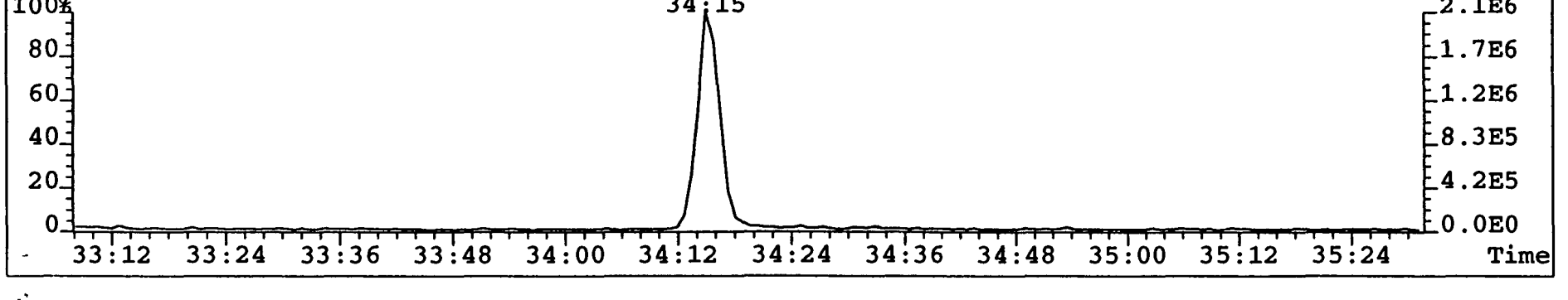
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
407.7818 F:4 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



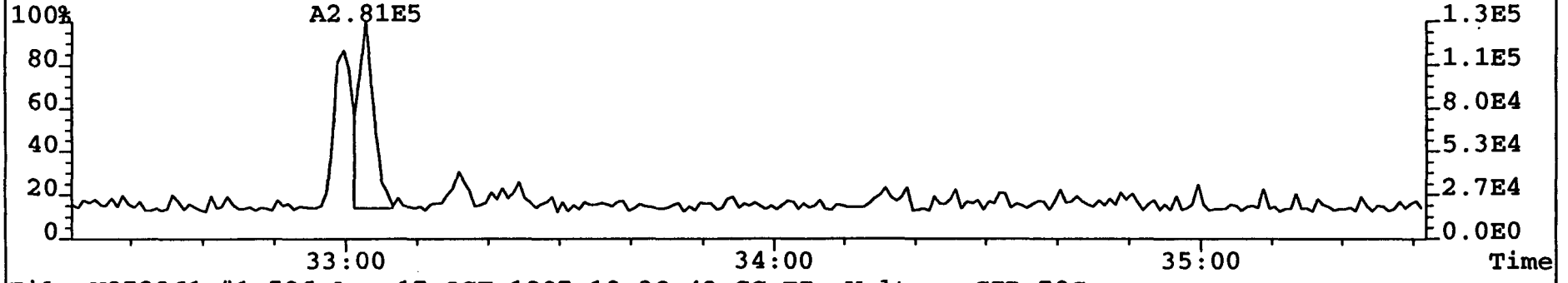
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
409.7789 F:4 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
417.8253 F:4 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
407.7818 F:4 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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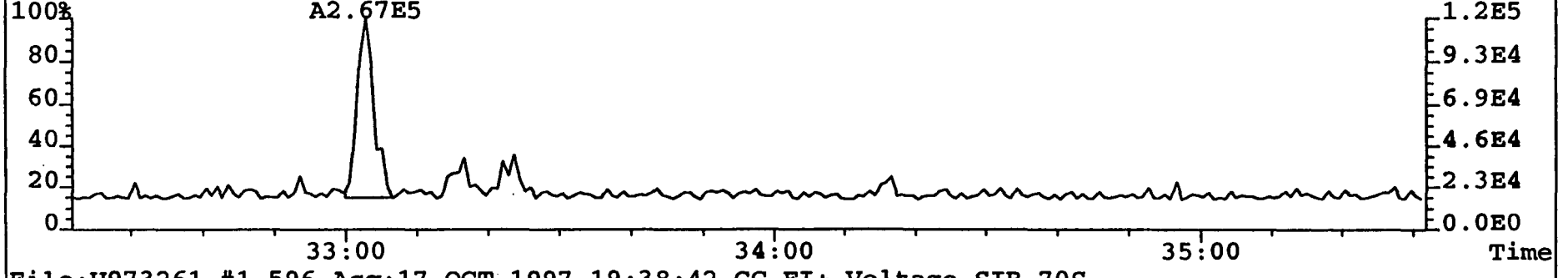
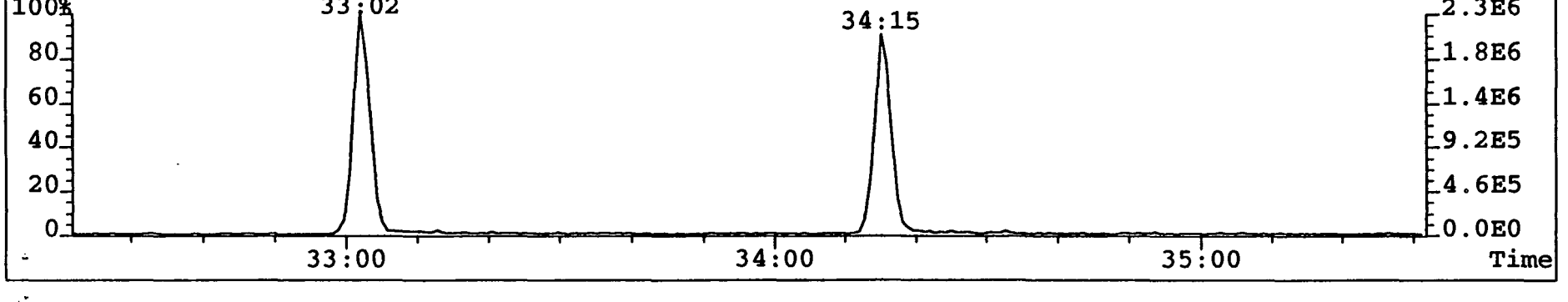
409.7789 F:4 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
417.8253 F:4 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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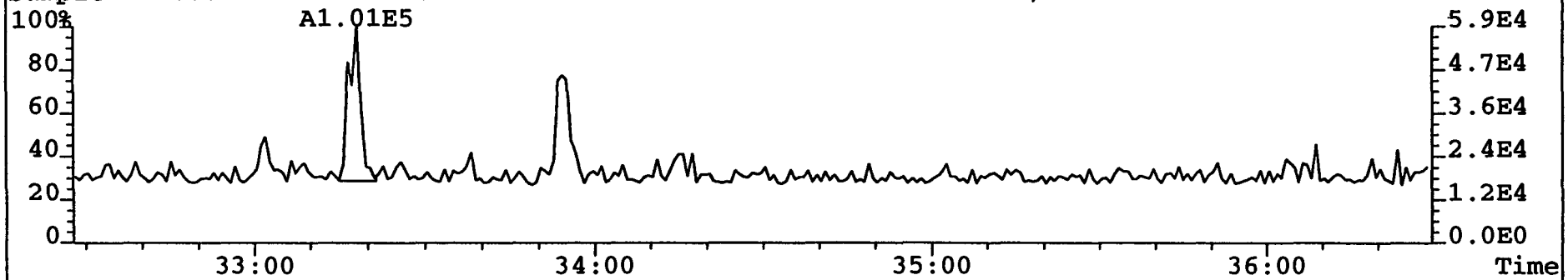
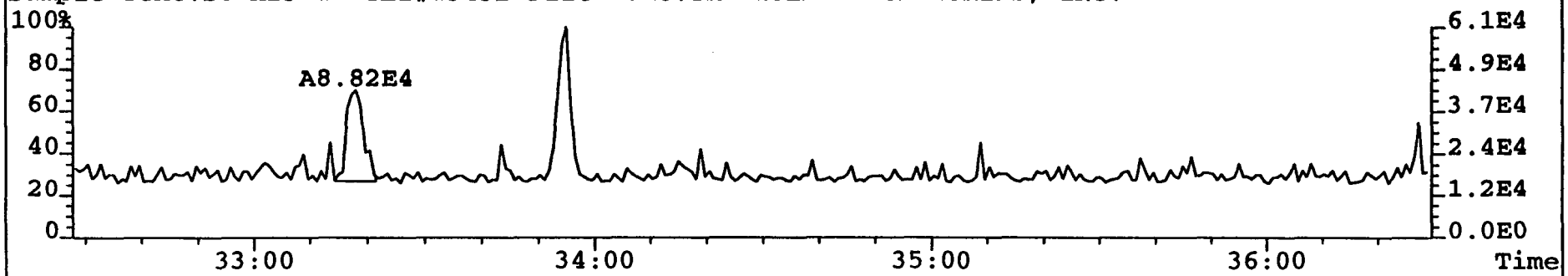
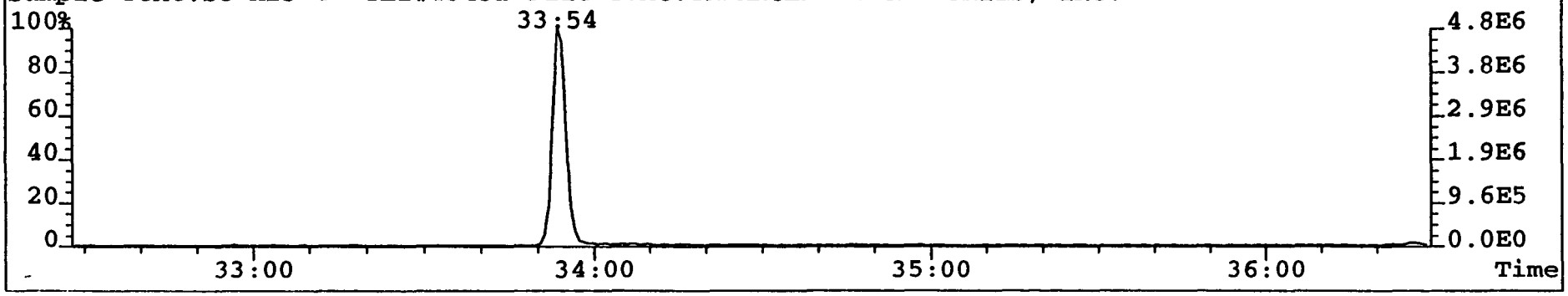
423.7766 F:4 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



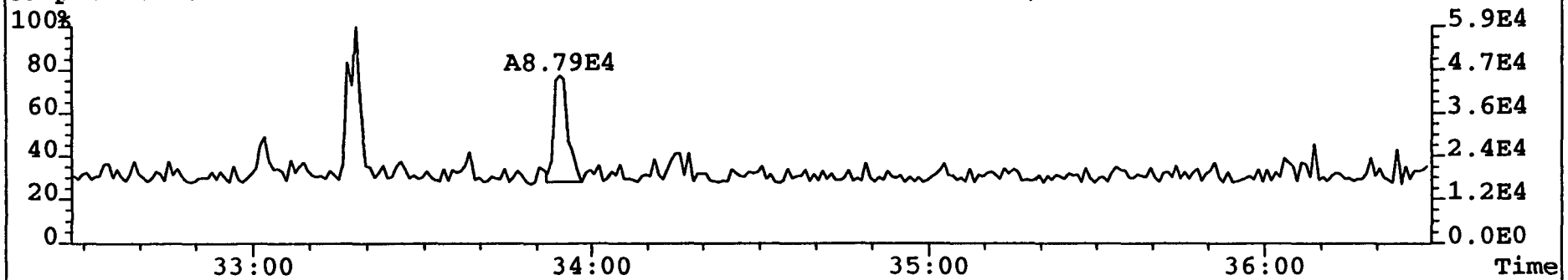
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
425.7737 F:4 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



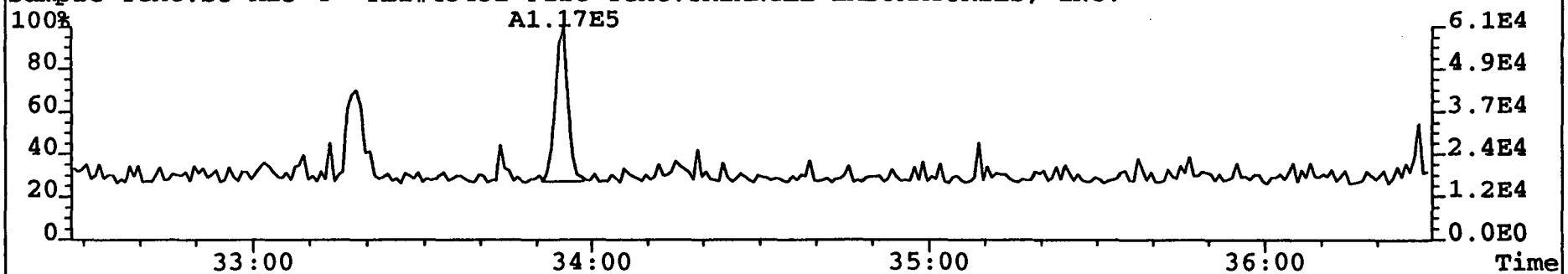
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
435.8169 F:4 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



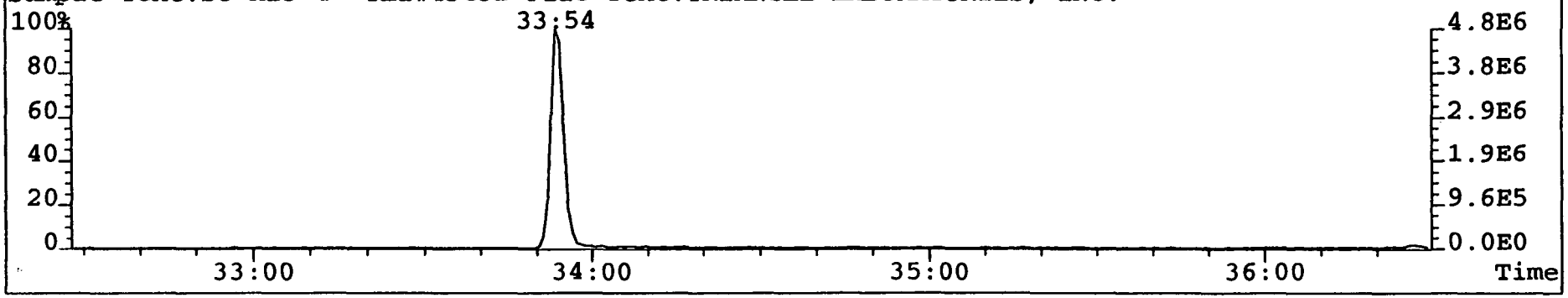
File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
423.7766 F:4 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
425.7737 F:4 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973261 #1-596 Acq:17-OCT-1997 19:38:42 GC EI+ Voltage SIR 70S
435.8169 F:4 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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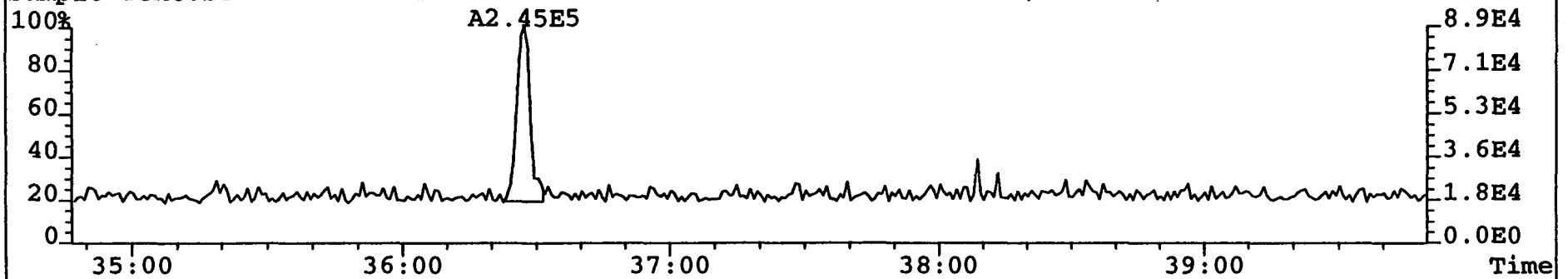
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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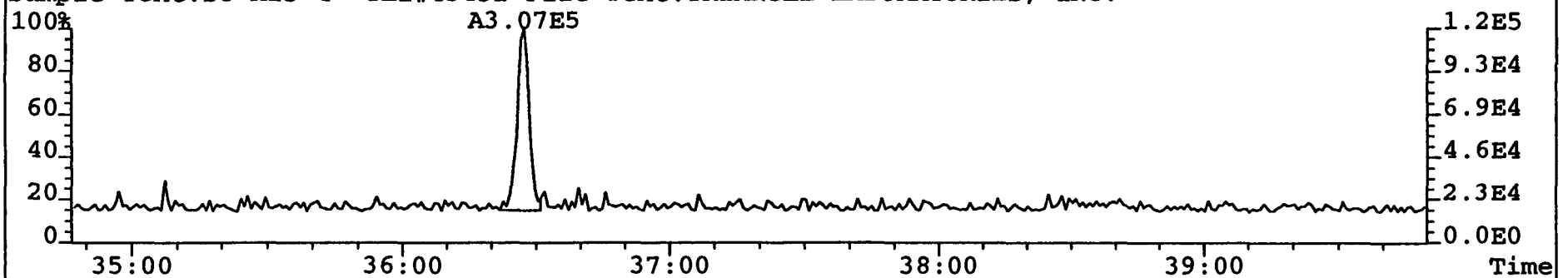
459.7348 F:4 Exp:EPCUS2
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



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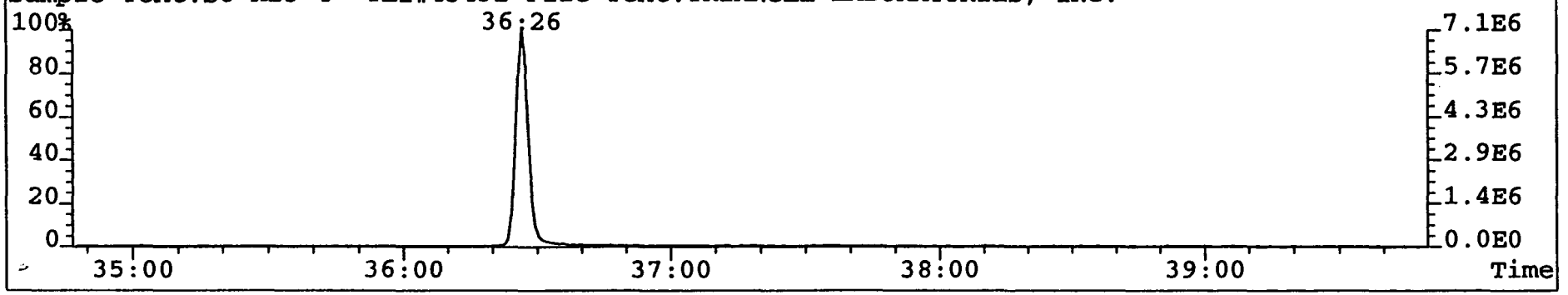
Sample Text:SO-M23-4 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



Pacific Environmental Services

TLI Project: 43432 — Method 23 TCDD/TCDF Analysis (DB-225)
Client Sample: SO-23-4 — Analysis File: X973639

Client Project:	Saginaw, MI				
Sample Matrix:	M23TRAIN	Date Received:	09/29/97	Spike File:	SPC2NF04
TLI ID:	185-6-4A-C	Date Extracted:	10/09/97	ICal:	XF24087
		Date Analyzed:	10/18/97	ConCal:	X973633
Sample Size:	1.000	Dilution Factor:	n/a	% Moisture:	n/a
Dry Weight:	n/a	Blank File:	U973257	% Lipid:	n/a
GC Column:	DB-225	Analyst:	BB	% Solids:	n/a

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDF	1.3			0.78	24:33	—

Internal Standard	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	3.5	87.9	40%-130%	0.79	24:32	—

Recovery Standard	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.81	23:19	—

Data Reviewer: VC 10/23/97

C2NF_PSR v2.00, LARS 6.10.04

Triangle Laboratories, Inc.®
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Printed: 23:35 10/23/97

Initial ....Date...

Data Review By: VC 10/21/97 Calculated Noise Area: n/a

The Total Area for each peak with an ion abundance ratio outside ratio limits has been recalculated according to method requirements.

Page No. 1 Listing of X973639B.dbf
10/21/97 Matched GC Peaks / Ratio / Ret. Time

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
TCDF						0.65-0.89				0.798-1.112			
304-306	DC	NL		0:00	RO	1.33	11.15			0.000			
				19:46		0.79	7,257.49	3,197.52	4,059.97	0.806			
				19:53	RO	2.93	75.07	124.33	42.41	0.810			
				20:04	RO	0.57	57.12	24.85	43.39	0.818			
				20:12		0.70	20.30	8.36	11.94	0.823			
				20:17		0.67	62.05	24.92	37.13	0.827			
				20:24		0.81	102.11	45.84	56.27	0.832			
				20:47		0.78	10,340.25	4,536.10	5,804.15	0.847			
				20:55		0.79	6,091.61	2,682.27	3,409.34	0.853			
				21:03		0.79	7,180.72	3,169.05	4,011.67	0.858			
				21:14		0.79	5,508.93	2,438.33	3,070.60	0.865			
				21:20	RO	0.63	99.86	43.44	69.11	0.870			
				21:30		0.79	3,661.54	1,614.56	2,046.98	0.876			
				21:39		0.78	4,925.04	2,157.04	2,768.00	0.882			
				21:48		0.79	1,924.21	849.86	1,074.35	0.889			
				21:58		0.77	11,238.99	4,904.51	6,334.48	0.895			
				22:07		0.75	2,985.97	1,277.81	1,708.16	0.901			
				22:31		0.78	5,724.63	2,511.50	3,213.13	0.918			
				22:36		0.79	3,924.73	1,726.42	2,198.31	0.921			
				22:44	RO	0.90	82.80	41.95	46.78	0.927			
				22:52		0.80	90.26	40.18	50.08	0.932			
				23:00		0.79	4,116.99	1,818.00	2,298.99	0.938			
				23:07		0.77	747.45	324.58	422.87	0.942			
				23:15		0.79	3,663.88	1,619.04	2,044.84	0.948			
				23:31		0.78	3,889.24	1,709.35	2,179.89	0.959			
				23:46		0.77	448.24	194.47	253.77	0.969			
				23:57		0.77	2,567.26	1,115.13	1,452.13	0.976			
				24:24		0.79	2,301.89	1,018.31	1,283.58	0.995			
				24:33		0.78	2,387.65	1,049.80	1,337.85	1.001	2378-TCDF		AN
				24:48		0.75	2,018.92	868.41	1,150.51	1.011			
				25:08		0.77	1,711.85	743.93	967.92	1.024			
				25:17		0.79	3,476.71	1,538.69	1,938.02	1.031			
				25:33	RO	1.27	15.15	10.90	8.56	1.041			
				25:40		0.86	6.21	2.88	3.33	1.046			
				26:13		0.78	1,588.19	693.66	894.53	1.069			
				27:07	RO	0.43	105.17	45.75	106.41	1.105			
304-306			35	Peaks			100,398.48						
13C12-TCDF						0.65-0.89				0.959-1.041			
316-318	DC	NL		0:00		0.66	17.59			0.000			
	DC	WL		19:35	RO	0.59	6.30			0.798			
	DC	WL		22:29	RO	1.62	13.58			0.916			
	DC	WL		22:39	RO	0.56	6.76			0.923			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
		DC	WL	22:58	RO	0.57	39.97			0.936			
				24:06	RO	0.62	7.68	3.34	5.35	0.982			
				24:32		0.79	7,730.05	3,406.82	4,323.23	1.000	13C12-2378-TCDF	IS0	
				25:05		0.88	2.72	1.27	1.45	1.022			
				25:15	RO	0.60	28.71	12.49	20.73	1.029			
		DC	WH	26:57		0.68	91.52			1.099			
316-318			4	Peaks			7,769.16						

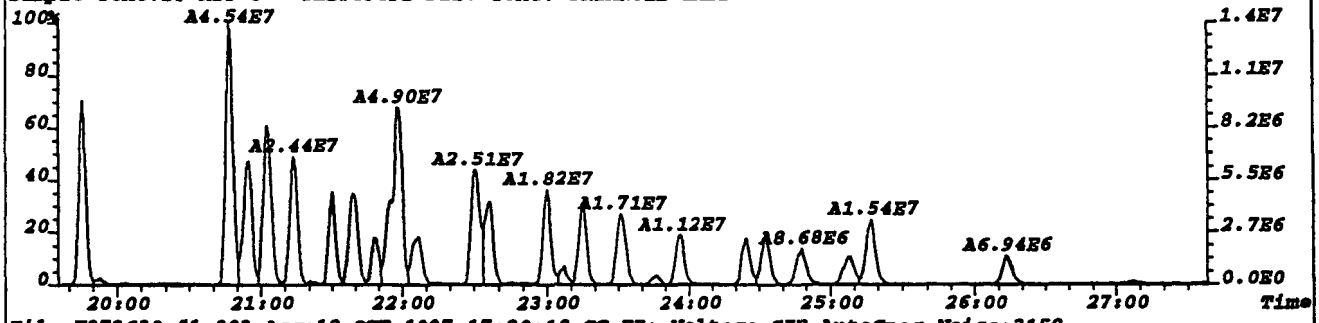
---------- Above: TCDF / TCDD Follows ----------

13C12-TCDD					0.65-0.89					0.913-1.087			
332-334		DC	NL	0:00	RO	3.11	5.20			0.000			
				21:49	RO	0.94	30.87	16.38	17.44	0.949			
				23:00		0.76	5,175.20	2,240.34	2,934.86	1.000	13C12-2378-TCDD	IS1	
				23:19		0.81	6,318.95	2,837.37	3,481.58	1.014	13C12-1234-TCDD	RS1	
				24:06	RO	0.92	70.99	36.73	40.11	1.048			
		DC	WH	25:17	RO	1.07	5.91			1.099			
		DC	WH	25:29	RO	2.38	5.36			1.108			
		DC	WH	25:40	RO	0.45	7.08			1.116			
		DC	WH	25:52	RO	0.99	14.05			1.125			
		DC	WH	26:25	RO	2.66	2.74			1.149			
		DC	WH	26:35	RO	2.15	5.54			1.156			
332-334			4	Peaks			11,596.01						

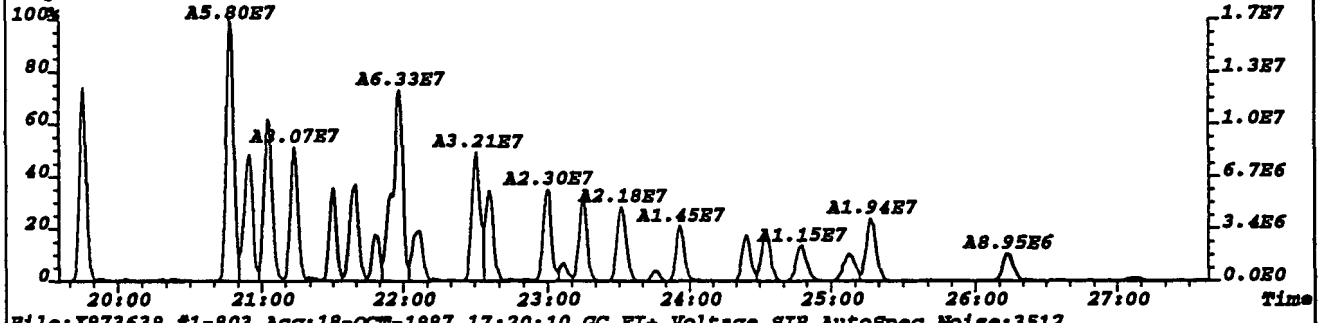
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside Limits	<M-Below Method Detection Limit	T-Time Changed
Rel.RT-Relative Retention Time	NL-Channel Specific Noise Level	M-Peak Area Changed
		N-Name Changed
		E-Ether Interference

*** End of Report ***

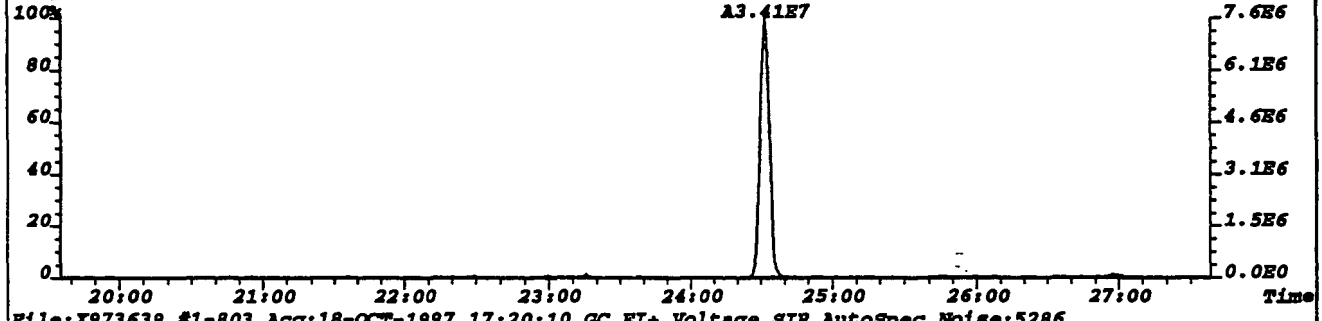
File:X973639 #1-803 Acq:18-OCT-1997 17:20:10 GC EI+ Voltage SIR AutoSpec Noise:4194
303.9016 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,16776.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



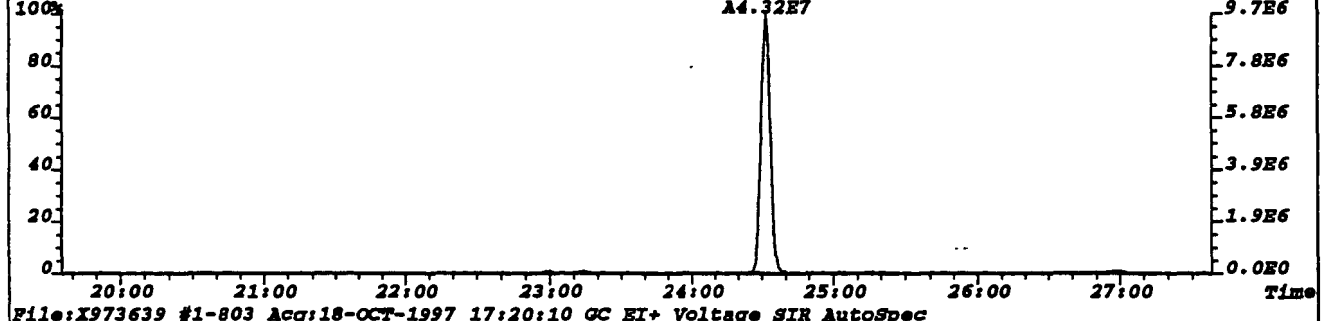
File:X973639 #1-803 Acq:18-OCT-1997 17:20:10 GC EI+ Voltage SIR AutoSpec Noise:3150
305.8987 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,12600.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



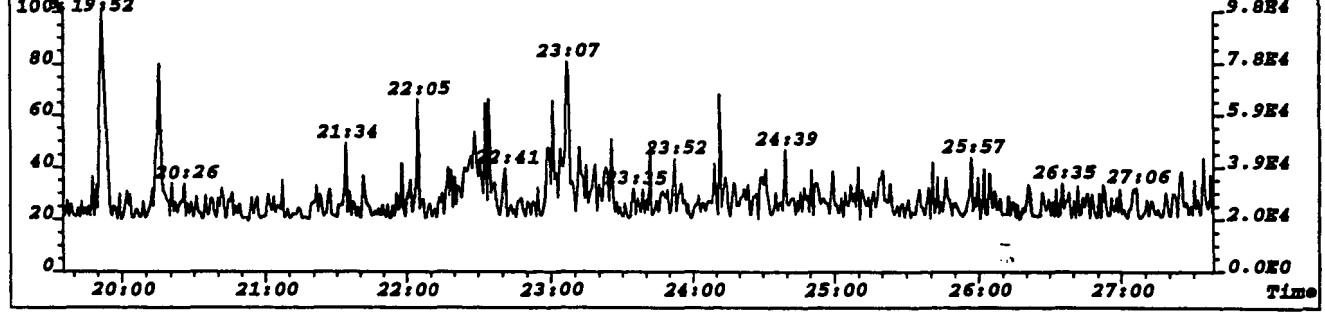
File:X973639 #1-803 Acq:18-OCT-1997 17:20:10 GC EI+ Voltage SIR AutoSpec Noise:3512
315.9419 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,14048.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



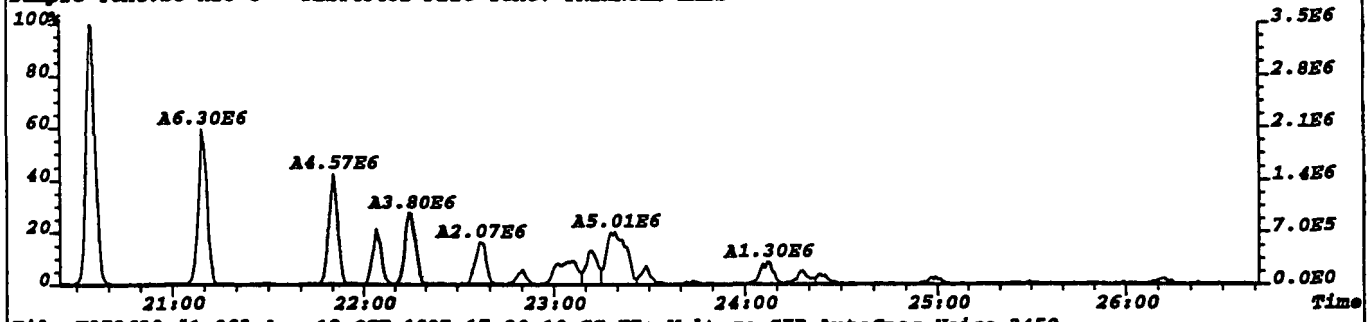
File:X973639 #1-803 Acq:18-OCT-1997 17:20:10 GC EI+ Voltage SIR AutoSpec Noise:5286
317.9389 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,21144.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



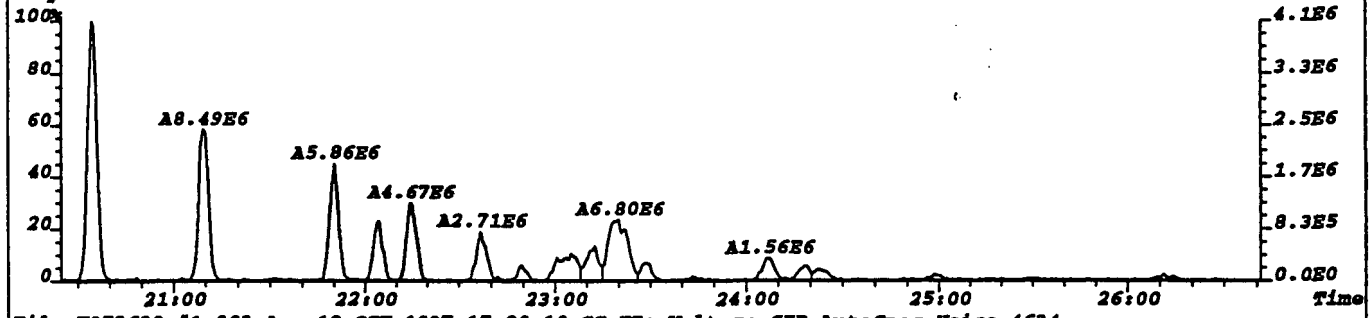
File:X973639 #1-803 Acq:18-OCT-1997 17:20:10 GC EI+ Voltage SIR AutoSpec
375.8364 Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



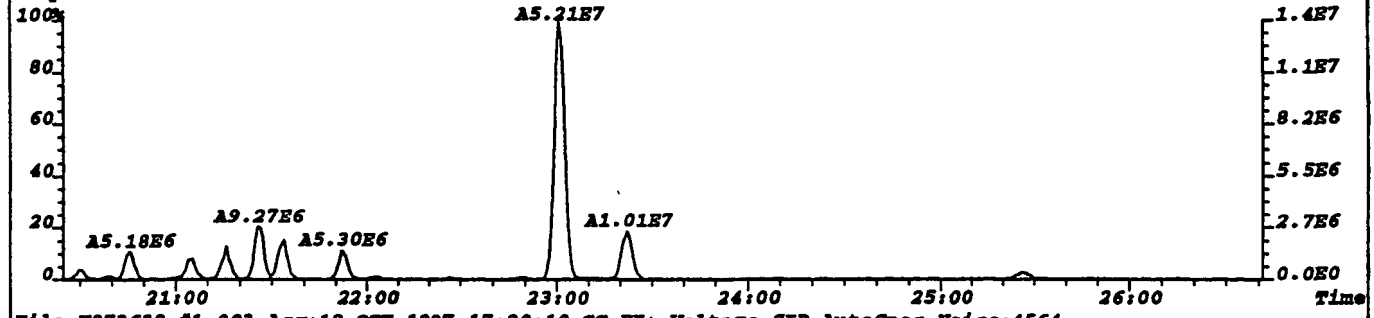
File:X973639 #1-803 Acq:18-OCT-1997 17:20:10 GC EI+ Voltage SIR AutoSpec Noise:3168
319.8965 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,12672.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



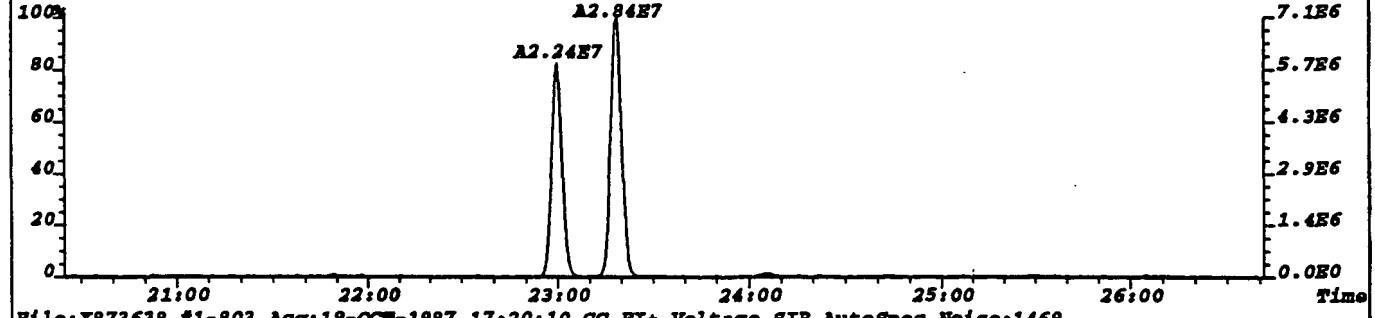
File:X973639 #1-803 Acq:18-OCT-1997 17:20:10 GC EI+ Voltage SIR AutoSpec Noise:3450
321.8936 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,13800.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



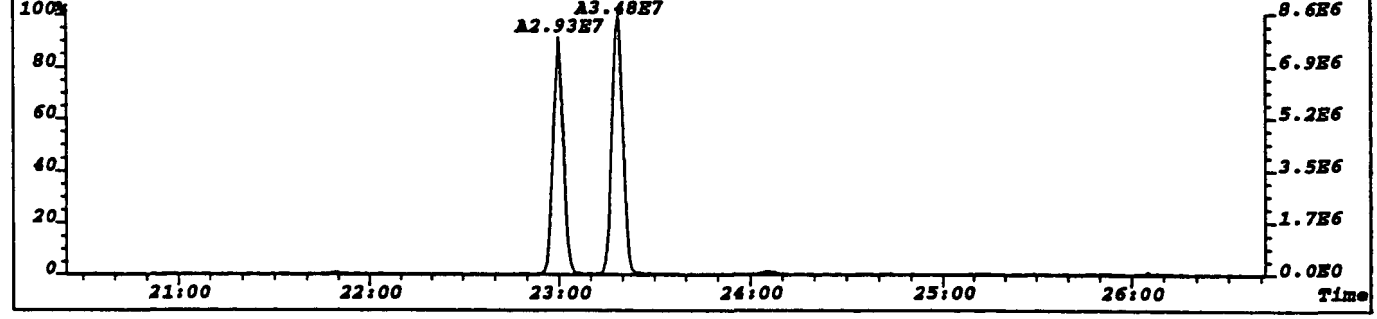
File:X973639 #1-803 Acq:18-OCT-1997 17:20:10 GC EI+ Voltage SIR AutoSpec Noise:4634
327.8847 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,18536.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



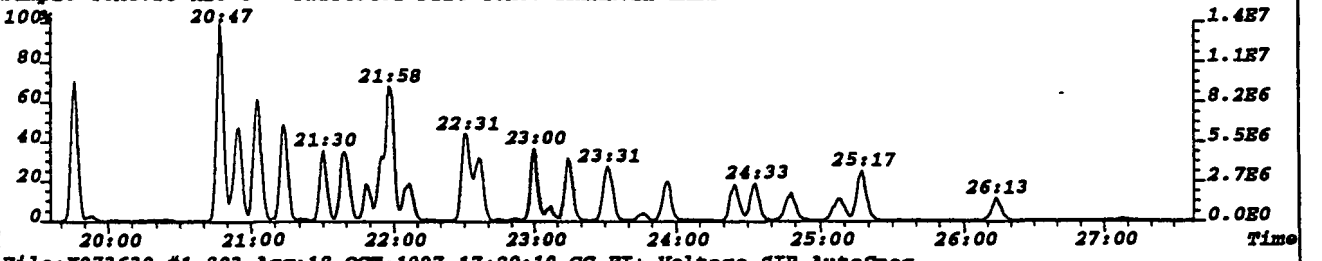
File:X973639 #1-803 Acq:18-OCT-1997 17:20:10 GC EI+ Voltage SIR AutoSpec Noise:4564
331.9368 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,18256.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



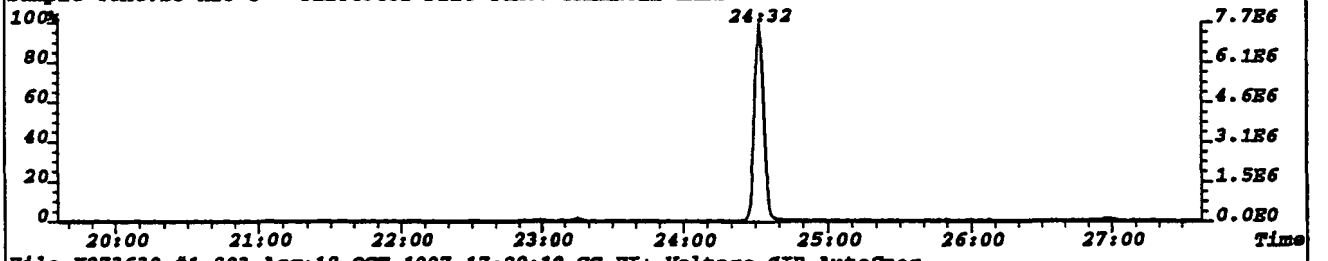
File:X973639 #1-803 Acq:18-OCT-1997 17:20:10 GC EI+ Voltage SIR AutoSpec Noise:1469
333.9338 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,5876.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



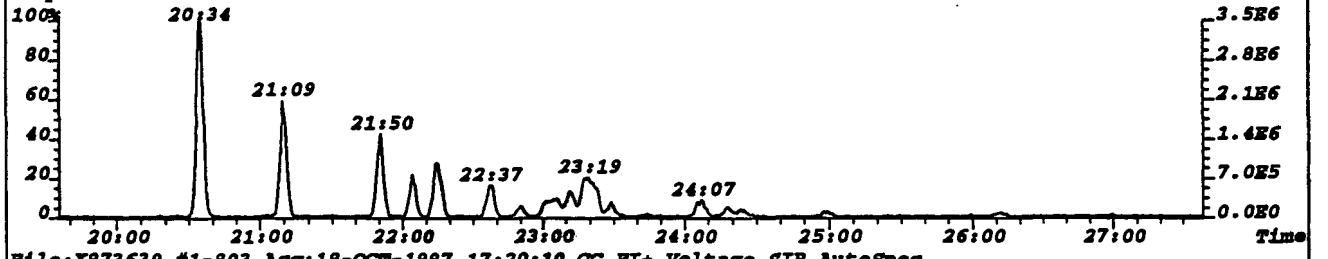
File:X973639 #1-803 Acq:18-OCT-1997 17:20:10 GC EI+ Voltage SIR AutoSpec
303.9016 Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



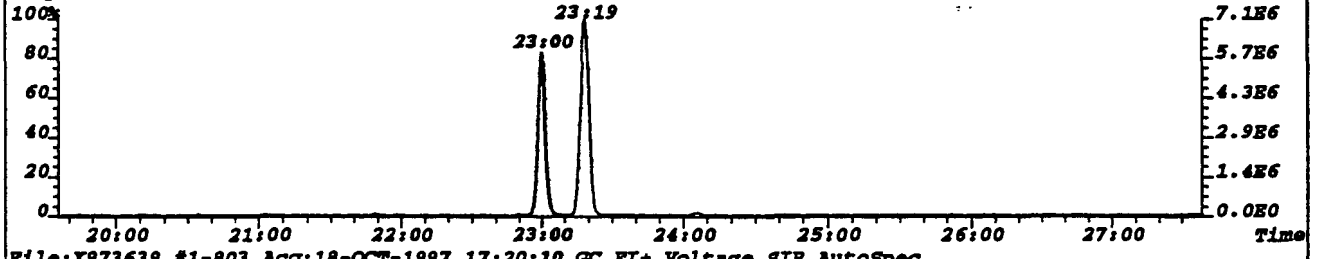
File:X973639 #1-803 Acq:18-OCT-1997 17:20:10 GC EI+ Voltage SIR AutoSpec
315.9419 Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



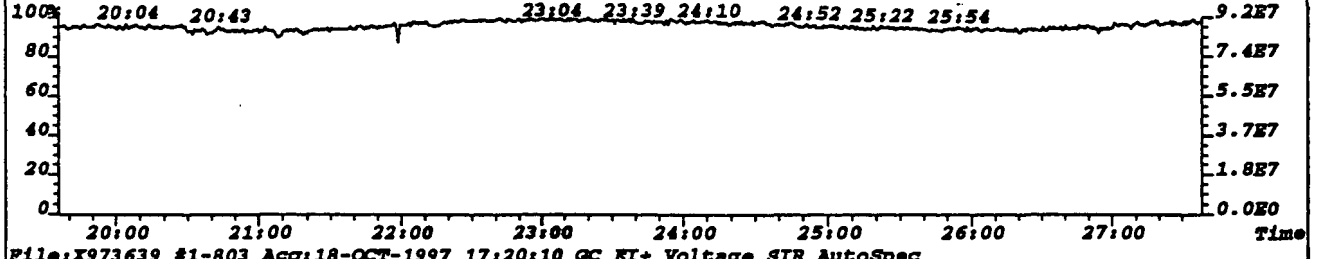
File:X973639 #1-803 Acq:18-OCT-1997 17:20:10 GC EI+ Voltage SIR AutoSpec
319.8965 Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



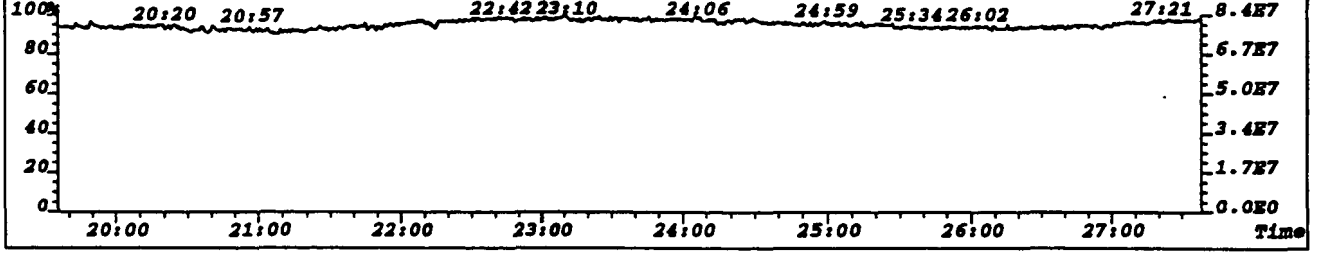
File:X973639 #1-803 Acq:18-OCT-1997 17:20:10 GC EI+ Voltage SIR AutoSpec
331.9368 Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



File:X973639 #1-803 Acq:18-OCT-1997 17:20:10 GC EI+ Voltage SIR AutoSpec
292.9825 Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



File:X973639 #1-803 Acq:18-OCT-1997 17:20:10 GC EI+ Voltage SIR AutoSpec
330.9792 Exp:XCONF_TT
Sample Text:SO-M23-3 TLI#43432 File Text: TRIANGLE LABS



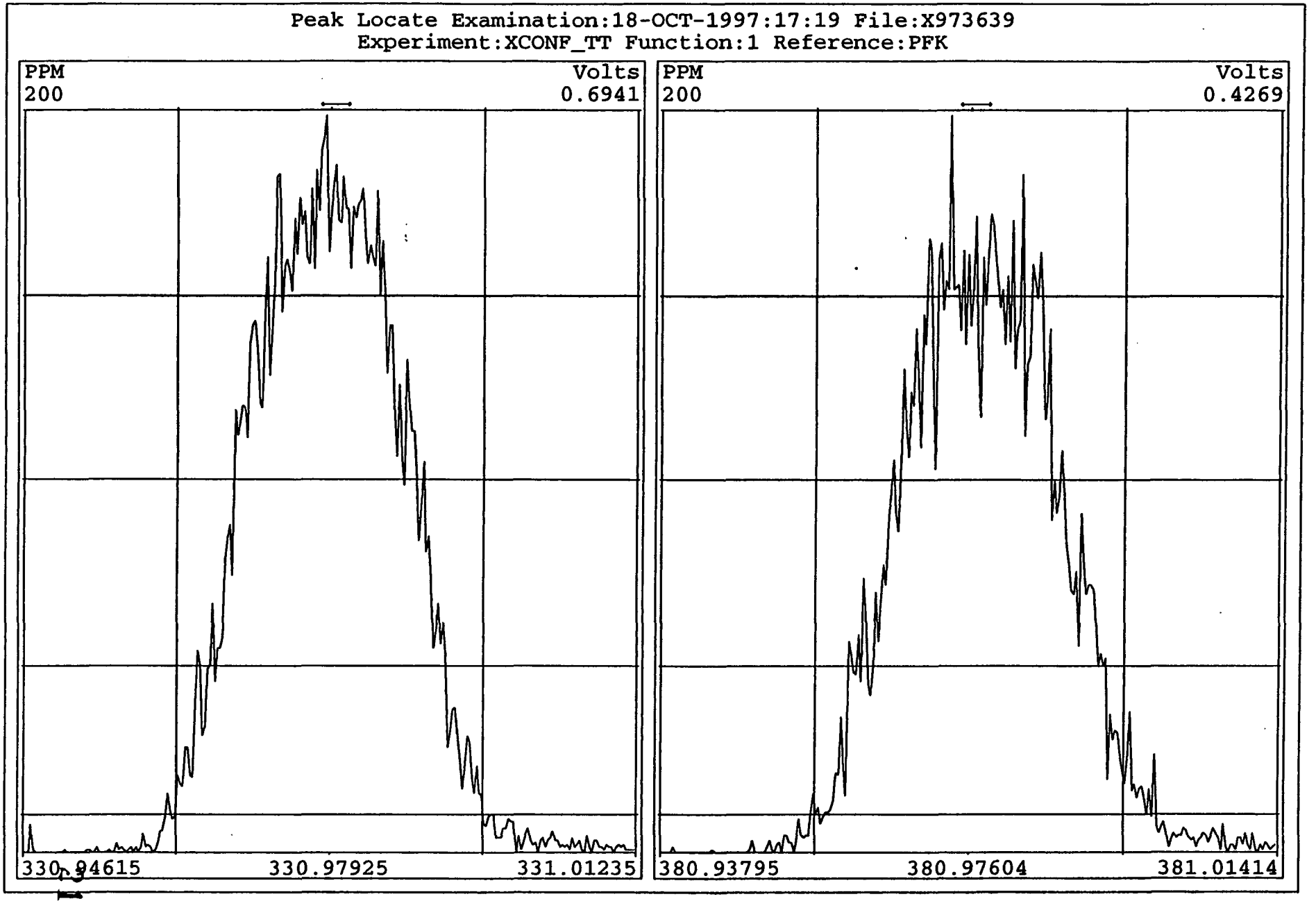

Peak Locate Examination:18-OCT-1997:17:19 File:X973639
Experiment:XCONF_TT Function:1 Reference:PFK
PPM
200
Volts
0.6941
330.94615
330.97925
331.01235
PPM
200
Volts
0.4269
380.93795
380.97604
381.01414

Fig 16

Pacific Environmental Services

TLI Project: **43432** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **FB1-M23** Analysis File: **U973262**

Client Project:	Saginaw, MI				
Sample Matrix:	M23TRAIN	Date Received:	09/29/97	Spike File:	SPX23704
TLI ID:	185-6-5A-B	Date Extracted:	10/09/97	ICal:	UF59167
		Date Analyzed:	10/17/97	ConCal:	U973252
Sample Size:	1.000	Dilution Factor:	n/a	% Moisture:	n/a
Dry Weight:	n/a	Blank File:	U973257	% Lipid:	n/a
GC Column:	DB-5	Analyst:	BB	% Solids:	n/a

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	ND	0.007				—
1,2,3,7,8-PeCDD	ND	0.008				—
1,2,3,4,7,8-HxCDD	ND	0.01				—
1,2,3,6,7,8-HxCDD	ND	0.01				—
1,2,3,7,8,9-HxCDD	ND	0.01				—
1,2,3,4,6,7,8-HpCDD	ND	0.01				—
1,2,3,4,6,7,8,9-OCDD	ND	0.01				—
2,3,7,8-TCDF	ND	0.009				—
1,2,3,7,8-PeCDF	ND	0.007				—
2,3,4,7,8-PeCDF	ND	0.007				—
1,2,3,4,7,8-HxCDF	ND	0.008				—
1,2,3,6,7,8-HxCDF	ND	0.006				—
2,3,4,6,7,8-HxCDF	ND	0.007				—
1,2,3,7,8,9-HxCDF	ND	0.008				—
1,2,3,4,6,7,8-HpCDF	ND	0.01				—
1,2,3,4,7,8,9-HpCDF	ND	0.01				—
1,2,3,4,6,7,8,9-OCDF	ND	0.01				—

Totals	Amt. (ng)	Number	DL	EMPC	Flags
Total TCDD	ND		0.007		—
Total PeCDD	ND		0.008		—
Total HxCDD	ND		0.01		—
Total HpCDD	ND		0.01		—
Total TCDF	ND		0.009		—
Total PeCDF	ND		0.007		—
Total HxCDF	ND		0.007		—
Total HpCDF	ND		0.01		—

X237_PSR v2.00, LARS 6.10.04

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Printed: 20:41 10/21/97

Pacific Environmental Services

TLI Project: **43432** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **FB1-M23** Analysis File: **U973262**

Internal Standards	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	2.3	57.6	40%-130%	0.80	21:36	—
$^{13}C_{12}$-2,3,7,8-TCDD	3.5	86.4	40%-130%	0.76	22:31	—
$^{13}C_{12}$-1,2,3,7,8-PeCDF	3.7	93.5	40%-130%	1.46	26:18	—
$^{13}C_{12}$-1,2,3,7,8-PeCDD	4.4	109	40%-130%	1.54	27:29	—
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	4.4	110	40%-130%	0.51	30:15	—
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	4.1	102	40%-130%	1.24	30:59	—
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	3.2	80.5	25%-130%	0.42	33:02	—
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	4.0	99.6	25%-130%	1.01	33:54	—
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	8.0	99.7	25%-130%	0.85	36:27	—

Surrogate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	3.4	85.8	70%-140%		22:32	—
$^{13}C_{12}$-2,3,4,7,8-PeCDF	3.9	97.7	70%-140%	1.53	27:06	—
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	3.5	88.3	70%-140%	0.51	30:09	—
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	3.8	94.3	70%-140%	1.24	30:54	—
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	3.9	98.3	70%-140%	0.43	34:15	—

Alternate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	3.2	79.9	40%-130%	0.49	31:31	—
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	3.7	91.8	40%-130%	0.52	30:47	—

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.80	22:17	—
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.21	31:18	—

Data Reviewer: VC 10/21/97

X237_PSR v2.00, LARS 6.10.04

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Printed: 20:41 10/21/97

Initial ....Date...

Data Review By: VC 10/21/97 Calculated Noise Area: 2.37

The Total Area for each peak with an ion abundance ratio outside ratio limits has been recalculated according to method requirements.

Page No. 1 Listing of U973262B.dbf
10/21/97 Matched GC Peaks / Ratio / Ret. Time

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
TCDF						0.65-0.89				0.813-1.106			
304-306	DC	NL		0:00	RO	0.91	3.33			0.000			
	DC	SN		18:27	RO	0.35	1.33			0.854			
	DC	SN		18:41		0.79	1.11			0.865			
	DC	SN		19:02	RO	1.18	10.60			0.881			
	DC	SN		19:18		0.79	7.73			0.894			
	DC	SN		19:53		0.82	11.23			0.921			
	DC	SN		20:04	RO	1.73	1.65			0.929			
	DC	SN		20:13		0.78	8.76			0.936			
	DC	SN		21:57	RO	2.88	1.38			1.016			
	DC	SN		22:24		0.75	4.25			1.037			
	DC	SN		22:32	RO	2.14	2.14			1.043			
304-306			0	Peaks			0.00						
13C12-TCDF						0.65-0.89				0.954-1.046			
316-318	DC	NL		0:00		0.82	3.14			0.000			
	DC	WL		18:50	RO	3.83	1.65			0.872			
	DC	WL		19:10	RO	1.21	2.34			0.887			
	DC	WL		19:40	RO	0.90	2.21			0.910			
	DC	WL		20:14	RO	0.64	22.64			0.937			
	DC	SN		20:51	RO	1.32	2.28			0.965			
	DC	SN		21:03	RO	1.21	14.00			0.975			
				21:36		0.80	2,517.83	1,122.19	1,395.64	1.000	13C12-2378-TCDF	ISO	
	DC	SN		21:51	RO	0.52	12.80			1.012			
	DC	SN		22:09	RO	0.26	8.99			1.025			
	DC	WH		22:40	RO	6.46	4.81			1.049			
	DC	WH		23:00	RO	0.28	7.75			1.065			
	DC	WH		23:13	RO	0.40	3.56			1.075			
	DC	WH		23:56	RO	2.56	6.04			1.108			
	DC	WH		24:06	RO	0.28	5.36			1.116			
316-318			1	Peak			2,517.83						

---------- Above: TCDF / TCDD Follows ----------

TCDD						0.65-0.89				0.848-1.061			
320-322	DC	NL		0:00	RO	1.93	1.29			0.000			
	DC	SN		19:17	RO	3.47	0.83			0.856			
	DC	SN		19:31	RO	0.96	0.81			0.867			
	DC	SN		21:15	RO	0.58	0.90			0.944			
	DC	SN		21:20	RO	2.66	0.73			0.947			
	DC	SN		21:30	RO	0.28	0.85			0.955			
	DC	SN		21:35	RO	1.17	3.36			0.959			
	DC	SN		22:04	RO	2.15	2.07			0.980			
	DC	SN		22:09	RO	0.44	1.15			0.984			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
	DC	SN		23:16	RO	1.26	2.04			1.033			
	DC	SN		23:25	RO	1.66	1.31			1.040			
	DC	SN		23:33		0.88	2.40			1.046			
320-322			0	Peaks			0.00						
37Cl-TCDD										0.911-1.089			
328	DC	NL		0:00			0.86			0.000			
	DC	WL		20:19			1.17			0.902			
	DC	SN		20:48			8.31			0.924			
	DC	SN		21:03			2.61			0.935			
				22:32			2,439.26	2,439.26		1.001	37Cl-TCDD		SUR1
	DC	SN		22:49			5.86			1.013			
	DC	SN		22:57			1.70			1.019			
	DC	SN		23:03			1.92			1.024			
	DC	SN		23:03			4.68			1.024			
	DC	SN		23:11			7.80			1.030			
	DC	SN		23:16			10.88			1.033			
	DC	SN		23:29			1.32			1.043			
	DC	SN		23:34			3.38			1.047			
	DC	SN		23:40			7.38			1.051			
	DC	SN		23:48			4.04			1.057			
	DC	SN		23:55			4.99			1.062			
	DC	SN		23:59			4.49			1.065			
	DC	SN		24:06			2.22			1.070			
328			1	Peak			2,439.26						
13C12-TCDD						0.65-0.89				0.911-1.089			
332-334	DC	NL		0:00	RO	1.96	3.52			0.000			
	DC	WL		19:09	RO	0.62	5.86			0.850			
	DC	WL		19:23	RO	0.37	1.31			0.861			
	DC	SN		21:02	RO	2.21	10.64			0.934			
				22:17		0.80	3,143.12	1,392.24	1,750.88	0.990	13C12-1234-TCDD		RS1
				22:31		0.76	3,012.10	1,304.89	1,707.21	1.000	13C12-2378-TCDD		IS1
				22:54	RO	0.55	60.87	26.48	48.11	1.017			
	DC	SN		23:16		0.86	12.51			1.033			
	DC	SN		23:21	RO	1.25	10.90			1.037			
	DC	SN		23:27	RO	1.53	9.77			1.041			
	DC	SN		23:40	RO	0.39	9.03			1.051			
	DC	SN		23:56	RO	1.01	11.91			1.063			
332-334			3	Peaks			6,216.09						

---------- Above: TCDD / PeCDF Follows ----------

PeCDF						1.32-1.78				0.906-1.077			
340-342	DC	NL		0:00	RO	0.88	2.09			0.000			
	DC	SN		24:14	RO	0.21	1.05			0.921			
	DC	SN		24:26	RO	1.09	3.77			0.929			
	DC	SN		25:21	RO	0.96	12.16			0.964			
	DC	SN		25:58	RO	2.42	1.40			0.987			
	DC	SN		26:53	RO	1.01	2.58			1.022			
	DC	SN		27:29	RO	0.28	0.72			1.045			
	DC	SN		27:36	RO	2.99	1.96			1.049			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
		DC	SN	28:10	RO	1.19	2.39			1.071			
		DC	WH	28:23	RO	1.20	4.31			1.079			
340-342			0	Peaks			0.00						
13C12-PeCDF				1.32-1.78						0.848-1.152			
352-354		DC	NL	0:00	RO	1.13	1.78			0.000			
		DC	SN	25:10	RO	0.90	1.83			0.957			
				25:20		1.39	56.91	33.12	23.79	0.963			
		DC	SN	25:54	RO	1.26	16.75			0.985			
				26:18		1.46	3,215.49	1,905.76	1,309.73	1.000	13C12-PeCDF 123	IS2	
		DC	SN	26:29	RO	2.08	20.63			1.007			
				26:38		1.38	35.75	20.75	15.00	1.013			
				27:06		1.53	3,047.45	1,843.61	1,203.84	1.030	13C12-PeCDF 234	SUR2	
		DC	SN	27:32	RO	1.26	11.27			1.047			
352-354			4	Peaks			6,355.60						

---------- Above: PeCDF / PeCDD Follows ----------

PeCDD				1.32-1.78						0.921-1.025			
356-358		DC	NL	0:00		1.76	2.18			0.000			
		DC	SN	25:21	RO	0.83	2.12			0.922			
		DC	SN	25:29	RO	0.70	3.92			0.927			
		DC	SN	25:45	RO	0.90	2.12			0.937			
		DC	SN	25:51	RO	3.32	0.97			0.941			
		DC	SN	26:17		1.38	7.22			0.956			
		DC	SN	26:40	RO	2.55	3.52			0.970			
		DC	SN	26:51		1.53	2.93			0.977			
		DC	SN	26:55	RO	0.71	1.51			0.979			
		DC	SN	27:34	RO	0.42	1.66			1.003			
356-358			0	Peaks			0.00						
13C12-PeCDD				1.32-1.78						0.855-1.145			
368-370		DC	NL	0:00		1.61	2.09			0.000			
		DC	SN	26:29	RO	1.24	4.31			0.964			
		DC	SN	26:50	RO	2.36	2.42			0.976			
		DC	SN	27:06	RO	2.82	1.56			0.986			
		DC	SN	27:15	RO	0.87	0.67			0.992			
				27:29		1.54	2,054.64	1,247.07	807.57	1.000	13C12-PeCDD 123	IS3	
				27:39		1.47	218.86	130.12	88.74	1.006			
		DC	SN	27:49	RO	2.62	12.98			1.012			
		DC	SN	28:03	RO	3.48	7.57			1.021			
		DC	SN	28:23	RO	2.65	6.40			1.033			
		DC	SN	28:31		1.47	4.45			1.038			
368-370			2	Peaks			2,273.50						

---------- Above: PeCDD / HxCDF Follows ----------

HxCDF				1.05-1.43						0.958-1.051			
374-376		DC	NL	0:00	RO	1.50	2.84			0.000			
		DC	SN	28:59		1.18	1.66			0.958			
		DC	SN	29:05	RO	2.22	1.10			0.961			
		DC	SN	29:09	RO	0.39	0.99			0.964			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
	DC	SN		29:15	RO	2.75	1.59			0.967			
	DC	SN		29:22		1.21	1.57			0.971			
	DC	SN		29:26		1.38	1.45			0.973			
	DC	SN		29:34	RO	0.70	0.83			0.977			
	DC	SN		29:43	RO	0.55	2.19			0.982			
	DC	SN		29:47	RO	1.55	0.65			0.985			
	DC	SN		29:56	RO	2.19	2.98			0.990			
	DC	SN		30:03	RO	0.51	1.08			0.993			
	DC	SN		30:09		1.07	5.13			0.997	123478-HxCDF	AN	
	DC	SN		30:16	RO	2.05	2.22			1.001	123678-HxCDF	AN	
	DC	SN		30:47	RO	0.96	4.10			1.018	234678-HxCDF	AN	
	DC	SN		31:17	RO	0.58	1.03			1.034			
	DC	SN		31:29		1.21	1.06			1.041	123789-HxCDF	AN	
374-376			0	Peaks			0.00						
13C12-HxCDF				0.43-0.59						0.868-1.132			
384-386	DC	NL		0:00	RO	0.22	11.72			0.000			
				30:09		0.51	2,165.97	727.27	1,438.70	0.997	13C12-HxCDF 478	SUR3	
				30:15		0.51	2,517.24	849.00	1,668.24	1.000	13C12-HxCDF 678	IS4	
				30:47		0.52	1,979.95	676.70	1,303.25	1.018	13C12-HxCDF 234	ALT2	
	DC	SN		30:57	RO	0.77	8.62			1.023			
				31:31		0.49	1,623.54	533.41	1,090.13	1.042	13C12-HxCDF 789	ALT1	
384-386			4	Peaks			8,286.70						

---------- Above: HxCDF / HxCDD Follows ----------

HxCDD				1.05-1.43						0.952-1.015			
390-392	DC	NL		0:00	RO	0.76	1.63			0.000			
	DC	SN		29:39	RO	0.92	1.25			0.957			
	DC	SN		29:59	RO	0.51	0.70			0.968			
	DC	SN		30:12	RO	1.48	4.97			0.975			
	DC	SN		30:24	RO	1.68	2.28			0.981			
	DC	SN		31:19	RO	2.21	1.05			1.011	123789-HxCDD	AN	
	DC	WH		31:32	RO	1.03	3.22			1.018			
	DC	WH		31:40	RO	0.69	0.92			1.022			
390-392			0	Peaks			0.00						
13C12-HxCDD				1.05-1.43						0.968-1.032			
402-404	DC	NL		0:00		1.09	3.56			0.000			
	DC	SN		30:10		1.40	3.07			0.974			
	DC	SN		30:22	RO	1.69	7.32			0.980			
				30:54		1.24	1,721.79	954.16	767.63	0.997	13C12-HxCDD 478	SUR4	
				30:59		1.24	2,035.52	1,126.67	908.85	1.000	13C12-HxCDD 678	IS5	
				31:09	RO	1.58	34.88	24.61	15.57	1.005			
				31:18		1.21	2,080.58	1,140.65	939.93	1.010	13C12-HxCDD 789	RS2	
	DC	SN		31:29	RO	0.40	8.13			1.016			
				31:32		1.08	34.17	17.74	16.43	1.018			
	DC	SN		31:39	RO	0.87	11.00			1.022			
	DC	SN		31:45	RO	1.64	11.58			1.025			
402-404			5	Peaks			5,906.94						

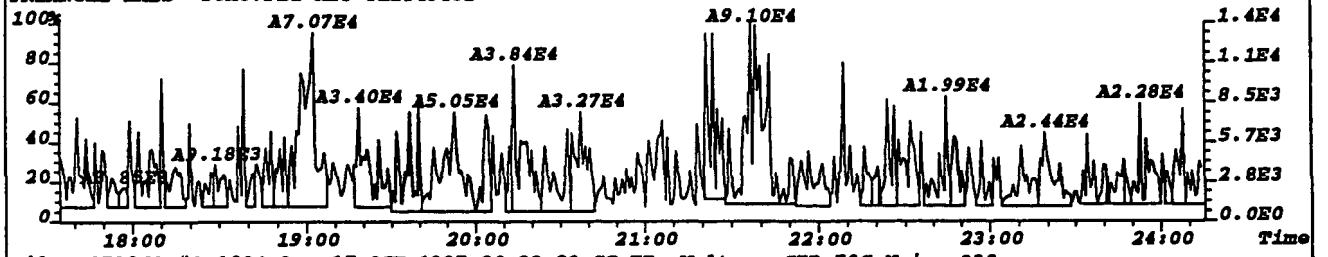
Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
---------- Above: HxCDD / HpCDF Follows ----------													
HpCDF				0.88-1.20						0.996-1.043			
408-410	DC	NL		0:00	RO	1.27	2.53			0.000			
	DC	SN		32:54	RO	4.51	1.53			0.996			
	DC	SN		33:09	RO	2.37	1.20			1.004			
	DC	SN		33:53	RO	0.77	2.22			1.026			
	DC	WH		34:28	RO	1.28	1.47			1.043			
	DC	WH		34:37	RO	1.38	1.51			1.048			
408-410			0	Peaks			0.00						
13C12-HpCDF				0.37-0.51						0.939-1.121			
418-420	DC	NL		0:00	RO	0.75	6.57			0.000			
				33:02		0.42	1,595.23	471.65	1,123.58	1.000	13C12-HpCDF	678	IS6
	DC	SN		33:14		0.51	36.88			1.006			
	DC	SN		33:22	RO	0.35	10.83			1.010			
	DC	SN		33:33	RO	0.20	12.53			1.016			
	DC	SN		33:41	RO	0.30	3.11			1.020			
	DC	SN		33:52	RO	0.19	3.96			1.025			
				34:15		0.43	1,384.26	417.79	966.47	1.037	13C12-HpCDF	789	SUR5
				34:29	RO	1.08	18.43	13.77	12.80	1.044			
	DC	SN		34:44	RO	1.42	4.29			1.051			
418-420			3	Peaks			2,997.92						
---------- Above: HpCDF / HpCDD Follows ----------													
HpCDD				0.88-1.20						0.977-1.005			
424-426	DC	NL		0:00	RO	1.33	1.69			0.000			
	DC	SN		33:11	RO	0.32	1.20			0.979			
	DC	SN		33:55	RO	1.64	2.69			1.000	1234678-HpCDD		AN
	DC	WH		34:15	RO	6.48	1.10			1.010			
424-426			0	Peaks			0.00						
13C12-HpCDD				0.88-1.20						0.971-1.029			
436-438	DC	NL		0:00		1.08	6.73			0.000			
				33:54		1.01	1,901.52	954.62	946.90	1.000	13C12-HpCDD	678	IS7
	DC	SN		34:11	RO	0.34	8.53			1.008			
	DC	SN		34:22	RO	1.96	6.59			1.014			
436-438			1	Peak			1,901.52						
---------- Above: HpCDD / Octa-CDD and CDF Follows ----------													
OCDF				0.76-1.02						0.890-1.110			
442-444	DC	NL		0:00		0.95	3.00			0.000			
	DC	SN		33:18	RO	0.15	0.59			0.914			
	DC	SN		33:51		0.95	2.07			0.929			
	DC	SN		34:24	RO	1.65	3.25			0.944			
	DC	SN		34:34	RO	1.78	1.68			0.948			
	DC	SN		34:51	RO	4.08	0.93			0.956			
	DC	SN		34:53	RO	2.02	0.98			0.957			
	DC	SN		34:59	RO	2.27	0.91			0.960			
	DC	SN		35:04		0.85	2.43			0.962			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
		DC	SN	36:24	RO	1.78	3.27			0.999			
		DC	SN	36:44	RO	0.24	1.40			1.008			
		DC	SN	37:00	RO	1.59	3.65			1.015			
		DC	SN	37:06	RO	1.13	4.18			1.018			
		DC	SN	37:39	RO	4.05	1.46			1.033			
		DC	SN	38:03	RO	0.37	1.23			1.044			
		DC	SN	38:23	RO	1.10	3.55			1.053			
		DC	SN	38:30	RO	0.61	4.25			1.056			
		DC	SN	38:58		0.86	6.00			1.069			
		DC	SN	39:09	RO	0.70	3.16			1.074			
442-444			0	Peaks			0.00						
OCDD					0.76-1.02					0.890-1.110			
458-460		DC	NL	0:00	RO	1.11	2.21			0.000			
		DC	SN	36:17	RO	1.03	1.76			0.995			
		DC	SN	36:31	RO	0.17	1.57			1.002			
		DC	SN	36:48	RO	0.66	2.72			1.010			
458-460			0	Peaks			0.00						
13C12-OCDD					0.76-1.02					0.995-1.005			
470-472		DC	NL	0:00	RO	1.05	1.95			0.000			
				36:27		0.85	3,166.63	1,457.83	1,708.80	1.000	13C12-OCDD	IS8	
470-472			1	Peak			3,166.63						

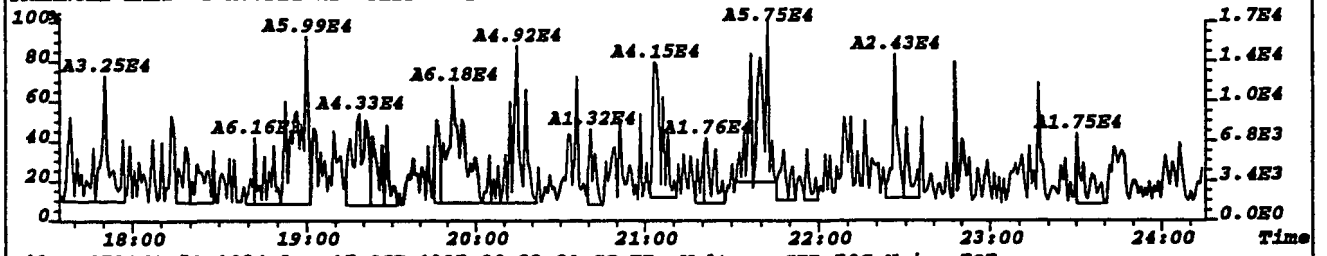
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside Limits	<M-Below Method Detection Limit	T-Time Changed
Rel.RT-Relative Retention Time	NL-Channel Specific Noise Level	M-Peak Area Changed
		N-Name Changed
		E-Ether Interference

*** End of Report ***

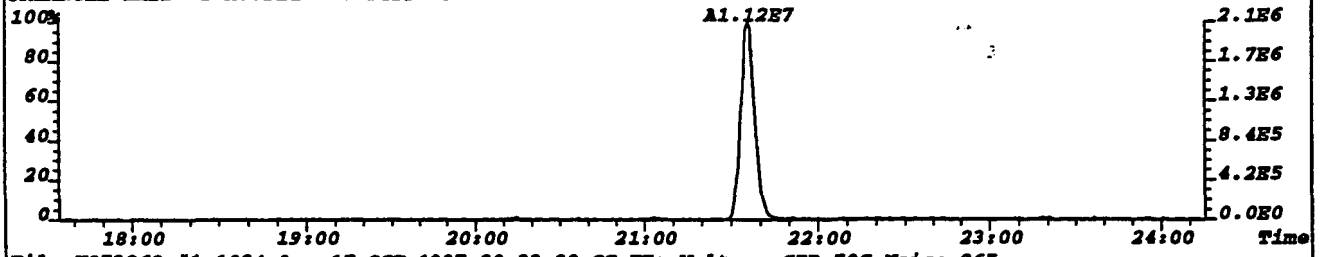
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:853
303.9016 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,3412.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



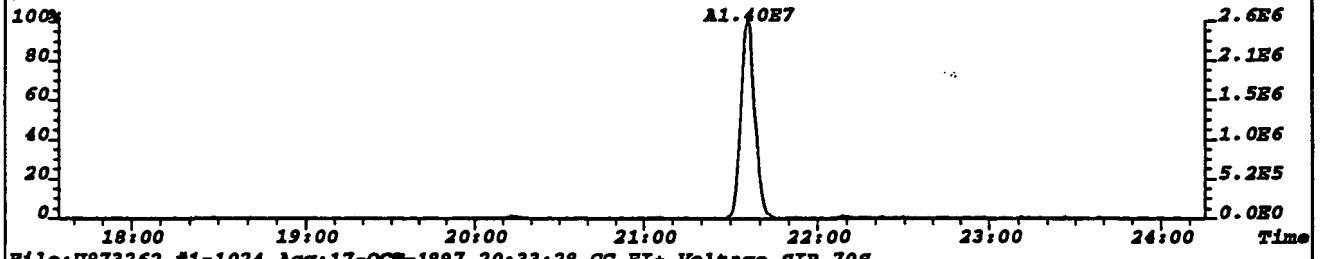
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:939
305.8987 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,3756.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



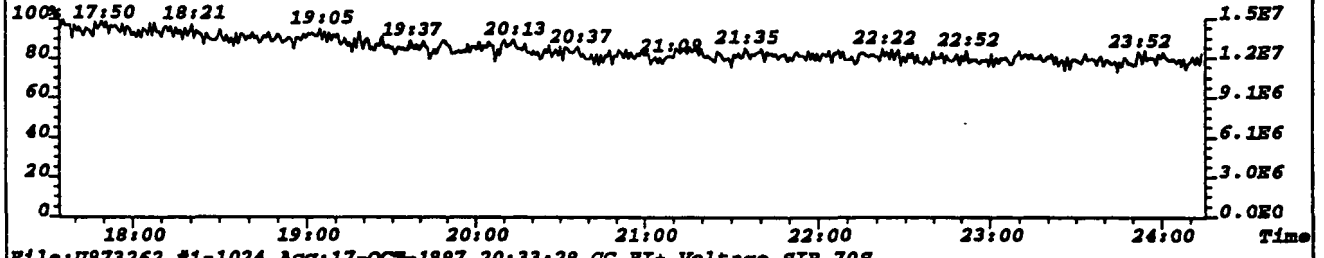
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:707
315.9419 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,2828.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



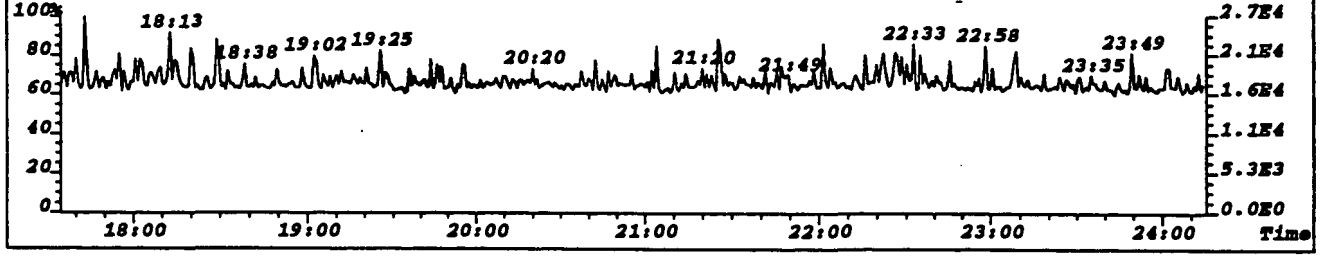
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:865
317.9389 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,3460.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432

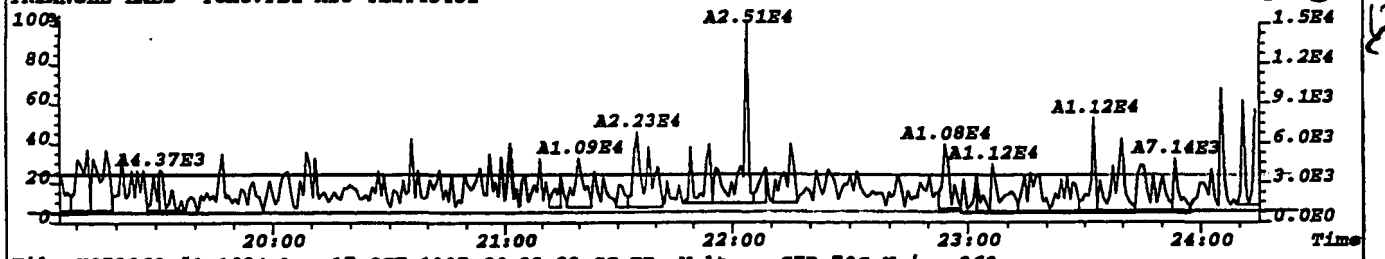


File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S
375.8364 F:2 Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432

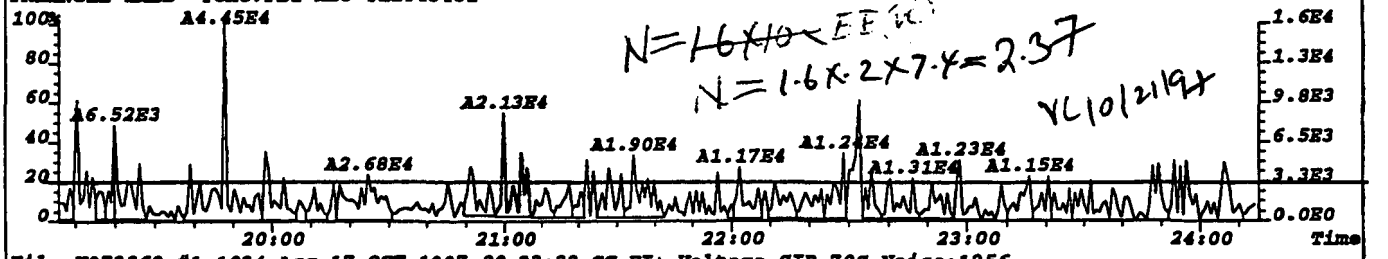


CE (VC) 10/21/97

File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:705
319.8965 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2820.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432

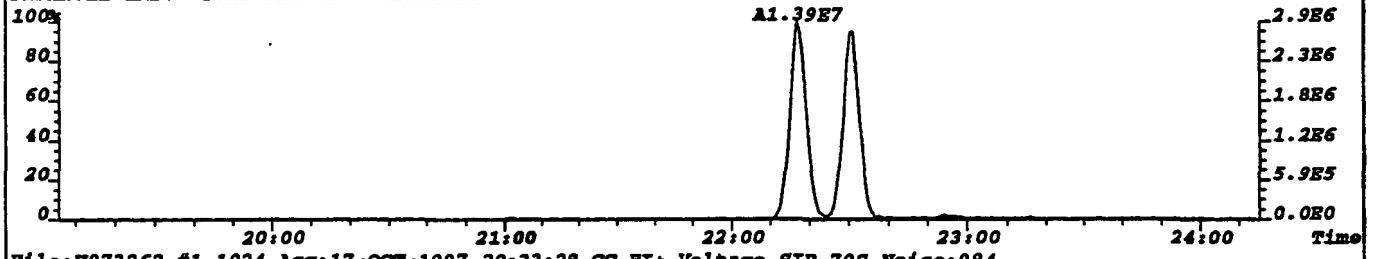


File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:363
321.8936 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1452.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432

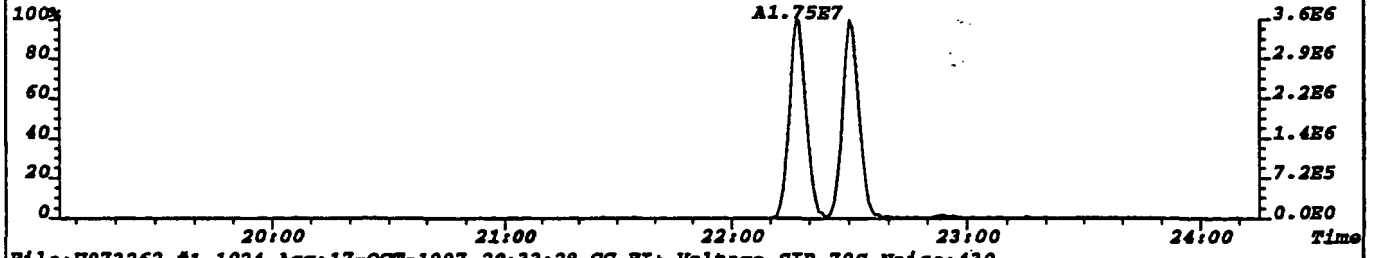


N=~~1.6×10~~ EF (VC)
N=1.6×.2×7.4=2.37
VC 10/21/97

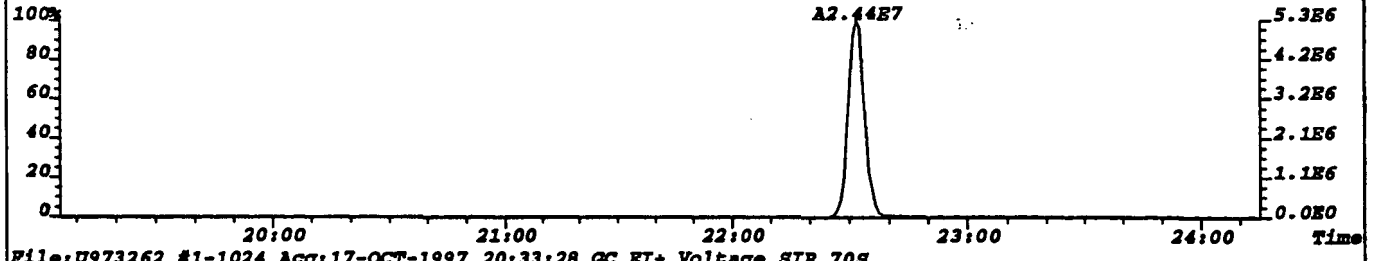
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:1956
331.9368 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7824.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



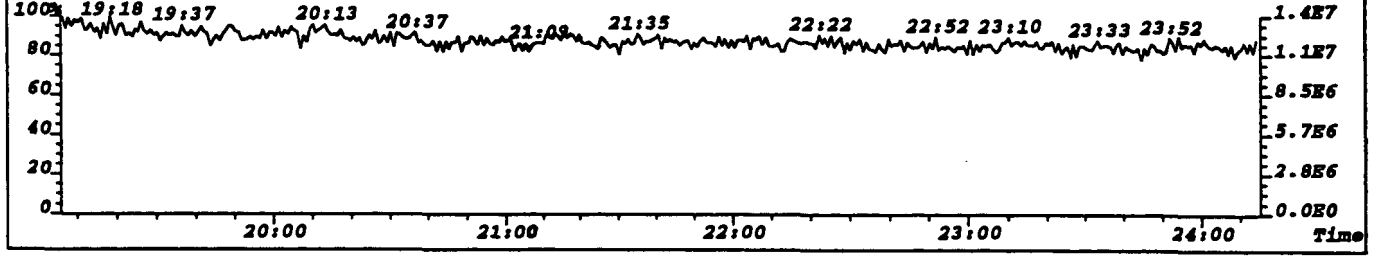
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:994
333.9338 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3976.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



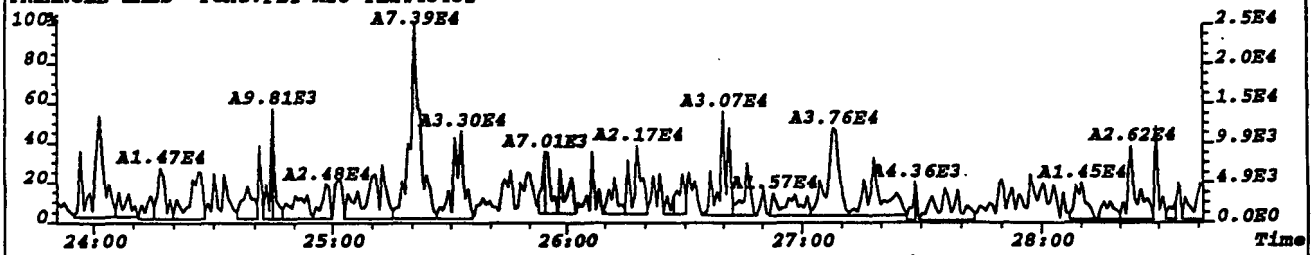
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:430
327.8847 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1720.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



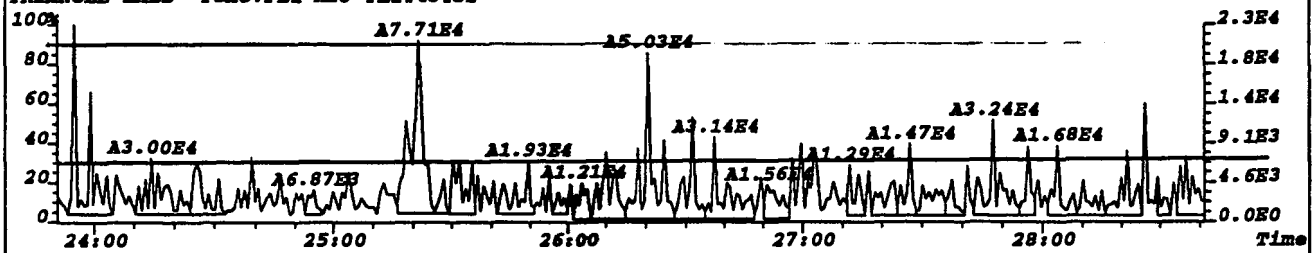
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



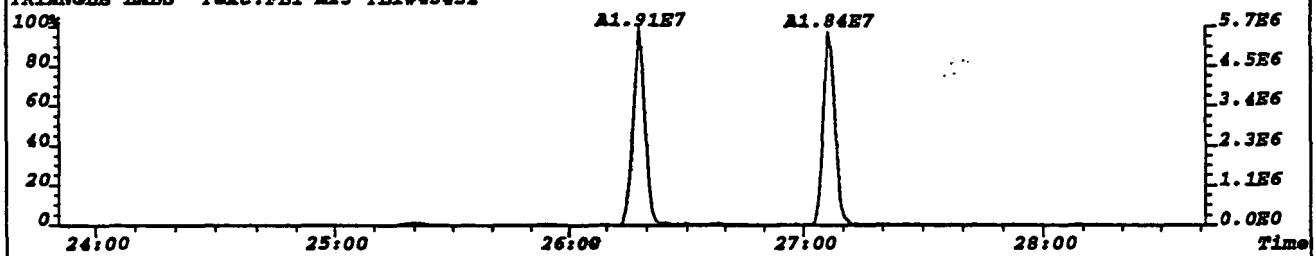
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:636
339.8597 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2544.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



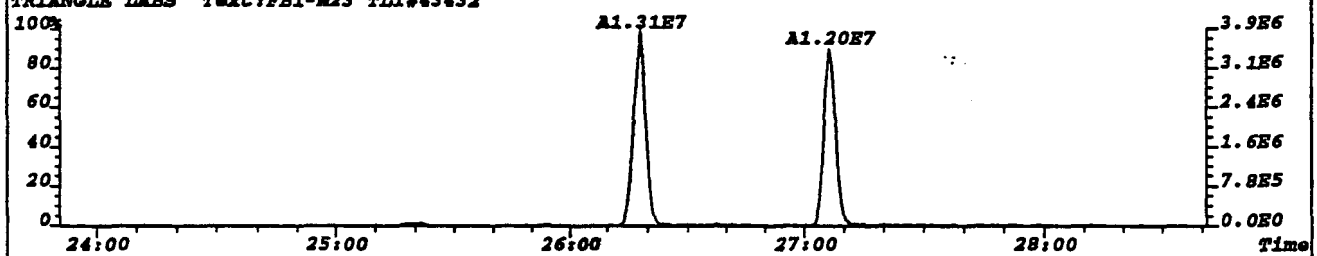
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:719
341.8567 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2876.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



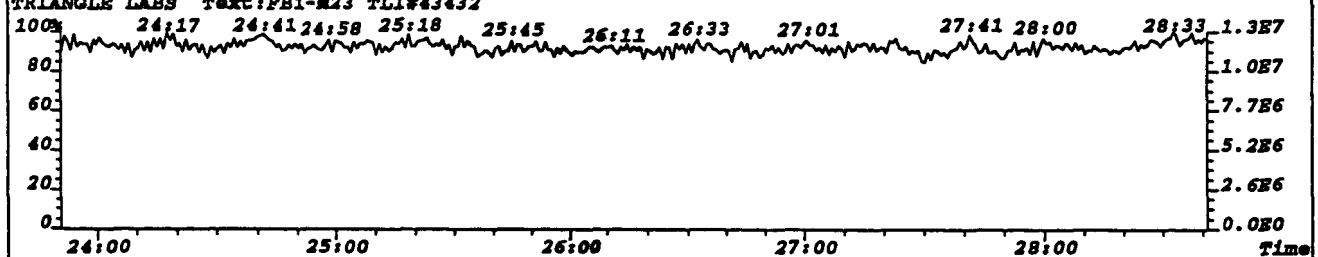
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:541
351.9000 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2164.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



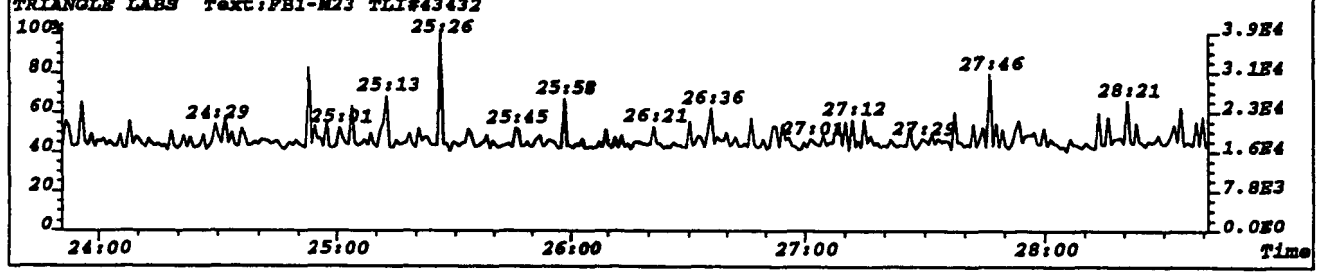
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:481
353.8970 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1924.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



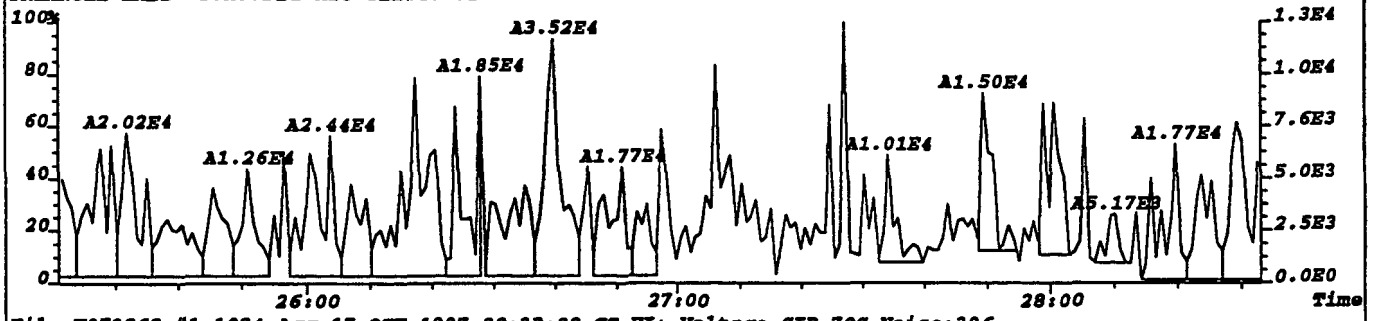
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



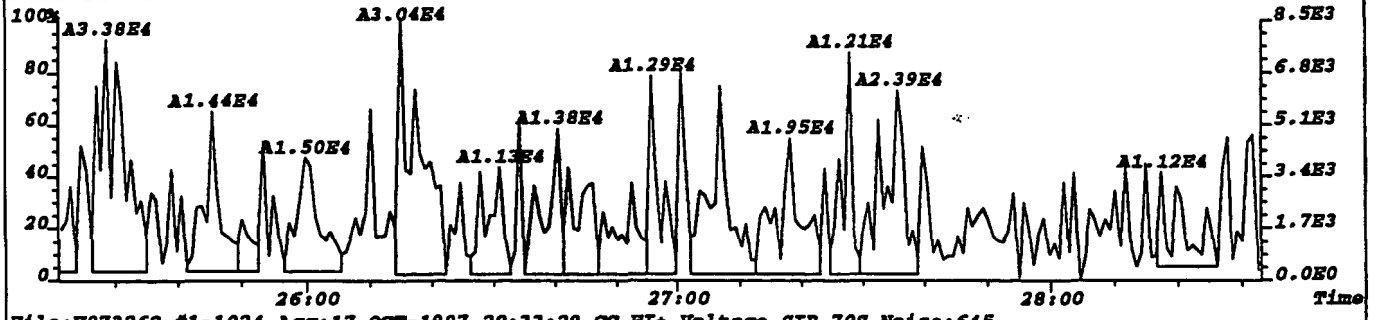
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S
409.7974 F:2 Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



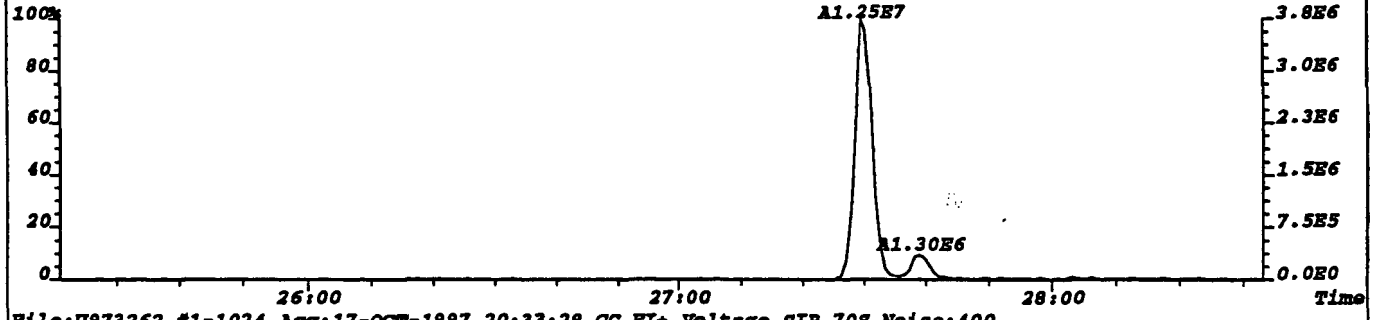
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:696
355.8546 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,2784.0,1.00%,P,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



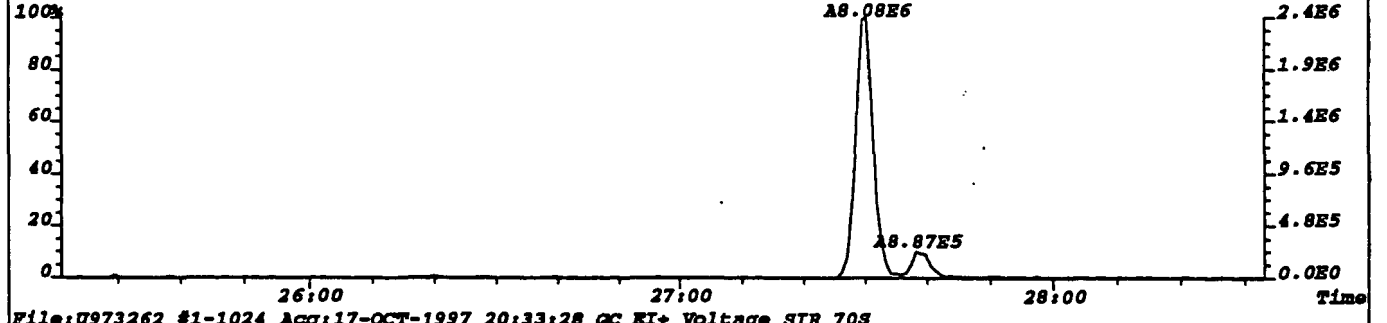
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:396
357.8516 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,1584.0,1.00%,P,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



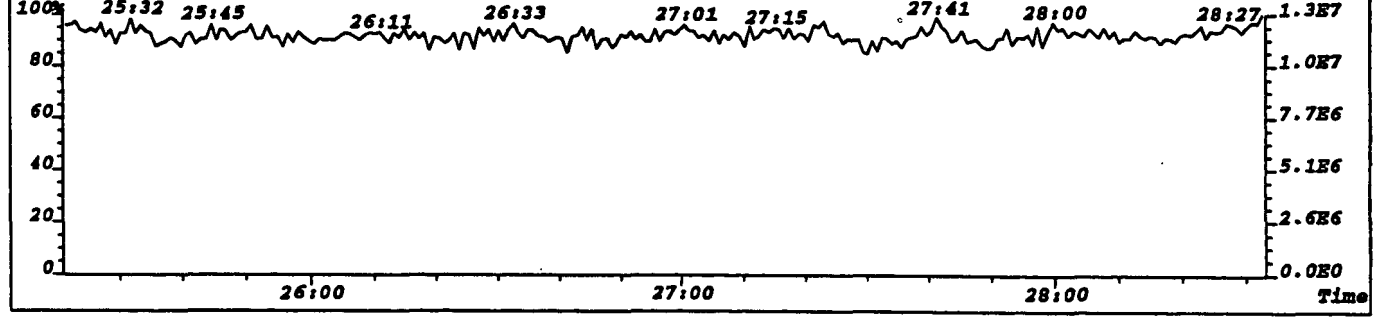
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:645
367.8949 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,2580.0,1.00%,P,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



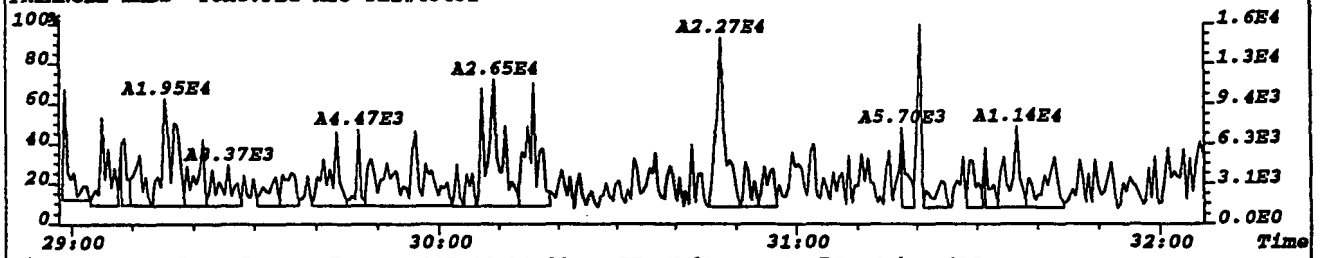
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:400
369.8919 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,1600.0,1.00%,P,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



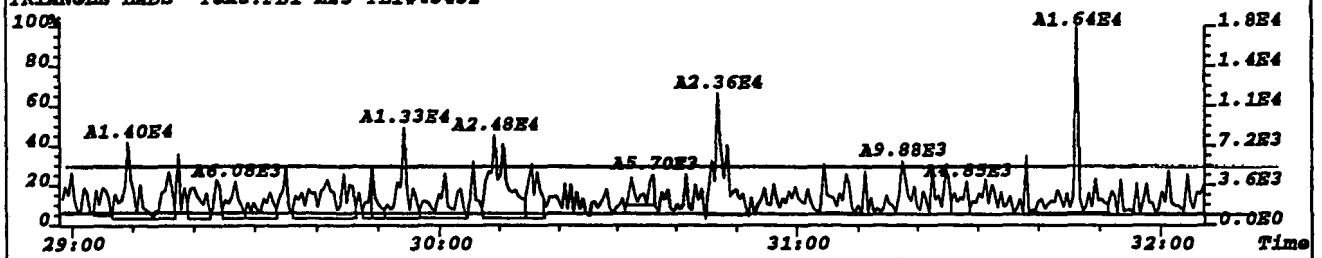
File:U973262 #1-1024 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



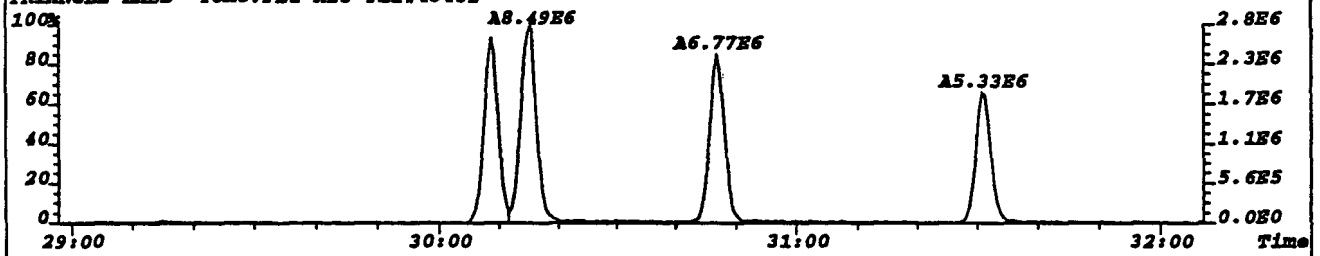
File:U973262 #1-405 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:953
373.8208 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3812.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



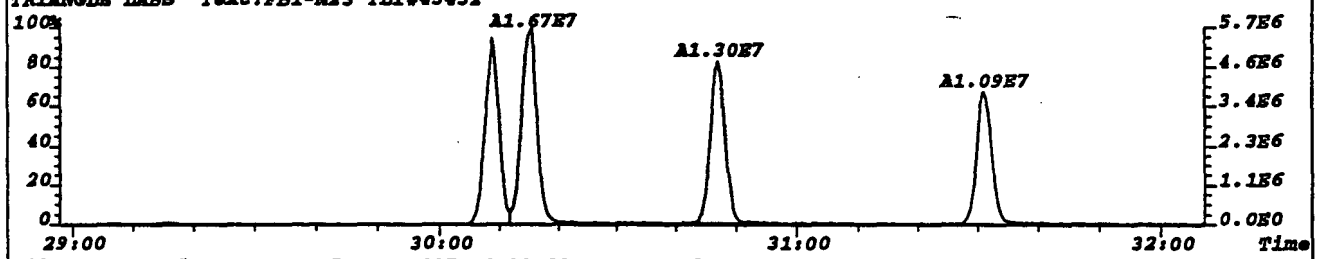
File:U973262 #1-405 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:636
375.8178 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2544.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



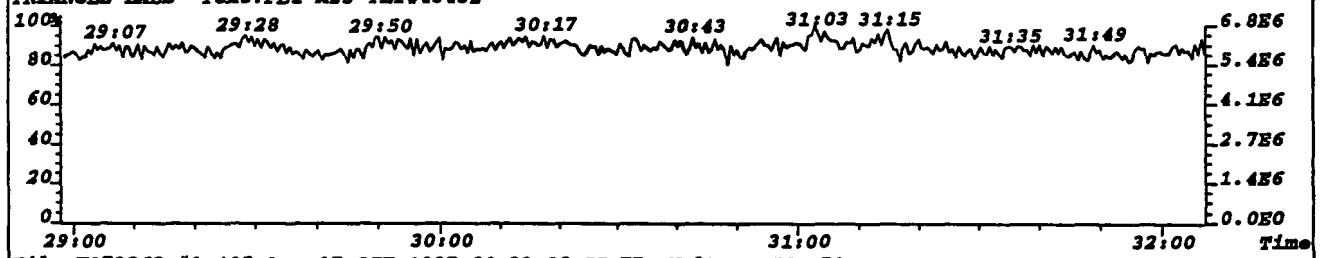
File:U973262 #1-405 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:1978
383.8639 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7912.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



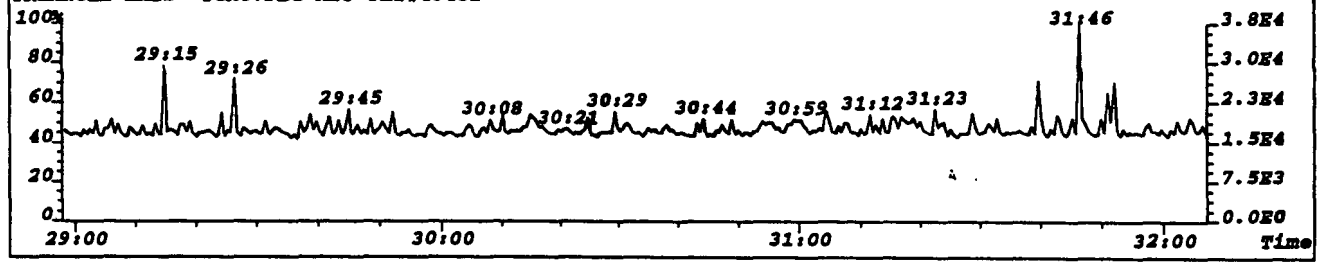
File:U973262 #1-405 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:9151
385.8610 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,36604.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



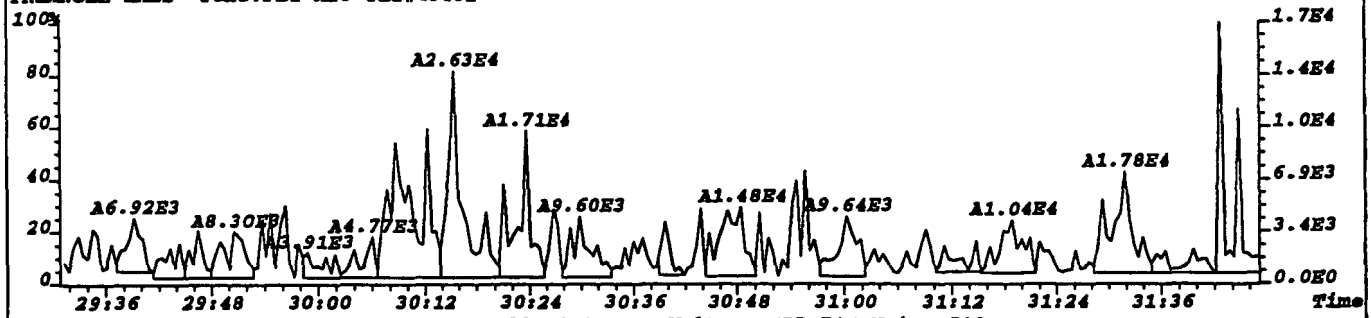
File:U973262 #1-405 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S
392.9760 F:3 Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



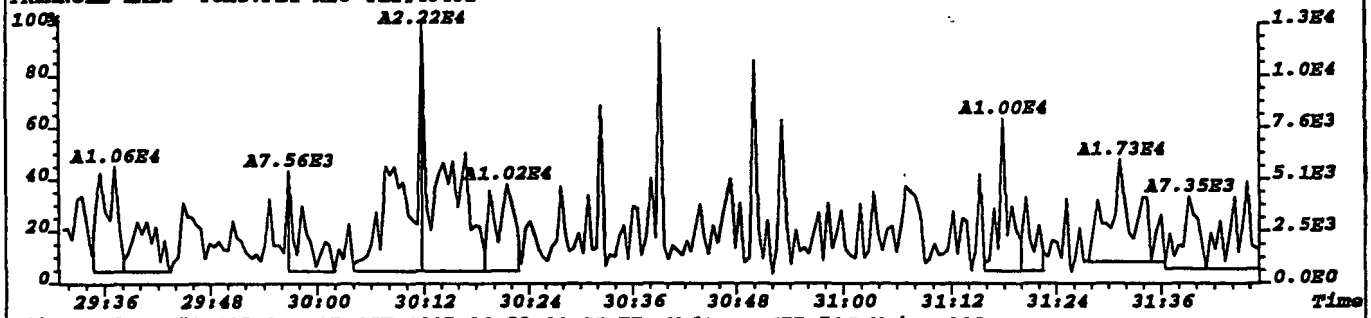
File:U973262 #1-405 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S
445.7555 F:3 Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



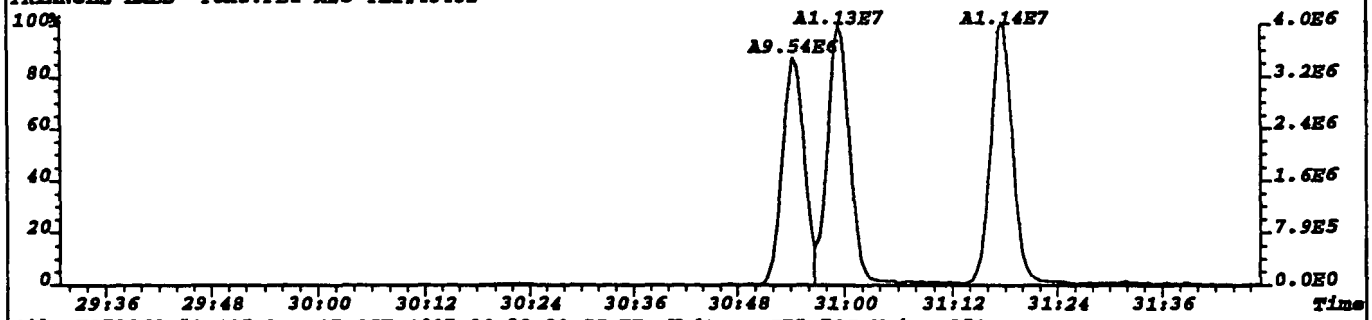
File:U973262 #1-405 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:451
389.8156 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1804.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



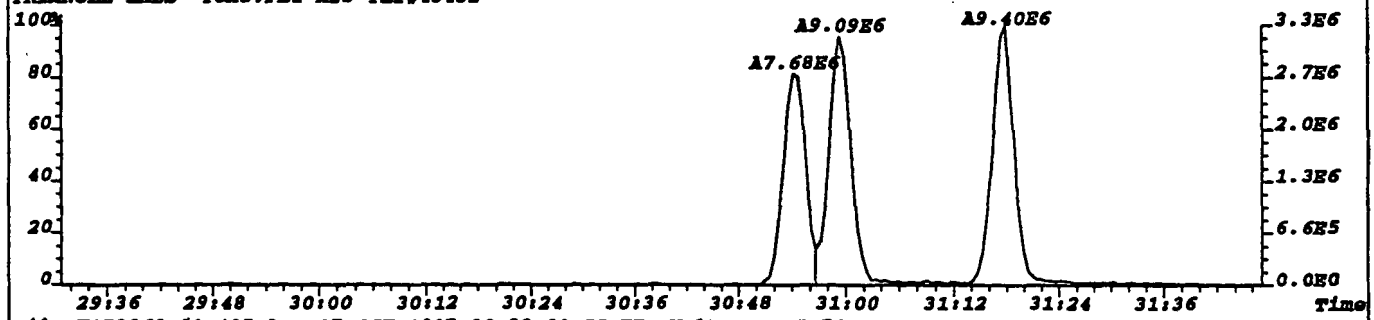
File:U973262 #1-405 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:593
391.8127 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2372.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



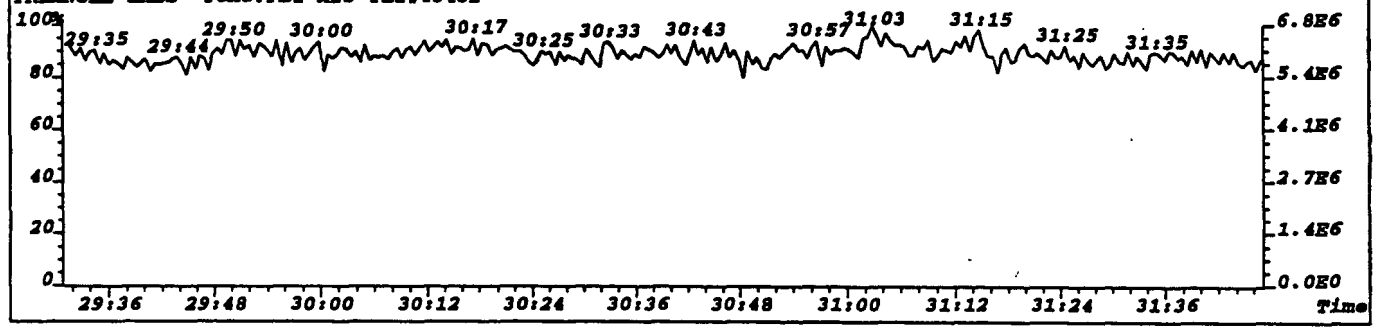
File:U973262 #1-405 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:928
401.8558 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3712.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



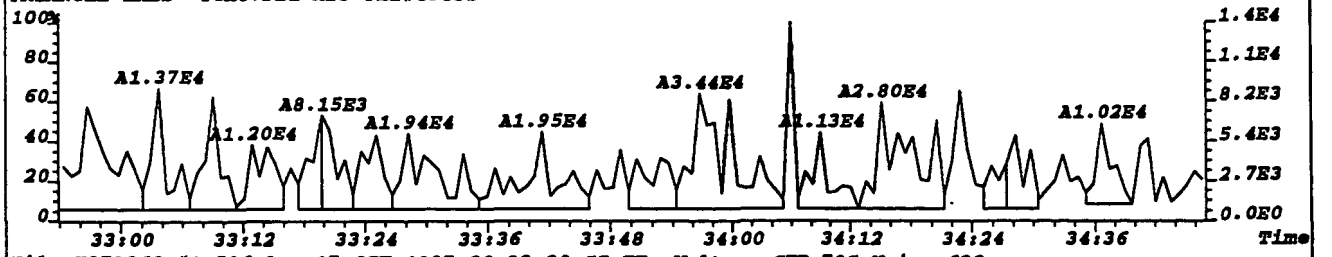
File:U973262 #1-405 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:851
403.8529 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3404.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



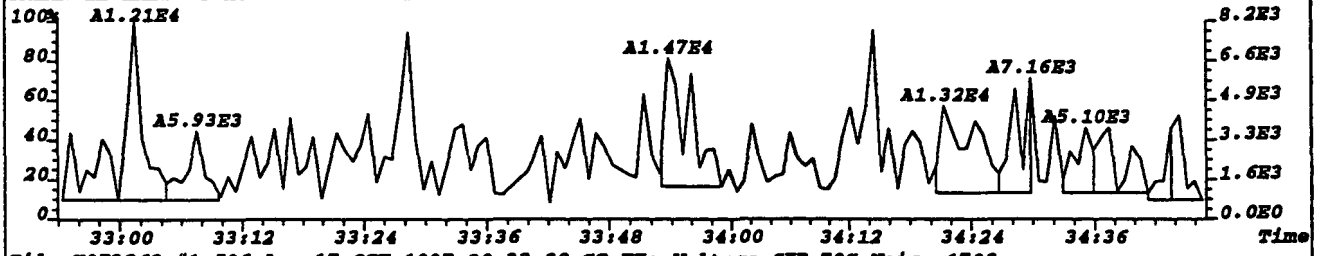
File:U973262 #1-405 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S
392.9760 F:3 Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



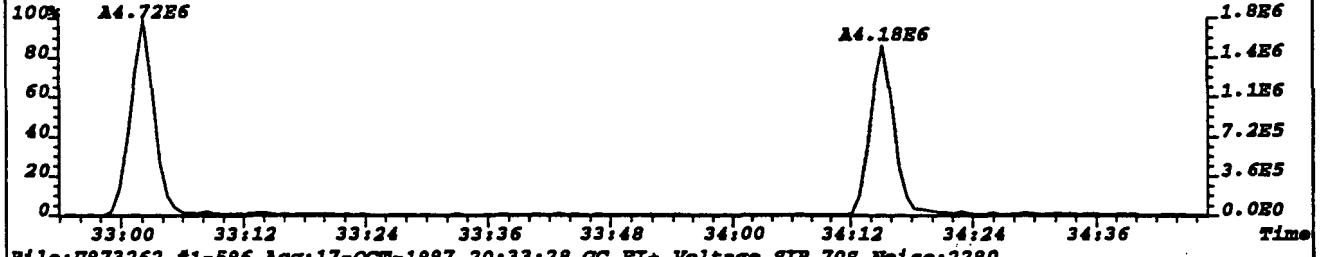
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:789
407.7818 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3156.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



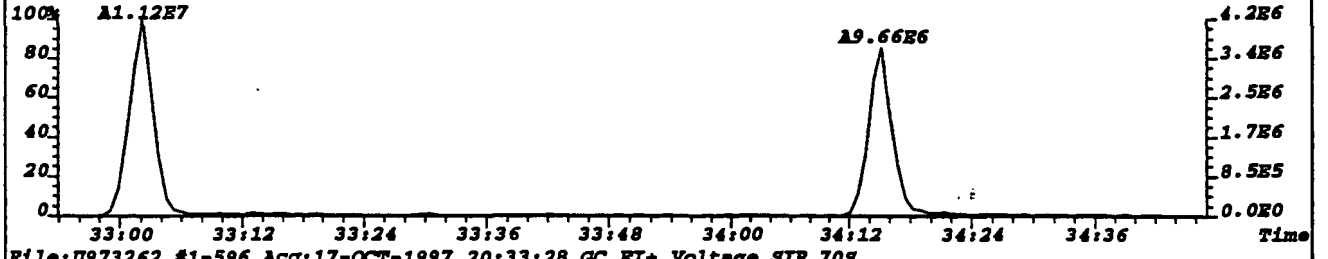
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:622
409.7789 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2488.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



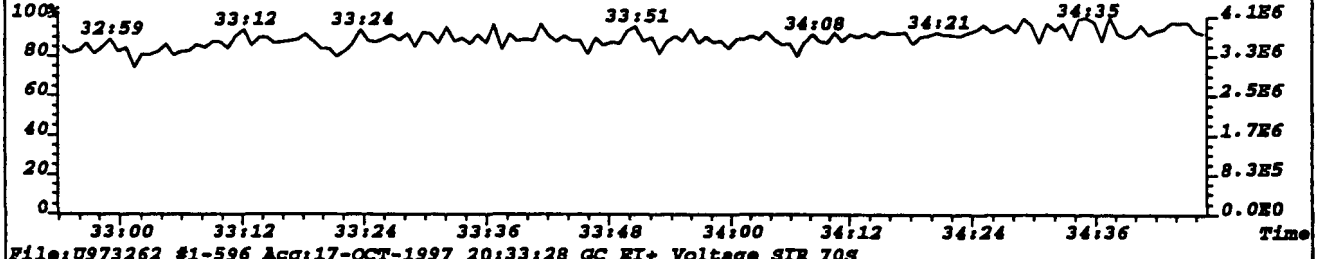
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:1702
417.8253 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6808.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



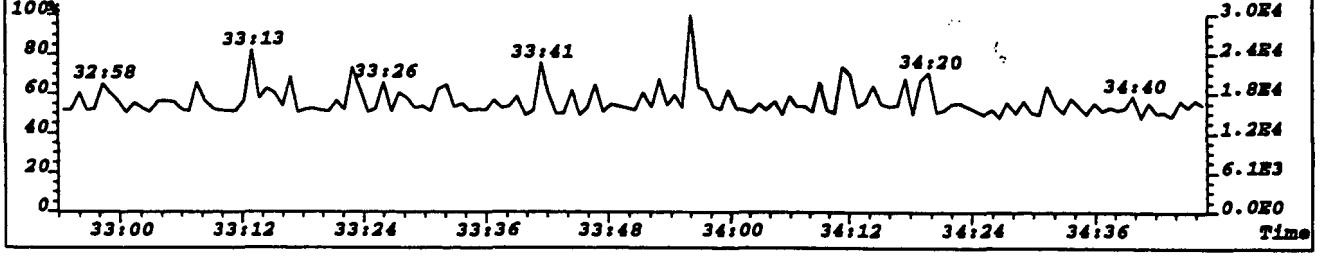
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:2280
419.8220 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,9120.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



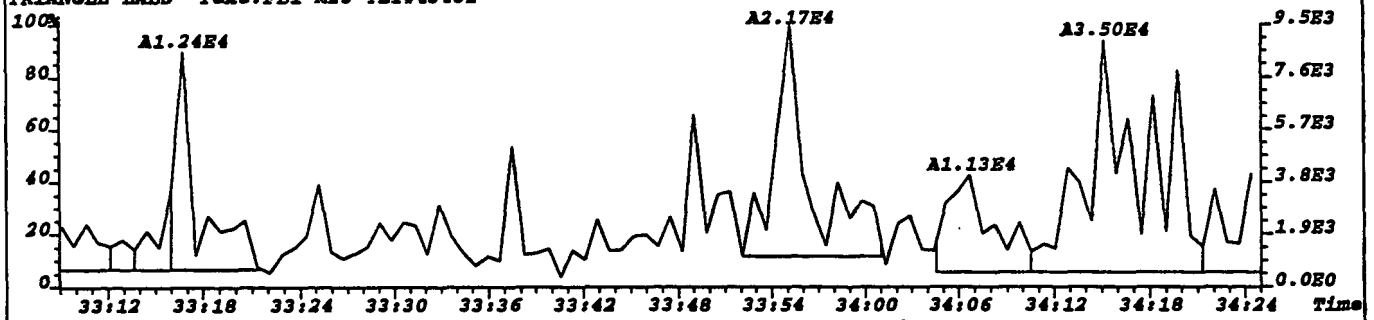
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



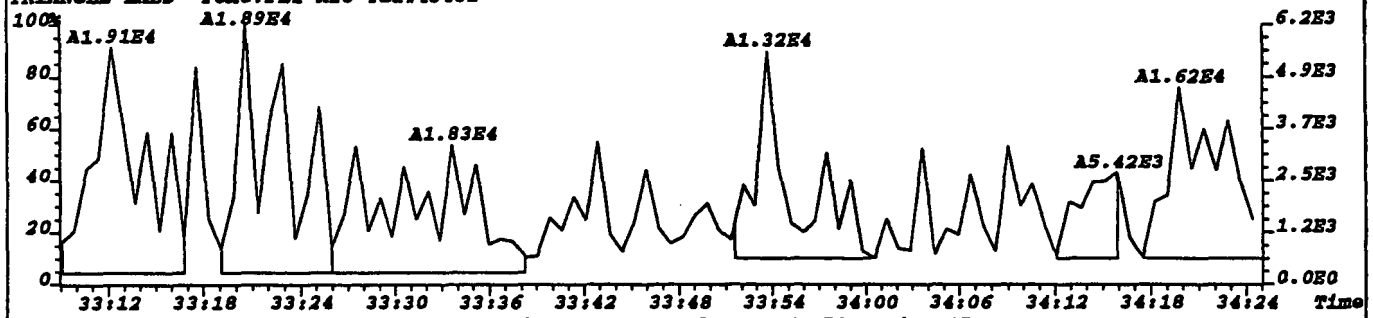
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S
479.7165 F:4 Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



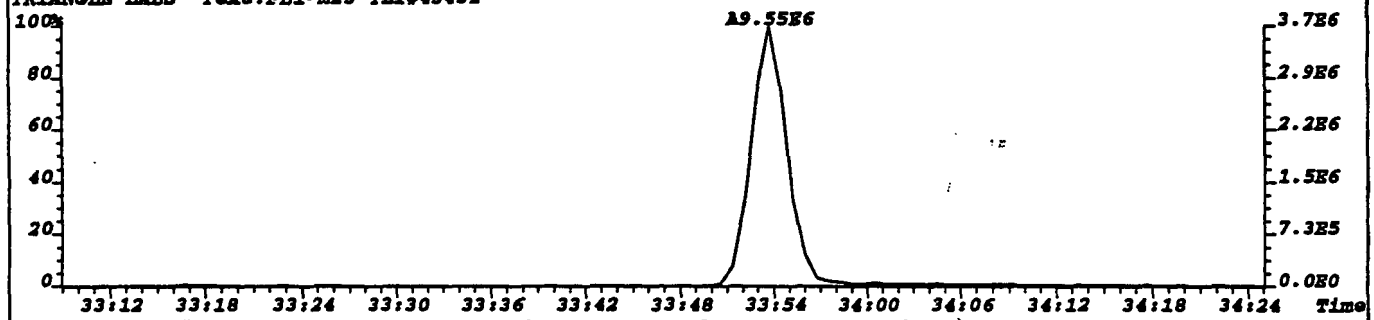
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:551
423.7766 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2204.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



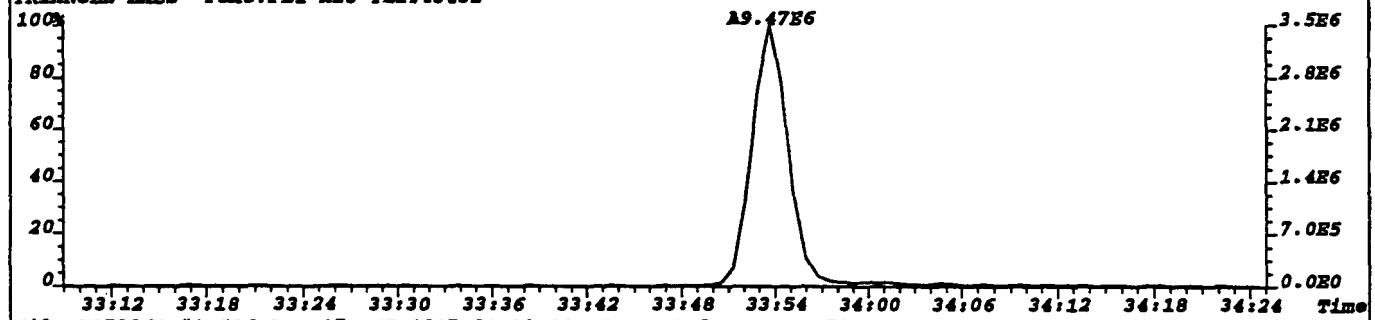
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:416
425.7737 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1664.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



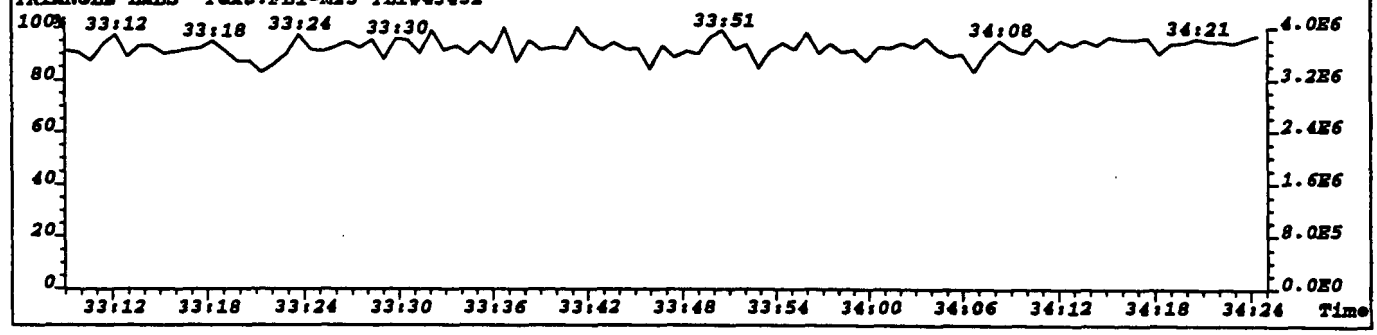
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:1744
435.8169 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6976.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



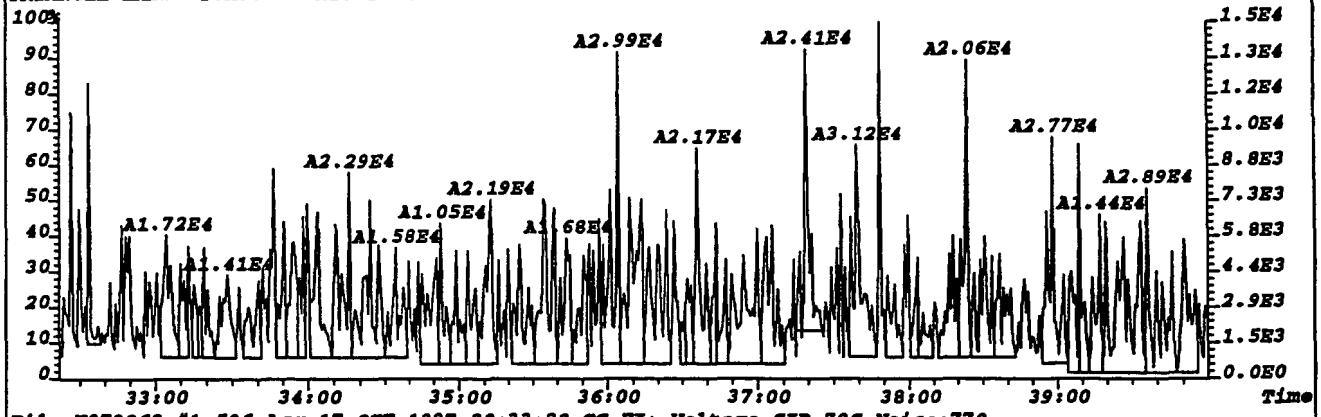
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:1619
437.8140 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6476.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



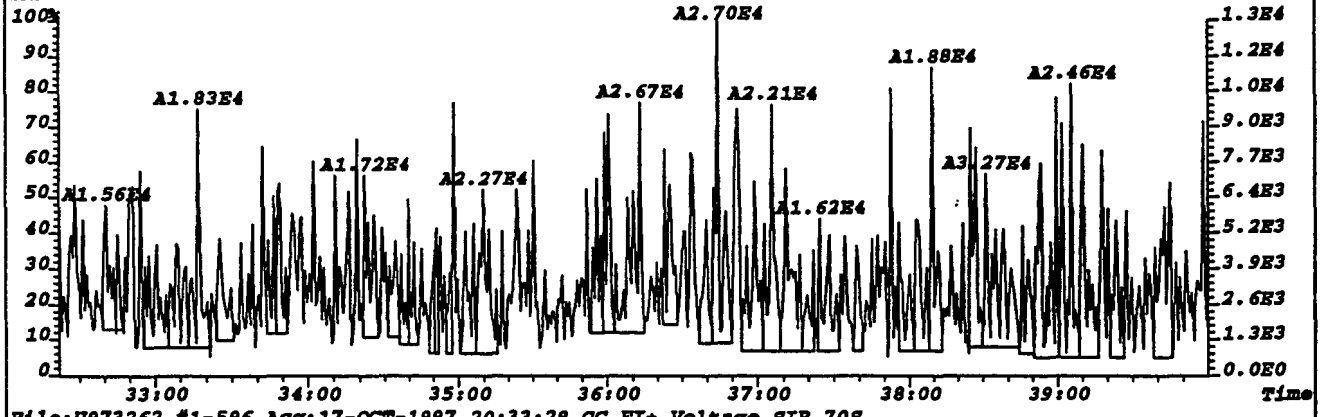
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



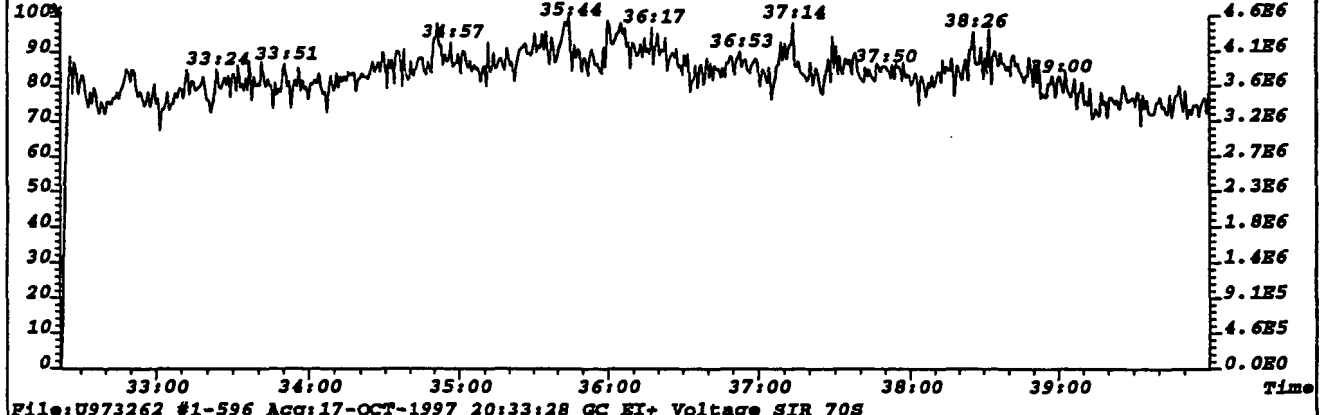
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:728
441.7428 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2912.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



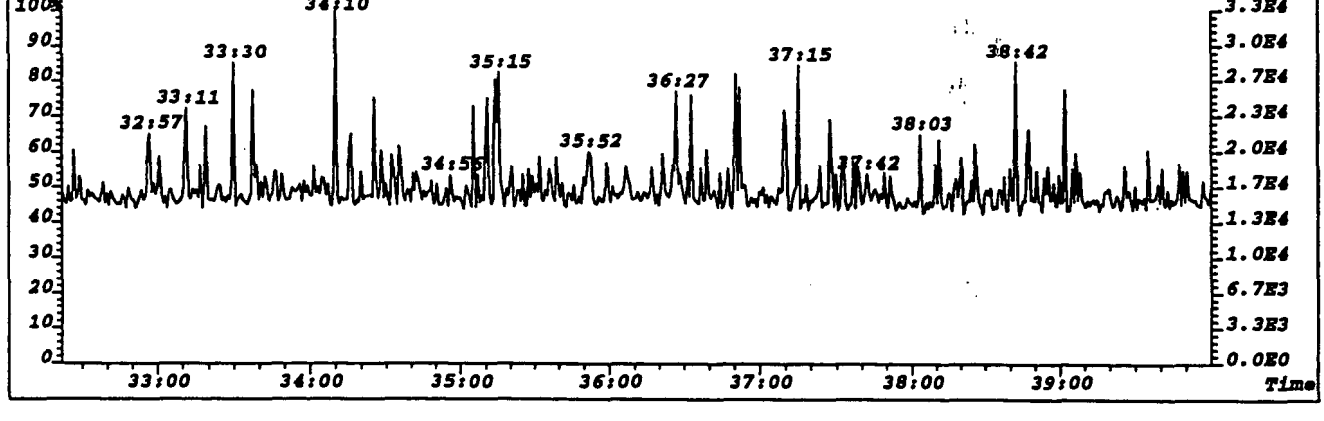
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:770
443.7399 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3080.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



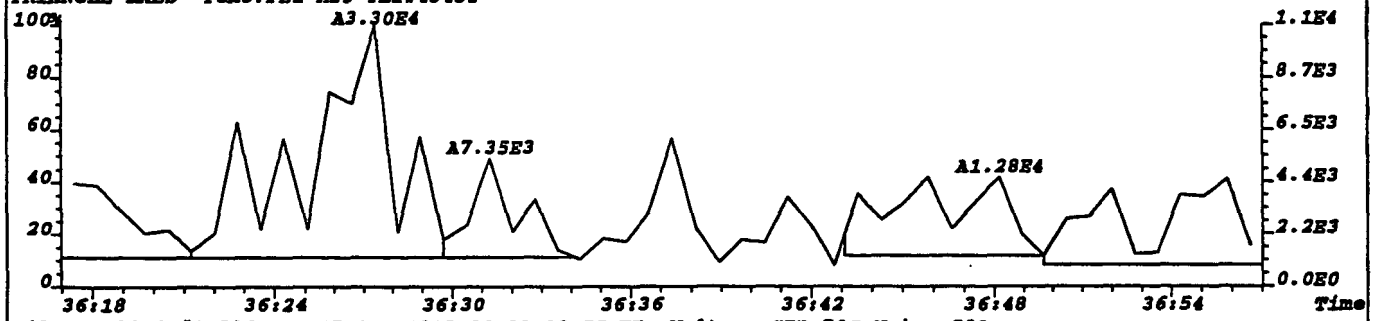
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



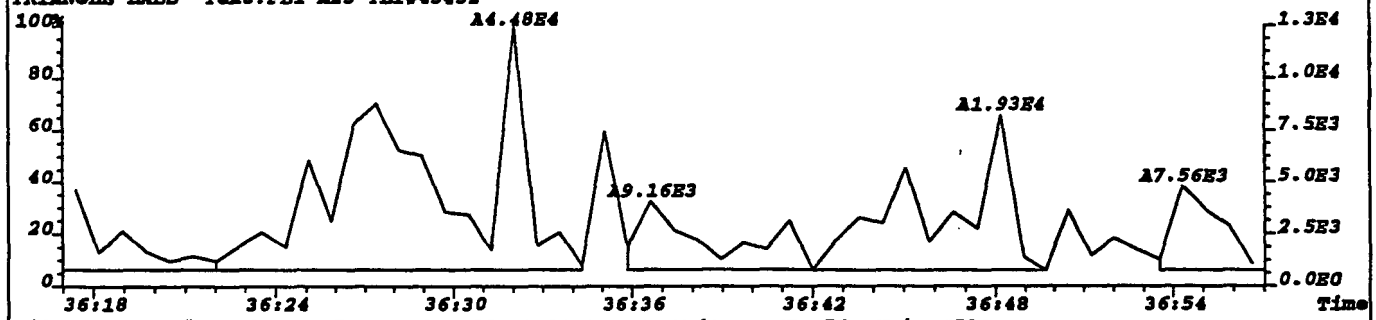
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S
513.6775 F:4 Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



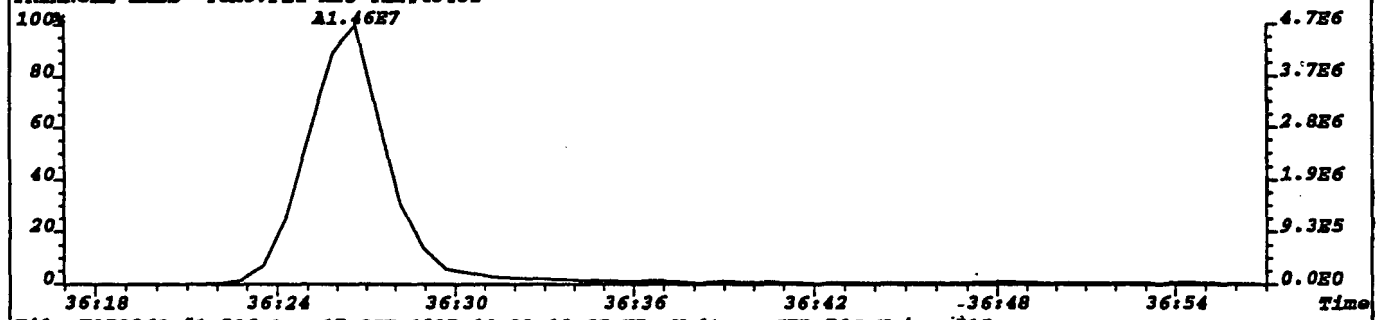
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:649
457.7377 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2596.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



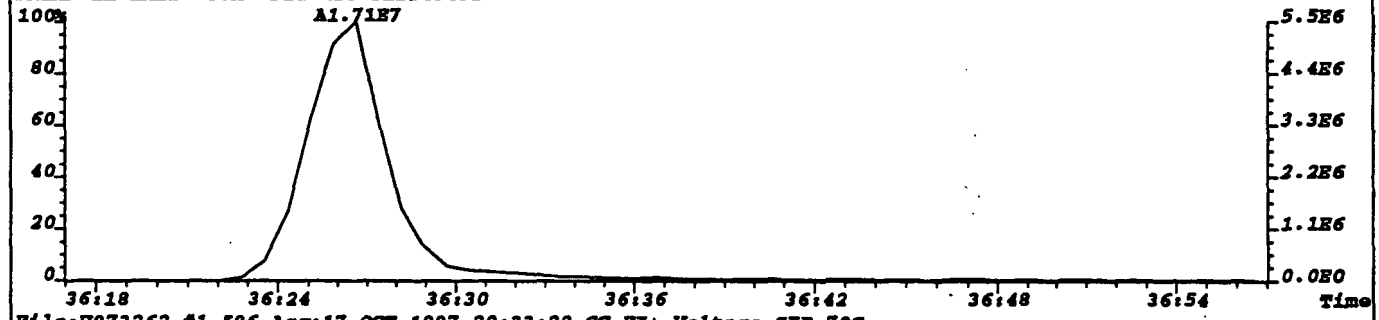
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:583
459.7348 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2332.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



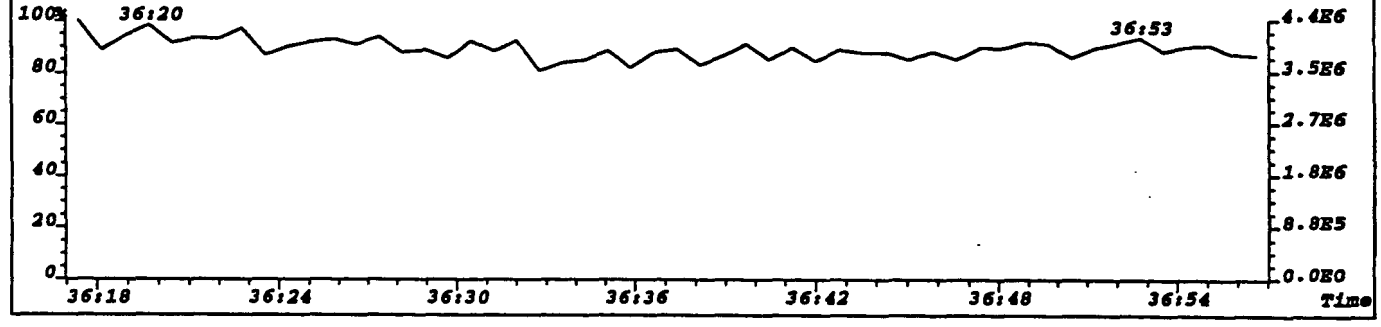
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:539
469.7779 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2156.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432



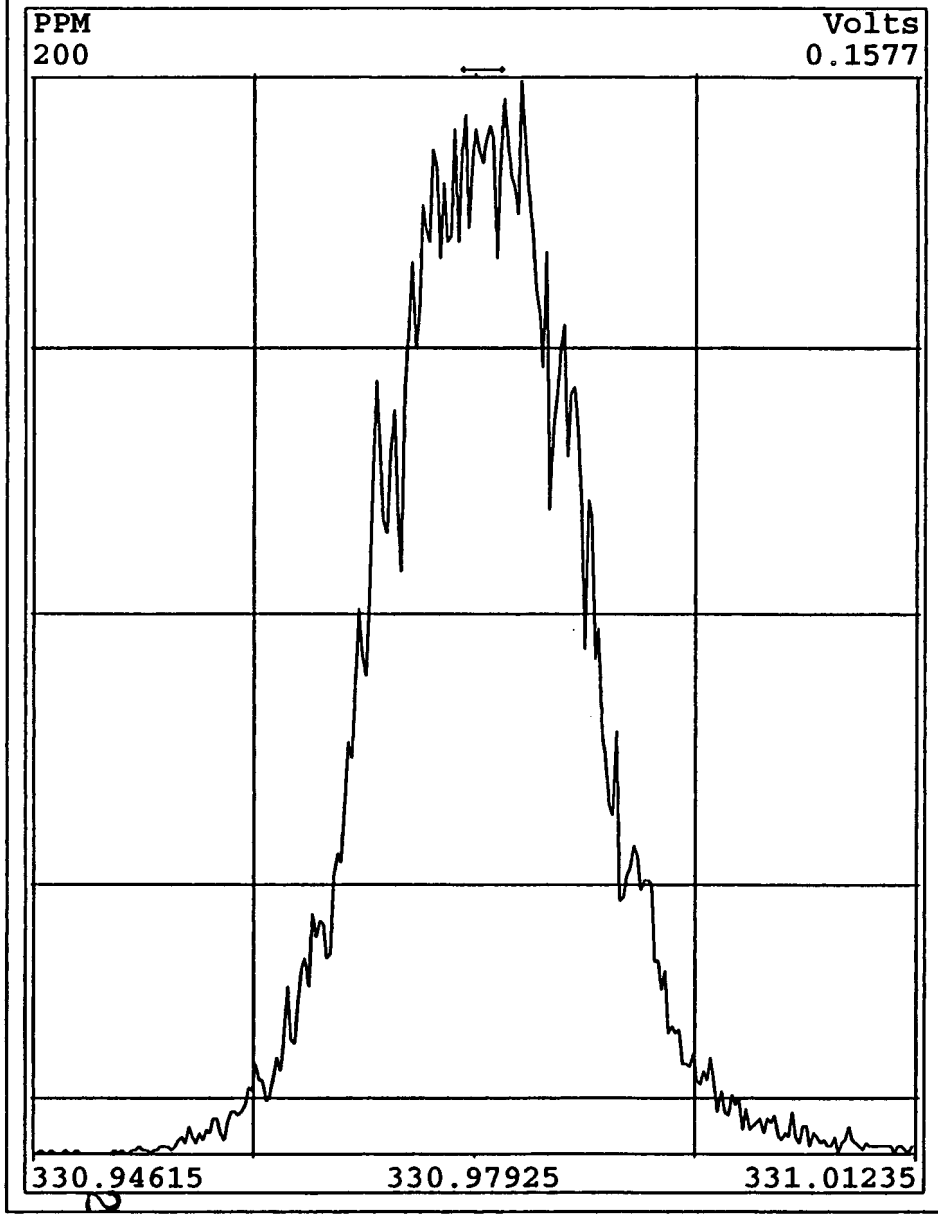
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S Noise:515
471.7750 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2060.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432

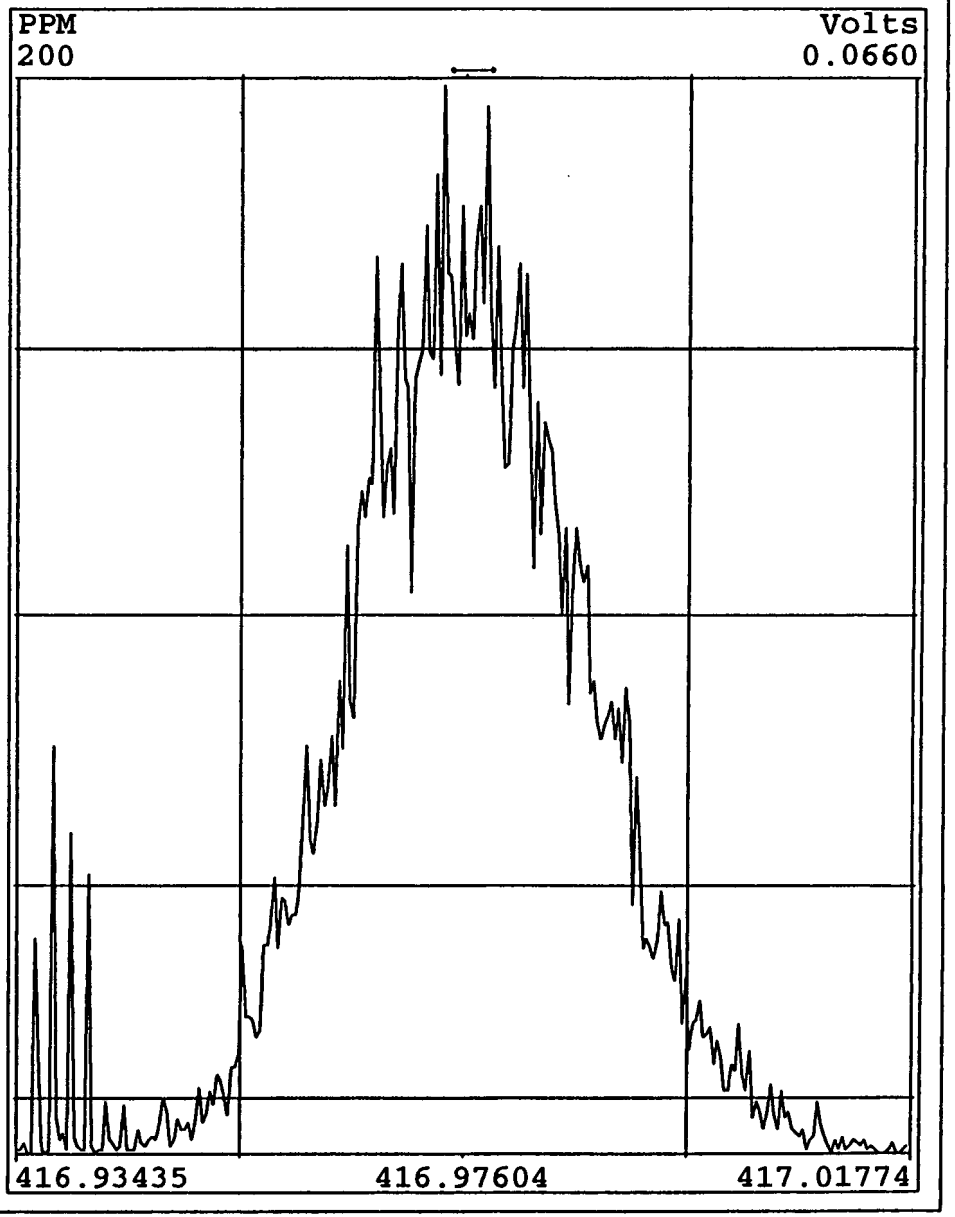


File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:FB1-M23 TLI#43432

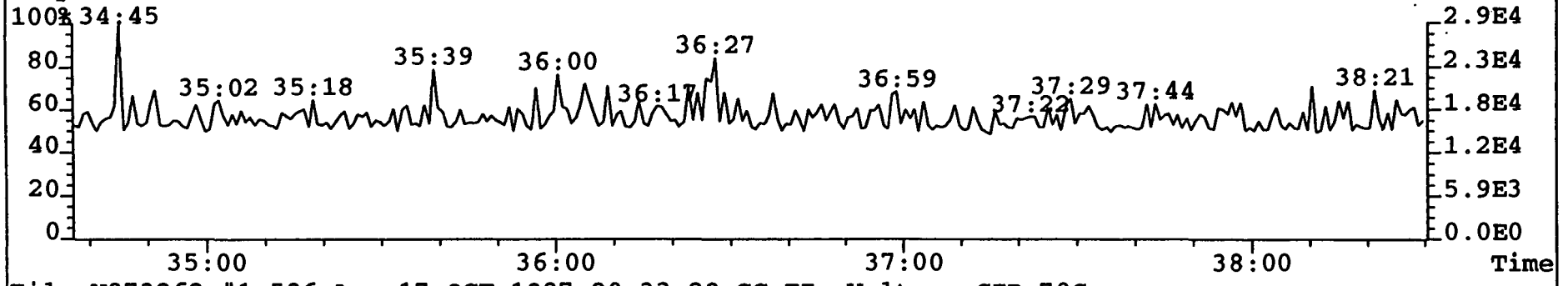


Peak Locate Examination:17-OCT-1997:20:32 File:U973262
Experiment:EPCUS2 Function:2 Reference:PFK

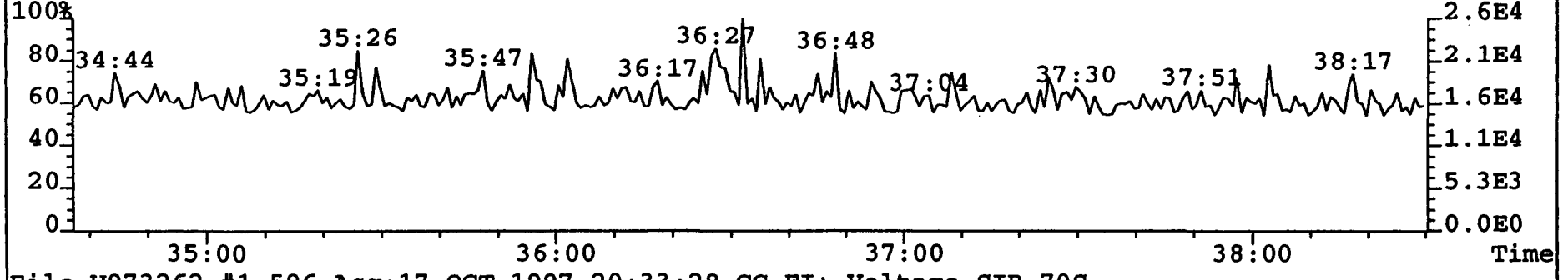




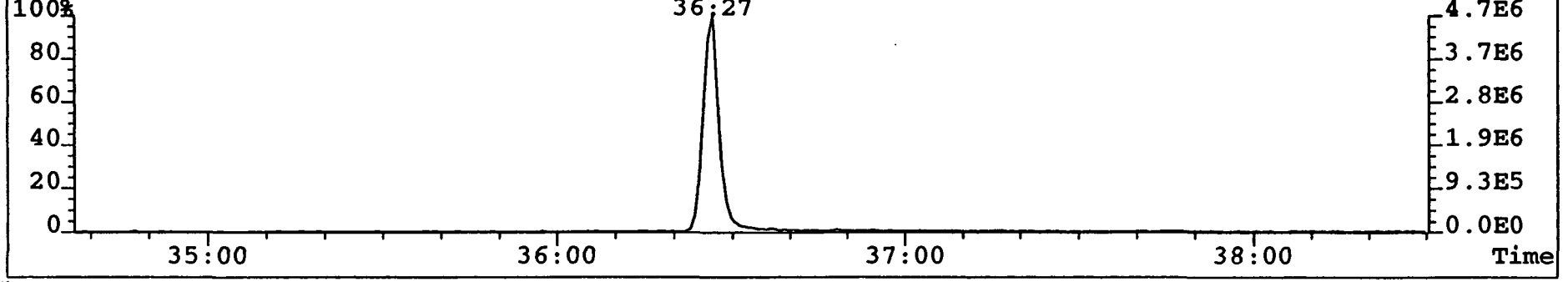
File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S
457.7377 F:4 Exp:EPCUS2
Sample Text:FB1-M23 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S
459.7348 F:4 Exp:EPCUS2
Sample Text:FB1-M23 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973262 #1-596 Acq:17-OCT-1997 20:33:28 GC EI+ Voltage SIR 70S
469.7779 F:4 Exp:EPCUS2
Sample Text:FB1-M23 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



Pacific Environmental Services

TLI Project: **43432** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **FB2-M23** Analysis File: **U973263**

Client Project:	**Saginaw, MI**				
Sample Matrix:	**M23TRAIN**	Date Received:	**09/29/97**	Spike File:	**SPX23704**
TLI ID:	**185-6-6A-C**	Date Extracted:	**10/09/97**	ICal:	**UF59167**
		Date Analyzed:	**10/17/97**	ConCal:	**U973252**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U973257**	% Lipid:	**n/a**
GC Column:	**DB-5**	Analyst:	**BB**	% Solids:	**n/a**

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	ND	0.006				—
1,2,3,7,8-PeCDD	ND	0.008				—
1,2,3,4,7,8-HxCDD	ND	0.01				—
1,2,3,6,7,8-HxCDD	ND	0.009				—
1,2,3,7,8,9-HxCDD	ND	0.009				—
1,2,3,4,6,7,8-HpCDD	ND	0.01				—
1,2,3,4,6,7,8,9-OCDD	ND	0.01				—
2,3,7,8-TCDF	EMPC		0.03			—
1,2,3,7,8-PeCDF	ND	0.007				—
2,3,4,7,8-PeCDF	ND	0.006				—
1,2,3,4,7,8-HxCDF	ND	0.007				—
1,2,3,6,7,8-HxCDF	ND	0.005				—
2,3,4,6,7,8-HxCDF	ND	0.006				—
1,2,3,7,8,9-HxCDF	ND	0.007				—
1,2,3,4,6,7,8-HpCDF	ND	0.008				—
1,2,3,4,7,8,9-HpCDF	ND	0.01				—
1,2,3,4,6,7,8,9-OCDF	ND	0.01				—

Totals	Amt. (ng)	Number	DL	EMPC	Flags
Total TCDD	ND		0.006		—
Total PeCDD	ND		0.008		—
Total HxCDD	ND		0.01		—
Total HpCDD	ND		0.01		—
Total TCDF	EMPC			0.03	—
Total PeCDF	ND		0.006		—
Total HxCDF	ND		0.006		—
Total HpCDF	ND		0.009		—

X237_PSR v2.00, LARS 6.10.04

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Printed: 23:43 10/23/97

Pacific Environmental Services

TLI Project: **43432** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **FB2-M23** Analysis File: **U973263**

Internal Standards	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	3.2	78.9	40%-130%	0.78	21:32	___
$^{13}C_{12}$-2,3,7,8-TCDD	3.6	90.2	40%-130%	0.79	22:27	___
$^{13}C_{12}$-1,2,3,7,8-PeCDF	3.5	87.5	40%-130%	1.48	26:16	___
$^{13}C_{12}$-1,2,3,7,8-PeCDD	4.0	100	40%-130%	1.44	27:27	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	4.1	102	40%-130%	0.50	30:14	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	4.0	101	40%-130%	1.18	30:58	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	3.3	82.1	25%-130%	0.43	33:01	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	3.8	94.8	25%-130%	1.01	33:53	___
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	7.6	95.1	25%-130%	0.90	36:26	___

Surrogate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	3.6	89.0	70%-140%		22:28	___
$^{13}C_{12}$-2,3,4,7,8-PeCDF	3.8	94.4	70%-140%	1.53	27:05	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	3.8	95.3	70%-140%	0.51	30:07	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	4.0	99.6	70%-140%	1.21	30:53	___
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	3.5	88.0	70%-140%	0.41	34:14	___

Alternate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	3.7	93.3	40%-130%	0.49	31:30	___
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	4.2	104	40%-130%	0.50	30:46	___

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.83	22:13	___
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.18	31:16	___

Data Reviewer: VC 10/23/97

X237_PSR v2.00, LARS 6.10.04

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Printed: 23:43 10/23/97

Initial ....Date...

Data Review By: VL 10/23/97 Calculated Noise Area: 2.00

The Total Area for each peak with an ion abundance ratio outside ratio limits has been recalculated according to method requirements.

Page No. 1 Listing of U973263B.dbf
10/23/97 Matched GC Peaks / Ratio / Ret. Time

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
TCDF						0.65-0.89				0.813-1.106			
304-306		DC	NL	0:00		0.79	2.76			0.000			
		DC	SN	17:40		0.72	5.36			0.820			
		DC	SN	17:46	RO	0.14	0.37			0.825			
		DC	SN	18:11	RO	1.17	2.57			0.844			
		DC	SN	18:51		0.87	18.24			0.875			
		DC	SN	19:28		0.75	3.60			0.904			
		DC	SN	19:46		0.87	16.70			0.918			
		DC	SN	20:11	RO	0.60	9.06			0.937			
		DC	SN	20:26		0.76	3.70			0.949			
		DC	SN	20:39	RO	0.44	2.71			0.959			
		DC	SN	20:46	RO	0.24	1.38			0.964			
		DC	SN	21:03	RO	0.22	3.47			0.978			
	K			21:34	RO	0.94	21.47	11.44	12.13	1.002	2378-TCDF		AN
		DC	SN	22:05	RO	0.47	8.74			1.026			
		DC	SN	23:10	RO	0.27	0.74			1.076			
		DC	SN	23:39		0.87	3.82			1.098			
304-306			1	Peak			21.47						
13C12-TCDF						0.65-0.89				0.954-1.046			
316-318		DC	NL	0:00	RO	1.06	1.38			0.000			
		DC	WL	17:55	RO	1.01	3.01			0.832			
		DC	WL	19:14	RO	1.94	1.66			0.893			
		DC	WL	19:43	RO	0.29	1.17			0.916			
		DC	WL	19:55	RO	1.36	2.05			0.925			
		DC	WL	20:09		0.67	46.27			0.936			
		DC	WL	20:31	RO	0.48	4.14			0.953			
				21:32		0.78	3,180.34	1,391.79	1,788.55	1.000	13C12-2378-TCDF		ISO
		DC	SN	21:48		0.81	7.09			1.012			
		DC	SN	22:06	RO	0.96	22.37			1.026			
		DC	SN	22:19	RO	1.31	7.54			1.036			
		DC	SN	22:27	RO	1.45	7.49			1.043			
		DC	WH	23:00	RO	1.51	6.57			1.068			
		DC	WH	23:15	RO	0.44	3.54			1.080			
		DC	WH	23:48		0.78	4.70			1.105			
316-318			1	Peak			3,180.34						

---------- Above: TCDF / TCDD Follows ----------

TCDD						0.65-0.89				0.848-1.061			
320-322		DC	NL	0:00	RO	0.99	1.43			0.000			
		DC	SN	19:36	RO	7.53	0.53			0.873			
		DC	SN	21:59		0.89	1.55			0.979			
		DC	SN	22:10	RO	0.93	5.50			0.987			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
	DC	SN		22:30	RO	0.56	5.31			1.002			
	DC	SN		22:51	RO	1.42	1.47			1.018			
	DC	SN		22:58	RO	0.44	0.71			1.023			
	DC	WH		23:56	RO	1.80	1.54			1.066			
320-322			0	Peaks			0.00						
37Cl-TCDD										0.911-1.089			
328	DC	NL		0:00			0.76			0.000			
	DC	WL		19:12			2.18			0.855			
	DC	WL		19:54			0.92			0.886			
				20:43			54.32	54.32		0.923			
				22:28			2,435.30	2,435.30		1.001	37Cl-TCDD	SUR1	
	DC	SN		22:51			7.18			1.018			
	DC	SN		22:59			5.77			1.024			
	DC	SN		23:12			5.43			1.033			
	DC	SN		23:19			2.54			1.039			
	DC	SN		23:26			6.43			1.044			
	DC	SN		23:33			6.69			1.049			
	DC	SN		23:56			4.86			1.066			
	DC	SN		24:11			2.72			1.077			
328			2	Peaks			2,489.62						
13C12-TCDD					0.65-0.89					0.911-1.089			
332-334	DC	NL		0:00	RO	2.49	1.45			0.000			
	DC	WL		19:31	RO	1.35	2.50			0.869			
	DC	SN		20:56	RO	1.44	14.96			0.932			
				22:13		0.83	2,898.12	1,311.33	1,586.79	0.990	13C12-1234-TCDD	RS1	
				22:27		0.79	2,900.22	1,277.31	1,622.91	1.000	13C12-2378-TCDD	IS1	
				22:51	RO	1.07	48.78	29.44	27.56	1.018			
	DC	SN		22:59	RO	0.63	12.18			1.024			
	DC	SN		23:08		0.79	8.84			1.030			
	DC	SN		23:37	RO	1.24	4.46			1.052			
	DC	SN		23:46	RO	0.53	7.01			1.059			
	DC	SN		24:03	RO	0.58	6.76			1.071			
	DC	SN		24:15	RO	0.38	6.02			1.080			
332-334			3	Peaks			5,847.12						

---------- Above: TCDD / PeCDF Follows ----------

PeCDF					1.32-1.78					0.906-1.077			
340-342	DC	NL		0:00	RO	0.84	1.04			0.000			
	DC	SN		23:48	RO	0.64	1.65			0.906			
	DC	SN		23:57	RO	0.95	5.28			0.912			
	DC	SN		24:29	RO	1.25	1.74			0.932			
	DC	SN		25:06	RO	2.62	3.42			0.956			
	DC	SN		25:16	RO	1.02	12.17			0.962			
	DC	SN		25:30		1.38	6.20			0.971			
	DC	SN		25:40	RO	3.30	1.63			0.977			
	DC	SN		25:46	RO	0.57	0.99			0.981			
	DC	SN		26:09	RO	0.66	1.55			0.996			
	DC	SN		26:17	RO	3.09	1.89			1.001	12378-PeCDF	AN	
	DC	SN		26:30	RO	2.85	1.56			1.009			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
	DC	SN		26:44	RO	0.39	0.74			1.018			
	DC	SN		26:50	RO	0.25	0.66			1.022			
	DC	SN		27:04	RO	0.55	4.08			1.030	23478-PeCDF	AN	
	DC	SN		27:15	RO	0.18	1.17			1.037			
	DC	SN		27:27	RO	1.11	1.37			1.045			
	DC	SN		27:47	RO	1.22	1.53			1.058			
	DC	SN		27:57	RO	1.18	1.74			1.064			
	DC	SN		28:01	RO	11.19	0.41			1.067			
	DC	SN		28:12		1.48	0.77			1.074			
	DC	WH		28:32	RO	0.91	1.41			1.086			
	DC	WH		28:45	RO	0.58	1.65			1.095			
340-342			0	Peaks			0.00						
13C12-PeCDF				1.32-1.78						0.848-1.152			
352-354	DC	NL		0:00	RO	1.00	1.30			0.000			
				25:17		1.65	63.39	39.48	23.91	0.963			
	DC	SN		25:52	RO	2.20	13.80			0.985			
				26:16		1.48	2,774.19	1,654.48	1,119.71	1.000	13C12-PeCDF 123	IS2	
	DC	SN		26:36	RO	0.98	22.57			1.013			
				27:05		1.53	2,540.82	1,534.67	1,006.15	1.031	13C12-PeCDF 234	SUR2	
	DC	SN		27:20	RO	2.86	3.29			1.041			
	DC	SN		28:07		1.73	11.37			1.070			
352-354			3	Peaks			5,378.40						

---------- Above: PeCDF / PeCDD Follows ----------

PeCDD				1.32-1.78						0.921-1.025			
356-358	DC	NL		0:00	RO	1.10	1.28			0.000			
	DC	SN		25:35		1.33	1.61			0.932			
	DC	SN		26:17	RO	0.67	2.52			0.957			
	DC	SN		26:21	RO	0.55	1.27			0.960			
	DC	SN		26:31	RO	0.64	2.07			0.966			
	DC	SN		26:40	RO	4.86	1.45			0.971			
	DC	SN		26:43		1.34	1.59			0.973			
	DC	SN		27:10	RO	0.99	1.63			0.990			
	DC	SN		27:22		1.46	1.18			0.997			
	DC	SN		27:54	RO	0.97	1.04			1.016			
	DC	SN		28:05	RO	0.68	0.89			1.023			
	DC	WH		28:27	RO	0.53	1.17			1.036			
356-358			0	Peaks			0.00						
13C12-PeCDD				1.32-1.78						0.855-1.145			
368-370	DC	NL		0:00	RO	0.74	0.97			0.000			
	DC	SN		25:31	RO	2.47	0.97			0.930			
	DC	SN		25:42		1.46	1.99			0.936			
	DC	SN		26:24	RO	2.19	2.88			0.962			
	DC	SN		26:34	RO	1.31	2.53			0.968			
	DC	SN		27:14	RO	0.63	1.23			0.992			
				27:27		1.44	1,744.52	1,030.41	714.11	1.000	13C12-PeCDD 123	IS3	
				27:38		1.59	175.78	107.86	67.92	1.007			
	DC	SN		27:52	RO	1.25	4.87			1.015			
	DC	SN		28:00	RO	0.91	4.98			1.020			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
	DC	SN		28:16	RO	1.00	8.19			1.030			
	DC	SN		28:34	RO	0.67	4.13			1.041			
368-370			2	Peaks			1,920.30						
---------- Above: PeCDD / HxCDF Follows ----------													
HxCDF				1.05-1.43						0.958-1.051			
374-376	DC	NL		0:00	RO	0.97	2.33			0.000			
	DC	SN		29:15	RO	0.81	3.63			0.967			
	DC	SN		29:34	RO	0.51	0.74			0.978			
	DC	SN		30:41		1.25	1.89			1.015			
	DC	SN		30:47		1.11	6.52			1.018	234678-HxCDF	AN	
	DC	SN		30:53		1.17	2.47			1.021			
	DC	SN		31:37	RO	0.57	0.58			1.046			
	DC	WH		31:57	RO	5.19	0.36			1.057			
	DC	WH		32:02	RO	0.92	0.87			1.060			
	DC	WH		32:08	RO	0.89	1.12			1.063			
374-376			0	Peaks			0.00						
13C12-HxCDF				0.43-0.59						0.868-1.132			
384-386	DC	NL		0:00	RO	1.51	3.16			0.000			
	DC	SN		29:05		0.50	10.55			0.962			
	DC	SN		29:13		0.51	25.56			0.966			
				30:07		0.51	2,283.17	769.43	1,513.74	0.996	13C12-HxCDF 478	SUR3	
				30:14		0.50	2,459.91	817.06	1,642.85	1.000	13C12-HxCDF 678	IS4	
	DC	SN		30:23	RO	0.30	20.76			1.005			
	DC	SN		30:35	RO	0.09	7.79			1.012			
				30:46		0.50	2,359.53	790.89	1,568.64	1.018	13C12-HxCDF 234	ALT2	
	DC	SN		31:01	RO	3.73	6.90			1.026			
				31:30		0.49	1,997.36	656.52	1,340.84	1.042	13C12-HxCDF 789	ALT1	
	DC	SN		31:40		0.53	17.78			1.047			
	DC	SN		31:44	RO	2.05	8.71			1.050			
	DC	SN		31:57	RO	7.14	1.19			1.057			
384-386			4	Peaks			9,099.97						
---------- Above: HxCDF / HxCDD Follows ----------													
HxCDD				1.05-1.43						0.952-1.015			
390-392	DC	NL		0:00		1.20	1.80			0.000			
	DC	SN		29:31	RO	0.56	0.69			0.953			
	DC	SN		29:33		1.41	1.06			0.954			
	DC	SN		29:37	RO	0.62	1.30			0.956			
	DC	SN		29:47	RO	0.55	1.28			0.962			
	DC	SN		30:08		1.25	3.76			0.973			
	DC	SN		30:14	RO	0.92	3.05			0.976			
	DC	SN		30:36	RO	0.82	0.65			0.988			
	DC	SN		30:45	RO	1.02	3.56			0.993			
	DC	SN		30:54	RO	0.62	1.81			0.998	123478-HxCDD	AN	
	DC	SN		31:17	RO	1.65	2.80			1.010	123789-HxCDD	AN	
	DC	WH		31:28	RO	3.54	0.63			1.016			
	DC	WH		31:33	RO	0.70	0.96			1.019			
390-392			0	Peaks			0.00						

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
13C12-HxCDD				1.05-1.43						0.968-1.032			
402-404	DC	NL		0:00		1.16	2.64			0.000			
	DC	SN		30:20	RO	0.94	10.57			0.980			
	DC	SN		30:39	RO	2.03	0.67			0.990			
				30:53		1.21	1,900.63	1,040.31	860.32	0.997	13C12-HxCDD 478	SUR4	
				30:58		1.18	2,128.10	1,153.87	974.23	1.000	13C12-HxCDD 678	IS5	
	DC	SN		31:05	RO	1.94	28.94			1.004			
				31:16		1.18	2,191.63	1,188.48	1,003.15	1.010	13C12-HxCDD 789	RS2	
	DC	SN		31:23	RO	1.65	18.41			1.013			
	DC	SN		31:35	RO	0.39	13.26			1.020			
	DC	SN		31:39	RO	1.76	14.94			1.022			
	DC	SN		31:48		1.19	10.48			1.027			
402-404			3	Peaks			6,220.36						

---------- Above: HxCDD / HpCDF Follows ----------

HpCDF				0.88-1.20						0.996-1.043			
408-410	DC	NL		0:00	RO	1.35	2.06			0.000			
	DC	WL		32:50	RO	2.04	1.04			0.994			
	DC	SN		32:58	RO	5.02	1.08			0.998			
	DC	SN		33:03		1.05	4.52			1.001	1234678-HpCDF	AN	
	DC	SN		33:11	RO	1.39	2.02			1.005			
	DC	SN		33:14	RO	4.94	0.67			1.007			
	DC	SN		33:22	RO	1.72	1.90			1.011			
	DC	SN		34:23		0.92	2.46			1.041			
	DC	WH		34:41	RO	3.76	1.47			1.050			
408-410			0	Peaks			0.00						
13C12-HpCDF				0.37-0.51						0.939-1.121			
418-420	DC	NL		0:00		0.47	11.15			0.000			
				33:01		0.43	1,715.36	513.44	1,201.92	1.000	13C12-HpCDF 678	IS6	
				34:14		0.41	1,333.53	389.61	943.92	1.037	13C12-HpCDF 789	SUR5	
	DC	SN		34:28	RO	0.52	13.15			1.044			
	DC	SN		34:35	RO	0.14	9.13			1.047			
418-420			2	Peaks			3,048.89						

---------- Above: HpCDF / HpCDD Follows ----------

HpCDD				0.88-1.20						0.977-1.005			
424-426	DC	NL		0:00		1.15	1.40			0.000			
	DC	SN		33:11	RO	0.61	2.22			0.979			
	DC	SN		33:54	RO	0.33	1.14			1.000	1234678-HpCDD	AN	
	DC	SN		34:00	RO	1.22	1.04			1.003			
	DC	WH		34:13	RO	16.17	0.24			1.010			
424-426			0	Peaks			0.00						
13C12-HpCDD				0.88-1.20						0.971-1.029			
436-438	DC	NL		0:00	RO	1.25	5.47			0.000			
	DC	SN		33:16	RO	1.22	8.24			0.982			
				33:53		1.01	1,907.82	956.89	950.93	1.000	13C12-HpCDD 678	IS7	
	DC	SN		34:03	RO	6.04	6.55			1.005			
	DC	SN		34:14	RO	0.59	12.63			1.010			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
	DC	SN		34:19		1.20	11.75			1.013			
436-438			1	Peak			1,907.82						

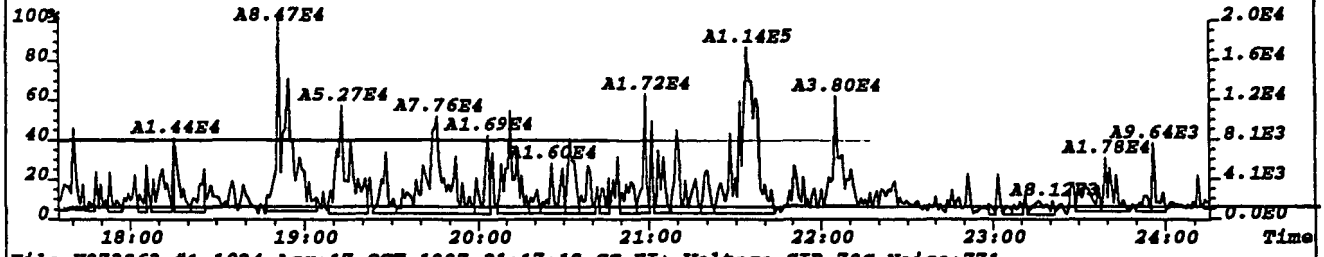
---------- Above: HpCDD / Octa-CDD and CDF Follows ----------

OCDF					0.76-1.02					0.890-1.110			
442-444	DC	NL		0:00	RO	1.09	2.12			0.000			
	DC	SN		32:54	RO	0.24	1.23			0.903			
	DC	SN		33:18	RO	0.28	1.36			0.914			
	DC	SN		33:32	RO	1.67	0.45			0.920			
	DC	SN		33:43		0.83	2.16			0.925			
	DC	SN		34:07	RO	4.23	0.59			0.936			
	DC	SN		34:43	RO	0.15	0.55			0.953			
	DC	SN		35:09		1.00	1.52			0.965			
	DC	SN		35:15		0.97	0.69			0.968			
	DC	SN		35:31		0.85	4.08			0.975			
	DC	SN		35:56	RO	1.32	2.55			0.986			
	DC	SN		36:28	RO	0.67	3.57			1.001			
	DC	SN		36:58	RO	0.19	1.87			1.015			
	DC	SN		37:07	RO	0.64	4.61			1.019			
	DC	SN		37:51	RO	1.30	2.68			1.039			
	DC	SN		37:57	RO	0.66	3.89			1.042			
	DC	SN		38:51	RO	0.42	2.89			1.066			
	DC	SN		39:12		0.78	3.24			1.076			
	DC	SN		39:23	RO	1.51	3.33			1.081			
442-444			0	Peaks			0.00						
OCDD					0.76-1.02					0.890-1.110			
458-460	DC	NL		0:00		0.82	1.98			0.000			
	DC	SN		36:33		0.96	2.31			1.003			
	DC	SN		36:50	RO	0.70	1.85			1.011			
458-460			0	Peaks			0.00						
13C12-OCDD					0.76-1.02					0.995-1.005			
470-472	DC	NL		0:00		0.88	1.99			0.000			
				36:26		0.90	3,182.05	1,508.40	1,673.65	1.000	13C12-OCDD	IS8	
	DC	WH		36:45	RO	0.31	10.89			1.009			
	DC	WH		36:51	RO	1.85	10.41			1.011			
470-472			1	Peak			3,182.05						

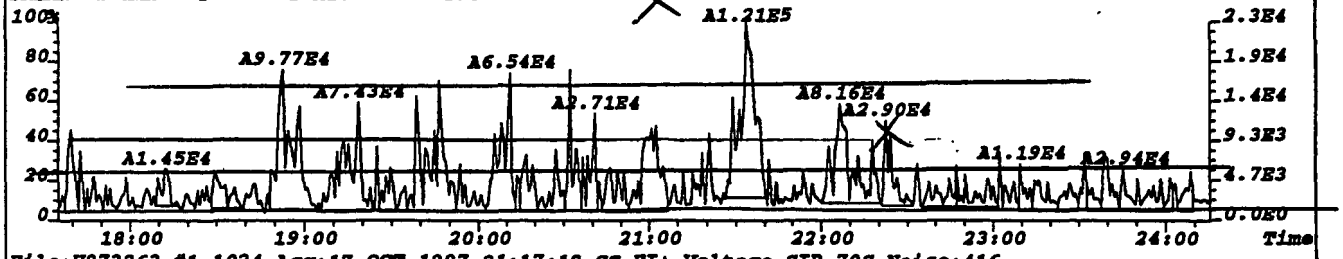
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside Limits	<M-Below Method Detection Limit	T-Time Changed
Rel.RT-Relative Retention Time	NL-Channel Specific Noise Level	M-Peak Area Changed
		N-Name Changed
		E-Ether Interference

*** End of Report ***

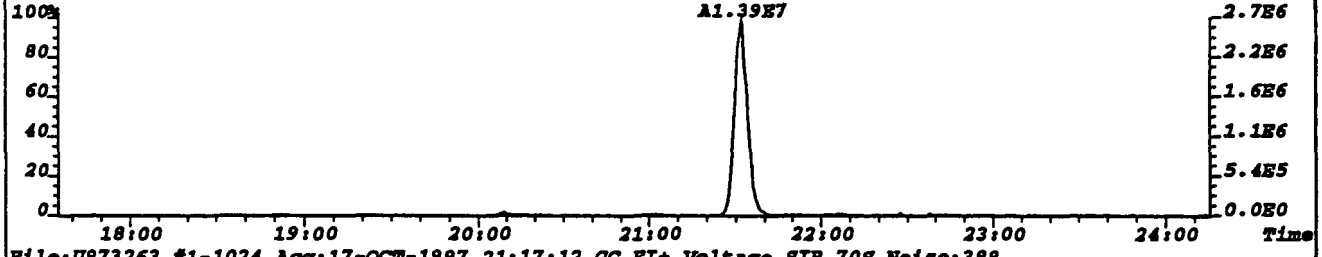
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:608
303.9016 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,2432.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



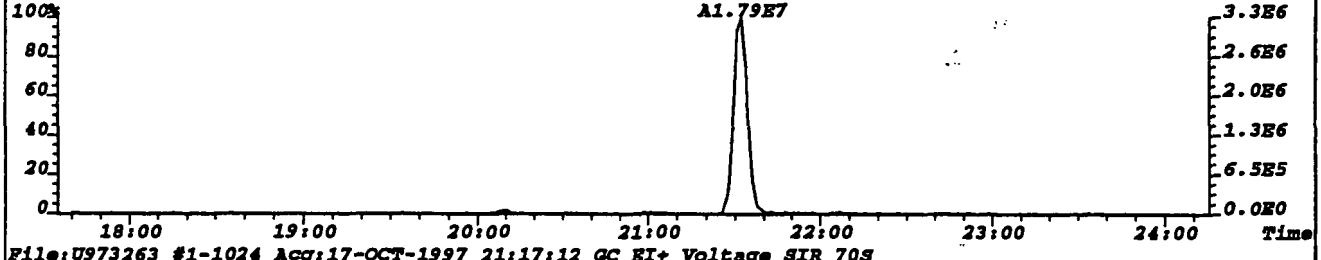
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:771
305.8987 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,3084.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



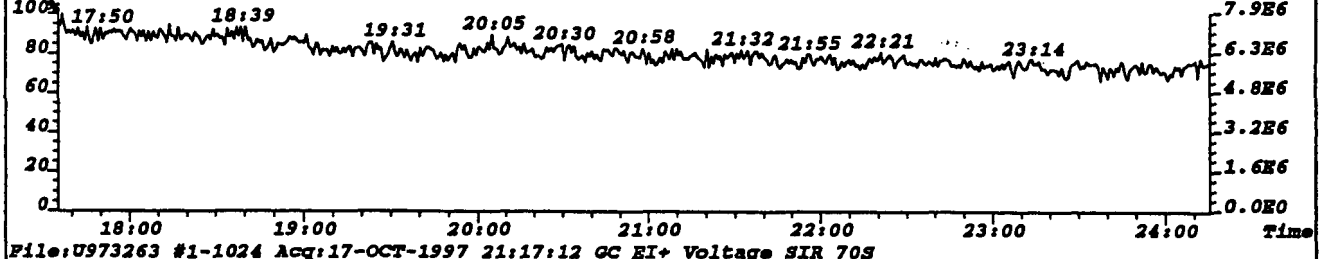
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:416
315.9419 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,1664.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



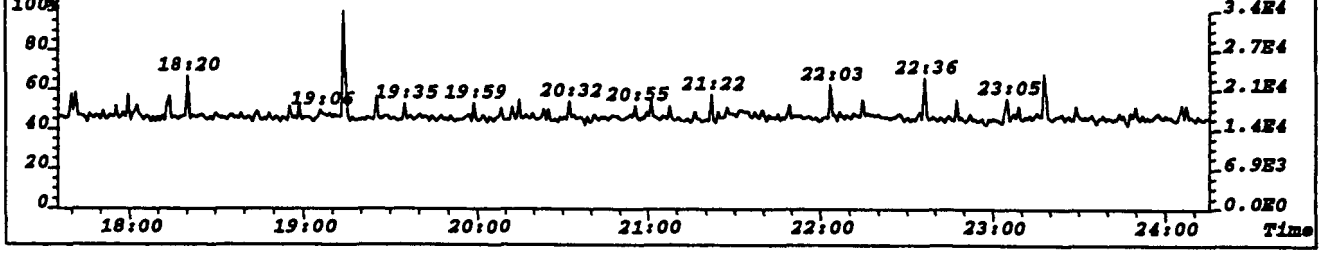
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:388
317.9389 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,1552.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



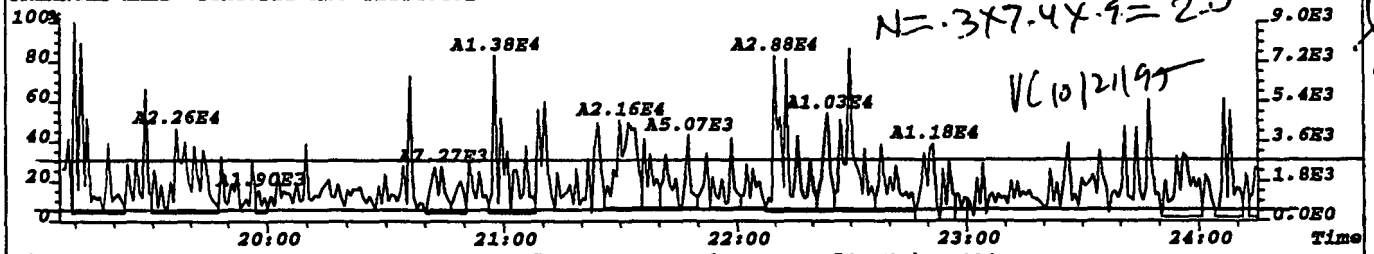
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S
375.8364 F:2 Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



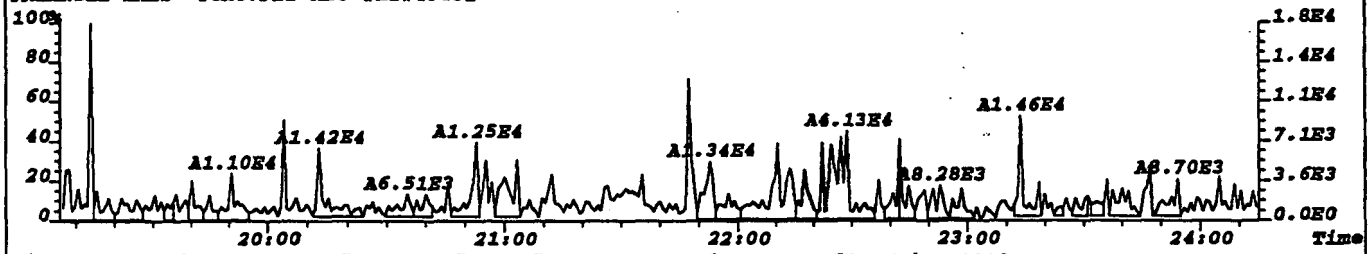
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:399
319.8965 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1596.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432

N=.3X7.4X.9=2.0

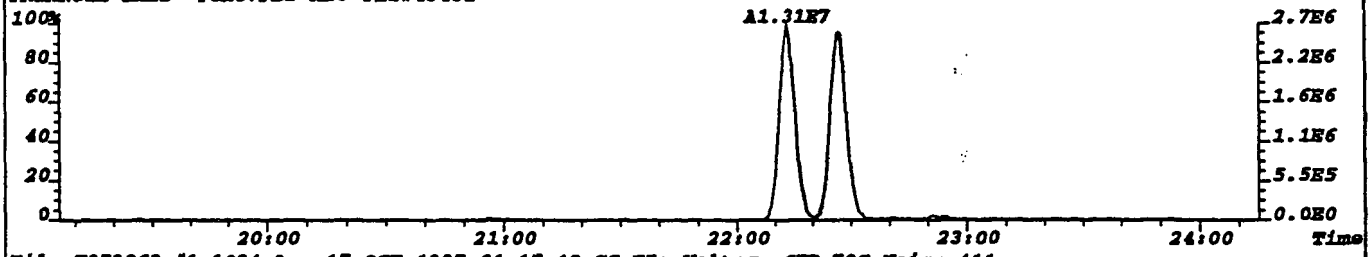
VC 10/21/97



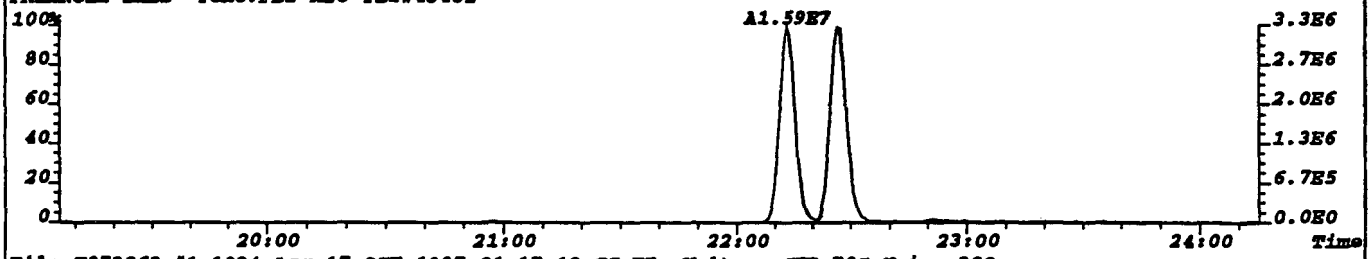
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:404
321.8936 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1616.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



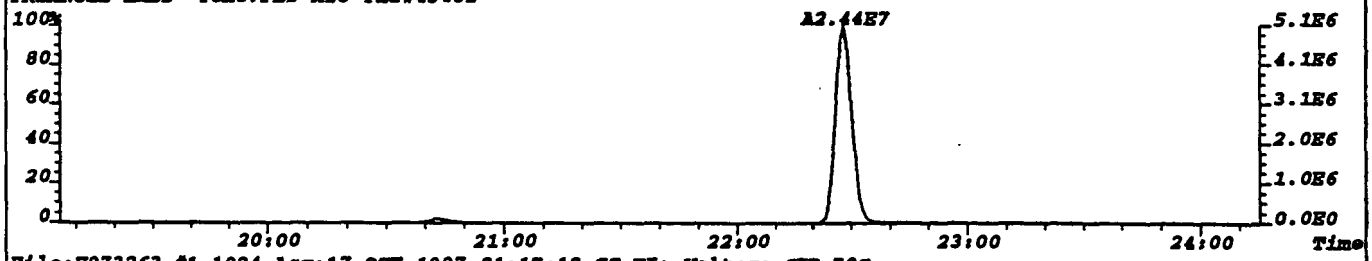
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:1018
331.9368 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4072.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



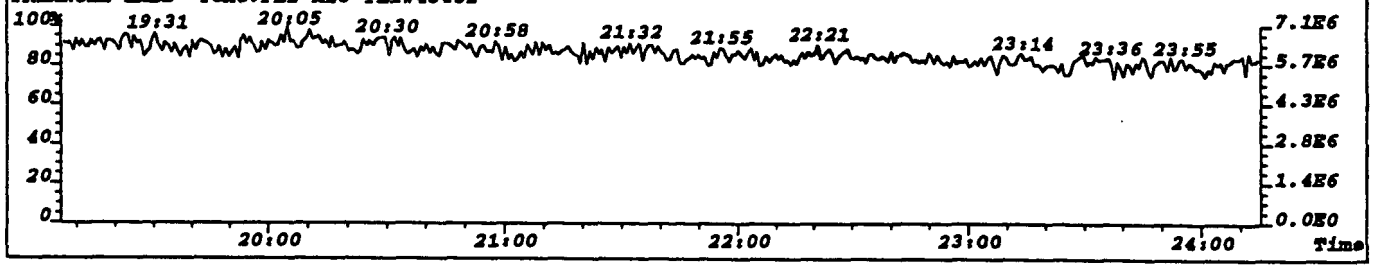
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:411
333.9338 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1644.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



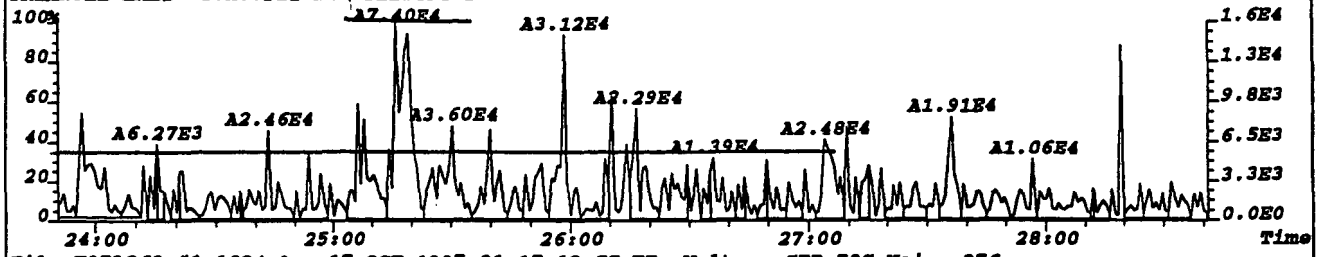
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:382
327.8847 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1528.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



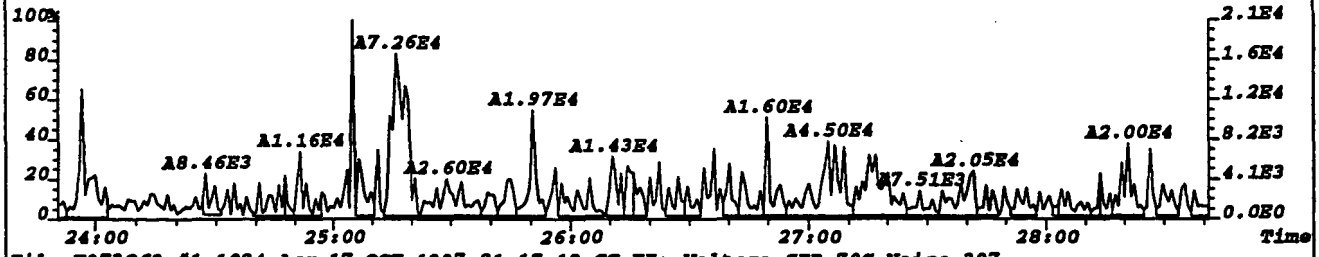
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



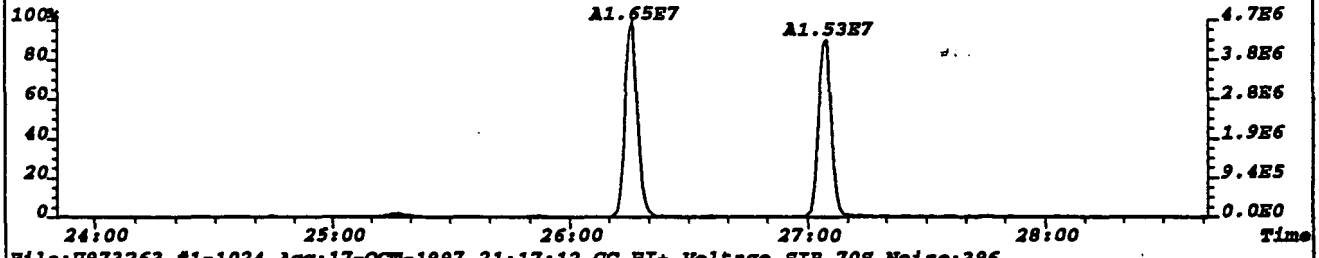
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:315
339.8597 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1260.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



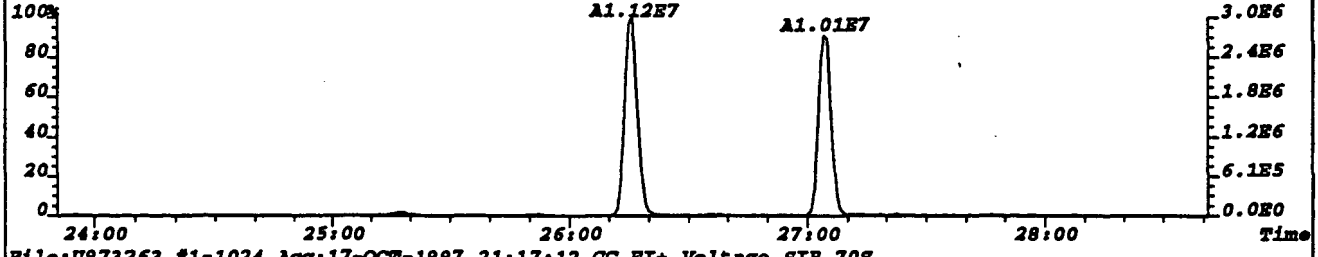
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:376
341.8567 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1504.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



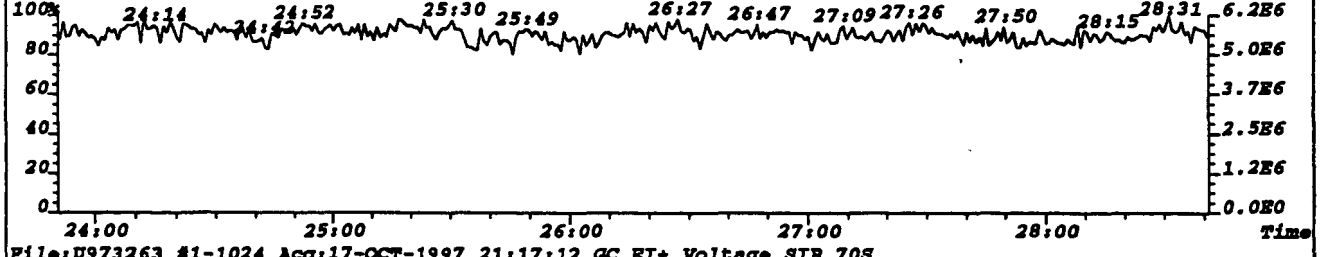
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:397
351.9000 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1588.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



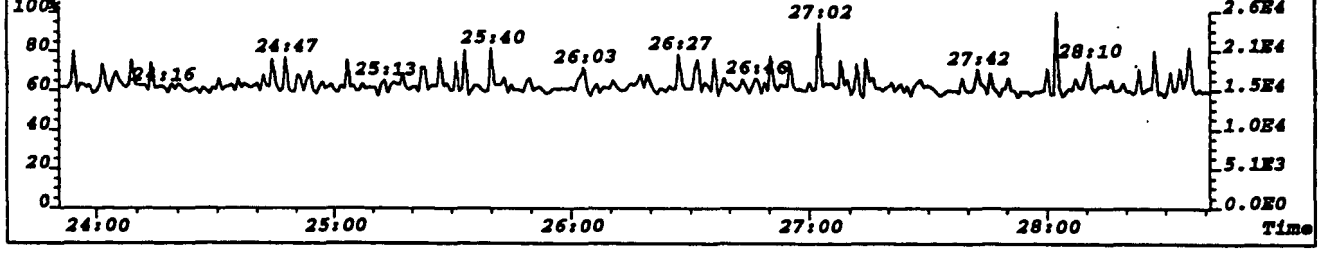
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:396
353.8970 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1584.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



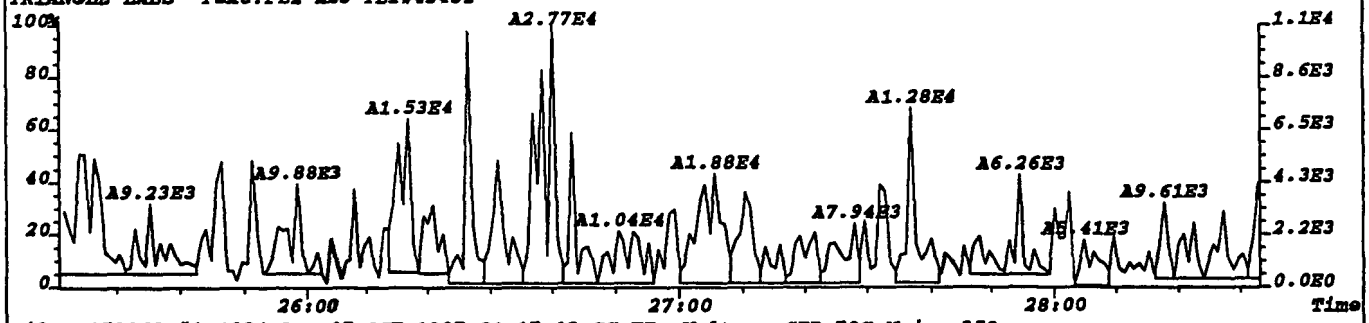
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



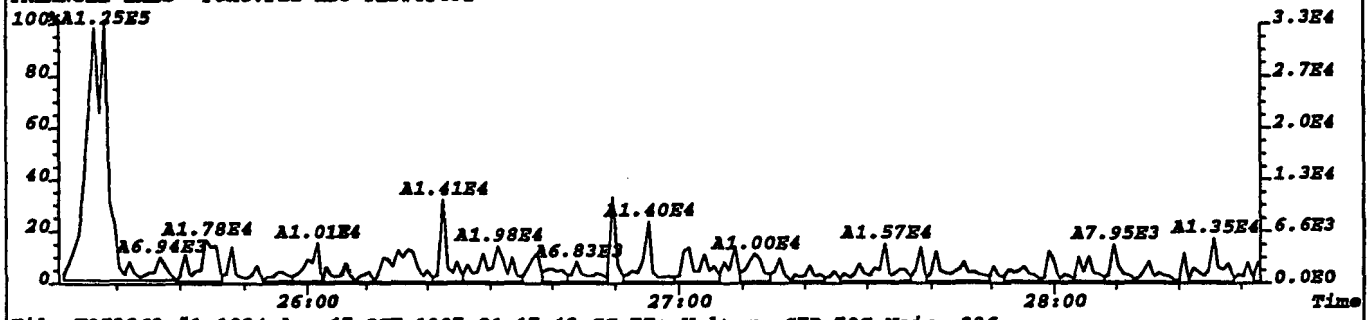
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S
409.7974 F:2 Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



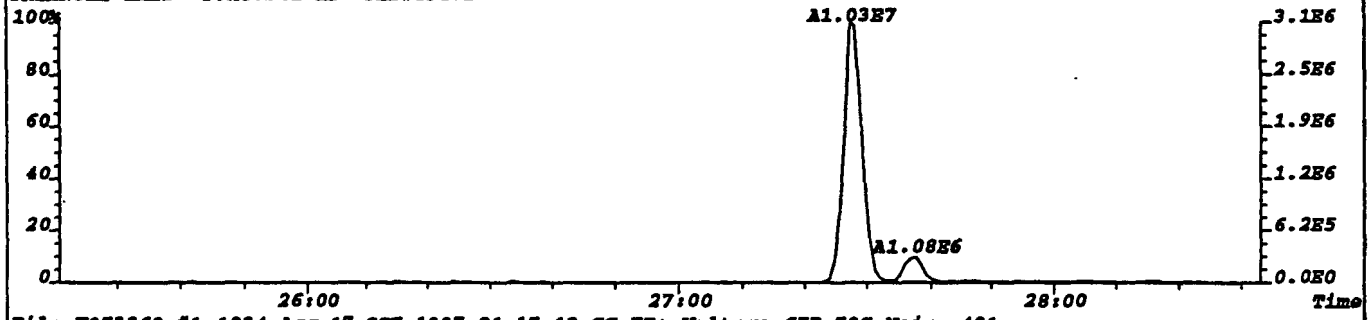
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:388
355.8546 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,1552.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



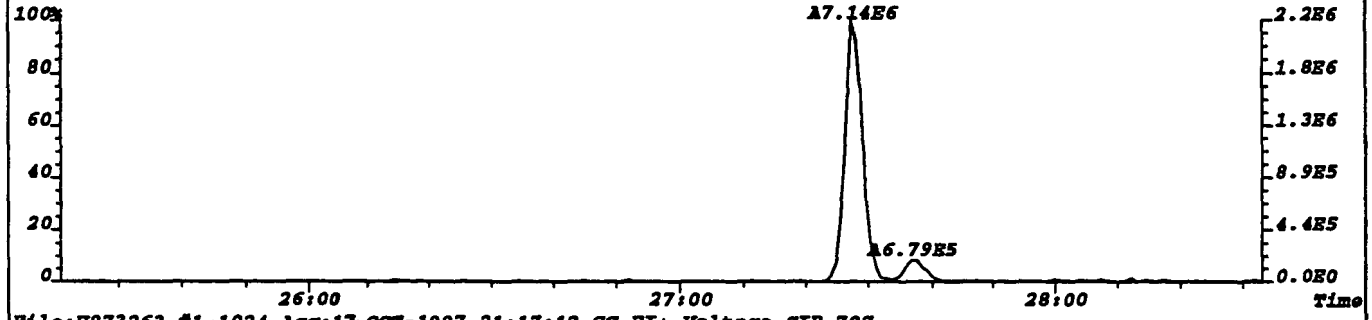
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:353
357.8516 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,1412.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



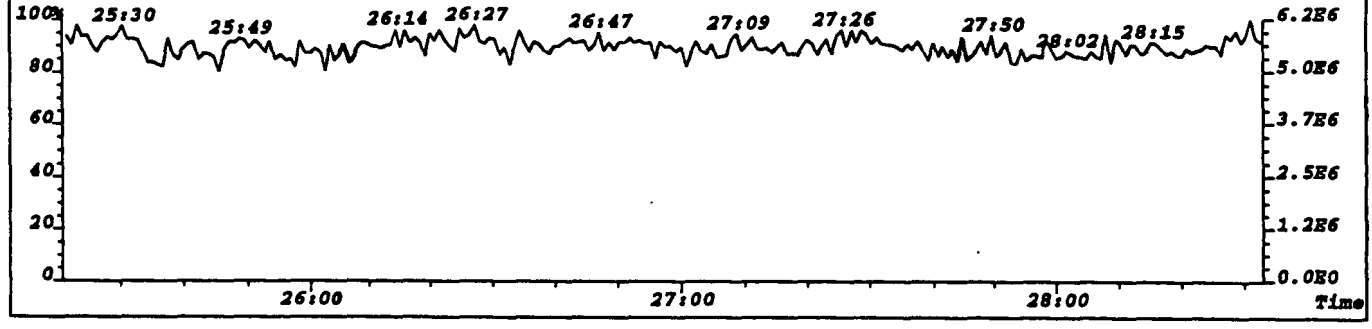
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:296
367.8949 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,1184.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



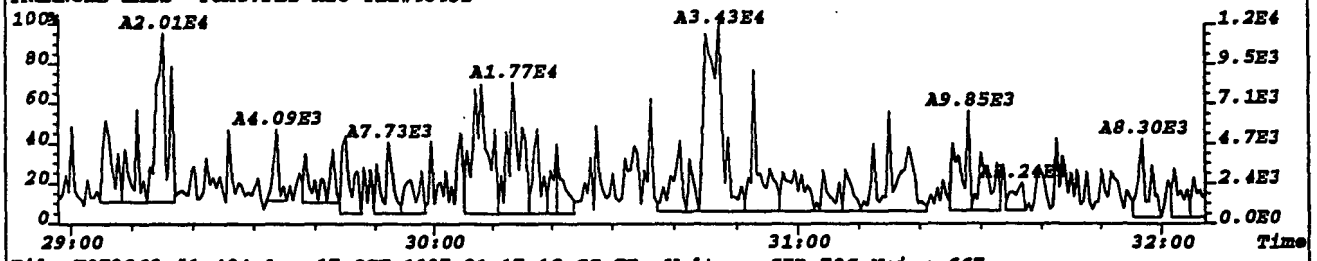
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:401
369.8919 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,1604.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



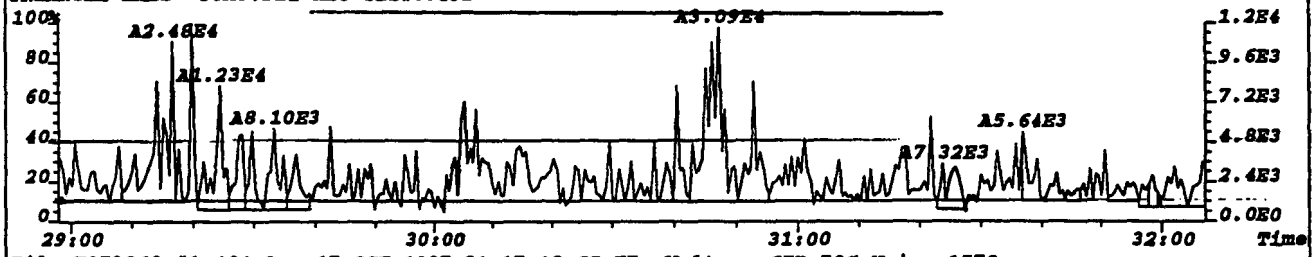
File:U973263 #1-1024 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



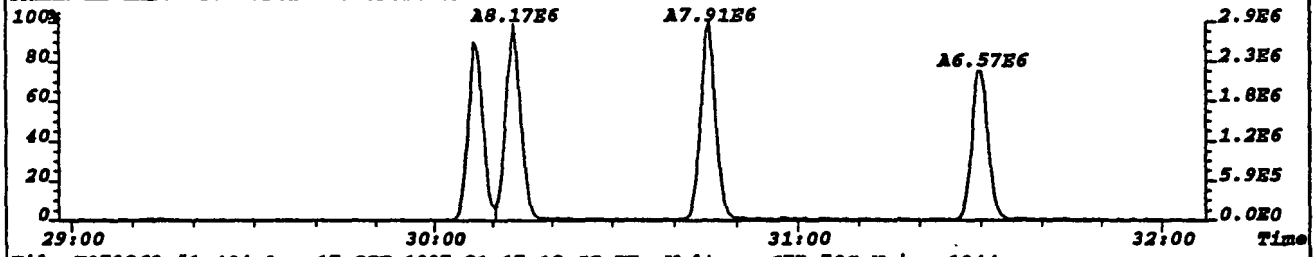
File:U973263 #1-404 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:643
373.8208 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2572.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



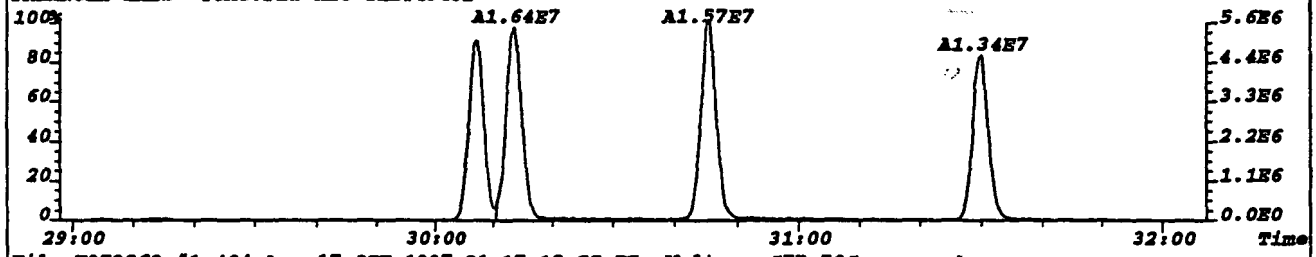
File:U973263 #1-404 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:667
375.8178 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2668.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



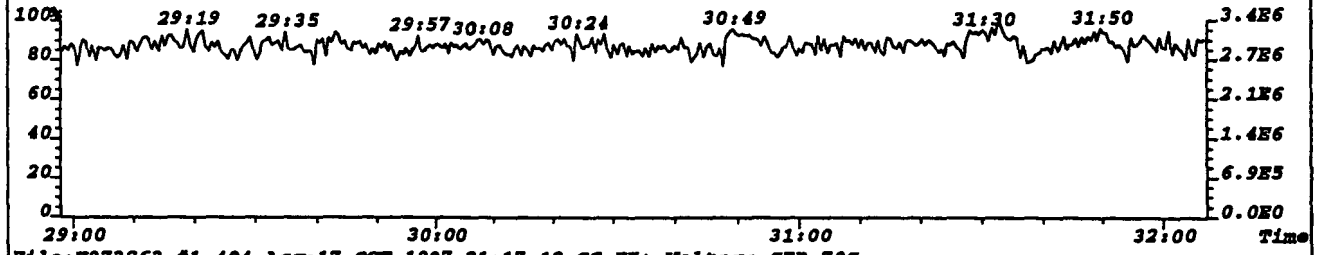
File:U973263 #1-404 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:1579
383.8639 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6316.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



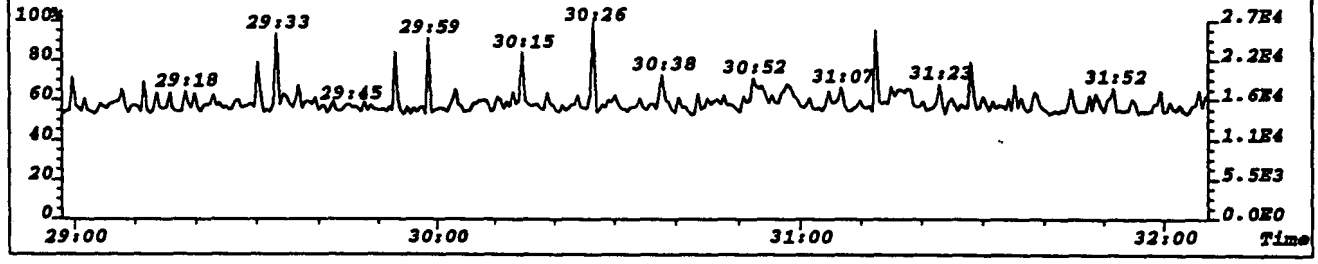
File:U973263 #1-404 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:1044
385.8610 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4176.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



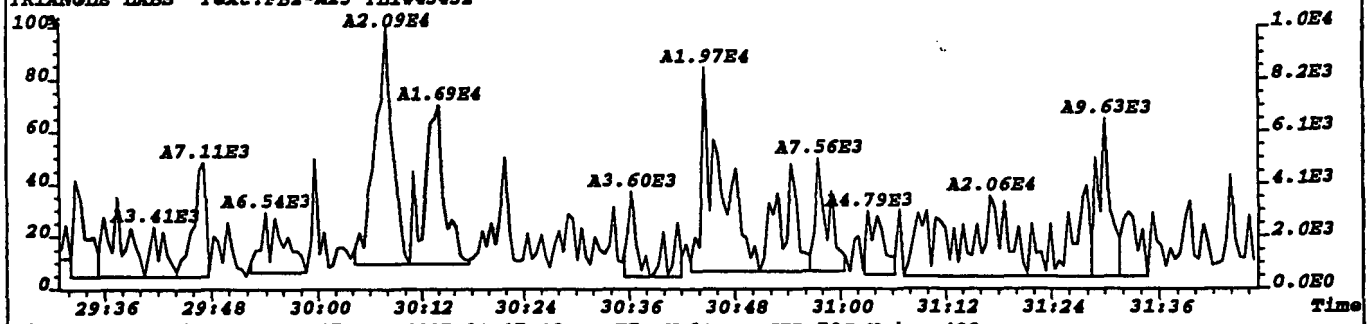
File:U973263 #1-404 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S
392.9760 F:3 Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



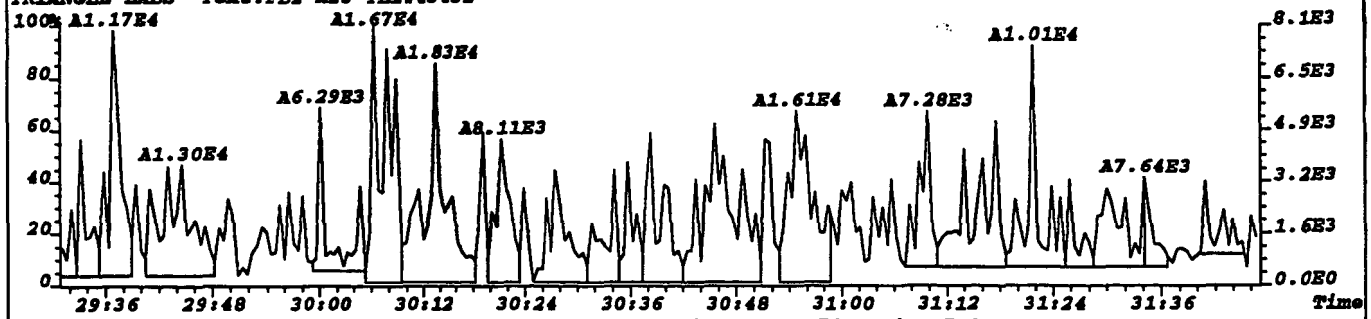
File:U973263 #1-404 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S
445.7555 F:3 Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



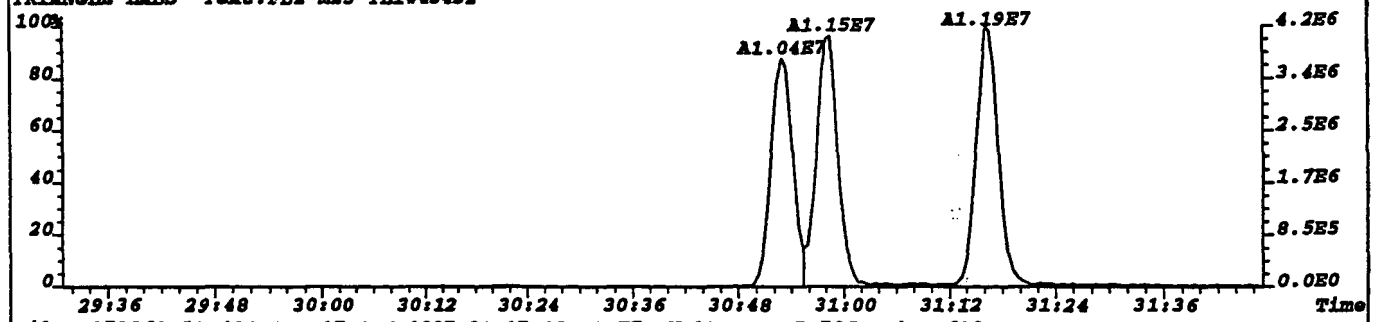
File:U973263 #1-404 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:490
389.8156 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1960.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



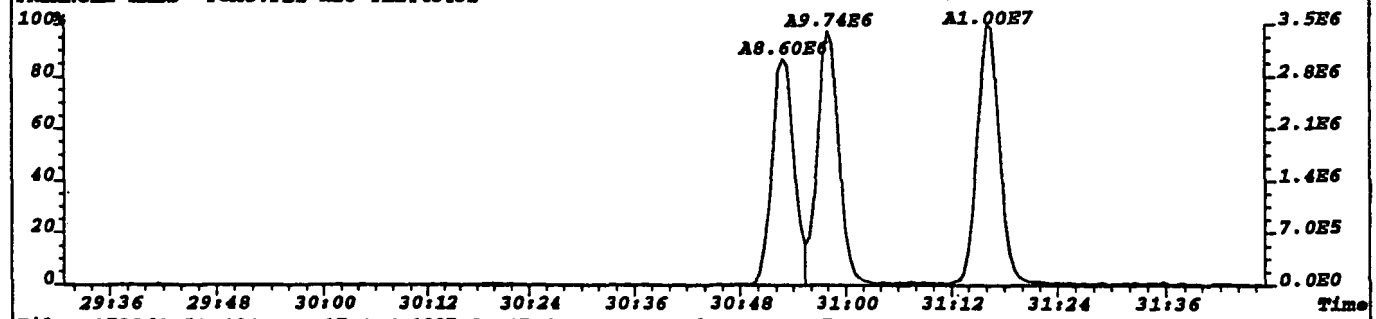
File:U973263 #1-404 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:408
391.8127 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1632.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



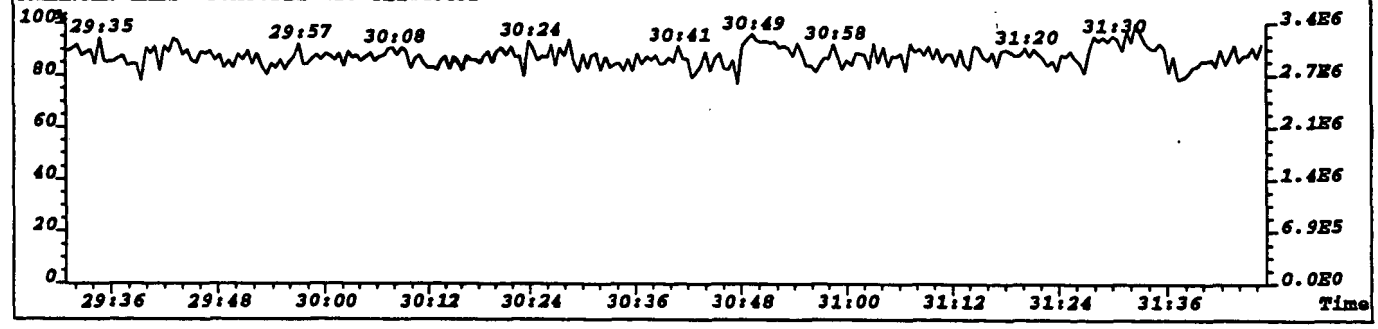
File:U973263 #1-404 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:709
401.8558 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2836.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



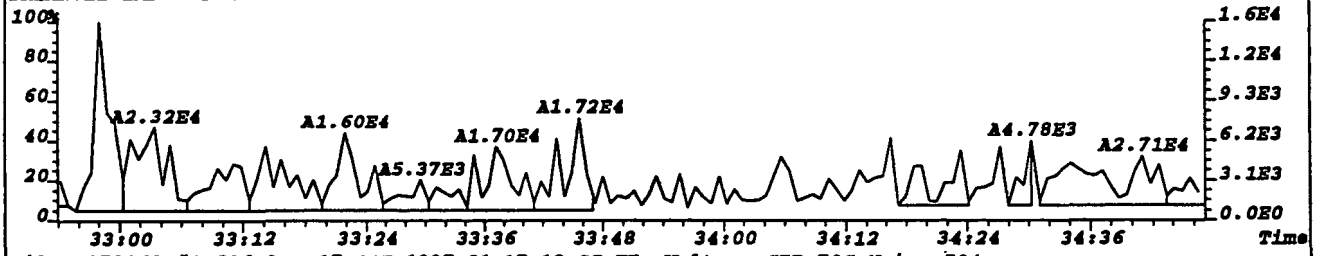
File:U973263 #1-404 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:610
403.8529 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2440.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



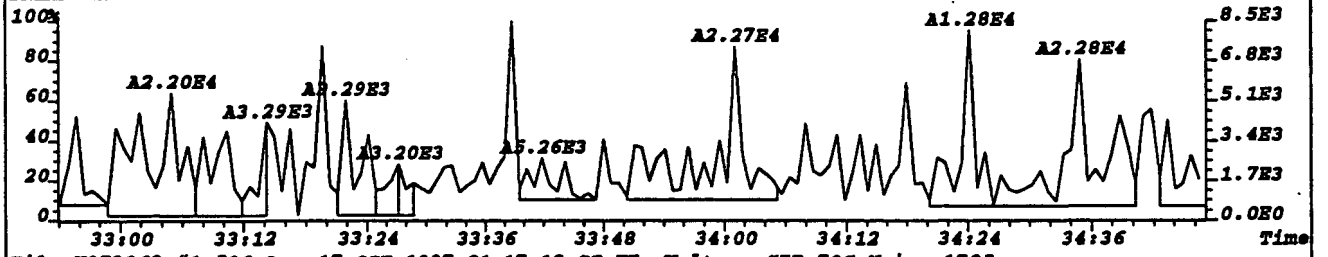
File:U973263 #1-404 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S
392.9760 F:3 Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



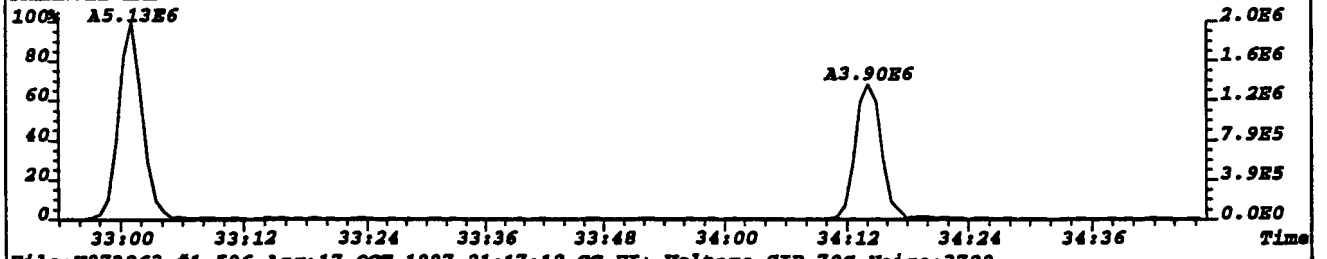
File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:682
407.7818 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2728.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



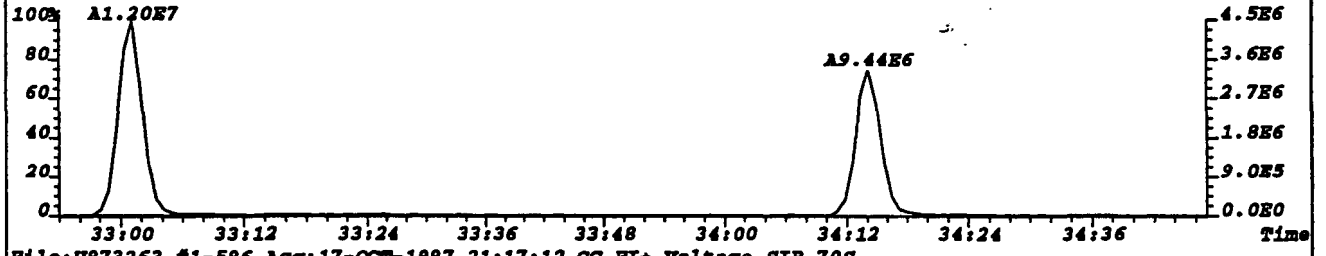
File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:504
409.7789 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2016.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



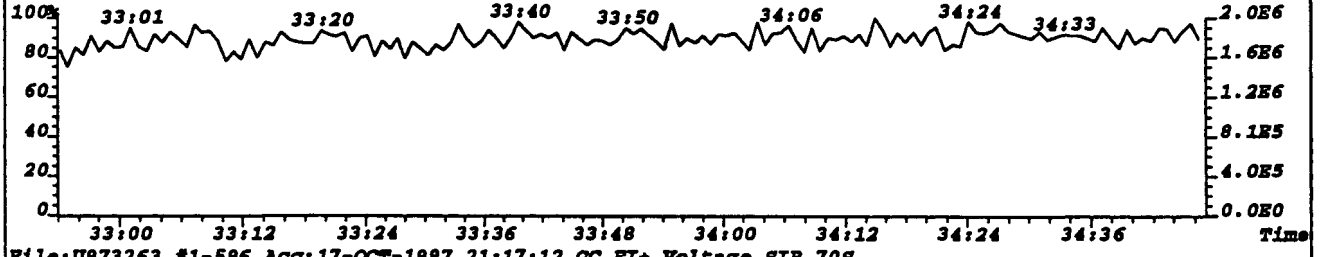
File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:1785
417.8253 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7140.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



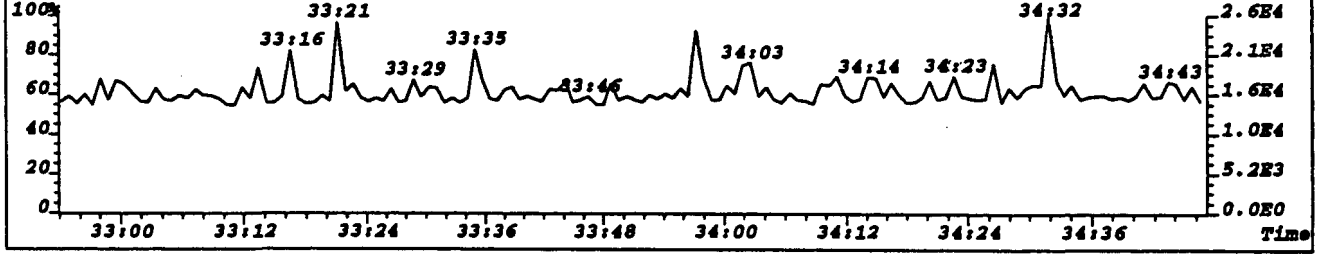
File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:3789
419.8220 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,15156.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



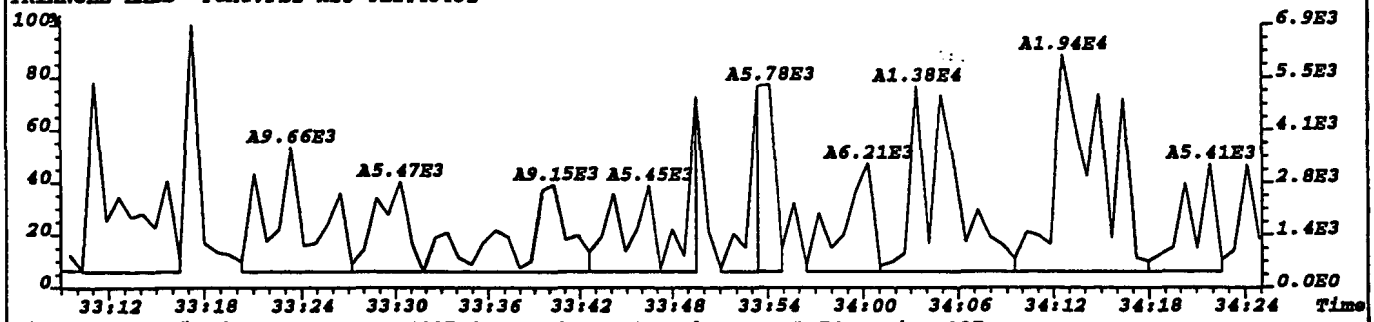
File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



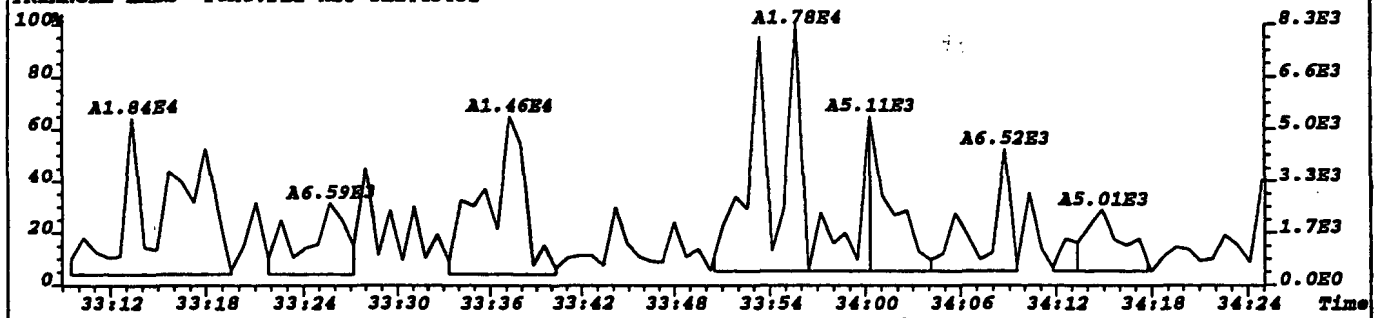
File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S
479.7165 F:4 Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



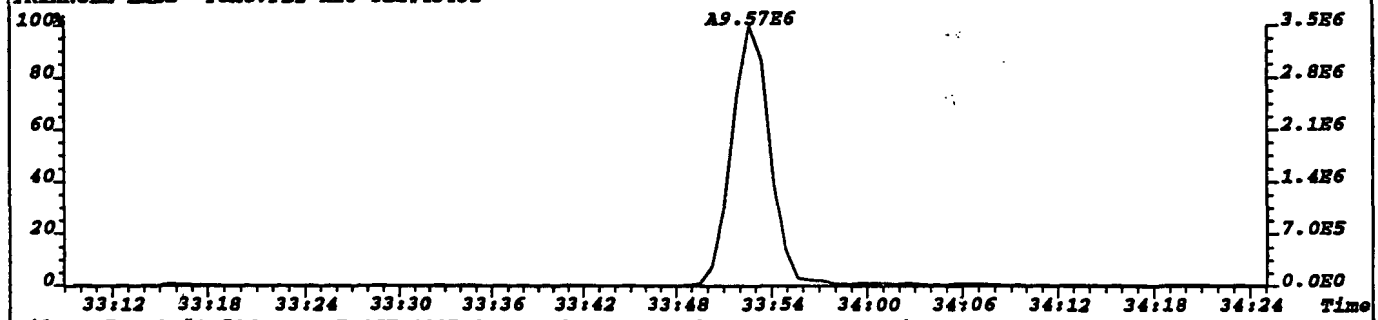
File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:375
423.7766 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1500.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



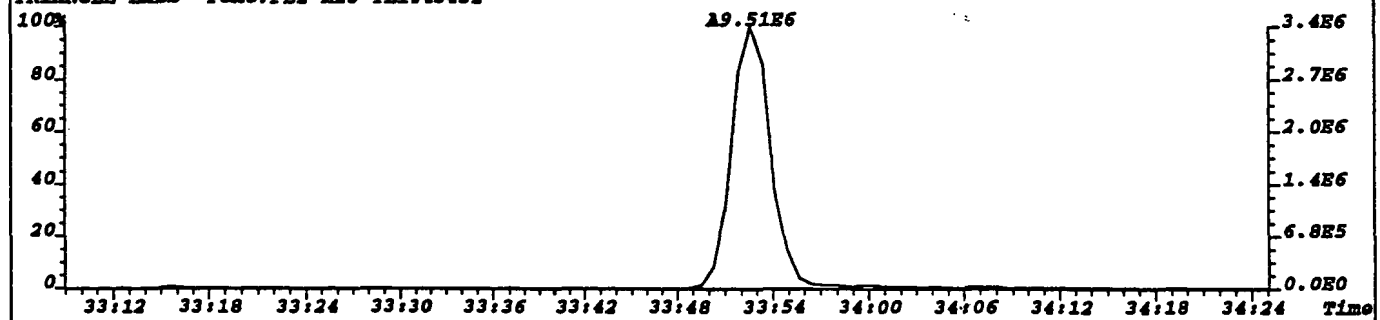
File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:327
425.7737 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1308.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



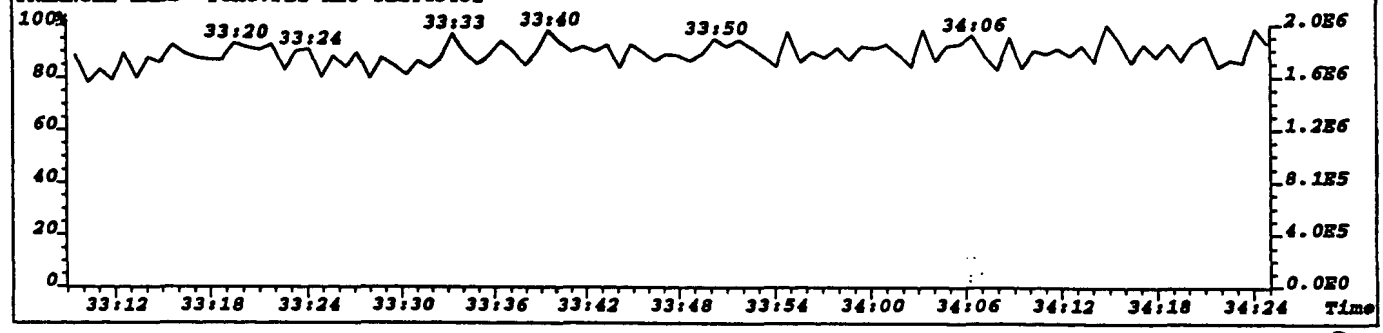
File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:1682
435.8169 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6728.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



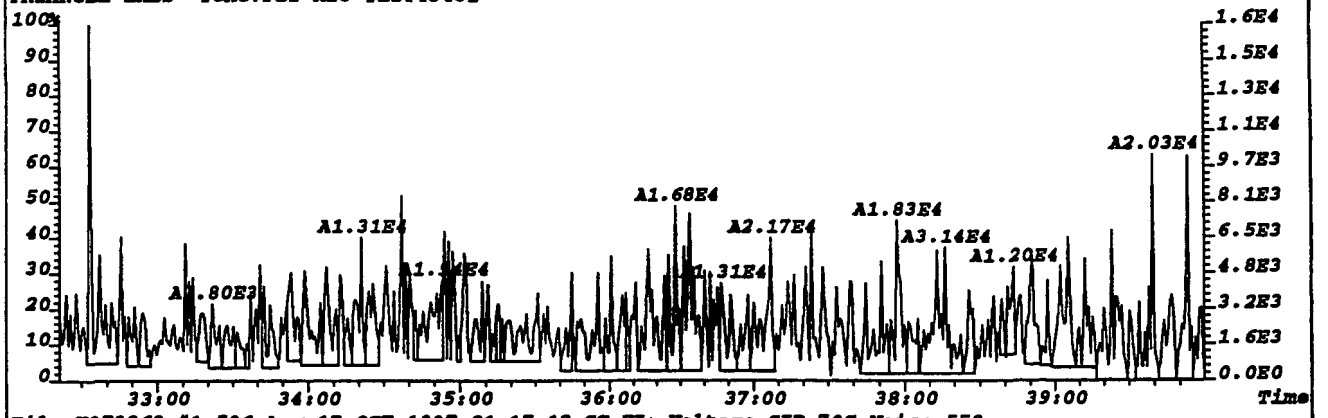
File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:1341
437.8140 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5364.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



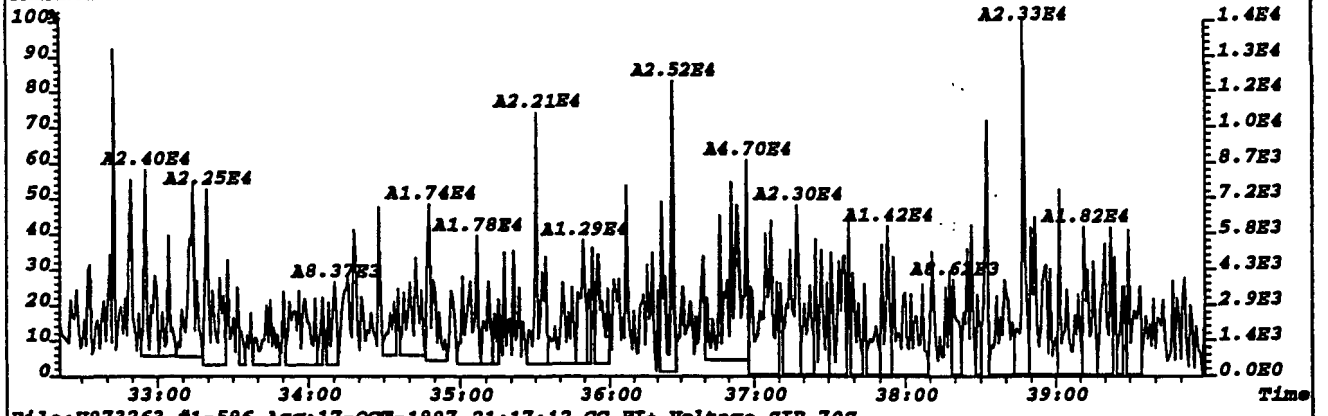
File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



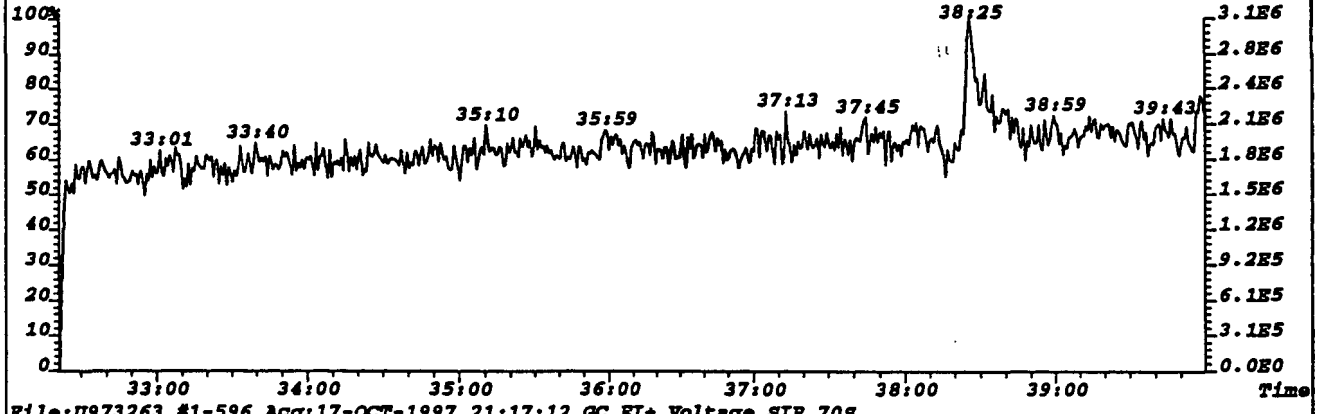
File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:611
441.7428 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2444.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



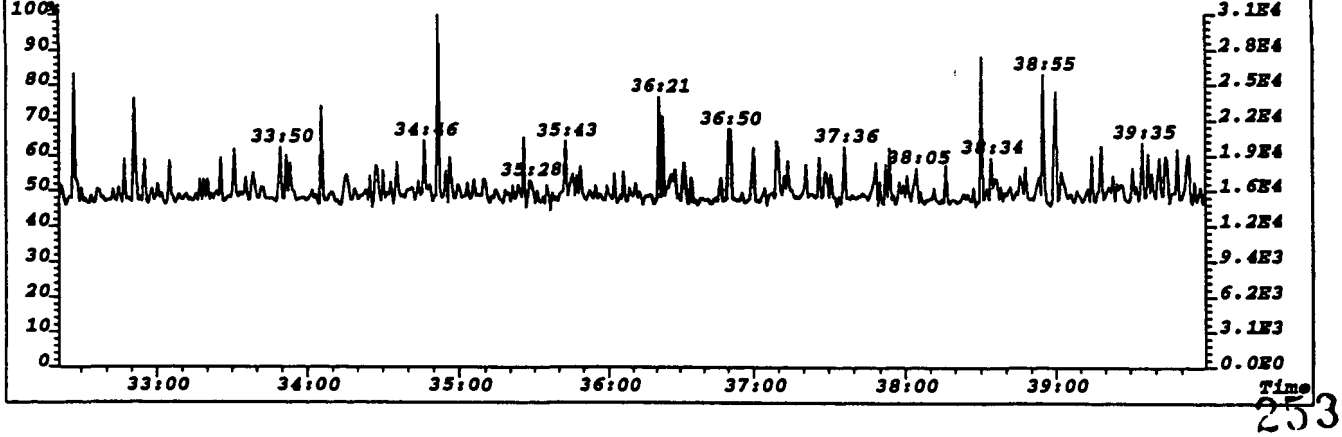
File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:558
443.7399 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2232.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



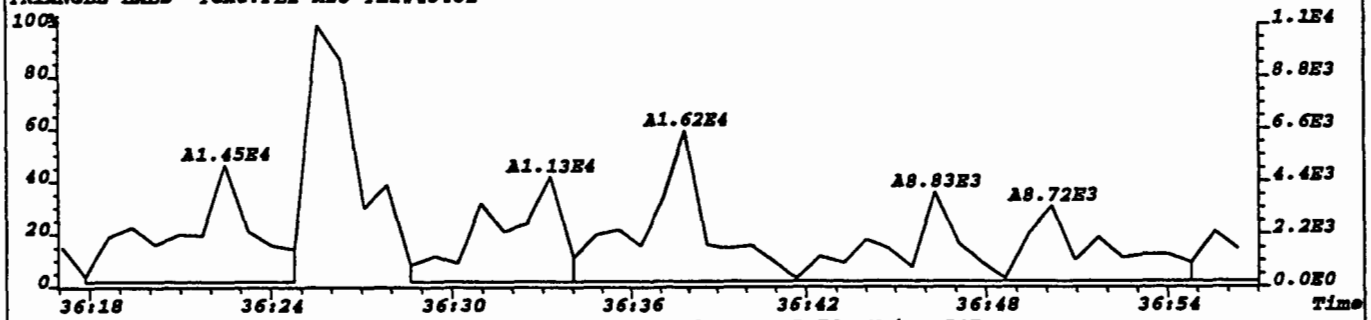
File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



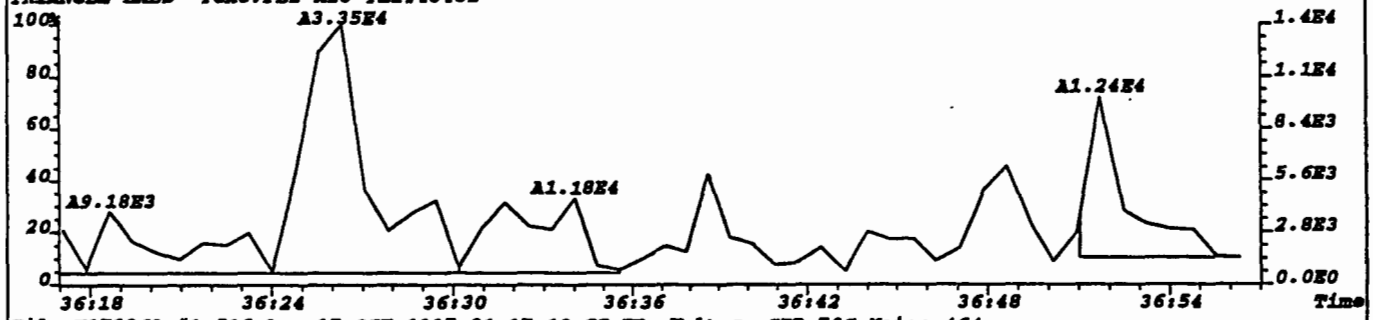
File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S
513.6775 F:4 Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



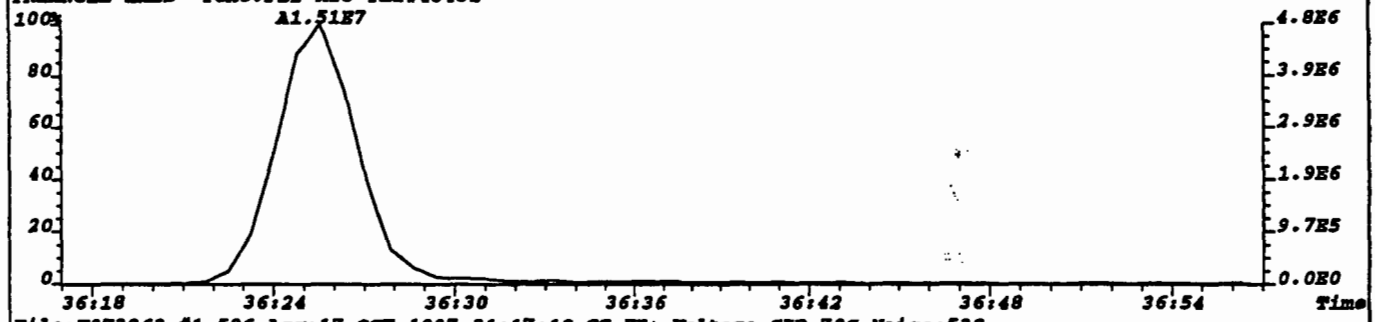
File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:446
457.7377 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1784.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432



File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:547
459.7348 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2188.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432

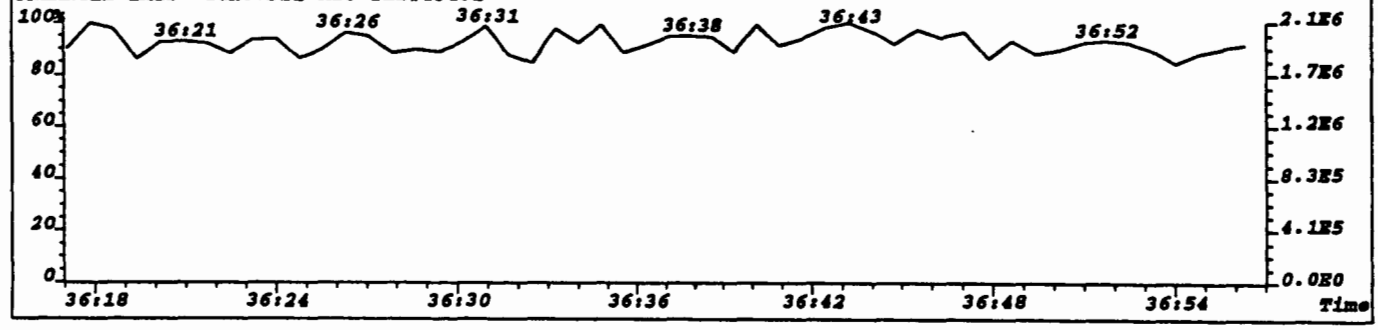


File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:464
469.7779 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1856.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432

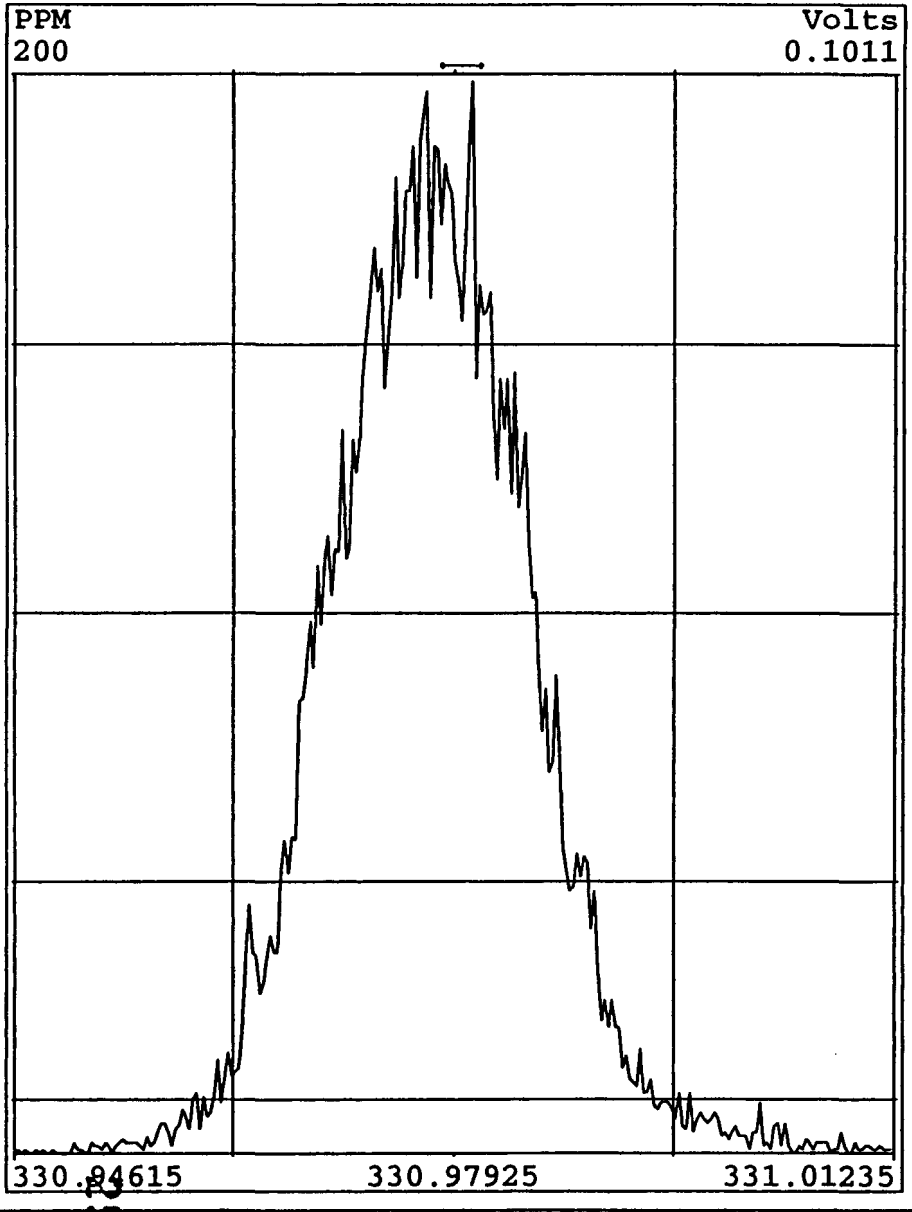


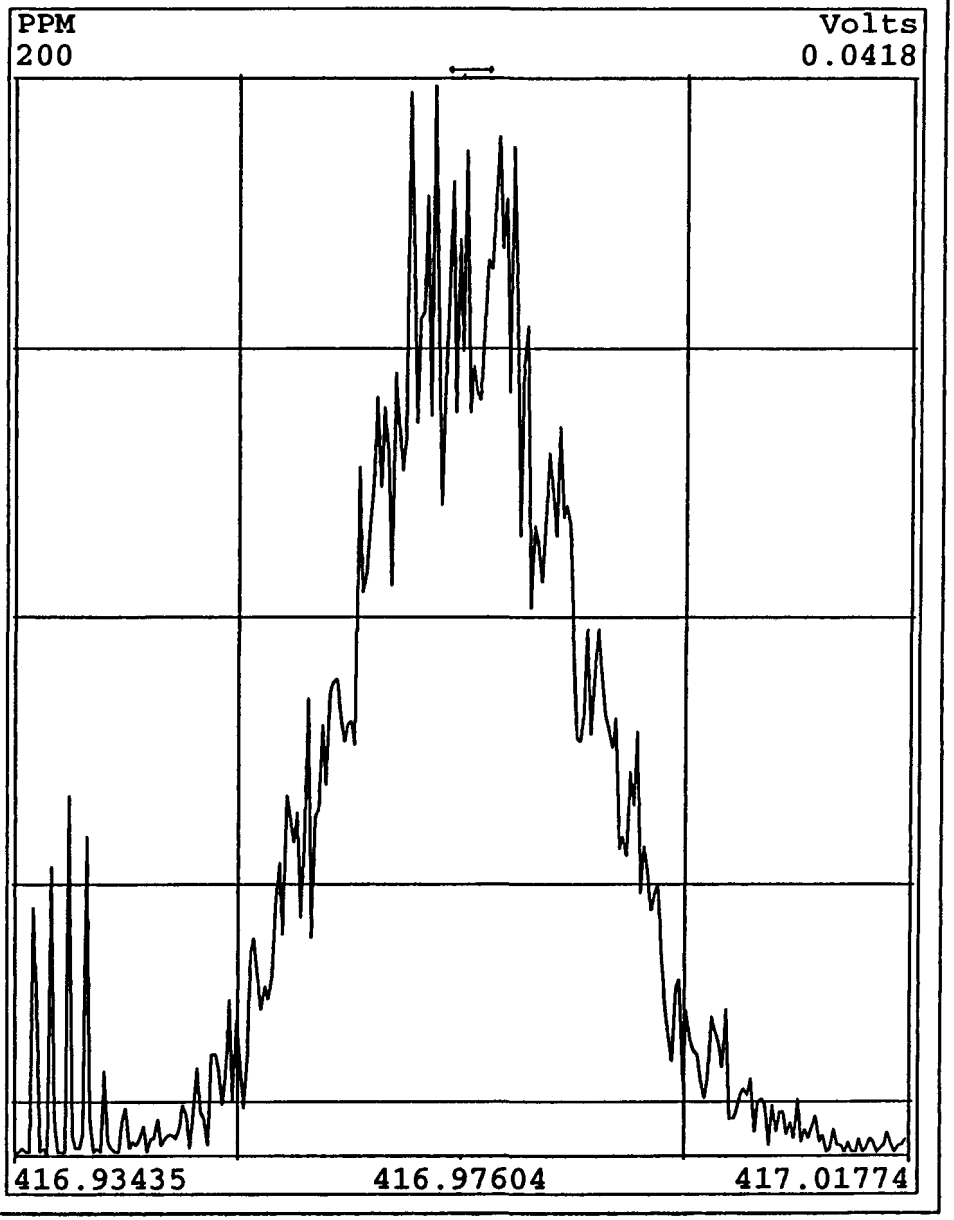
File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S Noise:532
471.7750 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2128.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432

File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:FB2-M23 TLI#43432

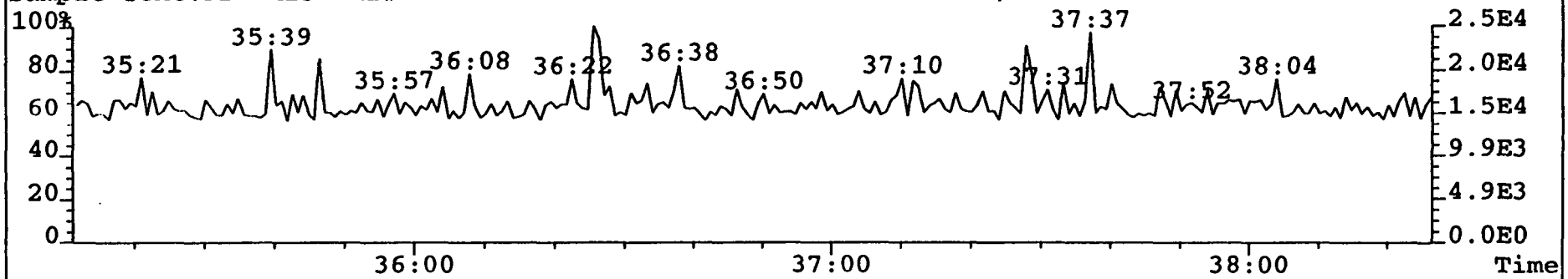


Peak Locate Examination:17-OCT-1997:21:15 File:U973263
Experiment:EPCUS2 Function:2 Reference:PFK

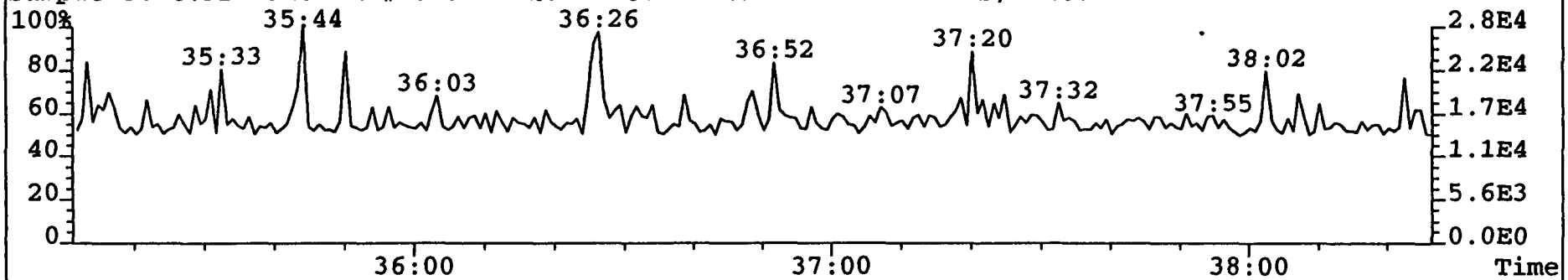




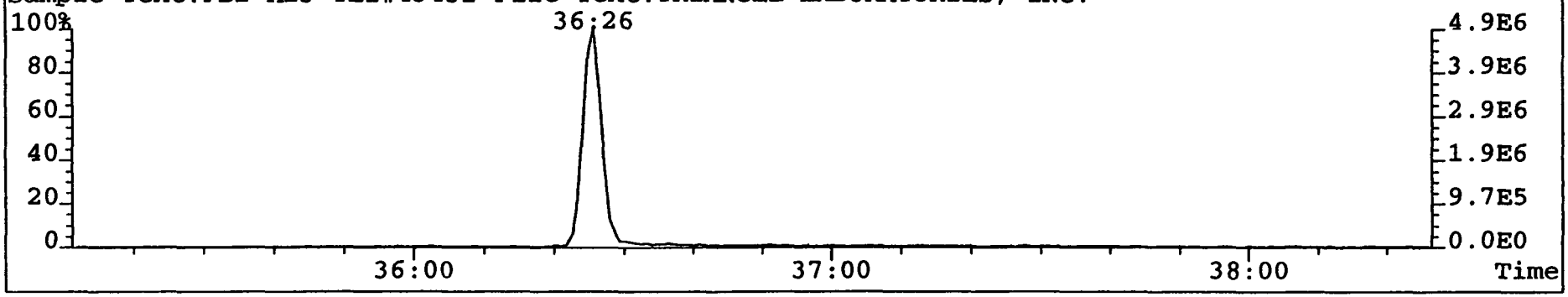
File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S
457.7377 F:4 Exp:EPCUS2
Sample Text:FB2-M23 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S
459.7348 F:4 Exp:EPCUS2
Sample Text:FB2-M23 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973263 #1-596 Acq:17-OCT-1997 21:17:12 GC EI+ Voltage SIR 70S
469.7779 F:4 Exp:EPCUS2
Sample Text:FB2-M23 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



Pacific Environmental Services

TLI Project: **43432** Method 23 TCDD/TCDF Analysis (DB-225)
Client Sample: **FB2-M23** Analysis File: **X973680**

Client Project:	**Saginaw, MI**				
Sample Matrix:	**M23TRAIN**	Date Received:	**09/29/97**	Spike File:	**SPC2NF04**
TLI ID:	**185-6-6A-C**	Date Extracted:	**10/09/97**	ICal:	**XF24087**
		Date Analyzed:	**10/22/97**	ConCal:	**X973676**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U973257**	% Lipid:	**n/a**
GC Column:	**DB-225**	Analyst:	**GG**	% Solids:	**n/a**

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDF	ND	0.01				—

Internal Standard	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	3.3	81.8	40%-130%	0.79	24:18	—

Recovery Standard	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.82	23:07	—

Data Reviewer: VC 10/23/97

C2NF_PSR v2.00, LARS 6.10.04

Triangle Laboratories, Inc.®
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Printed: 23:38 10/23/97

Initial ....Date...

Data Review By: VC 10/23/97 Calculated Noise Area: 9.99

The Total Area for each peak with an ion abundance ratio outside ratio limits has been recalculated according to method requirements.

Page No. 1 Listing of X973680B.dbf
10/23/97 Matched GC Peaks / Ratio / Ret. Time

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
TCDF						0.65-0.89				0.800-1.112			
304-306	DC	NL		0:00		0.65	17.53			0.000			
	DC	SN		20:52	RO	0.93	9.01			0.859			
				24:34		0.70	16.64	6.87	9.77	1.011			
	DC	SN		24:40		0.69	6.48			1.015			
304-306			1	Peak			16.64						
13C12-TCDF						0.65-0.89				0.959-1.041			
316-318	DC	NL		0:00	RO	0.54	23.26			0.000			
	DC	WL		22:20	RO	2.85	10.12			0.919			
	DC	WL		22:47	RO	2.62	14.73			0.938			
	DC	WL		23:03	RO	1.09	64.53			0.949			
				24:18		0.79	7,789.42	3,430.53	4,358.89	1.000	13C12-2378-TCDF	IS0	
	DC	SN		24:35	RO	0.26	10.83			1.012			
	DC	WH		25:44	RO	0.54	9.95			1.059			
	DC	WH		26:42		0.76	63.12			1.099			
	DC	WH		26:46	RO	1.19	14.02			1.102			
316-318			1	Peak			7,789.42						

---------- Above: TCDF / TCDD Follows ----------

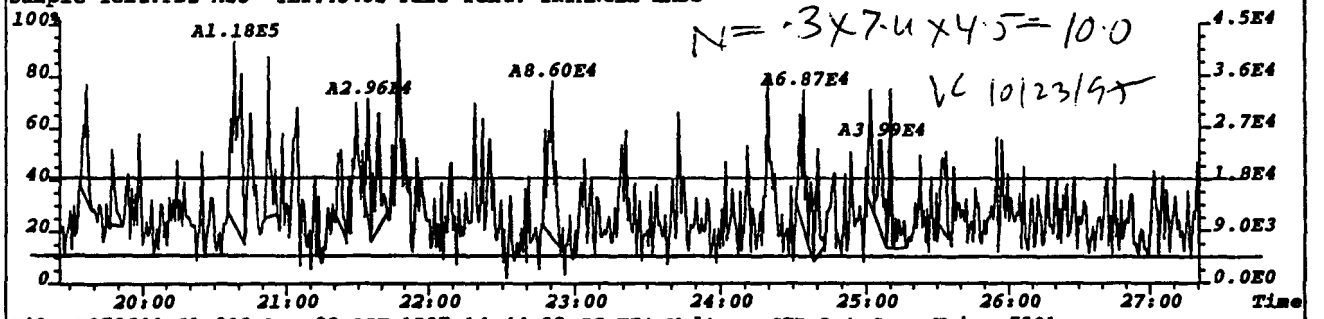
13C12-TCDD						0.65-0.89				0.912-1.088			
332-334	DC	NL		0:00	RO	2.12	8.30			0.000			
	DC	SN		20:52	RO	1.36	6.99			0.915			
				22:49		0.79	5,739.59	2,541.14	3,198.45	1.000	13C12-2378-TCDD	IS1	
				23:07		0.82	6,840.77	3,089.24	3,751.53	1.013	13C12-1234-TCDD	RS1	
				23:24		0.67	15.31	6.14	9.17	1.026			
				23:53	RO	0.48	53.88	23.44	49.27	1.047			
	DC	SN		24:44	RO	5.03	5.26			1.084			
	DC	WH		24:56		0.67	4.68			1.093			
	DC	WH		24:59	RO	3.17	10.02			1.095			
	DC	WH		25:09		0.87	2.90			1.102			
	DC	WH		25:25	RO	0.30	4.11			1.114			
	DC	WH		25:33	RO	0.57	7.33			1.120			
	DC	WH		25:51	RO	0.90	21.05			1.133			
332-334			4	Peaks			12,649.55						

Compound/
M_Z.... QC.Log Omit Why ..RT. OK Ratio Total.Area... Area.Peak.1.. Area.Peak.2.. Rel.RT Compound.Name.. ID.. Flags.

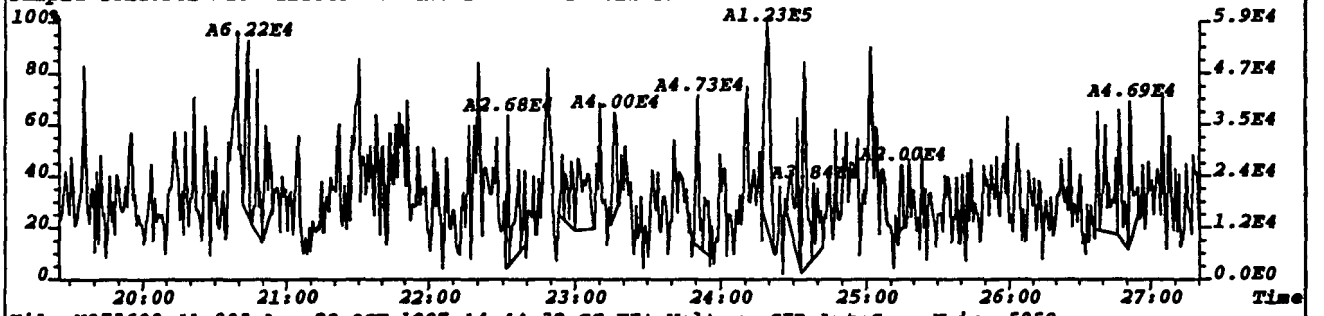
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside Limits	<M-Below Method Detection Limit	T-Time Changed
Rel.RT-Relative Retention Time	NL-Channel Specific Noise Level	M-Peak Area Changed
		N-Name Changed
		E-Ether Interference

*** End of Report ***

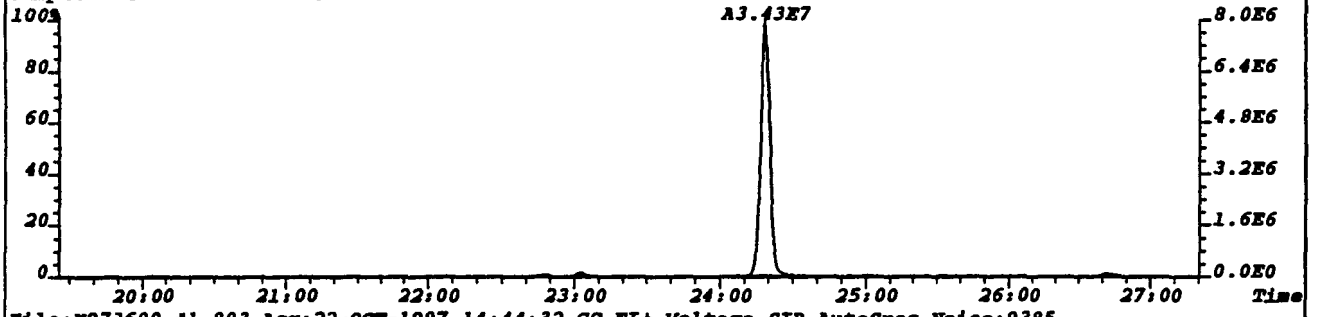
File:X973680 #1-803 Acq:22-OCT-1997 14:44:32 GC EI+ Voltage SIR AutoSpec Noise:3464
303.9016 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,13856.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:FB2-M23 TLI#43432 File Text: TRIANGLE LABS



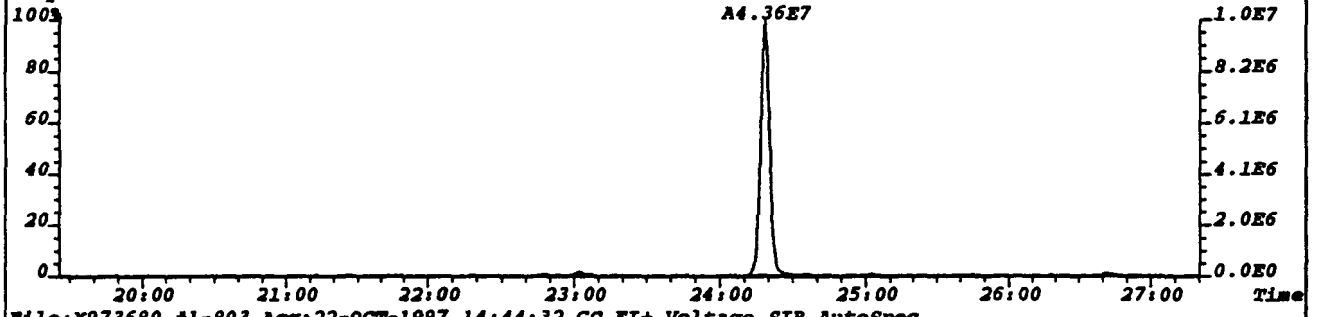
File:X973680 #1-803 Acq:22-OCT-1997 14:44:32 GC EI+ Voltage SIR AutoSpec Noise:5301
305.8987 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,21204.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:FB2-M23 TLI#43432 File Text: TRIANGLE LABS



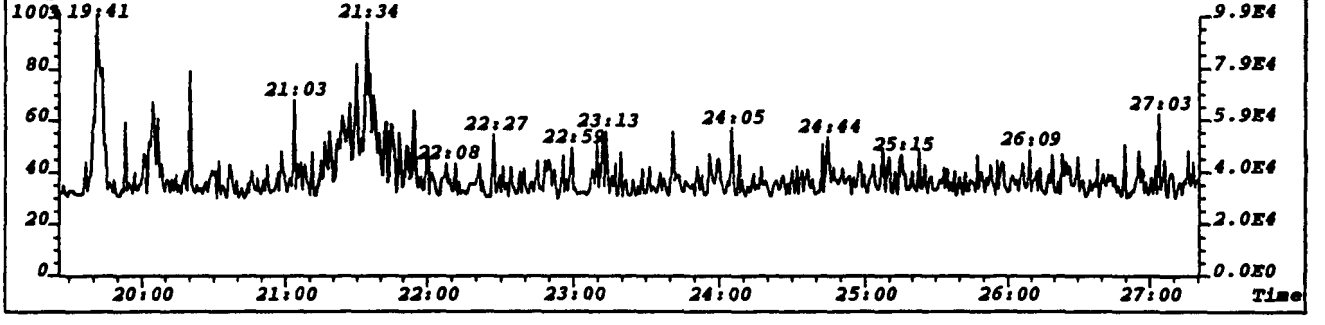
File:X973680 #1-803 Acq:22-OCT-1997 14:44:32 GC EI+ Voltage SIR AutoSpec Noise:5059
315.9419 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,20236.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:FB2-M23 TLI#43432 File Text: TRIANGLE LABS



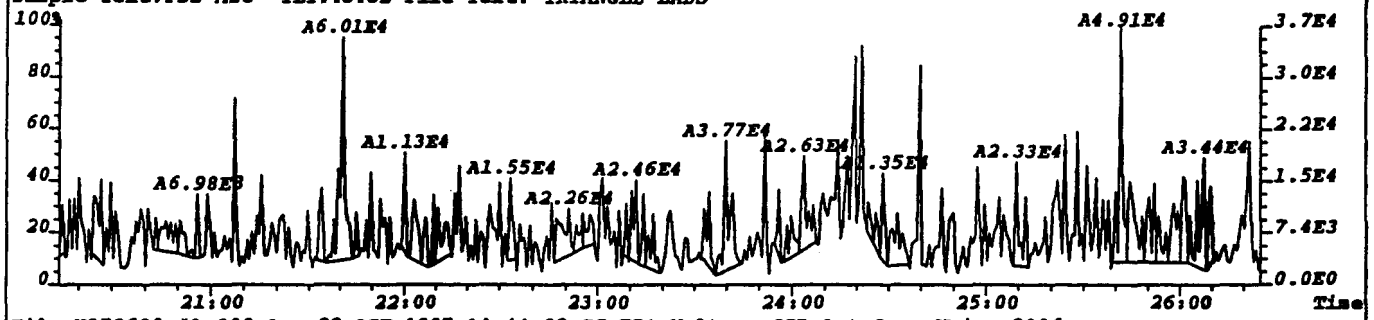
File:X973680 #1-803 Acq:22-OCT-1997 14:44:32 GC EI+ Voltage SIR AutoSpec Noise:9385
317.9389 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,37540.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:FB2-M23 TLI#43432 File Text: TRIANGLE LABS



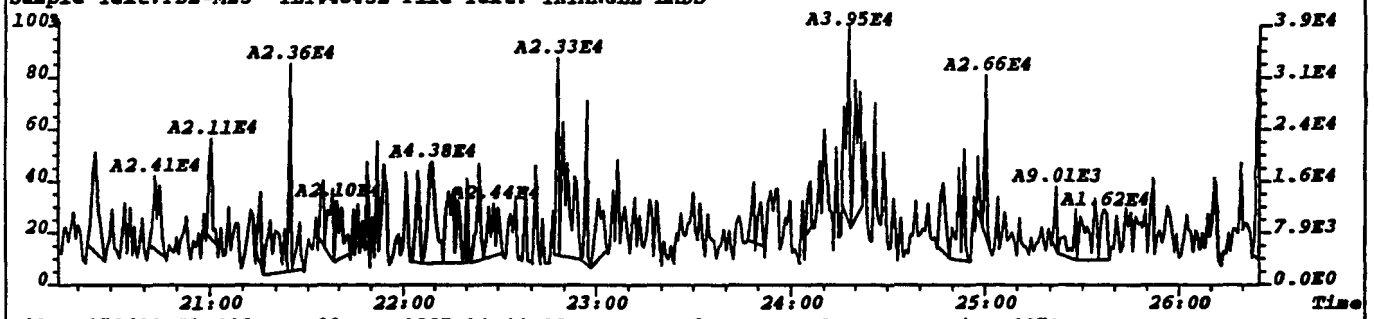
File:X973680 #1-803 Acq:22-OCT-1997 14:44:32 GC EI+ Voltage SIR AutoSpec
375.8364 Exp:XCONF_TT
Sample Text:FB2-M23 TLI#43432 File Text: TRIANGLE LABS



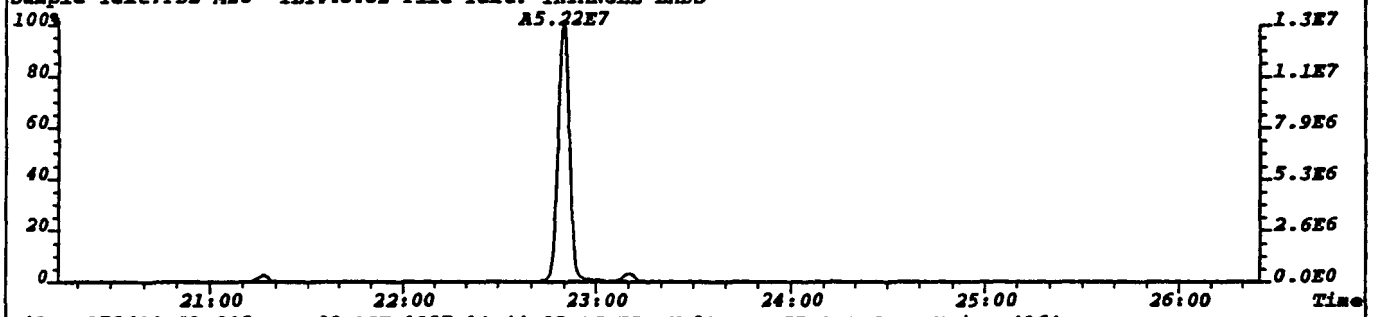
File:X973680 #1-803 Acq:22-OCT-1997 14:44:32 GC EI+ Voltage SIR AutoSpec Noise:1682
319.8965 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,6728.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:FB2-M23 TLI#43432 File Text: TRIANGLE LABS



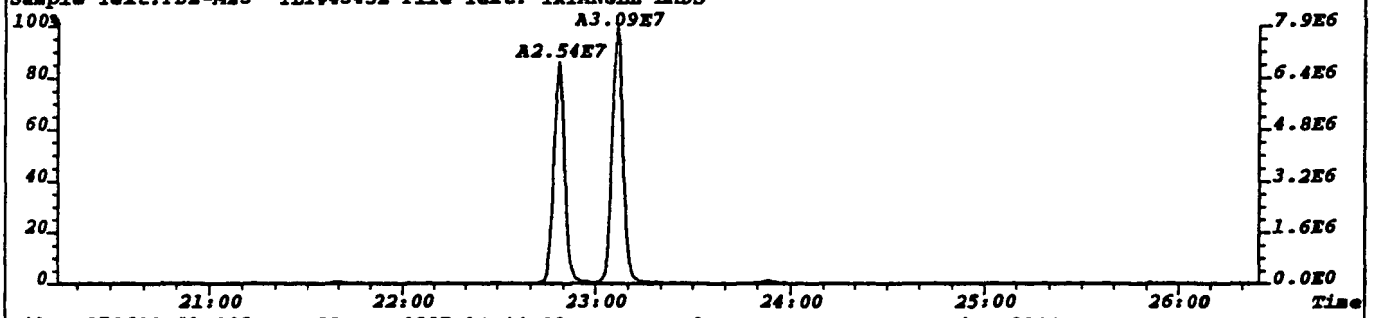
File:X973680 #1-803 Acq:22-OCT-1997 14:44:32 GC EI+ Voltage SIR AutoSpec Noise:2006
321.8936 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,8024.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:FB2-M23 TLI#43432 File Text: TRIANGLE LABS



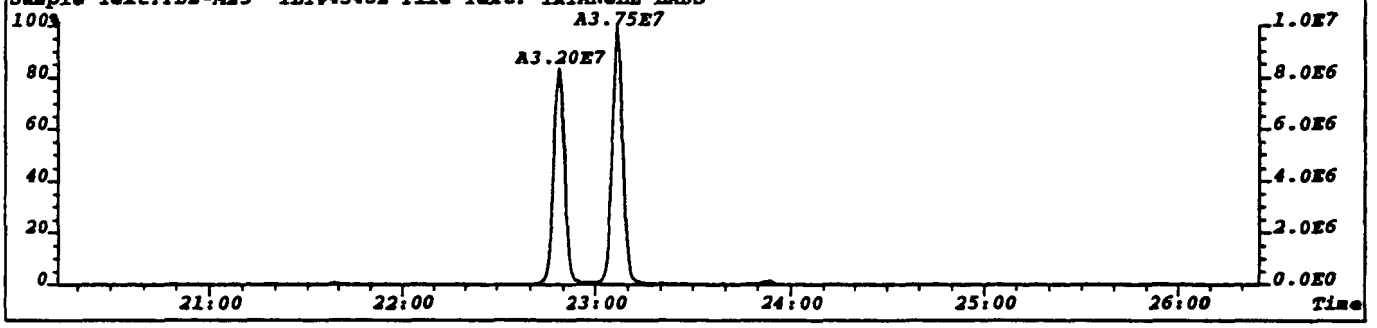
File:X973680 #1-803 Acq:22-OCT-1997 14:44:32 GC EI+ Voltage SIR AutoSpec Noise:6271
327.8847 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,25084.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:FB2-M23 TLI#43432 File Text: TRIANGLE LABS



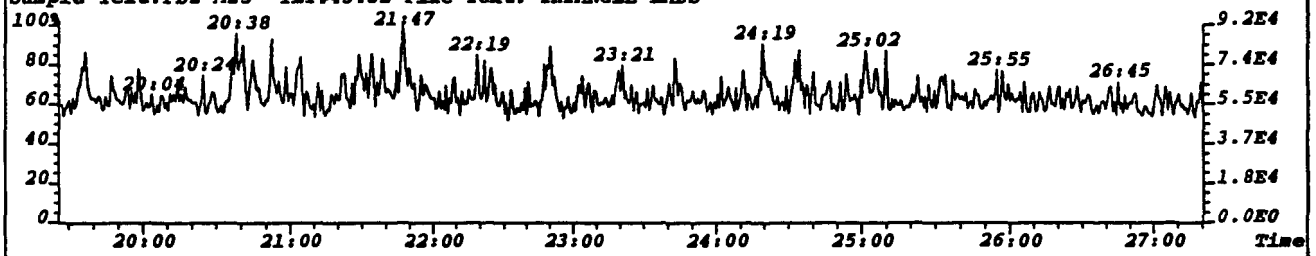
File:X973680 #1-803 Acq:22-OCT-1997 14:44:32 GC EI+ Voltage SIR AutoSpec Noise:4964
331.9368 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,19856.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:FB2-M23 TLI#43432 File Text: TRIANGLE LABS



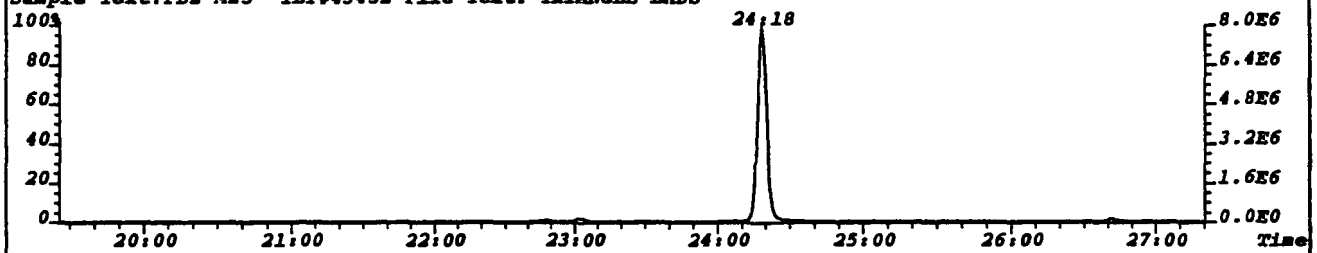
File:X973680 #1-803 Acq:22-OCT-1997 14:44:32 GC EI+ Voltage SIR AutoSpec Noise:2344
333.9338 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,9376.0,0.00%,F,F) Exp:XCONF_TT
Sample Text:FB2-M23 TLI#43432 File Text: TRIANGLE LABS



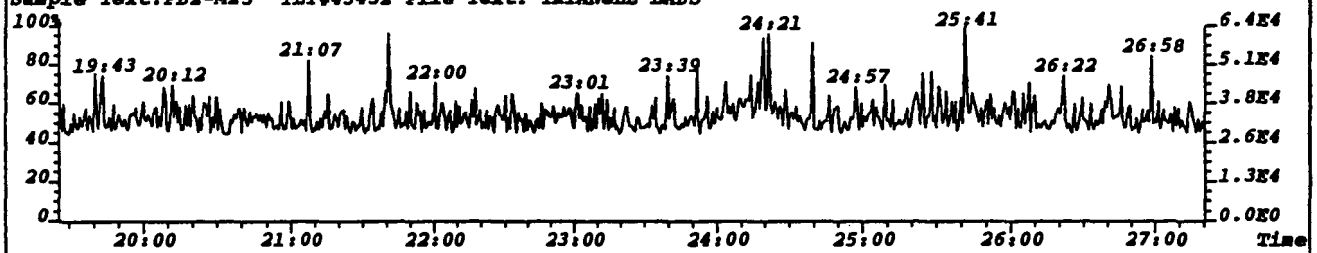
File:X973680 #1-803 Acq:22-OCT-1997 14:44:32 GC EI+ Voltage SIR AutoSpec
303.9016 Exp:XCONF_TT
Sample Text:FB2-M23 TLI#43432 File Text: TRIANGLE LABS



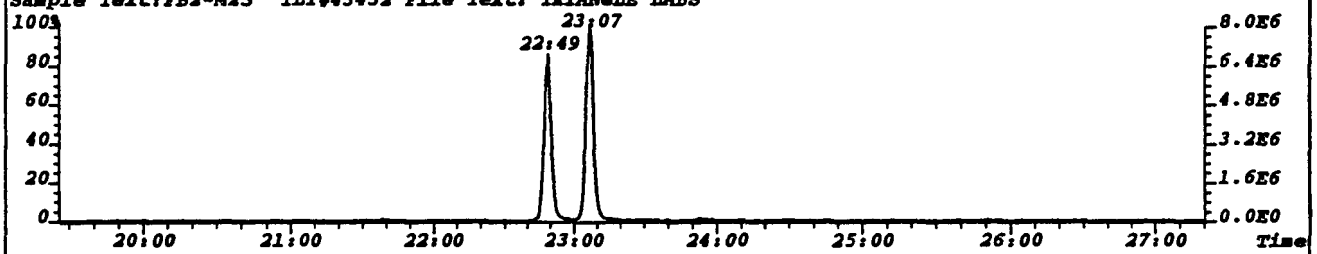
File:X973680 #1-803 Acq:22-OCT-1997 14:44:32 GC EI+ Voltage SIR AutoSpec
315.9419 Exp:XCONF_TT
Sample Text:FB2-M23 TLI#43432 File Text: TRIANGLE LABS



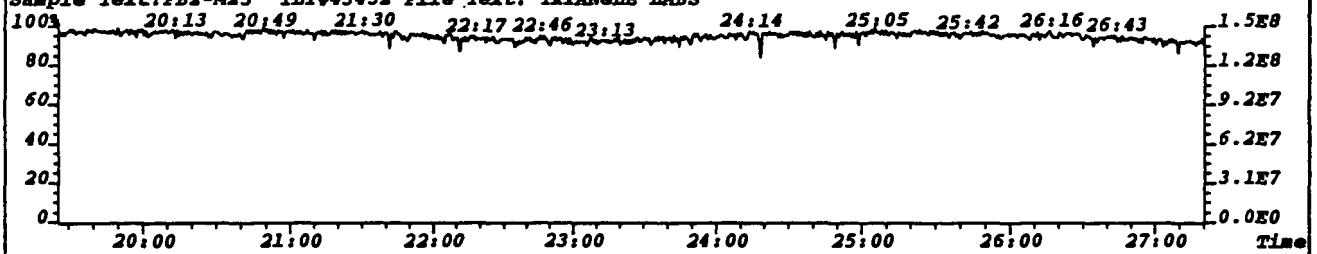
File:X973680 #1-803 Acq:22-OCT-1997 14:44:32 GC EI+ Voltage SIR AutoSpec
319.8965 Exp:XCONF_TT
Sample Text:FB2-M23 TLI#43432 File Text: TRIANGLE LABS



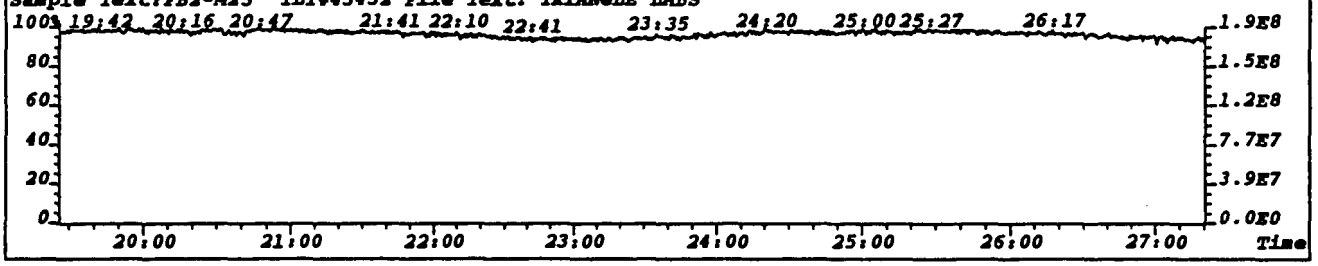
File:X973680 #1-803 Acq:22-OCT-1997 14:44:32 GC EI+ Voltage SIR AutoSpec
331.9368 Exp:XCONF_TT
Sample Text:FB2-M23 TLI#43432 File Text: TRIANGLE LABS



File:X973680 #1-803 Acq:22-OCT-1997 14:44:32 GC EI+ Voltage SIR AutoSpec
292.9825 Exp:XCONF_TT
Sample Text:FB2-M23 TLI#43432 File Text: TRIANGLE LABS



File:X973680 #1-803 Acq:22-OCT-1997 14:44:32 GC EI+ Voltage SIR AutoSpec
330.9792 Exp:XCONF_TT
Sample Text:FB2-M23 TLI#43432 File Text: TRIANGLE LABS



Pacific Environmental Services

TLI Project: 43432 — Method 23 PCDD/PCDF Analysis (a)
Client Sample: LAB BLANK M23 — Analysis File: U973264

Client Project:	Saginaw, MI				
Sample Matrix:	M23TRAIN	Date Received:	09/29/97	Spike File:	SPX23704
TLI ID:	185-6-7A-C,E	Date Extracted:	10/09/97	ICal:	UF59167
		Date Analyzed:	10/17/97	ConCal:	U973252
Sample Size:	1.000	Dilution Factor:	n/a	% Moisture:	n/a
Dry Weight:	n/a	Blank File:	U973257	% Lipid:	n/a
GC Column:	DB-5	Analyst:	BB	% Solids:	n/a

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	ND	0.003				
1,2,3,7,8-PeCDD	ND	0.004				
1,2,3,4,7,8-HxCDD	ND	0.006				
1,2,3,6,7,8-HxCDD	ND	0.005				
1,2,3,7,8,9-HxCDD	ND	0.005				
1,2,3,4,6,7,8-HpCDD	ND	0.005				
1,2,3,4,6,7,8,9-OCDD	0.01			0.84	36:25	B
2,3,7,8-TCDF	ND	0.003				
1,2,3,7,8-PeCDF	ND	0.003				
2,3,4,7,8-PeCDF	ND	0.003				
1,2,3,4,7,8-HxCDF	ND	0.003				
1,2,3,6,7,8-HxCDF	ND	0.003				
2,3,4,6,7,8-HxCDF	ND	0.003				
1,2,3,7,8,9-HxCDF	ND	0.003				
1,2,3,4,6,7,8-HpCDF	ND	0.004				
1,2,3,4,7,8,9-HpCDF	ND	0.004				
1,2,3,4,6,7,8,9-OCDF	ND	0.004				

Totals	Amt. (ng)	Number	DL	EMPC	Flags
Total TCDD	ND		0.003		
Total PeCDD	ND		0.004		
Total HxCDD	ND		0.005		
Total HpCDD	ND		0.005		
Total TCDF	ND		0.003		
Total PeCDF	ND		0.003		
Total HxCDF	ND		0.003		
Total HpCDF	ND		0.004		

X237_PSR v2.00, LARS 6.10.04

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Printed: 2:03:12 10/21/97

Pacific Environmental Services

TLI Project: **43432** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **LAB BLANK M23** Analysis File: **U973264**

Internal Standards	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	3.4	85.0	40%-130%	0.75	21:31	—
$^{13}C_{12}$-2,3,7,8-TCDD	3.3	82.3	40%-130%	0.80	22:27	—
$^{13}C_{12}$-1,2,3,7,8-PeCDF	4.0	101	40%-130%	1.46	26:16	—
$^{13}C_{12}$-1,2,3,7,8-PeCDD	4.7	118	40%-130%	1.50	27:28	—
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	4.2	105	40%-130%	0.50	30:13	—
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	3.8	95.7	40%-130%	1.24	30:58	—
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	3.6	90.0	25%-130%	0.42	33:01	—
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	4.1	102	25%-130%	1.01	33:53	—
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	8.3	104	25%-130%	0.85	36:25	—

Surrogate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	3.8	94.1	70%-140%		22:28	—
$^{13}C_{12}$-2,3,4,7,8-PeCDF	3.9	98.5	70%-140%	1.44	27:04	—
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	3.7	93.1	70%-140%	0.50	30:07	—
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	3.9	96.8	70%-140%	1.24	30:53	—
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	3.7	92.4	70%-140%	0.42	34:14	—

Alternate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	3.8	95.3	40%-130%	0.51	31:30	—
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	4.2	104	40%-130%	0.50	30:45	—

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.79	22:13	—
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.22	31:16	—

Data Reviewer: VC 10/21/97

X237_PSR v2.00, LARS 6.10.04

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Printed: 20:42 10/21/97

Initial ....Date...

Data Review By: VC 10/21/97 Calculated Noise Area: 1.20

The Total Area for each peak with an ion abundance ratio outside ratio limits has been recalculated according to method requirements.

Page No. 1 Listing of U973264B.dbf
10/21/97 Matched GC Peaks / Ratio / Ret. Time

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
TCDF						0.65-0.89				0.813-1.106			
304-306	DC	NL		0:00		0.88	1.47			0.000			
	DC	SN		17:38	RO	1.71	4.04			0.820			
	DC	SN		18:55	RO	0.38	2.28			0.879			
	DC	SN		20:15	RO	0.32	1.95			0.941			
	DC	SN		20:19	RO	1.75	0.78			0.944			
	DC	SN		20:52	RO	0.44	2.60			0.970			
	DC	SN		20:59	RO	0.35	3.95			0.975			
	DC	SN		21:21	RO	0.14	1.01			0.992			
	DC	SN		21:34	RO	1.12	10.67			1.002	2378-TCDF	AN	
	DC	SN		22:06	RO	0.99	4.00			1.027			
	DC	SN		22:22	RO	1.25	4.73			1.040			
	DC	SN		23:02	RO	1.94	1.96			1.070			
	DC	SN		23:42	RO	0.55	2.99			1.101			
	DC	WH		24:02	RO	4.68	0.50			1.117			
304-306			0	Peaks			0.00						
13C12-TCDF						0.65-0.89				0.954-1.046			
316-318	DC	NL		0:00		0.86	1.71			0.000			
	DC	WL		20:09	RO	0.60	28.87			0.936			
	DC	SN		20:37	RO	0.30	3.65			0.958			
	DC	SN		21:01		0.73	21.21			0.977			
				21:31		0.75	3,821.99	1,642.76	2,179.23	1.000	13C12-2378-TCDF	ISO	
	DC	SN		22:05	RO	1.52	14.78			1.026			
	DC	SN		22:12	RO	0.58	9.45			1.032			
	DC	SN		22:26	RO	0.57	9.24			1.043			
	DC	WH		22:38	RO	0.37	3.13			1.052			
	DC	WH		22:53	RO	0.51	5.13			1.064			
	DC	WH		23:09	RO	0.58	6.32			1.076			
	DC	WH		23:23	RO	1.82	3.17			1.087			
	DC	WH		23:38	RO	2.24	3.08			1.098			
	DC	WH		23:54	RO	0.58	3.43			1.111			
	DC	WH		24:15	RO	2.68	1.15			1.127			
316-318			1	Peak			3,821.99						

---------- Above: TCDF / TCDD Follows ----------

TCDD						0.65-0.89				0.848-1.061			
320-322	DC	NL		0:00	RO	0.96	1.40			0.000			
	DC	SN		19:10	RO	2.96	0.85			0.854			
	DC	SN		19:57	RO	2.34	1.04			0.889			
	DC	SN		20:23	RO	2.48	1.29			0.908			
	DC	SN		20:38	RO	1.28	1.13			0.919			
	DC	SN		21:30	RO	3.48	1.96			0.958			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
	DC	SN		22:00	RO	0.48	1.24			0.980			
	DC	SN		22:30	RO	0.29	3.33			1.002			
	DC	SN		23:14	RO	1.04	1.19			1.035			
	DC	SN		23:25	RO	0.41	1.61			1.043			
320-322			0	Peaks			0.00						
37Cl-TCDD										0.911-1.089			
328	DC	NL		0:00			0.77			0.000			
	DC	SN		20:42			6.98			0.922			
				22:28			2,622.50	2,622.50		1.001	37Cl-TCDD	SUR1	
	DC	SN		22:46			2.22			1.014			
	DC	SN		23:05			4.18			1.028			
	DC	SN		23:15			2.15			1.036			
	DC	SN		23:26			2.45			1.044			
	DC	SN		23:27			1.96			1.045			
	DC	SN		23:38			6.04			1.053			
	DC	SN		23:54			4.06			1.065			
	DC	SN		24:01			2.35			1.070			
	DC	SN		24:07			2.20			1.074			
	DC	SN		24:15			2.45			1.080			
328			1	Peak			2,622.50						
13C12-TCDD						0.65-0.89				0.911-1.089			
332-334	DC	NL		0:00	RO	1.25	1.43			0.000			
	DC	SN		20:55	RO	1.19	15.72			0.932			
	DC	SN		21:29	RO	1.14	2.85			0.957			
	DC	SN		21:50		0.86	3.68			0.973			
				22:13		0.79	3,236.15	1,428.45	1,807.70	0.990	13C12-1234-TCDD	RS1	
				22:27		0.80	2,953.50	1,311.21	1,642.29	1.000	13C12-2378-TCDD	IS1	
	DC	SN		22:38	RO	0.57	15.33			1.008			
				22:52	RO	0.94	58.96	31.28	33.31	1.019			
	DC	SN		23:20		0.66	9.52			1.039			
	DC	SN		23:27	RO	0.52	3.75			1.045			
	DC	SN		23:53	RO	0.17	4.53			1.064			
	DC	SN		23:57	RO	0.35	3.79			1.067			
	DC	SN		24:11		0.72	7.05			1.077			
332-334			3	Peaks			6,248.61						
---------- Above: TCDD / PeCDF Follows ----------													
PeCDF						1.32-1.78				0.906-1.077			
340-342	DC	NL		0:00	RO	0.99	1.15			0.000			
	DC	SN		23:51	RO	0.95	2.17			0.908			
	DC	SN		24:00	RO	2.09	2.01			0.914			
	DC	SN		24:59	RO	1.17	1.23			0.951			
	DC	SN		25:06	RO	1.83	0.61			0.956			
	DC	SN		25:11	RO	1.26	0.87			0.959			
	DC	SN		25:17	RO	0.14	0.81			0.963			
	DC	SN		25:42	RO	0.22	0.66			0.978			
	DC	SN		26:11	RO	3.54	1.56			0.997			
	DC	SN		26:19		1.66	4.15			1.002	12378-PeCDF	AN	
	DC	SN		26:43	RO	0.18	0.18			1.017			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
		DC	SN	27:03	RO	0.71	2.58			1.030	23478-PeCDF	AN	
		DC	SN	27:45	RO	0.93	0.63			1.056			
		DC	SN	27:49	RO	0.94	1.04			1.059			
		DC	SN	28:17		1.49	2.59			1.077			
		DC	WH	28:33	RO	0.19	0.35			1.087			
340-342			0	Peaks			0.00						
13C12-PeCDF				1.32-1.78						0.848-1.152			
352-354		DC	NL	0:00	RO	0.97	1.09			0.000			
				25:17		1.55	55.90	33.98	21.92	0.963			
		DC	SN	25:51		1.38	18.62			0.984			
				26:16		1.46	3,564.87	2,117.73	1,447.14	1.000	13C12-PeCDF 123	IS2	
				26:37	RO	0.85	27.47	16.70	19.61	1.013			
				27:04		1.44	3,407.15	2,013.27	1,393.88	1.030	13C12-PeCDF 234	SUR2	
		DC	SN	27:29	RO	0.75	7.16			1.046			
		DC	SN	27:36	RO	0.93	11.01			1.051			
		DC	SN	28:09	RO	2.02	15.61			1.072			
		DC	SN	28:40	RO	0.46	0.90			1.091			
352-354			4	Peaks			7,055.39						
---------- Above: PeCDF / PeCDD Follows ----------													
PeCDD				1.32-1.78						0.921-1.025			
356-358		DC	NL	0:00	RO	1.10	1.27			0.000			
		DC	SN	26:17	RO	2.94	3.93			0.957			
		DC	SN	26:29	RO	0.63	0.86			0.964			
		DC	SN	26:33	RO	0.53	0.79			0.967			
		DC	SN	27:05	RO	1.89	2.32			0.986			
		DC	SN	27:26	RO	3.15	0.66			0.999	12378-PeCDD	AN	
		DC	SN	27:36	RO	0.73	1.05			1.005			
		DC	SN	27:48	RO	1.21	1.88			1.012			
		DC	SN	27:55	RO	1.88	2.55			1.016			
		DC	WH	28:29	RO	3.10	1.96			1.037			
356-358			0	Peaks			0.00						
13C12-PeCDD				1.32-1.78						0.855-1.145			
368-370		DC	NL	0:00	RO	1.09	1.23			0.000			
		DC	SN	25:42	RO	4.02	1.22			0.936			
		DC	SN	25:53	RO	2.54	0.61			0.942			
		DC	SN	26:07	RO	2.08	0.99			0.951			
		DC	SN	26:15		1.72	4.41			0.956			
		DC	SN	26:38		1.73	2.27			0.970			
				27:28		1.50	2,292.92	1,374.35	918.57	1.000	13C12-PeCDD 123	IS3	
				27:37		1.58	227.91	139.61	88.30	1.005			
		DC	SN	27:55	RO	0.22	1.09			1.016			
		DC	SN	28:05		1.46	5.22			1.022			
		DC	SN	28:17	RO	0.61	2.93			1.030			
		DC	SN	28:23	RO	1.18	3.37			1.033			
		DC	SN	28:34	RO	1.18	4.03			1.040			
368-370			2	Peaks			2,520.83						

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
---------- Above: PeCDD / HxCDF Follows ----------													
HxCDF				1.05-1.43						0.958-1.051			
374-376	DC	NL		0:00		1.08	2.25			0.000			
	DC	SN		29:01	RO	2.76	0.47			0.960			
	DC	SN		29:13	RO	0.85	1.61			0.967			
	DC	SN		30:08	RO	2.57	2.44			0.997	123478-HxCDF	AN	
	DC	SN		30:13	RO	0.69	1.82			1.000	123678-HxCDF	AN	
	DC	SN		30:24	RO	0.94	1.10			1.006			
	DC	SN		30:29	RO	1.64	0.49			1.009			
	DC	SN		30:45	RO	0.82	4.25			1.018	234678-HxCDF	AN	
	DC	SN		30:59	RO	0.69	1.34			1.025			
	DC	SN		31:05	RO	0.57	0.36			1.029			
	DC	SN		31:11	RO	0.73	0.52			1.032			
	DC	SN		31:16	RO	2.19	1.19			1.035			
	DC	SN		31:19	RO	0.83	0.89			1.036			
	DC	SN		31:26		1.32	1.30			1.040			
	DC	SN		31:38	RO	0.67	1.23			1.047			
	DC	WH		31:55		1.40	1.25			1.056			
374-376			0	Peaks			0.00						
13C12-HxCDF				0.43-0.59						0.868-1.132			
384-386	DC	NL		0:00	RO	0.41	15.46			0.000			
	DC	SN		29:14	RO	0.67	17.32			0.967			
				30:07		0.50	2,848.05	952.23	1,895.82	0.997	13C12-HxCDF 478	SUR3	
				30:13		0.50	3,141.70	1,052.43	2,089.27	1.000	13C12-HxCDF 678	IS4	
				30:45		0.50	2,931.27	974.64	1,956.63	1.018	13C12-HxCDF 234	ALT2	
	DC	SN		30:54	RO	0.28	10.75			1.023			
	DC	SN		30:56	RO	0.26	4.80			1.024			
	DC	SN		31:10	RO	1.02	5.39			1.031			
	DC	SN		31:15	RO	0.83	3.44			1.034			
	DC	SN		31:18	RO	1.07	4.88			1.036			
				31:30		0.51	2,529.35	852.20	1,677.15	1.042	13C12-HxCDF 789	ALT1	
384-386			4	Peaks			11,450.37						
---------- Above: HxCDF / HxCDD Follows ----------													
HxCDD				1.05-1.43						0.952-1.015			
390-392	DC	NL		0:00		1.20	1.74			0.000			
	DC	SN		29:38	RO	0.89	1.03			0.957			
	DC	SN		29:43	RO	0.71	0.54			0.960			
	DC	SN		29:50	RO	0.88	0.81			0.963			
	DC	SN		29:54	RO	2.25	0.36			0.966			
	DC	SN		30:13	RO	0.79	4.91			0.976			
	DC	SN		30:40	RO	0.64	2.35			0.990			
	DC	SN		30:45	RO	1.98	2.91			0.993			
	DC	SN		30:56		1.39	1.96			0.999	123478-HxCDD	AN	
	DC	SN		31:16	RO	0.33	0.96			1.010	123789-HxCDD	AN	
	DC	WH		31:29	RO	1.04	2.84			1.017			
390-392			0	Peaks			0.00						

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
13C12-HxCDD				1.05-1.43						0.968-1.032			
402-404	DC	NL		0:00	RO	0.96	2.31			0.000			
	DC	SN		30:20		1.15	13.68			0.980			
				30:53		1.24	2,172.90	1,202.44	970.46	0.997	13C12-HxCDD	478	SUR4
				30:58		1.24	2,502.01	1,385.89	1,116.12	1.000	13C12-HxCDD	678	IS5
	DC	SN		31:06		1.42	17.48			1.004			
				31:16		1.22	2,717.47	1,491.50	1,225.97	1.010	13C12-HxCDD	789	RS2
	DC	SN		31:25	RO	3.12	5.04			1.015			
	DC	SN		31:30	RO	9.68	5.51			1.017			
	DC	SN		31:48	RO	2.14	6.54			1.027			
402-404				3 Peaks			7,392.38						

---------- Above: HxCDD / HpCDF Follows ----------

HpCDF				0.88-1.20						0.996-1.043			
408-410	DC	NL		0:00	RO	1.47	1.73			0.000			
	DC	SN		32:59	RO	5.24	3.18			0.999			
	DC	SN		33:39	RO	1.35	2.98			1.019			
	DC	SN		34:01		0.95	4.15			1.030			
	DC	SN		34:09	RO	3.30	2.00			1.034			
	DC	WH		34:31	RO	1.32	2.71			1.045			
	DC	WH		34:36		1.06	3.83			1.048			
408-410				0 Peaks			0.00						
13C12-HpCDF				0.37-0.51						0.939-1.121			
418-420	DC	NL		0:00	RO	0.35	6.45			0.000			
				33:01		0.42	2,331.46	690.68	1,640.78	1.000	13C12-HpCDF	678	IS6
	DC	SN		33:11		0.44	27.17			1.005			
	DC	SN		33:39	RO	0.58	13.55			1.019			
	DC	SN		33:53		0.43	4.15			1.026			
				34:14		0.42	1,903.15	566.96	1,336.19	1.037	13C12-HpCDF	789	SUR5
418-420				2 Peaks			4,234.61						

---------- Above: HpCDF / HpCDD Follows ----------

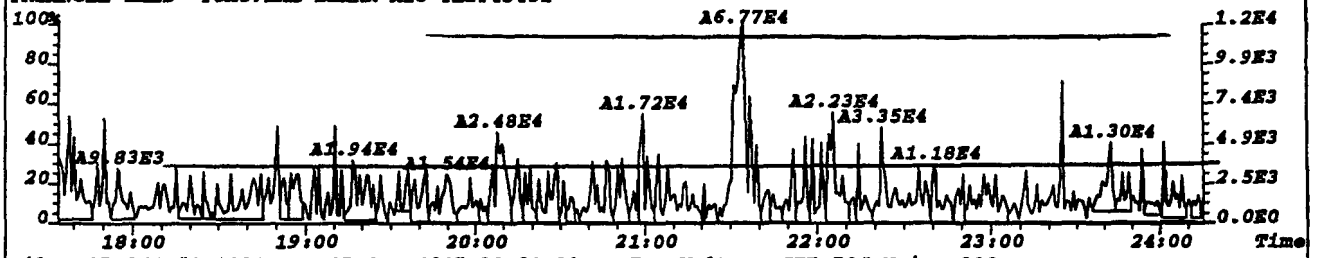
HpCDD				0.88-1.20						0.977-1.005			
424-426	DC	NL		0:00		0.90	1.52			0.000			
	DC	SN		33:17	RO	0.79	4.18			0.982			
	DC	SN		33:26	RO	5.15	0.55			0.987			
	DC	SN		33:53	RO	1.44	3.96			1.000	1234678-HpCDD		AN
	DC	WH		34:11	RO	3.75	1.08			1.009			
	DC	WH		34:14		1.09	5.74			1.010			
424-426				0 Peaks			0.00						
13C12-HpCDD				0.88-1.20						0.971-1.029			
436-438	DC	NL		0:00		1.11	6.45			0.000			
	DC	SN		33:17	RO	0.73	9.38			0.982			
				33:53		1.01	2,548.37	1,283.11	1,265.26	1.000	13C12-HpCDD	678	IS7
	DC	SN		34:04	RO	0.39	17.30			1.005			
	DC	SN		34:21	RO	1.41	7.55			1.014			
	DC	SN		34:28	RO	3.64	5.04			1.017			
436-438				1 Peak			2,548.37						

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
---------- Above: HpCDD / Octa-CDD and CDF Follows ----------													
OCDF				0.76-1.02						0.890-1.110			
442-444	DC	NL		0:00	RO	1.14	2.66			0.000			
	DC	SN		32:39		0.79	2.94			0.897			
	DC	SN		32:48	RO	1.31	1.93			0.901			
	DC	SN		33:30	RO	1.59	1.51			0.920			
	DC	SN		33:38	RO	4.25	0.45			0.924			
	DC	SN		34:14	RO	0.73	3.06			0.940			
	DC	SN		34:37	RO	1.13	1.68			0.951			
	DC	SN		34:47	RO	5.48	0.91			0.955			
	DC	SN		35:02	RO	1.14	2.21			0.962			
	DC	SN		36:02		0.98	3.62			0.989			
	DC	SN		36:17	RO	3.78	1.12			0.996			
	DC	SN		39:07	RO	3.31	0.96			1.074			
	DC	SN		39:14		0.84	4.48			1.077			
	DC	SN		39:26	RO	0.64	1.97			1.083			
	DC	SN		39:32	RO	1.25	1.74			1.086			
	DC	SN		39:40	RO	0.20	1.15			1.089			
442-444			0	Peaks			0.00						
OCDD				0.76-1.02						0.890-1.110			
458-460	DC	NL		0:00		0.91	1.97			0.000			
	DC	SN		36:17	RO	0.44	2.72			0.996			
MK				36:25		0.84	7.07	3.22	3.85	1.000	OCDD		AN
	DC	SN		36:45	RO	0.39	1.17			1.009			
458-460			1	Peak			7.07						
13C12-OCDD				0.76-1.02						0.995-1.005			
470-472	DC	NL		0:00	RO	1.15	1.74			0.000			
				36:25		0.85	4,321.34	1,988.45	2,332.89	1.000	13C12-OCDD		IS8
	DC	WH		36:37	RO	0.58	25.76			1.005			
	DC	WH		36:54	RO	0.27	6.56			1.013			
470-472			1	Peak			4,321.34						

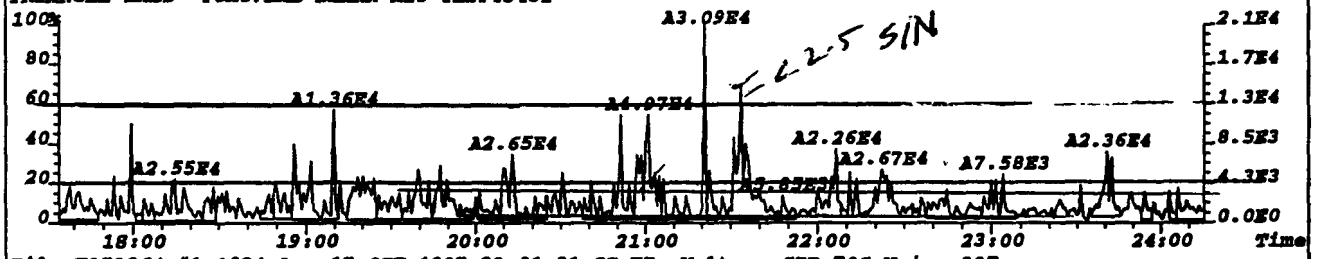
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside Limits	<M-Below Method Detection Limit	T-Time Changed
Rel.RT-Relative Retention Time	NL-Channel Specific Noise Level	M-Peak Area Changed
		N-Name Changed
		E-Ether Interference

*** End of Report ***

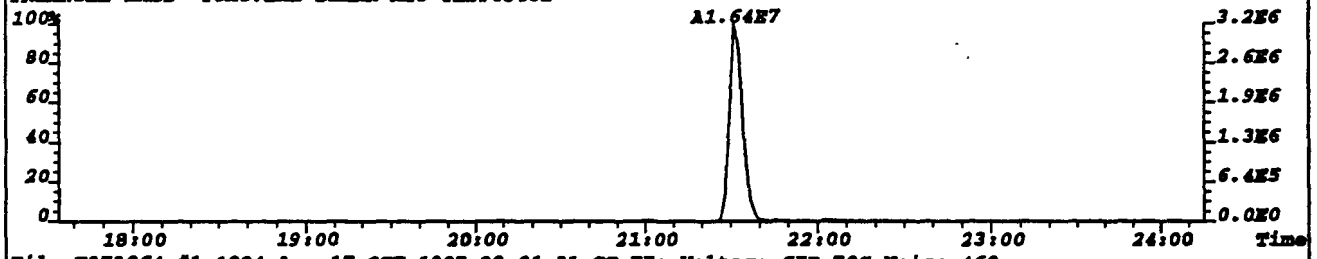
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:347
303.9016 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,1388.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



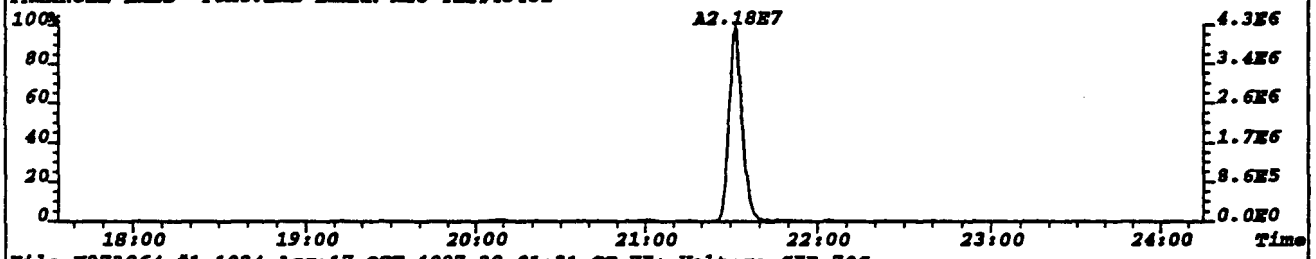
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:388
305.8987 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,1552.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



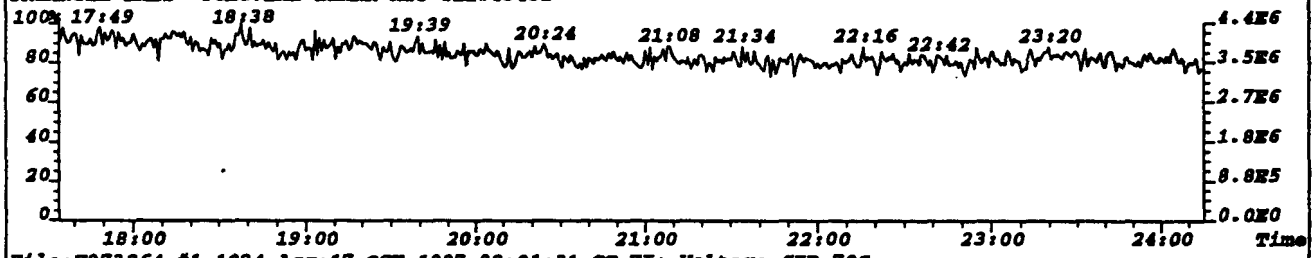
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:397
315.9419 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,1588.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



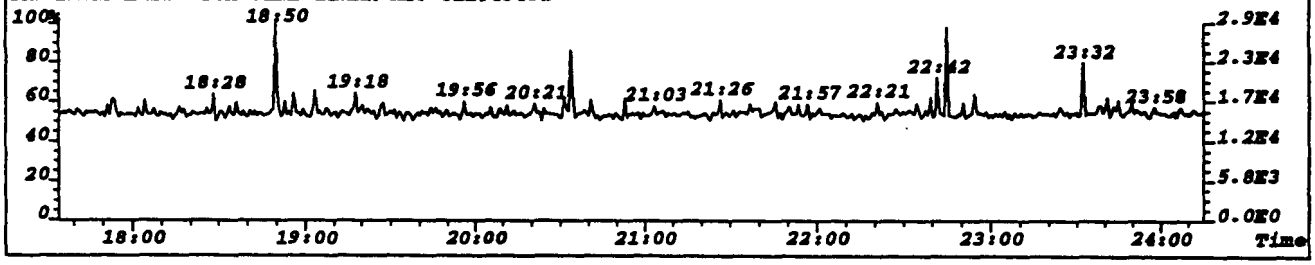
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:460
317.9389 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,1840.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



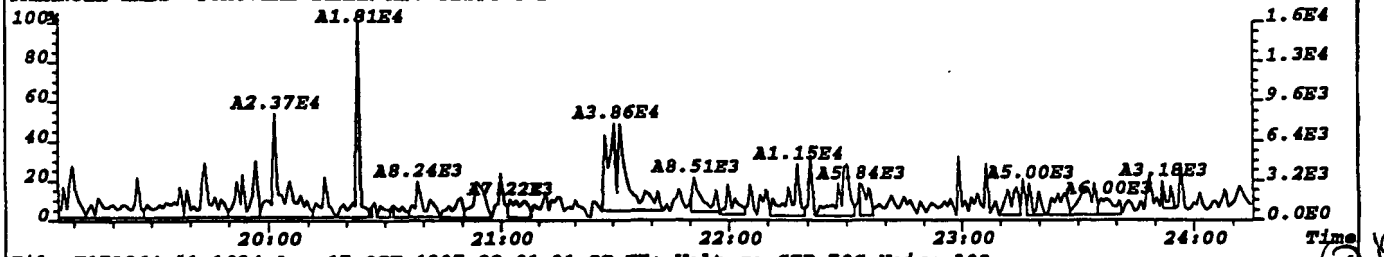
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
375.8364 F:2 Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:382
319.8965 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1528.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432

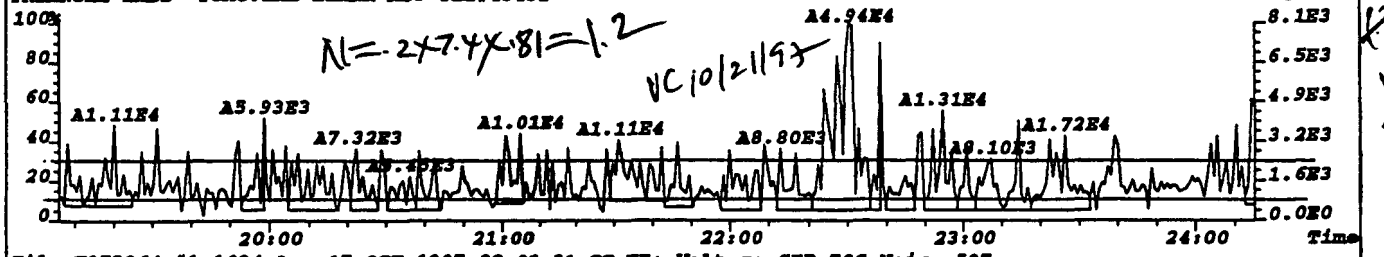


File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:393
321.8936 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1572.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432

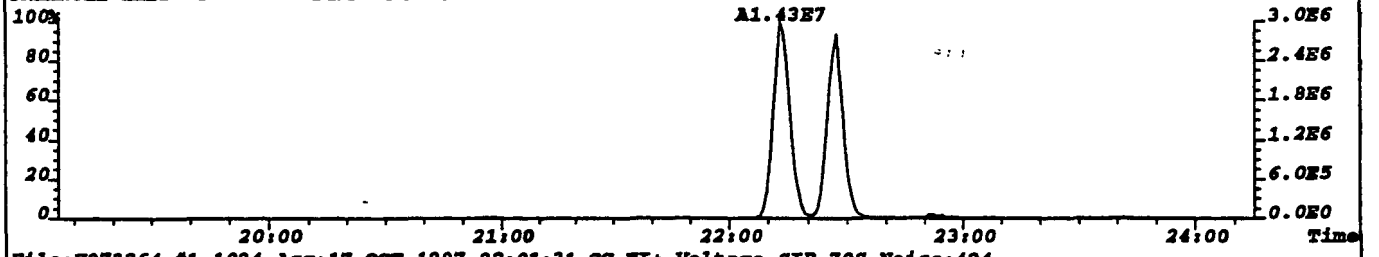
N=.2x7.4x.81=1.2

VC 10/21/97

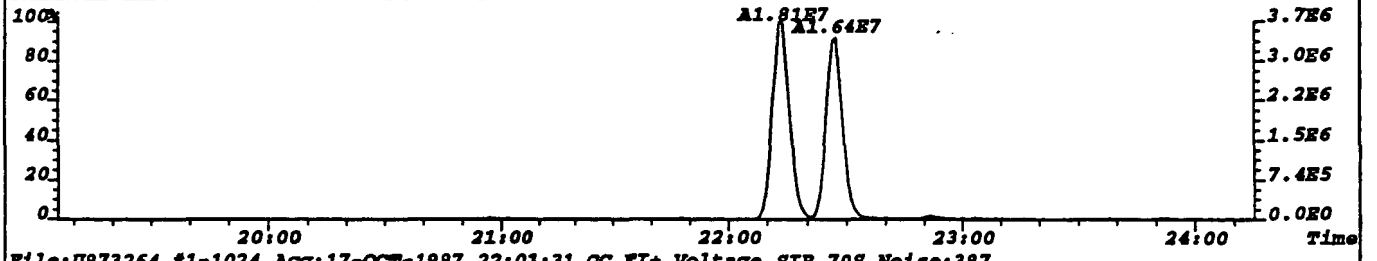
CE VC 10/21/97



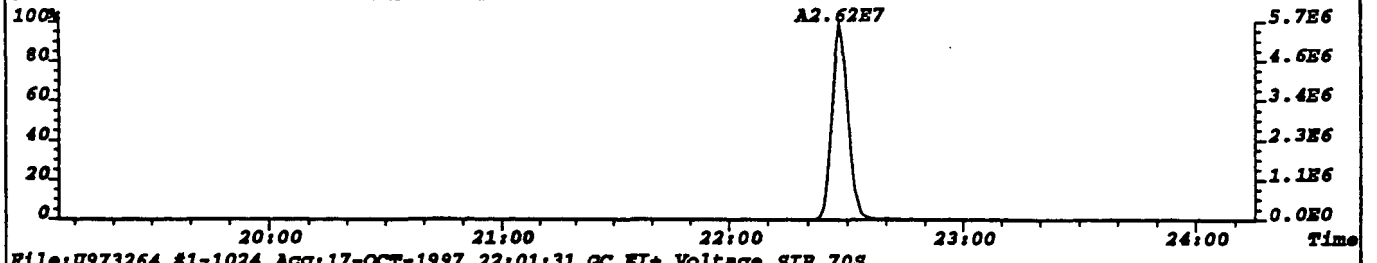
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:507
331.9368 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2028.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



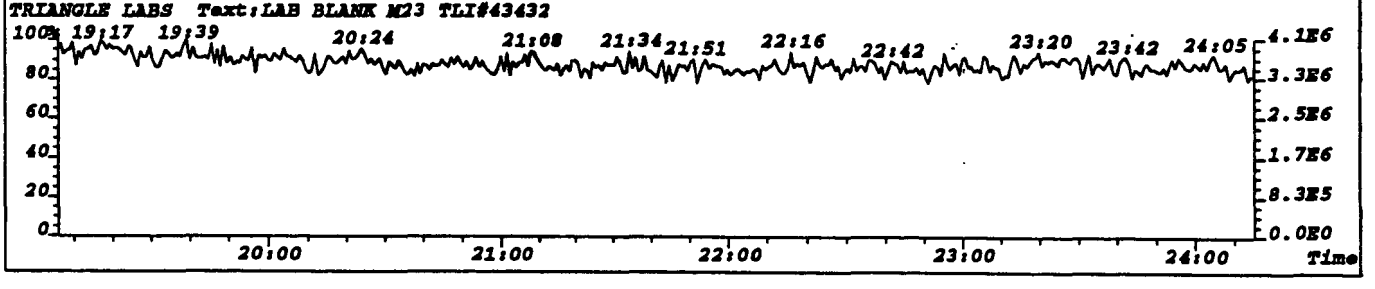
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:404
333.9338 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1616.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



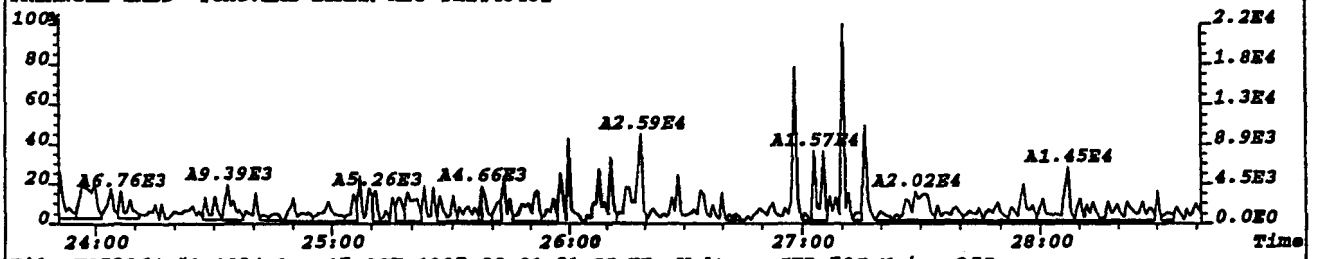
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:387
327.8847 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1548.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



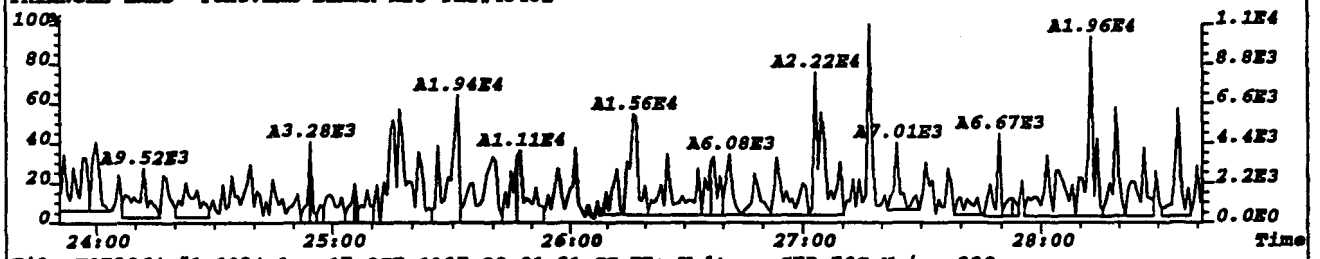
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



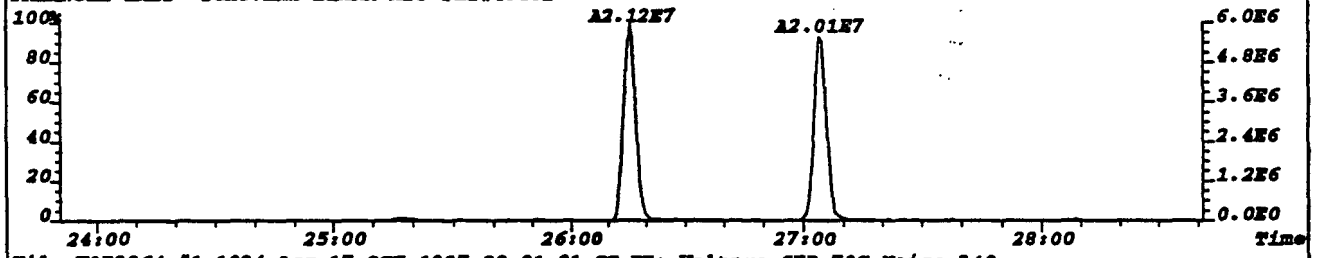
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:350
339.8597 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1400.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



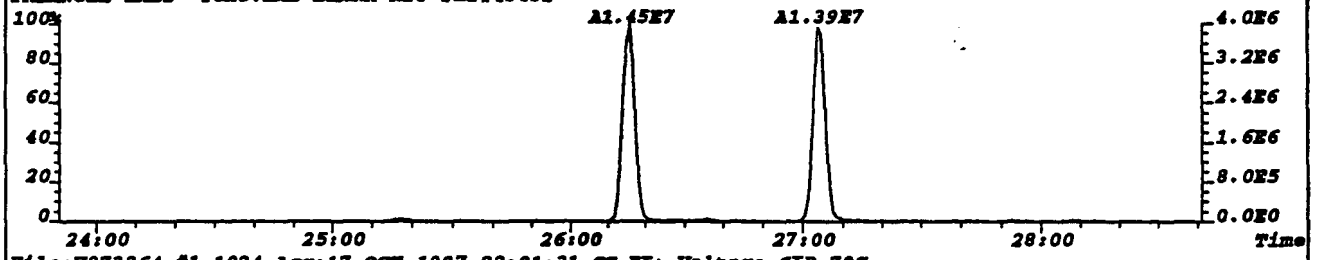
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:355
341.8567 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1420.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



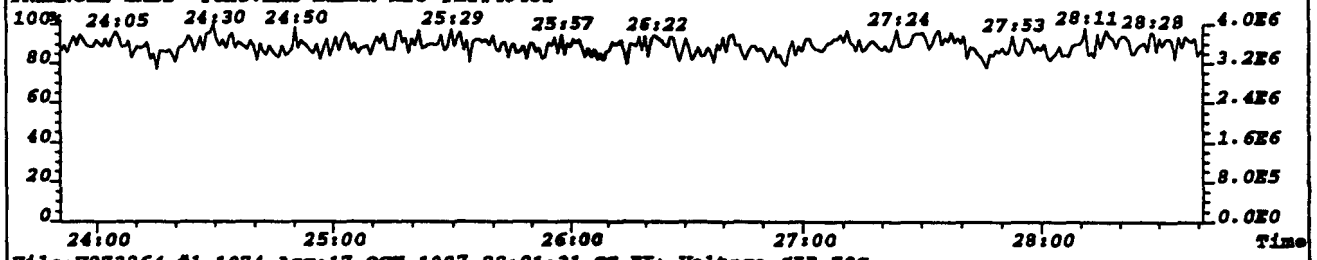
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:332
351.9000 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1328.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



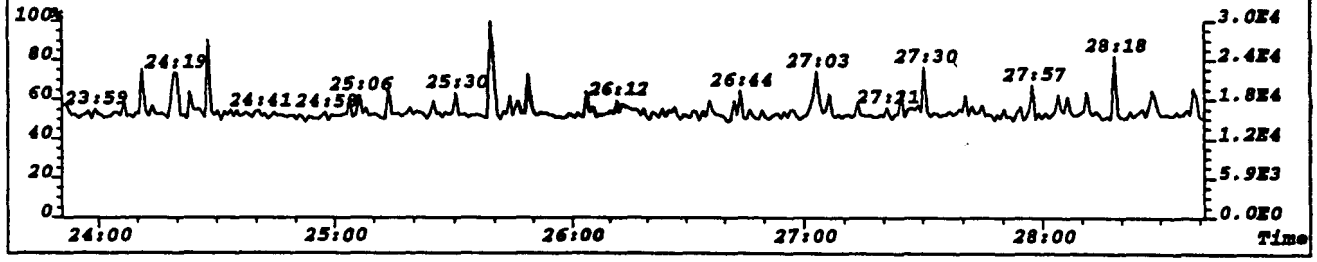
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:340
353.8970 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1360.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



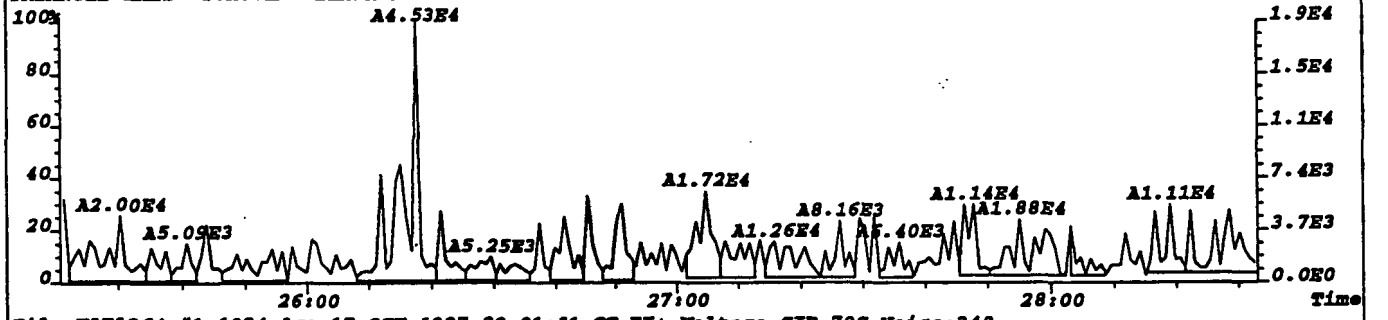
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



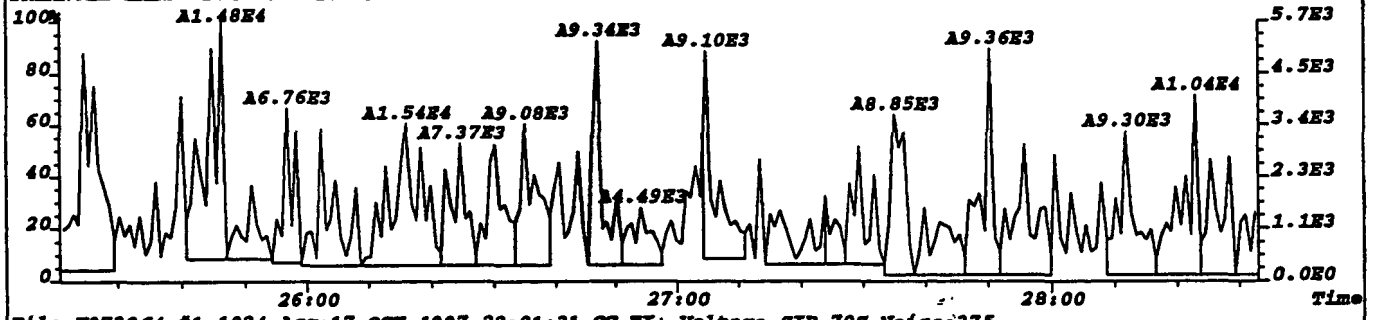
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
409.7974 F:2 Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



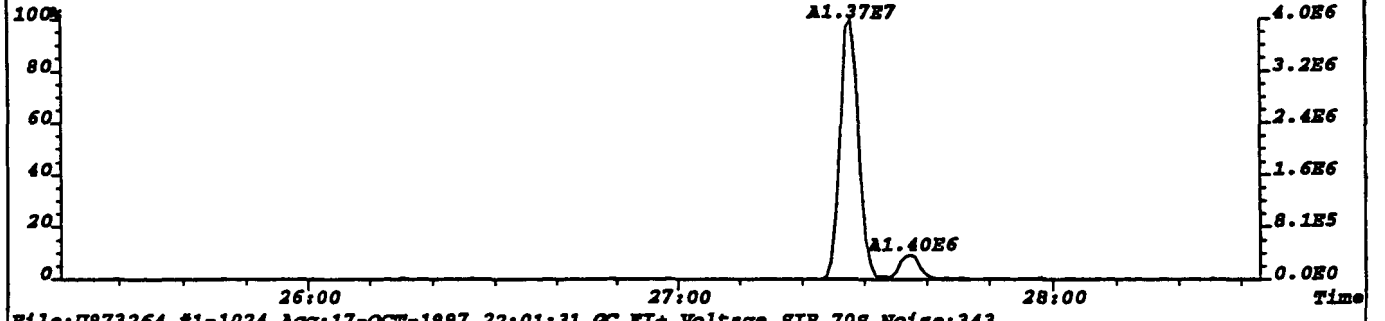
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:385
355.8546 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,1540.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



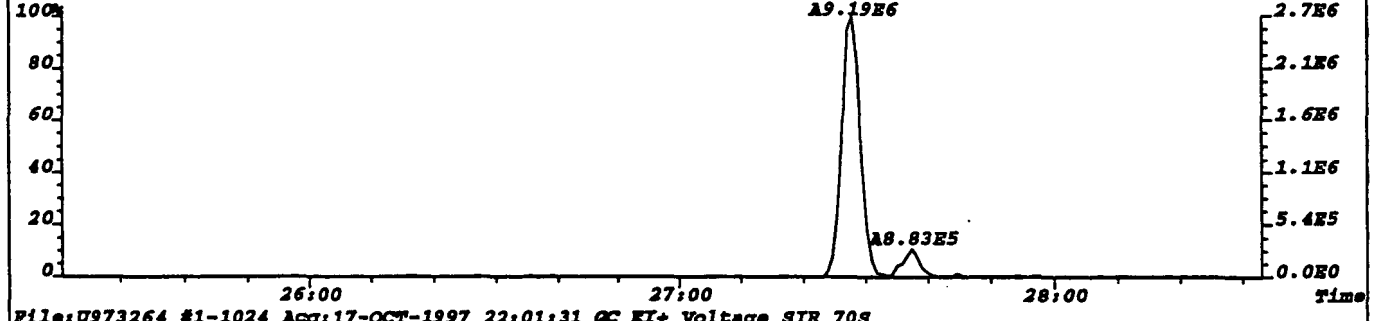
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:349
357.8516 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,1396.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



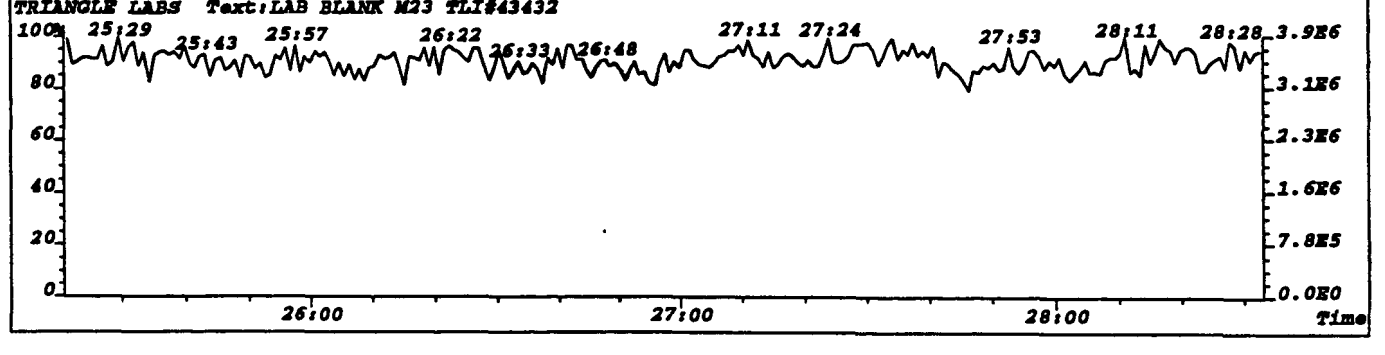
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:375
367.8949 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,1500.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



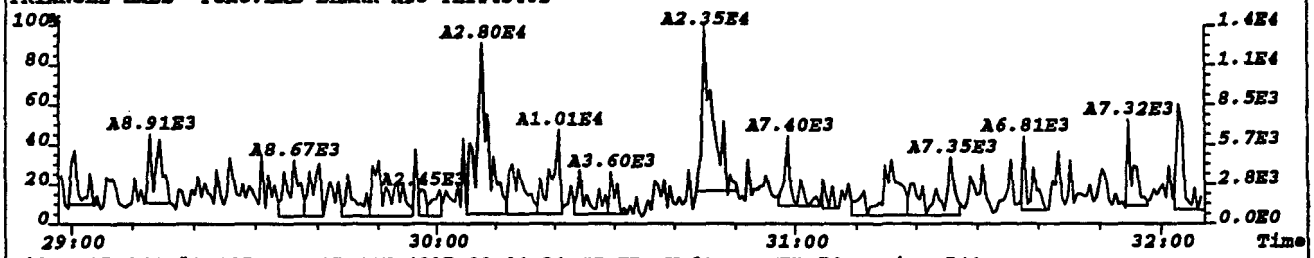
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:343
369.8919 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,1372.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



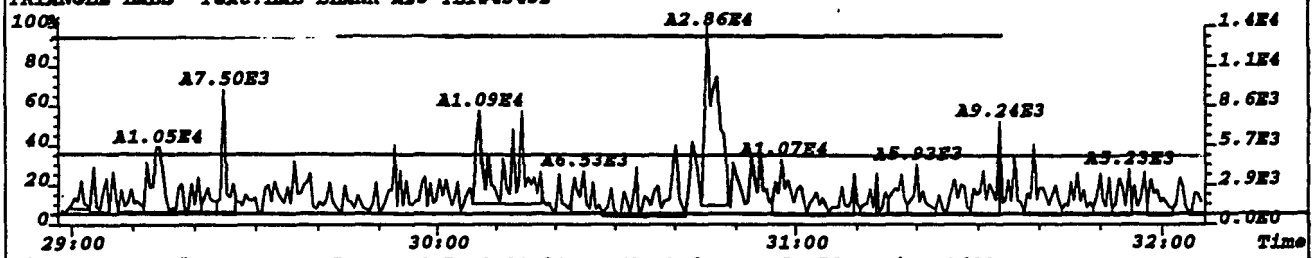
File:U973264 #1-1024 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



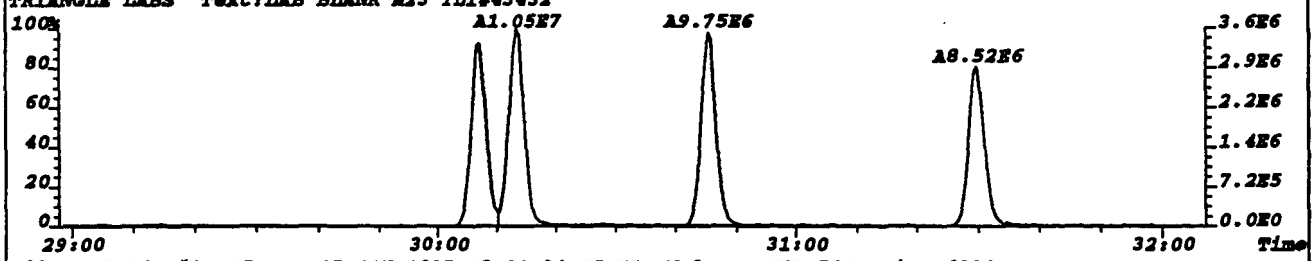
File:U973264 #1-405 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:586
373.8208 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2344.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



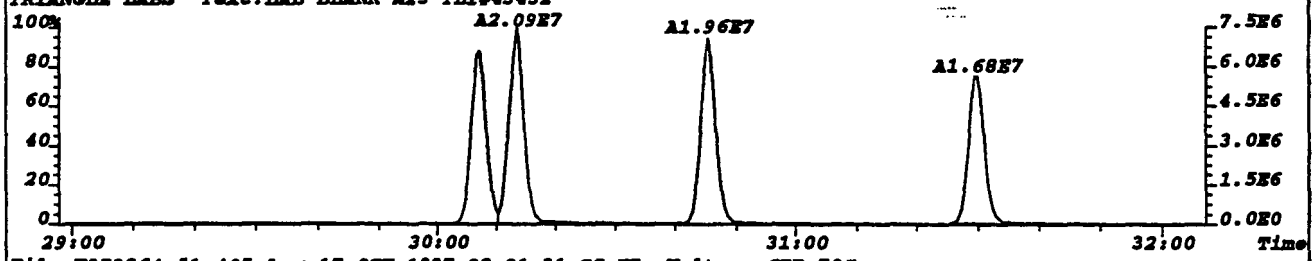
File:U973264 #1-405 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:541
375.8178 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2164.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



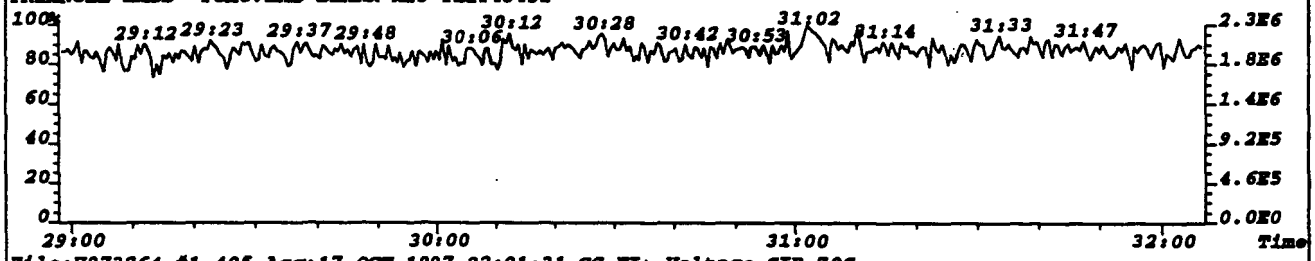
File:U973264 #1-405 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:2609
383.8639 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,10436.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



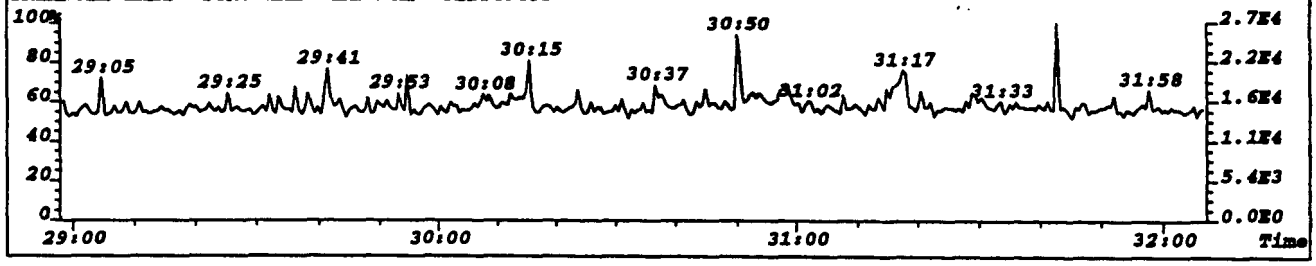
File:U973264 #1-405 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:6290
385.8610 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,25160.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



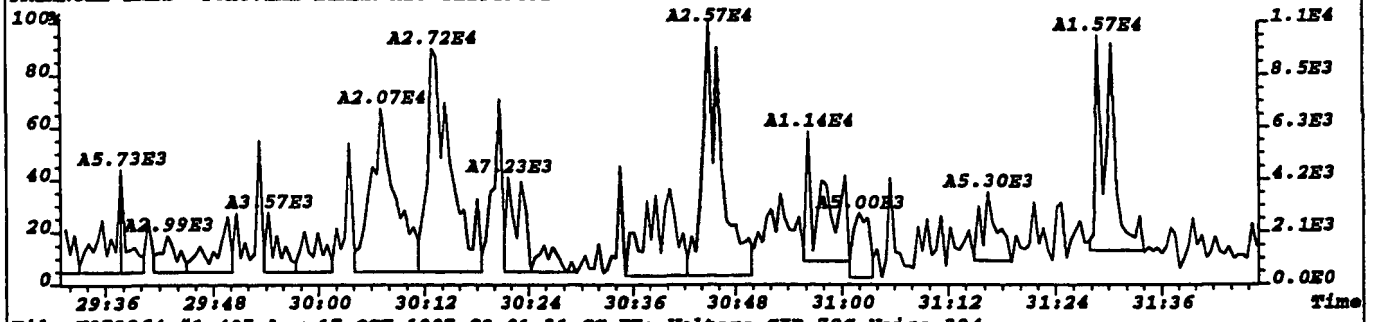
File:U973264 #1-405 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
392.9760 F:3 Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



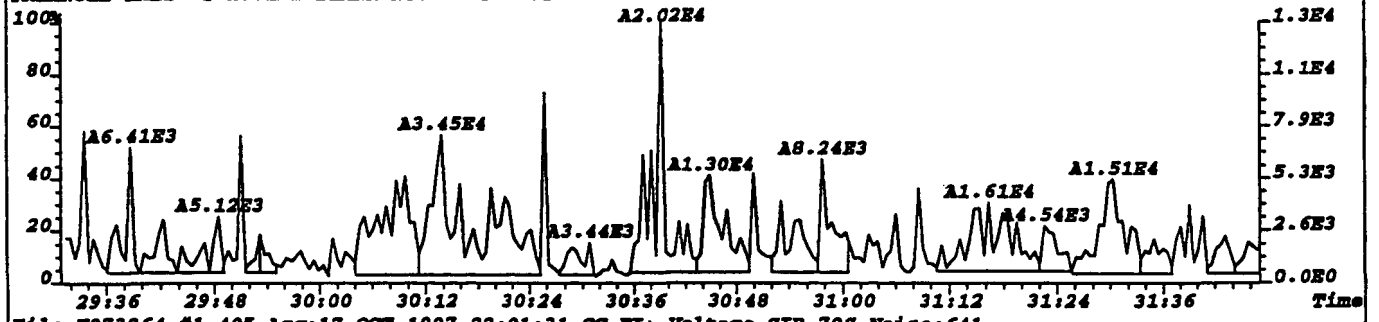
File:U973264 #1-405 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
445.7555 F:3 Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



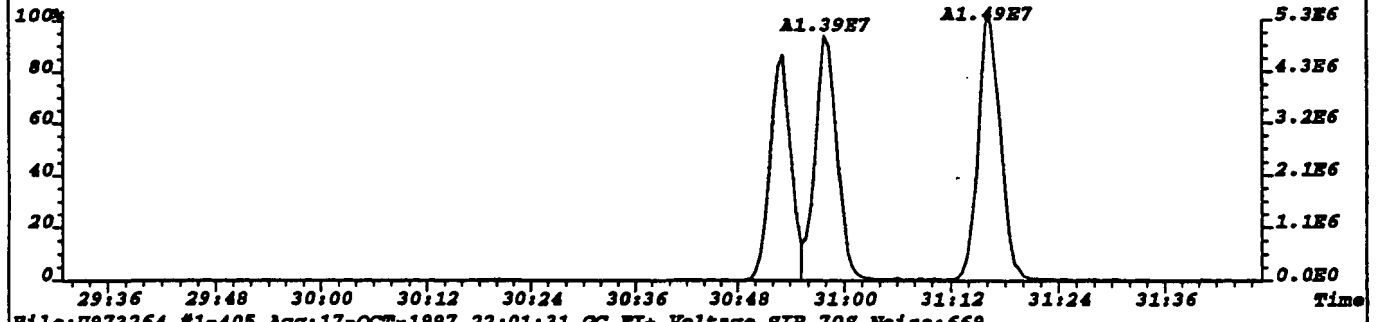
File:U973264 #1-405 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:473
389.8156 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1892.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



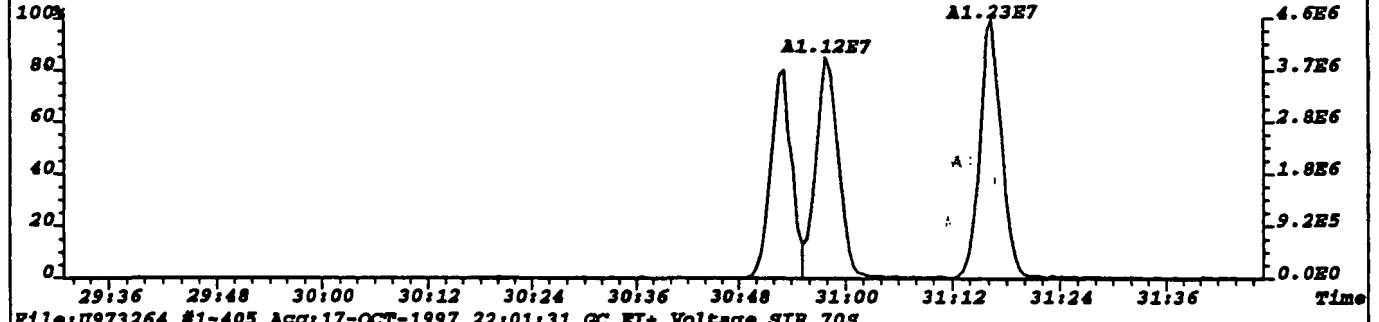
File:U973264 #1-405 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:394
391.8127 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1576.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



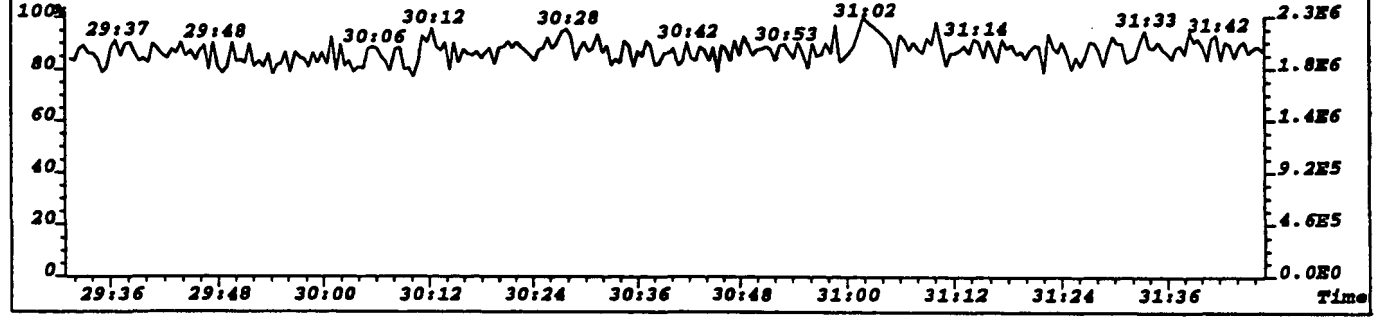
File:U973264 #1-405 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:641
401.8558 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2564.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



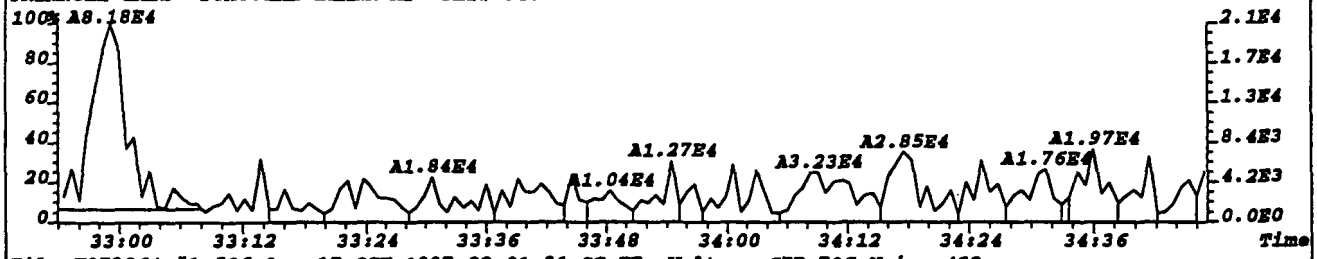
File:U973264 #1-405 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:669
403.8529 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2676.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



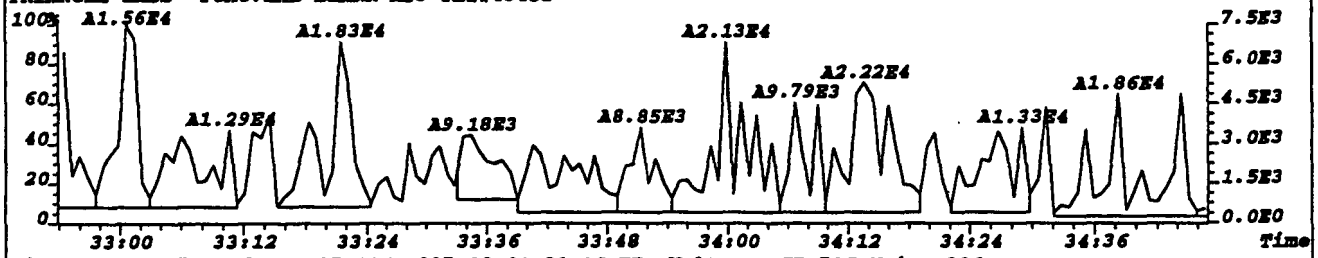
File:U973264 #1-405 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
392.9760 F:3 Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



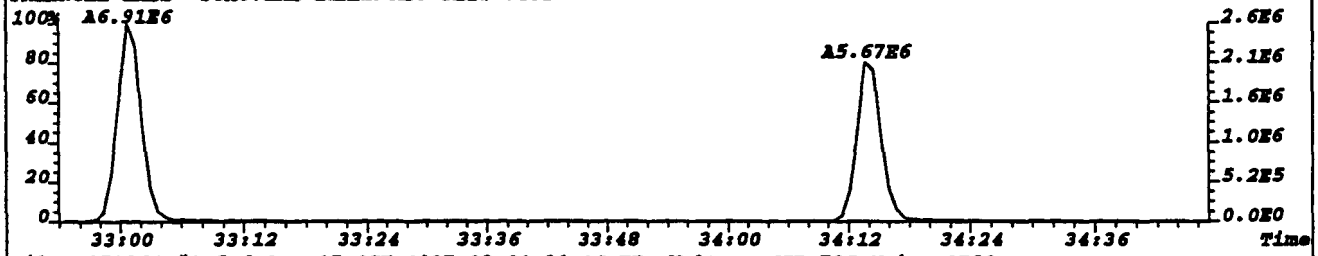
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:623
407.7818 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2492.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



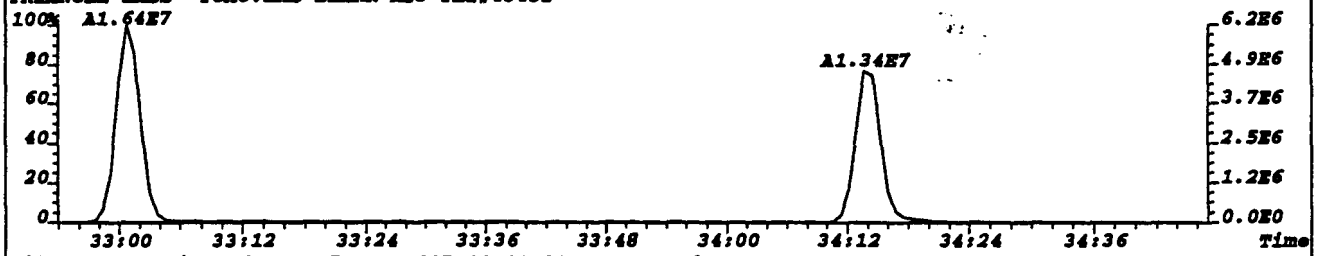
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:423
409.7789 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1692.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



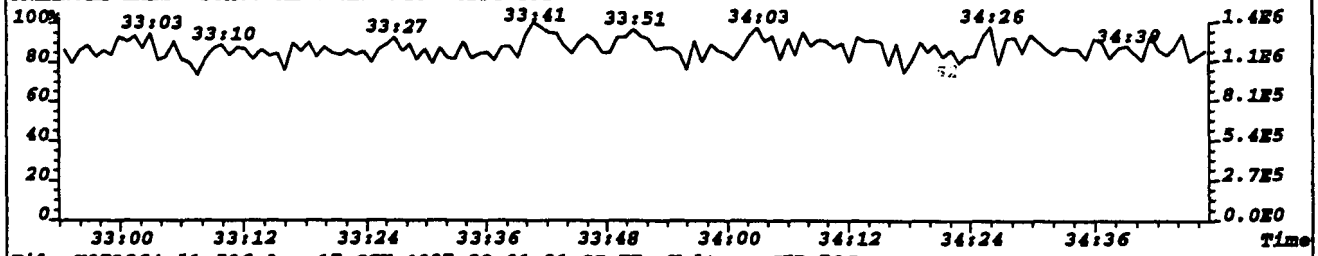
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:986
417.8253 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3944.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



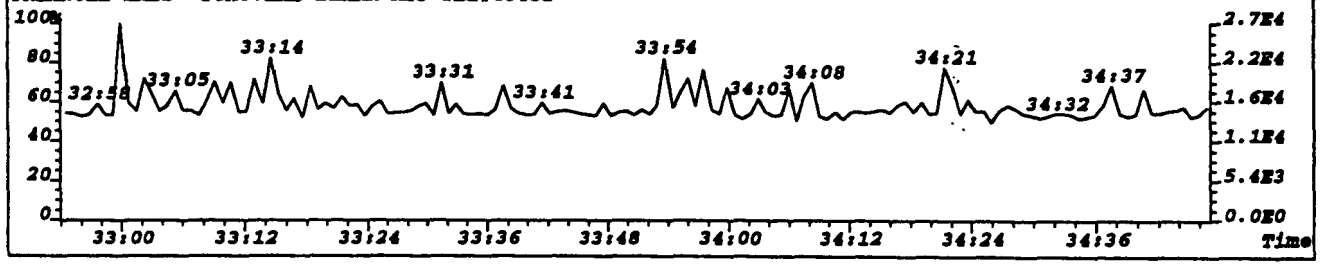
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:2782
419.8220 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,11128.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



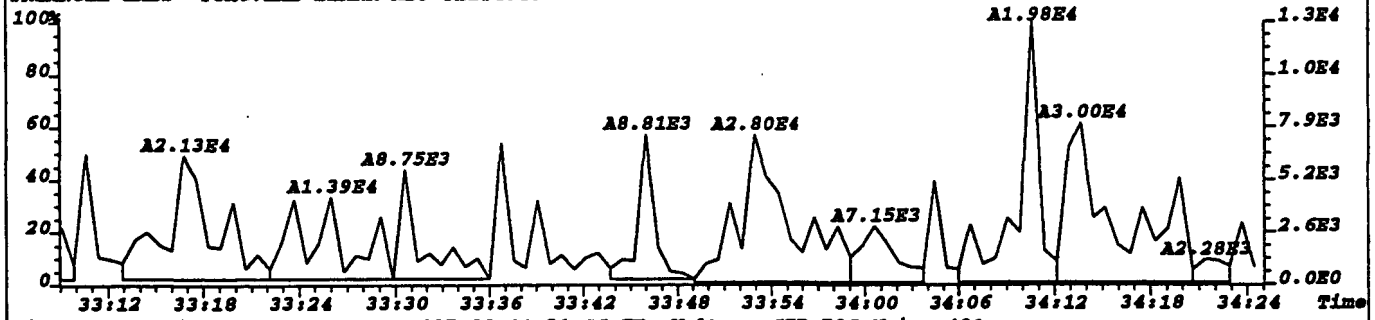
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



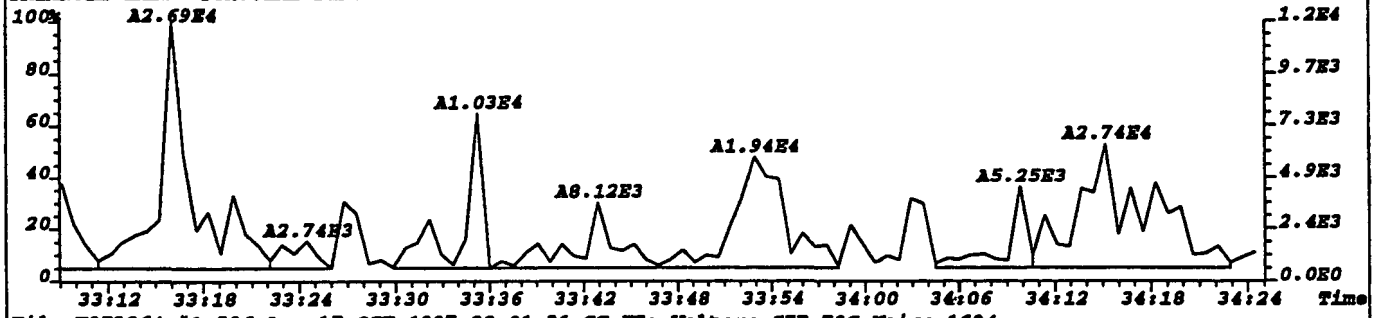
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
479.7165 F:4 Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



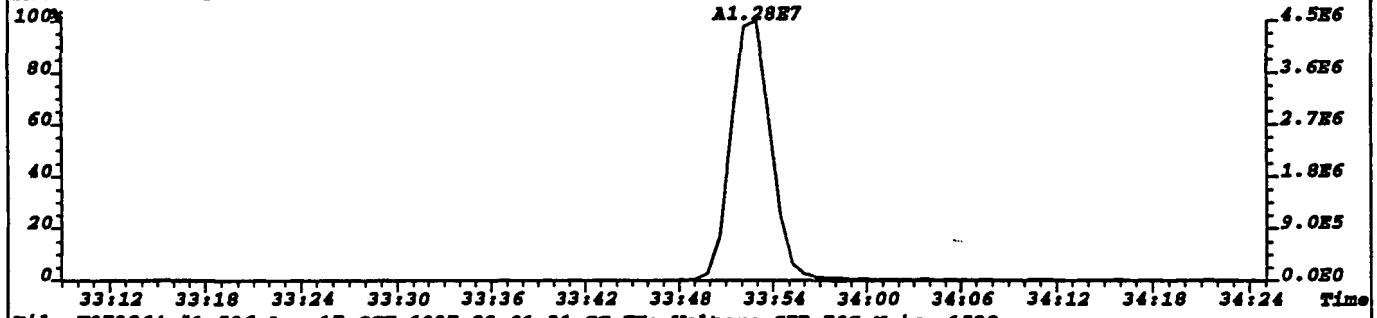
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:361
423.7766 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1444.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



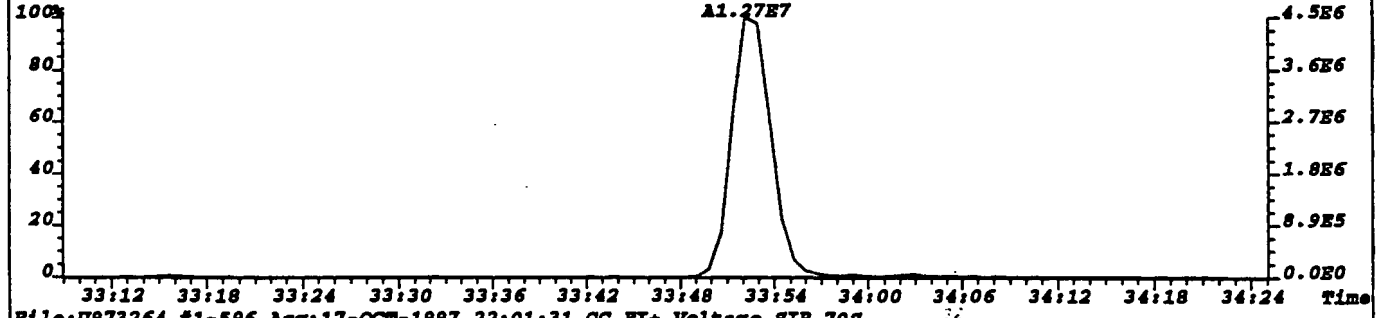
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:401
425.7737 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1604.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



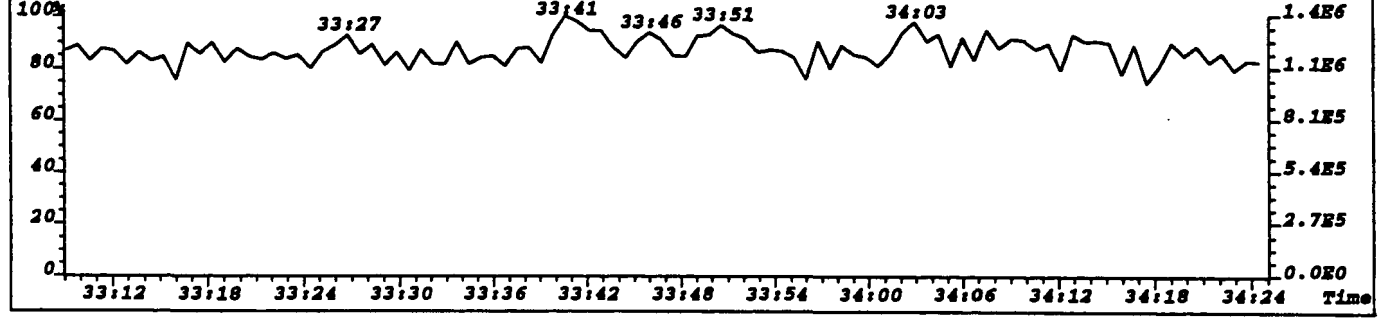
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:1694
435.8169 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6776.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



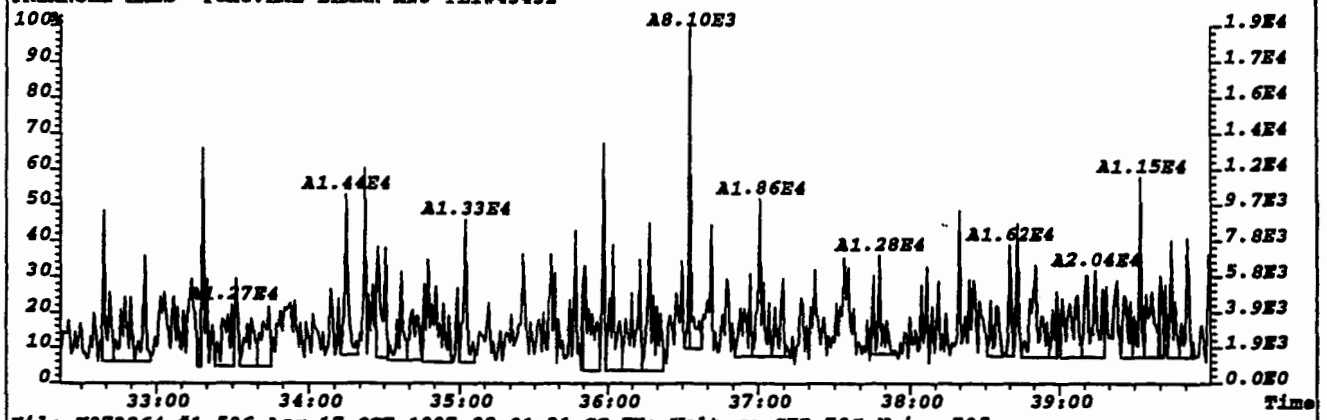
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:1528
437.8140 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6112.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



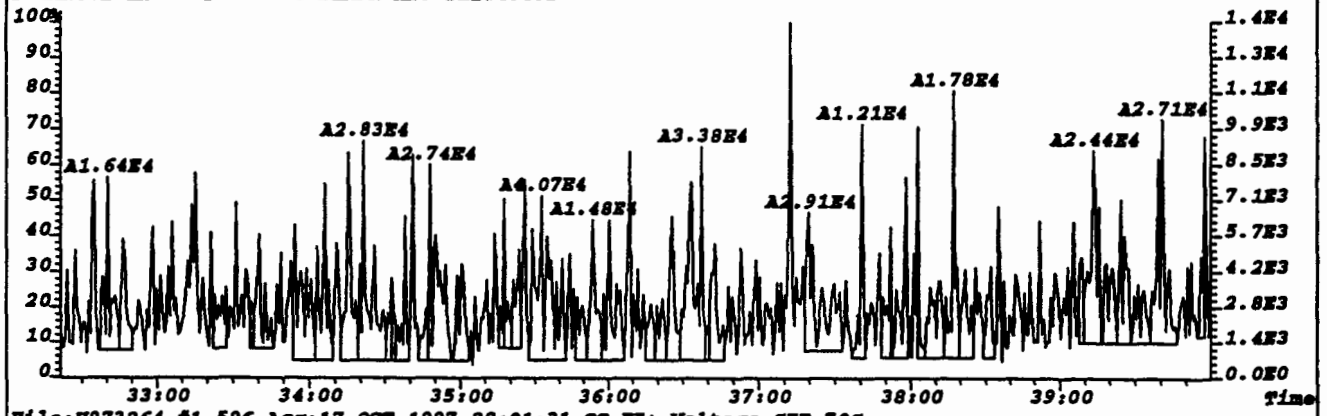
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



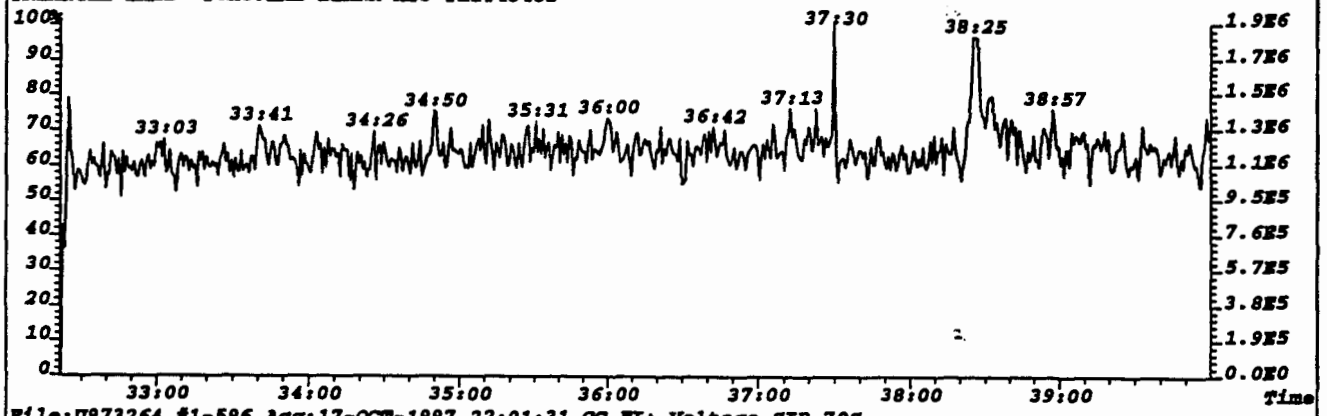
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:804
441.7428 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3216.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



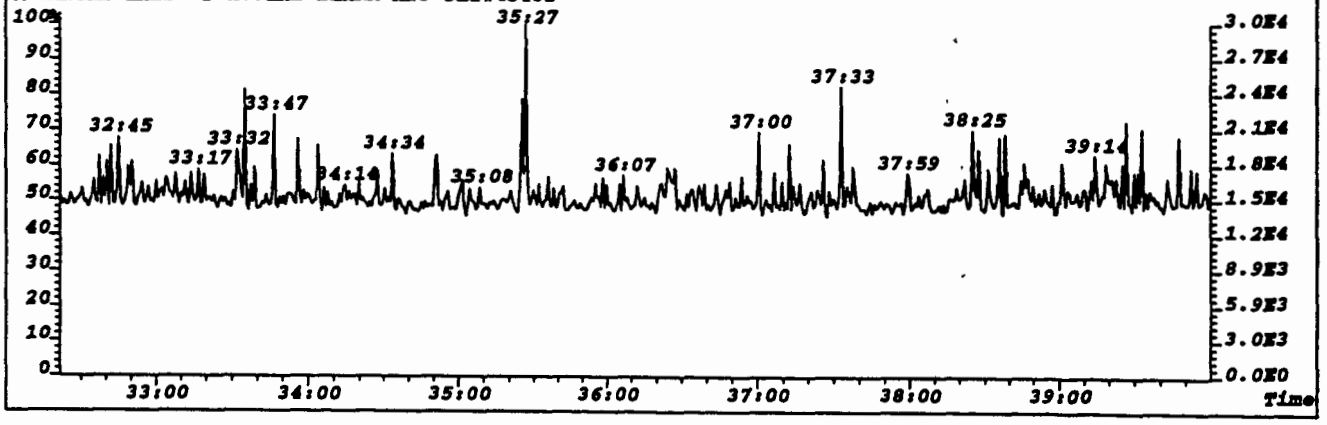
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:705
443.7399 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2820.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



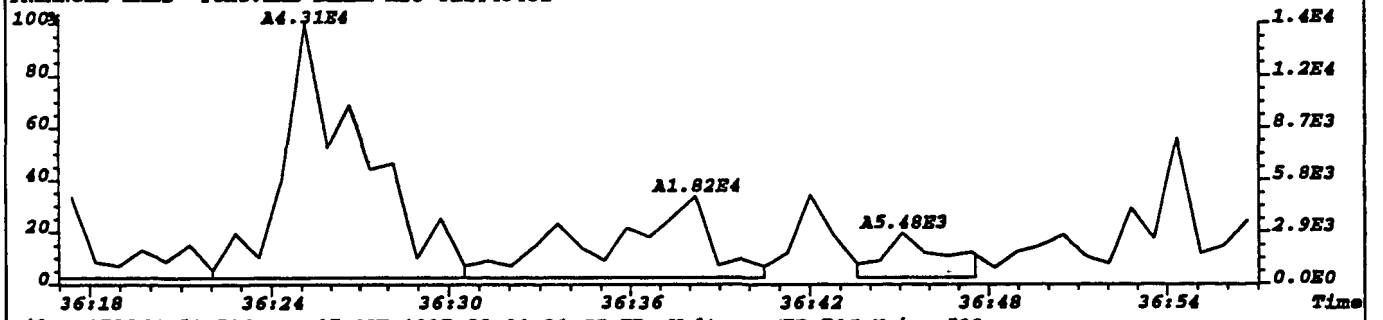
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



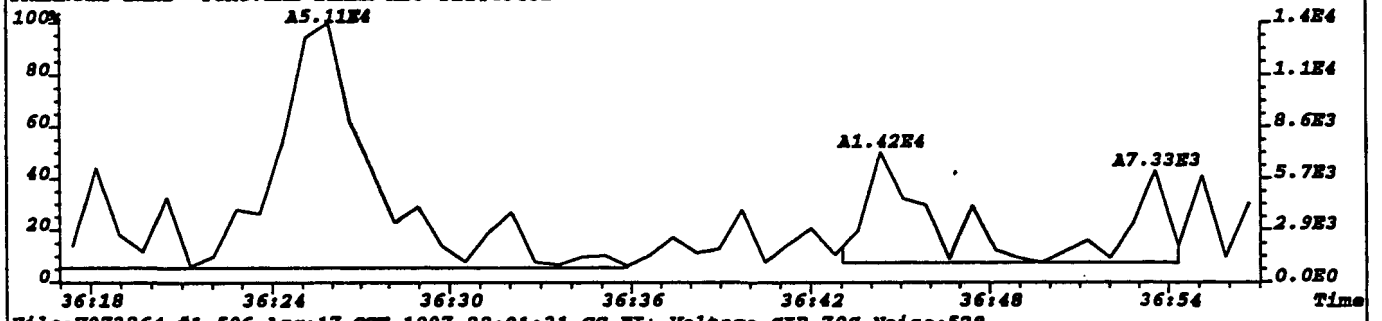
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
513.6775 F:4 Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



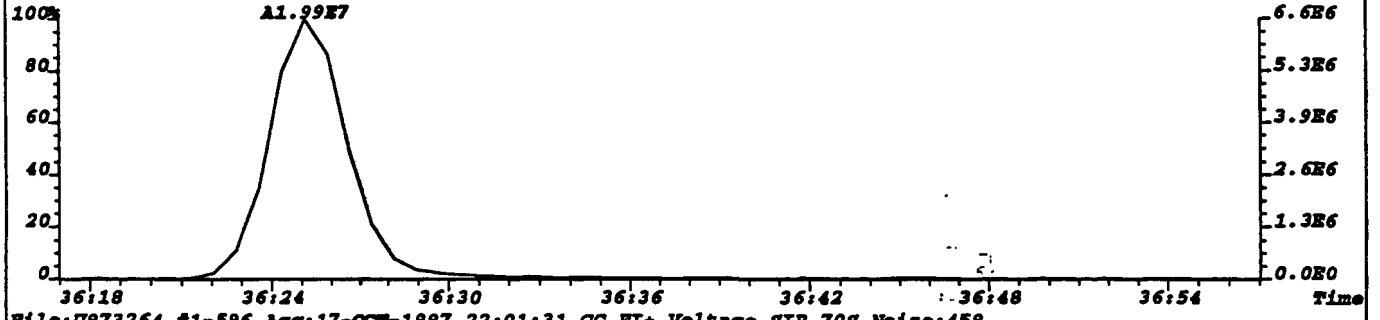
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:469
457.7377 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1876.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



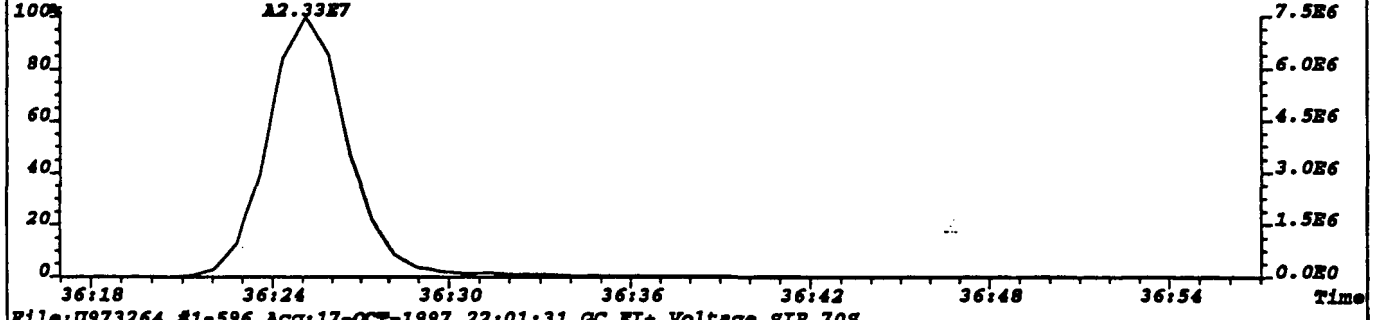
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:513
459.7348 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2052.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



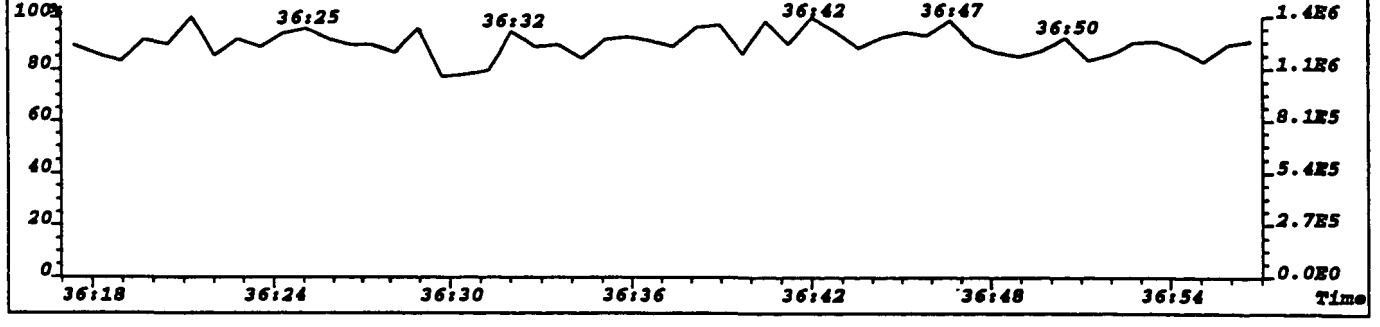
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:528
469.7779 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2112.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432



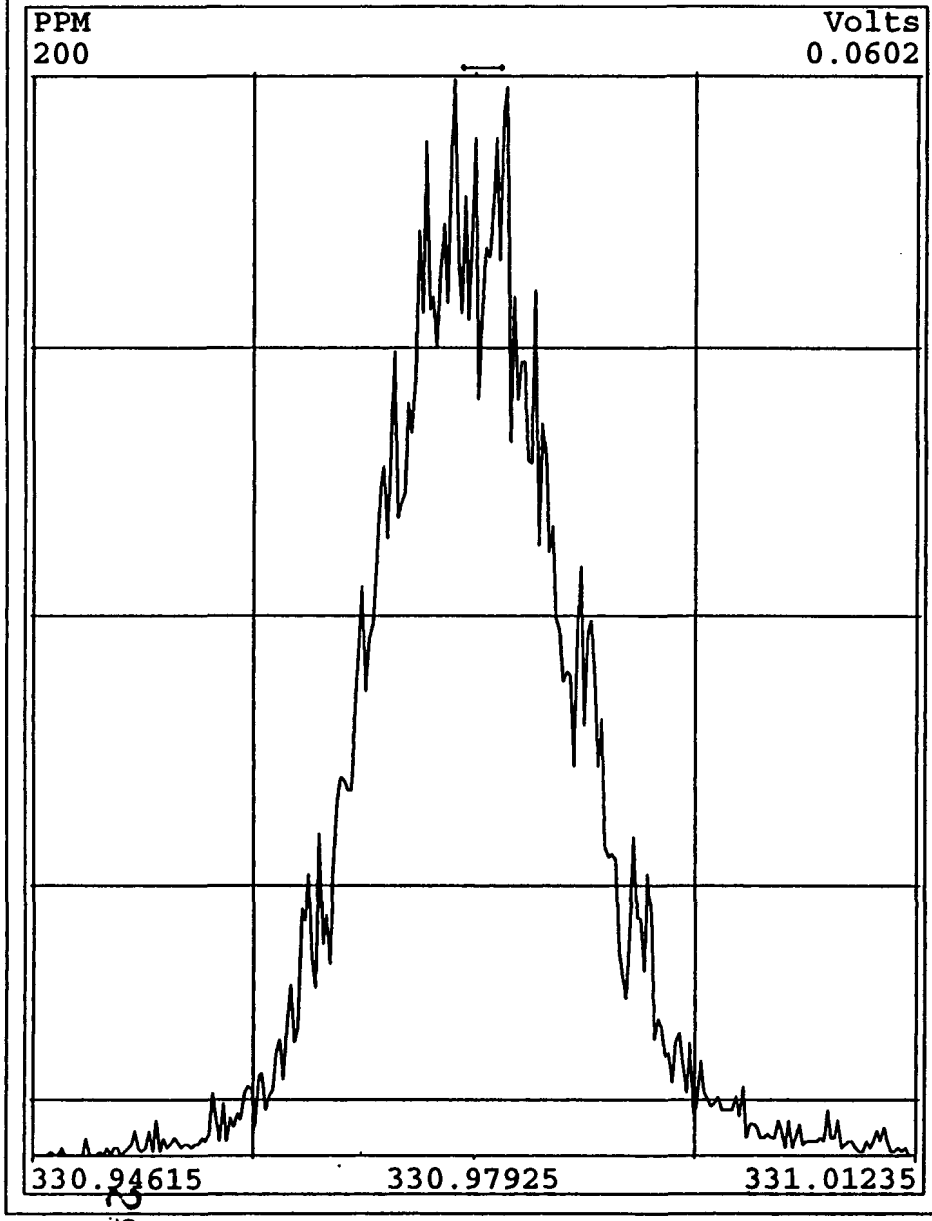
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S Noise:459
471.7750 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1836.0,1.00%,F,T) Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432

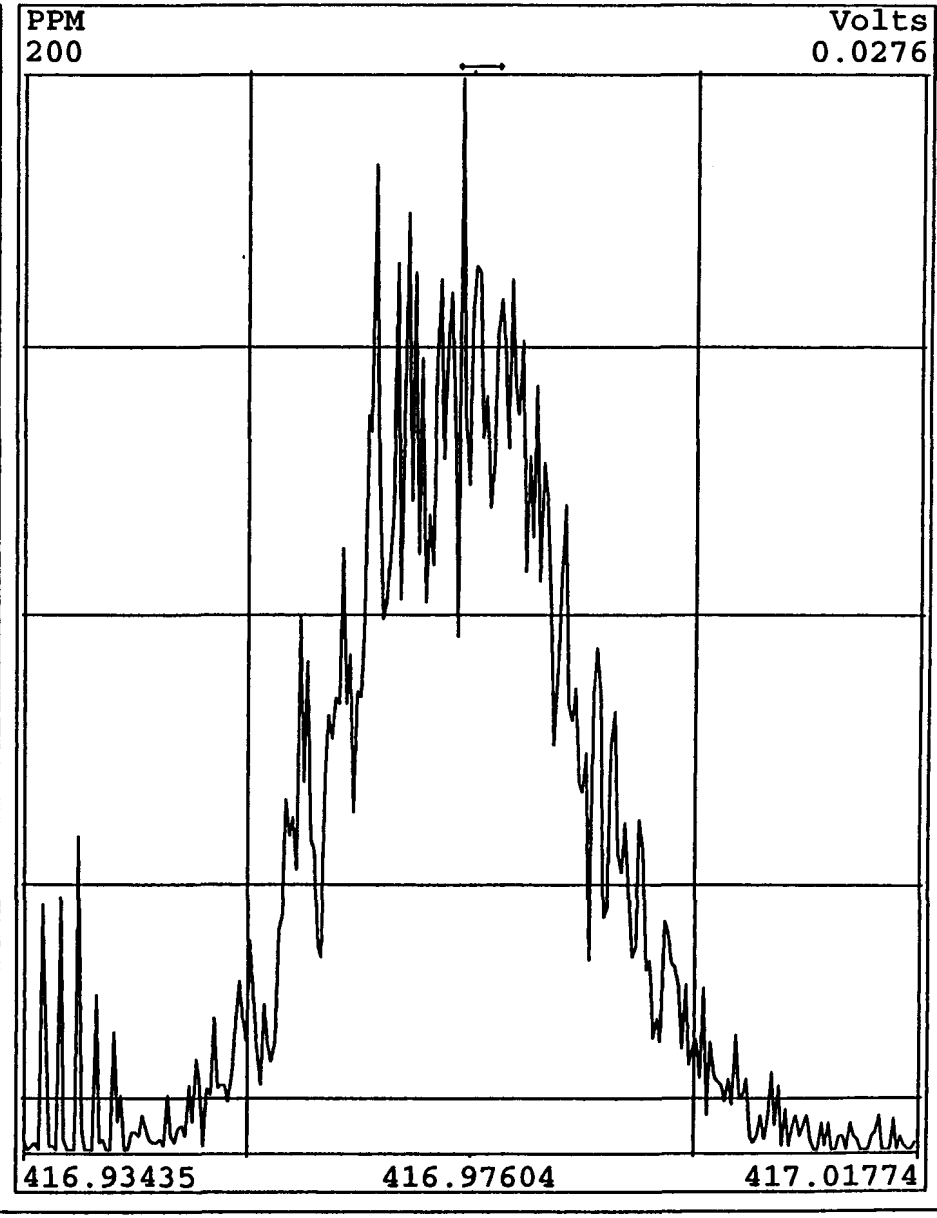


File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:EPCUS2
TRIANGLE LABS Text:LAB BLANK M23 TLI#43432

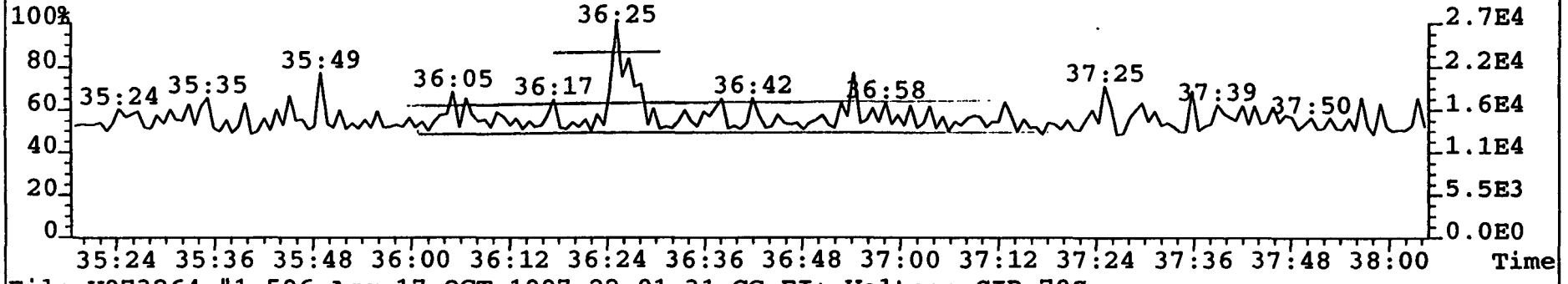


Peak Locate Examination:17-OCT-1997:21:59 File:U973264
Experiment:EPCUS2 Function:2 Reference:PFK

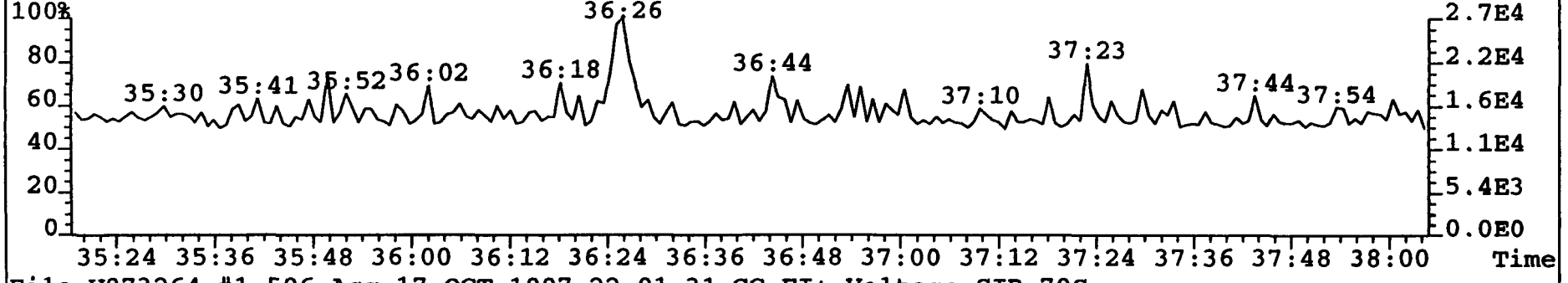




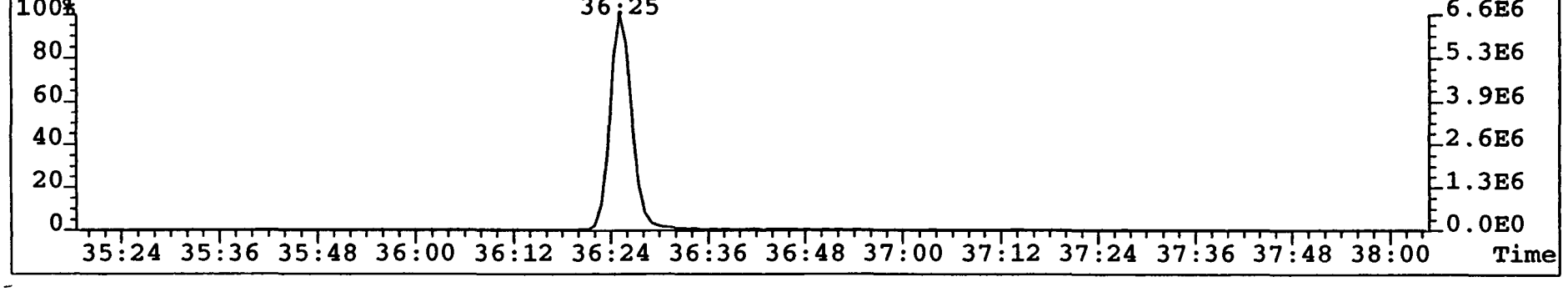
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
457.7377 F:4 Exp:EPCUS2
Sample Text:LAB BLANK M23 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



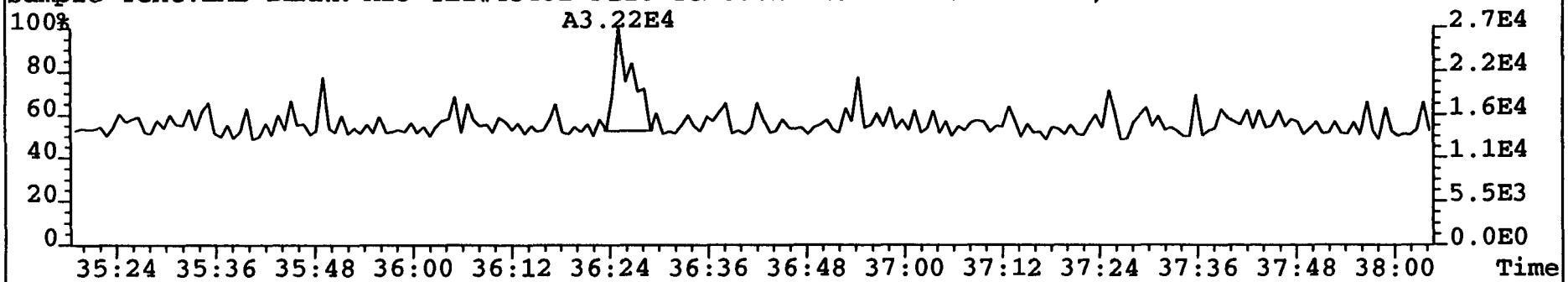
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
459.7348 F:4 Exp:EPCUS2
Sample Text:LAB BLANK M23 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



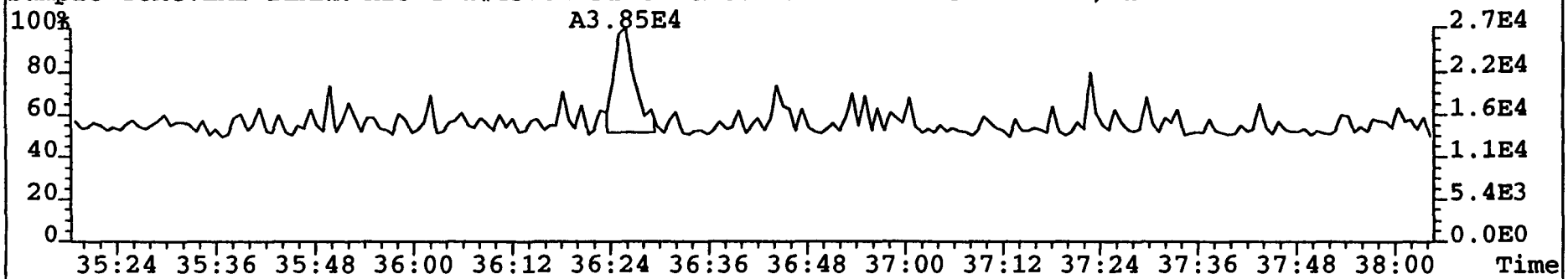
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
469.7779 F:4 Exp:EPCUS2
Sample Text:LAB BLANK M23 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



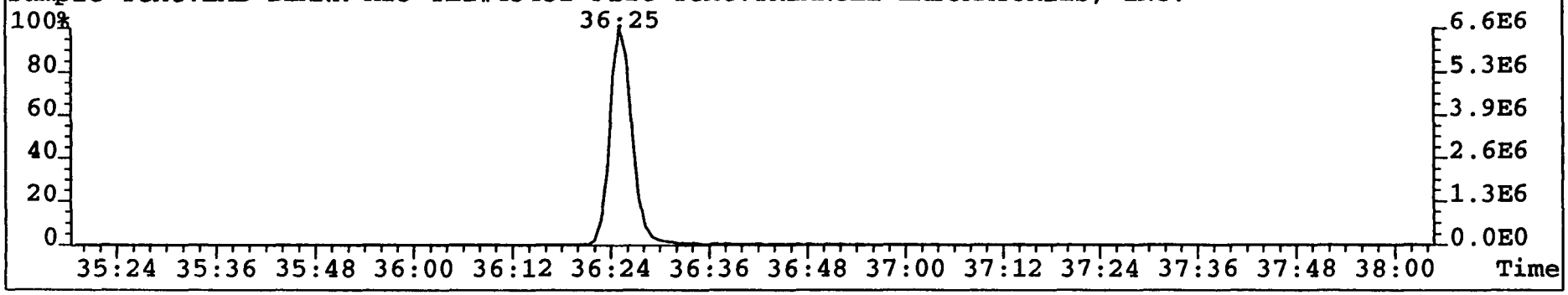
File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
457.7377 F:4 Exp:EPCUS2
Sample Text:LAB BLANK M23 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
459.7348 F:4 Exp:EPCUS2
Sample Text:LAB BLANK M23 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



File:U973264 #1-596 Acq:17-OCT-1997 22:01:31 GC EI+ Voltage SIR 70S
469.7779 F:4 Exp:EPCUS2
Sample Text:LAB BLANK M23 TLI#43432 File Text:TRIANGLE LABORATORIES, INC.



TRIANGLE LABS

CALIBRATION DATA

Triangle Laboratories, Inc.
801 Capitola Drive
Durham, NC 27713-4411
919-544-5729

P.O. Box 13485
Research Triangle Park, NC 27709-3485
Fax # 919-544-5491

Date: 10/18/97 TRIANGLE LABORATORIES, INC.

Continuing Calibration for X973633

Analysis Date....: 10/18/97 Method.....: C2NF
Operator.....: WK Instrument..: X
Init Calibration.: XF24087 Std.Conc....: 5.00
ICal Date.....: 04/08/97
Analysis Time....: 10:55 GC Column...: DB-225

Analyte Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
2378-TCDF	1.079	0.77	19:36 27:18	24:34	1.0007	0.967	0.112	11.6%
TOTAL TCDF	1.079	0.77				0.967	0.112	11.6%
2378-TCDD	1.265	0.75	20:25 26:21	23:01	1.0000	1.095	0.170	15.5%
TOTAL TCDD	1.265	0.75				1.095	0.170	15.5%

Other Standard Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
37Cl-TCDD	1.062		21:01 25:01	23:02	1.0007	1.018	0.044	4.3%

Internal Standard Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
13C12-2378-TCDF	1.495	0.80	23:33 25:33	24:33	1.0000	1.392	0.103	7.4%
13C12-2378-TCDD	1.011	0.79	21:01 25:01	23:01	1.0000	1.105	-0.094	-8.5%

Recovery Standard Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
13C12-1234-TCDD	1.000	0.81		23:19	1.0130	1.000	0.000	0.0%

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Date: 10/22/97

TRIANGLE LABORATORIES, INC.

Continuing Calibration for X973676

Analysis Date....: 10/22/97
Operator.....: GG
Init Calibration.: XF24087
ICal Date.....: 04/08/97
Analysis Time....: 11:06

Method.....: C2NF
Instrument..: X
Std.Conc....: 5.00
GC Column...: DB-225

Analyte Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
2378-TCDF	1.002	0.78	19:26 27:00	24:19	1.0014	0.967	0.035	3.6%
TOTAL TCDF	1.002	0.78				0.967	0.035	3.6%
2378-TCDD	1.038	0.69	20:14 26:05	22:49	1.0000	1.095	-0.057	-5.2%
TOTAL TCDD	1.038	0.69				1.095	-0.057	-5.2%

Other Standard Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
37Cl-TCDD	1.001		20:49 24:49	22:49	1.0000	1.018	-0.017	-1.7%

Internal Standard Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
13C12-2378-TCDF	1.228	0.77	23:17 25:17	24:17	1.0000	1.392	-0.164	-11.8%
13C12-2378-TCDD	0.975	0.78	20:49 24:49	22:49	1.0000	1.105	-0.130	-11.8%

Recovery Standard Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
13C12-1234-TCDD	1.000	0.79		23:06	1.0124	1.000	0.000	0.0%

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Printed: 11:58 10/22/97

Date: 10/17/97 TRIANGLE LABORATORIES OF RTP, INC.

Continuing Calibration for U973252

Analysis Date....: 10/17/97 Method.....: M237
Operator.....: GG Instrument..: U
Init Calibration.: UF59167 Std.Conc....: 50.00
ICal Date.....: 09/17/97

Analyte Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
Total MCDF	0.000		1:37 15:37			2.585	-2.585	100.0%
Total MCDD	0.000		2:32 16:32			2.303	-2.303	100.0%
Total DCDF	0.000		8:37 16:37			0.892	-0.892	100.0%
Total DCDD	0.000		9:32 17:32			1.770	-1.770	100.0%
Total TriCDF	0.000		12:37 19:37			0.250	-0.250	100.0%
Total TriCDD	0.000		14:32 20:32			0.000	0.000	100.0%
2378-TCDF	1.159	0.74	17:35 23:55	21:38	1.0008	1.077	0.082	7.6%
TOTAL TCDF	1.159	0.74				1.077	0.082	7.6%
2378-TCDD	1.022	0.67	19:06 23:55	22:32	1.0000	1.210	-0.188	-15.6%
TOTAL TCDD	1.022	0.67				1.210	-0.188	-15.6%
12378-PeCDF	1.206	1.53	23:51 28:21	26:20	1.0006	1.109	0.097	8.8%
23478-PeCDF	1.267	1.51		27:08	1.0310	1.138	0.129	11.4%
TOTAL PeCDF	1.237	1.52				1.124	0.113	10.0%
12378-PeCDD	1.390	1.61	25:21 28:13	27:31	1.0000	1.382	0.008	0.6%
TOTAL PeCDD	1.390	1.61				1.382	0.008	0.6%
123478-HxCDF	1.083	1.23	28:58 31:47	30:10	0.9972	1.212	-0.129	-10.6%
123678-HxCDF	1.399	1.25		30:16	1.0006	1.541	-0.142	-9.2%
234678-HxCDF	1.070	1.24		30:48	1.0182	1.267	-0.197	-15.6%
123789-HxCDF	1.037	1.24		31:32	1.0424	1.207	-0.170	-14.1%
TOTAL HxCDF	1.147	1.24				1.307	-0.160	-12.2%
123478-HxCDD	0.721	1.26	29:31 31:27	30:56	0.9978	0.857	-0.136	-15.9%
123678-HxCDD	0.839	1.25		31:01	1.0005	1.071	-0.232	-21.6%

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Date: 10/17/97 TRIANGLE LABORATORIES OF RTP, INC.

Continuing Calibration for U973252

123789-HxCDD	0.906	1.20		31:19	1.0102	1.042	-0.137	-13.1%
TOTAL HxCDD	0.822	1.23				0.990	-0.168	-17.0%
1234678-HpCDF	1.348	1.02	32:54 34:27	33:03	1.0005	1.467	-0.119	-8.1%
1234789-HpCDF	1.141	1.00		34:16	1.0373	1.241	-0.100	-8.0%
TOTAL HpCDF	1.245	1.01				1.354	-0.109	-8.1%
1234678-HpCDD	0.957	1.03	33:09 34:05	33:55	1.0000	1.012	-0.055	-5.4%
TOTAL HpCDD	0.957	1.03				1.012	-0.055	-5.4%
OCDF	1.427	0.89	32:27 40:27	36:34	1.0032	1.308	0.119	9.1%
OCDD	1.039	0.84	32:27 40:27	36:27	1.0000	1.077	-0.038	-3.6%

Other Standard Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
37Cl-TCDD	0.927		20:32 24:32	22:33	1.0007	0.944	-0.017	-1.8%
13C12-PeCDF 234	0.992	1.55	22:19 30:19	27:08	1.0310	0.970	0.022	2.2%
13C12-HxCDF 478	0.921	0.52		30:09	0.9967	0.974	-0.053	-5.5%
13C12-HxCDF 234	0.863	0.52		30:47	1.0176	0.941	-0.078	-8.2%
13C12-HxCDF 789	0.807	0.52		31:31	1.0419	0.886	-0.079	-9.0%
13C12-HxCDD 478	0.913	1.21		30:55	0.9973	0.897	0.016	1.8%
13C12-HpCDF 789	0.904	0.42	31:02 37:02	34:15	1.0368	0.883	0.021	2.4%

Internal Standard Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
13C12-2378-TCDF	1.128	0.78	20:37 22:37	21:37	1.0000	1.390	-0.262	-18.9%
13C12-2378-TCDD	1.074	0.82	20:32 24:32	22:32	1.0000	1.109	-0.035	-3.1%
13C12-PeCDF 123	0.963	1.49	22:19 30:19	26:19	1.0000	1.094	-0.131	-11.9%
13C12-PeCDD 123	0.448	1.46	23:31 31:31	27:31	1.0000	0.600	-0.152	-25.3%
13C12-HxCDF 678	1.070	0.52	26:15 34:15	30:15	1.0000	1.102	-0.032	-2.9%
13C12-HxCDD 678	0.949	1.19	30:00 32:00	31:00	1.0000	0.962	-0.013	-1.3%

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Continuing Calibration for U973252

13C12-HpCDF 678	0.835	0.43	31:02 37:02	33:02	1.0000	0.953	-0.118	-12.4%
13C12-HpCDD 678	0.833	1.01	32:55 34:55	33:55	1.0000	0.918	-0.085	-9.3%
13C12-OCDD	0.625	0.85	36:17 36:37	36:27	1.0000	0.763	-0.138	-18.0%

Recovery Standard Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
13C12-1234-TCDD	1.000	0.80		22:18	0.9896	1.000	0.000	0.0%
13C12-HxCDD 789	1.000	1.18		31:18	1.0097	1.000	0.000	0.0%

QC Front End Check: 1.1102

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ıte: 10/23/97 TRIANGLE LABORATORIES, INC.

Continuing Calibration for S976907

Analysis Date....: 10/23/97 Method.....: M237

Operator.....: GO Instrument..: S

ıit Calibration.: SF56117 Std.Conc....: 50.00

:al Date.....: 06/10/97

ıalyte Summary

ıme	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
Total MCDF	0.000		0:47 14:47			2.087	-2.087	100.0%
›tal MCDD	0.000		1:34 15:34			1.625	-1.625	100.0%
Total DCDF	0.000		7:47 15:47			0.687	-0.687	100.0%
›tal DCDD	0.000		8:34 16:34			1.326	-1.326	100.0%
Total TriCDF	0.000		11:47 18:47			1.082	-1.082	100.0%
›tal TriCDD	0.000		13:34 19:34			0.933	-0.933	100.0%
2378-TCDF	1.220	0.82	17:12 22:49	20:47	1.0000	1.251	-0.031	-2.5%
›TAL TCDF	1.220	0.82				1.251	-0.031	-2.5%
2378-TCDD	1.162	0.77	18:36 22:48	21:35	1.0008	1.191	-0.029	-2.4%
›TAL TCDD	1.162	0.77				1.191	-0.029	-2.4%
¹2378-PeCDF	1.085	1.54	22:44 26:54	25:00	1.0000	1.111	-0.026	-2.3%
_3478-PeCDF	1.105	1.49		25:45	1.0300	1.115	-0.010	-0.9%
™ƆTAL PeCDF	1.095	1.52				1.113	-0.018	-1.6%
_2378-PeCDD	1.179	1.58	24:05 26:46	26:07	1.0006	1.256	-0.077	-6.1%
™ƆTAL PeCDD	1.179	1.58				1.256	-0.077	-6.1%
₁23478-HxCDF	1.103	1.29	27:27 30:11	28:37	0.9971	1.215	-0.112	-9.2%
⁻23678-HxCDF	1.441	1.27		28:43	1.0006	1.574	-0.133	-8.4%
₄34678-HxCDF	1.075	1.29		29:13	1.0180	1.247	-0.172	-13.8%
23789-HxCDF	1.018	1.26		29:56	1.0430	1.105	-0.087	-7.9%
ıƆTAL HxCDF	1.159	1.28				1.285	-0.126	-9.8%
23478-HxCDD	0.881	1.24	27:58 29:51	29:21	0.9977	0.953	-0.072	-7.5%
123678-HxCDD	1.079	1.25		29:26	1.0006	1.133	-0.054	-4.8%

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Continuing Calibration for S976907

123789-HxCDD	1.025	1.22		29:43	1.0102	1.091	-0.066	-6.0%
TOTAL HxCDD	0.995	1.24				1.059	-0.064	-6.0%
1234678-HpCDF	1.489	1.02	31:15 32:46	31:25	1.0005	1.543	-0.054	-3.5%
1234789-HpCDF	1.148	1.10		32:36	1.0382	1.184	-0.036	-3.0%
TOTAL HpCDF	1.319	1.06				1.363	-0.044	-3.2%
1234678-HpCDD	0.999	1.05	31:30 32:25	32:15	1.0005	1.068	-0.069	-6.5%
TOTAL HpCDD	0.999	1.05				1.068	-0.069	-6.5%
OCDF	1.728	0.91	30:44 38:44	34:51	1.0034	1.493	0.235	15.8%
OCDD	1.049	0.86	30:44 38:44	34:44	1.0000	1.105	-0.056	-5.1%

Other Standard Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
37Cl-TCDD	0.929		19:34 23:34	21:35	1.0008	0.843	0.086	10.2%
13C12-PeCDF 234	0.988	1.59	21:00 29:00	25:44	1.0293	0.970	0.018	1.9%
13C12-HxCDF 478	0.940	0.51		28:36	0.9965	0.959	-0.019	-2.0%
13C12-HxCDF 234	0.860	0.52		29:13	1.0180	0.926	-0.066	-7.2%
13C12-HxCDF 789	0.789	0.52		29:56	1.0430	0.805	-0.016	-2.0%
13C12-HxCDD 478	0.940	1.21		29:20	0.9972	0.973	-0.033	-3.4%
13C12-HpCDF 789	0.792	0.41	29:24 35:24	32:36	1.0382	0.771	0.021	2.7%

Internal Standard Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
13C12-2378-TCDF	1.378	0.71	19:47 21:47	20:47	1.0000	1.318	0.060	4.6%
13C12-2378-TCDD	1.047	0.80	19:34 23:34	21:34	1.0000	1.066	-0.019	-1.8%
13C12-PeCDF 123	1.060	1.50	21:00 29:00	25:00	1.0000	1.133	-0.073	-6.5%
13C12-PeCDD 123	0.617	1.52	22:06 30:06	26:06	1.0000	0.635	-0.018	-2.9%
13C12-HxCDF 678	1.418	0.52	24:42 32:42	28:42	1.0000	1.204	0.214	17.8%
13C12-HxCDD 678	1.036	1.19	28:25 30:25	29:25	1.0000	0.995	0.041	4.1%

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Continuing Calibration for S976907

13C12-HpCDF 678	0.960	0.44	29:24 35:24	31:24	1.0000	0.887	0.073	8.3%
13C12-HpCDD 678	0.847	1.01	31:14 33:14	32:14	1.0000	0.815	0.032	3.9%
13C12-OCDD	0.390	0.93	34:34 34:54	34:44	1.0000	0.519	-0.129	-24.9%

Recovery Standard Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
13C12-1234-TCDD	1.000	0.86		21:22	0.9907	1.000	0.000	0.0%
13C12-HxCDD 789	1.000	1.23		29:42	1.0096	1.000	0.000	0.0%

QC Front End Check: 1.9799

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TRIANGLE LABORATORIES, INC. Date: 06/10/97

Initial Calibration Summary for SF56117

Analysis Date....: 06/10/97 Method.....: M237

Instrument.....: S

Analytes	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
Total MCDF	2.087	0.000	0%	8:15	0:01	13:43	2.931		1
Total MCDD	1.625	0.000	0%	8:42	0:34	14:34	2.827		1
Total DCDF	0.687	0.000	0%	10:38	6:43	14:43	5.965		1
Total DCDD	1.326	0.000	0%	11:09	7:34	15:34	1.609		1
Total TriCDF	1.082	0.000	0%	13:59	10:43	17:43	1.025		1
Total TriCDD	0.933	0.000	0%	14:03	12:34	18:34	1.064		1
2378-TCDF	1.251	0.116	9%	19:43	15:43	23:43	0.799		5
TOTAL TCDF	1.251	0.116	9%				0.799		5
2378-TCDD	1.191	0.231	19%	20:36	16:34	24:34	0.772		5
TOTAL TCDD	1.191	0.231	19%				0.772		5
12378-PeCDF	1.111	0.082	7%	24:12	20:11	28:11	1.552		5
23478-PeCDF	1.115	0.061	5%	24:59			1.470		5
TOTAL PeCDF	1.113	0.069	6%				1.509		5
12378-PeCDD	1.256	0.113	9%	25:22	21:21	29:21	1.526		5
TOTAL PeCDD	1.256	0.113	9%				1.526		5
123478-HxCDF	1.215	0.064	5%	27:55	24:01	32:01	1.247		5
123678-HxCDF	1.574	0.099	6%	28:01			1.260		5
234678-HxCDF	1.247	0.069	6%	28:32			1.243		5
123789-HxCDF	1.105	0.060	5%	29:15			1.246		5
TOTAL HxCDF	1.285	0.062	5%				1.249		5
123478-HxCDD	0.953	0.067	7%	28:41	24:45	32:45	1.265		5
123678-HxCDD	1.133	0.070	6%	28:46			1.251		5
123789-HxCDD	1.091	0.067	6%	29:03			1.233		5
TOTAL HxCDD	1.059	0.067	6%				1.249		5
1234678-HpCDF	1.543	0.103	7%	30:45	26:45	34:45	1.034		5
1234789-HpCDF	1.184	0.100	8%	31:57			1.080		5
TOTAL HpCDF	1.363	0.095	7%				1.053		5
1234678-HpCDD	1.068	0.089	8%	31:37	27:36	35:36	0.993		5
TOTAL HpCDD	1.068	0.089	8%				0.993		5
OCDF	1.493	0.131	9%	34:09	30:02	38:02	0.876		5
OCDD	1.105	0.066	6%	34:03	30:02	38:02	0.902		5

Other Standards	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
37Cl-TCDD	0.843	0.038	5%	20:36	18:34	22:34			5
13C12-PeCDF 234	0.970	0.030	3%	24:58	22:11	26:11	1.470		5
13C12-HxCDF 478	0.959	0.042	4%	27:55			0.518		5
13C12-HxCDF 234	0.926	0.021	2%	28:32			0.517		5
13C12-HxCDF 789	0.805	0.044	5%	29:15			0.519		5
13C12-HxCDD 478	0.973	0.027	3%	28:40			1.241		5
13C12-HpCDF 789	0.771	0.049	6%	31:57	28:45	34:45	0.424		5

Internal Standards	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
13C12-2378-TCDF	1.318	0.065	5%	19:43	18:43	20:43	0.734		5
13C12-2378-TCDD	1.066	0.020	2%	20:34	18:34	22:34	0.802		5
13C12-PeCDF 123	1.133	0.051	5%	24:11	20:11	28:11	1.447		5

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TRIANGLE LABORATORIES, INC. Date: 06/10/97

Initial Calibration Summary for SF56117

13C12-PeCDD 123	0.635	0.082	13%	25:21	21:21	29:21	1.461		5
13C12-HxCDF 678	1.204	0.073	6%	28:01	24:01	32:01	0.522		5
13C12-HxCDD 678	0.995	0.017	2%	28:45	27:45	29:45	1.240		5
13C12-HpCDF 678	0.887	0.046	5%	30:45	28:45	34:45	0.429		5
13C12-HpCDD 678	0.815	0.077	9%	31:36	30:36	32:36	1.019		5
13C12-OCDD	0.519	0.080	15%	34:02	32:02	36:02	0.866		5
Recovery Standards	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
13C12-1234-TCDD	1.000	0.000	0%	20:21			0.811		5
13C12-HxCDD 789	1.000	0.000	0%	29:02			1.231		5

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TRIANGLE LABORATORIES OF RTP, INC. Date: 09/17/97
Initial Calibration Summary for UF59167

Analysis Date....: 09/17/97 Method.....: M237
Instrument.....: U

Analytes	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
Total MCDF	2.585	0.566	22%	9:04	3:32	17:32	3.578*		5
Total MCDD	2.303	0.263	11%	9:40	4:20	18:20	2.804		5
Total DCDF	0.892	0.121	14%	12:12	10:32	18:32	6.782		5
Total DCDD	1.770	0.150	8%	12:53	11:20	19:20	1.518		5
Total TriCDF	0.250	0.000	0%	11:49	14:32	21:32	0.237*		2
Total TriCDD	0.000	0.000	100%		16:20	22:20			0
2378-TCDF	1.077	0.056	5%	23:33	19:32	27:32	0.752		5
TOTAL TCDF	1.077	0.056	5%				0.752		5
2378-TCDD	1.210	0.179	15%	24:20	20:20	28:20	0.738		5
TOTAL TCDD	1.210	0.179	15%				0.738		5
12378-PeCDF	1.109	0.022	2%	27:49	23:48	31:48	1.480		5
23478-PeCDF	1.138	0.080	7%	28:33			1.470		5
TOTAL PeCDF	1.124	0.040	4%				1.474		5
12378-PeCDD	1.382	0.159	12%	28:55	24:54	32:54	1.548		5
TOTAL PeCDD	1.382	0.159	12%				1.548		5
123478-HxCDF	1.212	0.049	4%	31:27	27:32	35:32	1.293		5
123678-HxCDF	1.541	0.067	4%	31:33			1.256		5
234678-HxCDF	1.267	0.111	9%	32:03			1.271		5
123789-HxCDF	1.207	0.061	5%	32:47			1.260		5
TOTAL HxCDF	1.307	0.069	5%				1.268		5
123478-HxCDD	0.857	0.045	5%	32:10	28:14	36:14	1.272		5
123678-HxCDD	1.071	0.039	4%	32:15			1.236		5
123789-HxCDD	1.042	0.020	2%	32:33			1.258		5
TOTAL HxCDD	0.990	0.032	3%				1.254		5
1234678-HpCDF	1.467	0.037	3%	34:14	30:14	38:14	1.045		5
1234789-HpCDF	1.241	0.084	7%	35:29			0.993		5
TOTAL HpCDF	1.354	0.051	4%				1.020		5
1234678-HpCDD	1.012	0.044	4%	35:06	31:05	39:05	1.031		5
TOTAL HpCDD	1.012	0.044	4%				1.031		5
OCDF	1.308	0.078	6%	37:59	33:50	41:50	0.899		5
OCDD	1.077	0.039	4%	37:50	33:50	41:50	0.839		5

Other Standards	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
37Cl-TCDD	0.944	0.015	2%	24:20	22:20	26:20			5
13C12-PeCDF 234	0.970	0.043	4%	28:32	25:48	29:48	1.421		5
13C12-HxCDF 478	0.974	0.026	3%	31:26			0.514		5
13C12-HxCDF 234	0.941	0.046	5%	32:02			0.511		5
13C12-HxCDF 789	0.886	0.036	4%	32:46			0.515		5
13C12-HxCDD 478	0.897	0.023	3%	32:09			1.197		5
13C12-HpCDF 789	0.883	0.031	4%	35:28	32:14	38:14	0.427		5

Internal Standards	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
13C12-2378-TCDF	1.390	0.117	8%	23:32	22:32	24:32	0.746		5
13C12-2378-TCDD	1.109	0.027	2%	24:20	22:20	26:20	0.805		5
13C12-PeCDF 123	1.094	0.045	4%	27:48	23:48	31:48	1.441		5

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TRIANGLE LABORATORIES OF RTP, INC. Date: 09/17/97

Initial Calibration Summary for UF59167

13C12-PeCDD 123	0.600	0.047	8%	28:54	24:54	32:54	1.424		5
13C12-HxCDF 678	1.102	0.047	4%	31:32	27:32	35:32	0.520		5
13C12-HxCDD 678	0.962	0.014	1%	32:14	31:14	33:14	1.207		5
13C12-HpCDF 678	0.953	0.050	5%	34:14	32:14	38:14	0.420		5
13C12-HpCDD 678	0.918	0.029	3%	35:05	34:05	36:05	1.030		5
13C12-OCDD	0.763	0.065	9%	37:50	35:50	39:50	0.856		5
Recovery Standards	**RF**	**SD**	**%RSD**	**RT**	**RT/LO**	**RT/HI**	**Ratio1**	**Ratio2**	**N**
13C12-1234-TCDD	1.000	0.000	0%	24:08			0.820		5
13C12-HxCDD 789	1.000	0.000	0%	32:32			1.210		5

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TRIANGLE LABORATORIES, INC. Date: 04/09/97

Initial Calibration Summary for XF24087

Analysis Date....: 04/08/97 Method.....: C2NF

Instrument.....: X GC Column...: DB-225

Analytes	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
2378-TCDF	0.967	0.044	5%	21:49	14:49	25:49	0.779		10
TOTAL TCDF	0.967	0.044	5%				0.779		10
2378-TCDD	1.095	0.097	9%	20:37	16:36	24:36	0.793		10
TOTAL TCDD	1.095	0.097	9%				0.793		10

Other Standards	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
37Cl-TCDD	1.018	0.047	5%	20:37	18:36	22:36			10

Internal Standards	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
13C12-2378-TCDF	1.392	0.071	5%	21:49	20:49	22:49	0.787		10
13C12-2378-TCDD	1.105	0.037	3%	20:36	18:36	22:36	0.783		10

Recovery Standards	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
13C12-1234-TCDD	1.000	0.000	0%	20:50			0.796		10

*** End of Report ***

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Appendix B.2

Analytical Data

Method 0010 SVOHAPs

TRIANGLE LABS

CASE NARRATIVE

Analysis of Samples for the Presence of

Semivolatile Analytes by

High-Resolution Gas Chromatography / Low-Resolution Mass Spectrometry

METHOD 8270A Rev. 1 (7/92)

Date : November 13, 1997

Client ID : Pacific Environmental Services

TLI Project Number : 43433

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Objective: Analysis of six MM5 train samples for Method 8270 polynuclear aromatic hydrocarbon (PAH) and Clean Air Act (CAA) semivolatile compounds.

Method:

Six MM5 train samples were received by Triangle Laboratories, Inc. on ice at 3°C on September 29, 1997. Although a condensate was listed on the client chain-of-custody (COC) for sample SO-MM5-1, no condensate was received for that sample. In addition, the Lab Blank sample was not listed on the client COC. The samples were stored in a cooler at 4°C prior to extraction. The XAD traps used for sampling were pre-spiked with 100 micrograms (ug) of terphenyl-d_{14} prior to sampling. Prior to extraction, the XAD, filter, and rinses were spiked with 100 ug of phenol-d_5, 2,4,6-tribromophenol, 1,4-dibromobenzene-d_4, and pyrene-d_{10}. These portions of the MM5 trains were Soxhlet extracted with methylene chloride for 16 hours. The impinger condensates, when present, were spiked with 100 ug of the surrogate standards anthracene-d10, 2-fluorobiphenyl, nitrobenzene-d_5 and 1,3,5-trichlorobenzene-d_3 before being extracted with methylene chloride using a separatory funnel. The extracts were combined and brought to a final volume of 1.0 mL for the semivolatile analysis. The analysis is based on the guidelines of Method 8270A Rev. 1 (7/92). The results reported relate only to the items tested.

The internal standards, 1,4-dichlorobenzene-d_4, naphthalene-d_8, acenaphthene-d_{10}, phenanthrene-d_{10}, chrysene-d_{12}, and perylene-d_{12}, were added to the extracts such that the final internal standard concentration was 40 ug/mL immediately prior to analysis by GC/MS.

The GC/MS analysis conditions are listed below:

GC Conditions:	
Column:	J&W DB5-625, 30m x .32mm x 1μm
Program:	35C, ramp at 12C/min to 285C, hold for 2 min. ramp at 8.5C/min to 315 C, hold for 6.5 min.
Carrier Gas:	Helium
MS Conditions:	
Instrument:	HP MSD, Chemsystem and Target data systems
Scan:	35-550 amu at 1.67 scan/sec
Interface:	Capillary, Injector: 250C, Detector: 275C

Report:

Enclosed with the case narrative are the sample identification index, project summary sheets, client and TLI chain of custody sheets, wet laboratory extraction information sheets, GC/MS tracking forms, and analytical run logs. The sample identification index correlates the client sample name, TLI sample number and the analytical file name for the each sample. The project summary sheets list the amounts of analytes detected in gray and list the estimated detection limits in parentheses for analytes which were not detected.

The data are reported as quantitation reports, chromatograms, interim reports, and spectra of detected target analytes. The quantitation report header lists the TLI project number, analysis method, instrument sample file name, and client sample name. The client project number, TLI sample number, calibration file, dilution factor, and date received, extracted, and analyzed are also listed in the quantitation report header. The response factors used for all calculations are from the continuing calibration listed in the header. All initial and continuing calibration data are located in the back of the data package. The amount reported for each target analyte detected in the samples is reported in total ug. The retention time (RT) will be listed for all internal standards and analytes which are detected. If a target analyte is not detected, it will be flagged with a "U" and a detection limit will be listed. Estimated detection limits are calculated using an area of 10,000 for all analytes which were not found in the samples. The estimated detection limits reported are the average detection limits achievable over time on an instrument type. The actual detection limit for a given compound on a given day may vary from the estimate reported. The quantitation limit for all analytes is half of the low point of the initial calibration adjusted for dilution when appropriate. Below this point the calibration cannot be considered to be linear. Any amounts reported at a level below the quantitation limit will be flagged with a "J" and should be considered estimated. If a target analyte is found at a level exceeding the upper calibration limit, it will be flagged with an "E" and should also be considered estimated. Any analytes flagged with a "B" on the sample topsheets were detected in the associated laboratory blank. All target analytes are quantitated against the internal standard preceding them on the target analyte list. Surrogate standards are quantitated against the internal standard with the matching internal standard reference number. For example, phenol-d_5 has 1 in the IS Ref column and would be quantitated against the internal standard which has IS1 listed in the flag column. If an internal standard area is above or below the quality control limits as defined by the continuing calibration, it will be flagged with "High" or "Low" in the flag column.

Immediately following the quantitation report are two pages which comprise the total ion chromatograms. Labeled internal and surrogate standards present in the sample have their identifications and retention time printed above their peak on the chromatogram. The chromatogram is followed by the interim report. On the interim report a $ is indicative of a surrogate standard and a * represents an internal standard. The interim report from the instrument is followed by the target spectra of detected compounds. Four spectral plots are included for each compound: a raw spectrum of the peak, a background subtracted version of the same spectrum, a library spectrum of the compound, and a plot showing the percent difference between the library spectrum and the background subtracted spectrum. Extracted ion current profiles are plotted on the right-hand side of the page showing the quantitation mass and one or two other prominent ions known to be present in target compound as they appear in the sample peak.

Results:

All samples were extracted outside the fourteen day sampling to extraction holding time. All samples and blanks were analyzed within the extraction to analysis holding time.

Please note that several target analytes were found at levels below the quantitation limit in the laboratory blank. These analytes should not be considered truly present in the native samples unless detected at a level at least five times the level in the blank. If the analyte level in the sample

is twenty times the level in the blank, the blank contribution can be considered statistically insignificant.

The internal standard area for perylene-d12 was outside Method 8270 quality control limits in samples SO-MM5-2-17 and SO-MM5-4-51. These internal standards were flagged with "IS High" and the amounts quantitated against them should be considered estimated.

Each sample was processed twice, once against the calibrations containing the PAH compounds and once against the calibrations containing CAA compounds. Therefore, each sample reported contains topsheets and interim reports for both the PAH and CAA analyses as well as a chromatogram and spectra for all analytes. Please note that the surrogate standards have been reported from the PAH analyses only.

All surrogate standard percent recoveries were within in-house quality control limits as defined by the following 95 percent confidence intervals:

Surrogate Standards	Mean	95% confidence interval
1,3,5-trichlorobenzene-d_3	55	22.19 - 87.75
1,4-dibromobenzene-d_4	69	34.65 - 103.19
2,4,6-tribromophenol	78	32.43 - 123.81
2-fluorobiphenyl	77	37.70 - 115.87
anthracene-d_{10}	77	37.45 - 116.75
nitrobenzene-d_5	68	30.52 - 105.65
phenol-d_5	70	28.39 - 112.40
pyrene-d_{10}	80	33.65 - 126.15
terphenyl-d_{14}	77	18.86 - 135.64

Sample Calculations:

Response Factor, RF = $\frac{\text{Area analyte x Amt Is}}{\text{Area IS x Amt analyte in the ccal}}$

Amount ug = $\frac{\text{Area analyte x Amt IS x DF}}{\text{Area IS x RF}}$

Where:

Amt IS = amount of internal standard = 40 ug
Amt analyte in the ccal = amount of analyte in the continuing calibration = 50 ug
DF = dilution factor

The data reported has been judged to be valid and in compliance with the guidelines of Method 8270A Rev. 1 (7/92) except as noted above. Should you have any questions about this project, please feel free to contact our Project Scientist, Amy Boehm, at (919) 544-5729, extension 268.

For Triangle Laboratories, Inc.,

Report Preparation:

Sarah A. Hubbard
Report Preparation Chemist

Quality Control:

Tracy Wardell
Report Preparation Chemist

The total number of pages in this data package is 216.

TRIANGLE LABS

TRIANGLE LABORATORIES, INC.

LIST OF CERTIFICATIONS AND ACCREDITATIONS

ENVIRONMENTAL

American Association for Laboratory Accreditation. Accredidation pending. Certificate Number 0226-01. Accreditation for technical competence in Environmental Testing.(Including Waste Water, Sol/Haz Waste, Pulp/Paper, and Air Matrices) Parameters are AOX/TOX, and Dioxin/Furan. Method 1613 for Drinking Water.

State of Alabama, Department of Environmental Management. Expires December 31, 1997. Laboratory I.D. # 40950. Dioxin in drinking water.

State of Alaska, Department of Environmental Conservation. Expires December 21, 1997. Certificate number OS-00397. Dioxin in drinking water.

State of Arizona, Department of Health Services. Expires May 26, 1998. Certificate #AZ0423. Drinking Water for Dioxin, Dioxin in WW and S/H Waste.

State of Arkansas, Department of Pollution Control and Ecology. Expires February 18, 1998. Pulp/paper, soil, water, and Hazardous Waste for Dioxin/Furan; AOX/TOX.

State of California, Department of Health Services. Expires August 31, 1999. Certificate #1922. Selected Metals in Waste Water; Volatiles, Semi-volatiles, and Dioxin/furan in WW and Sol/Haz Waste. Dioxin in drinking water.

State of Connecticut, Department of Health Services. Recertification pending. Registration # PH-0117. Dioxin in drinking water.

Delaware Health and Social Services. Expires December 31, 1997. Certificate #NC 140. Dioxin in drinking water.

Florida Department of Health and Rehabilitative Services. Expires June 30, 1998.Dioxin in DW. Drinking Water ID HRS# 87424. Metals, Extractable Organics (GC/MS), Pesticides/PCB's (GC) and Volatiles (GC/MS) in Environmental Samples. Environmental water ID HRS# E87411.

Hawaii Department of Health. Expires March 1, 1998. Dioxin in drinking water. "Accepted" status for regulatory purposes .

Revised 10/28/97 RM

Printed 10/29/97

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Idaho Department of Health and Welfare. Expires November 30, 1997. Dioxin in drinking water.

State of Kansas, Department of Health and Environment. Expires January 31, 1998. Environmental Analyses/Non potable Water and Solid and Hazardous Waste. Method 1613 for drinking water. ID #'s - Drinking water and/or pollution control - E-215. Solid or Hazardous Waste - E-1209.

Commonwealth of Kentucky, Department for Environmental Protection. Expires December 31, 1997. ID#90060. Dioxin in drinking water.

Maryland Department of Health and Mental Hygiene. Expires September 30, 1998. Certification #235. Drinking water by Method 1613A.

State of Michigan, Department of Public Health. Expires June 3, 1998. Drinking water by Method 1613.

Mississippi State Department of Health. No expiration date.. Dioxin in drinking water.

Montana Department of Health and Environmental Services. Expires December 31, 1997. Dioxin in drinking water.

State of New Jersey, Department of Environmental Protection and Energy. Extended by state. Temporary certificate until December 31, 1997. ID #67851. BNAs and Volatiles. Dioxin in drinking water.

State of New Mexico, Environment Department. Recertification pending. Dioxin in drinking water.

New York State Department of Health. Expires April 1, 1998. ID #11026. Environmental Analyses of non-potable Water, Solid and Hazardous Waste. Method 1613 in DW.

State of North Carolina, Department of Environment Health and Natural Resources Expires August 31, 1999. Certificate # 37751. Dioxin in drinking water.

State of North Carolina, Department of Environment, Health, and Natural Resources, Division of Environmental Management. Expires December 31, 1997. Certificate # 485. Metals, pesticides & PCBs, semi-volatiles and volatiles; TCLP.

North Dakota State Department of Health and Consolidated Laboratories. Expires December 31, 1997. Certificate # R-076. Effective October 4, 1993. Dioxin in drinking water.

Oklahoma Department of Environmental Quality. Expires August 31, 1998. Laboratory #9612. Dioxin by 1613A, 8290 and 8280.

State of South Carolina, Department of Health and Environmental Control. Expires April 1, 1998. Certificate number #99040001 (drinking water). Expires August 31, 1999. Certificate number #99040002 (other parameters). Dioxin/Furans, BNA, Volatiles, and PCBs/pesticides under Clean Water Act, 2,3,7,8-TCDD for Drinking Water, and Organic extractables for Solid and Hazardous Waste.

State of Tennessee. Department of Environment and Conservation. Expires February 5, 1999. ID #02992. Method 1613 Drinking water only.

U.S. Department of Agriculture Soil Permit. Expires September 30, 2001. Permit No. S-3790. Under the authority of the Federal Plant Pest Act, permission is granted to receive foreign soil samples for use in laboratory analysis.

U.S. Army Corps of Engineers. Expires November 30, 1997. Validated to perform methods 8280 & 8290 for Lockbourne Landfill Site Investigation, Defense Distribution Depot Projects, and assorted projects for the USACE North Pacific Division Laboratory.

U.S. EPA Region V. Expires November 14, 1999. Dioxin in drinking water.

U.S. EPA Region VIII, for the State of Wyoming. Expires November 13, 1997. Dioxin in drinking water.

State of Utah, Department of Health. Expires December 31, 1997. Certificate Number E-166. Certification for the following parameters: Semi-Volatiles and Volatiles under RCRA; Volatiles under Clean Water Act; Dioxin/furans by Method 8280; Drinking water for Dioxin by Method 1613; Metals including Mercury and Microwave Digestion.

Commonwealth of Virginia, Department of General Services, Division of Consolidated Laboratory Services. Expires June 30, 1998. ID # 00341. Dioxin in drinking water.

State of Washington, Department of Ecology. Expires September 11, 1998. Lab Accreditation Number C067. Scope of Accreditation applies to water analyses for Polychlorinated Dibenzo-p-dioxins and Polychlorinated Dibenzofurans, BNA Extr (Semivolatile) Organics and Purgeable (Volatile) Organics.

State of Washington, Department of Health. Expires April 30, 1998. Dioxin in drinking water. Lab I.D. 129

State of West Virginia, Department of Health. Expires December 31, 1997. Certificate No. 9923(C). Dioxin in drinking water.

State of Wisconsin, Department of Natural Resources. Expires August 31, 1998. Laboratory ID Number 999869530. Certification for the following categories of Organics: Purgeable, Base/Neutral, Acid, PCBs, and Dioxin. Expires November 14, 1999. Laboratory ID 999869530. Dioxin in drinking water.

PHARMACEUTICAL

Drug Enforcement Agency (DEA). Expires November 30, 1997. Registration number RT01195835. Controlled substance registration for schedules 1,2,3,3N,4,5.

N.C. Department of Human Resources. Expires October 31, 1998. Registration number NC-PT 0000 0031. North Carolina controlled substances registration. Application submitted for renewal.

Food & Drug Administration (FDA) Registration. Expires June 1998. ID #'s 001500 1053481. Annual registration of drug establishment. Annual registration of drug establishment.

OTHER

Clinical Laboratory Improvement Amendments (CLIA) Registration. Expires May 30, 1999. ID # 34D0705123. Department of Health & Human Services, Health Care Financing Administration.

U.S. EPA Large Quantity Hazardous Waste Generator. No expiration date. EPA ID #NCD982156879. Permit indicates that the laboratory is a large generator of hazardous waste.

North Carolina Radioactive Materials License. Expires April 30 1998. License No. 032-0954-1. License authorizes the licensee to receive, acquire, own, possess, transfer, import and use such radioactive materials as designated.

North Carolina General License for Radiation Protection. No. expiration date. License No. 032-875-OG. The general license applies only to radioactive material contained in devices which have been manufactured and labeled in accordance with specific requirements.

Triangle Laboratories of RTP
Sample Identification Index for Project: 43433

Client Id:	TLI Id:	File Name:
SO-MM5-1-8	185-7-2A-C,E	YP788
SO-MM5-2-17	185-7-3A-F	YP789
SO-MM5-3-37	185-7-4A-F	YP790
SO-MM5-4-51	185-7-5A-E	YP791
FBI-MM5-1	185-7-1A-D	YP775
LAB BLANK-MM5-28	185-7-6A-C	YP774
SBLK101497	SBLK101497	YP773

Triangle Laboratories of RTP
Project Summary for Project 43433

Client ID:	SO-MM5-1-8	SO-MM5-2-17	SO-MM5-3-37	SO-MM5-4-51	FBI-MM5-1
ilename :	YP788	YP789	YP790	YP791	YP775
.LI Id :	185-7-2A-C,E	185-7-3A-F	185-7-4A-F	185-7-5A-E	185-7-1A-D
Matrix :	MM5	MM5	MM5	MM5	MM5
Jnits :	ug	ug	ug	ug	ug
Naphthalene	24.93	28.20	92.27	45.94	5.85
-Methylnaphthalene	25.56	22.37	136.69	58.46	0.52
2-Chloronaphthalene	(0.43)	(0.43)	(0.44)	(0.40)	(0.40)
Acenaphthylene	0.81	0.64	2.14	1.10	(0.25)
Acenaphthene	0.28	(0.44)	0.94	0.62	(0.42)
Fluorene	0.94	0.61	1.33	0.77	(0.41)
Phenanthrene	2.07	1.16	1.77	1.17	0.13
Anthracene	0.26	(0.28)	0.34	0.28	(0.31)
Fluoranthene	0.96	1.37	0.86	0.91	(0.29)
Pyrene	1.18	1.66	1.05	0.98	(0.26)
Benzo(a)anthracene	(0.24)	(0.19)	(0.24)	(0.19)	(0.30)
Chrysene	0.22	(0.19)	(0.25)	(0.19)	(0.30)
Benzo(b)fluoranthene	(0.20)	(0.15)	(0.19)	(0.16)	(0.24)
Benzo(k)fluoranthene	(0.20)	(0.16)	(0.20)	(0.17)	(0.23)
Benzo(e)pyrene	(0.18)	(0.14)	(0.18)	(0.15)	(0.22)
Benzo(a)pyrene	(0.21)	(0.16)	(0.20)	(0.17)	(0.25)
Perylene	(0.20)	(0.16)	(0.19)	(0.16)	(0.23)
ndeno(1,2,3-cd)pyrene	(0.18)	(0.14)	(0.17)	(0.15)	(0.22)
Dibenz(a,h)anthracene	(0.24)	(0.19)	(0.23)	(0.20)	(0.29)
Benzo(g,h,i)perylene	(0.20)	(0.16)	(0.19)	(0.16)	(0.24)

( )-Estimated Detection Limit

Triangle Laboratories of RTP, Inc.
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Triangle Laboratories of RTP
Project Summary for Project 43433

Client ID:	LAB BLANK-MM5-28	SBLK101497
Filename :	YP774	YP773
TLI Id :	185-7-6A-C	SBLK101497
Matrix :	MM5	XAD
Units :	ug	ug
Naphthalene	(0.29)	2.44
2-Methylnaphthalene	(0.47)	(0.43)
2-Chloronaphthalene	(0.43)	(0.44)
Acenaphthylene	(0.27)	(0.27)
Acenaphthene	(0.45)	(0.45)
Fluorene	(0.44)	(0.45)
Phenanthrene	(0.32)	(0.29)
Anthracene	(0.33)	(0.30)
Fluoranthene	(0.31)	(0.29)
Pyrene	(0.31)	(0.28)
Benzo(a)anthracene	(0.37)	(0.32)
Chrysene	(0.37)	(0.33)
Benzo(b)fluoranthene	(0.36)	(0.30)
Benzo(k)fluoranthene	(0.34)	(0.29)
Benzo(e)pyrene	(0.33)	(0.28)
Benzo(a)pyrene	(0.37)	(0.31)
Perylene	(0.34)	(0.28)
Indeno(1,2,3-cd)pyrene	(0.32)	(0.27)
Dibenz(a,h)anthracene	(0.43)	(0.36)
Benzo(g,h,i)perylene	(0.35)	(0.29)

( )-Estimated Detection Limit

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Triangle Laboratories of RTP

Project Summary for Project 43433

Client ID:	SO-MM5-1-8	SO-MM5-2-1 7	SO-MM5-3-3 7	SO-MM5-4-5 1	FBI-MM5-1
Filename :	YP788	YP789	YP790	YP791	YP775
TLI Id :	185-7-2A-C,E	185-7-3A-F	185-7-4A-F	185-7-5A-E	185-7-1A-D
Matrix :	MM5	MM5	MM5	MM5	MM5
Units :	ug	ug	ug	ug	ug
n-Nitrosodimethylamine	(1.49)	(1.50)	(1.59)	(1.39)	(1.44)
Cumene	(0.38)	0.56	1.56	0.45	(0.39)
Phenol	6.57	35.15	11.09	19.44	3.22
Aniline	(0.50)	(0.50)	0.32	(0.46)	(0.52)
Benzyl Chloride	(0.39)	(0.39)	2.27	(0.36)	(0.40)
1,4-Dichlorobenzene	0.73	0.82	1.28	1.30	0.43
2-Methylphenol	(0.86)	(0.86)	2.16	0.70	(0.82)
Acetophenone	8.19	8.93	13.55	8.68	3.78
n-Nitrosomorpholine	(1.44)	(1.44)	(1.54)	(1.34)	(1.44)
o-Toluidine	(0.52)	(0.52)	(0.56)	(0.49)	(0.52)
Hexachloroethane	(1.37)	(1.37)	(1.46)	(1.27)	(1.35)
1,2-Dibromo-3-chloropropane	(1.42)	(1.43)	(1.52)	(1.32)	(1.43)
N,N-Diethylaniline	(0.51)	(0.51)	(0.55)	(0.48)	(0.49)
bis- (2-Chloroethyl) ether	(1.07)	(1.07)	(1.14)	(0.99)	(1.11)
3/4-Methylphenol	(0.76)	(0.76)	(0.81)	0.99	(0.83)
Nitrobenzene	(0.52)	(0.52)	(0.56)	(0.49)	(0.52)
N,N-Dimethylaniline	(0.50)	(0.50)	(0.54)	(0.47)	(0.53)
Isophorone	(0.44)	(0.44)	(0.47)	(0.41)	(0.44)
o-Anisidine	(0.91)	(0.92)	(0.98)	(0.86)	(0.95)
1,4-Phenylenediamine	(0.72)	(0.73)	(0.78)	(0.68)	(0.69)
1,2,4-Trichlorobenzene	(0.83)	(0.83)	(0.89)	1.29	(0.80)
Hexachlorobutadiene	(1.35)	(1.36)	(1.45)	(1.27)	(1.37)
a,a,a-Trichlorotoluene	(0.64)	(0.64)	(0.69)	(0.60)	(0.65)
Hydroquinone	(0.76)	(0.77)	(0.82)	(0.72)	(0.71)
2-Chloroacetophenone	(0.35)	(0.35)	(0.38)	(0.33)	(0.35)
Hexachlorocyclopentadiene	(1.51)	(1.50)	(1.57)	(1.40)	(1.34)
2,4,6-Trichlorophenol	(1.29)	0.39	(1.34)	(1.20)	(1.22)
2,4,5-Trichlorophenol	(1.21)	(1.21)	(1.26)	(1.12)	(1.06)
Biphenyl	2.13	1.22	5.10	2.50	(0.33)
Dimethylphthalate	2.49	1.89	2.23	1.43	3.32
4-Nitrophenol	(1.72)	(1.71)	(1.78)	(1.59)	(1.79)
2,4-Dinitrotoluene	(1.41)	(1.41)	(1.47)	(1.31)	(1.38)
Dibenzofuran	(0.33)	(0.33)	2.49	1.25	(0.30)
4,6-Dinitro-2-methylphenol	(2.80)	(2.79)	(2.91)	(2.60)	(3.05)
Trifluralin	(2.09)	(2.08)	(2.18)	(1.94)	(2.22)

( )-Estimated Detection Limit

Triangle Laboratories of RTP, Inc.
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Triangle Laboratories of RTP
Project Summary for Project 43433

Client ID:	SO-MM5-1-8	SO-MM5-2-17	SO-MM5-3-37	SO-MM5-4-51	FBI-MM5-1
Filename :	YP788	YP789	YP790	YP791	YP775
TLI Id :	185-7-2A-C,E	185-7-3A-F	185-7-4A-F	185-7-5A-E	185-7-1A-D
Matrix :	MM5	MM5	MM5	MM5	MM5
Units :	ug	ug	ug	ug	ug
2,4-Dinitrophenol	(3.75)	(3.73)	(3.90)	(3.48)	(4.70)
Di-n-butylphthalate	9.59	8.83	8.67	5.85	3.41
Hexachlorobenzene	(0.99)	(0.88)	(1.00)	(0.84)	(0.88)
4-Aminobiphenyl	(0.41)	(0.37)	(0.42)	(0.35)	(0.38)
Pentachlorophenol	(1.75)	(1.56)	(1.77)	(1.49)	(1.68)
Pentachloronitrobenzene	(3.83)	(3.41)	(3.87)	(3.26)	(3.55)
4-Nitrobiphenyl	(1.06)	(0.94)	(1.07)	(0.90)	(0.96)
Benzidine	(0.33)	(0.26)	(0.33)	(0.26)	(0.44)
4,4'-Methylenedianiline	(0.80)	(0.63)	(0.80)	(0.63)	(1.02)
Dimethylaminoazobenzene	(0.71)	(0.56)	(0.71)	(0.56)	(0.88)
3,3'-Dimethylbenzidine	(0.41)	(0.32)	(0.41)	(0.32)	(0.55)
3,3'-Dimethoxybenzidine	(0.82)	(0.64)	(0.81)	(0.64)	(1.13)
3,3'-Dichlorobenzidine	(0.60)	(0.48)	(0.60)	(0.47)	(0.74)
Methylene bis-chloroaniline	(1.40)	(1.10)	(1.39)	(1.09)	(1.68)
bis(2-Ethylhexyl)phthalate	11.05	20.27	21.21	9.14	21.61

( )-Estimated Detection Limit

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Triangle Laboratories of RTP
Project Summary for Project 43433

Client ID:	LAB BLANK-MM5-28	SBLK101497
Filename :	YP774	YP773
TLI Id :	185-7-6A-C	SBLK101497
Matrix :	MM5	XAD
Units :	ug	ug
n-Nitrosodimethylamine	(1.50)	(1.41)
Cumene	(0.41)	(0.39)
Phenol	(0.66)	(0.63)
Aniline	(0.54)	(0.51)
Benzyl Chloride	(0.41)	(0.39)
1,4-Dichlorobenzene	(0.67)	(0.63)
2-Methylphenol	(0.86)	(0.81)
Acetophenone	(0.61)	2.53
n-Nitrosomorpholine	(1.49)	(1.41)
o-Toluidine	(0.54)	(0.51)
Hexachloroethane	(1.41)	(1.33)
1,2-Dibromo-3-chloropropane	(1.48)	(1.40)
N,N-Diethylaniline	(0.51)	(0.48)
bis- (2-Chloroethyl) ether	(1.15)	(1.08)
3/4-Methylphenol	(0.99)	(0.89)
Nitrobenzene	(0.62)	(0.56)
N,N-Dimethylaniline	(0.63)	(0.57)
Isophorone	(0.52)	(0.47)
o-Anisidine	(1.13)	(1.02)
1,4-Phenylenediamine	(0.82)	(0.74)
1,2,4-Trichlorobenzene	(0.95)	(0.86)
Hexachlorobutadiene	(1.63)	(1.47)
a,a,a-Trichlorotoluene	(0.77)	(0.70)
Hydroquinone	(0.85)	(0.77)
2-Chloroacetophenone	(0.41)	3.83
Hexachlorocyclopentadiene	(1.44)	(1.46)
2,4,6-Trichlorophenol	(1.31)	(1.33)
2,4,5-Trichlorophenol	(1.14)	(1.15)
Biphenyl	(0.36)	(0.36)
Dimethylphthalate	1.14	(0.42)
4-Nitrophenol	(1.93)	(1.96)
2,4-Dinitrotoluene	(1.48)	(1.50)
Dibenzofuran	(0.32)	(0.32)
4,6-Dinitro-2-methylphenol	(3.27)	(3.32)
Trifluralin	(2.39)	(2.42)

( )-Estimated Detection Limit

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Triangle Laboratories of RTP
Project Summary for Project 43433

Client ID:	LAB BLANK-MM5-28	SBLK101497
Filename :	YP774	YP773
TLI Id :	185-7-6A-C	SBLK101497
Matrix :	MM5	XAD
Units :	ug	ug
2,4-Dinitrophenol	(5.05)	(5.12)
Di-n-butylphthalate	29.02	1.61
Hexachlorobenzene	(0.96)	(0.87)
4-Aminobiphenyl	(0.41)	(0.37)
Pentachlorophenol	(1.82)	(1.66)
Pentachloronitrobenzene	(3.84)	(3.50)
4-Nitrobiphenyl	(1.04)	(0.95)
Benzidine	(0.54)	(0.47)
4,4'-Methylenedianiline	(1.26)	(1.11)
Dimethylaminoazobenzene	(1.08)	(0.95)
3,3'-Dimethylbenzidine	(0.67)	(0.59)
3,3'-Dimethoxybenzidine	(1.39)	(1.22)
3,3'-Dichlorobenzidine	(0.91)	(0.80)
Methylene bis-chloroaniline	(2.06)	(1.81)
bis(2-Ethylhexyl)phthalate	1.19	0.57

( )-Estimated Detection Limit

Triangle Laboratories of RTP, Inc.
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17

CLIENT CHAIN OF CUSTODY

SAMPLER'S SIGNATURE _____

P/Q 03927/0700003270

From: Pacific Environmental Services
5001 S. Miami Blvd. Suite 300
RTP, NC 27709

Contact: Frank Meadows
Phone: 919-941-0333
Fax: 919-941-0234
P.O.#: _____

Project: ~~Tell City, IN~~ GM - Saginaw

(PES03 /AJB)

If the data will be reported to a state agency, which one? ____

Analysis Wanted: EPA Method 23 | EPA Method 0010

Total Number of Containers:

Sample Name	Date	Time	Comp	Grab	Matrix	Sample Amt.						Remarks
FB1-MMS	9/22/97				Filter, XAD Front + Back Rinse	4 Containers			X			
FB-23-1	9/22/97				Filter, XAD, Rinse	3 Containers	X					
SO-MMS-1	9/23/97				Filter, XAD, Front/Back Rinse, Cond	5 Containers			X			
SO-~~MMS~~ 23-1	9/23/97				Filter, XAD, Rinse, Condensate	4 Containers	X					
SO-MMS-2	9/24/97				Filter, XAD, Rinses Condensates	6 Containers			X			
SO-23-2	9/24/97				Filter, XAD, Rinse Condensates	5 Containers	X					
SO-MMS-3	9/25/97				Filters, XAD, Front/Back Rinse, Cond	6 Containers			X			
SO-23-3	9/25/97				Filter, XAD, Rinse Cond	4 Containers	X					
SO-23-4	9/26/97				Filter, XAD, Rinse, Condensate	4 Containers	X					
SO-~~23~~ MMS-4	9/25/97				Filter, XAD, Rinse Condensate	5 Containers			X			
FB-23-2	9/26/97				Filter, XAD, Rinse	3 Containers	X					

Relinquished By/Sign.	Date/Time	Received By/Sign.	Relinquished By/Sign.	Date/Time	Received By/Sign.
Ron Kolb	9/26/97	B Rayfield	B Rayfield	9/29/97	A Edwards
Relinquished By/Sign.	Date/Time	Received By/Sign.	Relinquished By/Sign.	Date/Time	Received By/Sign.

Received for Laboratory By/Signature	Date/Time
Rebecca M Lynch	9/29/97 1413

Send Samples to: Triangle Laboratories, Inc.
Attn: Sample Custodian
801 Capitola Drive
Durham, NC 27713 USA
Phone: (919) 544-5729 • Fax: (919) 544-5491

Transmittal 1801

ANALYTICAL REQUEST AND CHAIN OF CUSTODY

PLANT: GM - Tonawanda

PROJECT #: 5414.003

RECOVERY PERSON: R. Kolch / B. Elgass

SAMPLE TECHNICIAN: T. Abercrombie, G. Gray

SAMPLE IDENTIFICATION	COLLECTION DATE	COLLECTION TIME	SAMPLE NAME	NUMBER OF CONTAINERS	EPA Method	23	EPA Method	8010							COMMENTS (Type of container, special preparation, special handling, etc.)
MM5 Lab Blanks	9/26/97		Filter, ~~XAD~~ Acetone Water	~~4~~ 3			X								No XAD trap
M23 Lab Blanks	9/26/97		Filter, Acetone Toluene, Water	4	X										No XAD trap

Ronald J. Kolch — 9/26/97 — RELINQUISHER'S NAME — DATE/TIME — RELINQUISHER'S SIGNATURE

B. Elgass — 9/26/97 — RECEIVER'S NAME — DATE/TIME — A. McDonald — RECEIVER'S SIGNATURE

SHIPPER'S NAME AND ID NUMBER

Karin M. Lynch 9/27/97 1413

METHOD DD10/MM5 **SAMPLE RECOVERY DATA**

Plant: GM - SAGINAW		Run No.: ~~SD-MM5-1~~ FBI - MM5
Sample Date: 9/22/97	Filter No.(s): ~~SD-MM5-1~~ FBI-MM5	Job No.: 5414.003
Sample Location: SCRUBBER OUTLET B Cupola		
Recovery Date: 9/22/97	XAD-2 Trap No.(s): ~~SD-MM5-1~~ FBI-MM5	
Sample Recovery Person: RK/BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	—	475.9	719.9	721.3	615.0	862.2	g
Initial wt.	—	475.9	719.9	721.3	615.0	862.2	g
Net wt.	—	0.0	0.0	0.0	0.0	0.0	g

Description

Train System: EPA MM5 DD10 TRAIN / BOX No. N-10 / Tom Coy

Probe: 7' Glass

Filter: Color - No Change Loading - None

Impinger Contents: Clear / No CHANGE

Silica Gel: @Grams Used - 300 Color - No CHANGE % Spent - None

Condensate Observed In Front Half: None

Recovered Sample Fractions

Filter Container No. FBI-MM5	marked/sealed: ✓
XAD Module Container No.: FBI-MM5	marked/sealed: ✓
Probe (FH) & Back Half Rinse (~~Acetone~~ MeCl2/Methanol) Container No.: FBI-MM5	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (~~Toluene~~ MeCl2/Methanol) Container No.: FBI-MM5	Liquid level marked/sealed: ✓
Impinger Contents Container No.:	Liquid level marked/sealed:
Impinger Rinse (~~Acetone~~ Methanol/MeCl2) Container No.:	Liquid level marked/sealed:

METHOD 0010/MM5 SAMPLE RECOVERY DATA

Plant: GM - SAGINAW		Run No.: SC - MM5 - 1
Sample Date: 9/23/97	Filter No.(s): SC - MM5 - 1	Job No.: 5414 003
Sample Location: B Cupola SCRUBBER OUTLET		
Recovery Date: 9/24/97	XAD-2 Trap No.(s): SC - MM5 - 1	
Sample Recovery Person: ~~SC - MM5~~ BE SK/BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
NET ~~Final~~ wt.	—	196.1	2.0	0.7	1.5	15.2	g
Initial wt.	—	495.3	717.4	719.5	617.2	875.5	g
Final ~~Net~~ wt.	—	691.4	721.2	720.2	618.7	890.7	g

217.3

Description

Train System: EPA Method 0010 MM5 / BOX ~~NO~~ #24 Total 223	
Probe: 7' Glass / Clear	
Filter: Color - Grey / Tan	Loading - Medium
Impinger Contents: Clear	
Silica Gel: @Grams Used - 300	Color - Blue % Spent - 40
Condensate Observed In Front Half: None	

Recovered Sample Fractions

Filter Container No. SC-MM5-1	marked/sealed: ✓
XAD Module Container No.: SC-MM5-1	marked/sealed: ✓
Probe (FH) & Back Half Rinse (Acetone) Container No.: SC-MM5-1	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (~~Toluene~~) Container No.: SC-MM5-1	Liquid level marked/sealed: ✓
Impinger Contents Container No.: SC-MM5-1	Liquid level marked/sealed: ✓
Impinger Rinse (~~Acetone~~/MeCl2) Container No.:	Liquid level marked/sealed:

METHOD 201a SAMPLE RECOVERY DATA

Plant: GM - SAGINAW		Run No.: SO - MM5 - 2
Sample Date: 9/24/97	Filter No.(s): SO - MM5 - 2	Job No.: 5414.003
Sample Location: B Cupola Scrubber Outlet		
Recovery Date: 9/24/97	XAD-2 Trap No.(s): SO - MM5 - 2	
Sample Recovery Person: RK/BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	—	1090.8	720.2	721.5	617.5	892.5	g
Initial wt.	—	475.9	719.9	721.3	615.0	862.2	g
Net wt.	—	614.9	0.3	0.2	0.5	30.3	g

646.2

Description

Train System: EPA Method 201/MM5 / Box N-10 / TOTAL: 646.2

Probe: 7' Glass / Clear

Filter: Color - Grey / TAN Loading - Medium

Impinger Contents: Clear

Silica Gel: @Grams Used - 300 Color - Lt. Blue % Spent - 60

Condensate Observed In Front Half: NONE

Recovered Sample Fractions

Filter Container No. SO - MM5 - 2	marked/sealed: ✓
XAD Module Container No.: SO - MM5 - 2	marked/sealed: ✓
Probe (FH) & Back Half Rinse (Acetone) Container No.: SO-MM5-2	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (Toluene) Container No.: SO-MM5-2	Liquid level marked/sealed: ✓
Impinger Contents Container No.: SO - MM5 - 2 A + B	Liquid level marked/sealed: ✓
Impinger Rinse (Acetone/MeCl2) Container No.:	Liquid level marked/sealed:

METHOD 0010 **SAMPLE RECOVERY DATA**

Plant: GM - Saginaw		Run No.: SO - MM5 - 3
Sample Date: 9/25/97	Filter No.(s): SO-MM5-3	Job No.: 5414.003
Sample Location: Scrubber Outlet		
Recovery Date: 9/25/97	XAD-2 Trap No.(s): SO-MM5-3	
Sample Recovery Person: RK / BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	—	1031.7	649.4	663.8	622.2	954.6	g
Initial wt.	—	496.0	714.1	725.6	618.7	908.0	g
Net wt.	—	535.7	-64.7	-61.8	3.5	46.6	g

Description

Train System: EPA MM5/0010 / BOX ID: #24 / TOTAL: 459.3

Probe: 7' Glass

Filter: Color - TAN Loading - Medium* (Two Filters)

Impinger Contents: Clear

Silica Gel: @Grams Used - 300 Color - Blue % Spent - 60

Condensate Observed In Front Half: None

Recovered Sample Fractions

Filter Container No. SO - MM5 - 3	marked/sealed: ✓
XAD Module Container No.: SO - MM5 - 3	marked/sealed: ✓
Probe (FH) & Back Half Rinse (~~Acetone~~ $MeCl_2$/Methanol) Container No.: SO-MM5-3	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (~~Toluene~~ $MeCl_2$/Methanol) Container No.: SO-MM5-3	Liquid level marked/sealed: ✓
Impinger Contents Container No.: SO - MM5 - 3	Liquid level marked/sealed: ✓
Impinger Rinse (~~Acetone~~ Methanol/MeCl2) Container No.: BE	Liquid level marked/sealed:

METHOD 0010 **SAMPLE RECOVERY DATA**

Plant: GM-SAGINAW		Run No.: SO-MM5-4
Sample Date: 9/25/97	Filter No.(s): SO-MM5-4	Job No.: 544.003
Sample Location: B Cupola Scrubber Outlet		
Recovery Date: 9/25/97	XAD-2 Trap No.(s): SO-MM5-4	
Sample Recovery Person: RK/BE		

Moisture Data

Impingers	XAD - 2 Trap	1 (knockout)	2 (100 ml H2O) (untipped)	3 (100 ml H2O) (tipped)	4 (knockout) (untipped)	Silica gel (untipped)	
Final wt.	—	891.5	~~677.2~~ 718.8	~~715.2~~ 725.7	~~725.4~~ 722.0	951.9	g
Initial wt.	—	476.4	726.7	728.2	616.7	902.1	g
Net wt.	—	415.1	-7.9	1.5	5.3	49.8	g

Description

Train System: EPA Method 0010 / Box ID: N-10 / TOTAL. 463.8

Probe:

Filter: Color - Loading -

Impinger Contents:

Silica Gel: @Grams Used - Color - % Spent -

Condensate Observed In Front Half:

Recovered Sample Fractions

Filter Container No. SO-MM5-4	marked/sealed: ✓
XAD Module Container No.: SO-MM5-4	marked/sealed: ✓
Probe (FH) & Back Half Rinse (~~Acetone~~ Methanol/MeCl2) Container No.: SO-MM5-4	Liquid level marked/sealed: ✓
Probe (FH) & Back Half Rinse (~~Toluene~~ Methanol/MeCl2) Container No.: SO-MM5-4	Liquid level marked/sealed: ✓
Impinger Contents Container No.: SO-MM5-4	Liquid level marked/sealed: ✓
Impinger Rinse (~~Acetone~~ Methanol/MeCl2) Container No.:	Liquid level marked/sealed:

Copy 10/17/97

TRIANGLE LABORATORIES, INC. -- LOG IN RECORD/CHAIN OF CUSTODY

Custody Seal : Absent
Chain of Custody : Present
Sample Tags : Absent
Sample Tag Numbers: Not Listed on Chain of Custody
SMO Forms : N/A

Sample Seals: Absent
Container...: Intact

TLI Project Number 43433
Client: PES03 - Pacific Environmental Services

Book 185

Date Received 09/29/97 By Michael M. Lynch

Page 7

Ice Chest ICE Temp 3.0 C

Carrier and Number TOM MCDONALD

TLI Number.. mR/H:CPM.	Client Sample ID..... .....Client COC ID.....*	Matrix Location.....	To LAB Date/Init	To STORAGE Date/Init	To LAB Date/Init	To STORAGE Date/Init	To LAB Date/Init	To STORAGE Date/Init	To LAB Date/Init	To STORAGE Date/Init	DISPOSED Date/Init
185-7-1A	FBI-MM5-1 FBI-MM5 * C01	FILTER	CJ 10/14/97	USED CJ 10/14/97							
185-7-1B	FBI-MM5-2 FBI-MM5 * C01	XAD									
185-7-1C	FBI-MM5-3 FBI-MM5 * C01	FH/RINSE									
185-7-1D	FBI-MM5-4 FBI-MM5 * C01	BH/RINSE									
185-7-2A	SO-MM5-1-8 SO-MM5-1 * C01	FILTER									
185-7-2B	SO-MM5-1-9 SO-MM5-1 * C01	XAD									
185-7-2C	SO-MM5-1-10 SO-MM5-1 * C01	FH/RINSE									
185-7-2E	SO-MM5-1-12 SO-MM5-1 * C01	BH/RINSE									
185-7-3A	SO-MM5-2-17 SO-MM5-2 * C01	FILTER									
185-7-3B	SO-MM5-2-18 SO-MM5-2 * C01	XAD									
185-7-3C	SO-MM5-2-19 SO-MM5-2 * C01	FH/RINSE									
185-7-3D	SO-MM5-2-20 SO-MM5-2 * C01	CONDENSATE BOTTLE A		CØI CJ 10/14/97							
185-7-3E	SO-MM5-2-21 SO-MM5-2 * C01	CONDENSATE BOTTLE B		CØI							
185-7-3F	SO-MM5-2-22 SO-MM5-2 * C01	BH/RINSE		USED CJ 10/14/97							

Receiving Remarks: COC LIST A CONDENSATE FOR SO-MM5-1 BUT A CONDENSATE WAS NOT RECEIVED.

Archive Remarks:

TRIANGLE LABORATORIES, INC. -- LOG IN RECORD/CHAIN OF CUSTODY

Custody Seal : Absent
Chain of Custody : Present
Sample Tags : Absent
Sample Tag Numbers: Not Listed on Chain of Custody
SMO Forms : N/A

Sample Seals: Absent
Container...: Intact

TLI Project Number 43433
Client: PES03 - Pacific Environmental Services

Date Received 09/29/97 By [signature]

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Ice Chest ICE Temp 3.0 C

Carrier and Number TOM MCDONALD

TLI Number.. mR/H:CPM.	Client Sample ID..... Client COC ID.....	*	Matrix Location.....	To LAB Date/Init	To STORAGE Date/Init	To LAB Date/Init	To STORAGE Date/Init	To LAB Date/Init	To STORAGE Date/Init	To LAB Date/Init	To STORAGE Date/Init	DISPOSED Date/Init
185-7-4A	SO-MM5-3-37 SO-MM5-3	*	FILTER A C01	CJ 10/14/97	USED CJ 10/14/97							
185-7-4B	SO-MM5-3-38 SO-MM5-3	*	FILTER B C01									
185-7-4C	SO-MM5-3-39 SO-MM5-3	*	XAD C01									
185-7-4D	SO-MM5-3-40 SO-MM5-3	*	FH/RINSE C01									
185-7-4E	SO-MM5-3-41 SO-MM5-3	*	CONDENSATE C01		CQ1 CJ 10/14/97							
185-7-4F	SO-MM5-3-42 SO-MM5-3	*	BH/RINSE C01		USED CJ 10/14/97							
185-7-5A	SO-MM5-4-51 SO-MM5-4	*	FILTER C01									
185-7-5B	SO-MM5-4-52 SO-MM5-4	*	XAD C01									
185-7-5C	SO-MM5-4-53 SO-MM5-4	*	FH/RINSE C01									
185-7-5D	SO-MM5-4-54 SO-MM5-4	*	CONDENSATE C01		CQ1 CJ 10/14/97							
185-7-5E	SO-MM5-4-55 SO-MM5-4	*	BH/RINSE C01		USED CJ 10/14/97							
185-7-6A	LAB BLANK-MM5-28 NOT ON COC	*	FILTER C01									
185-7-6B	LAB BLANK-MM5-30 NOT ON COC	*	CH2CL2/CH3OH C01									
185-7-6C	LAB BLANK-MM5-31 NOT ON COC	*	TYPE II WATER C01		CQ1 CJ 10/14/97							

Receiving Remarks: COC LIST A CONDENSATE FOR SO-MM5-1 BUT A CONDENSATE WAS NOT RECEIVED.

Archive Remarks:

TRIANGLE LABORATORIES, INC.

Sample Preparation Tracking & Management Form

Project: 43433 Client: Pacific Environmental Services (PES03)

Sample Information

Method: 8270 Extraction Date: 10/14/97

Solvent/Acids(): Methylene Chloride Lot: 973430

Sample #	crd	TLI SAMPLE ID / CLIENT SAMPLE ID	Sample Wgt g / Vol ml	Final Volume ml	5787 Exp 12/17/97 Surr Spike X 10/14/97 100 ug/mL 1000 mL	5383 (B) MK 10/16/97 5382A/B 5467 2/26 PS Exp 3/5/99 Surr Spike W 10/14/97 100 ug/mL 1000 mL	5467 Exp 3/5/99 BNA QC Check Soln 10/14/97 100 ug/mL 1000 mL	5249 Exp 1/6/98 8270 Acid QC check Soln 10/14/97 100 ug/mL 1000 mL	/ /	/ /
000		TLI Blank / SBLK	1	1	X TMW	10/16/97 JSY				
001		185-7-1A-D / FBI-MM5-1			X TMW	X TMW				
002		185-7-2A-C,E / SO-MM5-1-8			X TMW	X TMW				
003		185-7-3A-F / SO-MM5-2-17			X TMW	10/16/97 JSY				
004		185-7-4A-F / SO-MM5-3-37			X TMW	10/16/97 JSY				
005		185-7-5A-E / SO-MM5-4-51			X TMW	10/16/97 JSY				
006		185-7-6A-C / LAB BLANK-MM5-28			X TMW	10/16/97 JSY				
007		TLI LCS / TLI LCS			X TMW	X TMW	X TMW	X TMW		
008		TLI LCSD / TLI LCSD			X TMW	X TMW	X TMW	X TMW		

Comments: No condensates for sample 001 + 002 - need spike W
No XAD for 006 only filter
USED Supelco XAD P1035 for 007 + 008 USED Supelco XAD P1039 for 000

REV 07/26/93 (PSTMF 7)

43433

70MM5.TXT OWL SAMPLE EXTRACTION AND CLEANUP TRACKING FORM
21 '97 8270 MM5 PROJECT (IMPINGER INCLUDED)

SOP #	STEP DESCRIPTION
OWL-118	Prep glassware for soxhlet extraction. CJ 10/14/97
OWL-111	K/D front half and back half rinses to 1 ml.
OWL-118	Place filter and XAD into MeCl2 presoxed thimble. CJ 10/14/97
OWL-118	Add concentrated FH and BH rinses to thimble.
DSP-128	Spike 1000ul Spike X @ 100 ug/ml into all samples.
DSP-128	Spike 1000ul BN QC CHECK @ 100 ug/ml into LCS/LCSD.
DSP-128	Spike 1000ul A QC CHECK @ 100 ug/ml into LCS/LCSD.
OWL-118	Soxhlet extract 16 hours with CH2Cl2.
OWL-111	K/D down impinger rinses, if any.
OWL-118	Pour impinger water in separatory funnel, NA measure and record pH and volume. JSY 10/16/97 V.7
OWL-118	Add concentrated impinger rinses to the water. NA
DSP-128	Spike 1000ul Spike W @ 100 ug/ml into all samples. MK / JSY 10/16/97 NOTE: LCS/LCSD does not have a water fraction.
OWL-118	Extract 3 X 60 mL MeCl2. JSY 10/16/97 V.7
OWL-111	Filter the sox and impinger extracts through Na2SO4. MK for BSP 10/18/97
OWL-111	K/D the to 10 mL.
OWL-111	N2 to 1 ml.
OWL-111	Transfer to 1/2 dram vial with 2 X 0.5 mL of CH2Cl2 rinses.
OWL-111	N2 to 1 mL. MK 10/19/97
---	Relinquish to LRGC/MS for analysis.

Used SOP OWL 118 Revision 7.0 CJ 10/14/97

Date: 10/16/97
Time: 15:35

TRIANGLE LABORATORIES, INC.
Wet Lab Extraction and Observations
Project: 43433

PRDPERC v4.00
Page: 1

Sample #	crd	TLI_Number..	Customer.Sample.Id.....	Init. pH...	NaOH mL..	Adj. pH.1.	H2SO4 mL...	Adj. pH.2.	Appearance.	Color.....	Odor...	Vol.	Entered.By.....	Date....	Time....	S
000		TLI Blank	SBLK	7.00	n/a	n/a	n/a	n/a	HPLC WATER	COLORLESS	NONE	620	SYKOROVA	10/16/97	15:34:47	F
003		185-7-3A-F	SO-MM5-2-17	7.00	1.5	12.00	0.4	2.00	CLEAR WATER	COLORLESS	NONE	620	SYKOROVA	10/16/97	15:34:47	F
004		185-7-4A-F	SO-MM5-3-37	7.00	1.0	12.00	0.3	2.00	CLEAR WATER	COLORLESS	NONE	530	SYKOROVA	10/16/97	15:34:47	F
005		185-7-5A-E	SO-MM5-4-51	7.00	0.8	12.00	0.2	2.00	CLEAR WATER	COLORLESS	NONE	420	SYKOROVA	10/16/97	15:34:48	F
006		185-7-6A-C	LAB BLANK-MM5-28	7.00	1.5	12.00	0.5	2.00	CLEAR WATER	COLORLESS	NONE	440	SYKOROVA	10/16/97	15:34:48	F

*** End of Report ***

TRIANGLE LABORATORIES, INC.
Wet Lab MM5/PUF Observations
Project: 43433

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Sample #	crd	TLI_Number..	Customer.Sample.Id.....	F. No	XAD Color.....	Filter Color.....	Glass Wool Color.....	PUF Color.....	Odor.....	Air Q.No.	Entered.By.....	Date....	Time....	S
000		TLI Blank	SBLK		WHITE				NONE	P1039	LIVENGOOD	10/14	18:25	F
001		185-7-1A-D	FBI-MM5-1	1	WHITE	WHITE	WHITE		NONE	3927	LIVENGOOD	10/14	18:25	F
002		185-7-2A-C,E	SO-MM5-1-8	1	WHITE	BROWN	WHITE		NONE	3927	LIVENGOOD	10/14	18:25	F
003		185-7-3A-F	SO-MM5-2-17	1	WHITE	BROWN	WHITE		NONE	3927	LIVENGOOD	10/14	18:25	F
004		185-7-4A-F	SO-MM5-3-37	2	WHITE	BROWN	WHITE		NONE	3927	LIVENGOOD	10/14	18:25	F
005		185-7-5A-E	SO-MM5-4-51	1	WHITE	LGHT BROWN	WHITE		NONE	3927	LIVENGOOD	10/14	18:25	F
006		185-7-6A-C	LAB BLANK-MM5-28	1		WHITE			NONE		LIVENGOOD	10/14	18:25	F
007		TLI LCS	TLI LCS		WHITE				NONE	P1035	LIVENGOOD	10/14	18:25	F
008		TLI LCSD	TLI LCSD		WHITE				NONE	P1035	LIVENGOOD	10/14	18:25	F

*** End of Report ***

43433

(1 of 2)

Filter/XAD/Filter/BH Soxhlet extraction 9/10/N/97

(000) Used Supelco XAD P1039 30g - white

(001)

PES03-Pacific Environmental Services
FBI-MM5-1
Project: 43433
185-7-1A

PACIFIC ENVIRONMENTAL SERVICES, INC #1

Sample I.D. No.: FBI-MM5
Recovered By (Initials): [illegible]
Plant: GM-Powertrain, Saginaw, Michigan
Project Number: [illegible]
Date/Time: [illegible]
Sample Media/Description: Filter
Comments: [illegible]

Filter - (1) - white
XAD - white
Glasswool - white

PES03-Pacific Environmental Services
FBI-MM5-2
Project: 43433
185-7-1B

Triangle Labora
TLI PROJECT# 03
DATE 9/18/97
SPIKE 4.0ng USF
SPIKE 100ug TERP
SPIKER WM PREP.
PACIFIC ENV.

(002)

PES03-Pacific Environmental Services
SO-MM5-1-8
Project: 43433
185-7-2A

Tare: 173.2

PACIFIC ENVIRONMENTAL SERVICES, INC #8

Sample I.D. No.: SO-MM5-1
Recovered By (Initials): [illegible]
Plant: GM-Powertrain, Saginaw, Michigan
Project Number: [illegible]
Date/Time: [illegible]
Sample Media/Description: [illegible] MM5 train

Filter(1) - brown
XAD - white
Glasswool - white

Triangle Laboratories
TLI PROJECT# 03927
DATE 9/[illegible]/97
SPIKE [illegible]ng USF-C & USF-
SPIKE [illegible]ng TERPHENYL-D
SPIKER [illegible] PREP.
PACIFIC ENV.

PES03-Pacific Environmental Services
SO-MM5-1-9
Project: 43433
185-7-2B

(3)

Environmental Services
SO-MM5-2-17
Project: 43433
185-7-3A

Time: 173.5

PACIFIC ENVIRONMENTAL SERVICES, INC
Sample I.D. No.: SO-MM5-2
Recovered By (Initials): [illegible]
Plant: GM-Powertrain, Saginaw, Michigan
Project Number: [illegible]
Date/Time: [illegible]
Sample Media/Description: [illegible]
Comments: [illegible]

PES03-Pacific Environmental Services
SO-MM5-2-18
Project: 43433
185-7-3B

Filter - brown
XAD - white
Glasswool - white

Triangle Laboratories, Inc.
TLI PROJECT # 03927
DATE 9/18/97
SPIKE 4.0ng USF-C & USF-S
SPIKE 100ug TERPHENYL D14
SPIKER [illegible] PREP.
PACIFIC ENV.

(004)

PES03-Pacific Environmental Services
SO-MM5-3-37
Project: 43433
185-7-4A

Time: 172.1

PACIFIC ENVIRONMENTAL SERVICES, INC
Sample I.D. No.: SO-MM5-3
Recovered By (Initials): RL/BE
Plant: GM-Powertrain, Saginaw, Michigan
Project Number: [illegible]
Date/Time: [illegible]
Sample Media/Description: Filter A - Part A
Comments: [illegible]

Filter - (2) - both brown
XAD - white
Glasswool - white

PES03-Pacific Environmental Services
SO-MM5-3-38
Project: 43433
185-7-4B

Time: 173.5

PACIFIC ENVIRONMENTAL SERVICES, INC
Sample I.D. No.: SO-MM5-3
Recovered By (Initials): RL/BE
Plant: GM-Powertrain, Saginaw, Michigan
Project Number: [illegible]
Date/Time: 9/25/97 [illegible]
Sample Media/Description: Filter B - Part B
Comments: [illegible]

PES03-Pacific Environmental Services
SO-MM5-3-39
Project: 43433
185-7-4C

Triangle Laboratories, Inc.
TLI PROJECT# 03927
DATE 9/18/97
SPIKE 4.0ng USF-C & USF-S
SPIKE 100ug TERPHENYL D14
SPIKER [illegible] PREP.
PACIFIC ENV.

PES03-Pacific Environmental Services
SO-MM5-4-51
Project: 43433
185-7-5A

2 of 2

G 10/14/97

005

Filter - light brown
XAD - white
Glasswool - white

Pacific Environmental Services, Inc.
Sample I.D. No.: SO-MM5-4
Recovered By (Initials): [illegible]
Plant: GM-Powertrain, [illegible]
Project Number: 5414.00[illegible]
Date/Time: 9/24/97
Sample Media/Description: 5 filter [illegible]

PES03-Pacific Environmental Services
SO-MM5-4-52
Project: 43433
185-7-5B

Triangle Laboratories, Inc.
TLI PROJECT# 03927
DATE 9/18/97
SPIKE 4.0ng USF-C & USF-S
SPIKE 100ug TERPHENYL-D14
SPIKER [illegible] PREP.
PACIFIC ENV.

PES03-Pacific Environmental Services
LAB BLANK-MM5-28
Project: 43433
185-7-6A

006

Filter - (1) - white
no XAD
no glasswool

Pacific Environmental Services, Inc.
Sample I.D. No.: LAB BLANK - MM5
Recovered By (Initials): [illegible]
Plant: GM-Powertrain, Saginaw [illegible]
Project Number: [illegible]
Date/Time: [illegible]
Sample Media/Description: [illegible]

007 Supelco XAD P1035 30g white

008 Supelco XAD P1035 30g white

TRIANGLE LABORATORIES, INC.
Transfer Chain-of-Custody Form
Project 43433

Transfer From: OWLS5 To: OMSSV

	Initials..	Date.....	Time....
Released by:	MK	10/19/97	6:00 PM
Accepted by:	MD	10/22/97	06:30

MILES.ID.....		TLI_No.....	Cust.Id.....
43433-	-000	TLI Blank	SBLK
43433-	-001	185-7-1A-D	FBI-MM5-1
43433-	-002	185-7-2A-C,E	SO-MM5-1-8
43433-	-003	185-7-3A-F	SO-MM5-2-17
43433-	-004	185-7-4A-F	SO-MM5-3-37
43433-	-005	185-7-5A-E	SO-MM5-4-51
43433-	-006	185-7-6A-C	LAB BLANK-MM5-28
43433-	-007	TLI LCS	TLI LCS
43433-	-008	TLI LCSD	TLI LCSD

XfrCOC (Rev 11/01/94)

Additional comments or instructions:

SEMIVOLATILE GC/MS TRACKING FORM

TL-RTP Project #: 43433

MATRIX: MM5 PUF Water Soil Other _____

METHOD: 8270 625 CLP

ANALYTE LIST: Table 2 TCLP 625 CLP CAA/PAP PAH CB/CP Other _____

ICAL Name: ICAL Y022 CAA / ICAL Y022 TBL2/PAH

Date	Time	TLRTP ID	Sample ID	File Name	Comments
10/22/97	0915	3988	DFTPP	YP762	
	1159	5379	SSTD050 PAH	YP766	
	1555	5520	SSTD050 CAA	YP771	
	1730	N/A	SBUL 101497	YP773	
	1818	185.7.6A-C	LAB BLANK MM5-28	YP774	
	1906	185.7.1A-D	FBE-MM5-1	YP775	
	1955	N/A	LCS	YP776	
10/22/97	2041	N/A	LCS DUP	YP777	
10/23/97	0854	3988	DFTPP	YP782	
	0912	5379	SSTD050 PAH	YP783	
	0956	5520	SSTD050 CAA	YP784	
	1333	185.7.2A-C,E	SO-MM5-1-8	YP788	
	1421	185.7.3A-F	SO-MM5-2-17	YP789	IS #6 high
	1509	185.7.4A-F	SO-MM5-3-39	YP790	
10/23/97	1600	185.7.5A-E	SO-MM5-4-51	YP791	IS #6 high

TRIANGLE LABORATORIES OF RTP, INC.

Triangle Laboratories, Inc.
Run Log

35

Column Type	Column #	Analysis*	Acquisition Method	GC Method*	Find DBs*	Other*
DB5-625	4581957J	—	CC/1st.m	—	—	—

Standards		
Internal / Surrogate / Recovery	Internal / Surrogate / Recovery	Analyte
5402C Exp 12/31/97 5µl @834 µg/ml	N/A	N/A

Extract / Sample volume 100 µL (Circle unit) mL

DD 10/17/97
Signature Date

Date**	Time**	Project	Sample#	Client ID	Filename	pH*	Operator/Date	Backup*	Proc	Comments***
10/22/97	0915	N/A	3988	DFTPP	YP162		DD 10/22/97		DD	passed DD 10/22/97
10/22/97	0931	N/A	5376	SSTD160	YP163		DD 10/22/97		DD	
10/22/97	1034	N/A	5377	SSTD120	YP164		DD 10/22/97		DD	
10/22/97	1112	N/A	5378	SSTD080	YP165		DD 10/22/97		DD	
10/22/97	1159	N/A	5379	SSTD050	YP166		DD 10/22/97		DD	
10/22/97	1247	N/A	5380	SSTD020	YP167		DD 10/22/97		DD	curve passed DD 10/23/97
10/22/97	1334	N/A	5517	SSTD160 CAA	YP168		DD 10/22/97		DD	
10/22/97	1421	N/A	5518	SSTD120 CAA	YP169		DD 10/22/97		DD	
10/22/97	1508	N/A	5519	SSTD080 CAA	YP170		DD 10/22/97		DD	
10/22/97	1555	N/A	5520	SSTD050 CAA	YP171		DD 10/22/97		DD	

* Volatile Data Only ** Transcribed Data *** Dated Signature/Initials Required

SRVR1\QA\FORMS\LRRUNLOG.DOC (1/23/97)

Triangle Laboratories, Inc.
Run Log

Column Type	Column #	Analysis*	Acquisition Method	GC Method*	Find DBs*	Other*
DB5 625	4581957J	—	cclist.m	—	—	—

Standards		
Internal / Surrogate / Recovery	Internal / Surrogate / Recovery	Analyte
5402C Exp 12/31/97 5µl @ 834 µg/ml	N/A	N/A

Extract / Sample volume 100 µL (Circle unit) mL

DD — Signature; 10/22/97 — Date

Date**	Time**	Project	Sample#	Client ID	Filename	pH*	Operator/Date	Backup*	Proc	Comments***
10/22/97	1643	N/A	5521	SSTD020 CAA	YP772		DD 10/22/97		DD	curve passed DD 10/23/97
10/22/97	1730	43433	N/A	SBLK 101497	YP773		DD 10/22/97		DD	
10/22/97	1818	43433	185.7-6A-C	LAB BLANK MM5-28	YP774		DD 10/22/97		DD	
10/22/97	1906	43433	185.7.1A-D	FBI-MM5-1	YP775		DD 10/22/97		DD	
10/22/97	1955	43433	N/A	LCS	YP776		DD 10/22/97		DD	
10/22/97	2041	43433	N/A	LCS DUP	YP777		DD 10/22/97		DD	
10/22/97	2129 ZH	LEDD 10/23/97 N/A	N/A	SOLVENT BLANK	YP778		DD 10/22/97		DD	Off Clock DD 10/23/97
10/22/97	2215	91507A	N/A	P-1047	YP779		DD 10/22/97		DD	bad injection reanalyze DD 10/23/97
10/22/97	2304	91507B	N/A	P-1058	YP780		DD 10/22/97		DD	
10/22/97	2351	91507C	N/A	P-1059	YP781		DD 10/22/97		DD	Off Clock DD 10/23/97

* Volatile Data Only ** Transcribed Data *** Dated Signature/Initials Required

Triangle Laboratories, Inc.
Run Log

Column Type	Column #	Analysis*	Acquisition Method	GC Method*	Find DBs*	Other*
DB5.625	4581957J	—	Cclut.m	—	—	—

Standards		
Internal / Surrogate / Recovery	Internal / Surrogate / Recovery	Analyte
5402 C Exp 12/31/97 Spl@ 834 µg/mL	N/A	N/A

Extract / Sample volume 100 µL (Circle unit) mL

DO 10/24/97
Signature Date

Date**	Time**	Project	Sample#	Client ID	Filename	pH*	Operator/Date	Backup*	Proc	Comments***
10/24/97	1341	N/A	3988	DFTPP	YP802		DO 10/24/97		DO	passed DO 10/24/97
10/24/97	1408	N/A	5379	SSTD050	YP803		DO 10/24/97		DO	passed DO 10/24/97
10/24/97	1508	N/A	5557	SSTD050 DECCO	YP804		DO 10/24/97		DO	passed DO 10/24/97
10/24/97	1546	N/A	N/A	SOLVENT BLANK	YP805		DO 10/24/97		DO	
10/24/97	1639	43540A	N/A	SBLK 101697	YP806		DO 10/24/97		DO	
10/24/97	1732	43540A	186.15.7A-D	CI-M0010-FB	YP807		DO 10/24/97		DO	
10/24/97	1820	43540A	186.15.6A-D	CI-M0010-9	YP808		DO 10/24/97		DO	
10/24/97	1907	43540A	186.15.5A-D	CI-M0010-8	YP809		DO 10/24/97		DO	
10/24/97	1954	43540A	186.15.4A-D	CI-M0010-7	YP810		DO 10/24/97		DO	
10/24/97	2040	43540A	186.15.3A-D	CI-M0010.3	YP811		DO 10/24/97		DO	

* Volatile Data Only ** Transcribed Data *** Dated Signature/Initials Required

Triangle Laboratories, Inc.
Run Log

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Column Type	Column #	Analysis*	Acquisition Method	GC Method*	Find DBs*	Other*
DB5.625	4581957J	—	dclist.m	—	—	—

Standards		
Internal / Surrogate / Recovery	Internal / Surrogate / Recovery	Analyte
5402C Exp 12/31/97 Sul 834 ug/mL	N/A	N/A

Extract / Sample volume 100 µL (Circle unit) mL

DD 10/24/97
Signature Date

Date**	Time**	Project	Sample#	Client ID	Filename	pH*	Operator/Date	Backup*	Proc	Comments***
10/24/97	2126	43540A	186.15. 2A-D	C1-M0010-2	YP812		DD 10/24/97		DD	
10/24/97	2213	43540A	186.15. 1A-D	TE DD 10/28/97 C1-M0010-1	YP813		DD 10/24/97		DD	
10/24/97	2300	43433	185.7. 3A-F	50-MMS 2.17	YP814		DD 10/24/97		DD	is #6 high DD 10/28/97
10/24/97	2347	43433	185.7. 3A-E	50-MMS-4.51	YP815		DD 10/24/97		DD	is #6 high DD 10/28/97
10/25/97	0034	N/A	5562	1,2-Dinitrobenzene	YP816		DD 10/24/97		DD	
10/25/97	0119	N/A	5564	1,4-Dinitrobenzene	YP817		DD 10/24/97		DD	
10/25/97	0206	N/A	5563	hexachlorophene	YP818		DD 10/24/97		DD	no peaks DD 10/28/97
10/25/97	0253	N/A	5563	Hexachlorophene + 1.5	YP819		DD 10/24/97		DD	no hexachlorophene peak DD 10/28/97
10/25/97	0341	91507A	N/A	P-1047	YP820		DD 10/24/97		DD	
10/27/97	0924	N/A	3988	DFTPP	YP821		DD 10/27/97		DD	carryover from sequence - failed small DFTPP peak

Volatile Data Only ** Transcribed Data *** Dated Signature/Initials Required

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Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP788 | **Sample ID: SO-MM5-1-8**

Client Project: Saginaw, MI | **Date Received: 09/29/97** | **Response File: YP783**
TLI ID: 185-7-2A-C,E | **Date Extracted: 10/14/97**
Date Analyzed : 10/23/97

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
Naphthalene-d_8		IS 2	12.76		
Naphthalene	24.93	B	12.81		10
2-Methylnaphthalene	25.56		14.24		10
Acenaphthene-d_{10}		IS 3	16.41		
2-Chloronaphthalene		U		0.43	10
Acenaphthylene	0.81	J	16.12		10
Acenaphthene	0.28	J	16.48		10
Fluorene	0.94	J	17.56		10
Phenanthrene-d_{10}		IS 4	19.54		
Phenanthrene	2.07	J	19.59		10
Anthracene	0.26	J	19.70		10
Fluoranthene	0.96	J	22.09		10
Chrysene-d_{12}		IS 5	25.27		
Pyrene	1.18	J	22.57		10
Benzo(a)anthracene		U		0.24	10
Chrysene	0.22	J	25.29		10
Perylene-d_{12}		IS 6	29.39		
Benzo(b)fluoranthene		U		0.20	10
Benzo(k)fluoranthene		U		0.20	10
Benzo(e)pyrene		U		0.18	10
Benzo(a)pyrene		U		0.21	10
Perylene		U		0.20	10
Indeno(1,2,3-cd)pyrene		U		0.18	10
Dibenz(a,h)anthracene		U		0.24	10
Benzo(g,h,i)perylene		U		0.20	10

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Triangle Laboratories of RTP, Inc.
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP788 | **Sample ID: SO-MM5-1-8**

Client Project: Saginaw, MI	Date Received: 09/29/97	Response File: YP783
TLI ID: 185-7-2A-C,E	Date Extracted: 10/14/97	
	Date Analyzed : 10/23/97	

Dilution Factor: 1.00

Surrogate Summary	Amount (ug)	RT	IS Ref	%REC
Phenol-d_5	77.36	9.45	1	77
Nitrobenzene-d_5	76.47	11.29	2	76
1,3,5-Trichlorobenzene-d_3	80.13	11.98	2	80
1,4-Dibromobenzene-d_4	82.46	12.86	1	82
2-Fluorobiphenyl	82.30	15.00	3	82
2,4,6-Tribromophenol	102.84	18.06	3	103
Anthracene-d_{10}	102.73	19.66	4	103
Pyrene-d_{10}	82.46	22.53	5	82
Terphenyl-d_{14}	90.89	22.90	5	91

Reviewed by Patt Date 11/13/97

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit

IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP788 | **Sample ID: SO-MM5-1-8**

Client Project: Saginaw, MI | Date Received: 09/29/97 | Response File: YP784
TLI ID: 185-7-2A-C,E | Date Extracted: 10/14/97
Date Analyzed : 10/23/97

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
1,4-Dichlorobenzene-d_4		IS 1	10.21		
n-Nitrosodimethylamine		U		1.49	10
Cumene		U		0.38	10
Phenol	6.57	J	9.47		10
Aniline		U		0.50	10
bis-(2-Chloroethyl)ether		U		1.07	10
Benzyl Chloride		U		0.39	10
1,4-Dichlorobenzene	0.73	J	10.25		10
2-Methylphenol		U		0.86	10
Acetophenone	8.19	BJ	10.98		10
n-Nitrosomorpholine		U		1.44	10
o-Toluidine		U		0.52	10
Hexachloroethane		U		1.37	10
1,2-Dibromo-3-chloropropane		U		1.42	10
N,N-Diethylaniline		U		0.51	10
Naphthalene-d_8		IS 2	12.76		
3/4-Methylphenol		U		0.76	10
Nitrobenzene		U		0.52	10
N,N-Dimethylaniline		U		0.50	10
Isophorone		U		0.44	10
o-Anisidine		U		0.91	10
1,4-Phenylenediamine		U		0.72	10
1,2,4-Trichlorobenzene		U		0.83	10
Hexachlorobutadiene		U		1.35	10
α,a,a-Trichlorotoluene		U		0.64	10
Hydroquinone		U		0.76	10

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP788 | **Sample ID: SO-MM5-1-8**

Client Project: Saginaw, MI | Date Received: 09/29/97 | Response File: YP784
TLI ID: 185-7-2A-C,E | Date Extracted: 10/14/97
Date Analyzed : 10/23/97

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
2-Chloroacetophenone		U		0.35	10
Acenaphthene-d_{10}		IS 3	16.41		
Hexachlorocyclopentadiene		U		1.51	10
2,4,6-Trichlorophenol		U		1.29	10
2,4,5-Trichlorophenol		U		1.21	10
Biphenyl	2.13	J	15.21		10
Dimethylphthalate	2.49	J	15.84		10
2,4-Dinitrophenol		U		3.75	25
4-Nitrophenol		U		1.72	25
2,4-Dinitrotoluene		U		1.41	10
Dibenzofuran		U		0.33	10
4,6-Dinitro-2-methylphenol		U		2.80	25
Trifluralin		U		2.09	10
Phenanthrene-d_{10}		IS 4	19.54		
Di-n-butylphthalate	9.59	BJ	20.77		10
Hexachlorobenzene		U		0.99	10
4-Aminobiphenyl		U		0.41	10
Pentachlorophenol		U		1.75	25
Pentachloronitrobenzene		U		3.83	10
4-Nitrobiphenyl		U		1.06	10
Chrysene-d_{12}		IS 5	25.27		
Benzidine		U		0.33	10
4,4'-Methylenedianiline		U		0.80	10
Dimethylaminoazobenzene		U		0.71	10
3,3'-Dimethylbenzidine		U		0.41	10
3,3'-Dimethoxybenzidine		U		0.82	10

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Triangle Laboratories of RTP, Inc.
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Savar v3.5
Printed: 12:42 11/13/1997

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP788 | **Sample ID: SO-MM5-1-8**

Client Project: Saginaw, MI | **Date Received: 09/29/97** | **Response File: YP784**
TLI ID: 185-7-2A-C,E | **Date Extracted: 10/14/97**
Date Analyzed : 10/23/97

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
,3'-Dichlorobenzidine		U		0.60	10
Methylene bis-chloroaniline		U		1.40	10
is(2-Ethylhexyl)phthalate	11.05	B	25.34		10

Reviewed by Scott Date 11/13/97

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Triangle Laboratories of RTP, Inc.
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hone: (919) 544-5729 • Fax: (919) 544-5491

Savar v3.5
Printed: 12:42 11/13/1997

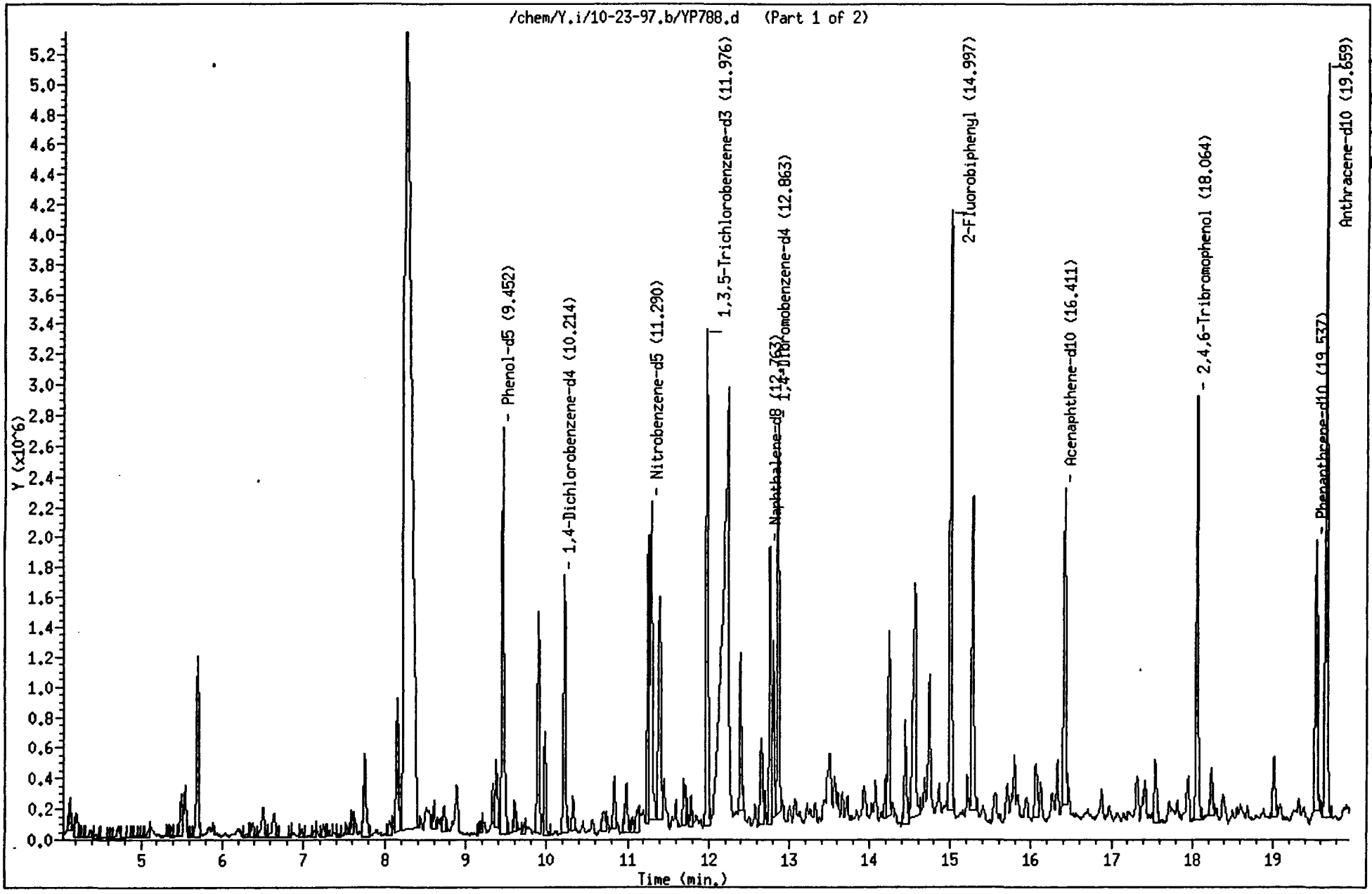
Data File: /chem/Y.i/10-23-97.b/YP788.d
Date : 23-OCT-1997 13:33
Instrument : Y.i
Sample ID : SO-MM5-1-8
Column phase : DB-5
Volume Injected (uL) : 1.0

Triangle Laboratories of RTP, Inc.

Column diameter : 0.32

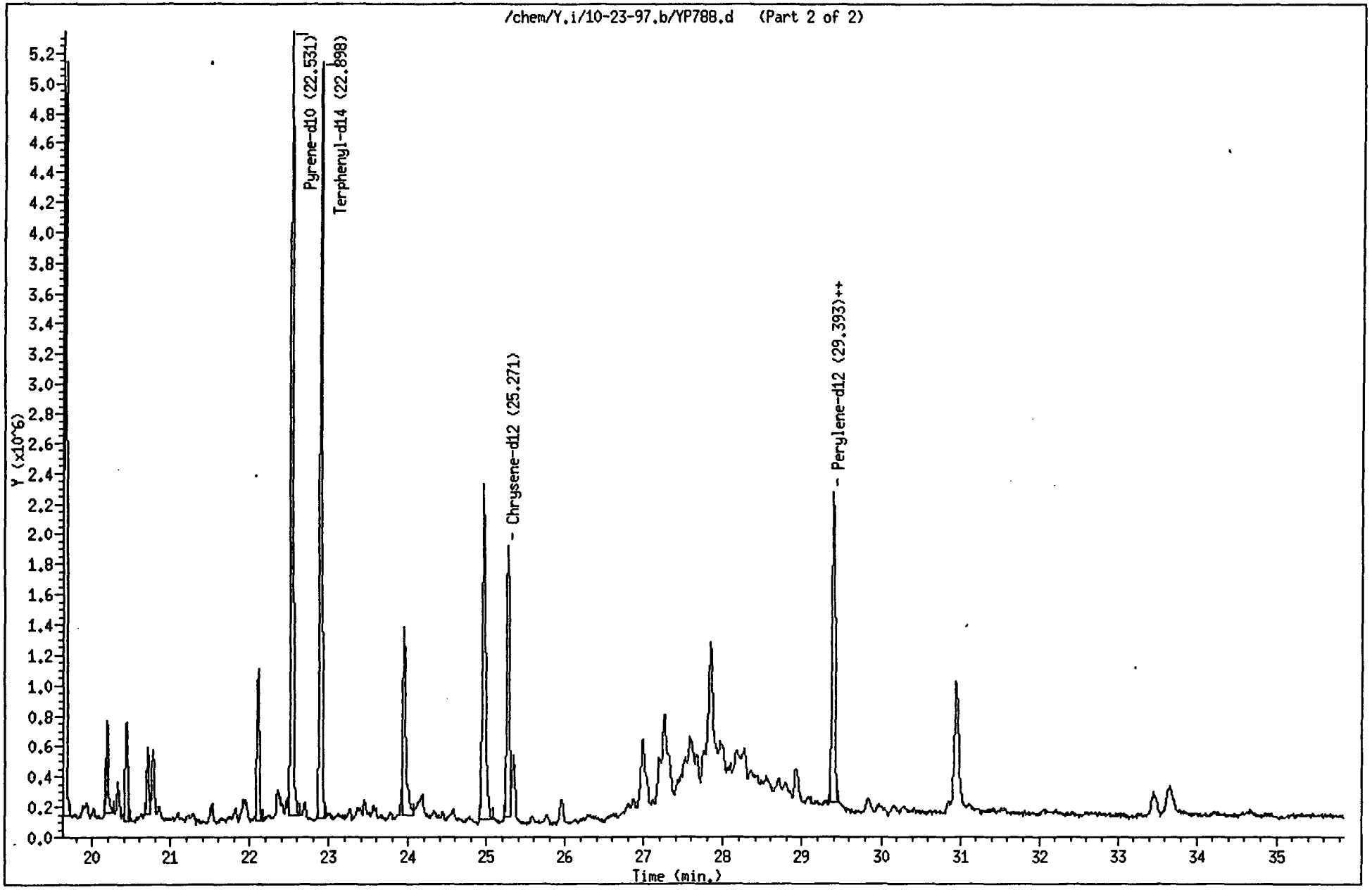
44

Data Review: [illegible]
Date: 11/12/97



Data File: /chem/Y.i/10-23-97.b/YP788.d
Date : 23-OCT-1997 13:33
Instrument : Y.i
Sample ID : SO-MM5-1-8
Column phase : DB-5
Volume Injected (uL) : 1.0

Column diameter : 0.32



TRIANGLE LABORATORIES, INC.

SEMI-VOLATILE QUANTITATION REPORT

Data file : /chem/Y.i/10-23-97.b/YP788.d
Lab. Id. : 43433
Inj Date : 23-OCT-1997 13:33 Autotune Date: 22-Oct-97 09:14:0
Operator : DD Inst ID: Y.i
Smp Info : SO-MM5-1-8
Misc Info : 185-7-2A-C,E
Comment :
Method : /chem/Y.i/10-23-97.b/cclist.m
Meth Date : 23-Oct-1997 14:39 target
Cal Date : 23-OCT-1997 09:12 Cal File: YP783.d
Als bottle: 4
Dil Factor: 1.000 Target Version: Target 2.20
Integrator: HP RTE Compound Sublist: pah.sub
Sample Type: AIR

		Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)
*	1	1,4-Dichlorobenzene-d4	152.00	10.214(1.000)	458159	40.00	
*	2	Naphthalene-d8	136.00	12.763(1.000)	1487169	40.00	
*	3	Acenaphthene-d10	164.00	16.411(1.000)	860099	40.00	
*	4	Phenanthrene-d10	188.00	19.537(1.000)	1322472	40.00	
*	5	Chrysene-d12	240.00	25.271(1.000)	1531806	40.00	
*	6	Perylene-d12	264.00	29.393(1.000)	2077760	40.00	
$	7	2-Fluorophenol	Compound Not Detected.				
$	8	Phenol-d5	99.00	9.452(0.925)	1489537	77.37	77.37
$	9	2-Chlorophenol-d4	Compound Not Detected.				
$	10	1,2-Dichlorobenzene-d4	Compound Not Detected.				
$	11	Nitrobenzene-d5	82.00	11.290(0.885)	1071904	76.49	76.49
$	12	1,3,5-Trichlorobenzene-d3	185.00	11.976(0.938)	989049	80.01	80.01
$	13	1,4-Dibromobenzene-d4	239.80	12.863(1.259)	878330	82.46	82.46
$	14	2-Fluorobiphenyl	172.00	14.997(0.914)	2198028	82.27	82.27
$	15	2,4,6-Tribromophenol	329.80	18.064(1.101)	658947	102.67	102.67
$	16	Anthracene-d10	188.00	19.659(1.006)	3644235	102.71	102.71
$	17	Pyrene-d10	212.00	22.531(0.892)	3713702	82.49	82.49
$	18	Terphenyl-d14	244.00	22.898(0.906)	2843543	90.84	90.84
	42	Naphthalene	128.00	12.806(1.003)	938092	24.92	24.92
	46	2-Methylnaphthalene	142.00	14.237(1.116)	630000	25.55	25.55
	50	2-Chloronaphthalene	162.00	~~15.241(0.929)~~	~~3168~~	~~0.14~~	~~0.14(aQ)~~ FP salt
	56	Acenaphthylene	152.00	16.117(0.982)	30926	0.81	0.81(a)
	58	Acenaphthene	154.00	16.476(1.004)	6399	0.28	0.28(aQ)
	65	Fluorene	166.00	17.561(1.070)	23520	0.94	0.94(a)
	73	Phenanthrene	178.00	19.587(1.003)	69913	2.07	2.07(a)
	74	Anthracene	178.00	19.702(1.008)	8455	0.26	0.26(aQ)
	77	Fluoranthene	~~Compound Not Detected.~~	22.898 086	33402		M salt
	78	Pyrene	202.00	22.567(0.893)	59151	1.18	1.18(aQ)
	83	Benzo(a)anthracene	228.00	~~25.235(0.999)~~	~~2128~~	~~0.05~~	~~0.05(a)~~ FP salt
	84	Chrysene	228.00	25.293 ~~25.326(1.003)~~	9095 ~~2055~~	0.05	0.05(aQ) M salt
	86	Benzo(b)fluoranthene	252.00	~~28.367(0.965)~~	~~3049~~	~~0.06~~	~~0.06(a)~~ FP salt

Data Review: salt
Date: 11/12/97

Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	CONCENTRATIONS FINAL (ug)	
87 Benzo(k)fluoranthene	252.00	~~28.439 (0.968)~~	~~2111~~	~~0.04~~	~~0.04 (aQ)~~	FP 894
88 Benzo(e)pyrene	Compound Not Detected.					
89 Benzo(a)pyrene	252.00	~~29.401 (1.000)~~	~~5246~~	~~0.11~~	~~0.11 (aQ)~~	FP 895
90 Perylene	252.00	~~29.401 (1.000)~~	~~5246~~	~~0.10~~	~~0.10 (a)~~	
91 Indeno(1,2,3-cd)pyrene	Compound Not Detected.					
92 Dibenz(a,h)anthracene	Compound Not Detected.					
93 Benzo(g,h,i)perylene	Compound Not Detected.					

QC Flag Legend

a - Target compound detected but, quantitated amount Below Limit Of Quantitation(BLOQ).
Q - Qualifier signal failed the ratio test.

TRIANGLE LABORATORIES, INC.

SEMI-VOLATILE QUANTITATION REPORT

Data file : /chem/Y.i/10-23-97.b/CAA/YP788.d
Lab. Id. : 43433
Inj Date : 23-OCT-97 13:33 — Autotune Date: 22-Oct-97 09:14:0
Operator : DD — Inst ID: Y.i
Smp Info : SO-MM5-1-8
Misc Info : 185-7-2A-C,E
Comment :
Method : /chem/Y.i/10-23-97.b/tlicaa.m
Meth Date : 23-Oct-1997 10:51
Cal Date : 23-OCT-97 09:56 — Cal File: YP784.d
Als bottle: 4
Dil Factor: 1.000 — Target Version: Target 2.20
Integrator: HP RTE — Compound Sublist: CAA1.sub
Sample Type: mm5

	Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)	
*	1 1,4 Dichlorobenzene-d4	152.00	10.214(1.000)	458159	40.00		
*	2 Naphthalene-d8	136.00	12.763(1.000)	1487166	40.00		
*	3 Acenaphthene-d10	164.00	16.411(1.000)	860099	40.00		
*	4 Phenanthrene-d10	188.00	19.537(1.000)	1322472	40.00		
*	5 Chrysene-d12	240.00	25.271(1.000)	1531806	40.00		
*	6 Perylene-d12	264.00	29.393(1.000)	2077760	40.00		
$	7 2-Fluorophenol	Compound Not Detected.					
$	8 Phenol-d5	99.00	9.452(0.925)	1489537	87.77	87.77	
$	9 2-Chlorophenol-d4	Compound Not Detected.					
$	10 1,2-Dichlorobenzene-d4	Compound Not Detected.					
$	11 Nitrobenzene-d5	82.00	11.290(0.885)	1071904	71.79	71.79	
$	12 1,3,5-Trichlorobenzene-d3	185.00	11.976(0.938)	989049	71.32	71.32	
$	13 1,4-Dibromobenzene-d4	240.00	12.863(1.259)	878330	81.60	81.60	
$	14 2-Fluorobiphenyl	172.00	14.997(0.914)	2198028	87.10	87.10	
$	15 2,4,6-Tribromophenol	329.80	18.064(1.101)	658947	115.29	115.29	
$	16 Anthracene-d10	188.00	19.659(1.006)	3644235	103.60	103.60	
$	17 Pyrene-d10	212.00	22.531(0.892)	3713698	77.64	77.64	
$	18 Terphenyl-d14	244.00	22.898(0.906)	2843543	92.15	92.15	
	20 n-Nitrosodimethylamine	74.00	~~4.724(0.463)~~	~~29586~~	~~4.42~~	~~4.42~~	FP 8a1h
	21 Cumene	105.00	~~8.712(0.853)~~	~~12904~~	~~0.49~~	~~0.49~~	
	23 Phenol	94.00	9.474(0.928)	98543	6.57	6.57	
	24 Aniline	93.00	~~9.944(0.964)~~	~~3253~~	~~0.16~~	~~0.16~~	FP 8aH
	27 bis-(2-Chloroethyl)ether	63.00	~~9.787(0.958)~~	~~4194~~	~~0.45~~	~~0.45~~	
	28 Benzyl Chloride	91.00	~~10.200(0.999)~~	~~18632~~	~~0.72~~	~~0.72~~	
	29 1,4-Dichlorobenzene	146.00	10.250(1.004)	11151	0.72	0.72	
	31 2-Methylphenol	108.00	~~10.662(1.044)~~	~~5184~~	~~0.44~~	~~0.44~~	FP 8aH
	32 3/4-Methylphenol	108.00	~~10.962(0.858)~~	~~9182~~	~~0.69~~	~~0.69~~	
	33 Acetophenone	105.00	10.983(1.075)	138901	8.19	8.19	
	34 n-Nitrosomorpholine	56.00	~~11.354(1.102)~~	~~8349~~	~~1.20~~	~~1.20~~	FP 8aH
	35 o-Toluidine	106.00	~~10.969(1.074)~~	~~57403~~	~~3.01~~	~~3.01~~	
	36 Hexachloroethane	Compound Not Detected.					

Data Review: [illegible]
Date: 11/12/97

Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	CONCENTRATIONS FINAL (ug)	
37 Nitrobenzene	77.00	~~11.333(0.888)~~	~~13780~~	~~0.71~~	~~0.71~~	FP salt
38 N,N-Dimethylaniline	120.00	~~11.268(0.883)~~	~~28576~~	~~1.43~~	~~1.43~~	
39 1,2-Dibromo-3-chloropropane	Compound Not Detected.					
40 Isophorone	82.00	~~11.904(0.925)~~	~~7698~~	~~0.33~~	~~0.33~~	FP salt
41 o-Anisidine	Compound Not Detected.					
42 1,4-Phenylenediamine	108.00	~~13.478(1.056)~~	~~1434~~	~~0.10~~	~~0.10~~	FP salt
43 1,2,4-Trichlorobenzene	180.00	~~12.634(0.990)~~	~~5997~~	~~0.49~~	~~0.49~~	
44 Naphthalene	128.00	12.806(1.003)	938092	26.80	26.80	
46 Hexachlorobutadiene	Compound Not Detected.					
47 N,N-Diethylaniline	134.00	~~12.906(1.264)~~	~~17835~~	~~0.91~~	~~0.91~~	
48 a,a,a-Trichlorotoluene	159.00	~~12.863(1.008)~~	~~321686~~	~~20.57~~	~~20.57~~	FP salt
49 Hydroquinone	110.00	~~13.536(1.061)~~	~~528~~	~~0.04~~	~~0.04~~	
51 2-Chloroacetophenone	105.00	~~13.951(1.093)~~	~~6765~~	~~0.23~~	~~0.23~~	
52 Hexachlorocyclopentadiene	Compound Not Detected.					
53 2,4,6-Trichlorophenol	196.00	~~14.811(0.902)~~	~~1028~~	~~0.13~~	~~0.13~~	FP salt
54 2,4,5-Trichlorophenol	196.00	~~14.811(0.902)~~	~~1028~~	~~0.12~~	~~0.12~~	
60 Biphenyl	154.00	15.205(0.927)	62543	2.13	2.13	
61 Dimethylphthalate	163.00	15.837(0.965)	60060	2.49	2.49	
62 2,4-Dinitrophenol	Compound Not Detected.					
63 4-Nitrophenol	139.00	~~16.612(1.012)~~	~~1965~~	~~0.33~~	~~0.33~~	FP salt
64 2,4-Dinitrotoluene	165.00	~~16.878(1.028)~~	~~9135~~	~~1.29~~	~~1.29~~	
65 Dibenzofuran	168.00	~~16.842(1.026)~~	~~27345~~	0.92	0.92	
66 Di-n-butylphthalate	149.00	20.773(1.063)	448996	9.59	9.59	
67 4,6-Dinitro-2-methylphenol	198.00	~~17.503(1.067)~~	~~252~~	~~0.07~~	~~0.07~~	FP salt
68 Trifluralin	Compound Not Detected.					
69 Hexachlorobenzene	283.80	~~19.012(0.973)~~	~~632~~	~~0.06~~	~~0.06~~	FP salt
70 4-Aminobiphenyl	169.00	~~19.063(0.976)~~	~~1902~~	~~0.07~~	~~0.07~~	
71 Pentachlorophenol	Compound Not Detected.					
72 Pentachloronitrobenzene	Compound Not Detected.					
73 4-Nitrobiphenyl	152.00	~~20.191(1.033)~~	~~1319~~	~~0.14~~	~~0.14~~	FP salt
74 Benzidine	184.00	~~22.531(0.892)~~	~~37162~~	~~1.22~~	~~1.22~~	
75 4,4'-Methylenedianiline	Compound Not Detected.					
77 Dimethylaminoazobenzene	120.00	~~22.890(0.906)~~	~~45333~~	~~3.23~~	~~3.23~~	FP salt
78 3,3'-Dimethylbenzidine	Compound Not Detected.					
80 3,3'-Dimethoxybenzidine	Compound Not Detected.					
81 3,3'-Dichlorobenzidine	Compound Not Detected.					
82 Methylene bis-chloroaniline	Compound Not Detected.					
83 bis(2-Ethylhexyl)phthalate	149.00	25.336(1.003)	404215	11.04	11.04	

Data File: /chem/Y.i/10-23-97.b/YP788.d

Date : 23-OCT-1997 13:33

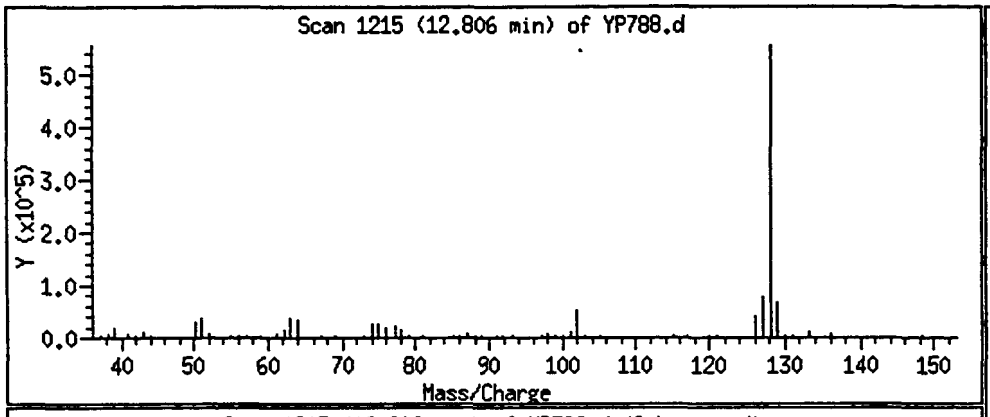
Instrument : Y.i

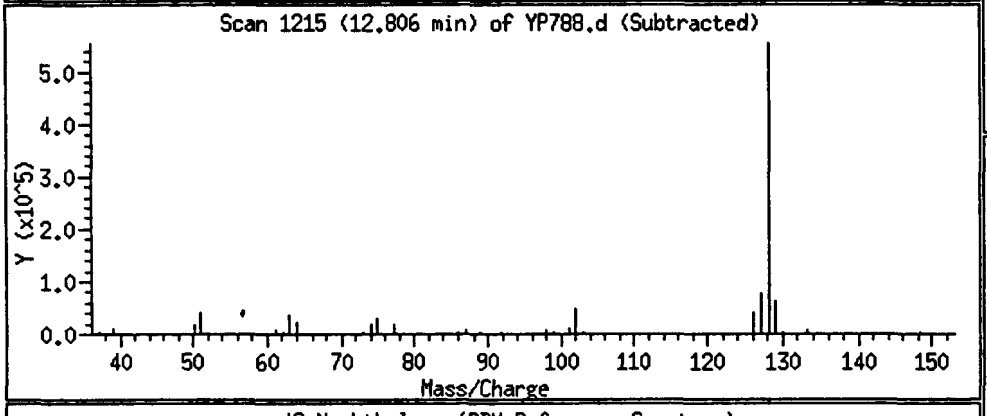
Sample ID : SO-MM5-1-8

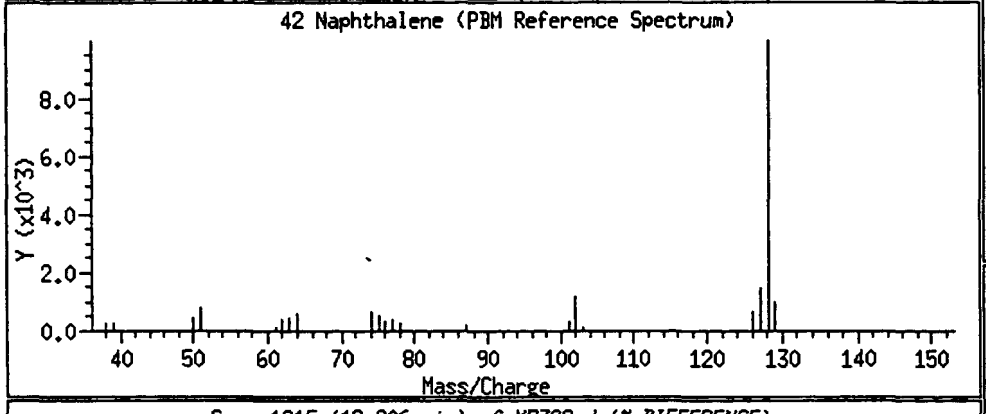
Column phase : DB-5 Column diameter : 0.32

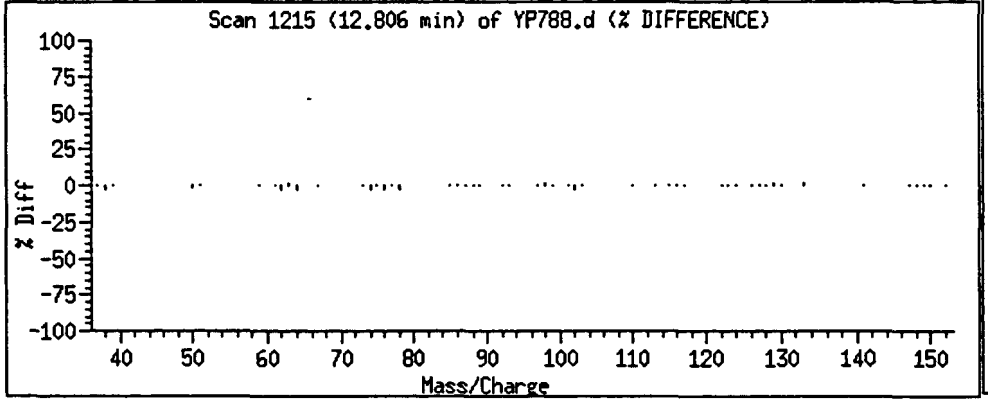
Volume Injected (uL) : 1.0

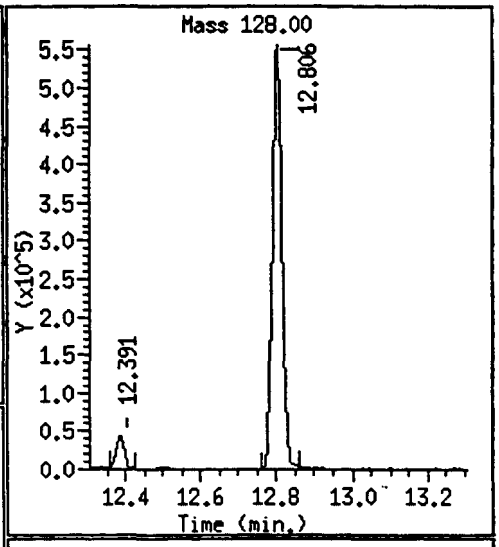
42 Naphthalene

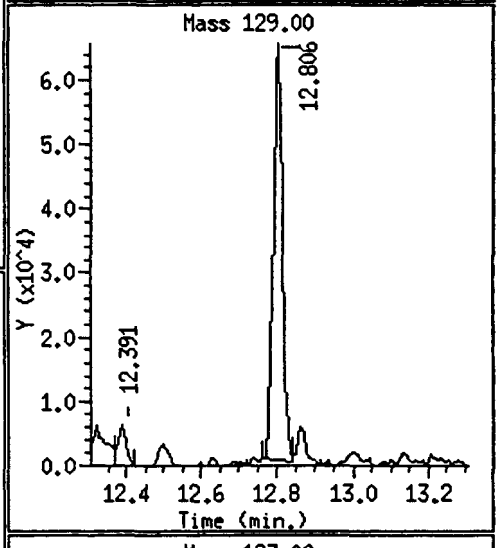


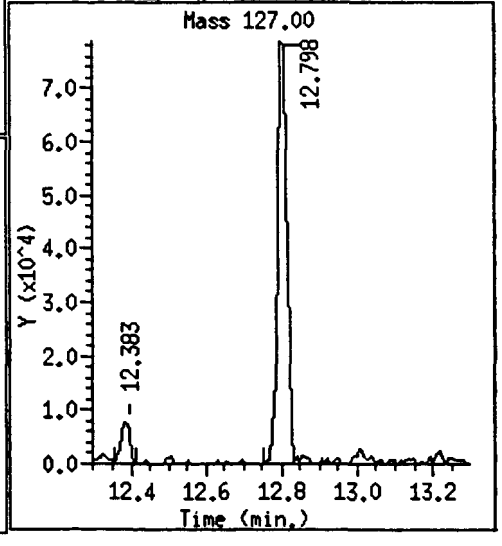












Data File: /chem/Y.i/10-23-97.b/YP788.d

Date : 23-OCT-1997 13:33

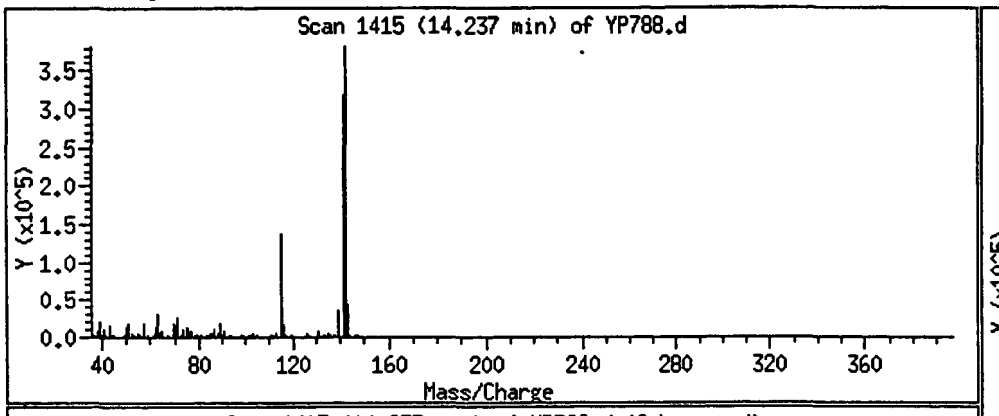
Instrument : Y.i

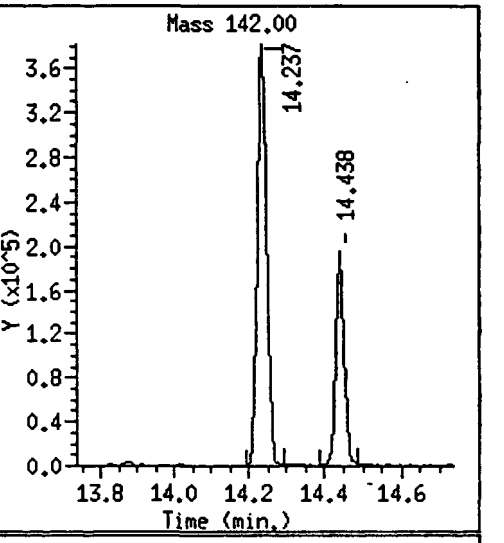
Sample ID : SO-MM5-1-8

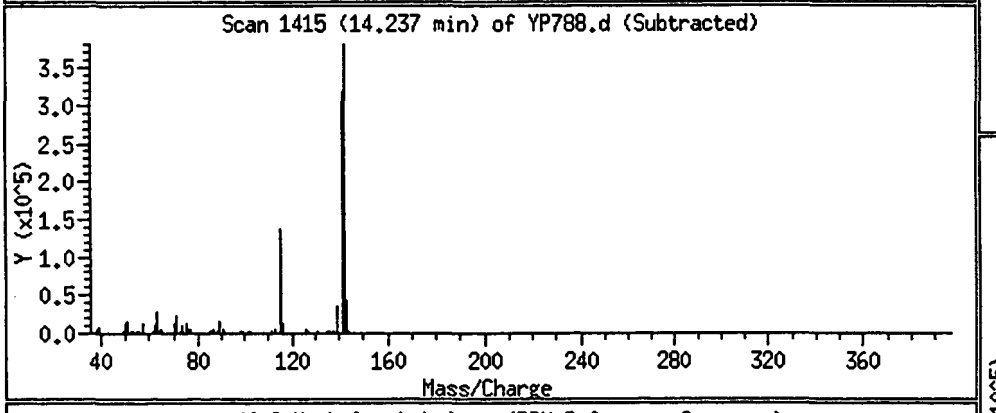
Column phase : DB-5 Column diameter : 0.32

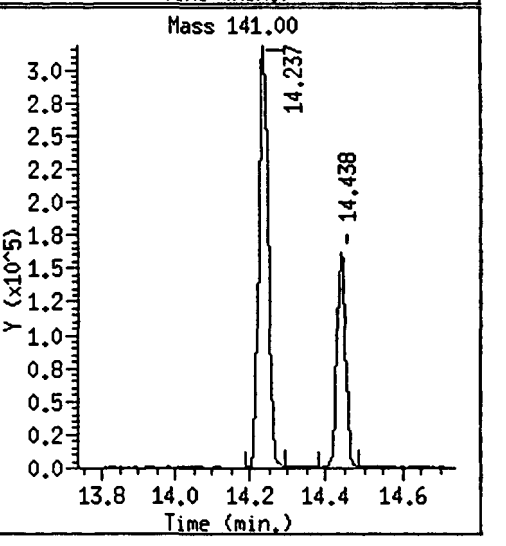
Volume Injected (uL) : 1.0

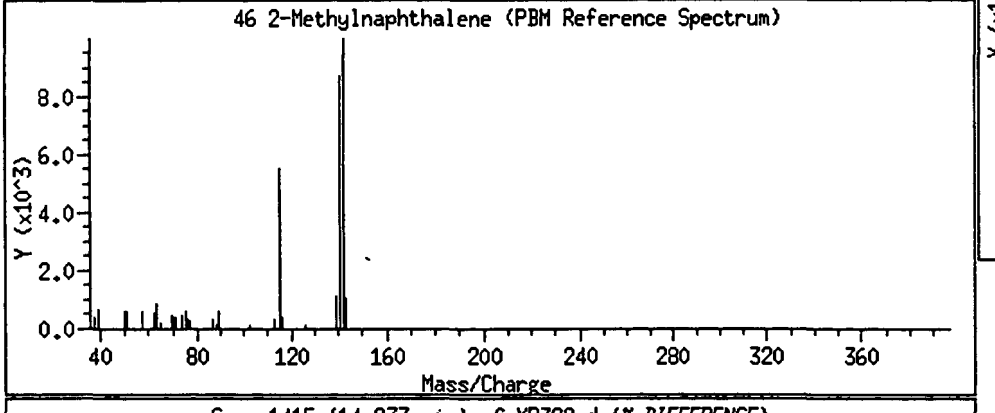
46 2-Methylnaphthalene

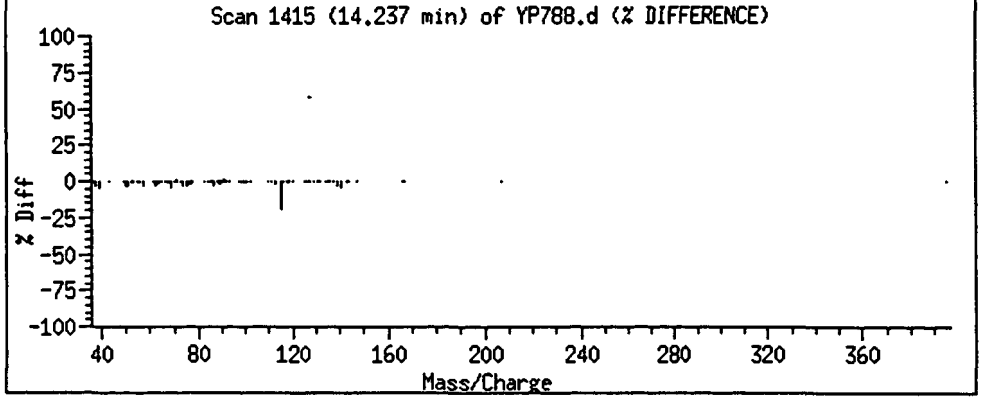












Data File: /chem/Y.i/10-23-97.b/YP788.d

Date : 23-OCT-1997 13:33

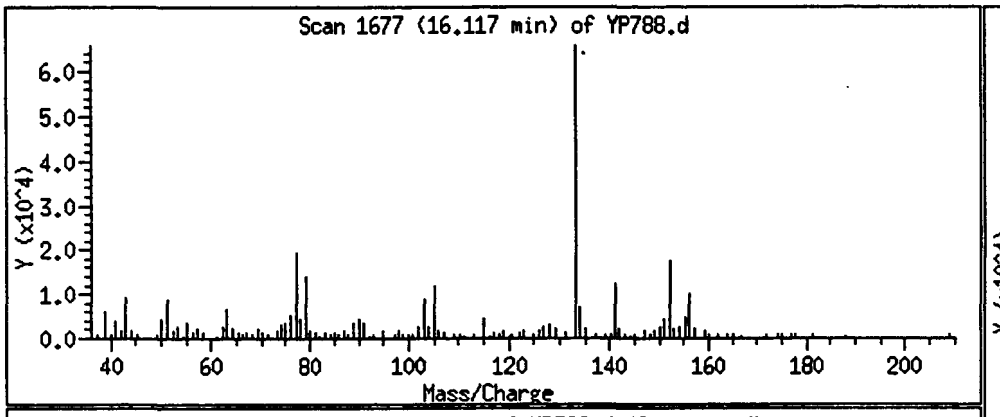
Instrument : Y.i

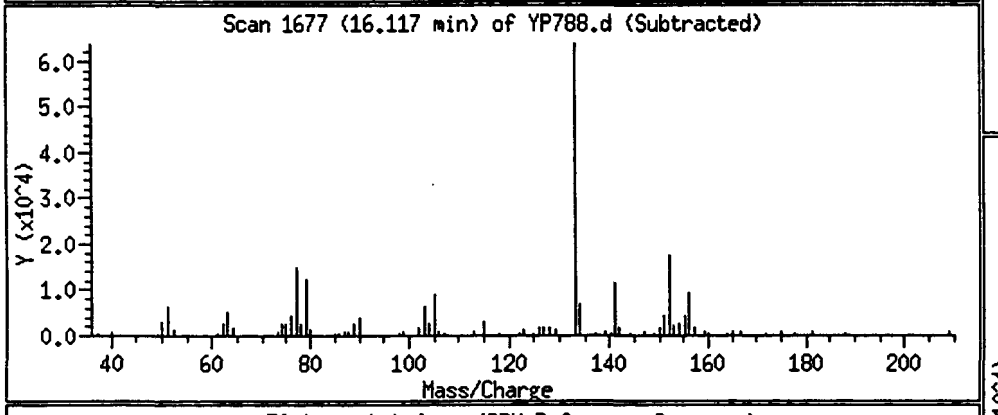
Sample ID : SO-MM5-1-8

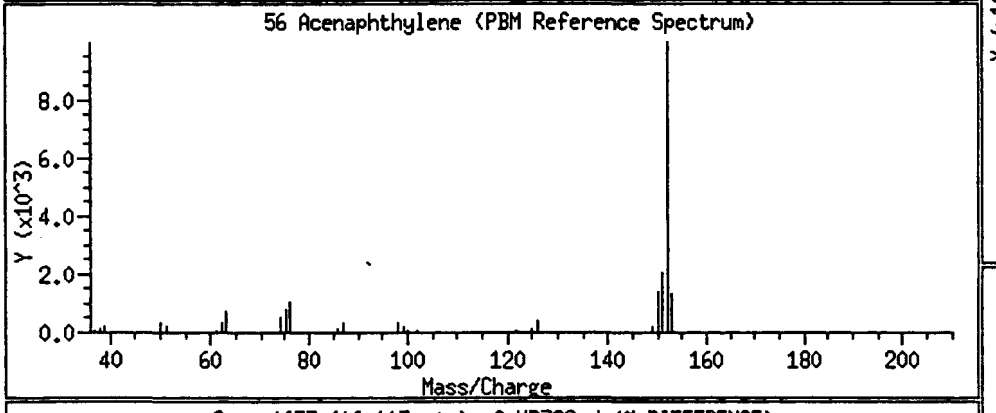
Column phase : DB-5 Column diameter : 0.32

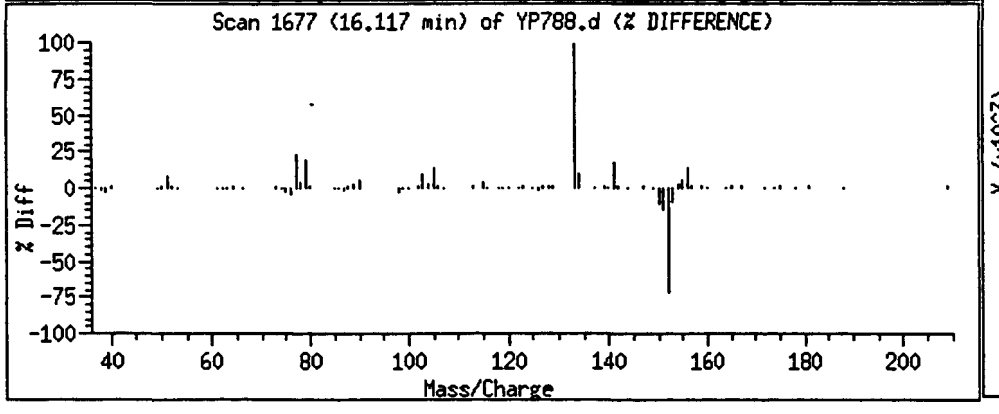
Volume Injected (uL) : 1.0

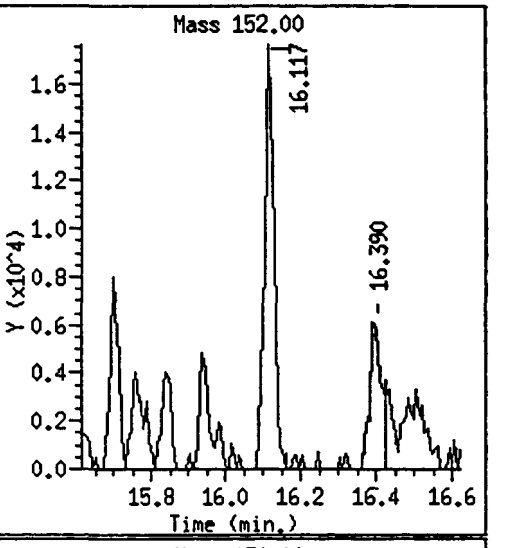
56 Acenaphthylene

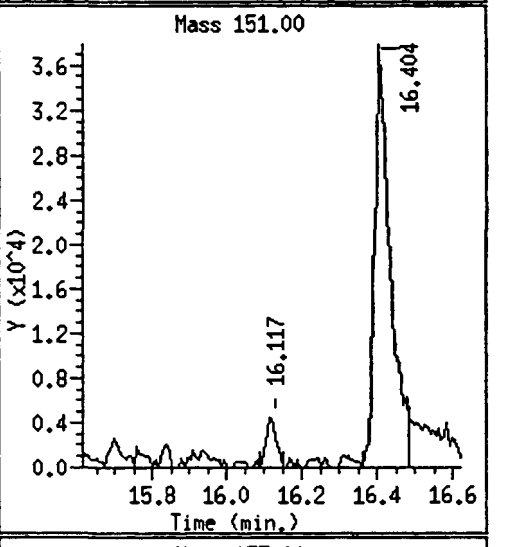


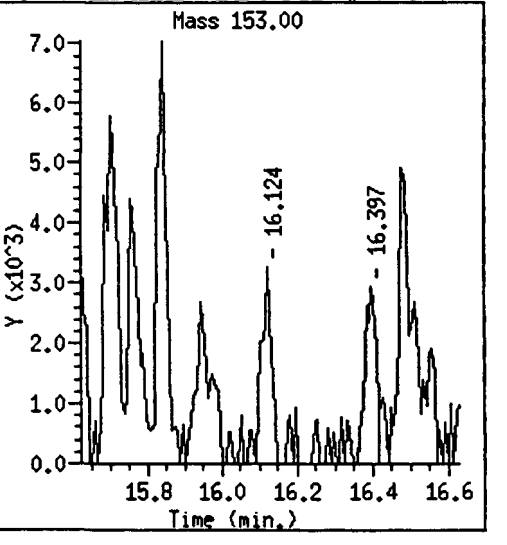












Data File: /chem/Y.i/10-23-97.b/YP788.d

Date : 23-OCT-1997 13:33

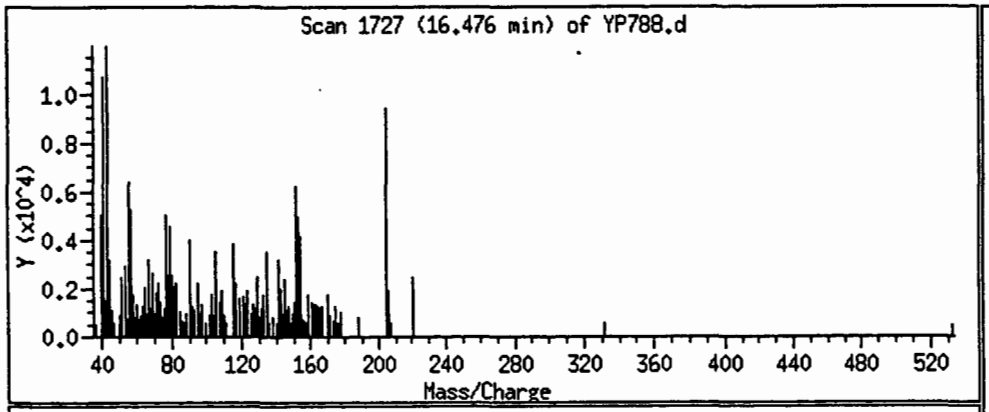
Instrument : Y.i

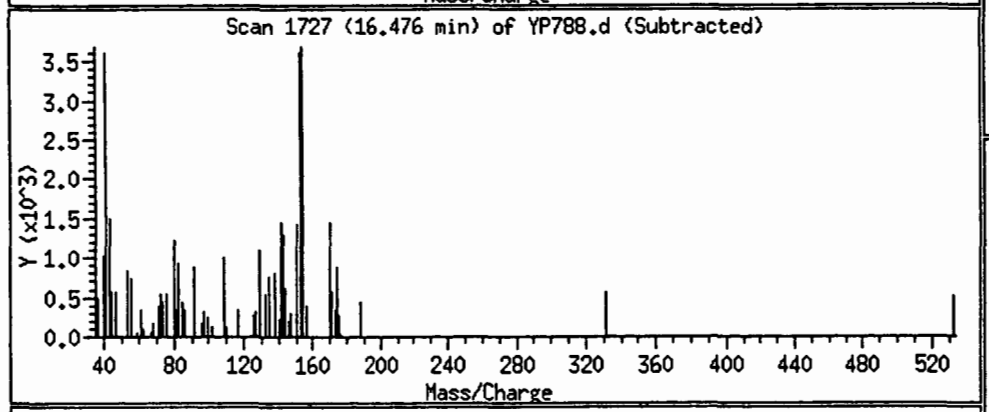
Sample ID : SO-MM5-1-8

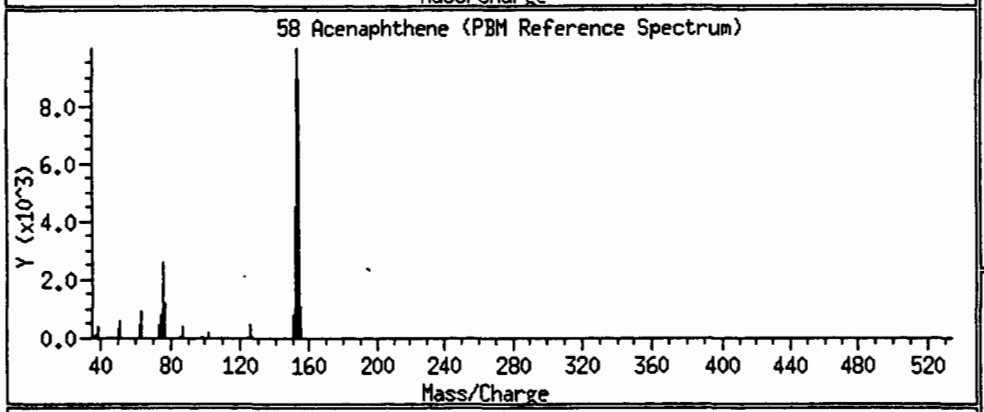
Column phase : DB-5 Column diameter : 0.32

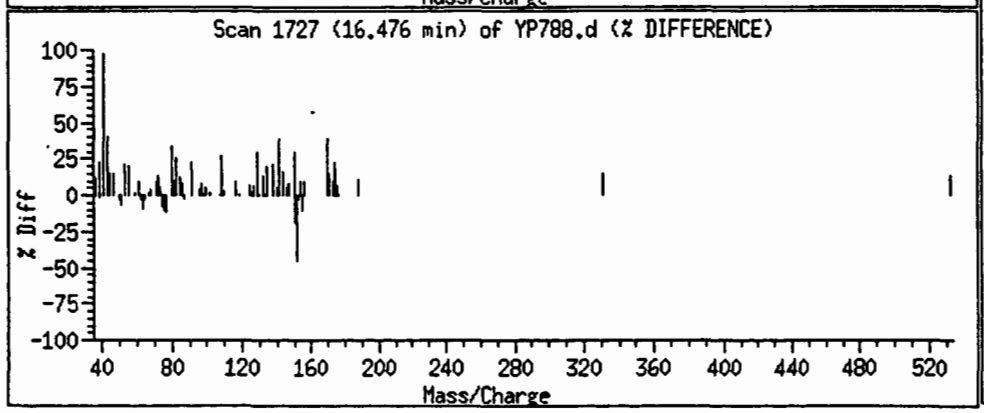
Volume Injected (uL) : 1.0

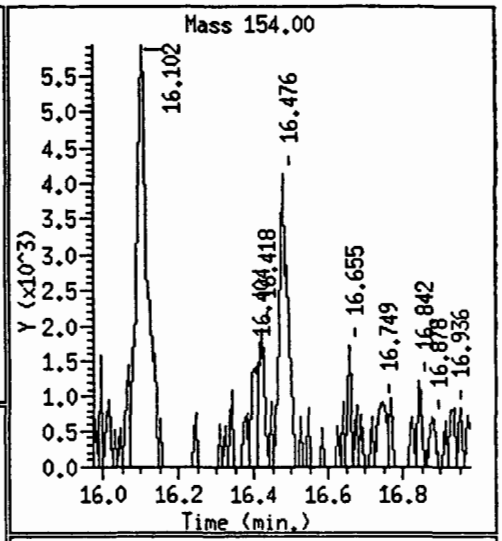
58 Acenaphthene

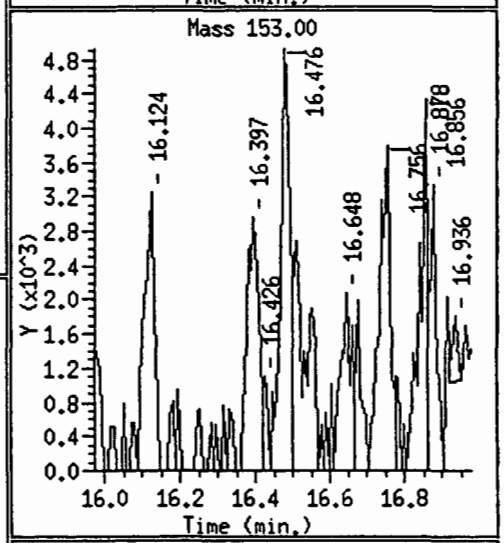


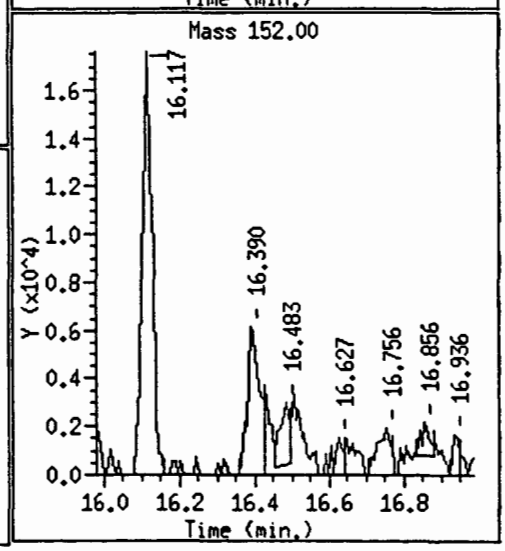












Data File: /chem/Y.i/10-23-97.b/YP788.d

Date : 23-OCT-1997 13:33

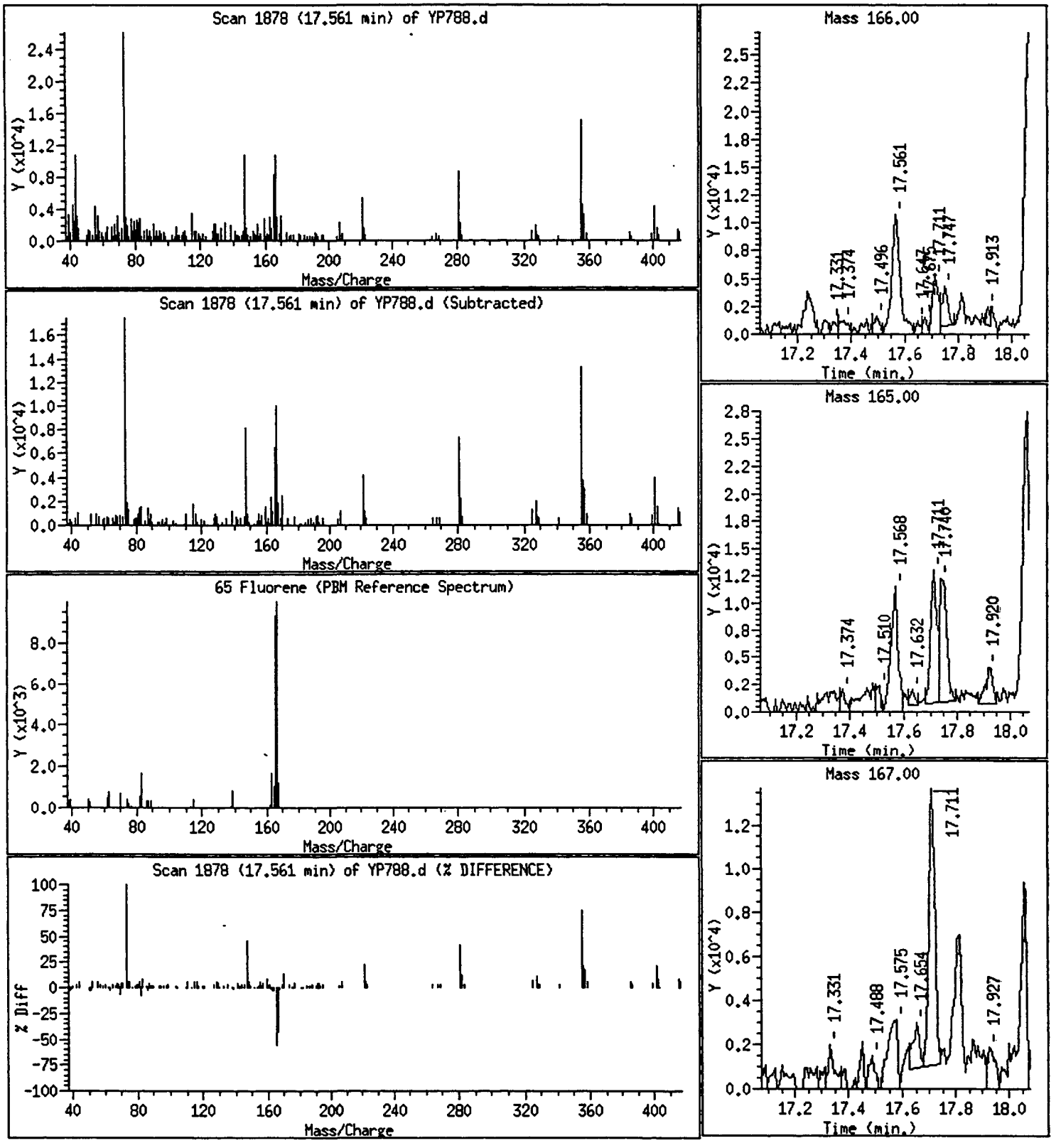
Instrument : Y.i

Sample ID : SO-MM5-1-8

Column phase : DB-5 Column diameter : 0.32

Volume Injected (uL) : 1.0

65 Fluorene



Data File: /chem/Y.i/10-23-97.b/YP788.d

Date : 23-OCT-1997 13:33

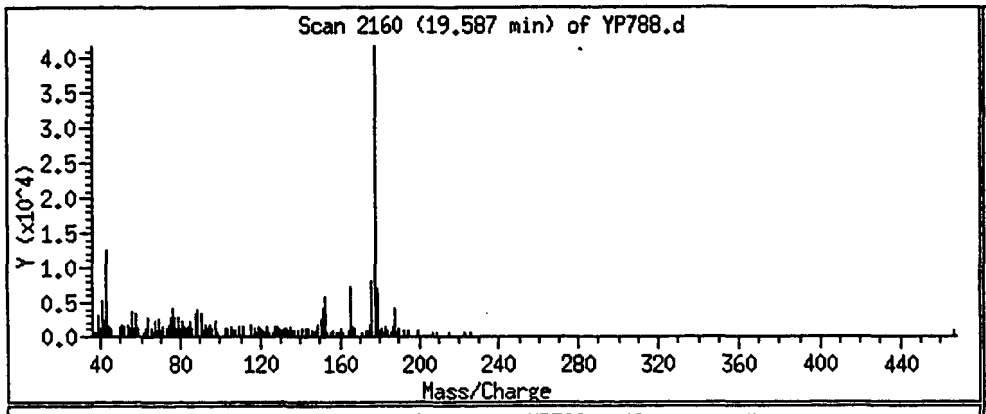
Instrument : Y.i

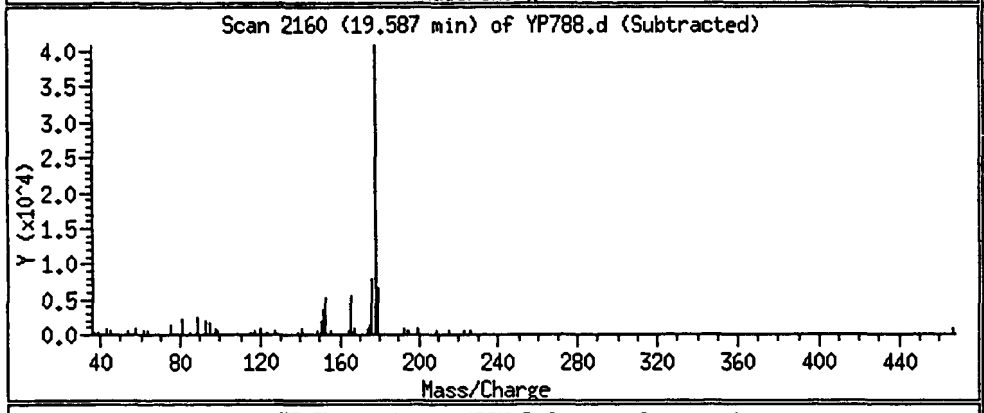
Sample ID : SO-MM5-1-8

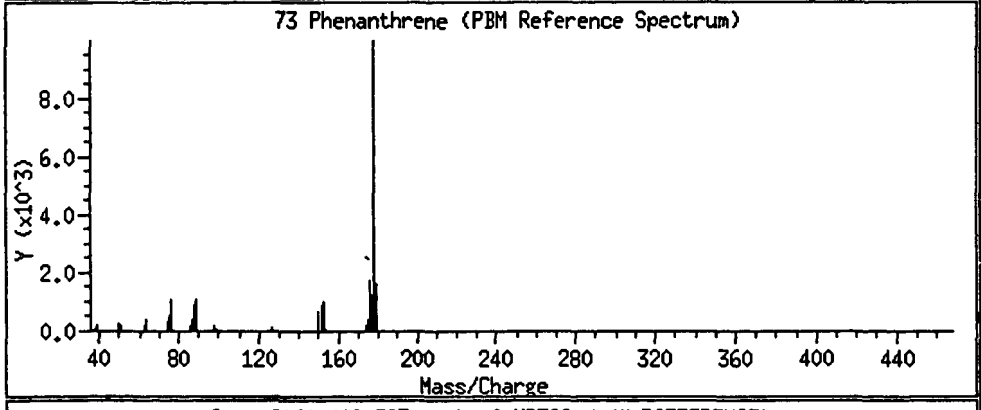
Column phase : DB-5 Column diameter : 0.32

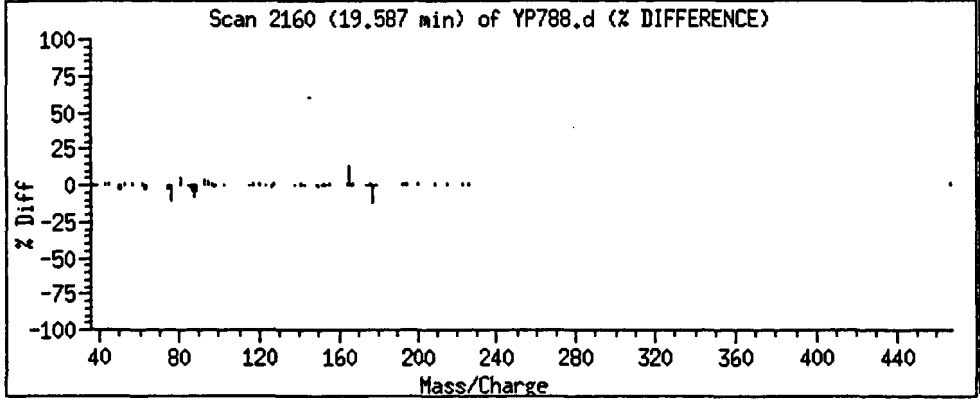
Volume Injected (uL) : 1.0

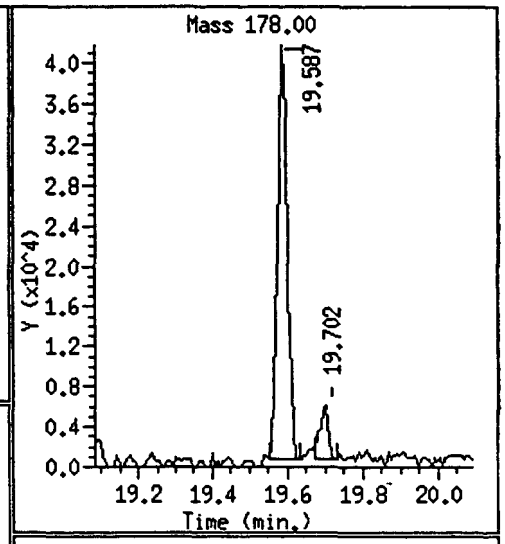
73 Phenanthrene

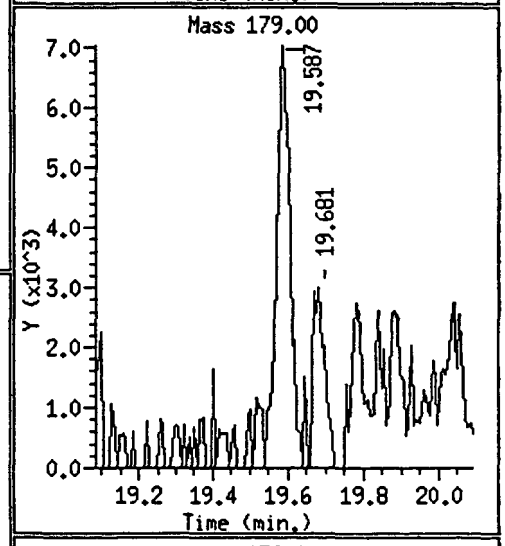


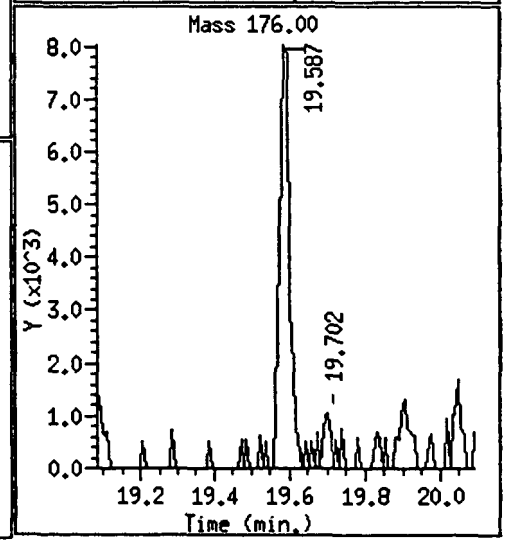












Data File: /chem/Y.i/10-23-97.b/YP788.d

Date : 23-OCT-1997 13:33

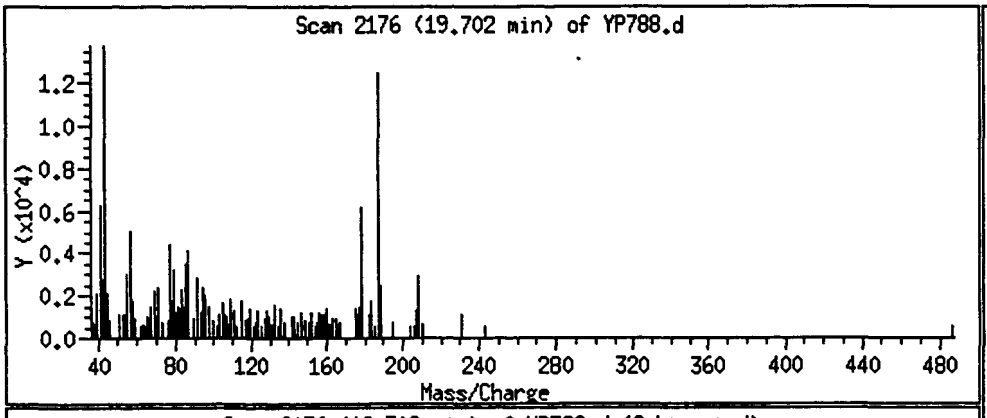
Instrument : Y.i

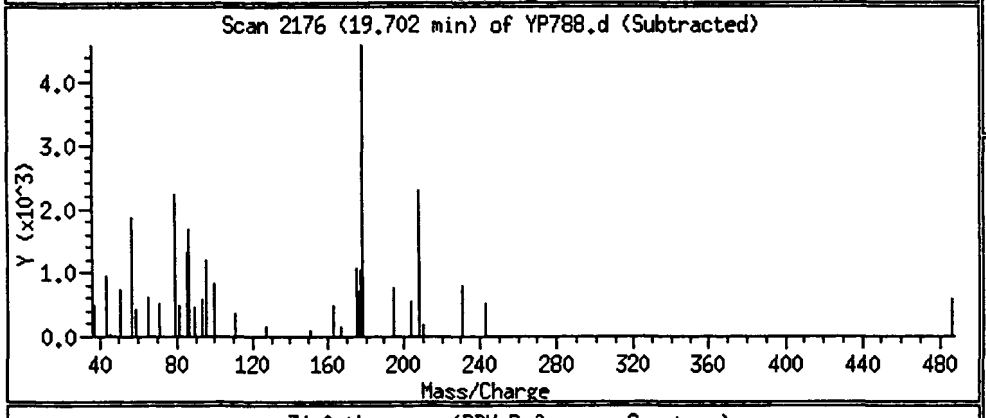
Sample ID : SO-MM5-1-8

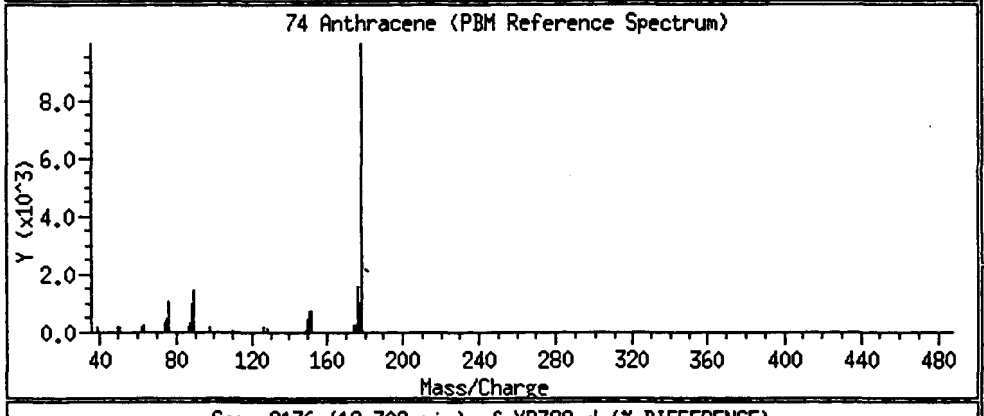
Column phase : DB-5 Column diameter : 0.32

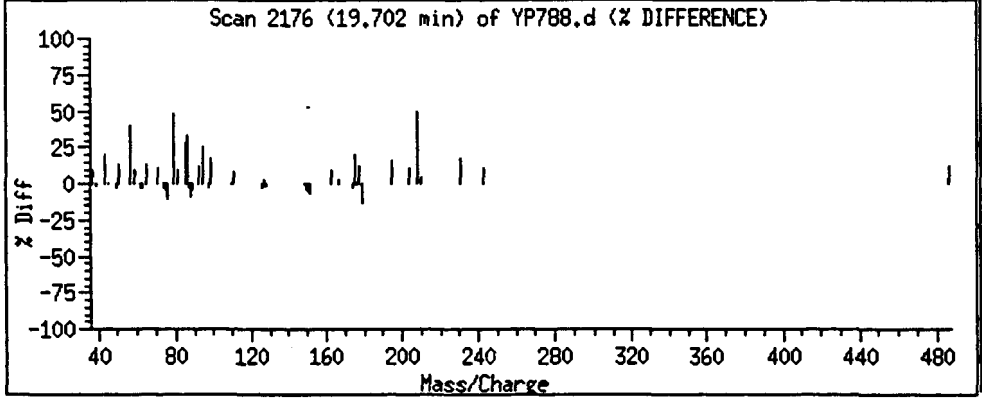
Volume Injected (uL) : 1.0

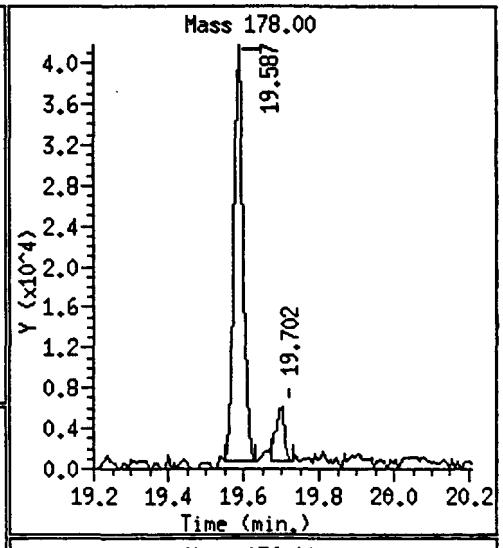
74 Anthracene

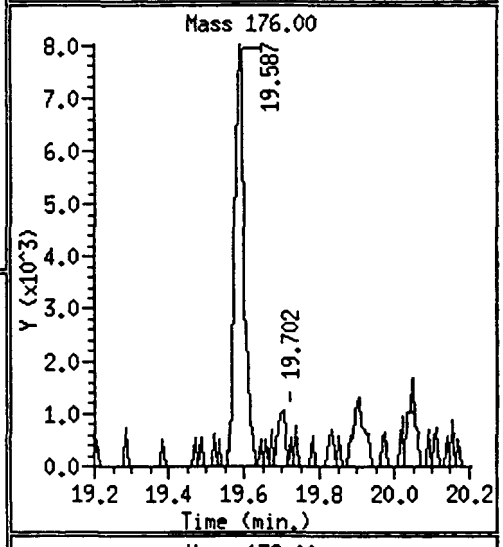


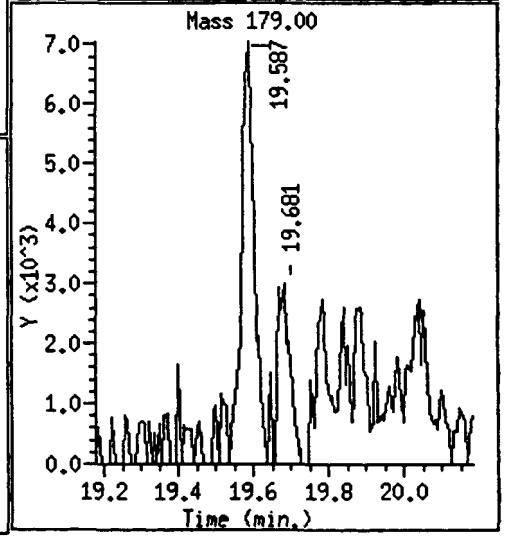












Data File: /chem/Y.i/10-23-97.b/YP788.d

Date : 23-OCT-1997 13:33

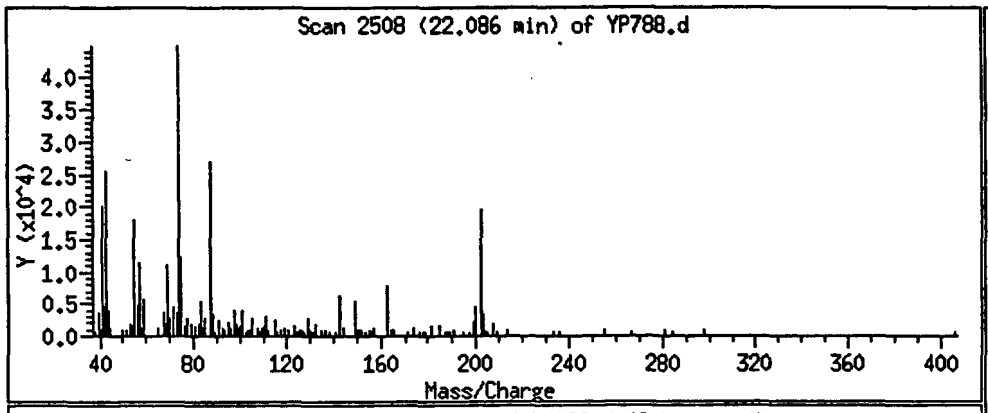
Instrument : Y.i

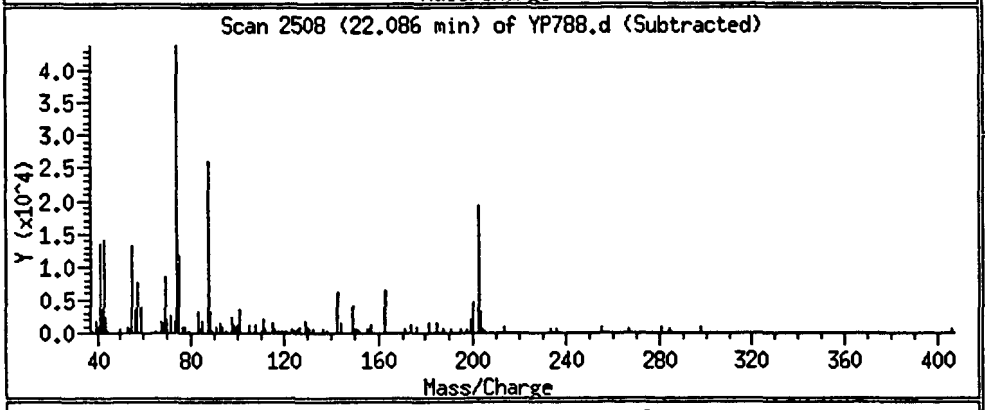
Sample ID : SO-MM5-1-8

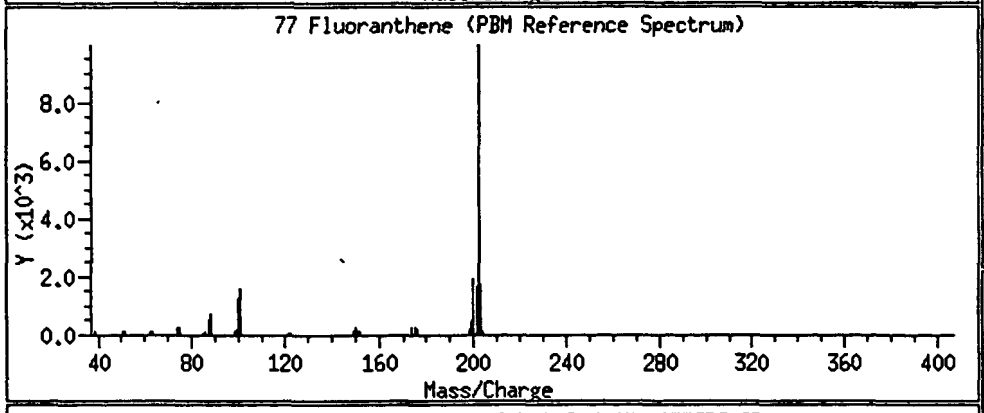
Column phase : DB-5 Column diameter : 0.32

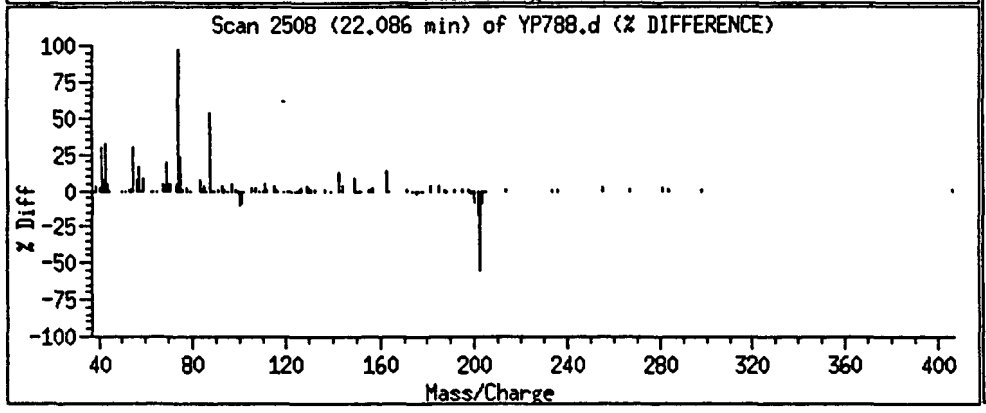
Volume Injected (uL) : 1.0

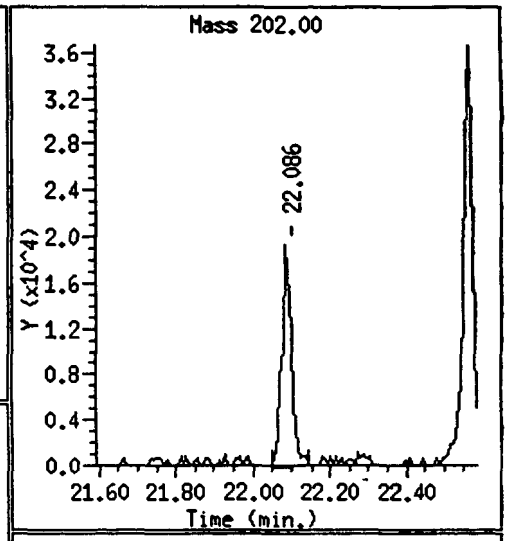
77 Fluoranthene

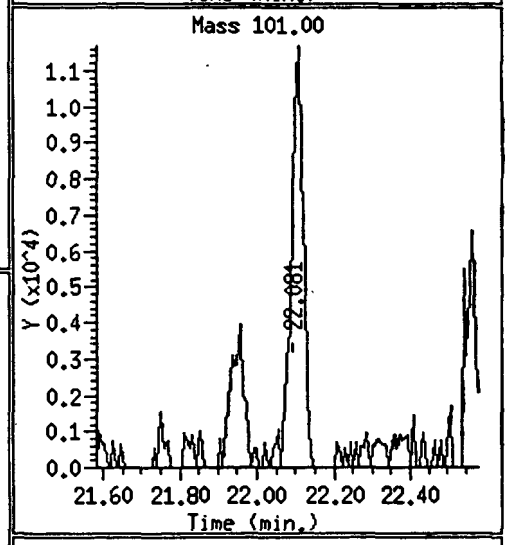


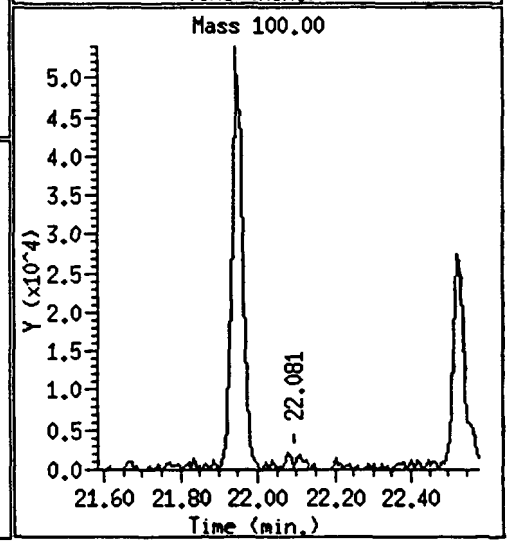












Data File: /chem/Y.i/10-23-97.b/YP788.d

Date : 23-OCT-1997 13:33

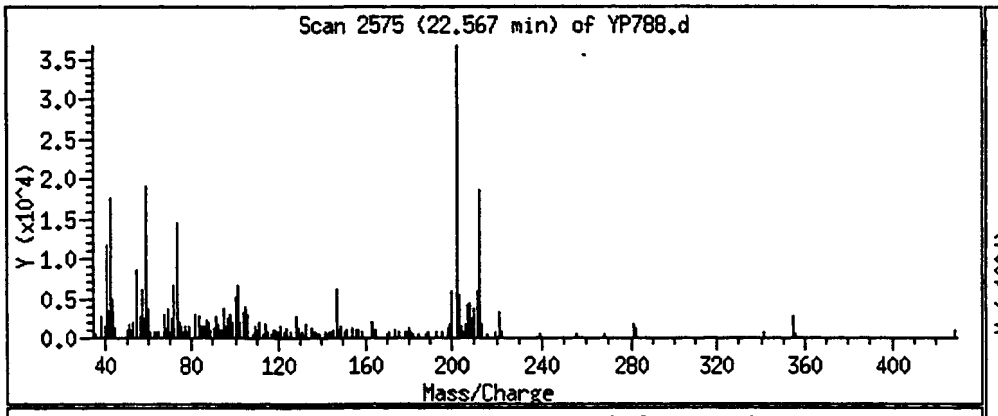
Instrument : Y.i

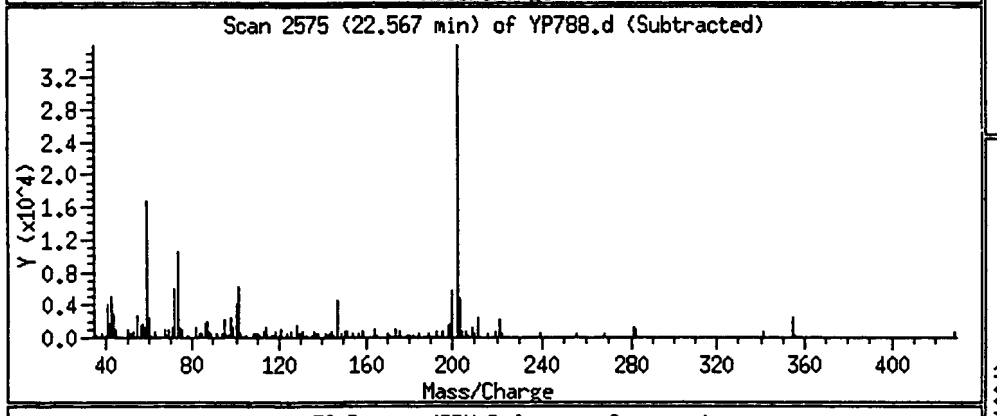
Sample ID : SO-MM5-1-8

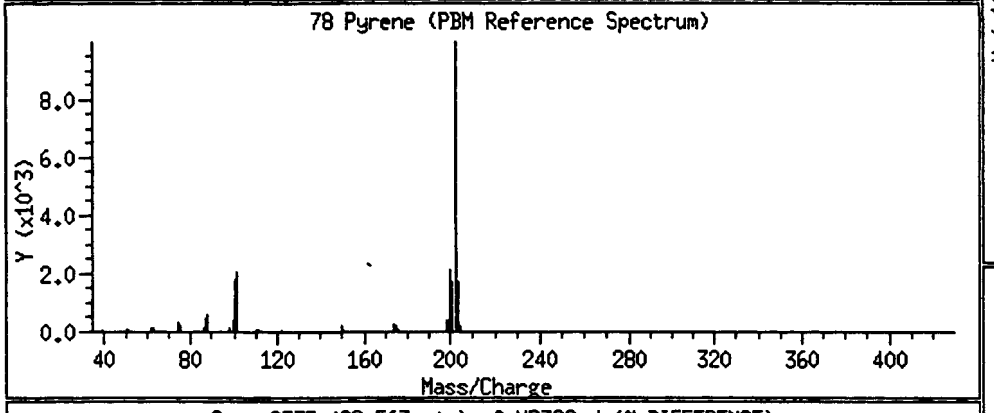
Column phase : DB-5 Column diameter : 0.32

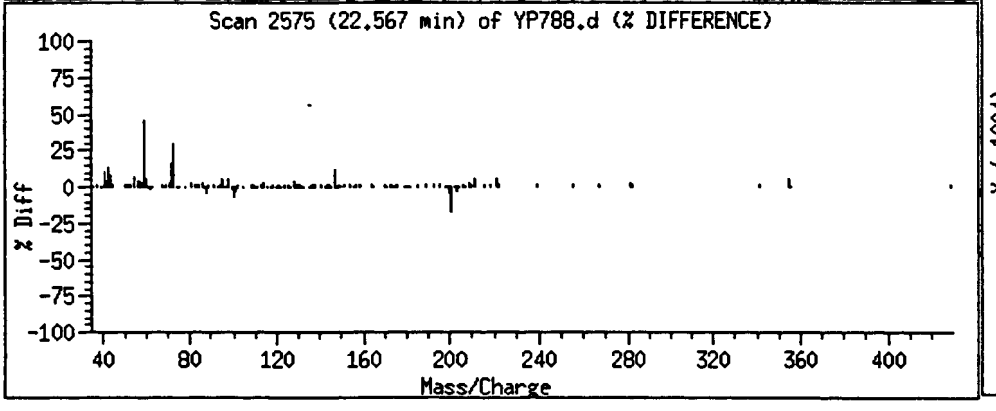
Volume Injected (uL) : 1.0

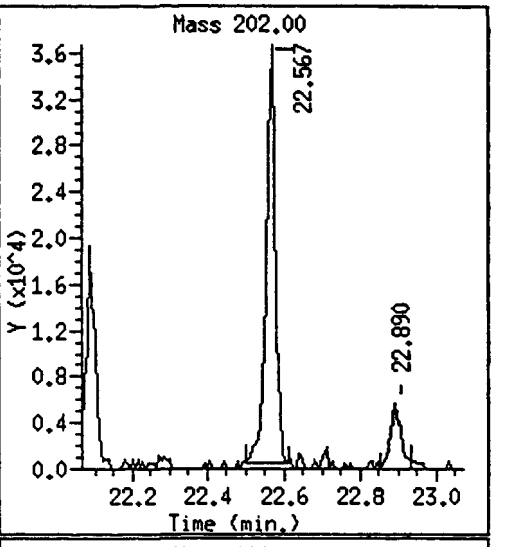
78 Pyrene

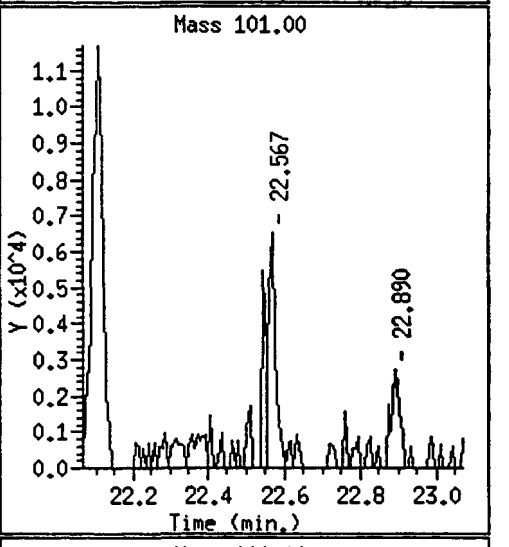


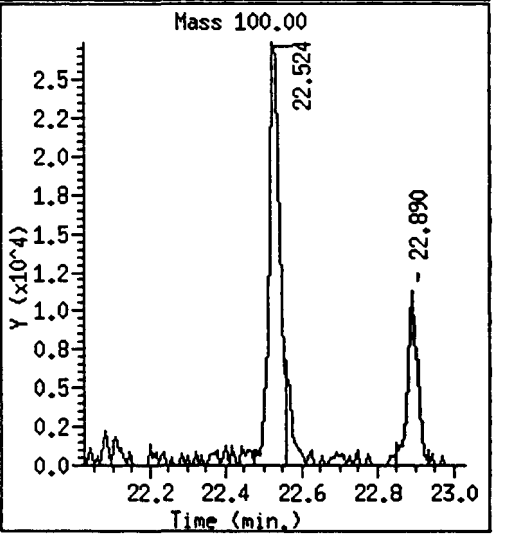












Data File: /chem/Y.i/10-23-97.b/YP788.d

Date : 23-OCT-1997 13:33

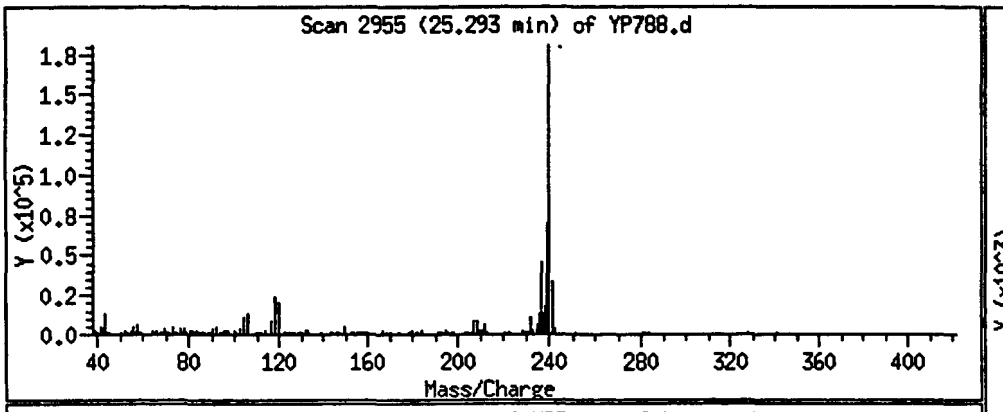
Instrument : Y.i

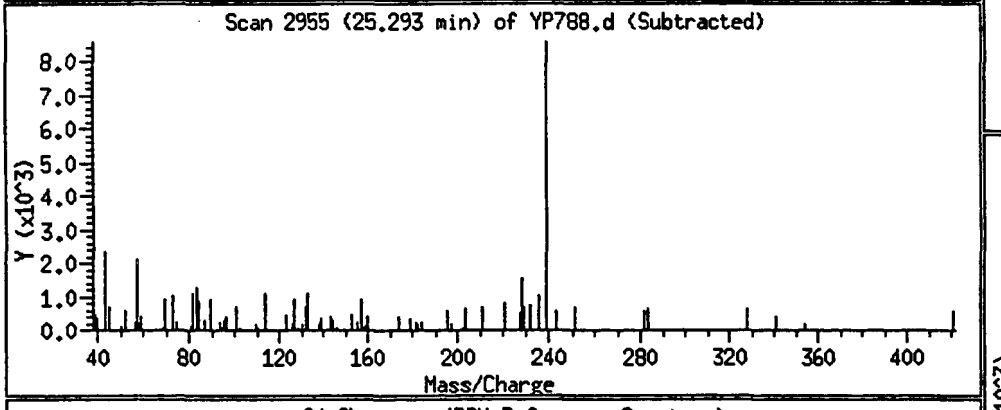
Sample ID : SO-MM5-1-8

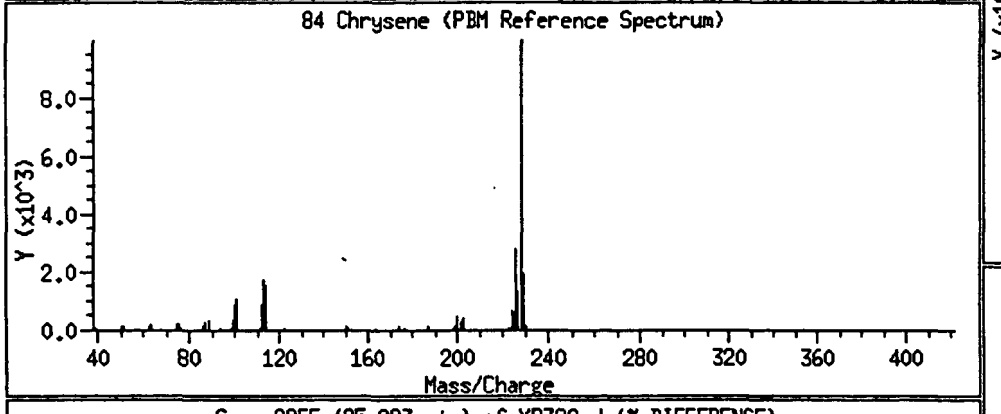
Column phase : DB-5 Column diameter : 0.32

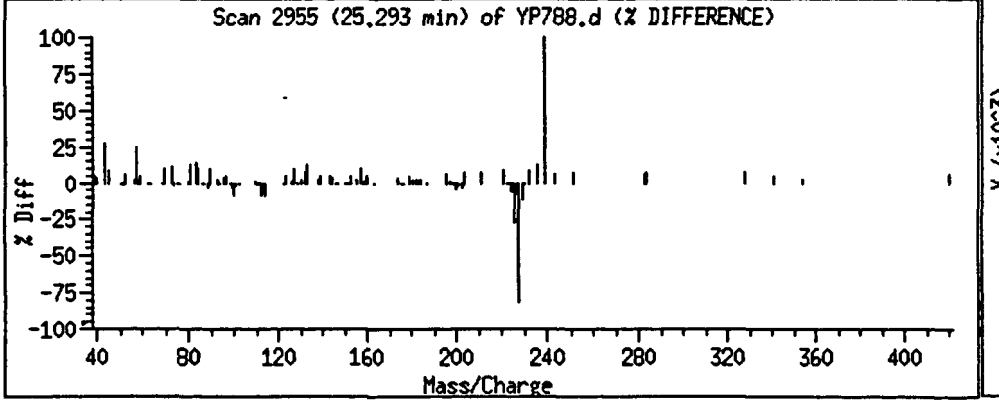
Volume Injected (uL) : 1.0

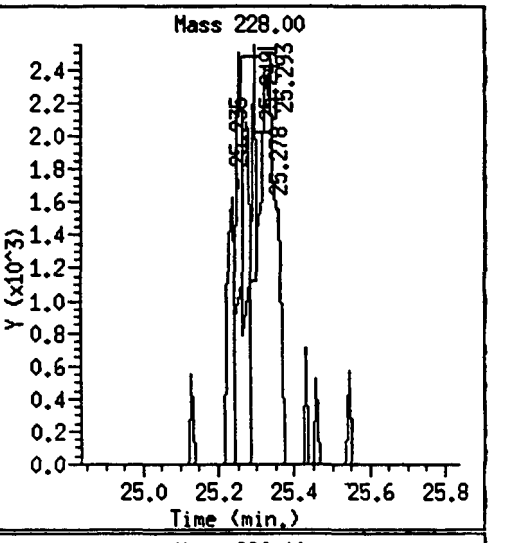
84 Chrysene

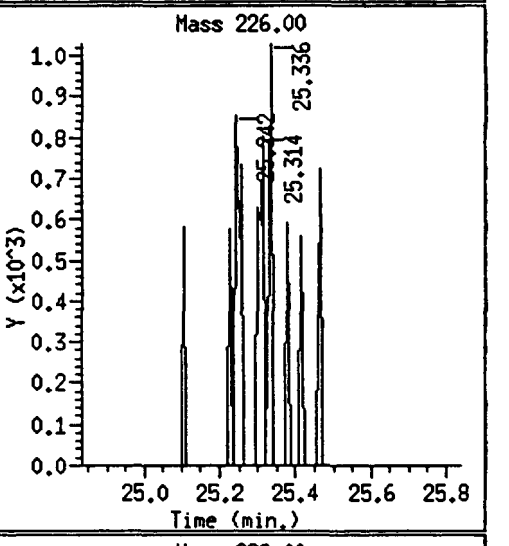


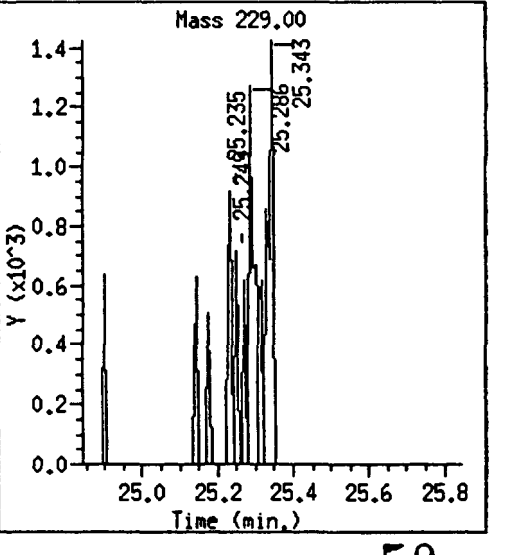












Data File: /chem/Y.i/10-23-97.b/CAA/YP788.d

Date : 23-OCT-97 13:33

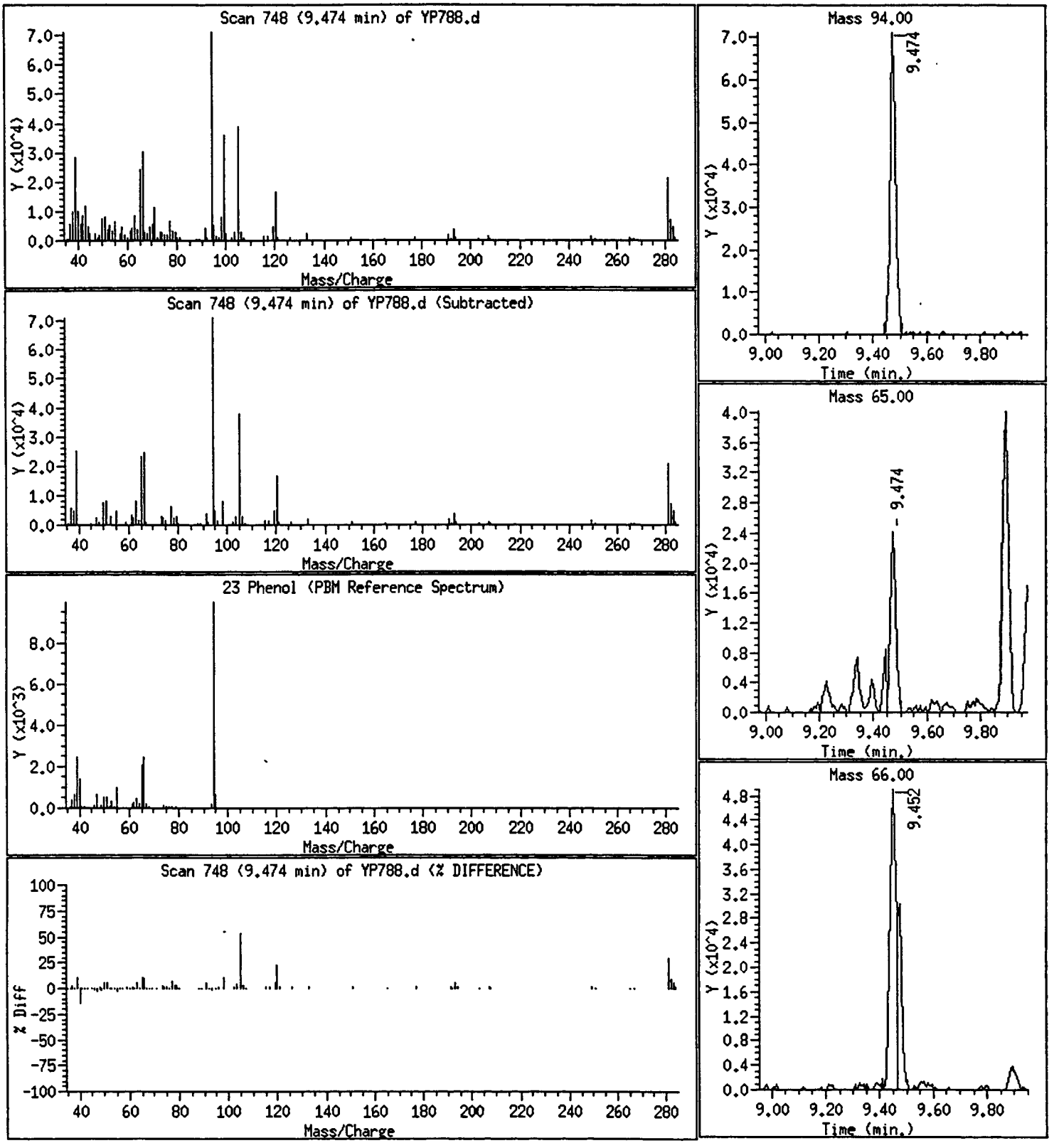
Instrument : Y.i

Sample ID : SO-MM5-1-8

Column phase : DB.5-625 Column diameter : 0.32

Volume Injected (uL) : 1.0

23 Phenol



Data File: /chem/Y.i/10-23-97.b/CAA/YP788.d

Date : 23-OCT-97 13:33

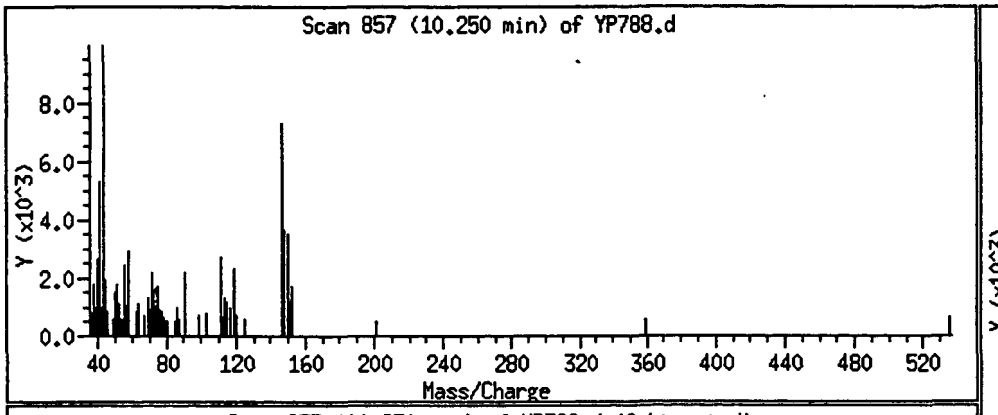
Instrument : Y.i

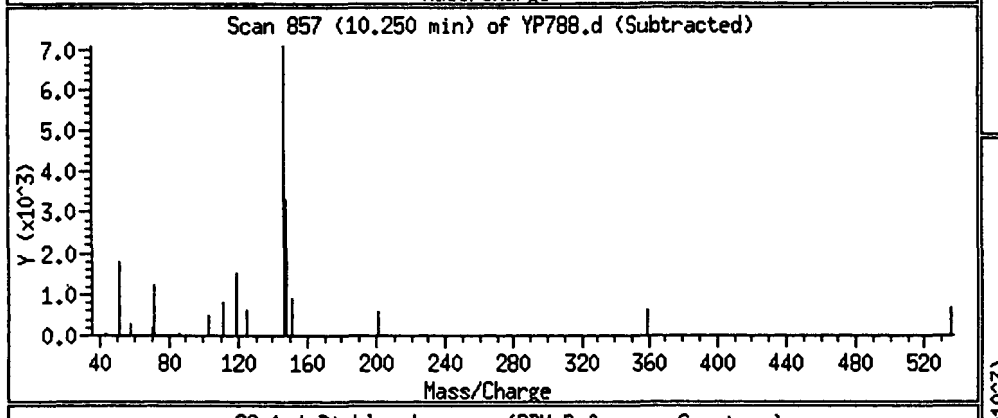
Sample ID : SO-MM5-1-8

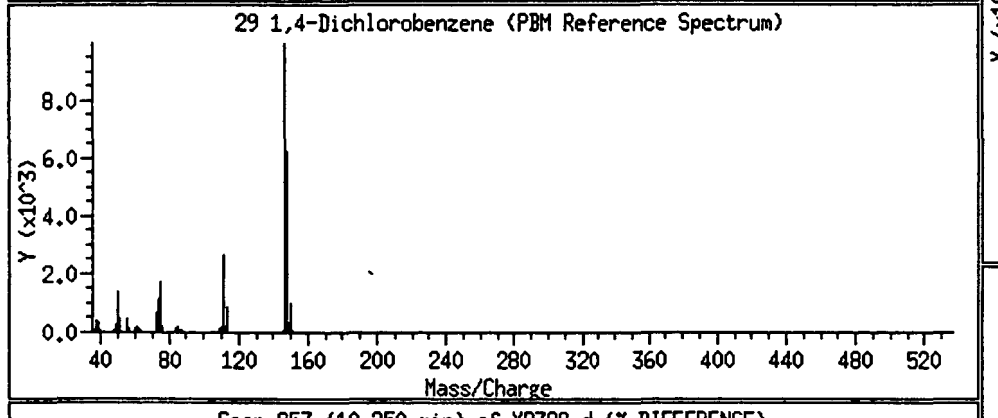
Column phase : DB.5-625 Column diameter : 0.32

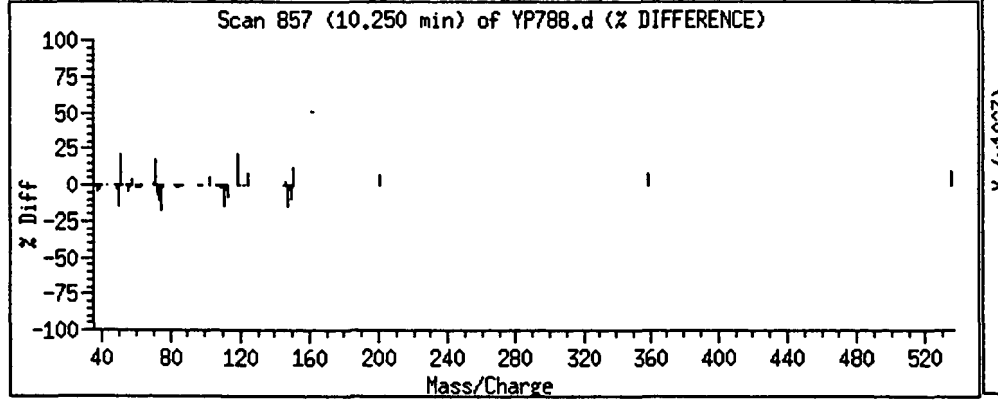
Volume Injected (uL) : 1.0

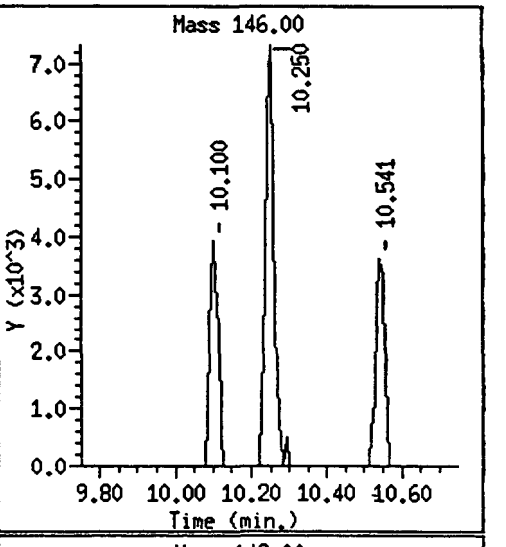
29 1,4-Dichlorobenzene

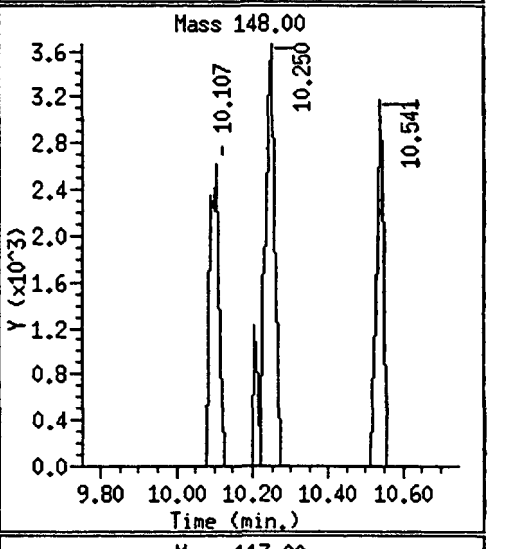


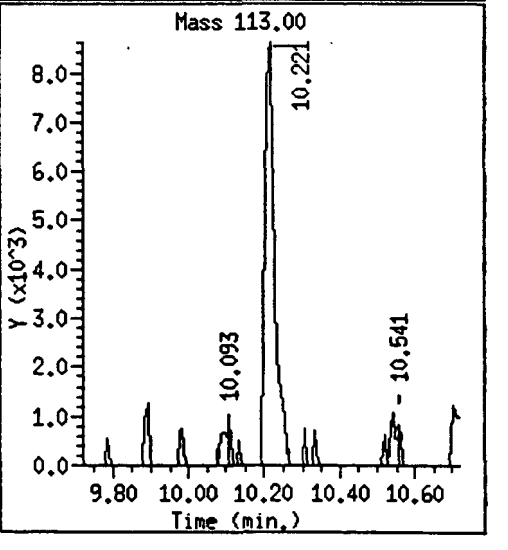












Data File: /chem/Y.i/10-23-97.b/CAA/YP788.d

Date : 23-OCT-97 13:33

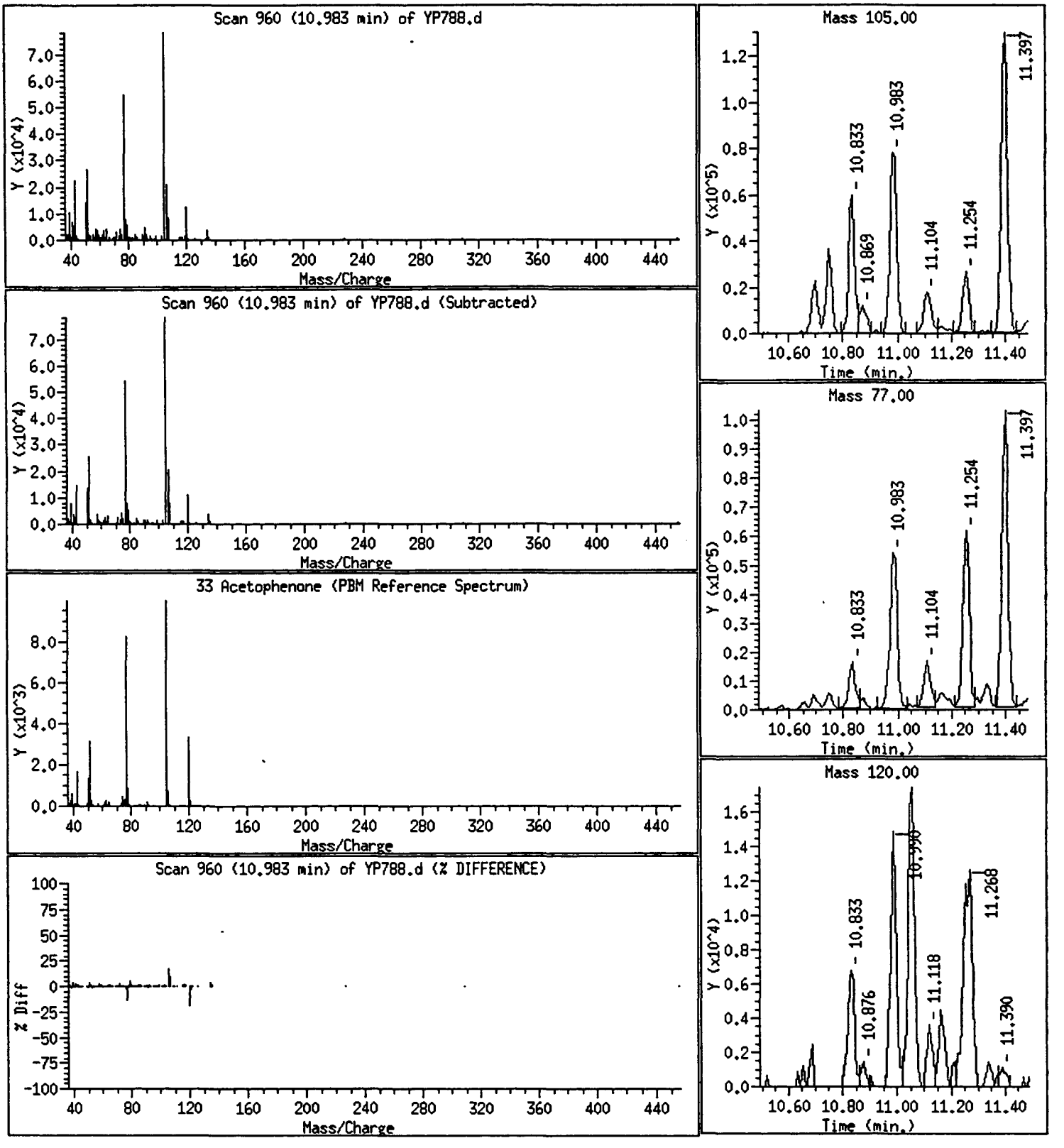
Instrument : Y.i

Sample ID : SO-MM5-1-8

Column phase : DB.5-625 Column diameter : 0.32

Volume Injected (uL) : 1.0

33 Acetophenone



Data File: /chem/Y.i/10-23-97.b/CAA/YP788.d

Date : 23-OCT-97 13:33

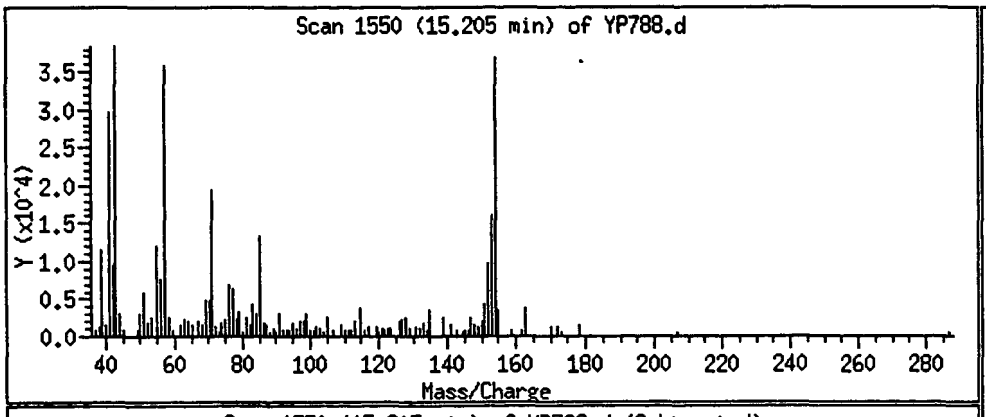
Instrument : Y.i

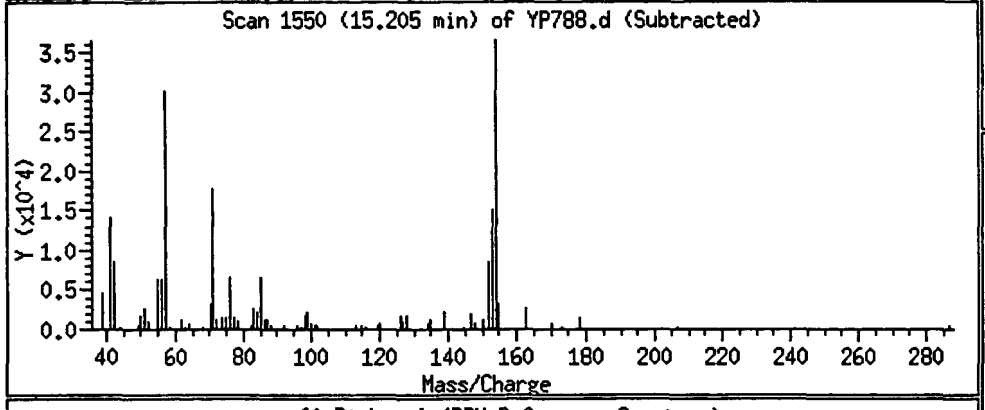
Sample ID : SO-MM5-1-8

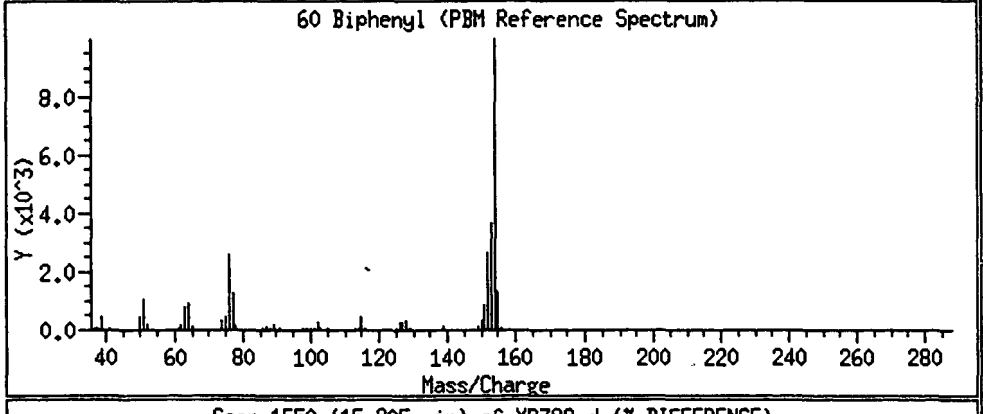
Column phase : DB.5-625 Column diameter : 0.32

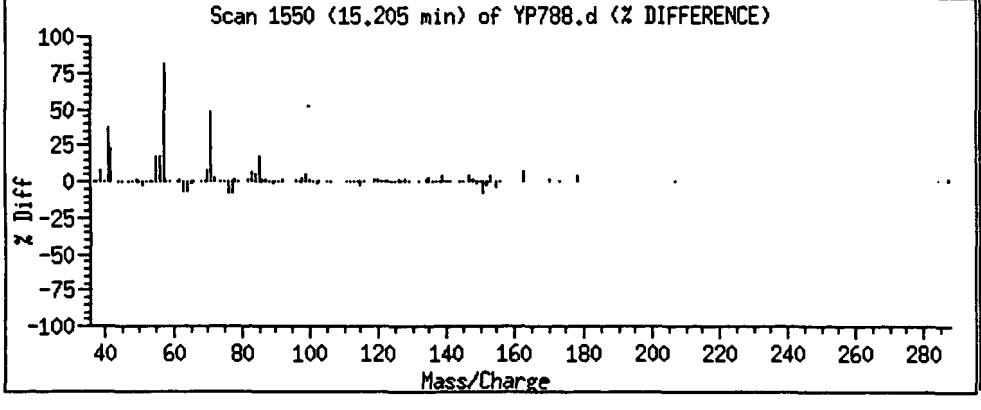
Volume Injected (uL) : 1.0

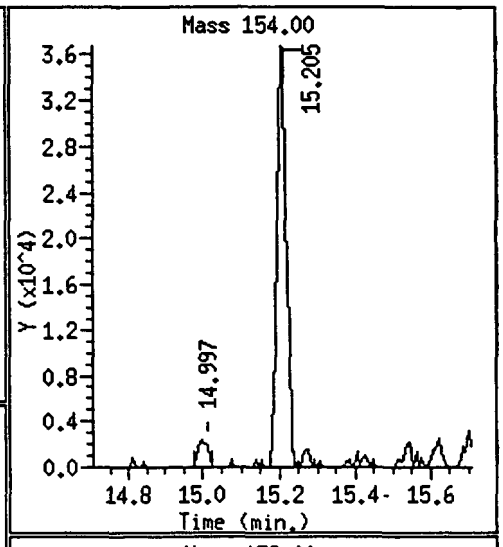
60 Biphenyl

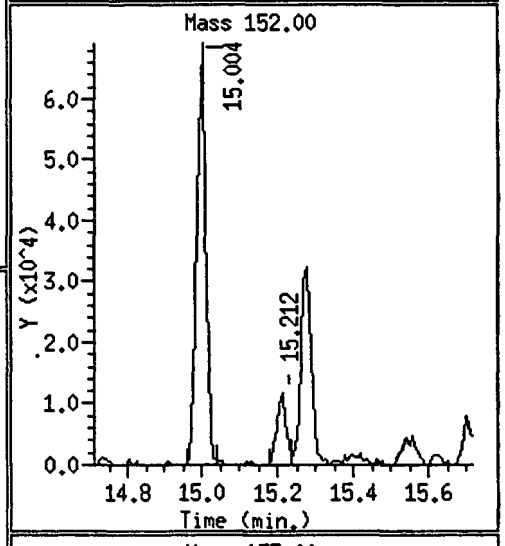


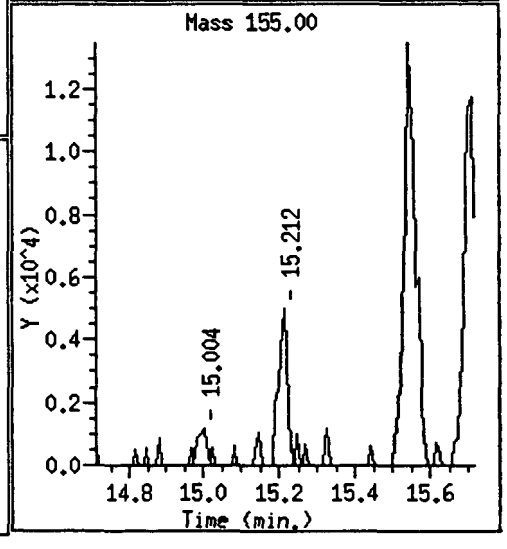












Data File: /chem/Y.i/10-23-97.b/CAA/YP788.d

Date : 23-OCT-97 13:33

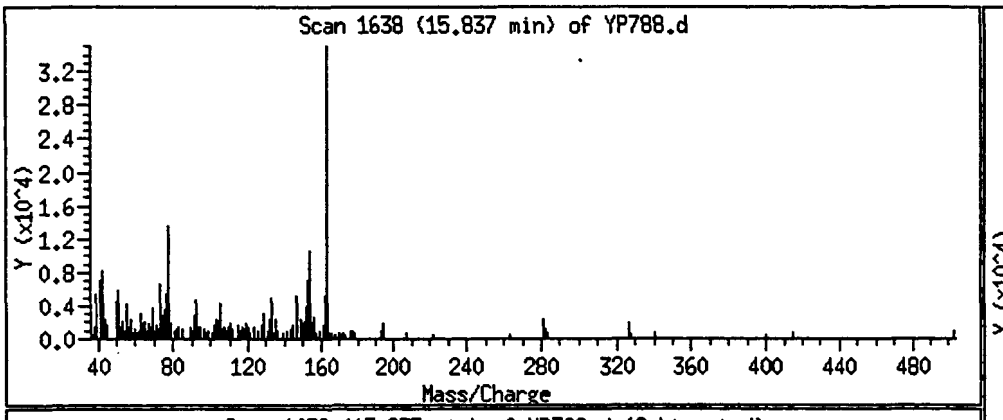
Instrument : Y.i

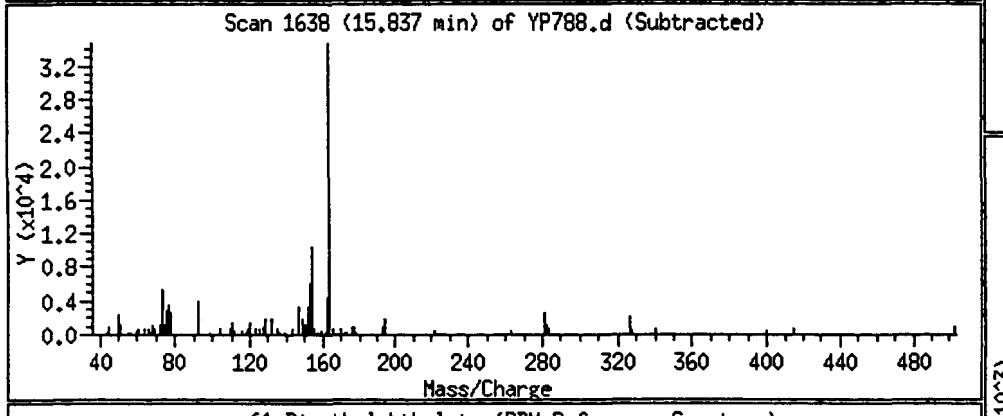
Sample ID : SO-MM5-1-8

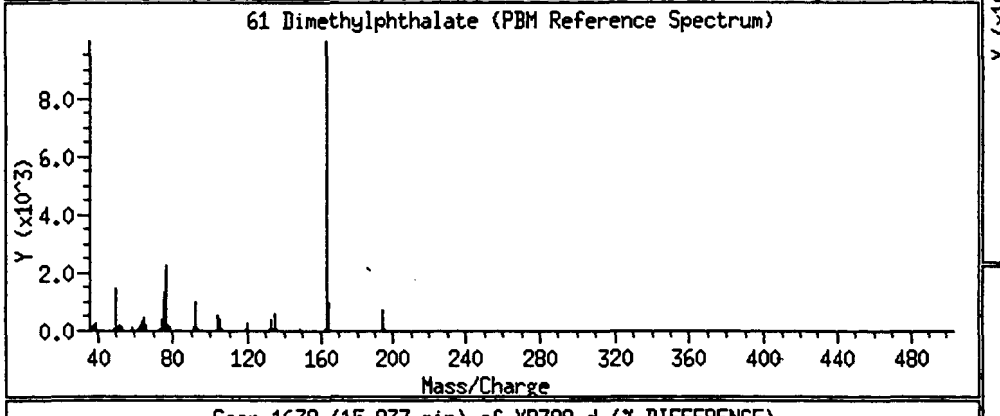
Column phase : DB.5-625 Column diameter : 0.32

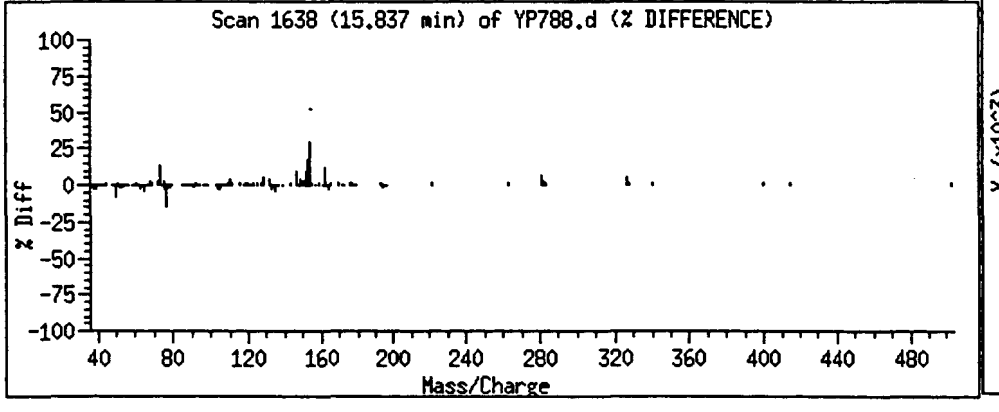
Volume Injected (uL) : 1.0

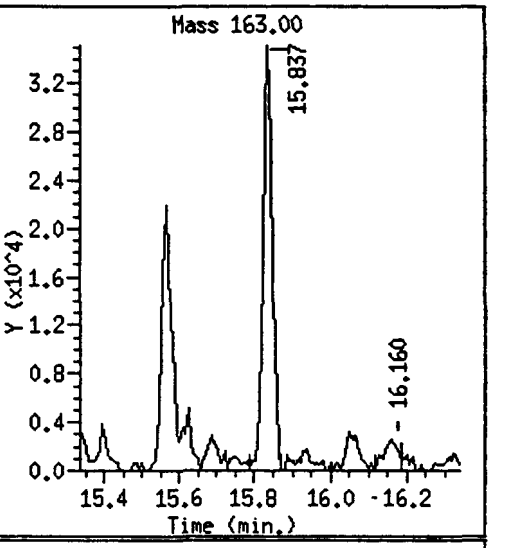
61 Dimethylphthalate

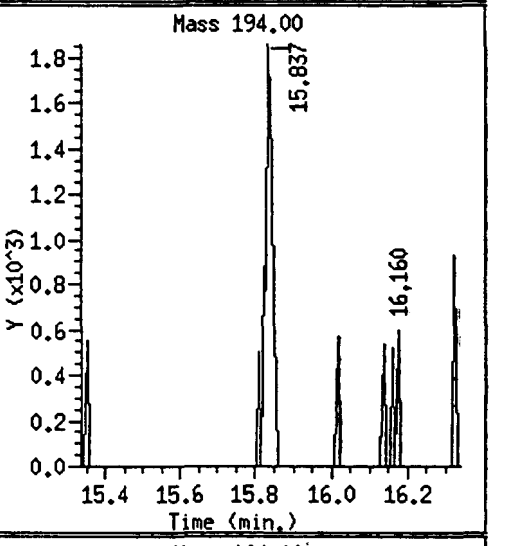


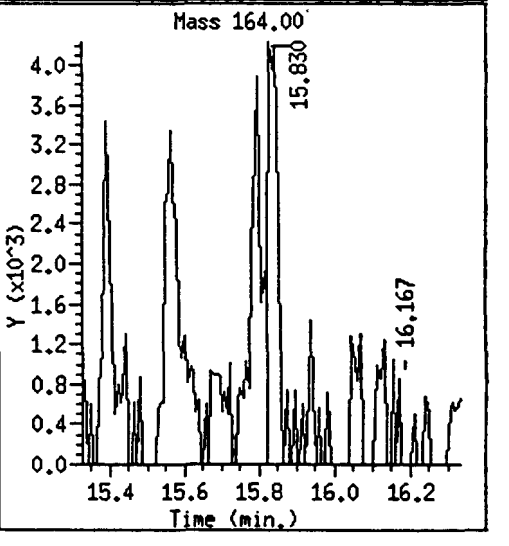












Data File: /chem/Y.i/10-23-97.b/CAA/YP788.d

Date : 23-OCT-97 13:33

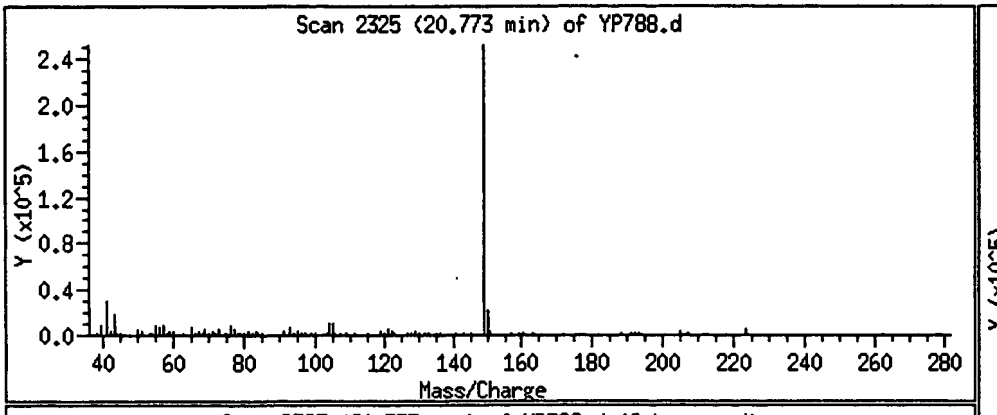
Instrument : Y.i

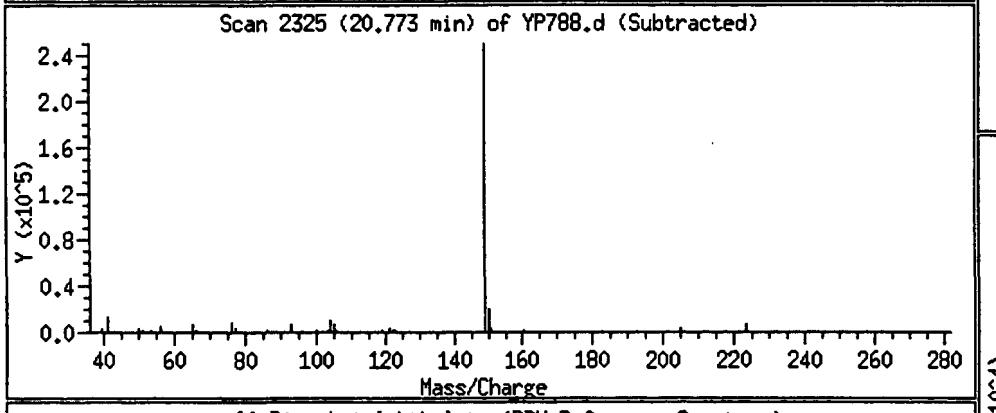
Sample ID : SO-MM5-1-8

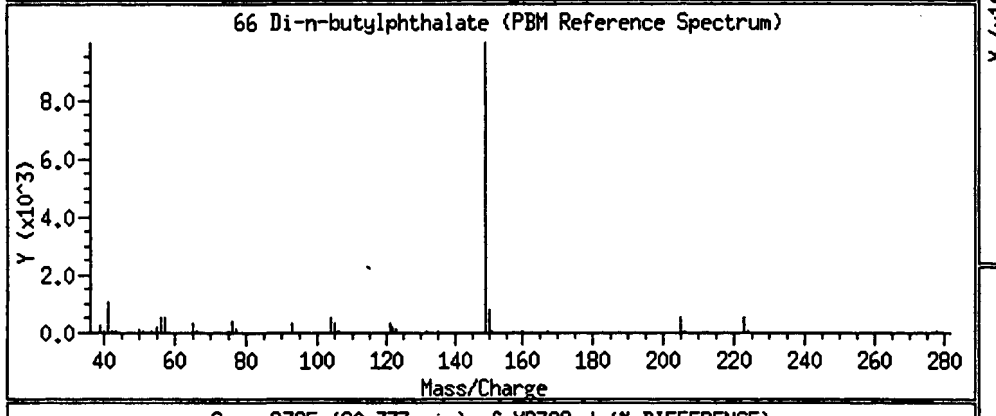
Column phase : DB.5-625 Column diameter : 0.32

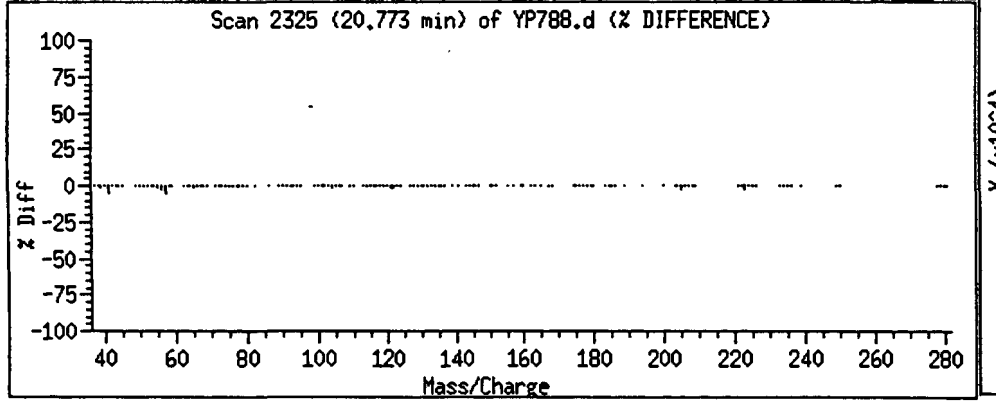
Volume Injected (uL) : 1.0

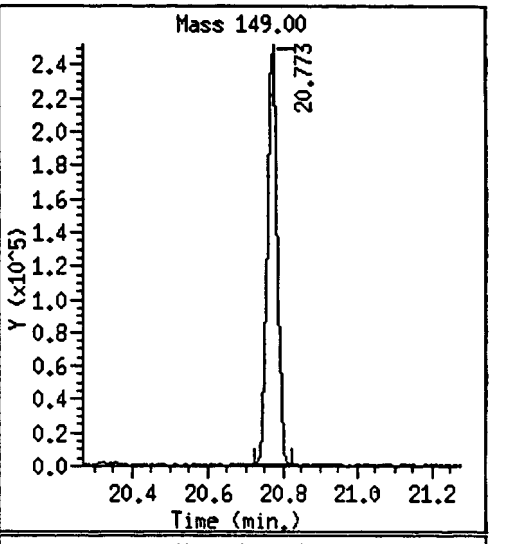
66 Di-n-butylphthalate

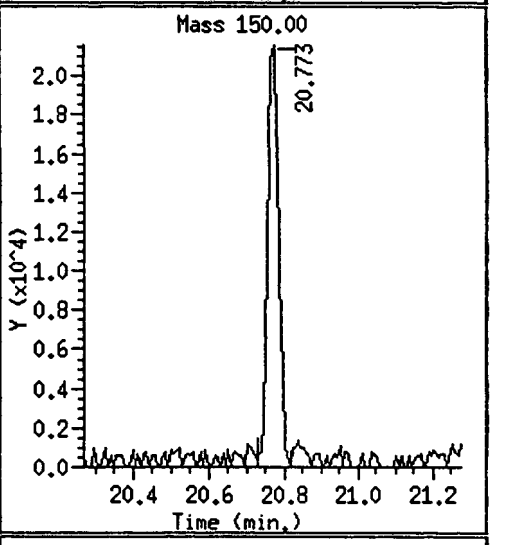


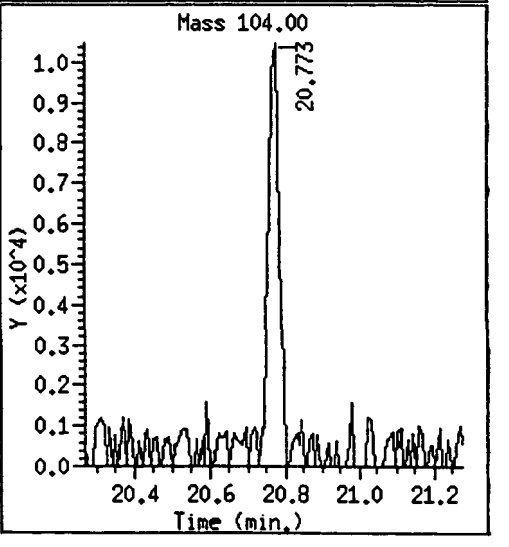












Data File: /chem/Y.i/10-23-97.b/CAA/YP788.d

Date : 23-OCT-97 13:33

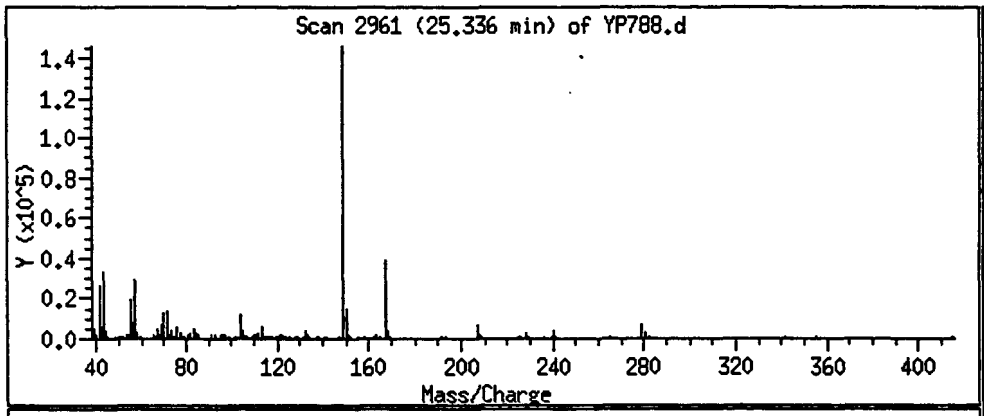
Instrument : Y.i

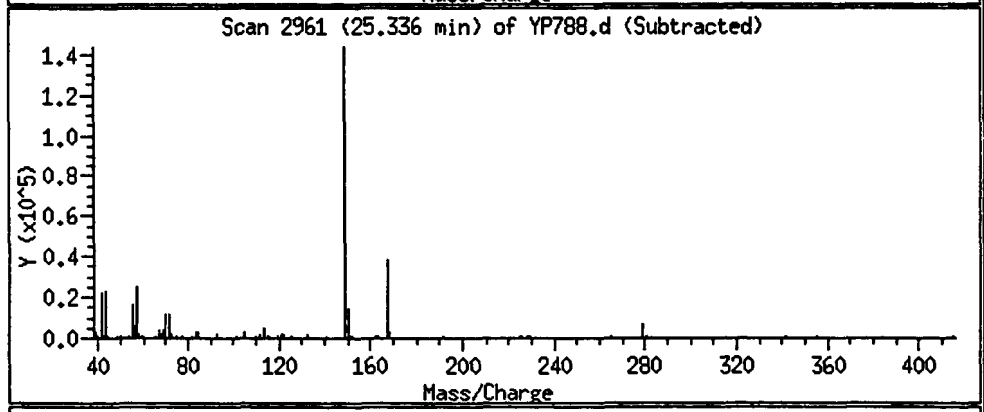
Sample ID : SO-MM5-1-8

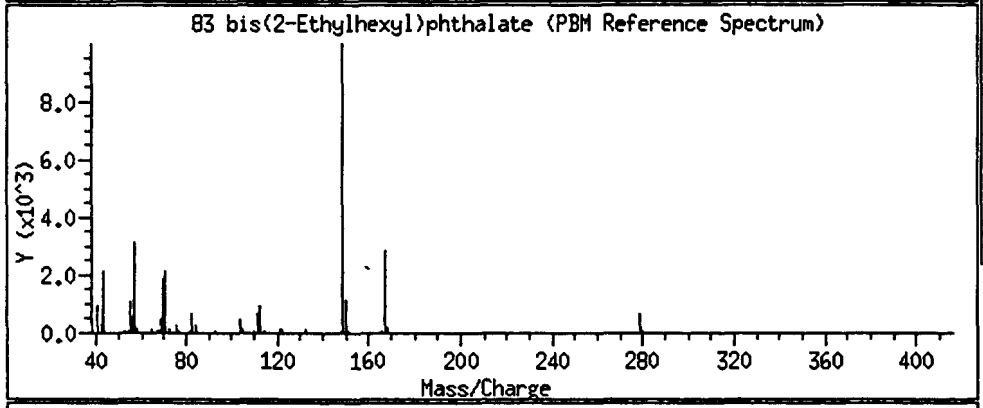
Column phase : DB.5-625 Column diameter : 0.32

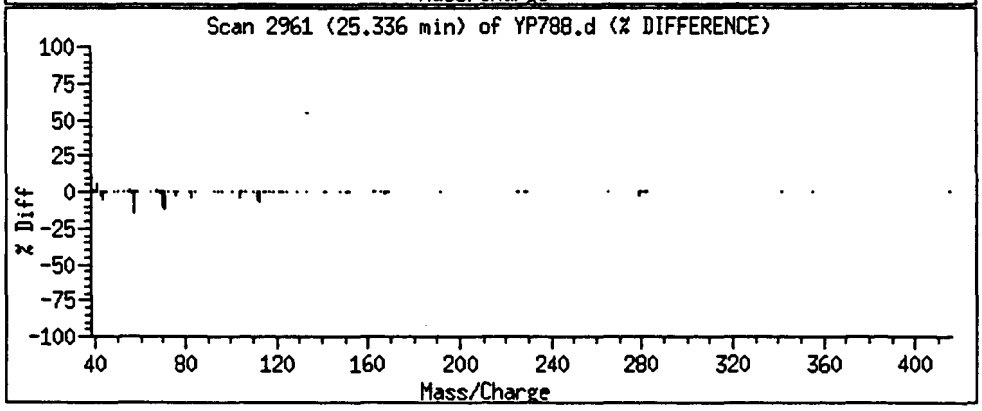
Volume Injected (uL) : 1.0

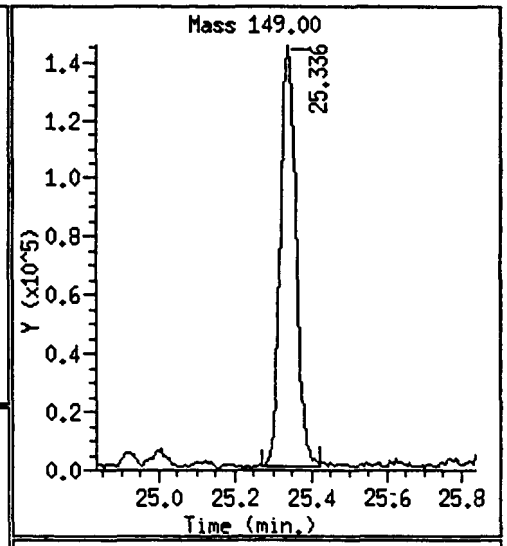
83 bis(2-Ethylhexyl)phthalate

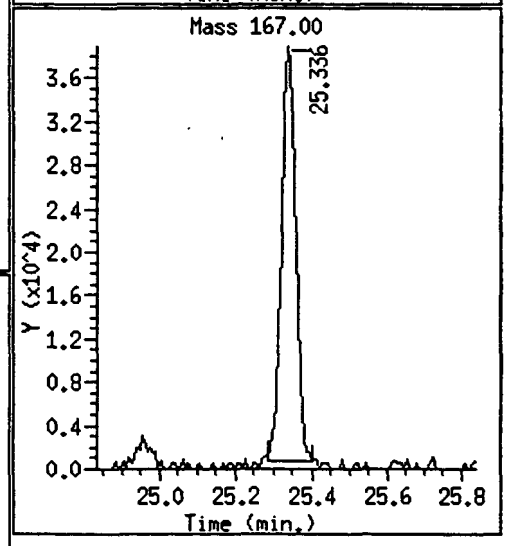












Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP789 | **Sample ID: SO-MM5-2-17**

Client Project: Saginaw, MI | Date Received: 09/29/97 | Response File: YP783
TLI ID: 185-7-3A-F | Date Extracted: 10/14/97
Date Analyzed : 10/23/97

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
Naphthalene-d_8		IS 2	12.75		
Naphthalene	28.20	B	12.80		10
2-Methylnaphthalene	22.37		14.23		10
Acenaphthene-d_{10}		IS 3	16.41		
2-Chloronaphthalene		U		0.43	10
Acenaphthylene	0.64	J	16.12		10
Acenaphthene		U		0.44	10
Fluorene	0.61	J	17.55		10
Phenanthrene-d_{10}		IS 4	19.54		
Phenanthrene	1.16	J	19.59		10
Anthracene		U		0.28	10
Fluoranthene	1.37	J	22.09		10
Chrysene-d_{12}		IS 5	25.26		
Pyrene	1.66	J	22.56		10
Benzo(a)anthracene		U		0.19	10
Chrysene		U		0.19	10
Perylene-d_{12}		IS 6 High	29.40		
Benzo(b)fluoranthene		U		0.15	10
Benzo(k)fluoranthene		U		0.16	10
Benzo(e)pyrene		U		0.14	10
Benzo(a)pyrene		U		0.16	10
Perylene		U		0.16	10
Indeno(1,2,3-cd)pyrene		U		0.14	10
Dibenz(a,h)anthracene		U		0.19	10
Benzo(g,h,i)perylene		U		0.16	10

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Triangle Laboratories of RTP, Inc.
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

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Printed: 17:20 11/13/1997

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP789 | **Sample ID: SO-MM5-2-17**

Client Project: Saginaw, MI	Date Received: 09/29/97	Response File: YP783
TLI ID: 185-7-3A-F	Date Extracted: 10/14/97	
	Date Analyzed : 10/23/97	

Dilution Factor: 1.00

Surrogate Summary	Amount (ug)	RT	IS Ref	%REC
Phenol-d_5	78.58	9.45	1	79
Nitrobenzene-d_5	68.08	11.29	2	68
1,3,5-Trichlorobenzene-d_3	63.30	11.97	2	63
1,4-Dibromobenzene-d_4	80.78	12.86	1	81
2-Fluorobiphenyl	77.96	15.00	3	78
2,4,6-Tribromophenol	107.83	18.06	3	108
Anthracene-d_{10}	92.58	19.65	4	93
Pyrene-d_{10}	80.73	22.53	5	81
Terphenyl-d_{14}	90.28	22.90	5	90

Reviewed by Sat Date 11/13/97

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Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP789 | **Sample ID: SO-MM5-2-17**

Client Project: Saginaw, MI | Date Received: 09/29/97 | Response File: YP784
TLI ID: 185-7-3A-F | Date Extracted: 10/14/97
Date Analyzed : 10/23/97

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
1,4-Dichlorobenzene-d_4		IS 1	10.22		
n-Nitrosodimethylamine		U		1.50	10
Cumene	0.56	J	8.71		10
Phenol	35.15		9.48		10
Aniline		U		0.50	10
bis-(2-Chloroethyl)ether		U		1.07	10
Benzyl Chloride		U		0.39	10
1,4-Dichlorobenzene	0.82	J	10.24		10
2-Methylphenol		U		0.86	10
Acetophenone	8.93	BJ	10.99		10
n-Nitrosomorpholine		U		1.44	10
o-Toluidine		U		0.52	10
Hexachloroethane		U		1.37	10
1,2-Dibromo-3-chloropropane		U		1.43	10
N,N-Diethylaniline		U		0.51	10
Naphthalene-d_8		IS 2	12.75		
3/4-Methylphenol		U		0.76	10
Nitrobenzene		U		0.52	10
N,N-Dimethylaniline		U		0.50	10
Isophorone		U		0.44	10
o-Anisidine		U		0.92	10
1,4-Phenylenediamine		U		0.73	10
1,2,4-Trichlorobenzene		U		0.83	10
Hexachlorobutadiene		U		1.36	10
a,a,a-Trichlorotoluene		U		0.64	10
Hydroquinone		U		0.77	10

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Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP789 | **Sample ID: SO-MM5-2-17**

Client Project: Saginaw, MI | Date Received: 09/29/97 | Response File: YP784
TLI ID: 185-7-3A-F | Date Extracted: 10/14/97
Date Analyzed : 10/23/97

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
2-Chloroacetophenone		U		0.35	10
Acenaphthene-d_{10}		IS 3	16.41		
Hexachlorocyclopentadiene		U		1.50	10
2,4,6-Trichlorophenol	0.39	J	14.80		10
2,4,5-Trichlorophenol		U		1.21	10
Biphenyl	1.22	J	15.20		10
Dimethylphthalate	1.89	J	15.84		10
2,4-Dinitrophenol		U		3.73	25
4-Nitrophenol		U		1.71	25
2,4-Dinitrotoluene		U		1.41	10
Dibenzofuran		U		0.33	10
4,6-Dinitro-2-methylphenol		U		2.79	25
Trifluralin		U		2.08	10
Phenanthrene-d_{10}		IS 4	19.54		
Di-n-butylphthalate	8.83	BJ	20.77		10
Hexachlorobenzene		U		0.88	10
4-Aminobiphenyl		U		0.37	10
Pentachlorophenol		U		1.56	25
Pentachloronitrobenzene		U		3.41	10
4-Nitrobiphenyl		U		0.94	10
Chrysene-d_{12}		IS 5	25.26		
Benzidine		U		0.26	10
4,4'-Methylenedianiline		U		0.63	10
Dimethylaminoazobenzene		U		0.56	10
3,3'-Dimethylbenzidine		U		0.32	10
3,3'-Dimethoxybenzidine		U		0.64	10

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Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP789 | **Sample ID: SO-MM5-2-17**

Client Project: Saginaw, MI | Date Received: 09/29/97 | Response File: YP784
TLI ID: 185-7-3A-F | Date Extracted: 10/14/97
Date Analyzed : 10/23/97

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
3,3'-Dichlorobenzidine		U		0.48	10
Methylene bis-chloroaniline		U		1.10	10
bis(2-Ethylhexyl)phthalate	20.27	B	25.33		10

Reviewed by Sott Date 11/13/97

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

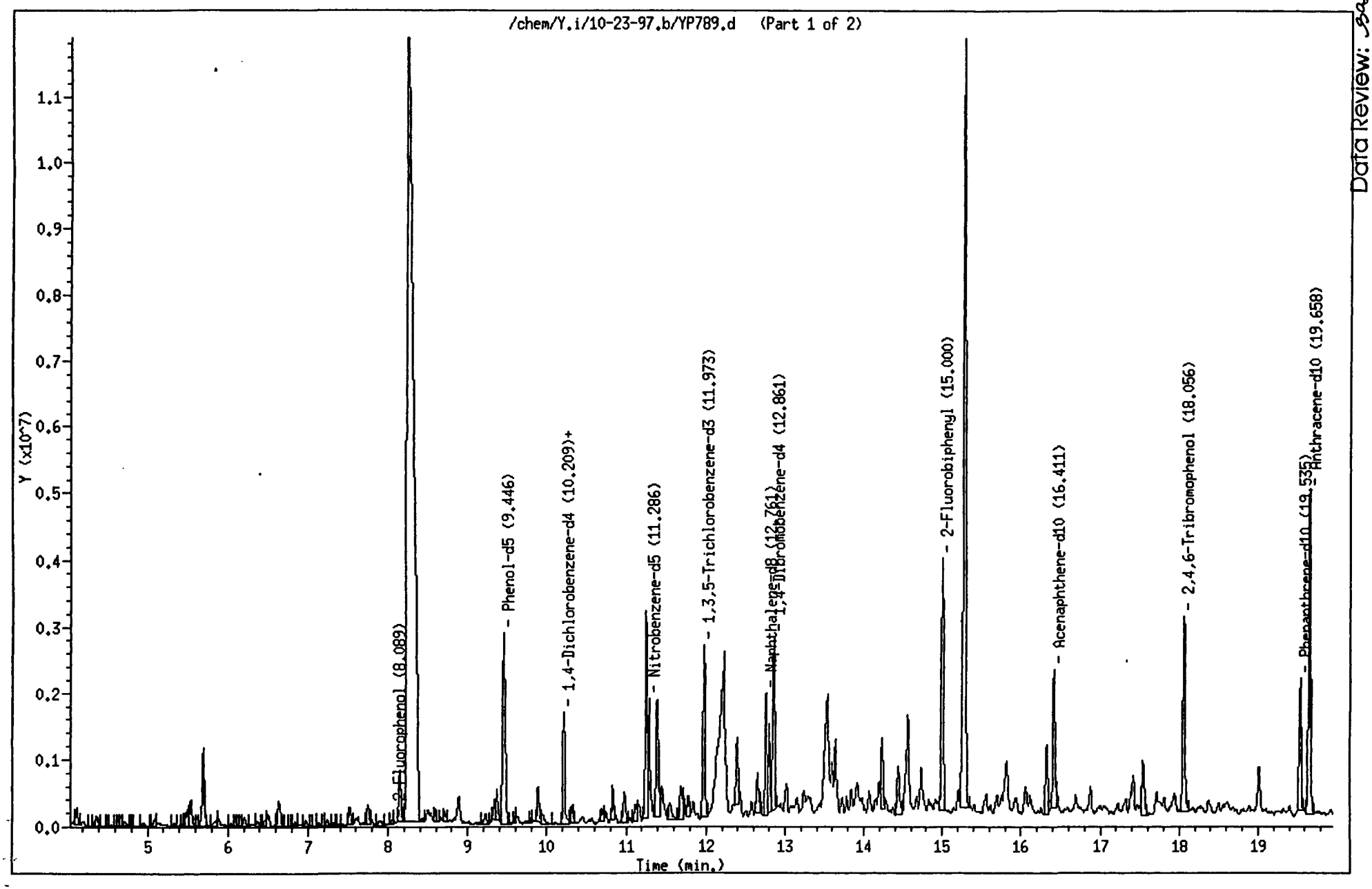
Data File: /chem/Y.i/10-23-97.b/YP789.d
Date : 23-OCT-97 14:21
Instrument : Y.i
Sample ID : SO-MM5-2-17
Column phase : DB-5
Volume Injected (uL) : 1.0

Triangle Laboratories of RTP, Inc.

Column diameter : 0.32

72

Data Review: [illegible]
Date: 11/12/97

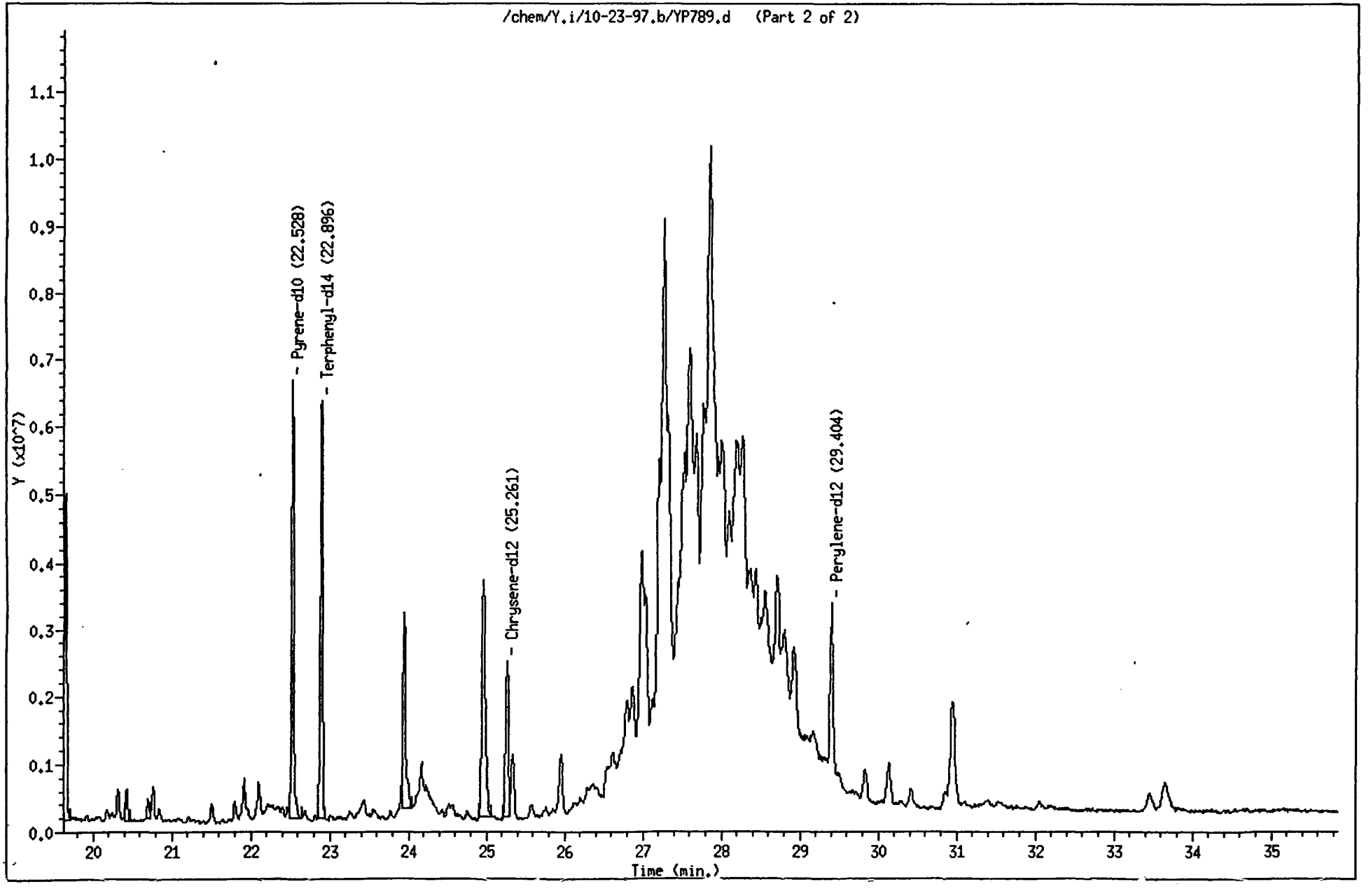


Data File: /chem/Y.i/10-23-97.b/YP789.d
Date : 23-OCT-97 14:21
Instrument : Y.i
Sample ID : SO-MM5-2-17
Column phase : DB-5
Volume Injected (uL) : 1.0

Triangle Laboratories of RTP, Inc.

Column diameter : 0.32

73



TRIANGLE LABORATORIES, INC.

SEMI-VOLATILE QUANTITATION REPORT

Data file : /chem/Y.i/10-23-97.b/YP789.d
Lab. Id. : 43433
Inj Date : 23-OCT-97 14:21 Autotune Date: 22-Oct-97 09:14:0
Operator : DD Inst ID: Y.i
Smp Info : SO-MM5-2-17
Misc Info : 185-7-3A-F
Comment :
Method : /chem/Y.i/10-23-97.b/cclist.m
Meth Date : 23-Oct-1997 15:22 target
Cal Date : 23-OCT-1997 09:12 Cal File: YP783.d
Als bottle: 5
Dil Factor: 1.000 Target Version: Target 2.20
Integrator: HP RTE Compound Sublist: pah.sub
Sample Type: AIR

			QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)
*	1	1,4-Dichlorobenzene-d4	152.00	10.216(1.000)	457778	40.00	
*	2	Naphthalene-d8	136.00	12.754(1.000)	1474295	40.00	
*	3	Acenaphthene-d10	164.00	16.411(1.000)	864321	40.00	
*	4	Phenanthrene-d10	188.00	19.535(1.000)	1484212	40.00	
*	5	Chrysene-d12	240.00	25.261(1.000)	1946041	40.00	
*	6	Perylene-d12	264.00	29.404(1.000)	2631565	40.00	
$	7	2-Fluorophenol	112.00	8.089(0.792)	937	0.07	0.07(aQR)
$	8	Phenol-d5	99.00	9.446(0.925)	1511762	78.59	78.59
$	9	2-Chlorophenol-d4	132.00	10.216(1.000)	467	0.03	0.03(aQR)
$	10	1,2-Dichlorobenzene-d4	Compound Not Detected.				
$	11	Nitrobenzene-d5	82.00	11.286(0.885)	946009	68.10	68.10
$	12	1,3,5-Trichlorobenzene-d3	185.00	11.973(0.939)	774522	63.20	63.20
$	13	1,4-Dibromobenzene-d4	239.80	12.861(1.259)	859747	80.78	80.78
$	14	2-Fluorobiphenyl	172.00	15.000(0.914)	2092326	77.94	77.94
$	15	2,4,6-Tribromophenol	329.80	18.056(1.100)	694334	107.65	107.65
$	16	Anthracene-d10	188.00	19.651(1.006)	3685890	92.56	92.56
$	17	Pyrene-d10	212.00	22.528(0.892)	4618603	80.75	80.75
$	18	Terphenyl-d14	244.00	22.896(0.906)	3588450	90.23	90.23
	42	Naphthalene	128.00	12.804(1.004)	1051943	28.19	28.19
	46	2-Methylnaphthalene	142.00	14.232(1.116)	546689	22.36	22.36
	50	2-Chloronaphthalene	162.00	~~15.302(0.932)~~	~~35558~~	~~1.51~~	~~1.51(aQ)~~ FP SAH
	56	Acenaphthylene	152.00	16.116(0.982)	24704	0.64	0.64(aQ)
	58	Acenaphthene	154.00	16.476(1.004)	7625	0.34	0.34(aQ) SAH 11/13/97
	65	Fluorene	166.00	17.551(1.069)	15253	0.61	~~0.61(aQ)~~ FP SAH
	73	Phenanthrene	178.00	19.586(1.003)	43994	1.16	1.16(a)
	74	Anthracene	178.00	19.694(1.008)	6508	0.18	0.18(a)
	77	Fluoranthene	202.00	22.088(1.131)	53366	1.37	1.37(a)
	78	Pyrene	202.00	22.564(0.893)	106043	1.66	1.66(aQ)
	83	Benzo(a)anthracene	228.00	25.239(0.999)	5824	0.11	~~0.11(a)~~
	84	Chrysene	228.00	~~25.232(1.000)~~	~~7846~~	0.15	0.15(a) FP SAH
	86	Benzo(b)fluoranthene	252.00	~~28.360(0.964)~~	~~3911~~	0.06	~~0.06(aQ)~~

Data Review: SAH
Date: 11/12/97

Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	CONCENTRATIONS FINAL (ug)
87 Benzo(k)fluoranthene	252.00	~~28.411(0.966)~~	~~624~~	0.01	~~0.01(aQ)~~
88 Benzo(e)pyrene	252.00	~~29.123(0.990)~~	~~1858~~	0.03	~~0.03(aQ)~~
89 Benzo(a)pyrene	252.00	~~29.266(0.995)~~	~~946~~	0.02	~~0.02(aQ)~~
90 Perylene	252.00	~~29.470(1.002)~~	~~976~~	0.02	~~0.02(aQ)~~
91 Indeno(1,2,3-cd)pyrene	Compound Not Detected.				
92 Dibenz(a,h)anthracene	Compound Not Detected.				
93 Benzo(g,h,i)perylene	Compound Not Detected.				

FP sat

QC Flag Legend

a - Target compound detected but, quantitated amount Below Limit Of Quantitation(BLOQ).
Q - Qualifier signal failed the ratio test.
R - Spike/Surrogate failed recovery limits.

TRIANGLE LABORATORIES, INC.

SEMI-VOLATILE QUANTITATION REPORT

Data file : /chem/Y.i/10-23-97.b/CAA/YP789.d
Lab. Id. : 43433
Inj Date : 23-OCT-97 14:21 Autotune Date: 22-Oct-97 09:14:0
Operator : DD Inst ID: Y.i
Smp Info : SO-MM5-2-17
Misc Info : 185-7-3A-F
Comment :
Method : /chem/Y.i/10-23-97.b/tlicaa.m
Meth Date : 23-Oct-1997 10:51
Cal Date : 23-OCT-97 09:56 Cal File: YP784.d
Als bottle: 5
Dil Factor: 1.000 Target Version: Target 2.20
Integrator: HP RTE Compound Sublist: CAA1.sub
Sample Type: mm5

	Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)	
*	1 1,4 Dichlorobenzene-d4	152.00	10.216(1.000)	457778	40.00		
*	2 Naphthalene-d8	136.00	12.754(1.000)	1474295	40.00		
*	3 Acenaphthene-d10	164.00	16.411(1.000)	864321	40.00		
*	4 Phenanthrene-d10	188.00	19.535(1.000)	1484212	40.00		
*	5 Chrysene-d12	240.00	25.261(1.000)	1946041	40.00		
*	6 Perylene-d12	264.00	29.404(1.000)	2631565	40.00		
$	7 2-Fluorophenol	112.00	8.089(0.792)	937	0.07	0.07	
$	8 Phenol-d5	99.00	9.446(0.925)	1511762	89.15	89.15	
$	9 2-Chlorophenol-d4	132.00	10.216(1.000)	467	0.02	0.02	
$	10 1,2-Dichlorobenzene-d4	Compound Not Detected.					
$	11 Nitrobenzene-d5	82.00	11.286(0.885)	946009	63.91	63.91	
$	12 1,3,5-Trichlorobenzene-d3	185.00	11.973(0.939)	774522	56.34	56.34	
$	13 1,4-Dibromobenzene-d4	240.00	12.861(1.259)	859747	79.94	79.94	
$	14 2-Fluorobiphenyl	172.00	15.000(0.914)	2092326	82.51	82.51	
$	15 2,4,6-Tribromophenol	329.80	18.056(1.100)	694334	120.88	120.88	
$	16 Anthracene-d10	188.00	19.651(1.006)	3687417	93.40	93.40	
$	17 Pyrene-d10	212.00	22.528(0.892)	4618603	76.00	76.00	
$	18 Terphenyl-d14	244.00	22.896(0.906)	3588450	91.54	91.54	
	20 n-Nitrosodimethylamine	74.00	~~4.724(0.462)~~	~~27108~~	~~4.05~~	~~4.05~~	FP salt
	21 Cumene	105.00	8.713(0.853)	14645	0.55	0.55	
	23 Phenol	94.00	9.475(0.927)	526594	35.14	35.14	
	24 Aniline	Compound Not Detected.					
	27 bis-(2-Chloroethyl)ether	63.00	~~9.781(0.957)~~	~~5371~~	~~0.57~~	~~0.57~~	FP salt
	28 Benzyl Chloride	91.00	~~10.201(0.999)~~	~~33441~~	~~0.91~~	~~0.91~~	
	29 1,4-Dichlorobenzene	146.00	10.244(1.003)	12592	0.82	0.82	
	31 2-Methylphenol	108.00	~~10.650(1.043)~~	~~9542~~	~~0.81~~	~~0.81~~	FP salt
	32 3/4-Methylphenol	108.00	~~10.950(0.859)~~	~~19287~~	~~1.47~~	~~1.47~~	
	33 Acetophenone	105.00	10.986(1.075)	151270	8.93	8.93	
	34 n-Nitrosomorpholine	56.00	~~11.250(1.101)~~	~~6437~~	~~0.93~~	~~0.93~~	FP salt
	35 o-Toluidine	106.00	~~10.971(1.074)~~	~~113817~~	~~5.97~~	~~5.97~~	
	36 Hexachloroethane	Compound Not Detected.					

Data Review: salt
Date: 11/12/97

Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	CONCENTRATIONS FINAL (ug)	
37 Nitrobenzene	77.00	~~11.321(0.888)~~	~~46630~~	~~2.44~~	~~2.44~~	FP 8qH
38 N,N-Dimethylaniline	120.00	~~11.257(0.883)~~	~~39471~~	~~1.99~~	~~1.99~~	
39 1,2-Dibromo-3-chloropropane	Compound Not Detected.					
40 Isophorone	82.00	~~11.801(0.925)~~	~~23985~~	~~1.05~~	~~1.05~~	FP 8qH
41 o-Anisidine	Compound Not Detected.					
42 1,4-Phenylenediamine	108.00	~~13.636(1.069)~~	~~1338~~	~~0.09~~	~~0.09~~	FP 8qH
43 1,2,4-Trichlorobenzene	180.00	~~12.639(0.991)~~	~~14782~~	~~1.23~~	~~1.23~~	
44 Naphthalene	128.00	12.804(1.004)	1051943	30.32	30.32	
46 Hexachlorobutadiene	Compound Not Detected.					
47 N,N-Diethylaniline	134.00	~~13.119(1.284)~~	~~14470~~	~~0.74~~	~~0.74~~	FP 8qH
48 a,a,a-Trichlorotoluene	159.00	~~12.861(1.008)~~	~~311260~~	~~20.08~~	~~20.08~~	
49 Hydroquinone	110.00	~~13.521(1.060)~~	~~2404~~	~~0.18~~	~~0.18~~	
51 2-Chloroacetophenone	105.00	~~13.951(1.094)~~	~~7591~~	~~0.26~~	~~0.26~~	
52 Hexachlorocyclopentadiene	Compound Not Detected.					
53 2,4,6-Trichlorophenol	196.00	14.799(0.902)	3068	0.39	0.39	
54 2,4,5-Trichlorophenol	196.00	14.799(0.902)	3068	~~0.36~~	~~0.36~~	FP 8qH
60 Biphenyl	154.00	15.202(0.926)	35873	1.21	1.21	
61 Dimethylphthalate	163.00	15.835(0.965)	45791	1.89	1.89	
62 2,4-Dinitrophenol	184.00	~~16.736(1.020)~~	~~1982~~	~~0.73~~	~~0.73~~	FP 8qH
63 4-Nitrophenol	139.00	~~16.620(1.013)~~	~~7936~~	~~1.35~~	~~1.35~~	
64 2,4-Dinitrotoluene	165.00	~~16.800(1.024)~~	~~8261~~	~~1.16~~	~~1.16~~	
65 Dibenzofuran	168.00	~~16.844(1.026)~~	~~19090~~	~~0.63~~	~~0.63~~	
66 Di-n-butylphthalate	149.00	20.769(1.063)	464077	8.83	8.83	
67 4,6-Dinitro-2-methylphenol	198.00	~~17.731(1.080)~~	~~658~~	~~0.18~~	~~0.18~~	FP 8qH
68 Trifluralin	Compound Not Detected.					
69 Hexachlorobenzene	283.80	~~19.016(0.973)~~	~~1065~~	~~0.09~~	~~0.09~~	FP 8qH
70 4-Aminobiphenyl	169.00	~~19.182(0.982)~~	~~3087~~	~~0.11~~	~~0.11~~	
71 Pentachlorophenol	Compound Not Detected.					
72 Pentachloronitrobenzene	Compound Not Detected.					
73 4-Nitrobiphenyl	152.00	~~20.105(1.029)~~	~~929~~	~~0.08~~	~~0.08~~	FP 8qH
74 Benzidine	184.00	~~22.528(0.892)~~	~~48862~~	~~1.26~~	~~1.26~~	
75 4,4'-Methylenedianiline	198.00	~~22.557(0.893)~~	~~4041~~	~~0.25~~	~~0.25~~	
77 Dimethylaminoazobenzene	120.00	~~22.889(0.906)~~	~~58091~~	~~3.25~~	~~3.25~~	
78 3,3'-Dimethylbenzidine	212.00	~~23.877(0.945)~~	~~727~~	~~0.02~~	~~0.02~~	
80 3,3'-Dimethoxybenzidine	Compound Not Detected.					
81 3,3'-Dichlorobenzidine	Compound Not Detected.					
82 Methylene bis-chloroaniline	Compound Not Detected.					
83 bis(2-Ethylhexyl)phthalate	149.00	25.333(1.003)	941724	20.26	20.26	

Data File: /chem/Y.i/10-23-97.b/YP789.d

Date : 23-OCT-97 14:21

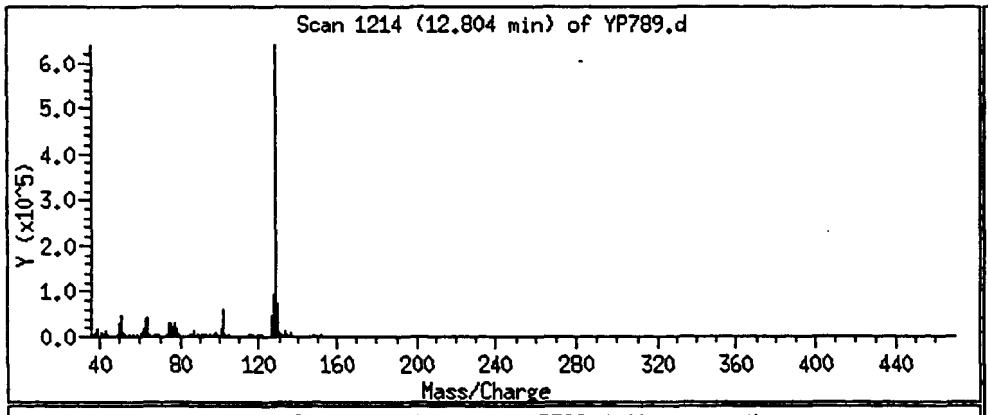
Instrument : Y.i

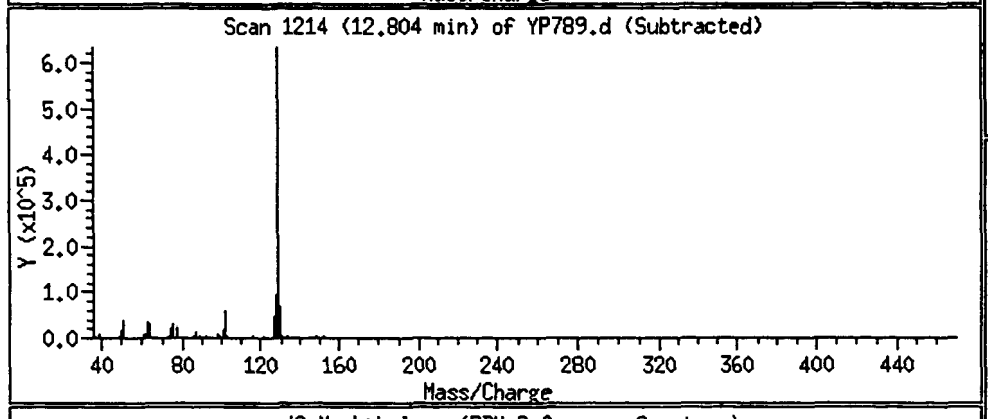
Sample ID : SO-MM5-2-17

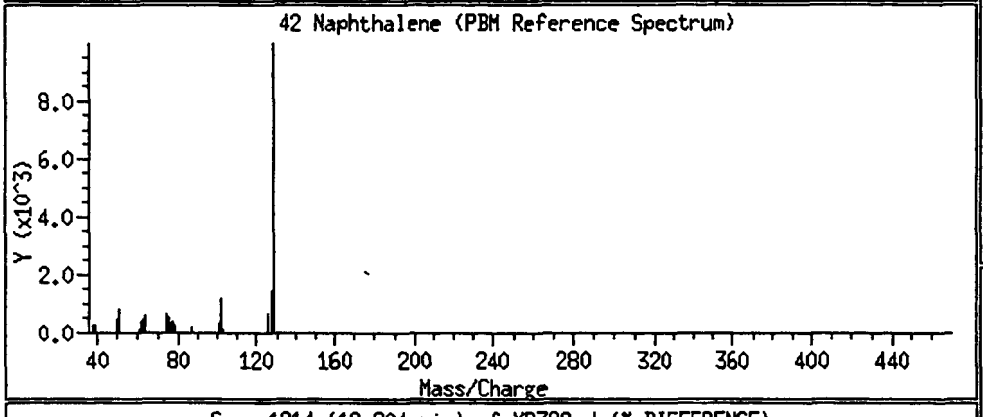
Column phase : DB-5 Column diameter : 0.32

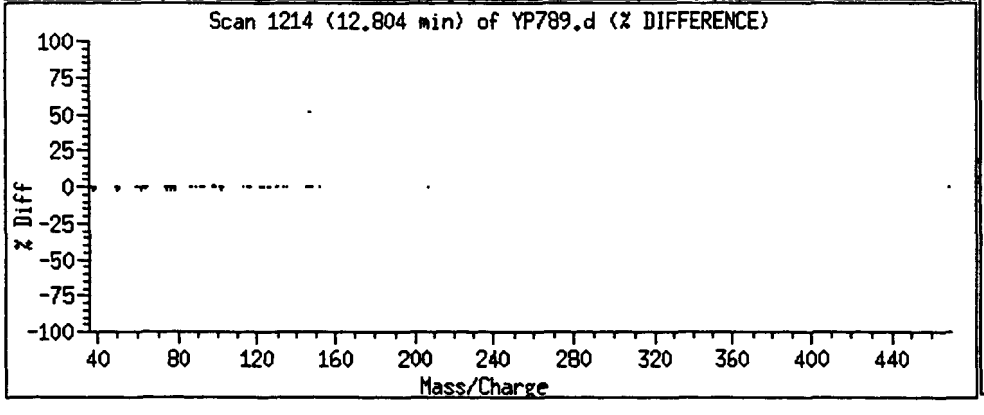
Volume Injected (uL) : 1.0

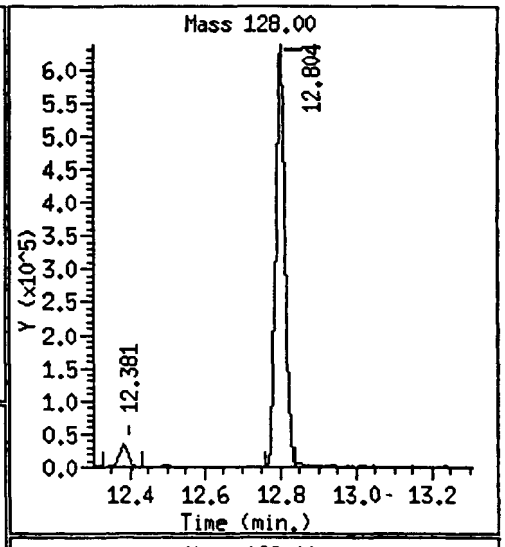
42 Naphthalene

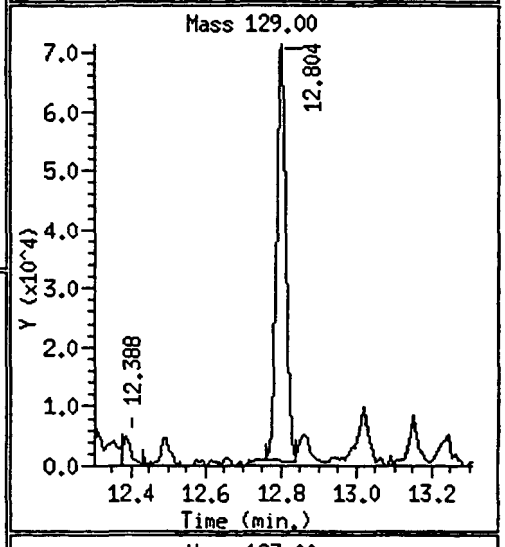


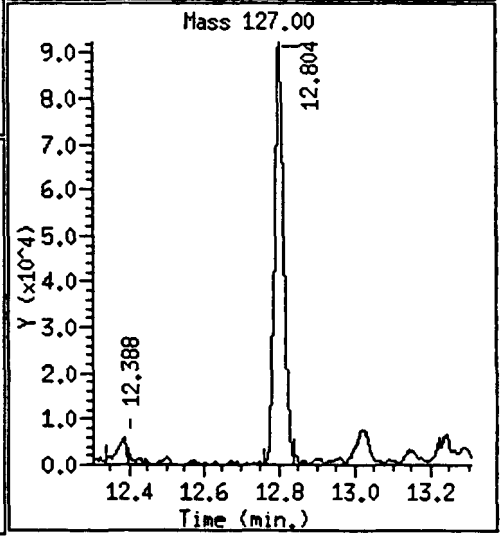












Data File: /chem/Y.i/10-23-97.b/YP789.d

Date : 23-OCT-97 14:21

Instrument : Y.i

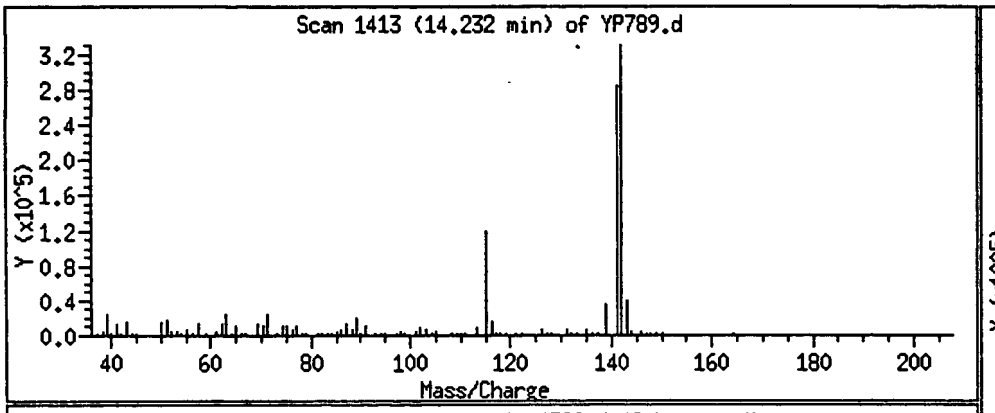
Sample ID : SO-MM5-2-17

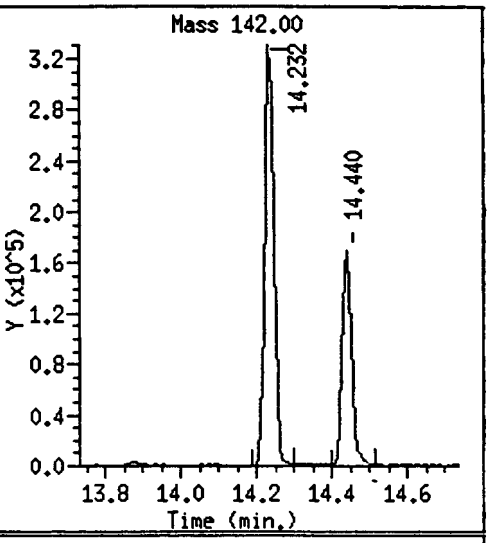
Column phase : DB-5

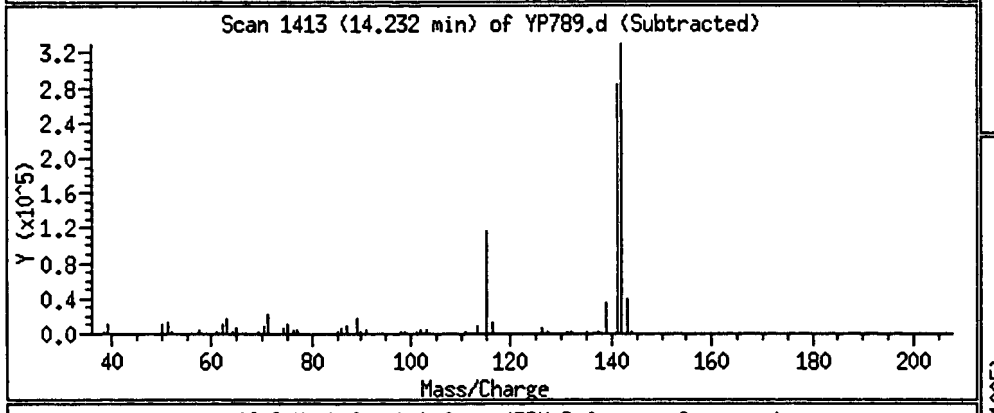
Column diameter : 0.32

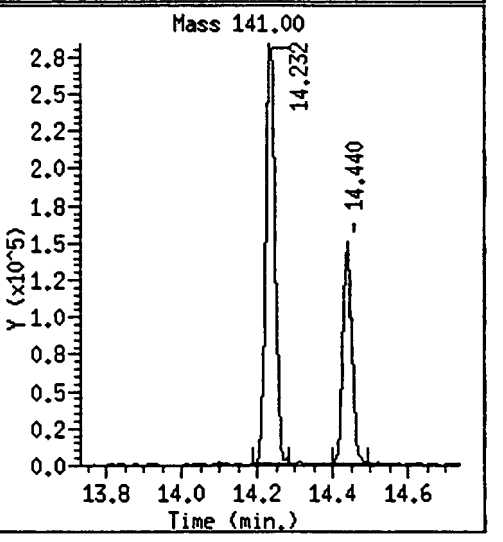
Volume Injected (uL) : 1.0

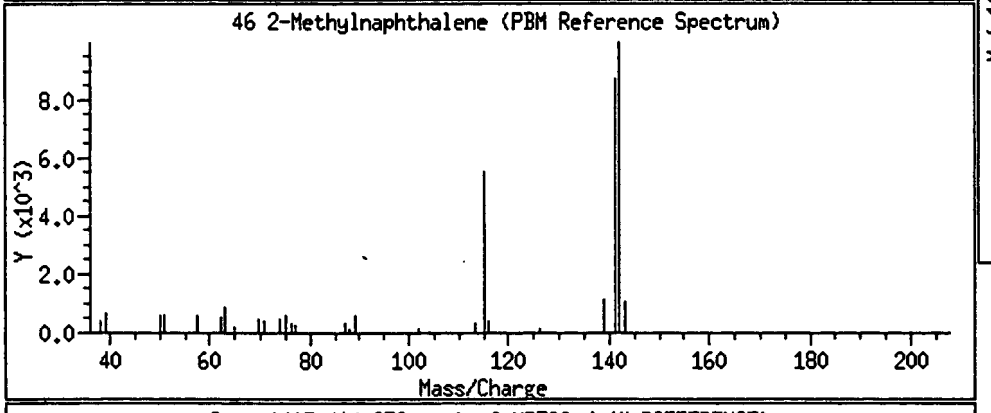
46 2-Methylnaphthalene

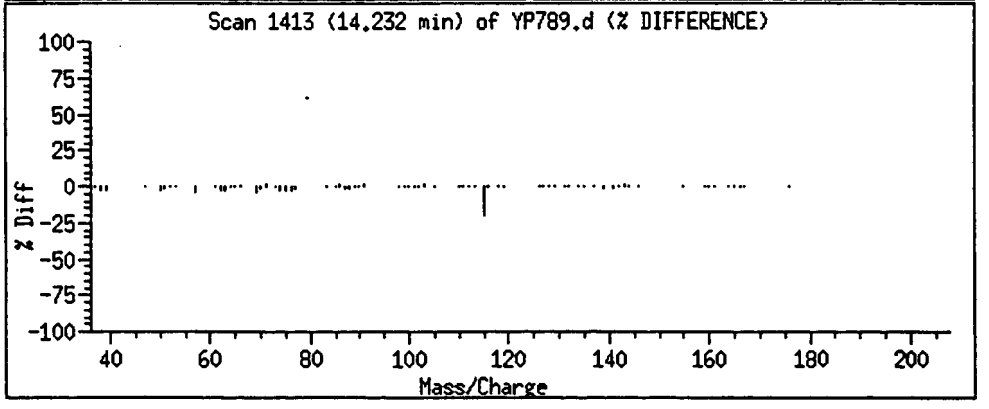












Data File: /chem/Y.i/10-23-97.b/YP789.d

Date : 23-OCT-97 14:21

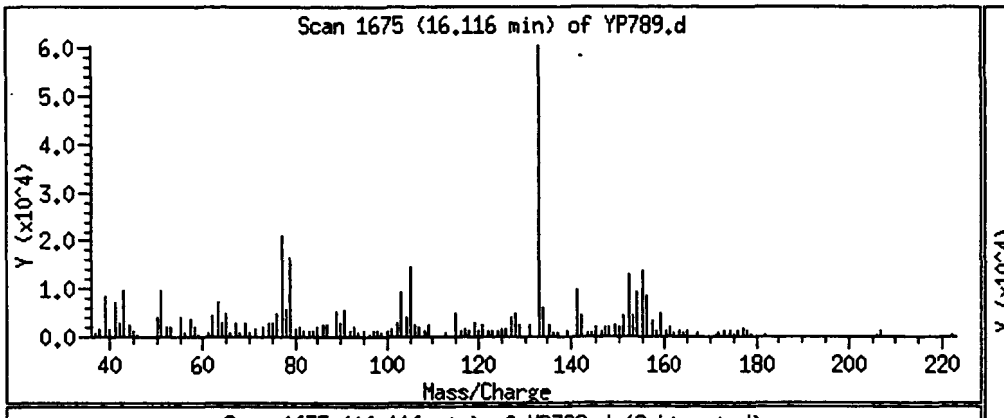
Instrument : Y.i

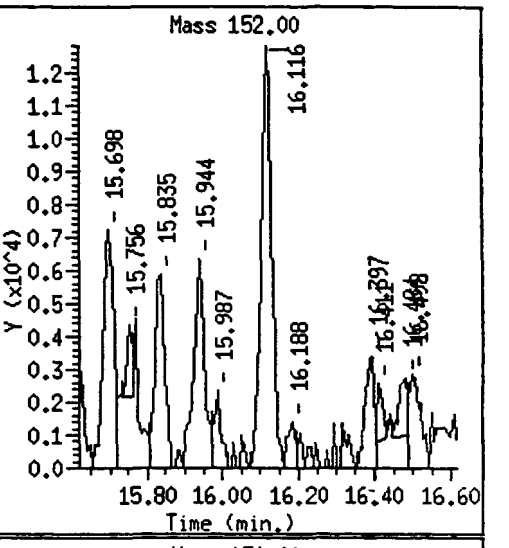
Sample ID : SO-MM5-2-17

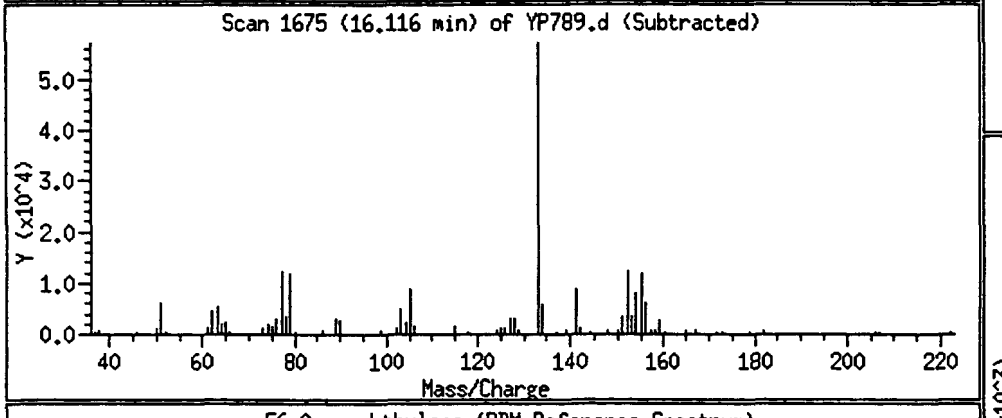
Column phase : DB-5 Column diameter : 0.32

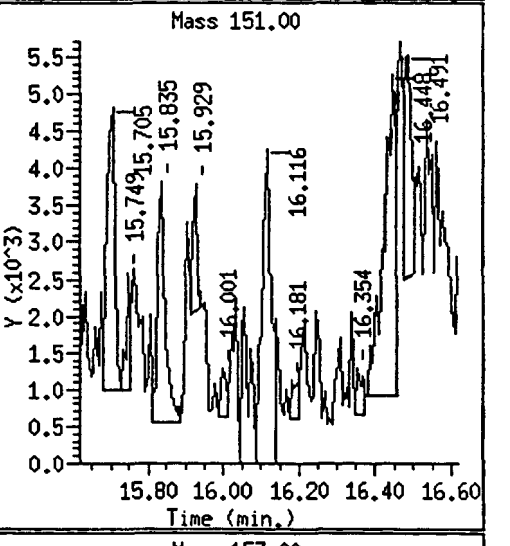
Volume Injected (uL) : 1.0

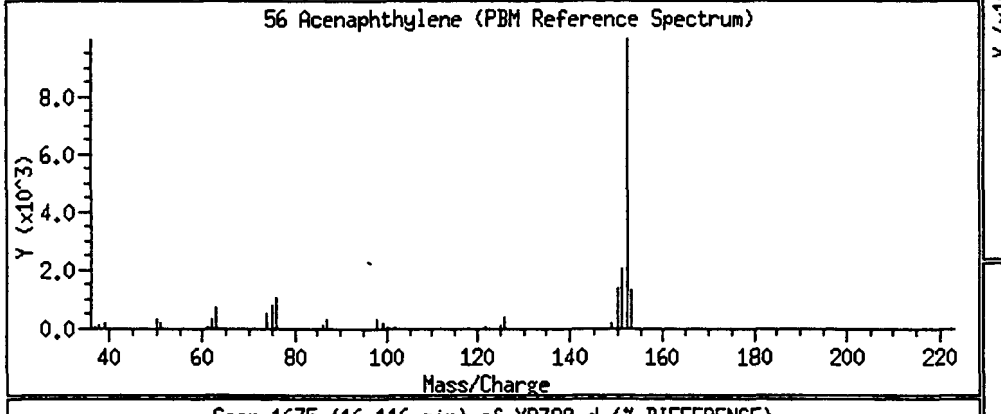
56 Acenaphthylene

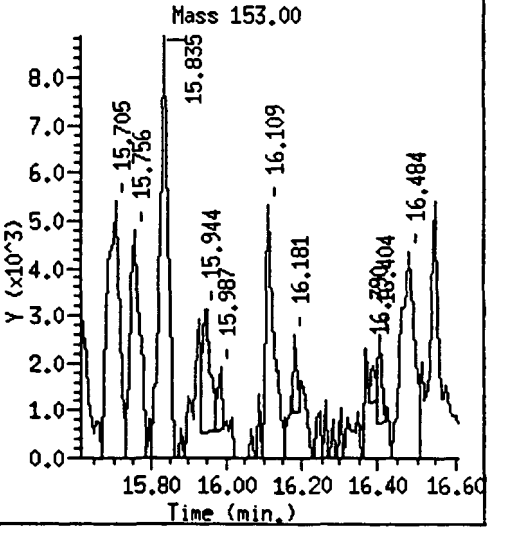


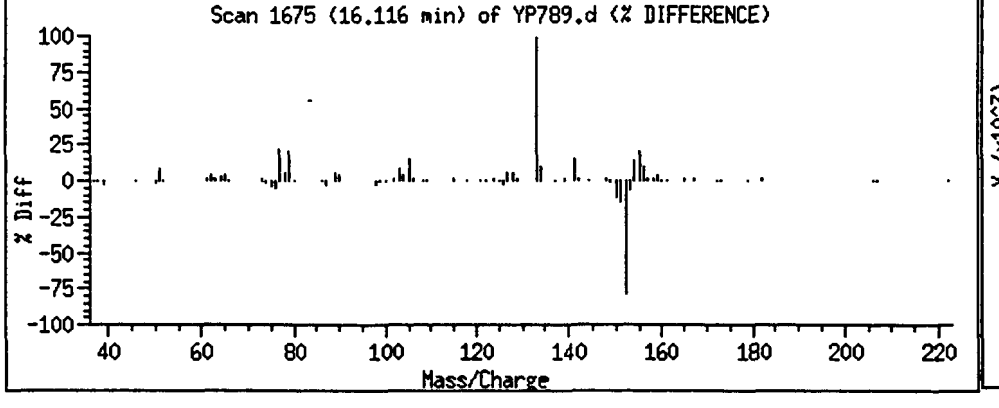












Data File: /chem/Y.i/10-23-97.b/YP789.d

Date : 23-OCT-97 14:21

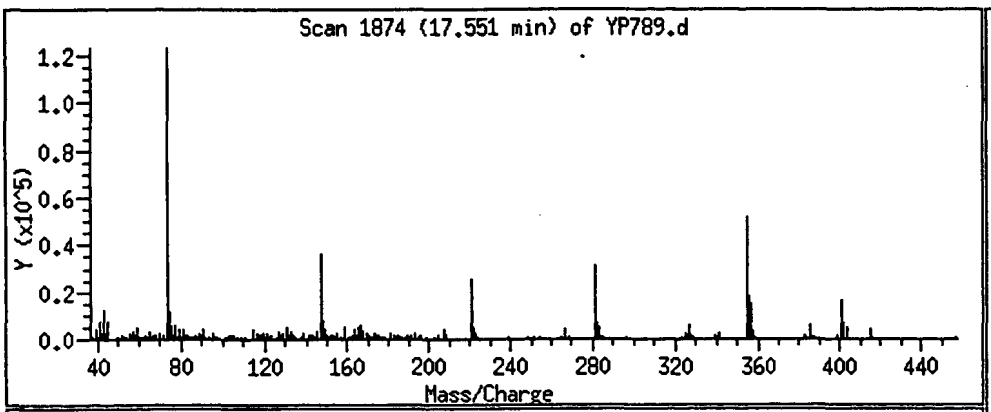
Instrument : Y.i

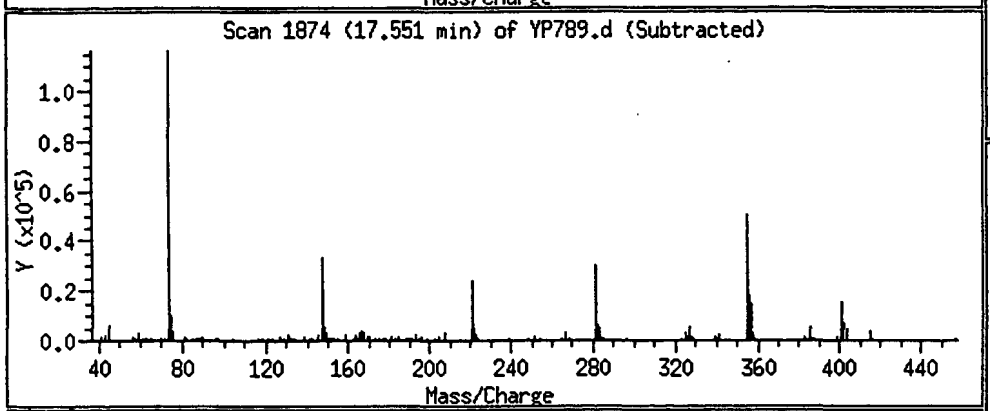
Sample ID : SO-MM5-2-17

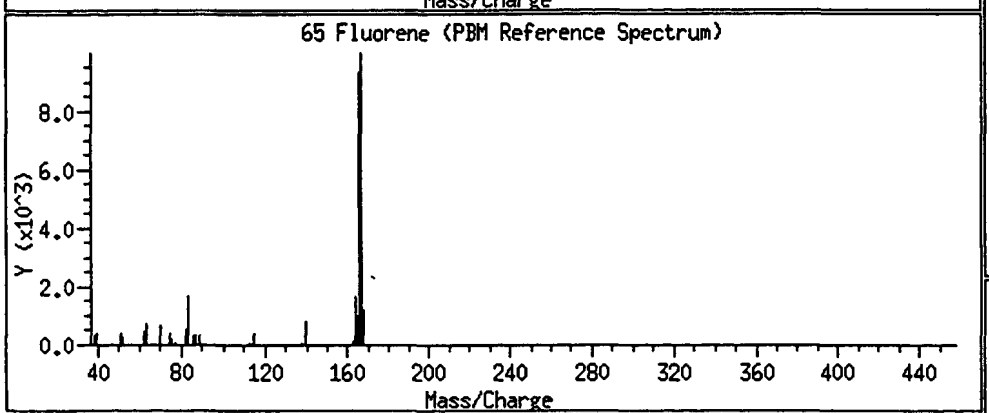
Column phase : DB-5 Column diameter : 0.32

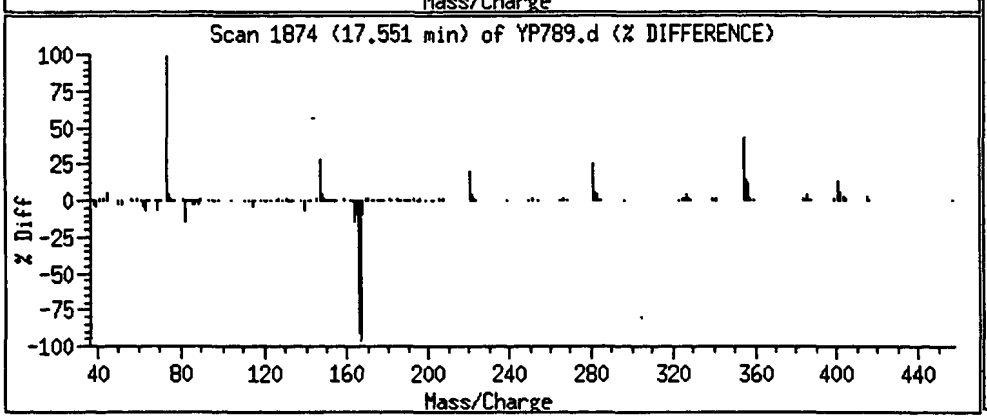
Volume Injected (uL) : 1.0

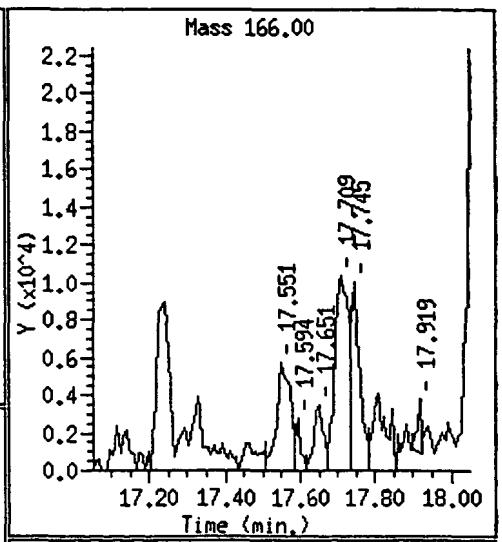
65 Fluorene

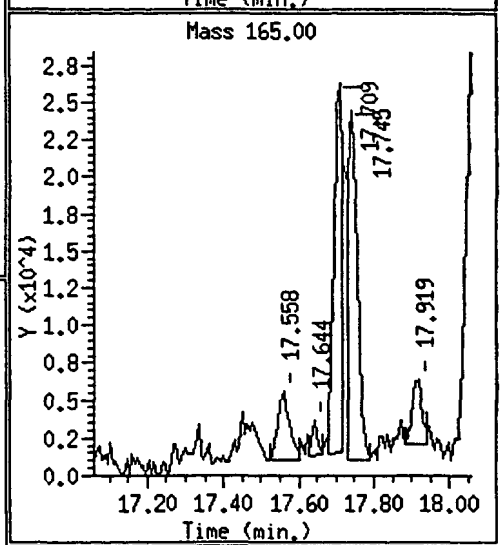


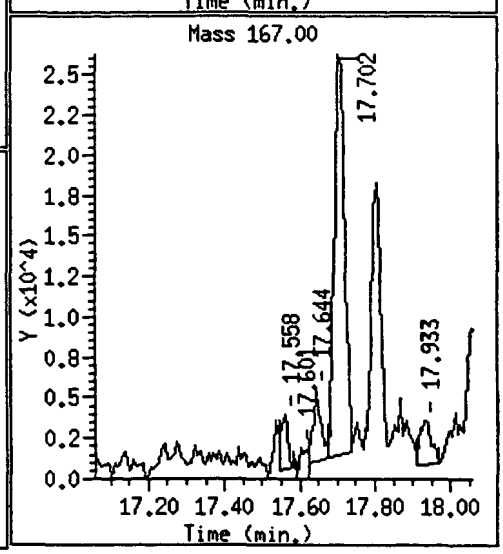












Data File: /chem/Y.i/10-23-97.b/YP789.d

Date : 23-OCT-97 14:21

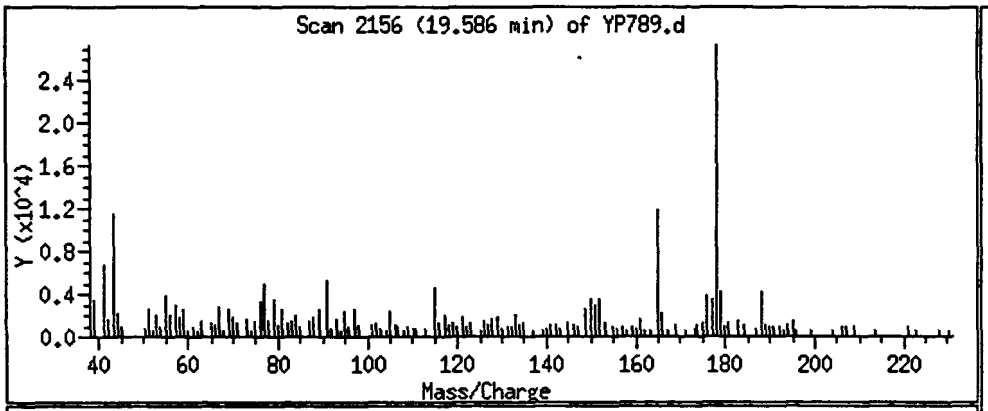
Instrument : Y.i

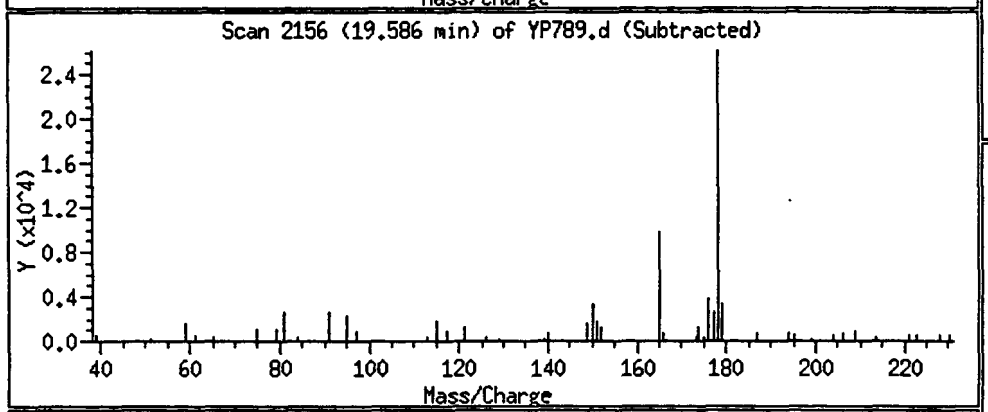
Sample ID : SO-MM5-2-17

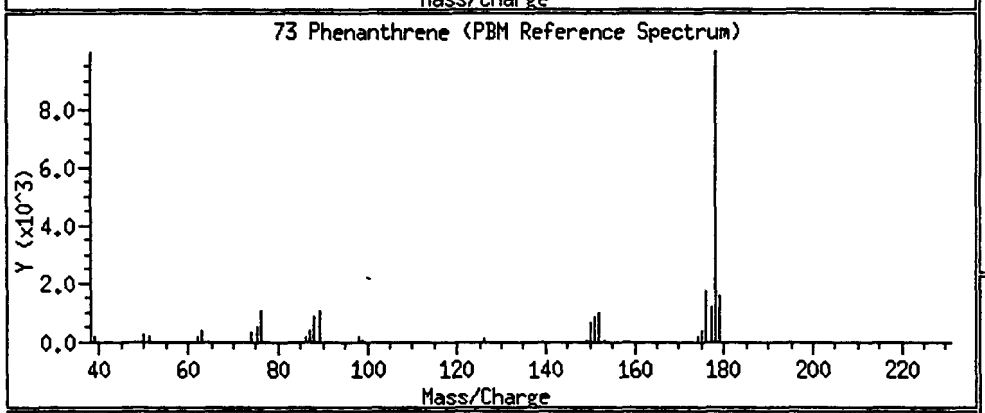
Column phase : DB-5 Column diameter : 0.32

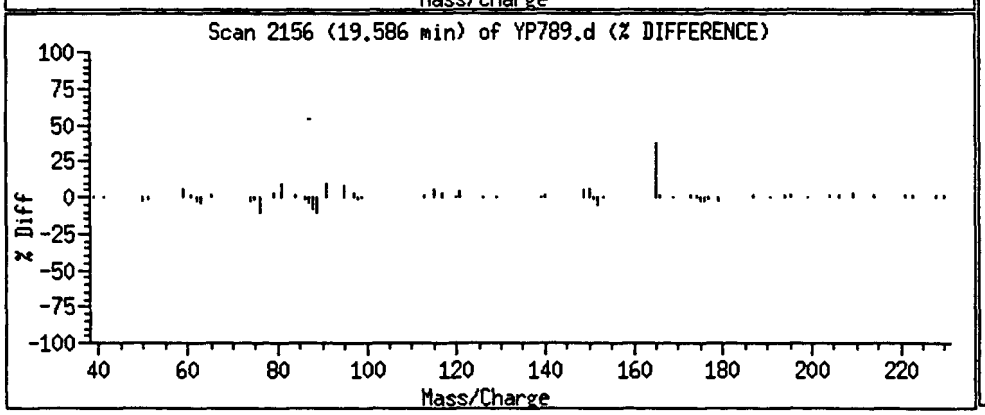
Volume Injected (uL) : 1.0

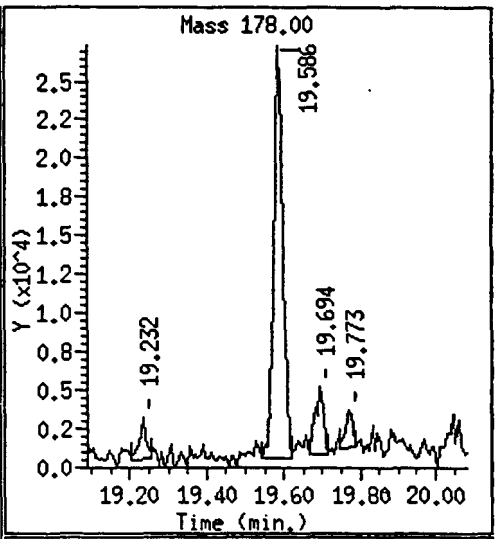
73 Phenanthrene

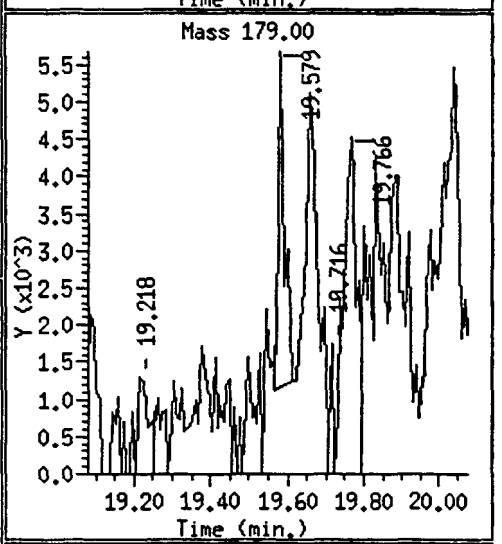


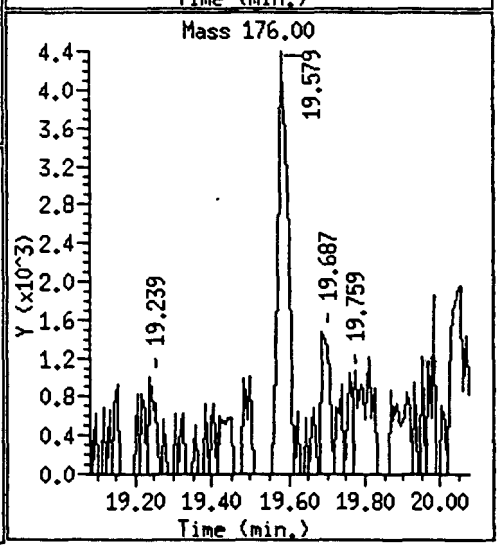












Data File: /chem/Y.i/10-23-97.b/YP789.d

Date : 23-OCT-97 14:21

Instrument : Y.i

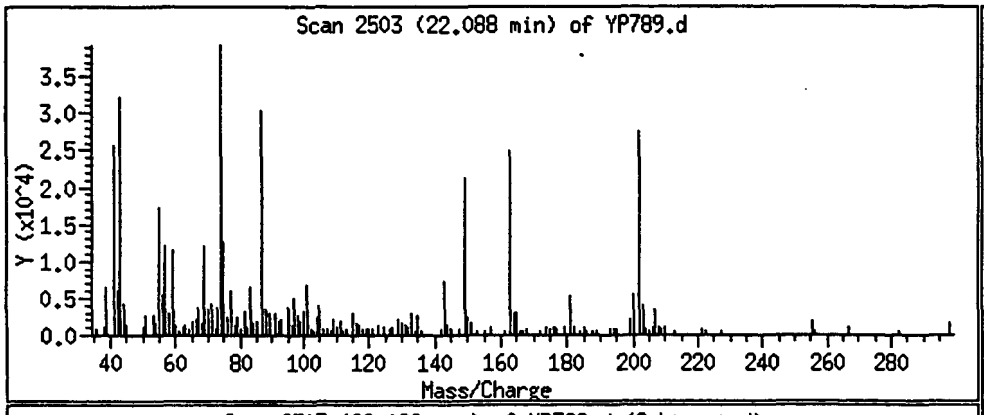
Sample ID : SO-MM5-2-17

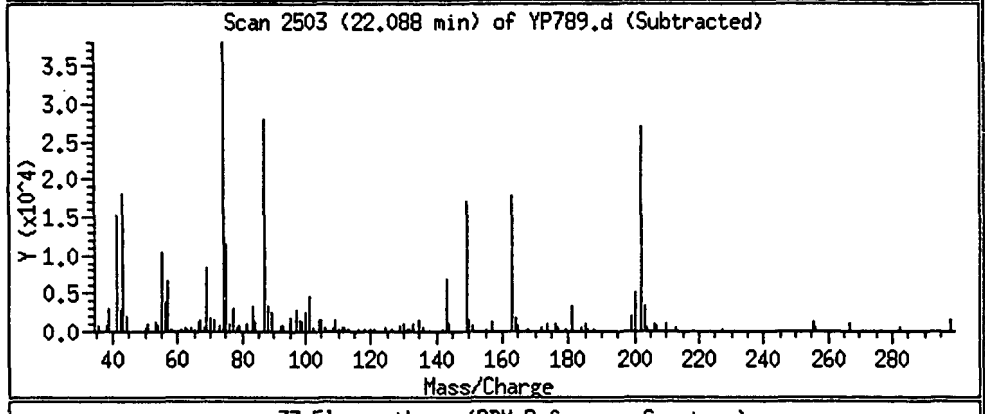
Column phase : DB-5

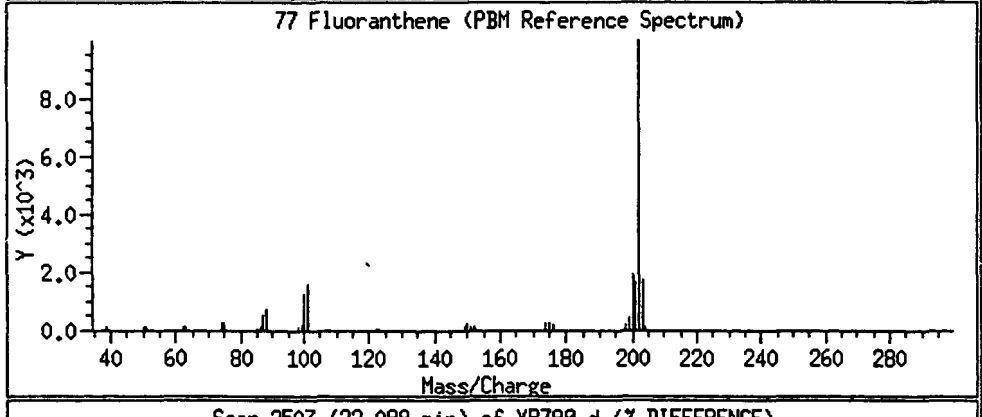
Column diameter : 0.32

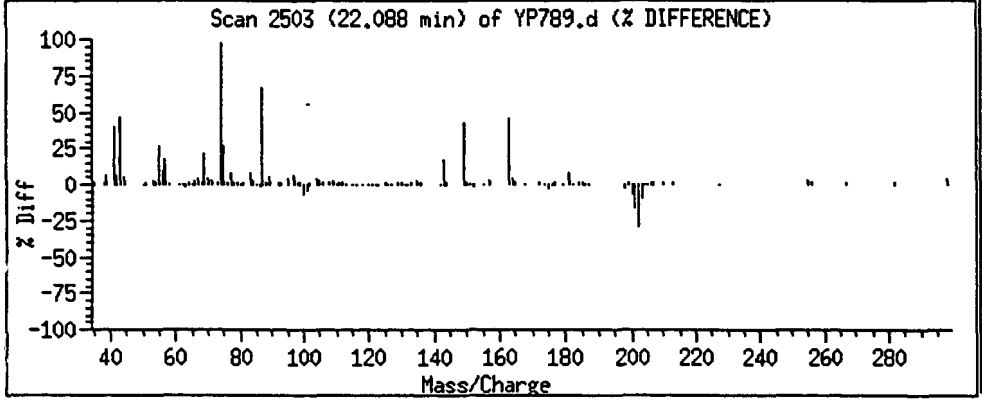
Volume Injected (uL) : 1.0

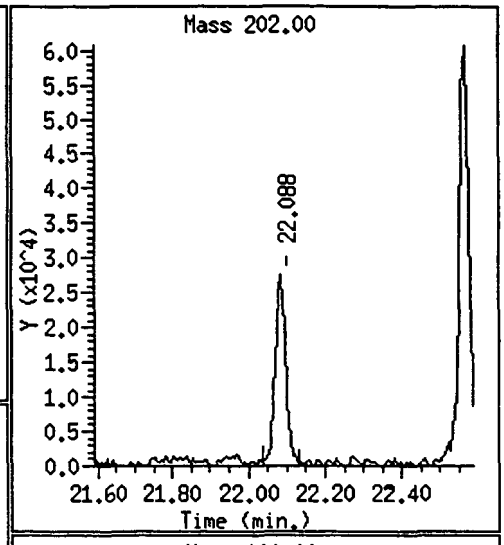
77 Fluoranthene

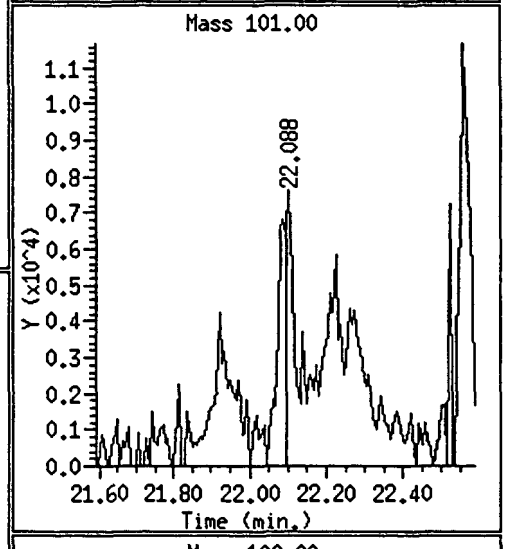


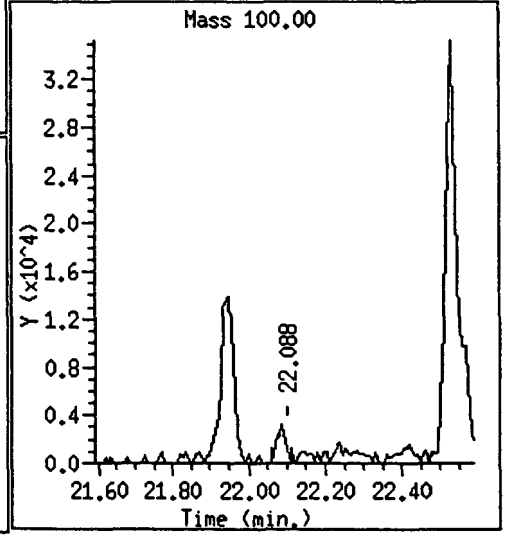












Data File: /chem/Y.i/10-23-97.b/YP789.d

Date : 23-OCT-97 14:21

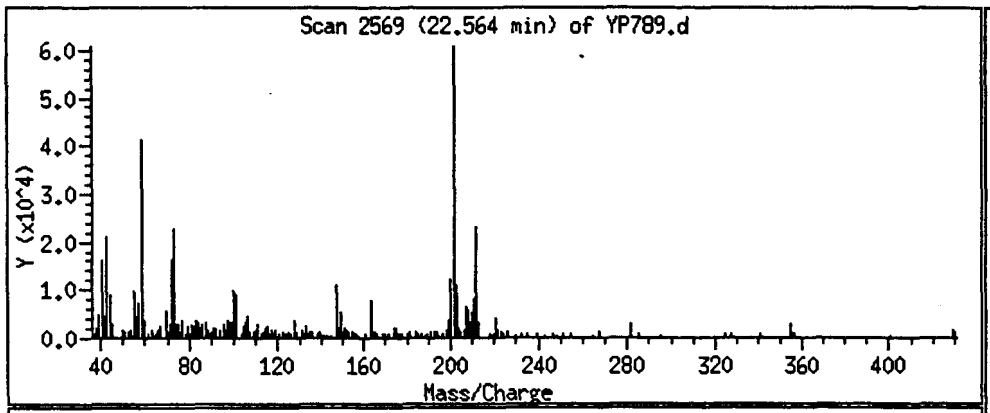
Instrument : Y.i

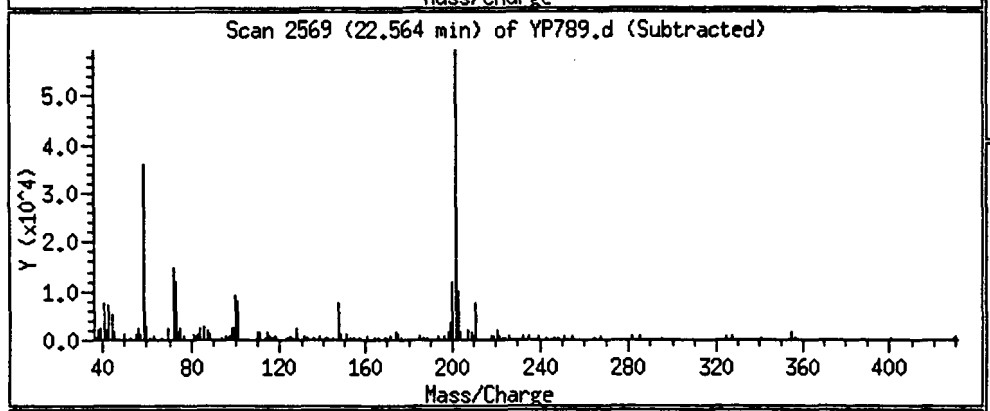
Sample ID : SO-MM5-2-17

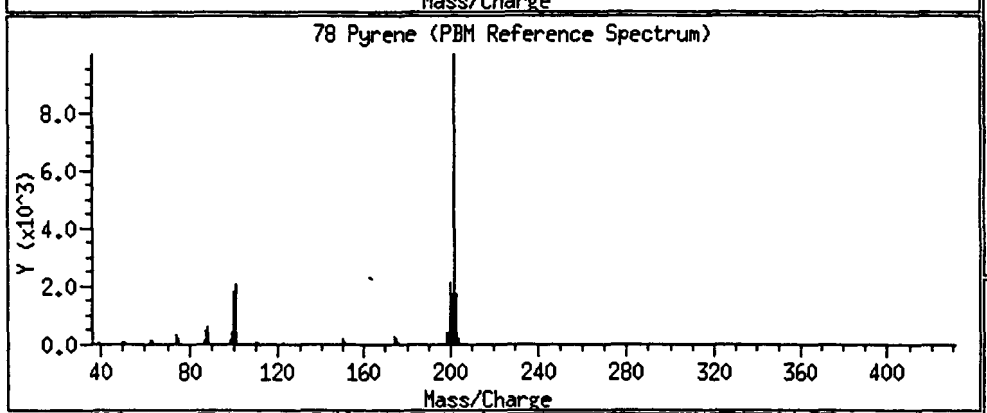
Column phase : DB-5 Column diameter : 0.32

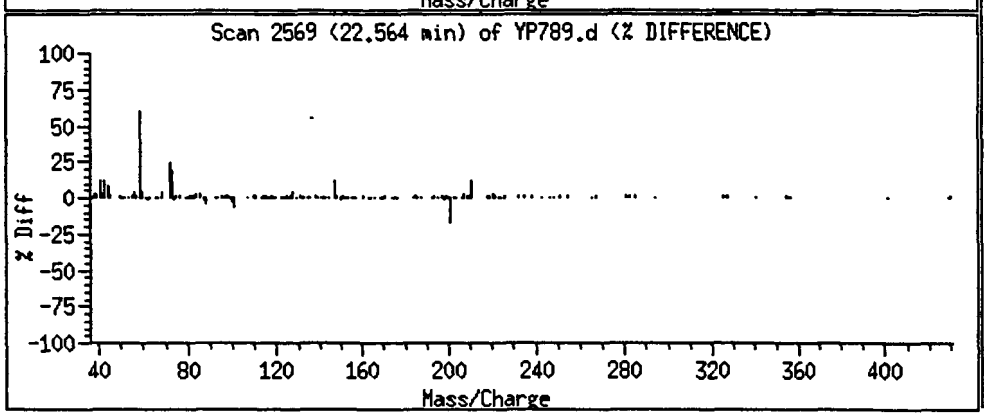
Volume Injected (uL) : 1.0

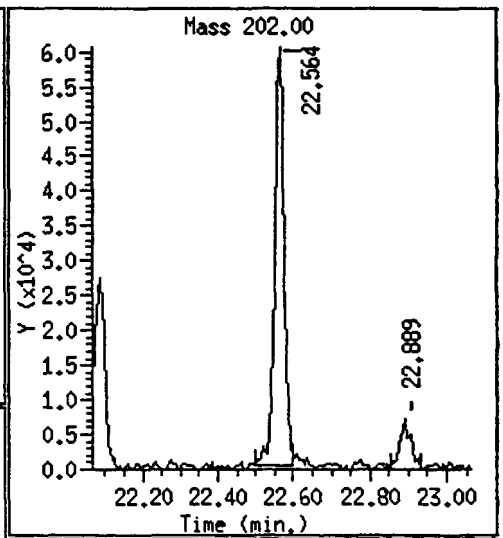
78 Pyrene

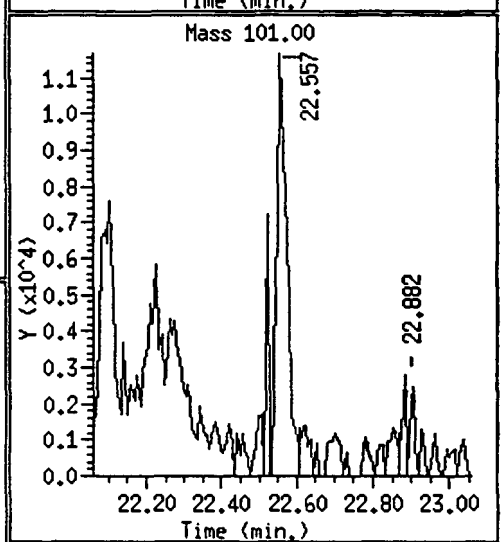


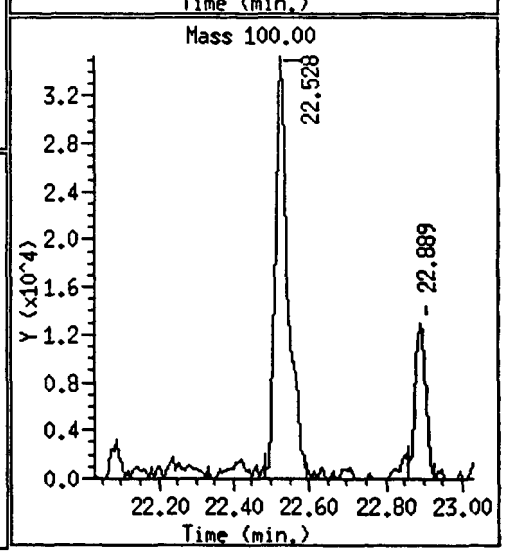












Data File: /chem/Y.i/10-23-97.b/CAA/YP789.d

Date : 23-OCT-97 14:21

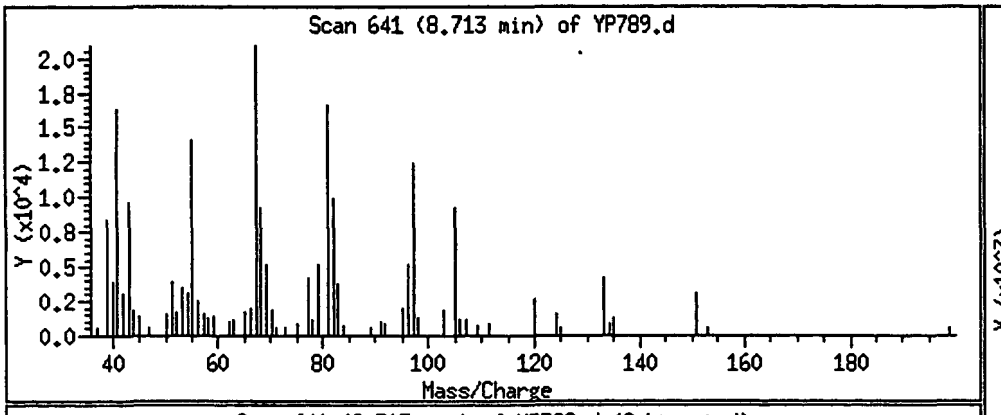
Instrument : Y.i

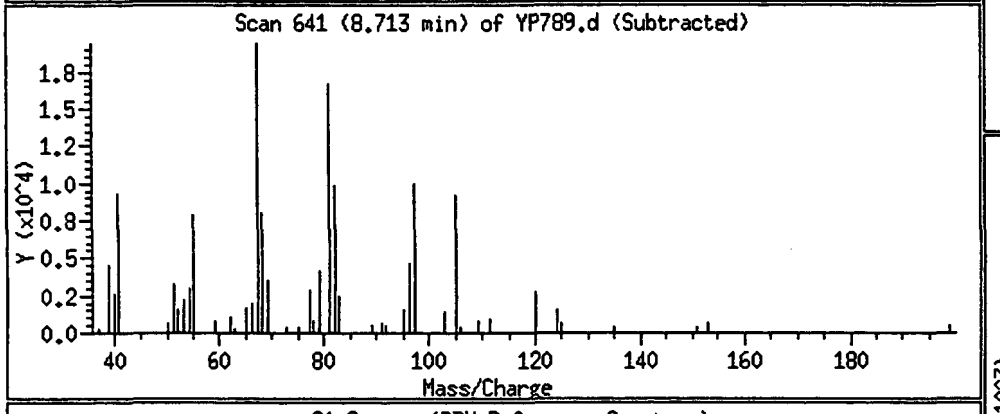
Sample ID : SO-MM5-2-17

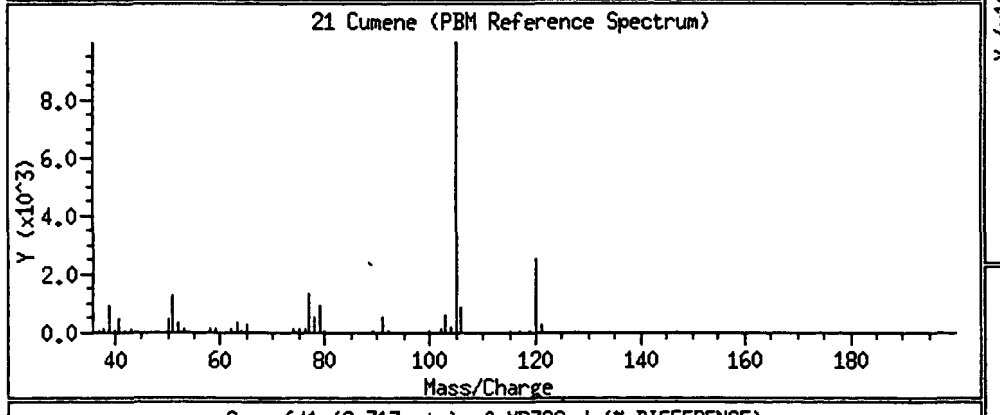
Column phase : DB.5-625 Column diameter : 0.32

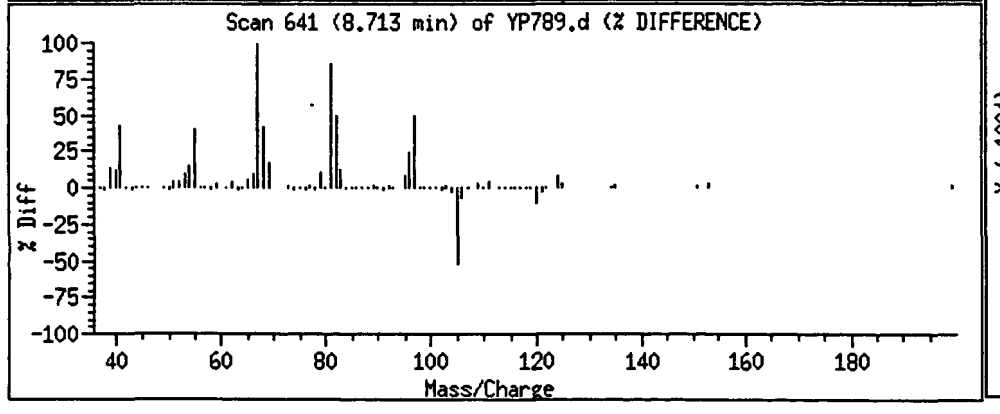
Volume Injected (uL) : 1.0

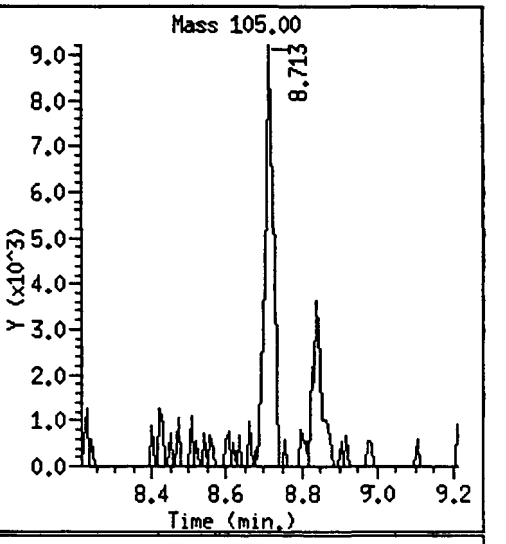
21 Cumene

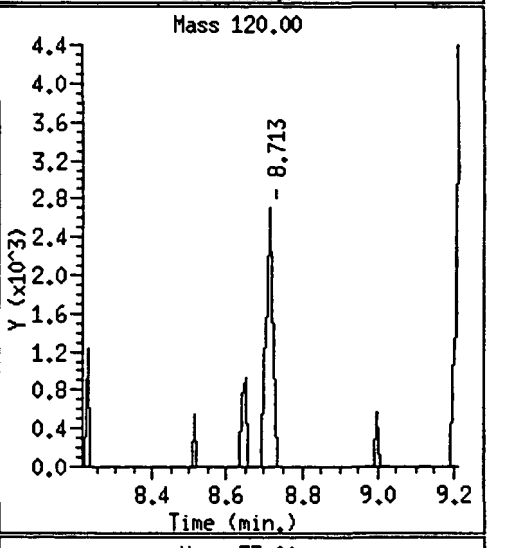


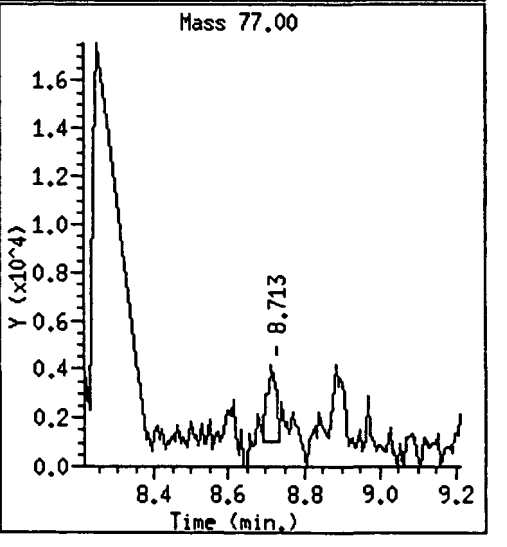












Data File: /chem/Y.i/10-23-97.b/CAA/YP789.d

Date : 23-OCT-97 14:21

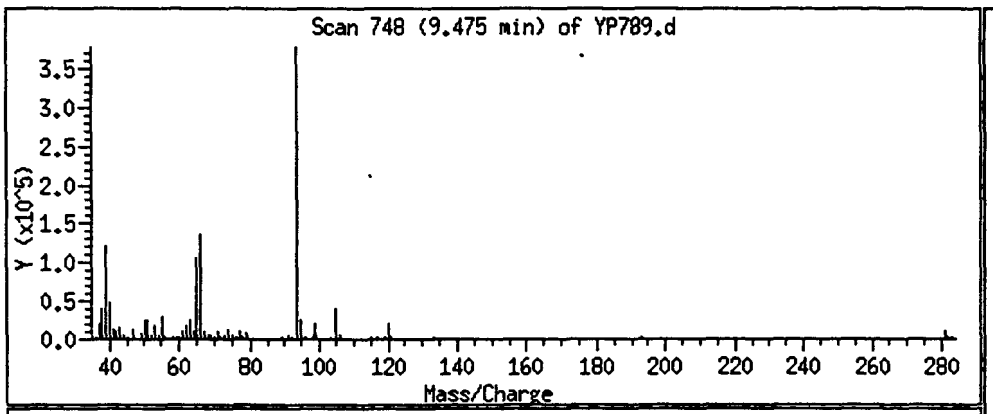
Instrument : Y.i

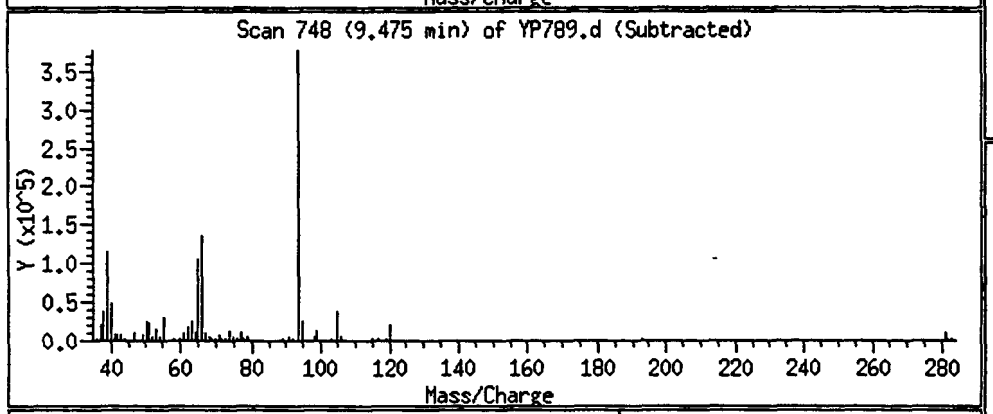
Sample ID : SO-MM5-2-17

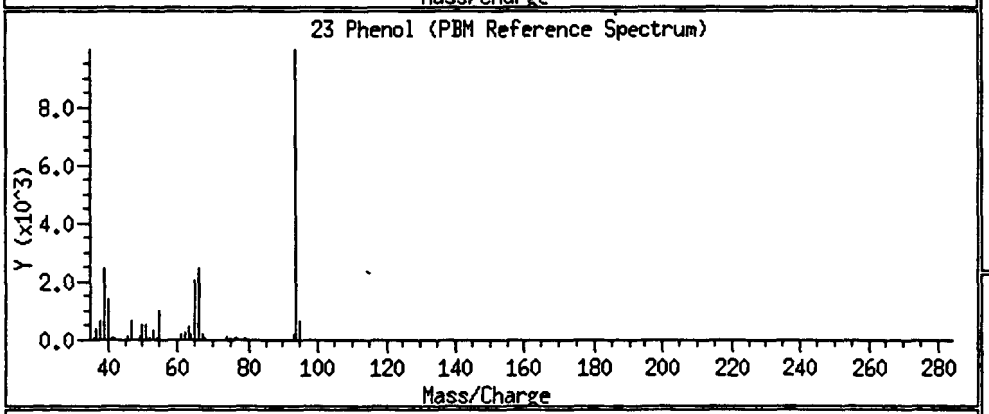
Column phase : DB.5-625 Column diameter : 0.32

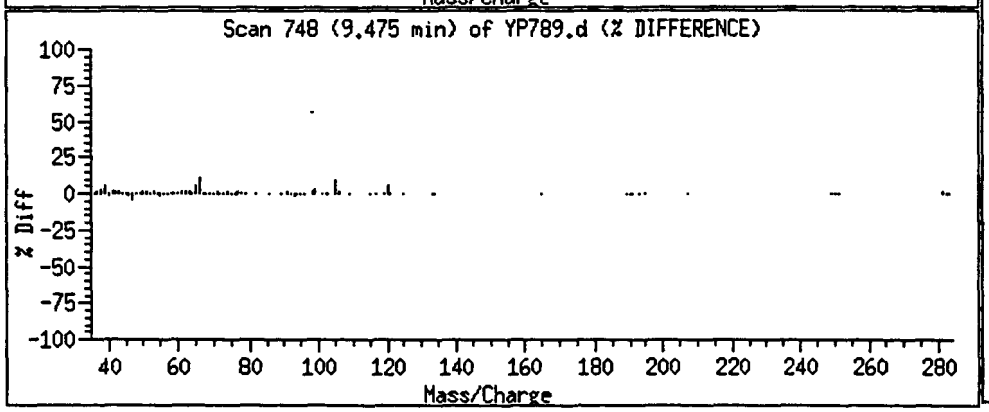
Volume Injected (uL) : 1.0

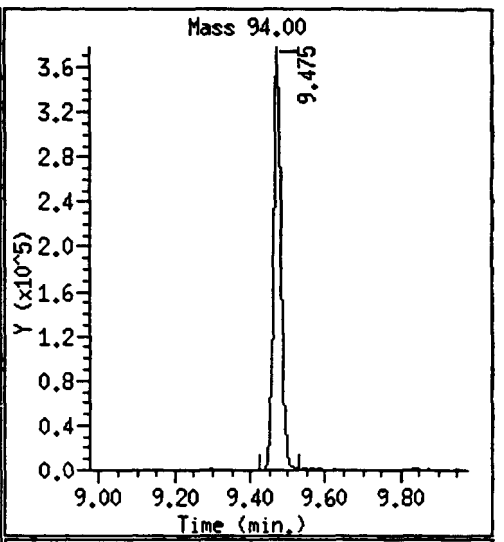
23 Phenol

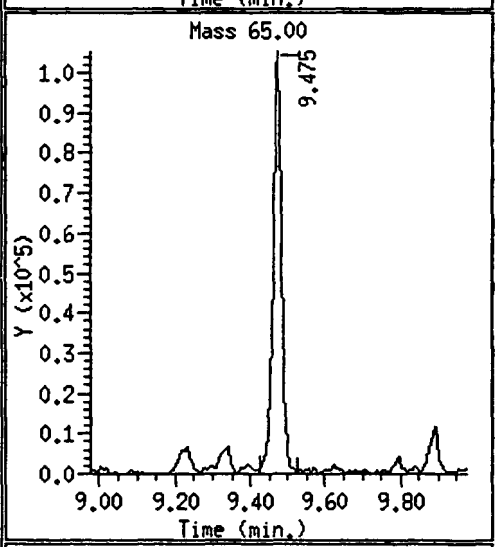


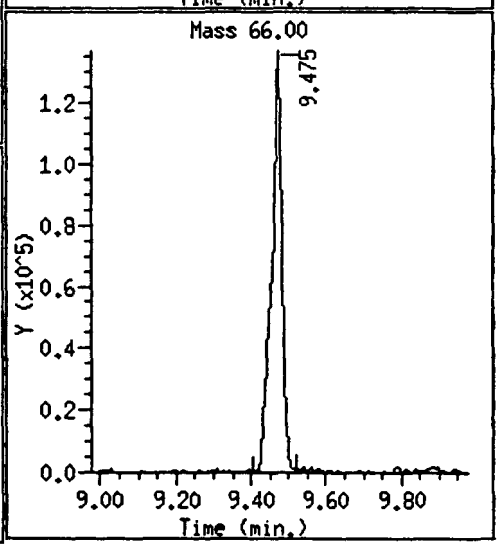












Data File: /chem/Y.i/10-23-97.b/CAA/YP789.d

Date : 23-OCT-97 14:21

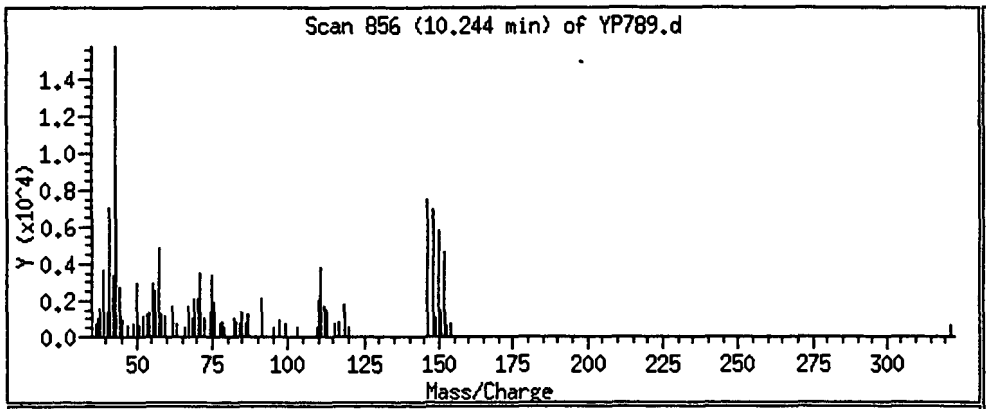
Instrument : Y.i

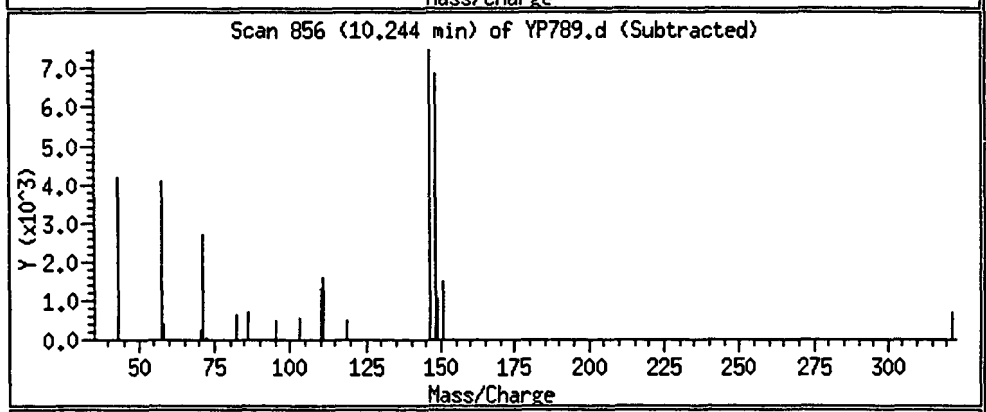
Sample ID : SO-MM5-2-17

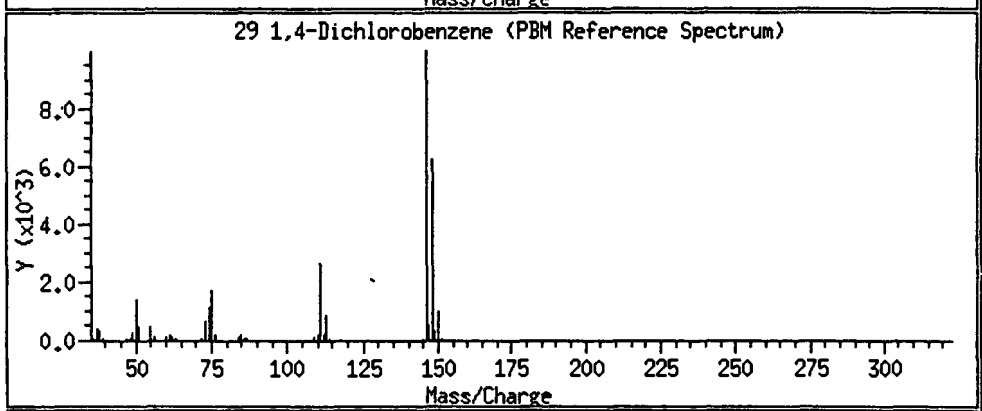
Column phase : DB.5-625 Column diameter : 0.32

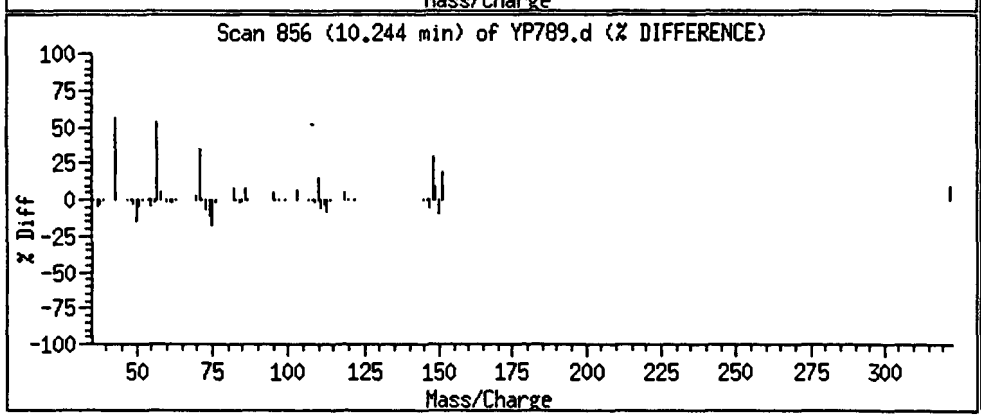
Volume Injected (uL) : 1.0

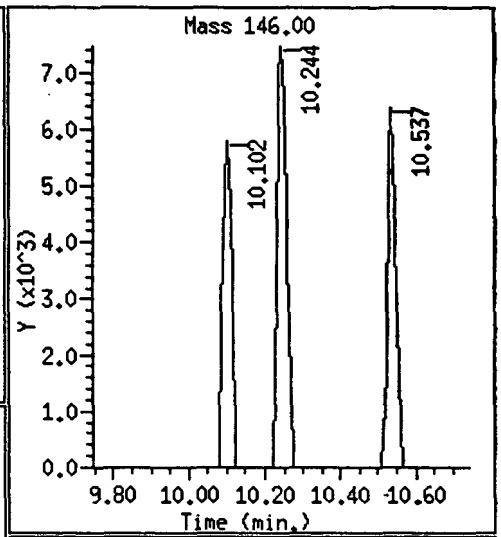
29 1,4-Dichlorobenzene

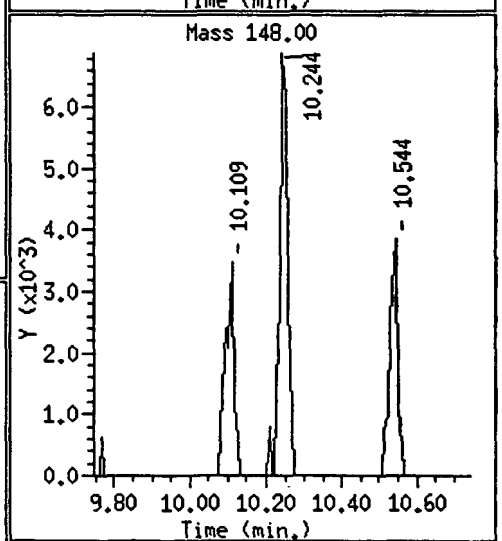


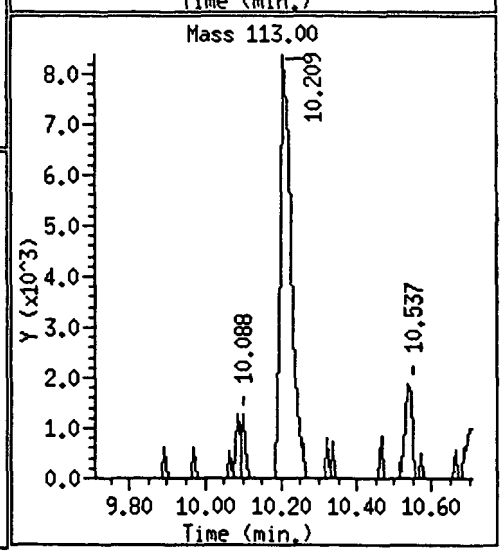












Data File: /chem/Y.i/10-23-97.b/CAA/YP789.d

Date : 23-OCT-97 14:21

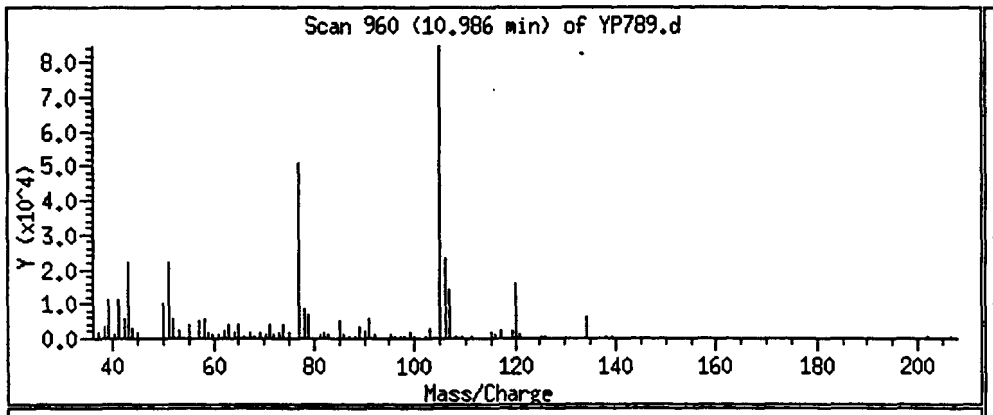
Instrument : Y.i

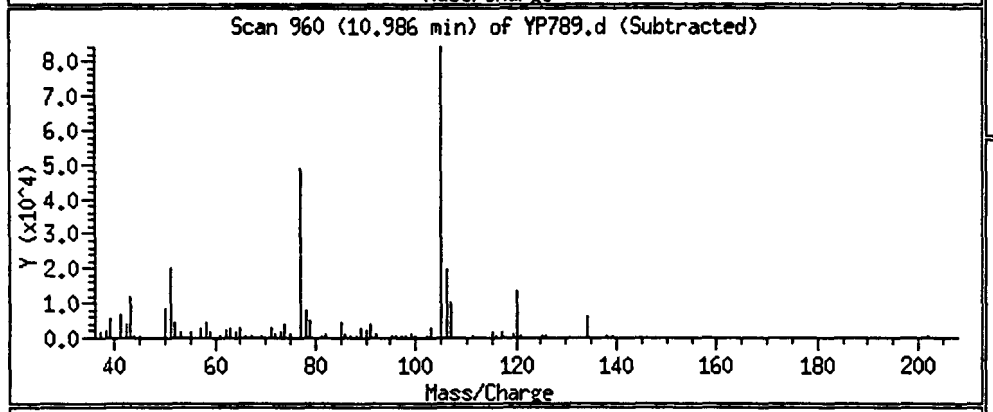
Sample ID : SO-MM5-2-17

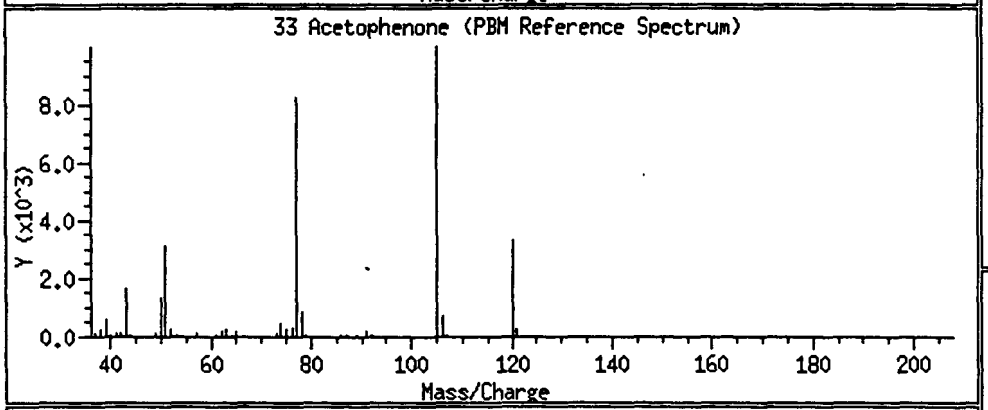
Column phase : DB.5-625 Column diameter : 0.32

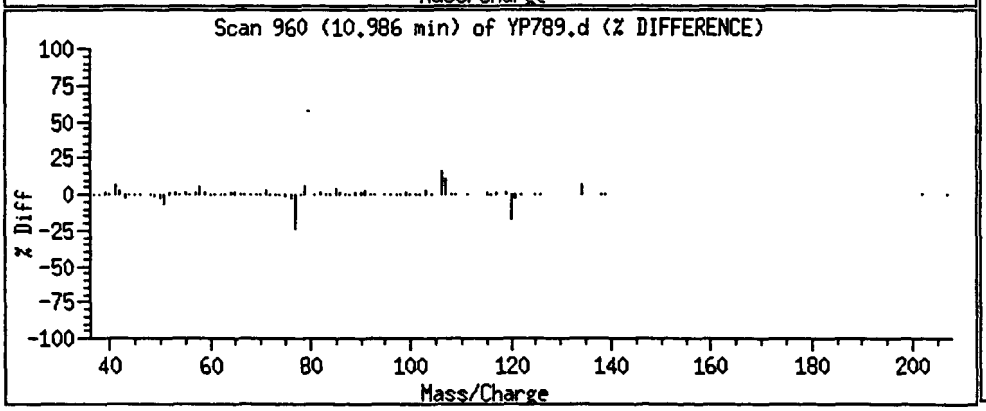
Volume Injected (uL) : 1.0

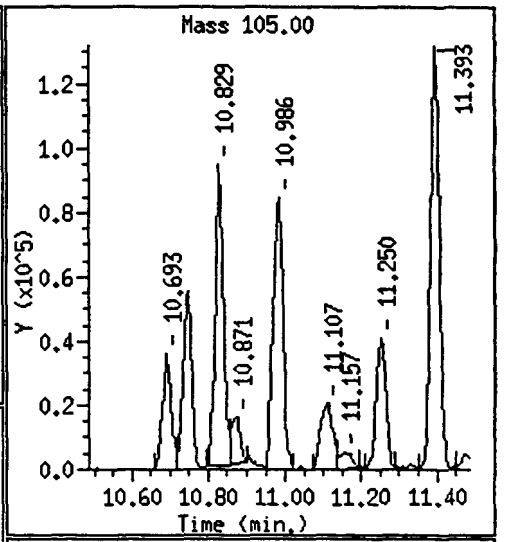
33 Acetophenone

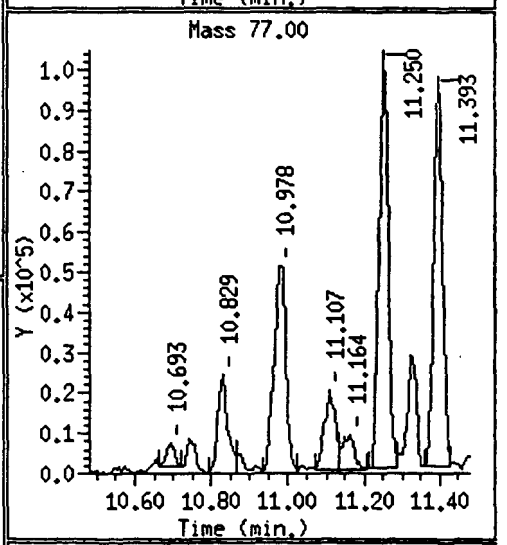


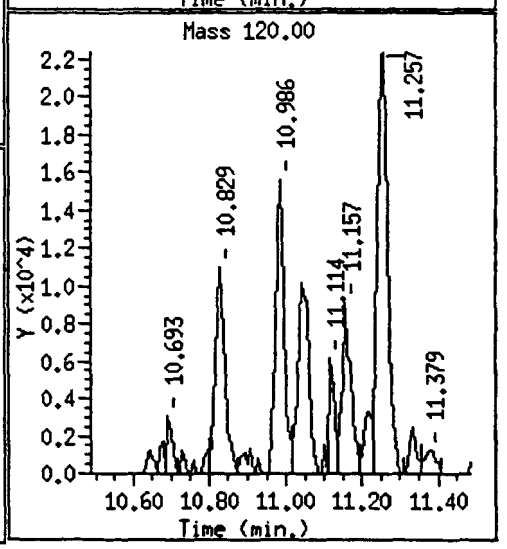












Data File: /chem/Y.i/10-23-97.b/CAA/YP789.d

Date : 23-OCT-97 14:21

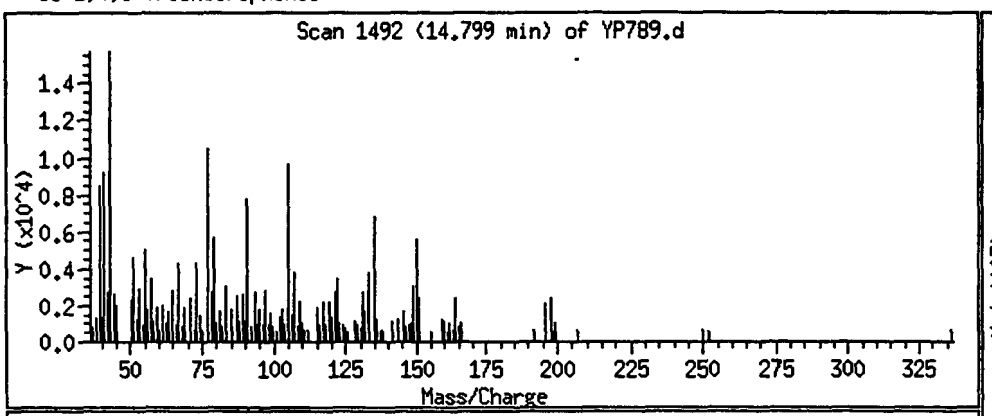
Instrument : Y.i

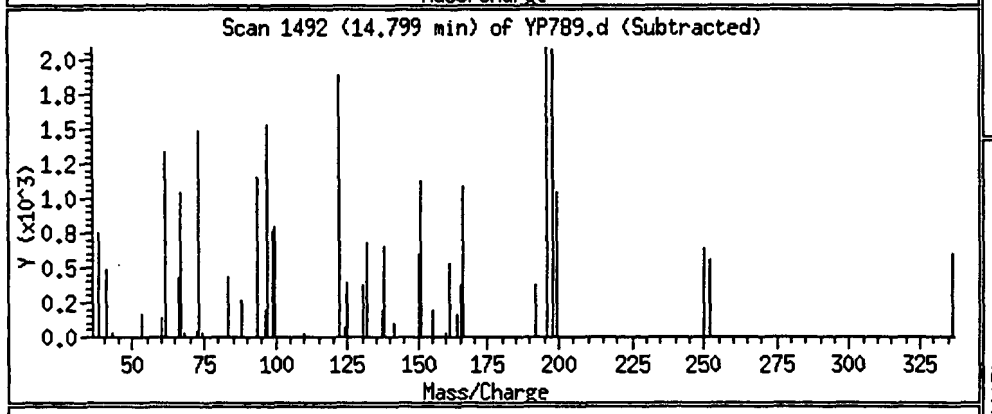
Sample ID : SO-MM5-2-17

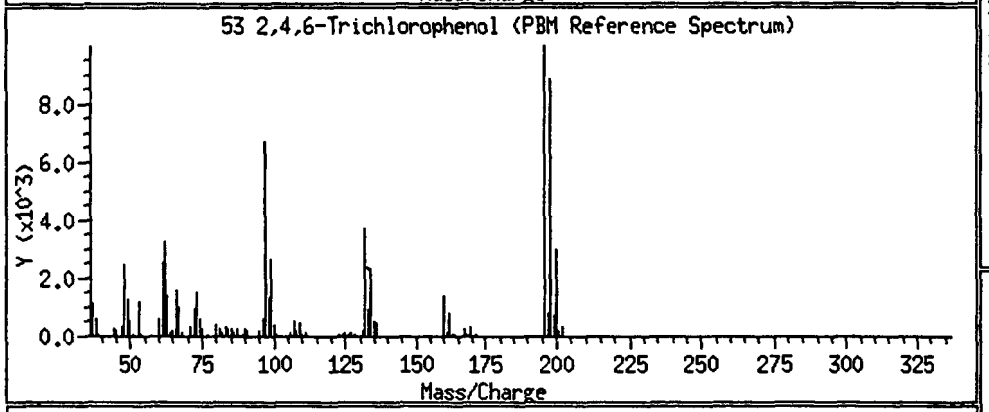
Column phase : DB.5-625 Column diameter : 0.32

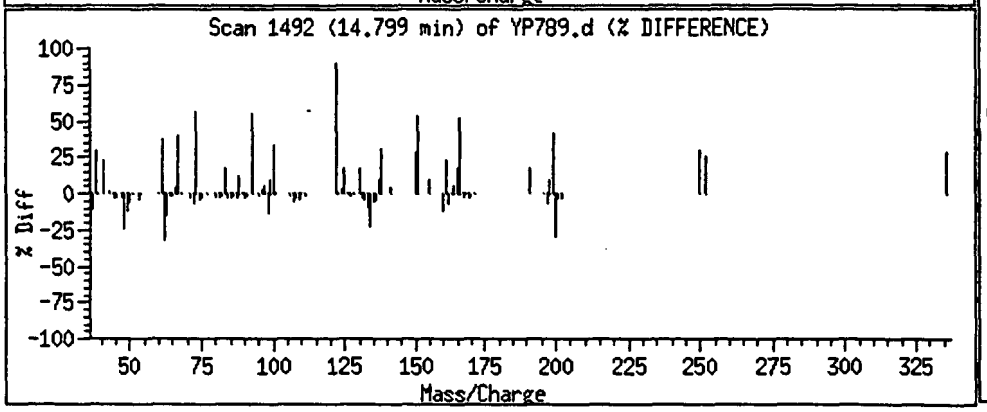
Volume Injected (uL) : 1.0

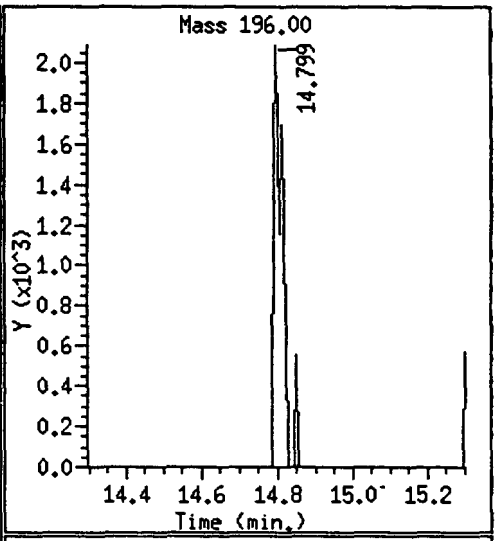
53 2,4,6-Trichlorophenol

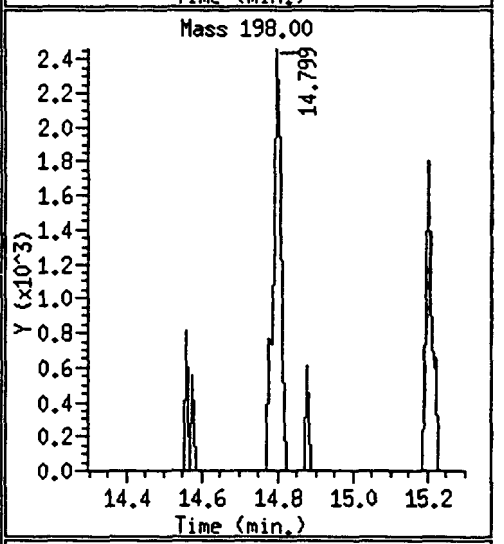


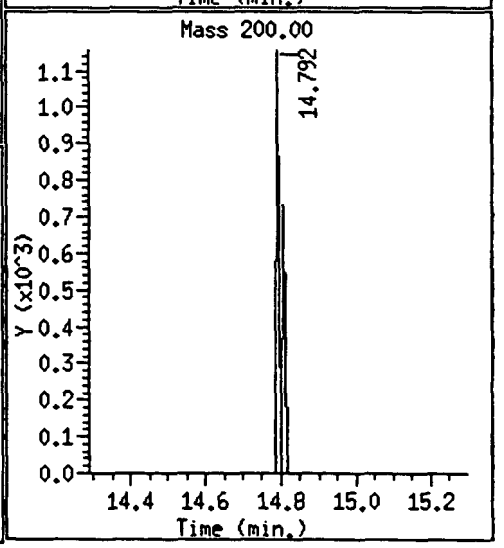












Data File: /chem/Y.i/10-23-97.b/CAA/YP789.d

Date : 23-OCT-97 14:21

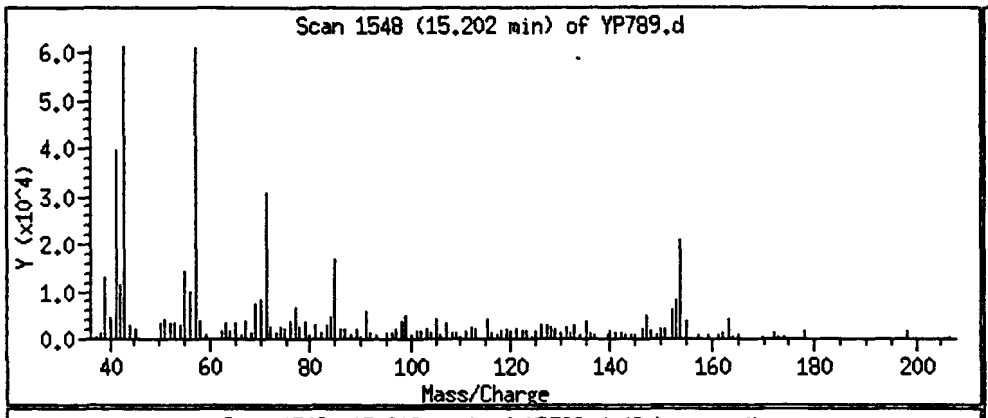
Instrument : Y.i

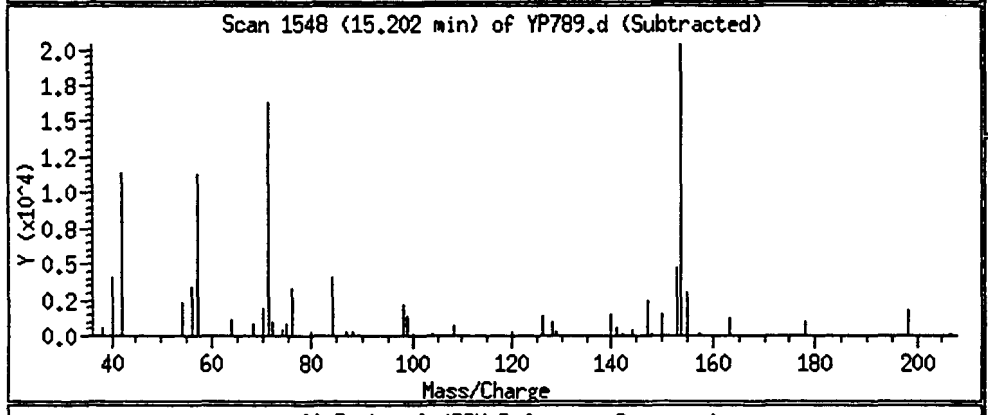
Sample ID : SO-MM5-2-17

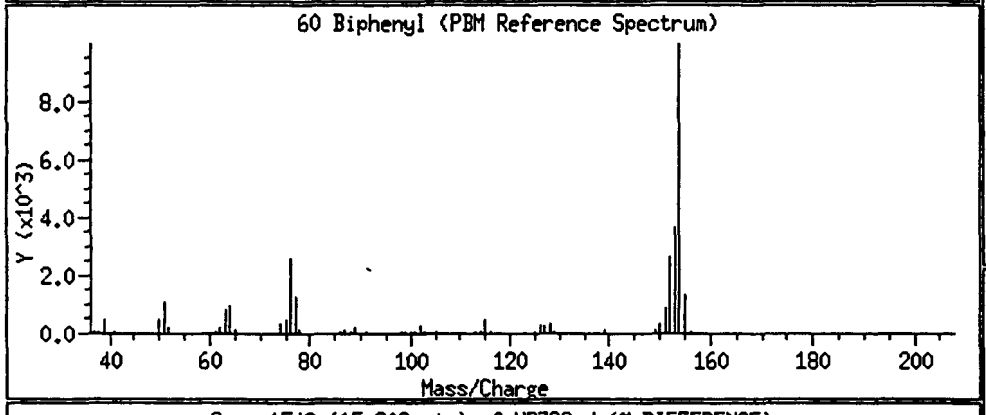
Column phase : DB.5-625 Column diameter : 0.32

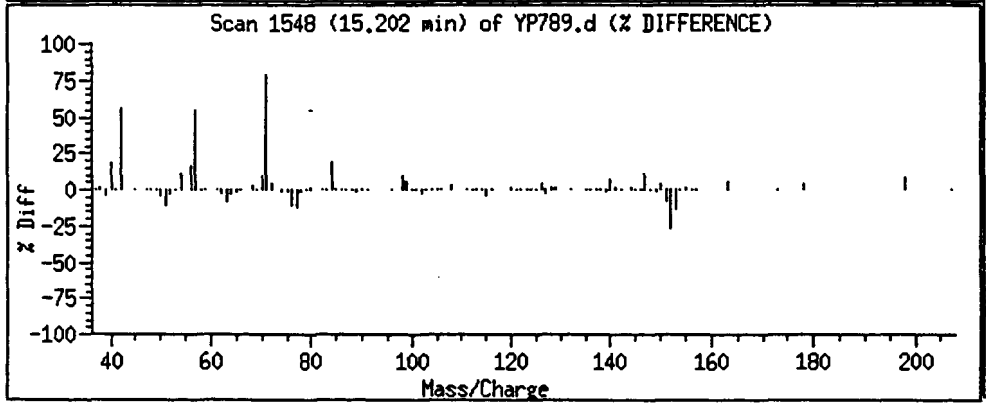
Volume Injected (uL) : 1.0

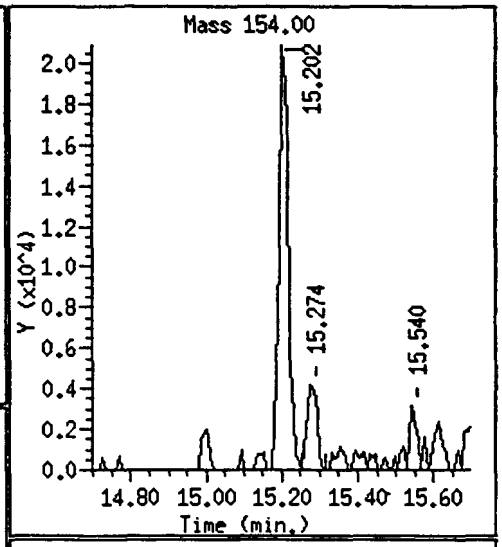
60 Biphenyl

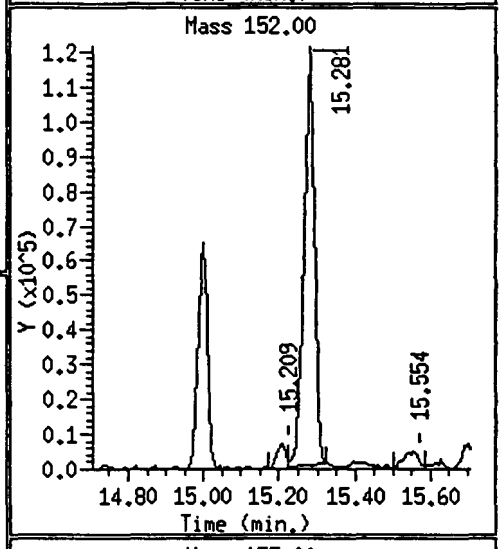


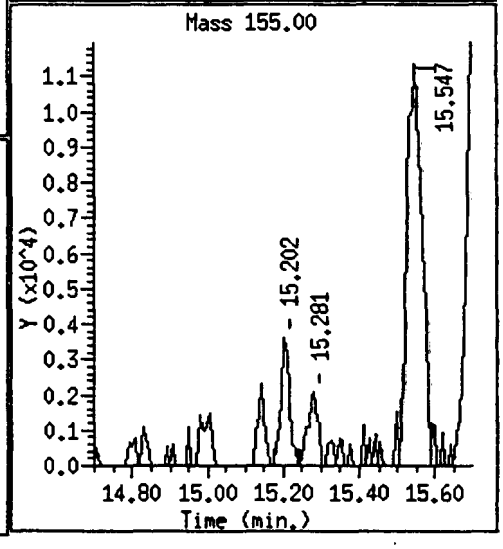












Data File: /chem/Y.i/10-23-97.b/CAA/YP789.d

Date : 23-OCT-97 14:21

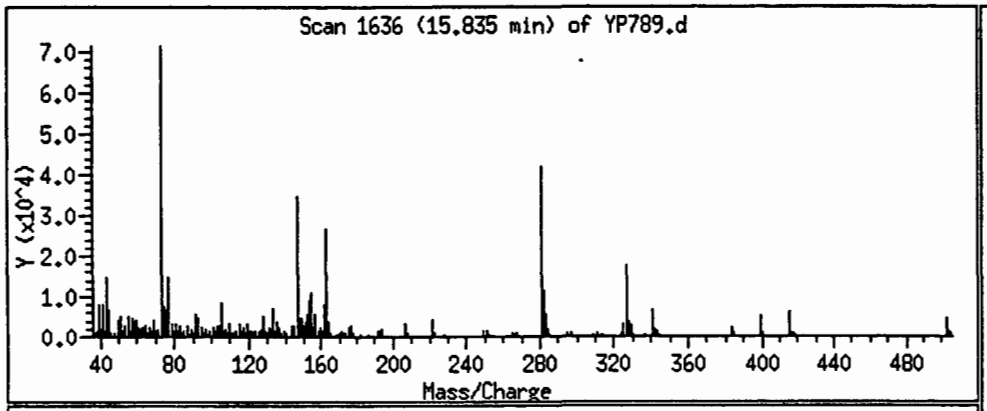
Instrument : Y.i

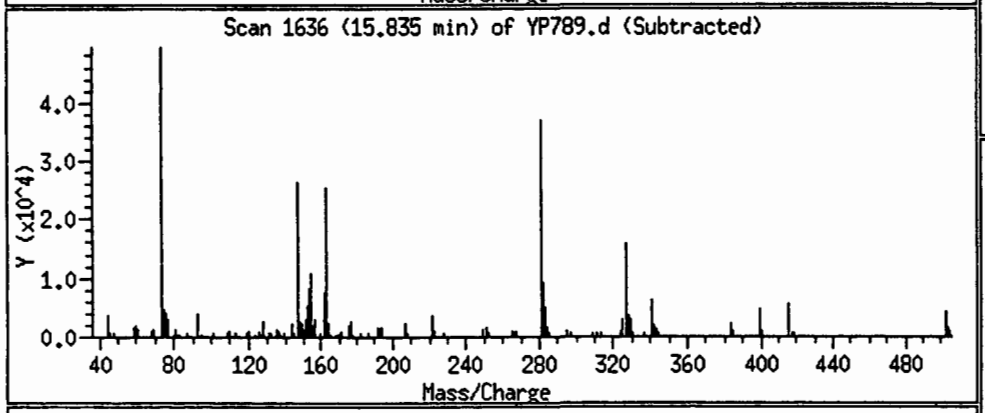
Sample ID : SO-MM5-2-17

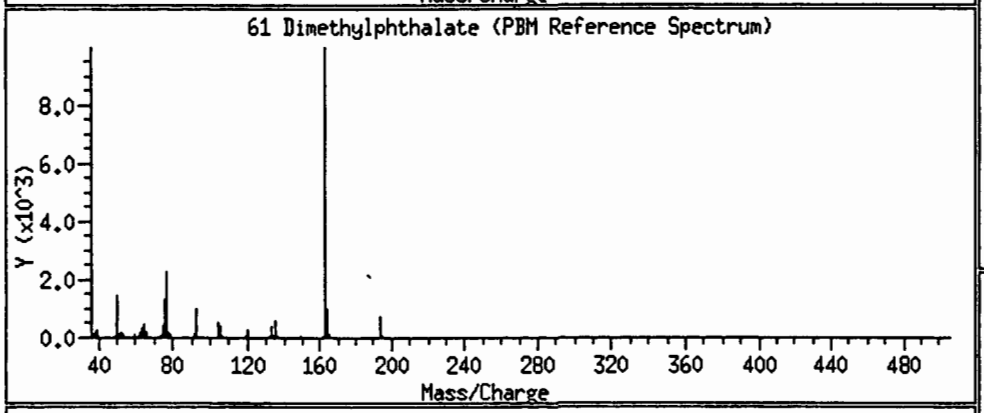
Column phase : DB.5-625 Column diameter : 0.32

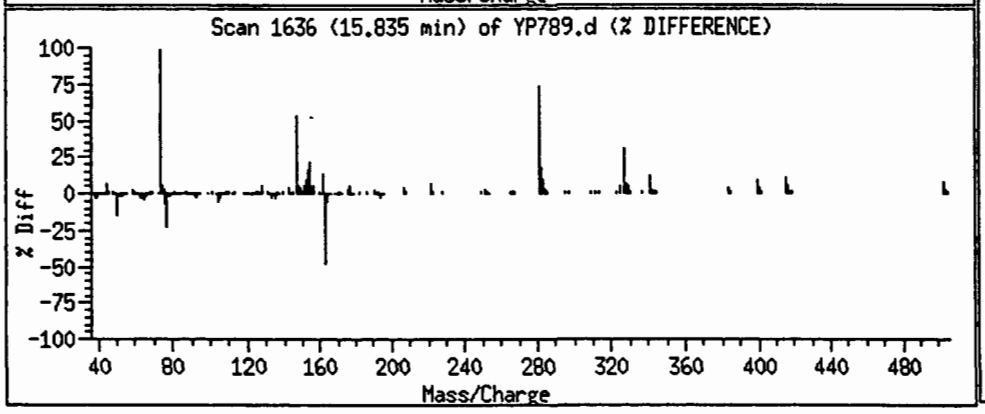
Volume Injected (uL) : 1.0

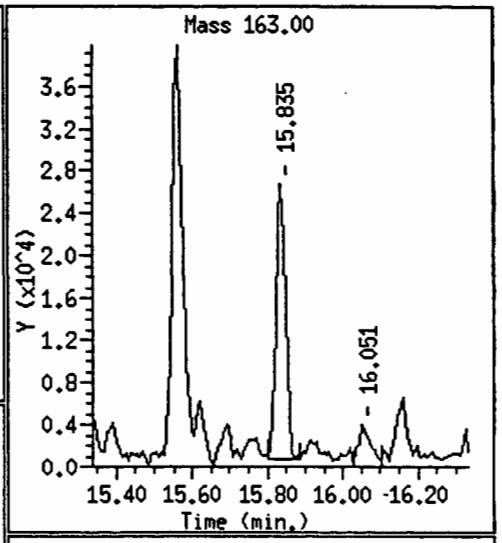
61 Dimethylphthalate

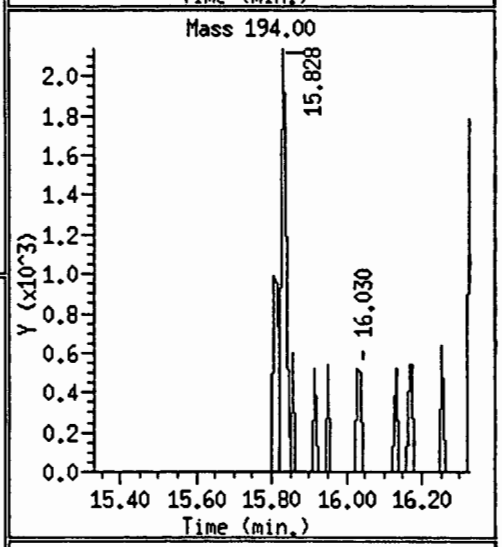


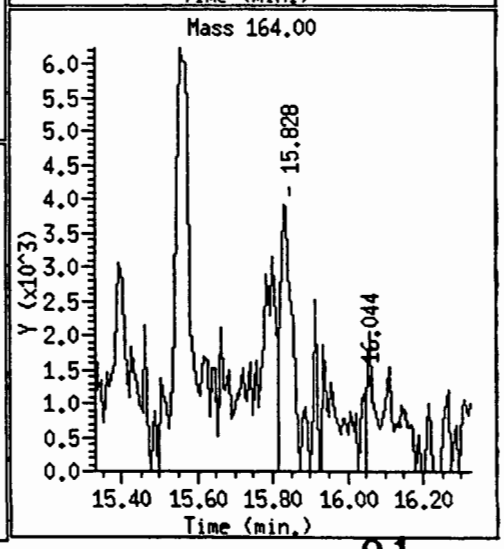












Data File: /chem/Y.i/10-23-97.b/CAA/YP789.d

Date : 23-OCT-97 14:21

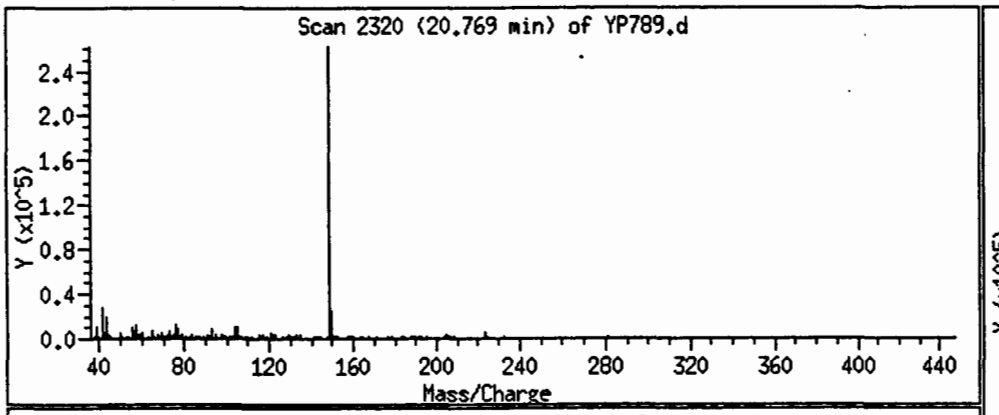
Instrument : Y.i

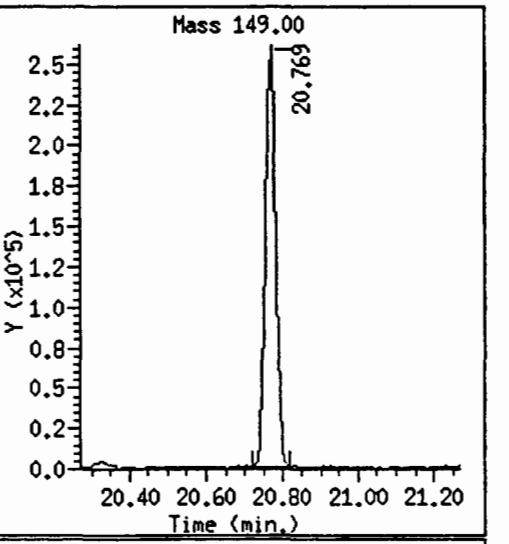
Sample ID : SO-MM5-2-17

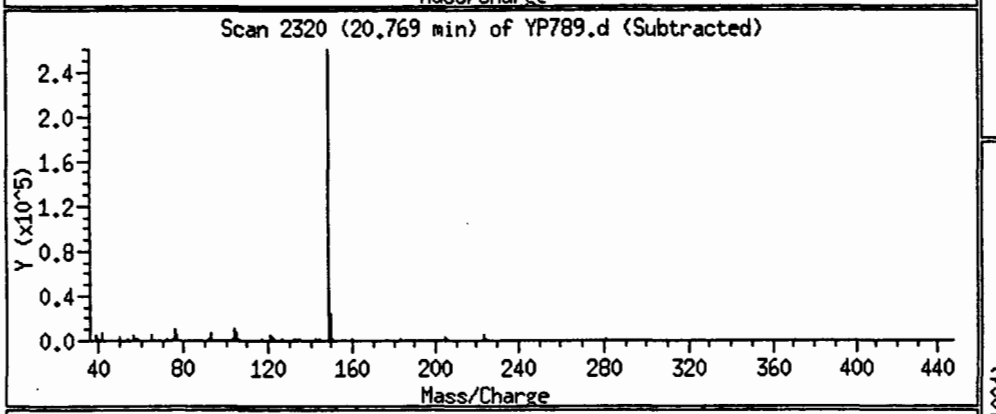
Column phase : DB.5-625 Column diameter : 0.32

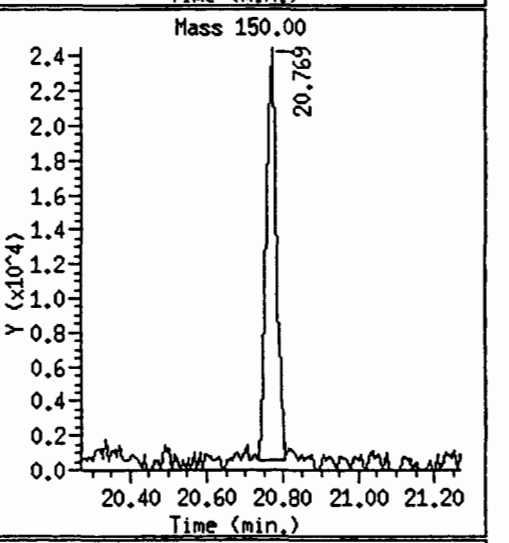
Volume Injected (uL) : 1.0

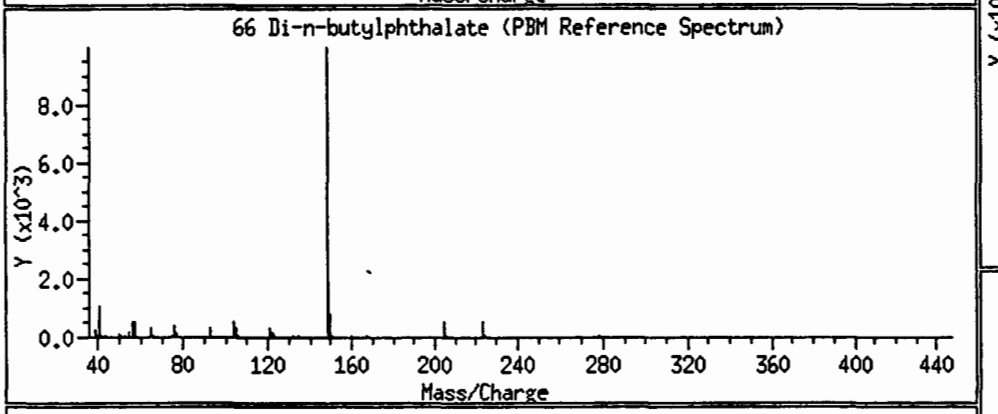
66 Di-n-butylphthalate

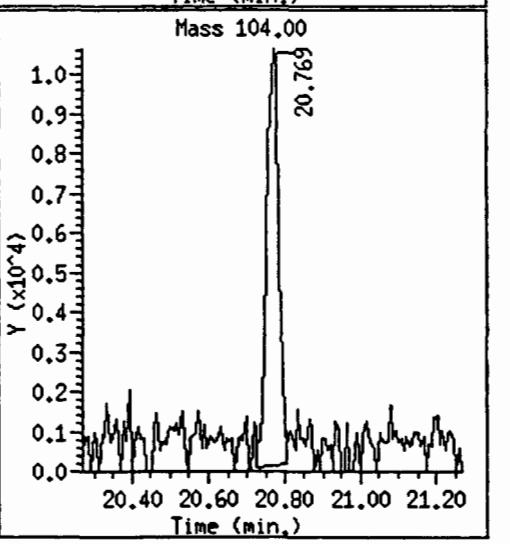


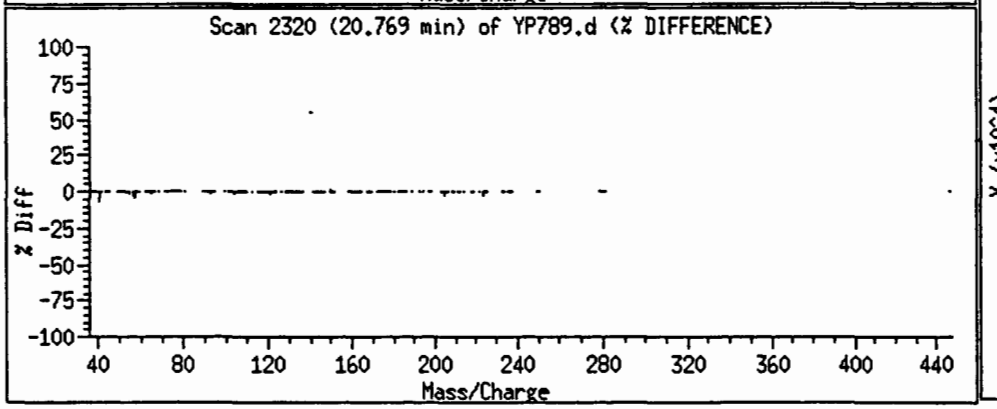












Data File: /chem/Y.i/10-23-97.b/CAA/YP789.d

Date : 23-OCT-97 14:21

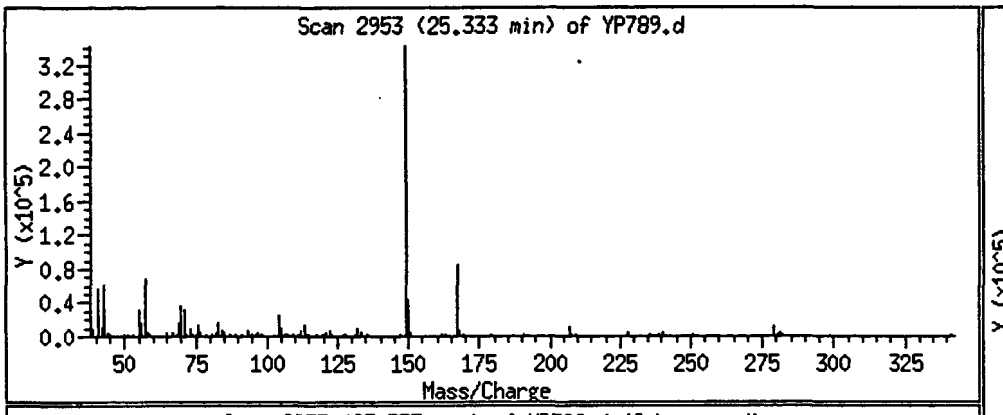
Instrument : Y.i

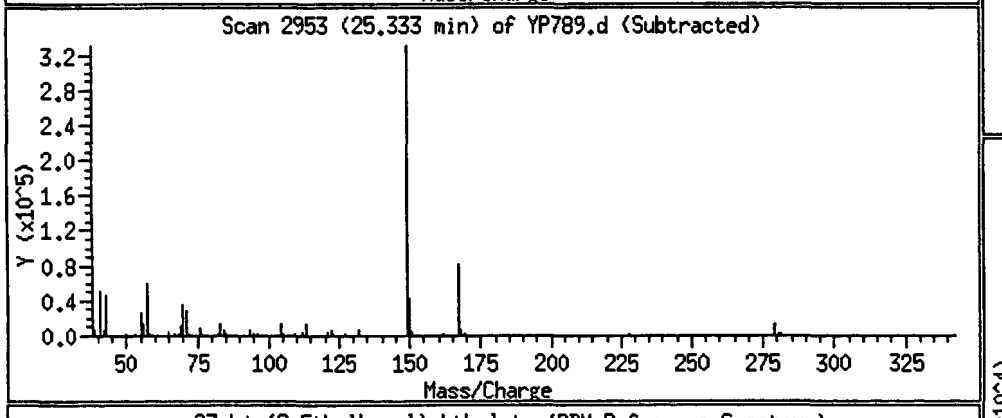
Sample ID : SO-MM5-2-17

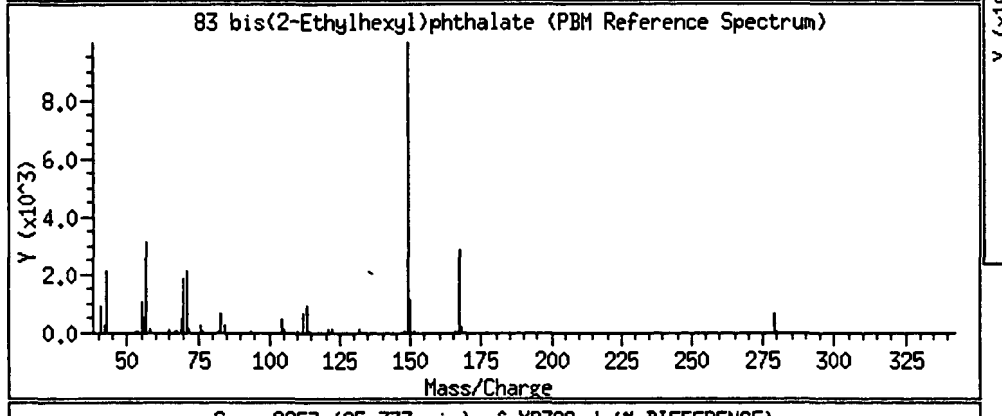
Column phase : DB.5-625 Column diameter : 0.32

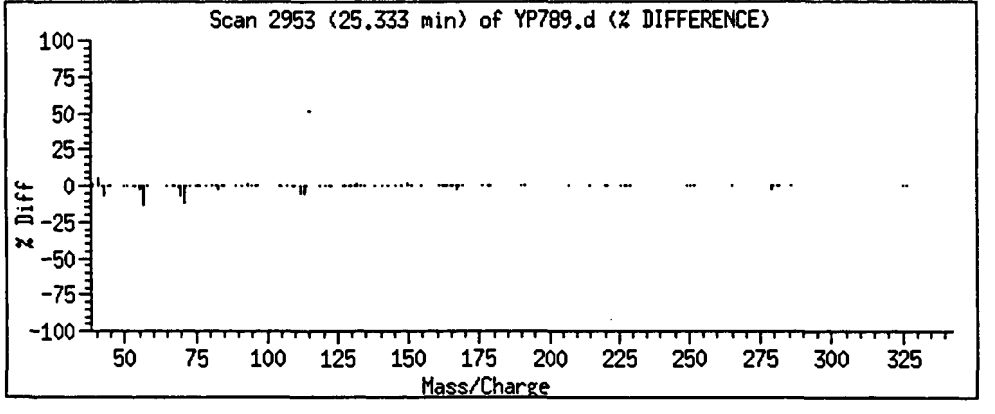
Volume Injected (uL) : 1.0

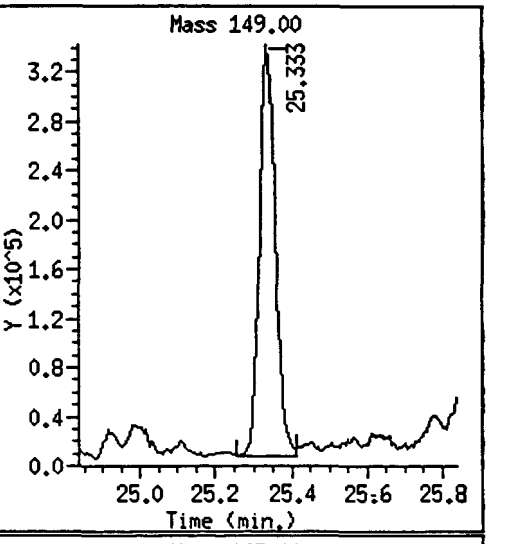
83 bis(2-Ethylhexyl)phthalate

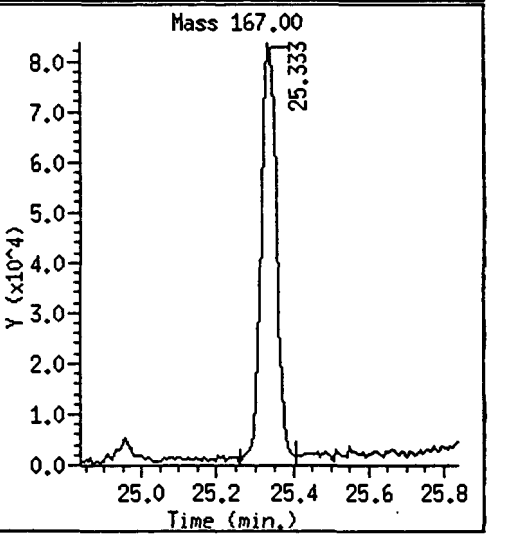












Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP790 | **Sample ID: SO-MM5-3-37**

Client Project: Saginaw, MI	Date Received: 09/29/97	Response File: YP783
TLI ID: 185-7-4A-F	Date Extracted: 10/14/97	
	Date Analyzed : 10/23/97	

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
Naphthalene-d_8		IS 2	12.76		
Naphthalene	92.27	B	12.81		10
2-Methylnaphthalene	136.69		14.24		10
Acenaphthene-d_{10}		IS 3	16.42		
2-Chloronaphthalene		U		0.44	10
Acenaphthylene	2.14	J	16.12		10
Acenaphthene	0.94	J	16.49		10
Fluorene	1.33	J	17.57		10
Phenanthrene-d_{10}		IS 4	19.54		
Phenanthrene	1.77	J	19.59		10
Anthracene	0.34	J	19.70		10
Fluoranthene	0.86	J	22.09		10
Chrysene-d_{12}		IS 5	25.28		
Pyrene	1.05	J	22.57		10
Benzo(a)anthracene		U		0.24	10
Chrysene		U		0.25	10
Perylene-d_{12}		IS 6	29.40		
Benzo(b)fluoranthene		U		0.19	10
Benzo(k)fluoranthene		U		0.20	10
Benzo(e)pyrene		U		0.18	10
Benzo(a)pyrene		U		0.20	10
Perylene		U		0.19	10
Indeno(1,2,3-cd)pyrene		U		0.17	10
Dibenz(a,h)anthracene		U		0.23	10
Benzo(g,h,i)perylene		U		0.19	10

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP790 | **Sample ID: SO-MM5-3-37**

Client Project: Saginaw, MI	Date Received: 09/29/97	Response File: YP783
TLI ID: 185-7-4A-F	Date Extracted: 10/14/97	
	Date Analyzed : 10/23/97	

Dilution Factor: 1.00

Surrogate Summary	Amount (ug)	RT	IS Ref	%REC
Phenol-d_5	77.47	9.46	1	77
Nitrobenzene-d_5	71.82	11.30	2	72
1,3,5-Trichlorobenzene-d_3	68.00	11.98	2	68
1,4-Dibromobenzene-d_4	81.64	12.86	1	82
2-Fluorobiphenyl	83.52	15.00	3	84
2,4,6-Tribromophenol	110.40	18.07	3	110
Anthracene-d_{10}	98.43	19.66	4	98
Pyrene-d_{10}	87.02	22.53	5	87
Terphenyl-d_{14}	94.18	22.90	5	94

Reviewed by Sal Date 11/13/97

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Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP790 | **Sample ID: SO-MM5-3-37**

Client Project: Saginaw, MI	Date Received: 09/29/97	Response File: YP784
TLI ID: 185-7-4A-F	Date Extracted: 10/14/97	
	Date Analyzed : 10/23/97	

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
1,4-Dichlorobenzene-d_4		IS 1	10.22		
n-Nitrosodimethylamine		U		1.59	10
Cumene	1.56	J	8.71		10
Phenol	11.09		9.48		10
Aniline	0.32	J	9.56		10
bis-(2-Chloroethyl)ether		U		1.14	10
Benzyl Chloride	2.27	J	10.20		10
1,4-Dichlorobenzene	1.28	J	10.25		10
2-Methylphenol	2.16	J	10.66		10
Acetophenone	13.55	B	10.99		10
n-Nitrosomorpholine		U		1.54	10
o-Toluidine		U		0.56	10
Hexachloroethane		U		1.46	10
1,2-Dibromo-3-chloropropane		U		1.52	10
N,N-Diethylaniline		U		0.55	10
Naphthalene-d_8		IS 2	12.76		
3/4-Methylphenol		U		0.81	10
Nitrobenzene		U		0.56	10
N,N-Dimethylaniline		U		0.54	10
Isophorone		U		0.47	10
o-Anisidine		U		0.98	10
1,4-Phenylenediamine		U		0.78	10
1,2,4-Trichlorobenzene		U		0.89	10
Hexachlorobutadiene		U		1.45	10
a,a,a-Trichlorotoluene		U		0.69	10
Hydroquinone		U		0.82	10

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Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
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Client Project: Saginaw, MI | **Date Received: 09/29/97** | **Response File: YP784**
TLI ID: 185-7-4A-F | **Date Extracted: 10/14/97**
Date Analyzed : 10/23/97

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
2-Chloroacetophenone		U		0.38	10
Acenaphthene-d_{10}		IS 3	16.42		
Hexachlorocyclopentadiene		U		1.57	10
2,4,6-Trichlorophenol		U		1.34	10
2,4,5-Trichlorophenol		U		1.26	10
Biphenyl	5.10	J	15.21		10
Dimethylphthalate	2.23	J	15.84		10
2,4-Dinitrophenol		U		3.90	25
4-Nitrophenol		U		1.78	25
2,4-Dinitrotoluene		U		1.47	10
Dibenzofuran	2.49	J	16.85		10
4,6-Dinitro-2-methylphenol		U		2.91	25
Trifluralin		U		2.18	10
Phenanthrene-d_{10}		IS 4	19.54		
Di-n-butylphthalate	8.67	BJ	20.77		10
Hexachlorobenzene		U		1.00	10
4-Aminobiphenyl		U		0.42	10
Pentachlorophenol		U		1.77	25
Pentachloronitrobenzene		U		3.87	10
4-Nitrobiphenyl		U		1.07	10
Chrysene-d_{12}		IS 5	25.28		
Benzidine		U		0.33	10
4,4'-Methylenedianiline		U		0.80	10
Dimethylaminoazobenzene		U		0.71	10
3,3'-Dimethylbenzidine		U		0.41	10
3,3'-Dimethoxybenzidine		U		0.81	10

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IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Triangle Laboratories of RTP, Inc.
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Savar v3.5
Printed: 12:43 11/13/1997

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP790 | **Sample ID: SO-MM5-3-37**

Client Project: Saginaw, MI	Date Received: 09/29/97	Response File: YP784
TLI ID: 185-7-4A-F	Date Extracted: 10/14/97	
	Date Analyzed : 10/23/97	

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
3,3'-Dichlorobenzidine		U		0.60	10
Methylene bis-chloroaniline		U		1.39	10
bis(2-Ethylhexyl)phthalate	21.21	B	25.34		10

Reviewed by Batt Date 11/13/97

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit

IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Triangle Laboratories of RTP, Inc.
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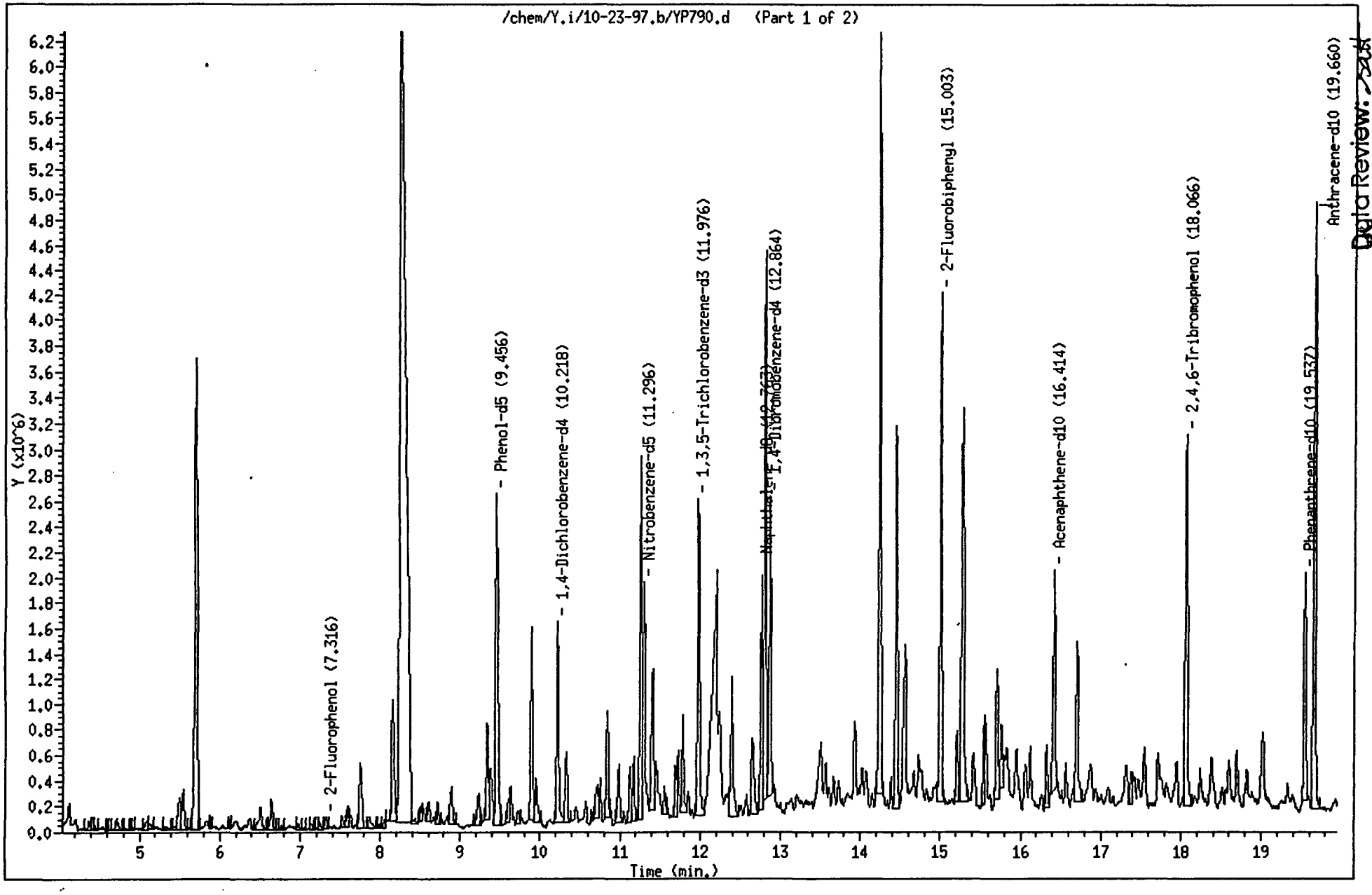
Savar v3.5
Printed: 12:43 11/13/1997

Data File: /chem/Y.i/10-23-97.b/YP790.d
Date : 23-OCT-97 15:09
Instrument : Y.i
Sample ID : SO-MM5-3-37
Column phase : DB-5
Volume Injected (uL) : 1.0

Triangle Laboratories of RTP, Inc.

Column diameter : 0.32

99



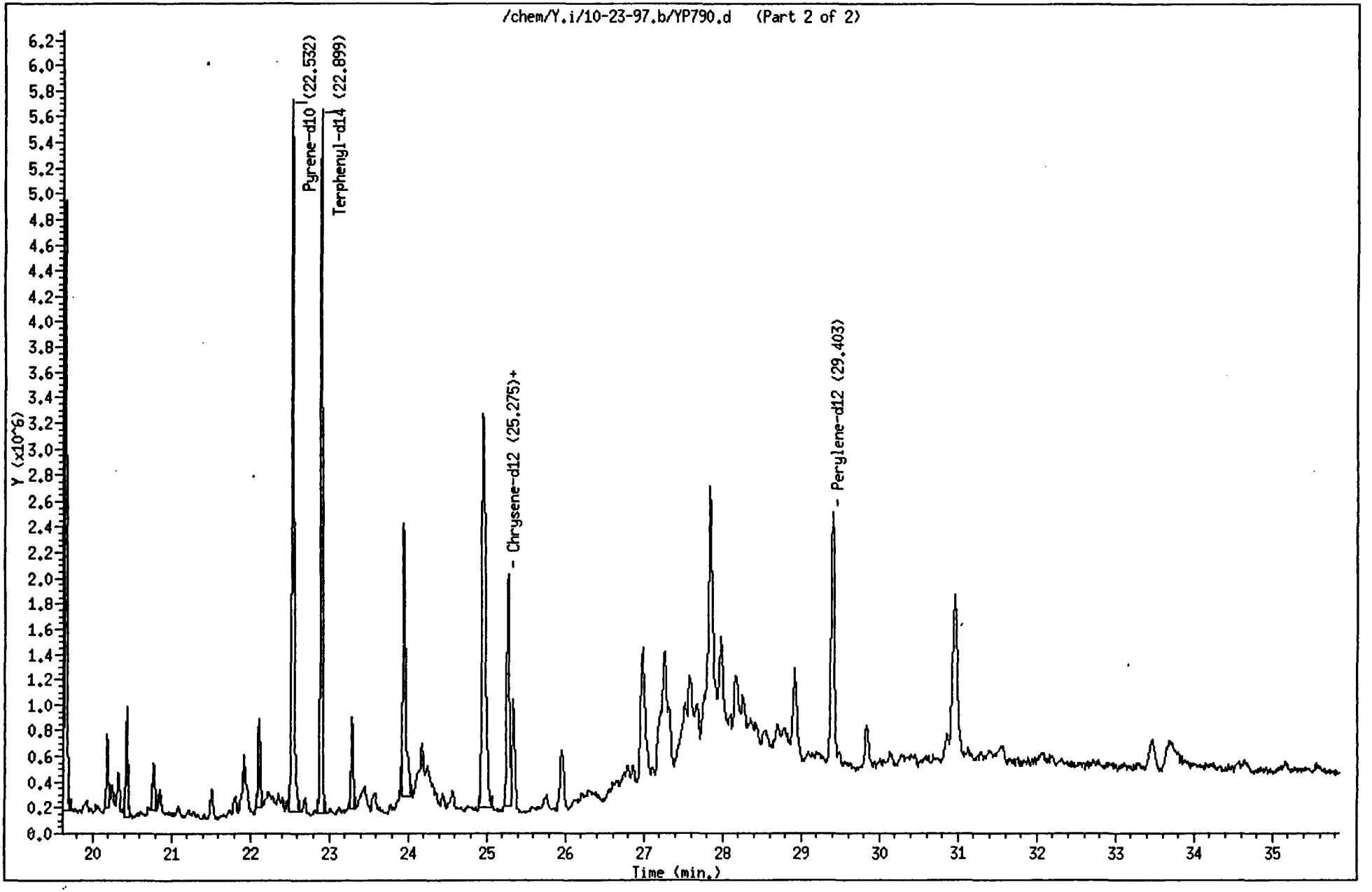
Data Review: [illegible]
Date: 11/12/97

Data File: /chem/Y.i/10-23-97.b/YP790.d
Date : 23-OCT-97 15:09
Instrument : Y.i
Sample ID : SO-MM5-3-37
Column phase : DB-5
Volume Injected (uL) : 1.0

Triangle Laboratories of RTP, Inc.

Column diameter : 0.32

001



TRIANGLE LABORATORIES, INC.

SEMI-VOLATILE QUANTITATION REPORT

Data file : /chem/Y.i/10-23-97.b/YP790.d
Lab. Id. : 43433
Inj Date : 23-OCT-97 15:09 Autotune Date: 22-Oct-97 09:14:0
Operator : DD Inst ID: Y.i
Smp Info : SO-MM5-3-37
Misc Info : 185-7-4A-F
Comment :
Method : /chem/Y.i/10-23-97.b/cclist.m
Meth Date : 24-Oct-1997 06:51 target
Cal Date : 23-OCT-1997 09:12 Cal File: YP783.d
Als bottle: 6
Dil Factor: 1.000 Target Version: Target 2.20
Integrator: HP RTE Compound Sublist: pah.sub
Sample Type: AIR

	Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)
*	1 1,4-Dichlorobenzene-d4	152.00	10.218(1.000)	430354	40.00	
*	2 Naphthalene-d8	136.00	12.763(1.000)	1386516	40.00	
*	3 Acenaphthene-d10	164.00	16.421(1.000)	827130	40.00	
*	4 Phenanthrene-d10	188.00	19.537(1.000)	1306920	40.00	
*	5 Chrysene-d12	240.00	25.275(1.000)	1533975	40.00	
*	6 Perylene-d12	264.00	29.403(1.000)	2125148	40.00	
$	7 2-Fluorophenol	112.00	7.316(0.716)	47891	3.77	3.77(aQR)
$	8 Phenol-d5	99.00	9.456(0.925)	1401072	77.48	77.48
$	9 2-Chlorophenol-d4	Compound Not Detected.				
$	10 1,2-Dichlorobenzene-d4	Compound Not Detected.				
$	11 Nitrobenzene-d5	82.00	11.296(0.885)	938553	71.84	71.84
$	12 1,3,5-Trichlorobenzene-d3	185.00	11.976(0.938)	782541	67.90	67.90
$	13 1,4-Dibromobenzene-d4	239.80	12.864(1.259)	816885	81.65	81.65
$	14 2-Fluorobiphenyl	172.00	15.003(0.914)	2145031	83.49	83.49
$	15 2,4,6-Tribromophenol	329.80	18.066(1.100)	680319	110.22	110.22
$	16 Anthracene-d10	188.00	19.660(1.006)	3450884	98.42	98.42
$	17 Pyrene-d10	212.00	22.532(0.891)	3924533	87.05	87.05
$	18 Terphenyl-d14	244.00	22.899(0.906)	2950812	94.13	94.13
	42 Naphthalene	128.00	12.807(1.003)	3236554	92.23	92.23
	46 2-Methylnaphthalene	142.00	14.241(1.116)	3141382	136.64	136.64
	50 2-Chloronaphthalene	162.00	~~15.255(0.929)~~	~~13110~~	~~0.58~~	~~0.58(a)~~ FP sah
	56 Acenaphthylene	152.00	16.119(0.982)	79028	2.14	2.14(aQ)
	58 Acenaphthene	154.00	16.486(1.004)	20453	0.94	0.94(aQ)
	65 Fluorene	166.00	17.568(1.070)	32030	1.33	1.33(a)
	73 Phenanthrene	178.00	19.588(1.003)	59246	1.77	1.77(a)
	74 Anthracene	178.00	19.703(1.008)	10776	0.34	0.34(a)
	77 Fluoranthene	~~Compound Not Detected.~~ 22.085		29555		M sah
	78 Pyrene	202.00	22.568(0.893)	52969	1.05	1.05(aQ)
	83 Benzo(a)anthracene	228.00	~~25.254(0.999)~~	~~2894~~	~~0.07~~	~~0.07(aQ)~~
	84 Chrysene	228.00	~~25.290(1.001)~~	~~2861~~	~~0.07~~	~~0.07(aQ)~~ FP sah
	86 Benzo(b)fluoranthene	252.00	~~28.382(0.965)~~	~~1527~~	~~0.03~~	~~0.03(aQ)~~

Data Review: sah
Date: 11/12/97

Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	CONCENTRATIONS FINAL (ug)
87 Benzo(k)fluoranthene	252.00	~~28.455(0.968)~~	~~1563~~	~~0.03~~	~~0.03(a)~~
88 Benzo(e)pyrene	252.00	~~29.139(0.991)~~	~~2409~~	~~0.04~~	~~0.04(aQ)~~
89 Benzo(a)pyrene	252.00	29.258(0.995)	~~1074~~	0.02	~~0.02(aQ)~~
90 Perylene	252.00	~~29.403(1.000)~~	~~1399~~	~~0.02~~	~~0.02(aQ)~~
91 Indeno(1,2,3-cd)pyrene	Compound Not Detected.				
92 Dibenz(a,h)anthracene	Compound Not Detected.				
93 Benzo(g,h,i)perylene	Compound Not Detected.				

FP sat

QC Flag Legend

a - Target compound detected but, quantitated amount
Below Limit Of Quantitation(BLOQ).
Q - Qualifier signal failed the ratio test.
R - Spike/Surrogate failed recovery limits.

TRIANGLE LABORATORIES, INC.

SEMI-VOLATILE QUANTITATION REPORT

Data file : /chem/Y.i/10-23-97.b/CAA/YP790.d
Lab. Id. : 43433
Inj Date : 23-OCT-97 15:09 — Autotune Date: 22-Oct-97 09:14:0
Operator : DD — Inst ID: Y.i
Smp Info : SO-MM5-3-37
Misc Info : 185-7-4A-F
Comment :
Method : /chem/Y.i/10-23-97.b/tlicaa.m
Meth Date : 23-Oct-1997 10:51
Cal Date : 23-OCT-97 09:56 — Cal File: YP784.d
Als bottle: 6
Dil Factor: 1.000 — Target Version: Target 2.20
Integrator: HP RTE — Compound Sublist: CAA1.sub
Sample Type: mm5

	Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)	
*	1 1,4 Dichlorobenzene-d4	152.00	10.218(1.000)	430354	40.00		
*	2 Naphthalene-d8	136.00	12.763(1.000)	1386516	40.00		
*	3 Acenaphthene-d10	164.00	16.421(1.000)	827130	40.00		
*	4 Phenanthrene-d10	188.00	19.537(1.000)	1306920	40.00		
*	5 Chrysene-d12	240.00	25.275(1.000)	1533975	40.00		
*	6 Perylene-d12	264.00	29.403(1.000)	2125148	40.00		
$	7 2-Fluorophenol	112.00	7.316(0.716)	47891	4.05	4.05	
$	8 Phenol-d5	99.00	9.456(0.925)	1401072	87.89	87.89	
$	9 2-Chlorophenol-d4	Compound Not Detected.					
$	10 1,2-Dichlorobenzene-d4	Compound Not Detected.					
$	11 Nitrobenzene-d5	82.00	11.296(0.885)	938553	67.42	67.42	
$	12 1,3,5-Trichlorobenzene-d3	185.00	11.976(0.938)	782541	60.53	60.53	
$	13 1,4-Dibromobenzene-d4	240.00	12.864(1.259)	816885	80.79	80.79	
$	14 2-Fluorobiphenyl	172.00	15.003(0.914)	2145031	88.39	88.39	
$	15 2,4,6-Tribromophenol	329.80	18.066(1.100)	680319	123.77	123.77	
$	16 Anthracene-d10	188.00	19.660(1.006)	3450884	99.27	99.27	
$	17 Pyrene-d10	212.00	22.532(0.891)	3924533	81.93	81.93	
$	18 Terphenyl-d14	244.00	22.899(0.906)	2950812	95.50	95.50	
	20 n-Nitrosodimethylamine	74.00	~~4.718(0.462)~~	~~23733~~	~~3.77~~	~~3.77~~	FP BCN
	21 Cumene	105.00	8.715(0.853)	38470	1.56	1.56	
	23 Phenol	94.00	9.477(0.927)	156252	11.09	11.09	
	24 Aniline	93.00	9.562(0.936)	6042	0.32	0.32	
	27 bis-(2-Chloroethyl)ether	63.00	~~9.719(0.951)~~	~~2550~~	~~0.29~~	~~0.29~~	FP BCN
	28 Benzyl Chloride	91.00	10.204(0.999)	54497	2.27	2.27	
	29 1,4-Dichlorobenzene	146.00	10.247(1.003)	18385	1.27	1.27	
	31 2-Methylphenol	108.00	10.660(1.043)	23778	2.16	2.16	
	32 3/4-Methylphenol	108.00	~~10.960(0.859)~~	~~19218~~	~~1.55~~	~~1.55~~	FP BCN
	33 Acetophenone	105.00	10.989(1.075)	215752	13.54	13.54	
	34 n-Nitrosomorpholine	56.00	~~11.046(1.081)~~	~~1266~~	~~0.19~~	~~0.19~~	FP BCN
	35 o-Toluidine	106.00	~~10.974(1.074)~~	~~86302~~	~~4.83~~	~~4.83~~	
	36 Hexachloroethane	Compound Not Detected.					

Data Review:
Date:

Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	CONCENTRATIONS FINAL (ug)	
37 Nitrobenzene	77.00	~~11.332(0.888)~~	~~37035~~	~~2.10~~	~~2.10~~	FP salt
38 N,N-Dimethylaniline	120.00	~~11.360(0.882)~~	~~65949~~	~~3.52~~	~~3.53~~	
39 1,2-Dibromo-3-chloropropane	Compound Not Detected.					
40 Isophorone	82.00	~~12.004(0.941)~~	~~10966~~	~~0.51~~	~~0.51~~	FP salt
41 o-Anisidine	Compound Not Detected.					
42 1,4-Phenylenediamine	108.00	~~13.617(1.067)~~	~~819~~	~~0.06~~	~~0.06~~	FP salt
43 1,2,4-Trichlorobenzene	180.00	~~12.642(0.990)~~	~~15044~~	~~1.33~~	~~1.33~~	
44 Naphthalene	128.00	12.807(1.003)	3236554	99.20	99.20	
46 Hexachlorobutadiene	Compound Not Detected.					
47 N,N-Diethylaniline	134.00	~~13.129(1.285)~~	~~14503~~	~~0.79~~	~~0.79~~	FP salt
48 a,a,a-Trichlorotoluene	159.00	~~12.864(1.008)~~	~~294970~~	~~20.23~~	~~20.23~~	
49 Hydroquinone	110.00	~~13.545(1.061)~~	~~889~~	~~0.07~~	~~0.07~~	
51 2-Chloroacetophenone	105.00	~~13.926(1.091)~~	~~46804~~	~~1.76~~	~~1.76~~	
52 Hexachlorocyclopentadiene	Compound Not Detected.					
53 2,4,6-Trichlorophenol	196.00	~~14.809(0.902)~~	~~2067~~	~~0.27~~	~~0.27~~	
54 2,4,5-Trichlorophenol	196.00	~~14.809(0.902)~~	~~2067~~	~~0.26~~	~~0.26~~	
60 Biphenyl	154.00	15.212(0.926)	143847	5.09	5.09	
61 Dimethylphthalate	163.00	15.838(0.964)	51622	2.22	2.22	
62 2,4-Dinitrophenol	184.00	~~16.558(1.008)~~	~~371~~	~~0.14~~	~~0.14~~	FP salt
63 4-Nitrophenol	139.00	~~16.637(1.013)~~	~~7695~~	~~1.37~~	~~1.37~~	
64 2,4-Dinitrotoluene	165.00	~~16.810(1.024)~~	~~11249~~	~~1.65~~	~~1.65~~	
65 Dibenzofuran	168.00	16.846(1.026)	72118	2.49	2.49	
66 Di-n-butylphthalate	149.00	20.769(1.063)	401230	8.67	8.67	
67 4,6-Dinitro-2-methylphenol	198.00	~~17.589(1.071)~~	~~320~~	~~0.09~~	~~0.09~~	FP salt
68 Trifluralin	Compound Not Detected.					
69 Hexachlorobenzene	283.80	~~19.011(0.973)~~	~~310~~	~~0.03~~	~~0.03~~	FP salt
70 4-Aminobiphenyl	169.00	~~19.090(0.977)~~	~~2360~~	~~0.09~~	~~0.09~~	
71 Pentachlorophenol	Compound Not Detected.					
72 Pentachloronitrobenzene	Compound Not Detected.					
73 4-Nitrobiphenyl	152.00	~~20.107(1.029)~~	~~1480~~	~~0.15~~	~~0.15~~	FP salt
74 Benzidine	184.00	~~22.532(0.891)~~	~~37961~~	~~1.25~~	~~1.25~~	
75 4,4'-Methylenedianiline	Compound Not Detected.					
77 Dimethylaminoazobenzene	120.00	~~22.899(0.906)~~	~~48104~~	~~3.42~~	~~3.42~~	FP salt
78 3,3'-Dimethylbenzidine	212.00	~~23.914(0.946)~~	~~796~~	~~0.03~~	~~0.03~~	
80 3,3'-Dimethoxybenzidine	Compound Not Detected.					
81 3,3'-Dichlorobenzidine	Compound Not Detected.					
82 Methylene bis-chloroaniline	231.00	~~25.261(0.999)~~	~~1294~~	~~0.18~~	~~0.18~~	FP salt
83 bis(2-Ethylhexyl)phthalate	149.00	25.340(1.003)	776924	21.20	21.20	

Data File: /chem/Y.i/10-23-97.b/YP790.d

Date : 23-OCT-97 15:09

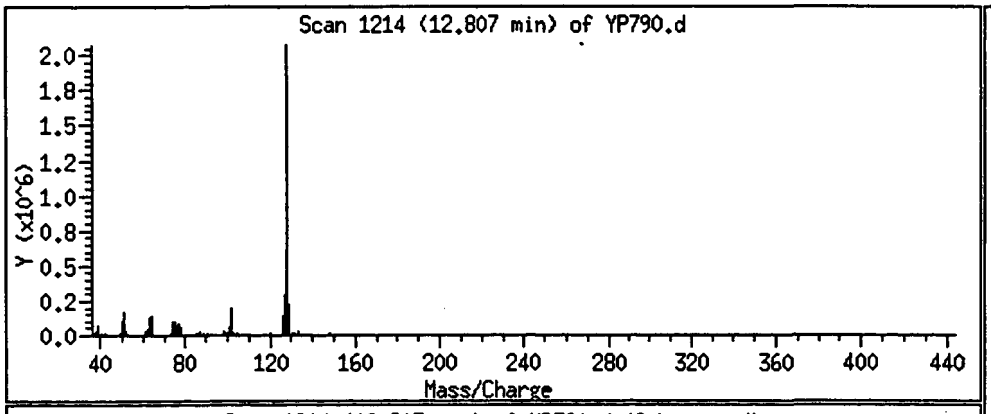
Instrument : Y.i

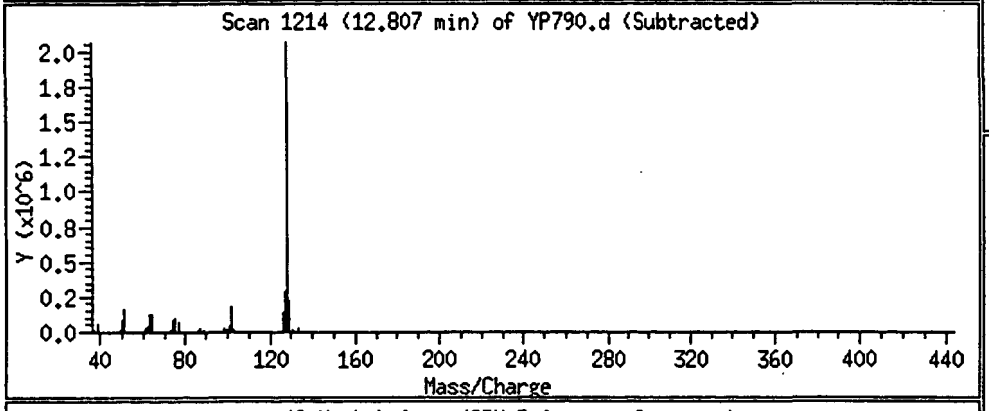
Sample ID : SO-MM5-3-37

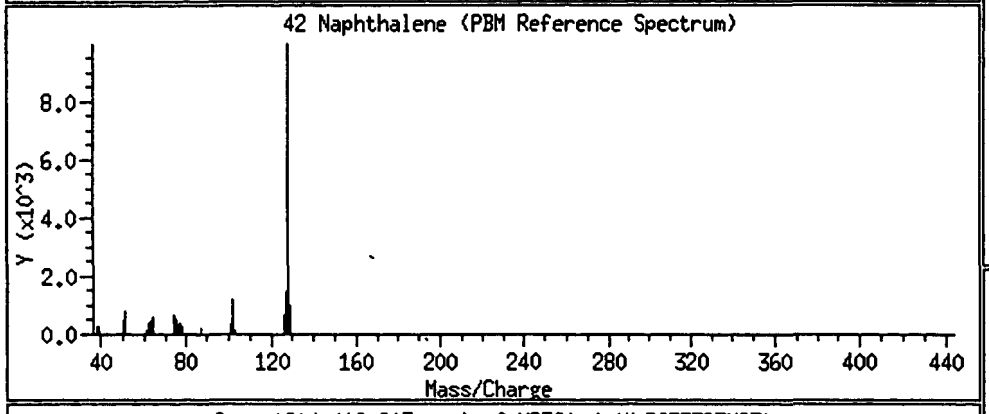
Column phase : DB-5 Column diameter : 0.32

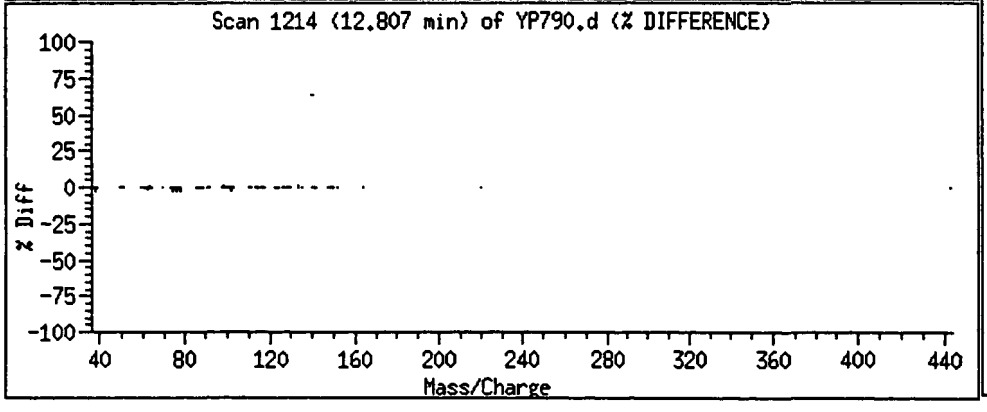
Volume Injected (uL) : 1.0

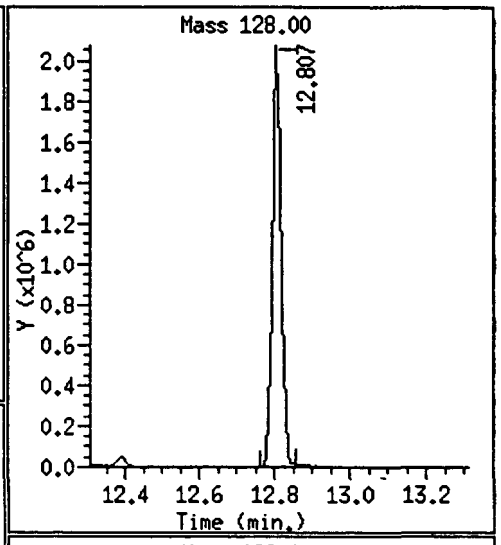
42 Naphthalene

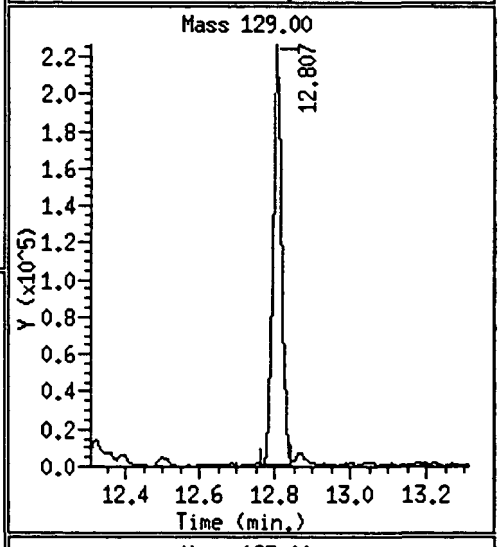


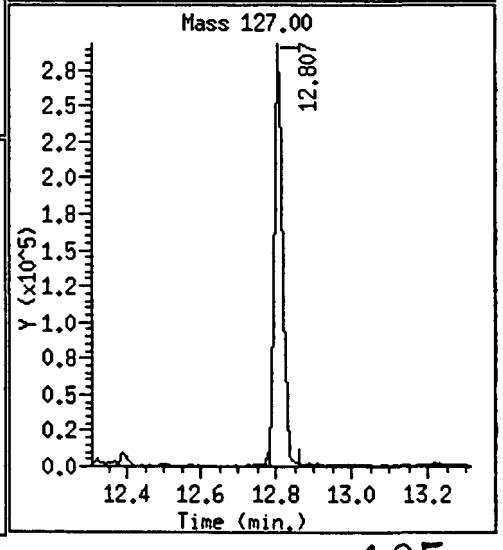












Data File: /chem/Y.i/10-23-97.b/YP790.d

Date : 23-OCT-97 15:09

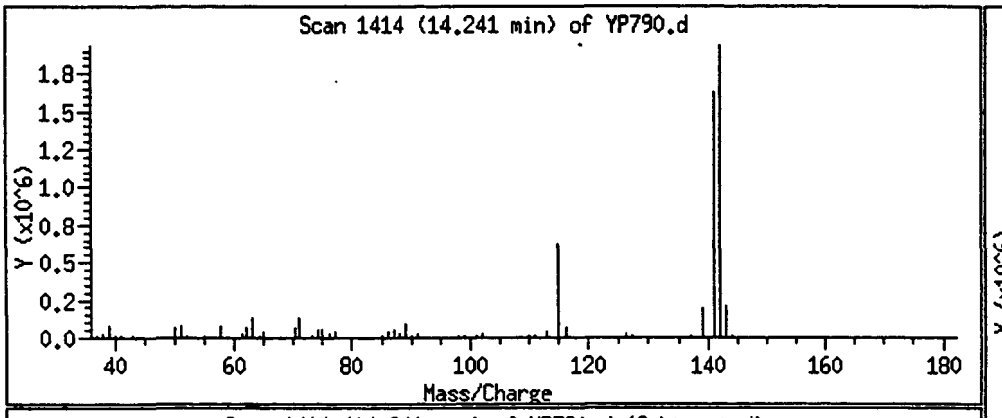
Instrument : Y.i

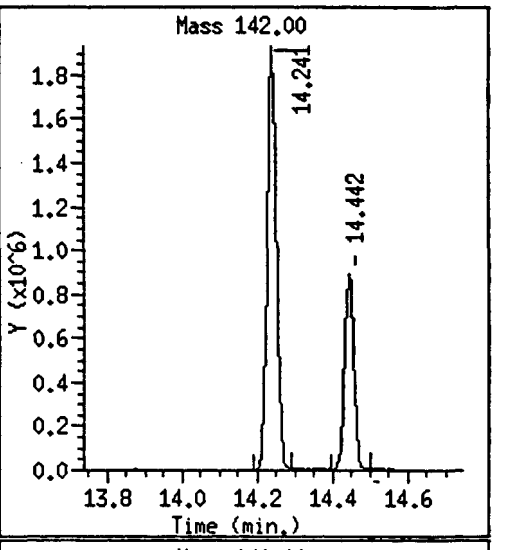
Sample ID : SO-MM5-3-37

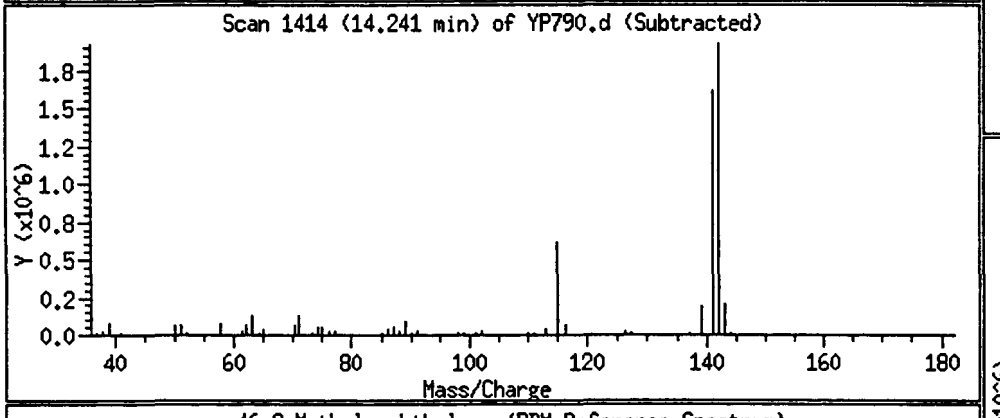
Column phase : DB-5 Column diameter : 0.32

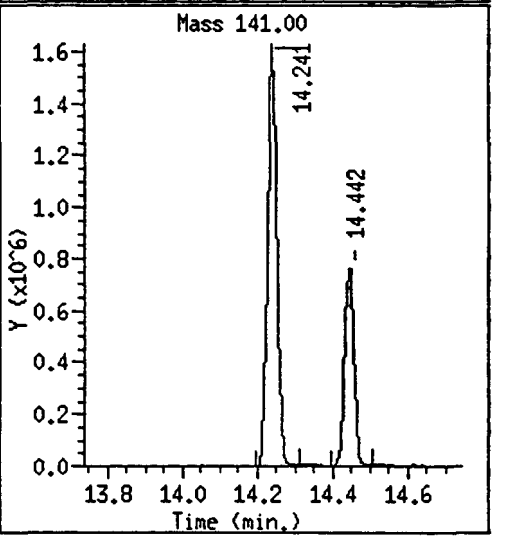
Volume Injected (uL) : 1.0

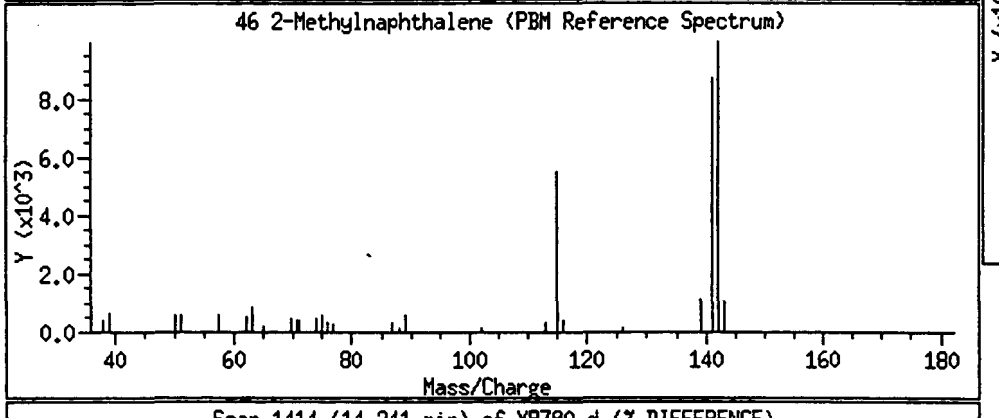
46 2-Methylnaphthalene

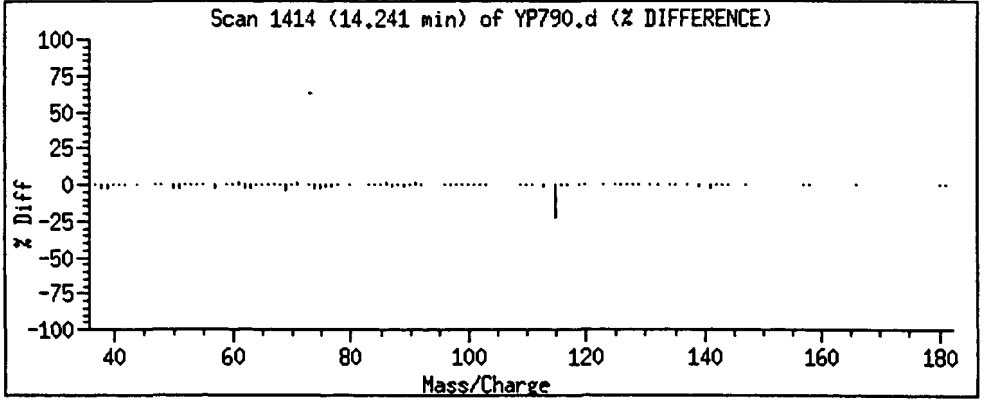












Data File: /chem/Y.i/10-23-97.b/YP790.d

Date : 23-OCT-97 15:09

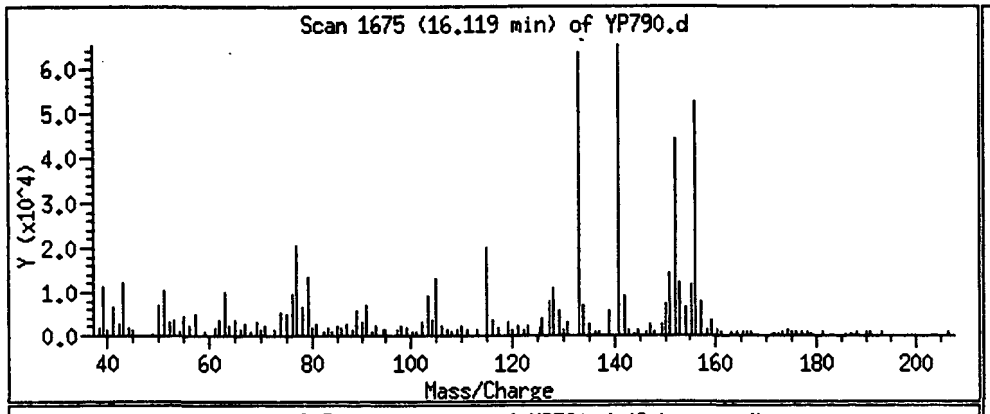
Instrument : Y.i

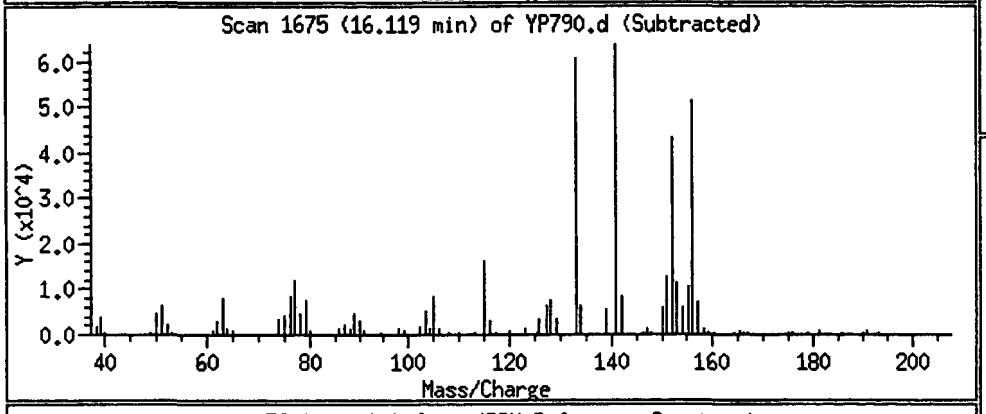
Sample ID : SO-MM5-3-37

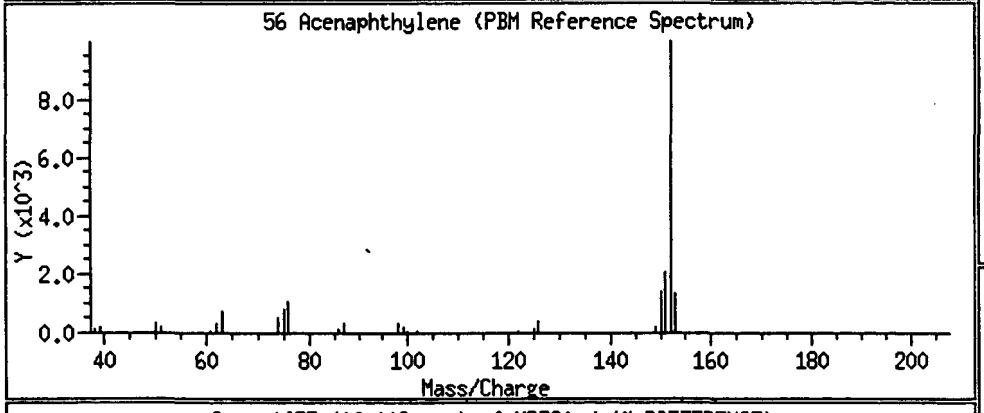
Column phase : DB-5 Column diameter : 0.32

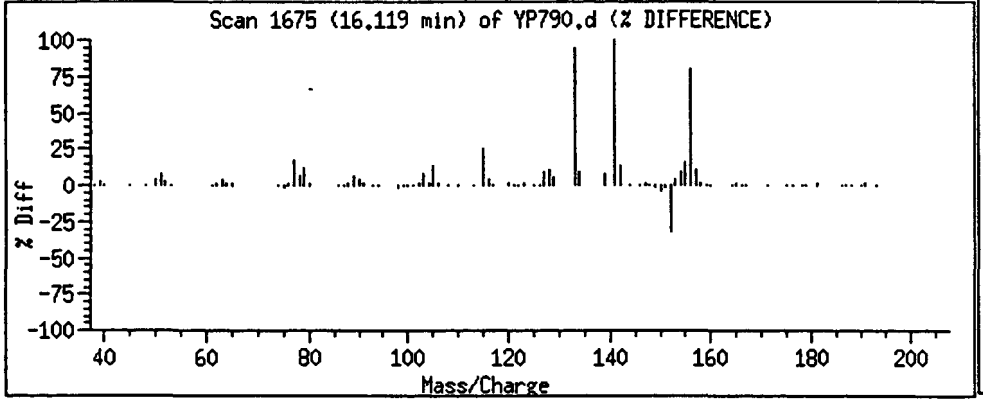
Volume Injected (uL) : 1.0

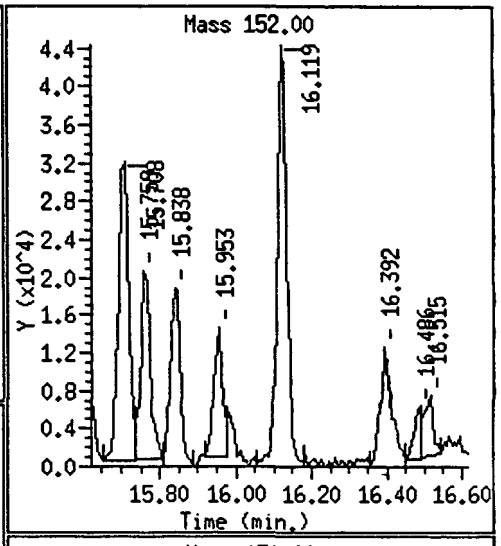
56 Acenaphthylene

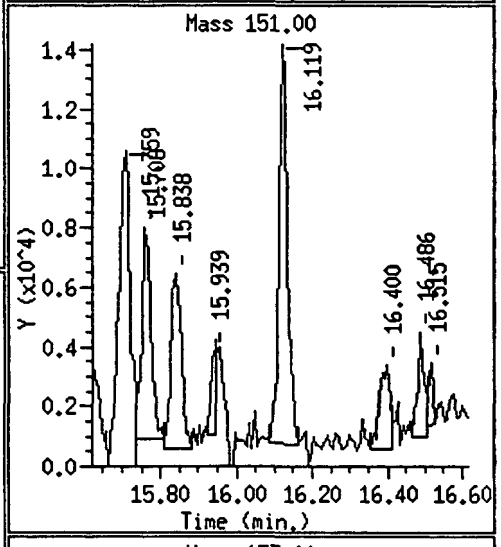


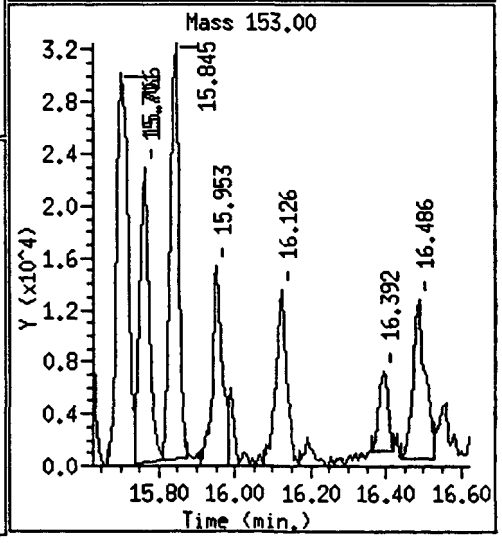












Data File: /chem/Y.i/10-23-97.b/YP790.d

Date : 23-OCT-97 15:09

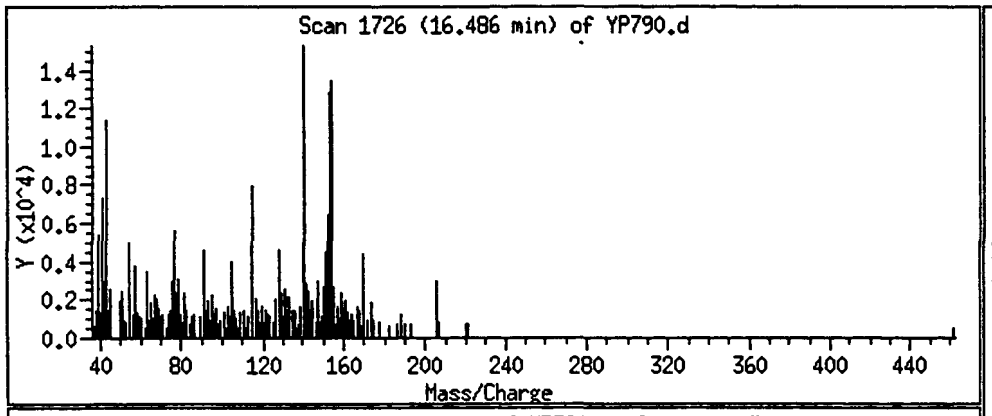
Instrument : Y.i

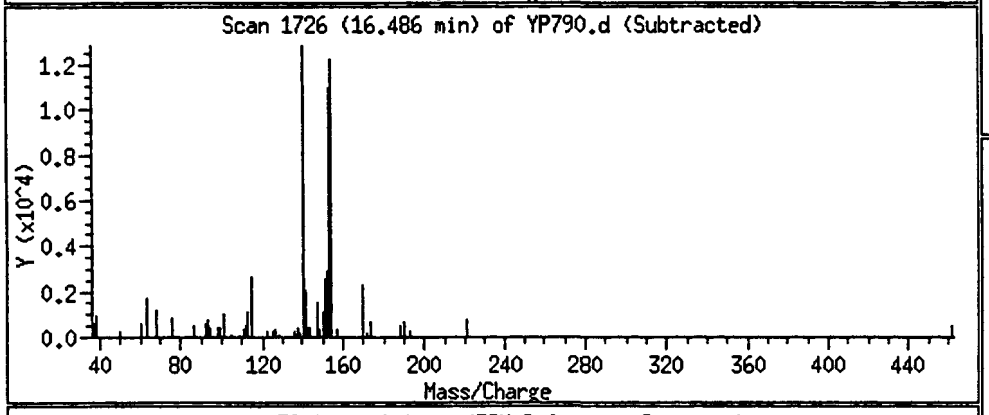
Sample ID : SO-MM5-3-37

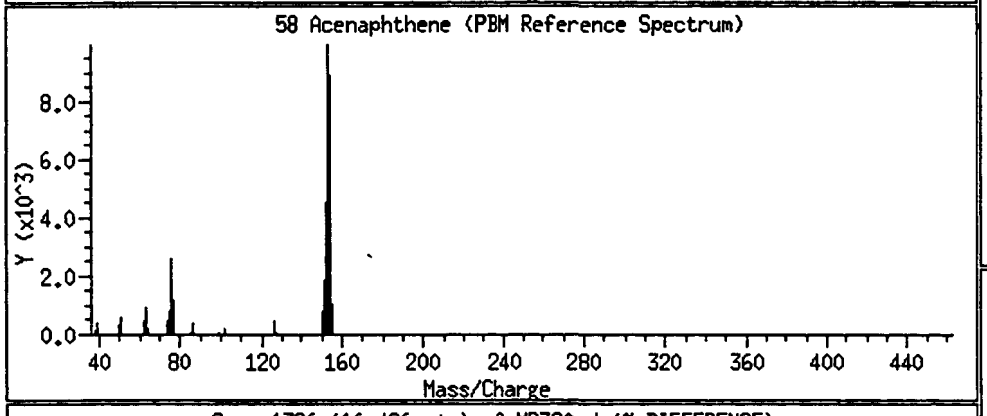
Column phase : DB-5 Column diameter : 0.32

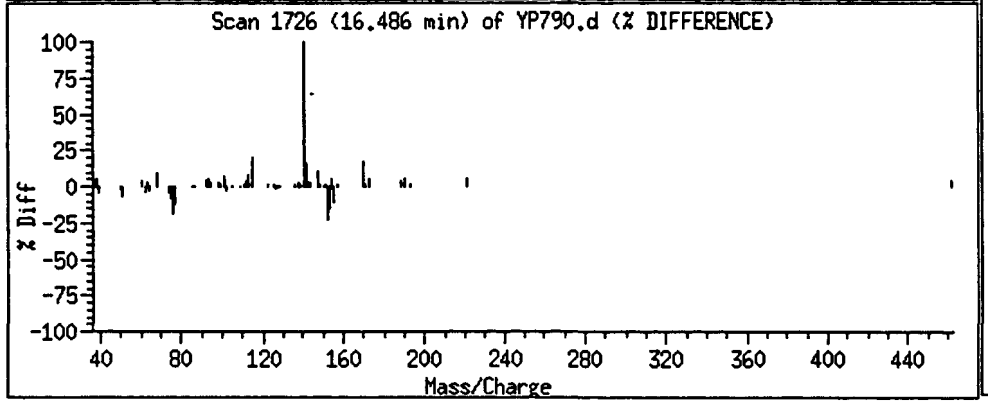
Volume Injected (uL) : 1.0

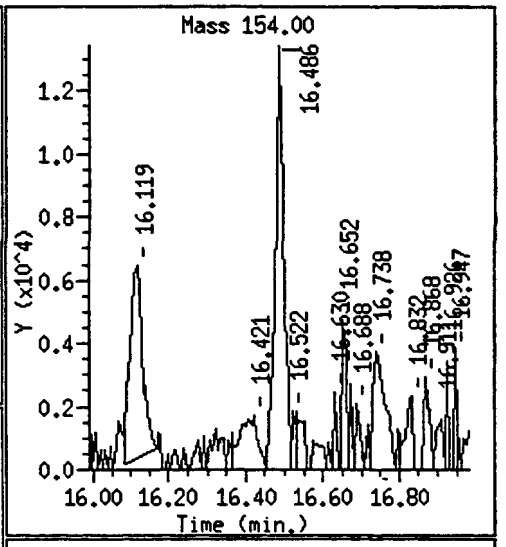
58 Acenaphthene

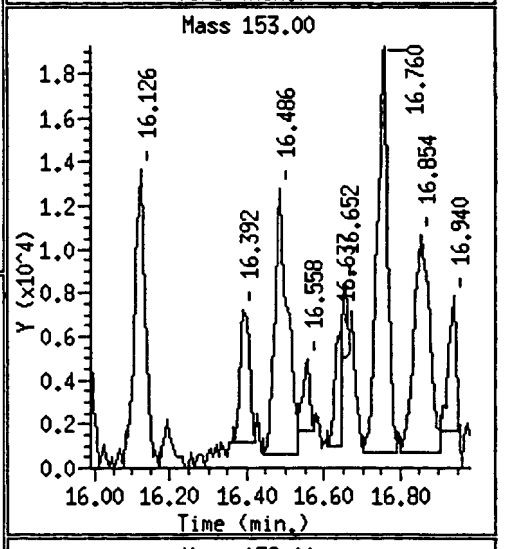


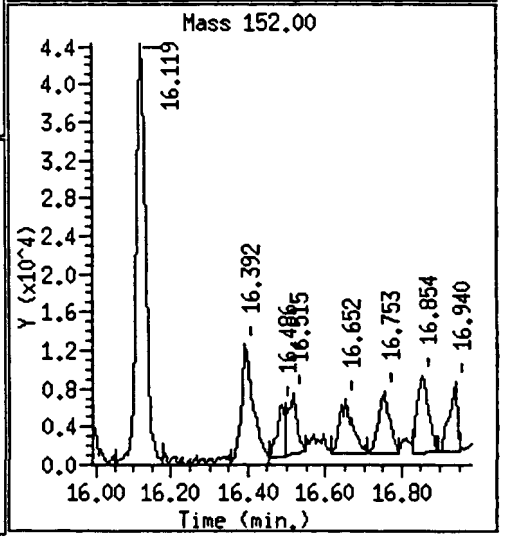












Data File: /chem/Y.i/10-23-97.b/YP790.d

Date : 23-OCT-97 15:09

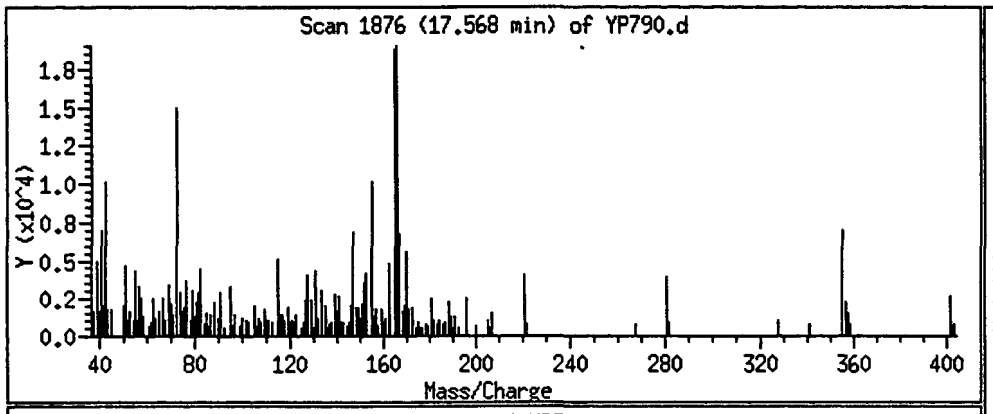
Instrument : Y.i

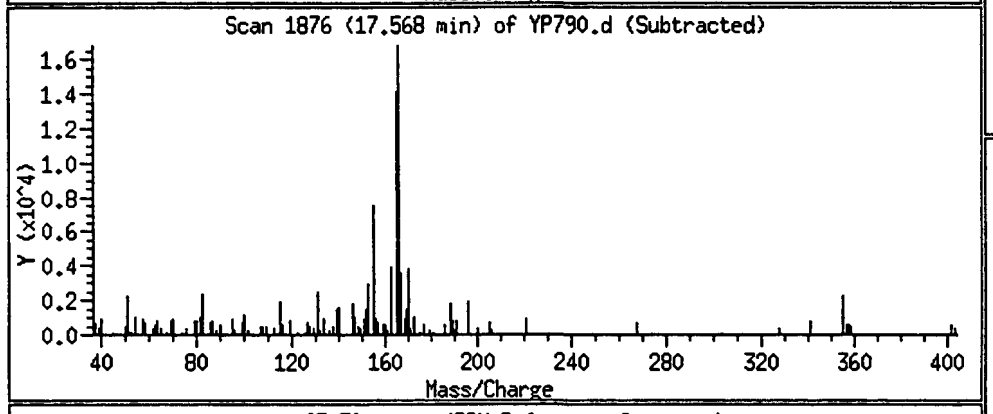
Sample ID : SO-MM5-3-37

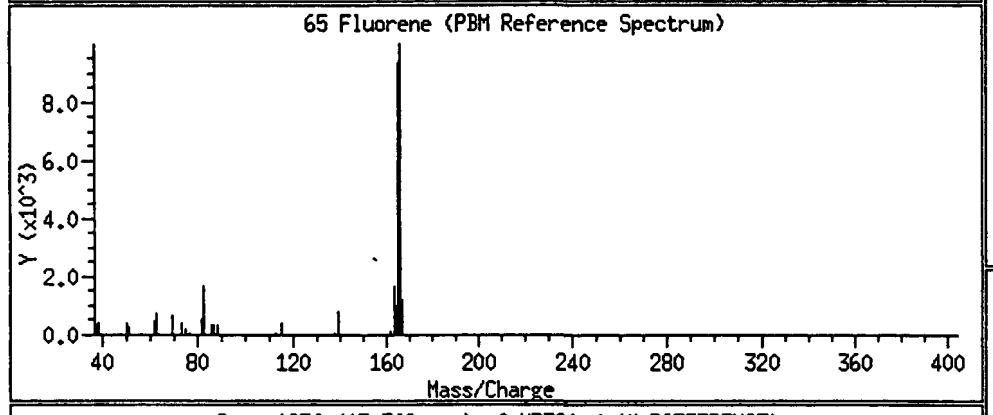
Column phase : DB-5 Column diameter : 0.32

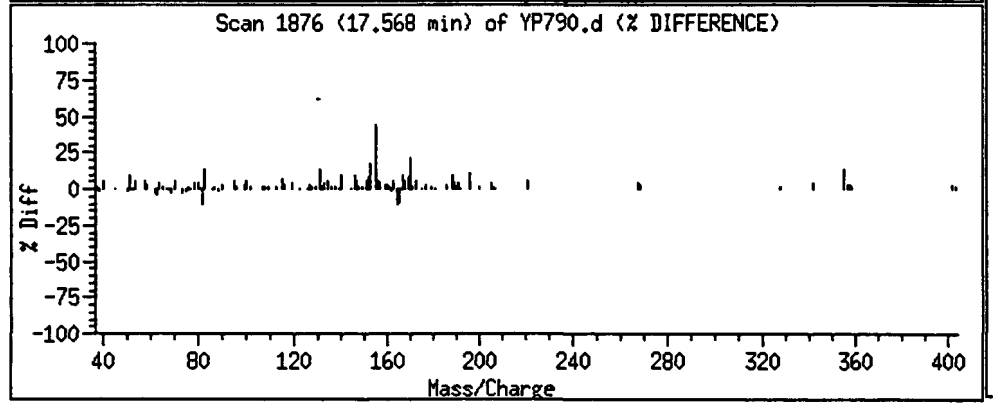
Volume Injected (uL) : 1.0

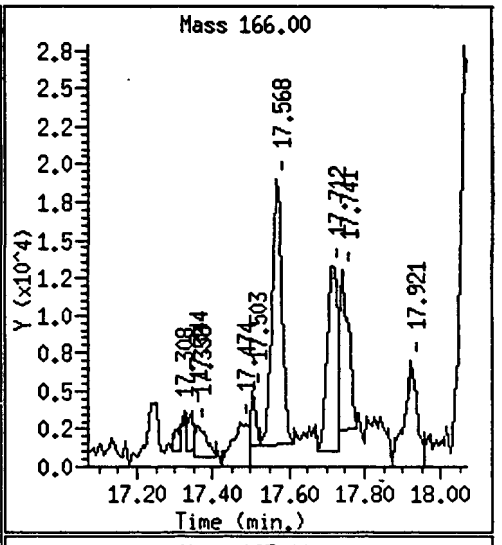
65 Fluorene

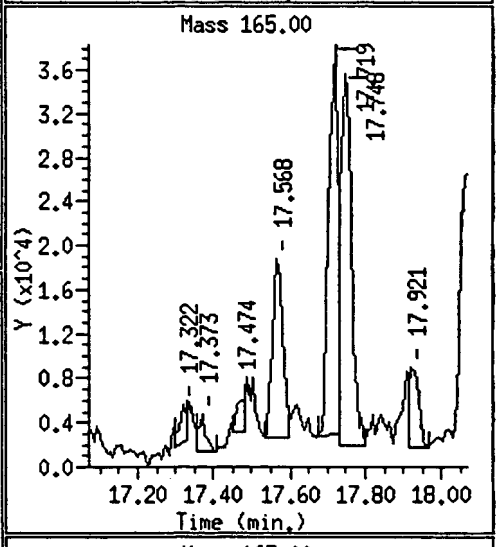


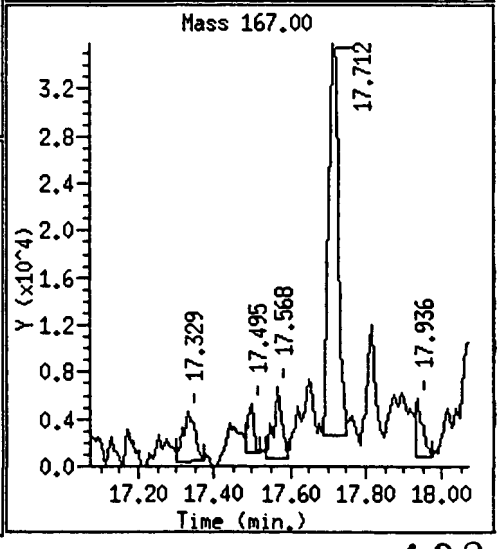












Data File: /chem/Y.i/10-23-97.b/YP790.d

Date : 23-OCT-97 15:09

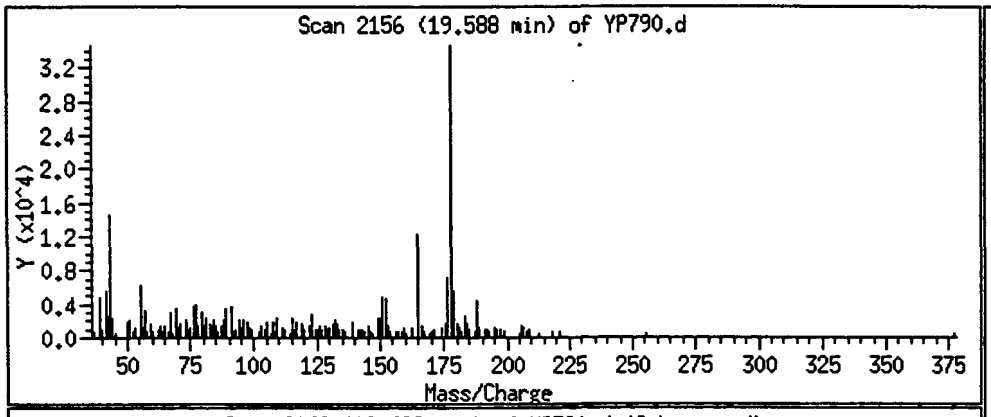
Instrument : Y.i

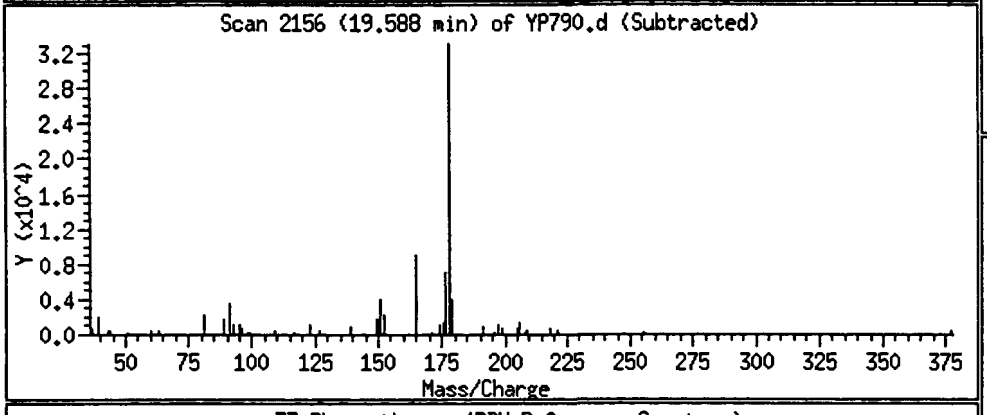
Sample ID : SO-MM5-3-37

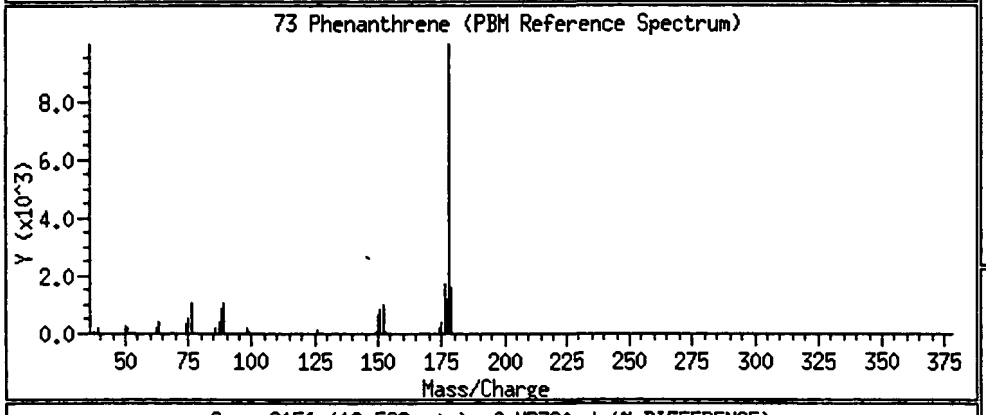
Column phase : DB-5 Column diameter : 0.32

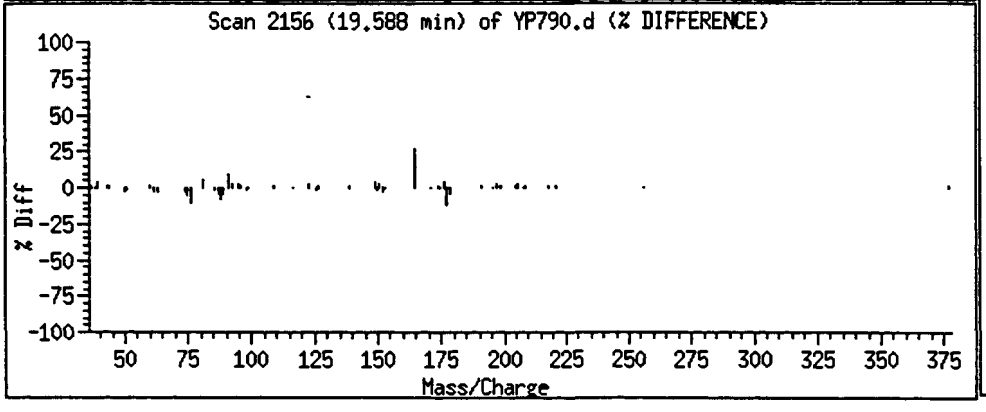
Volume Injected (uL) : 1.0

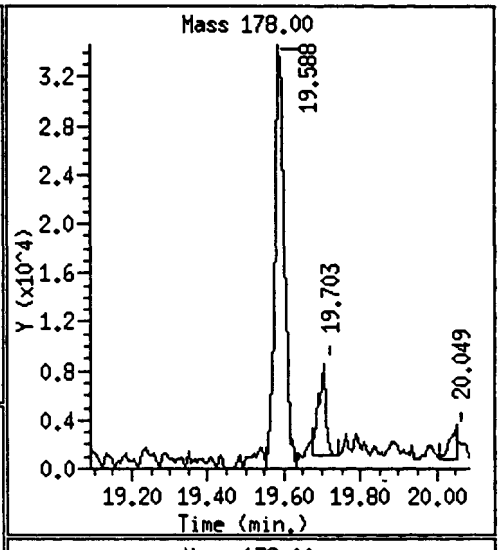
73 Phenanthrene

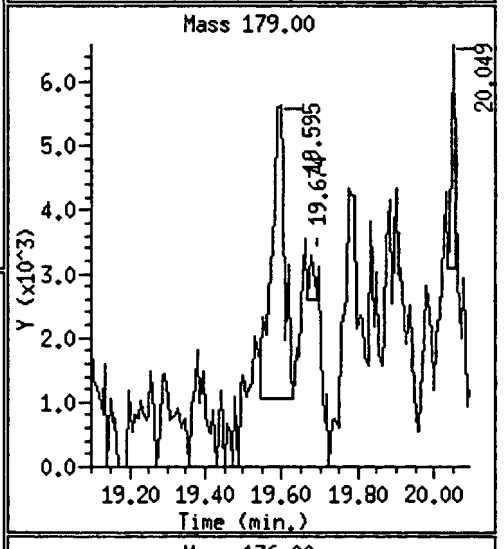


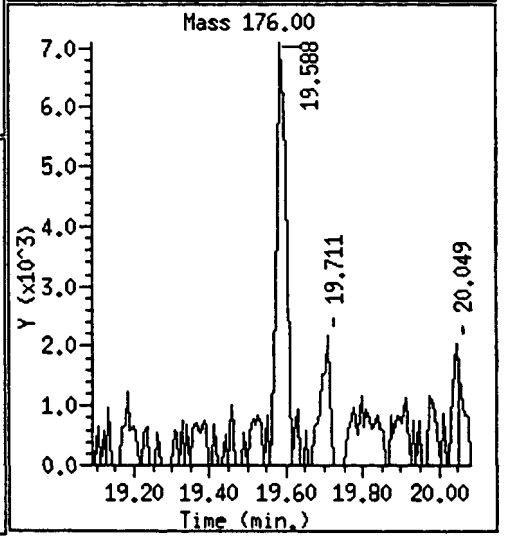












Data File: /chem/Y.i/10-23-97.b/YP790.d

Date : 23-OCT-97 15:09

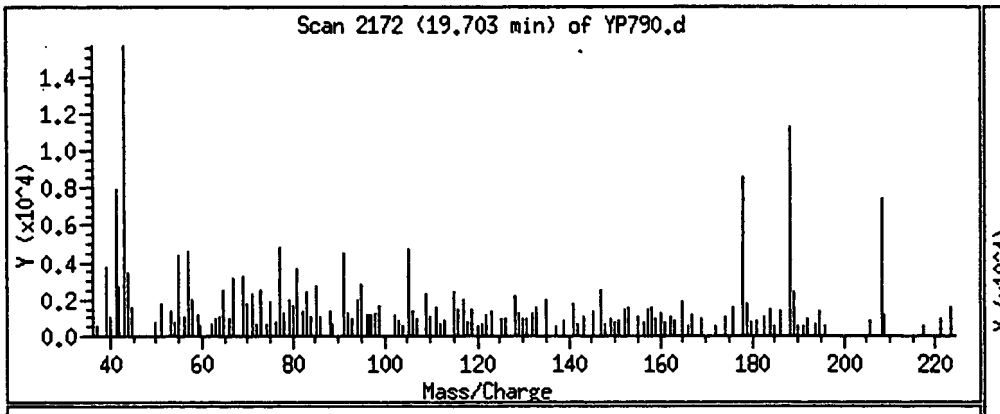
Instrument : Y.i

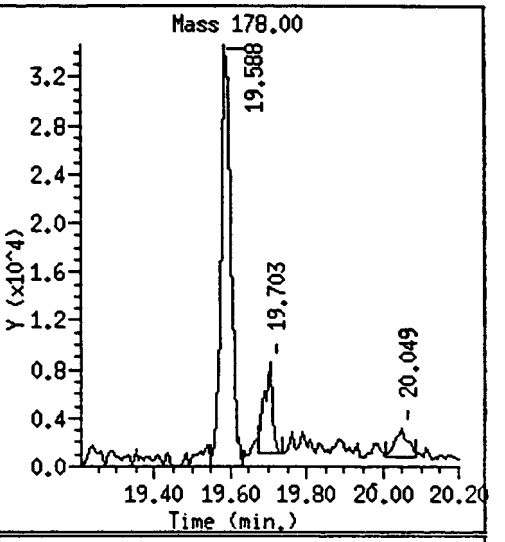
Sample ID : SO-MM5-3-37

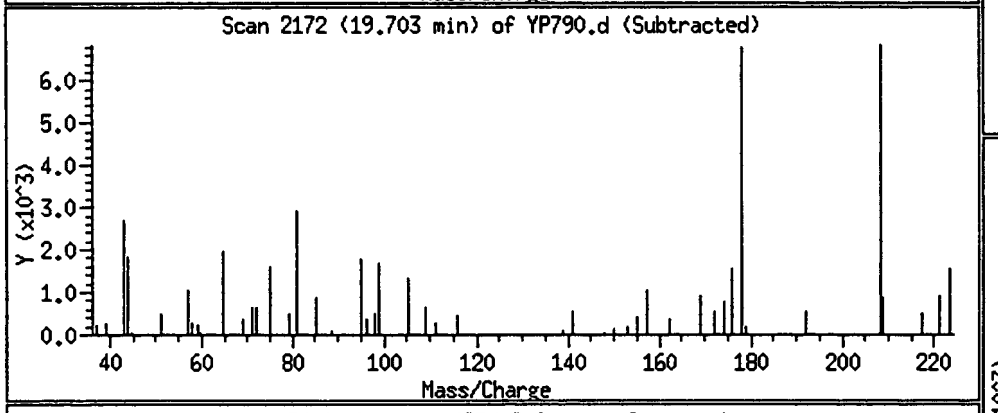
Column phase : DB-5 Column diameter : 0.32

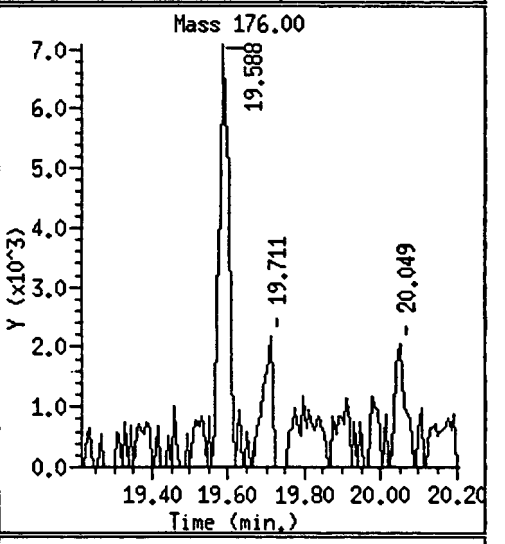
Volume Injected (uL) : 1.0

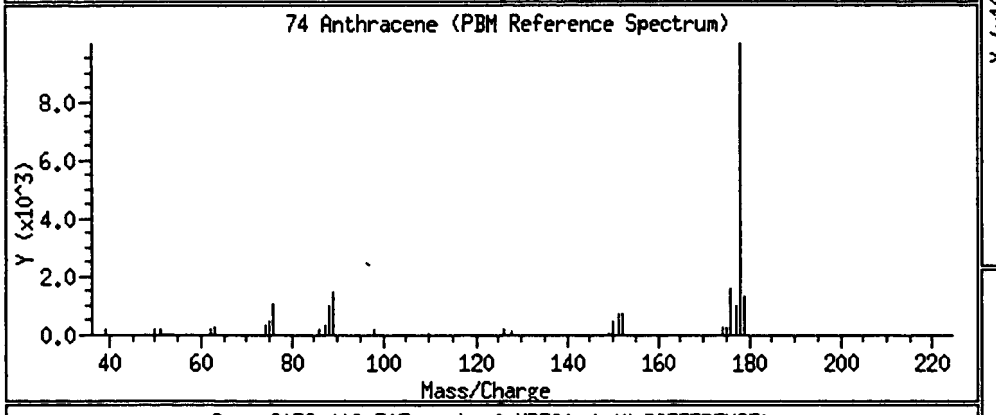
74 Anthracene

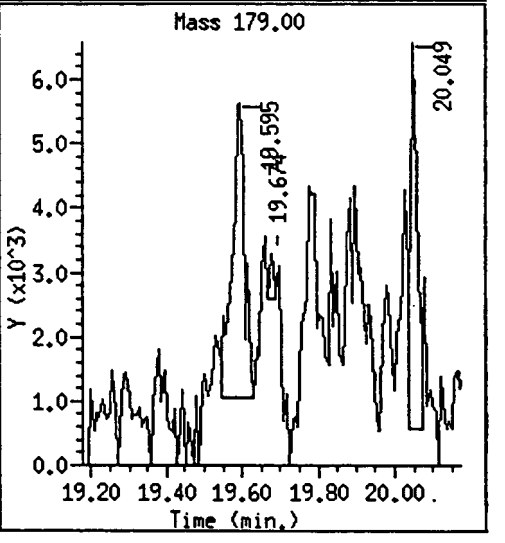


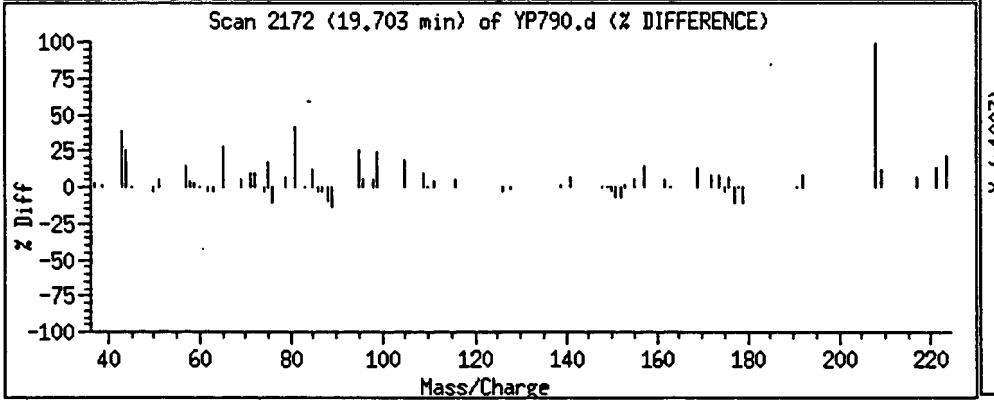












Data File: /chem/Y.i/10-23-97.b/YP790.d

Date : 23-OCT-97 15:09

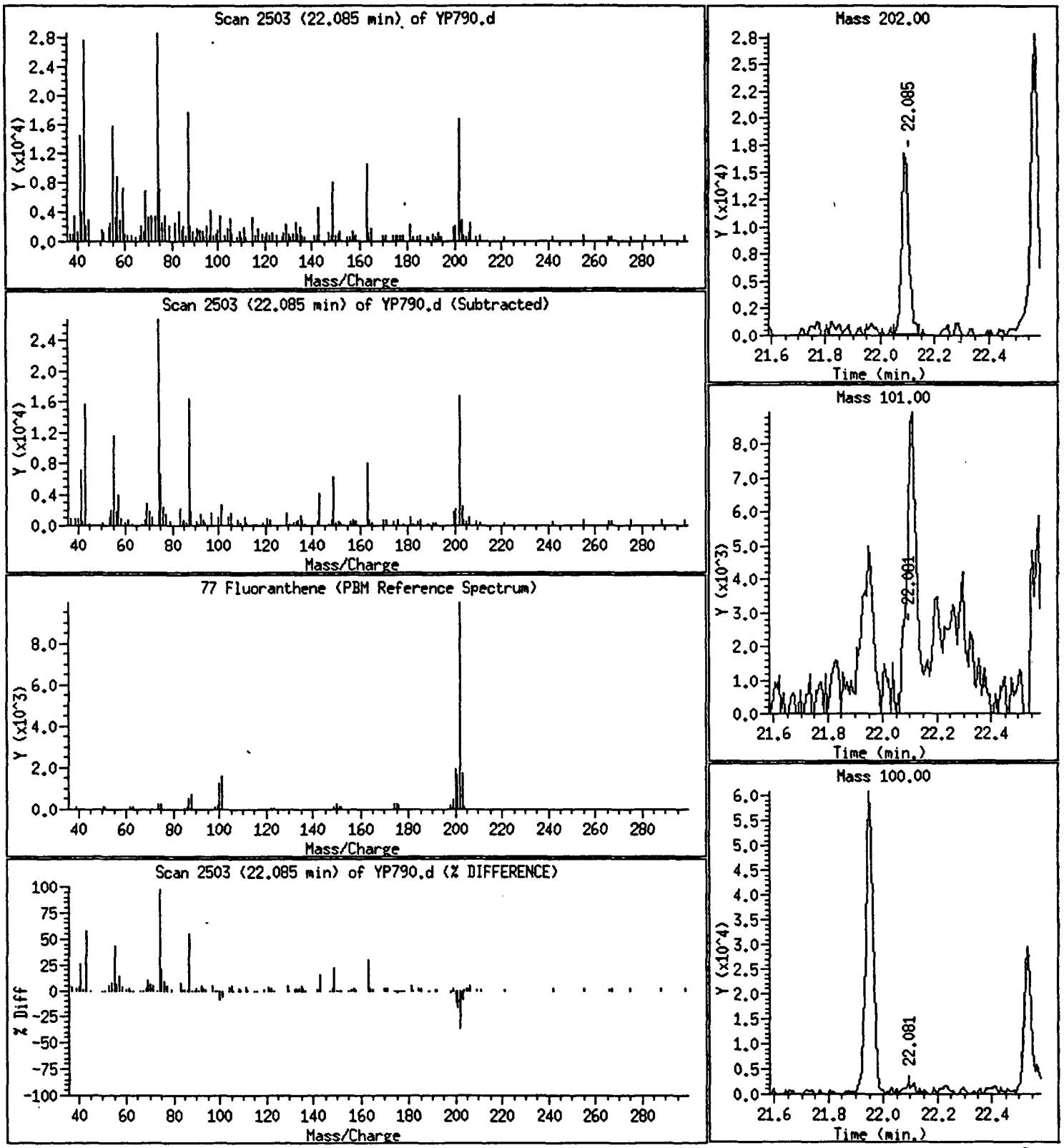
Instrument : Y.i

Sample ID : SO-MM5-3-37

Column phase : DB-5 Column diameter : 0.32

Volume Injected (uL) : 1.0

77 Fluoranthene



Data File: /chem/Y.i/10-23-97.b/YP790.d

Date : 23-OCT-97 15:09

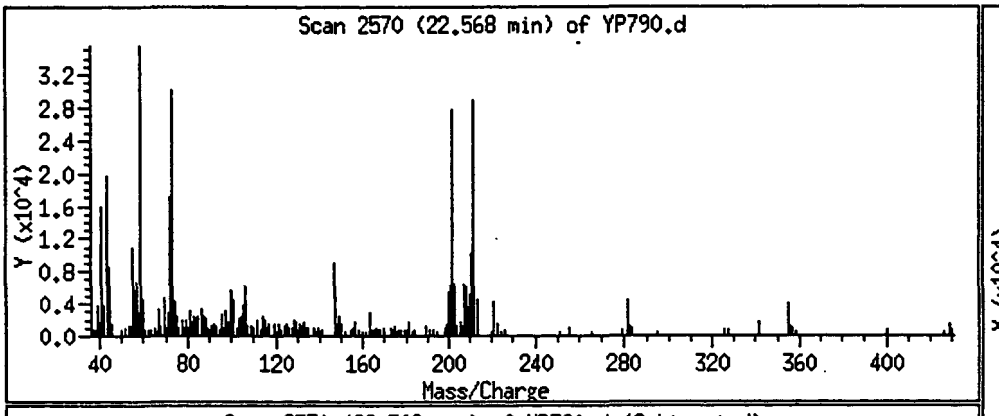
Instrument : Y.i

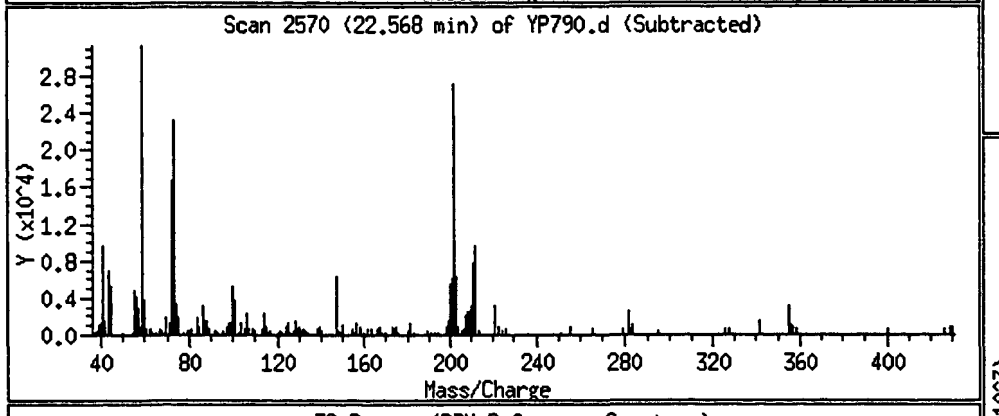
Sample ID : SO-MM5-3-37

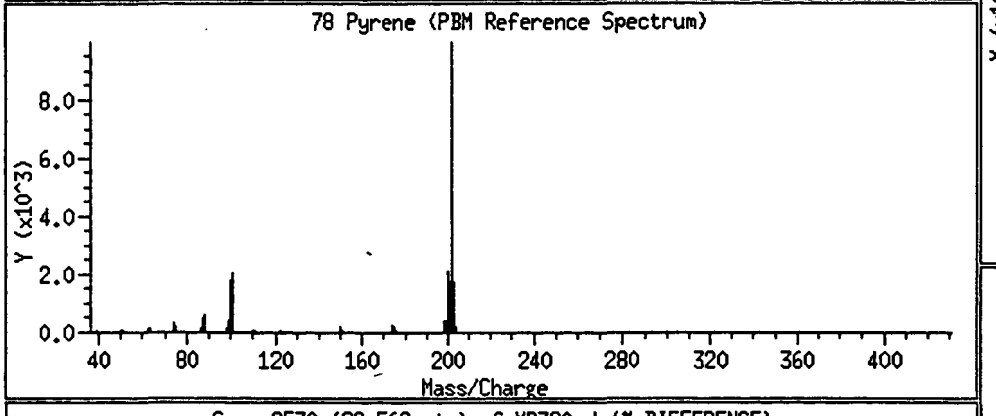
Column phase : DB-5 Column diameter : 0.32

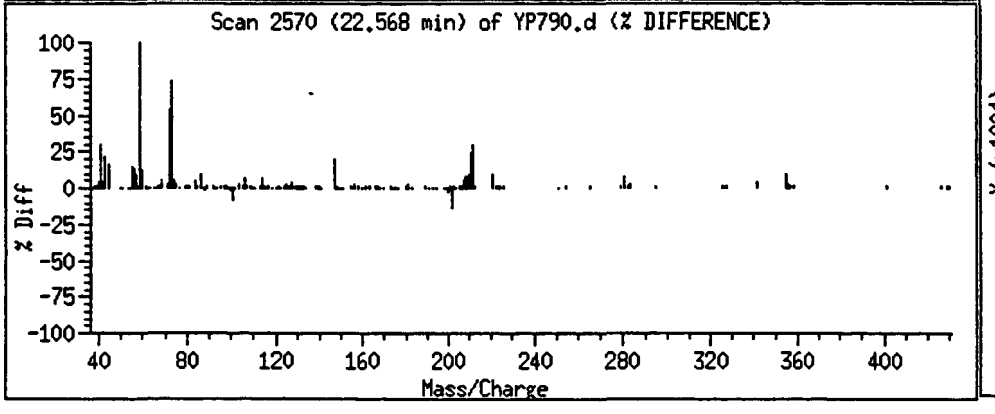
Volume Injected (uL) : 1.0

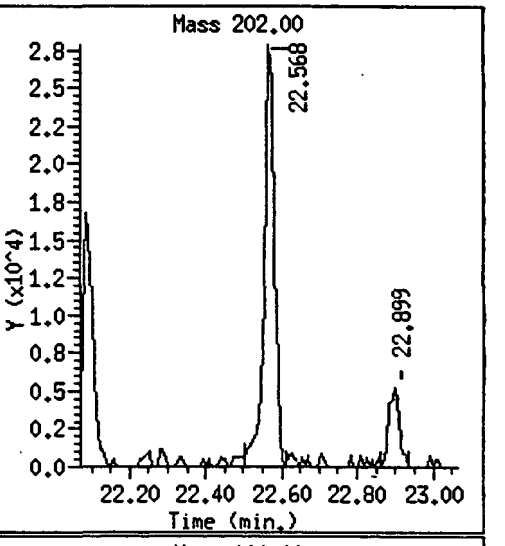
78 Pyrene

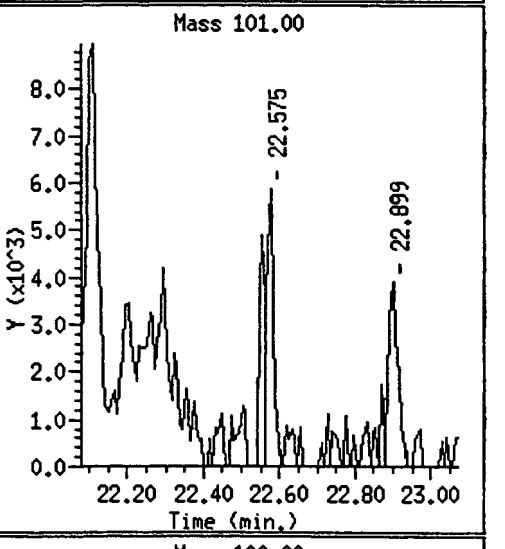


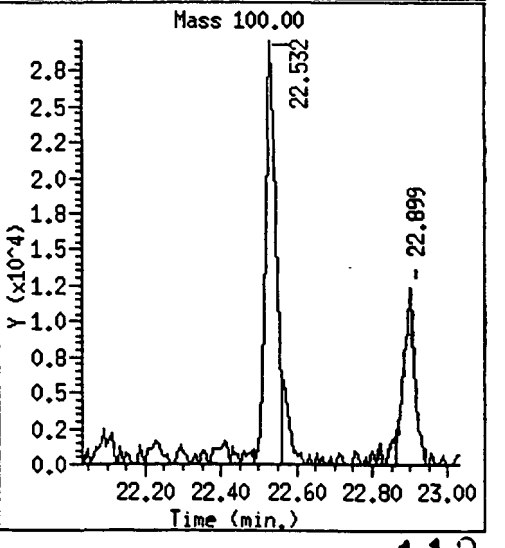












Data File: /chem/Y.i/10-23-97.b/CAA/YP790.d

Date : 23-OCT-97 15:09

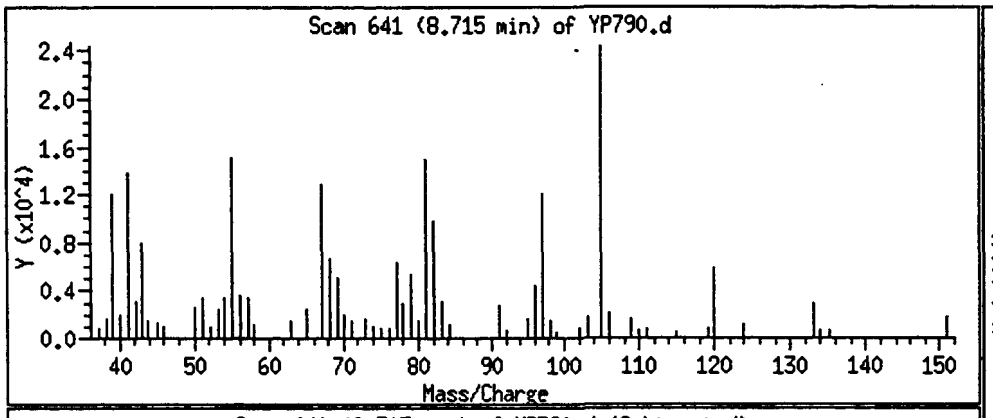
Instrument : Y.i

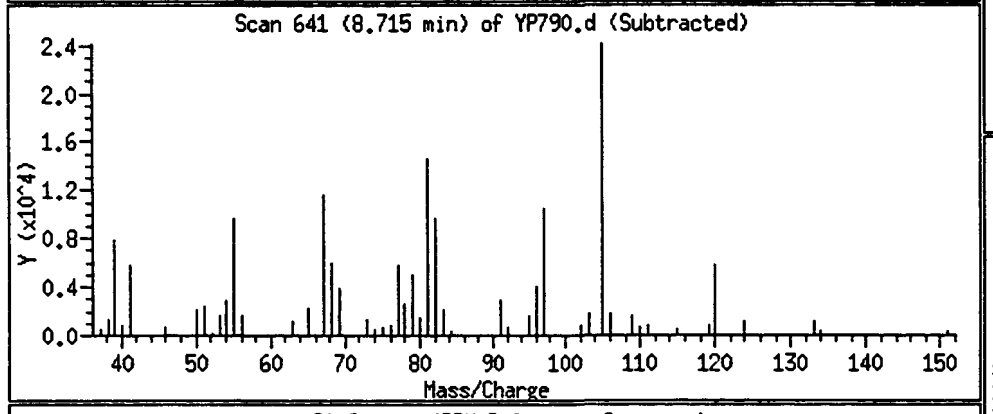
Sample ID : SO-MM5-3-37

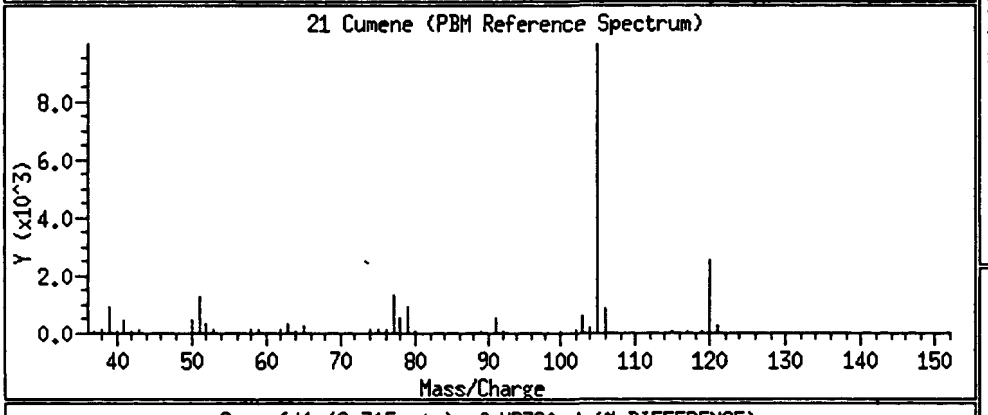
Column phase : DB.5-625 Column diameter : 0.32

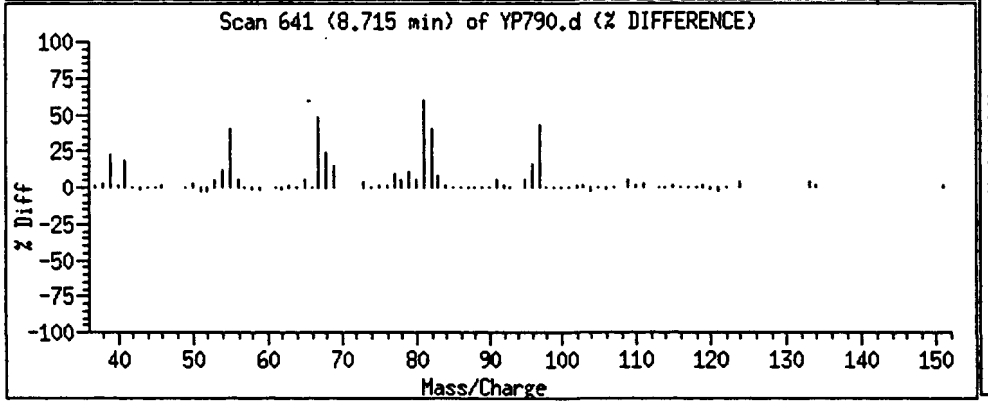
Volume Injected (uL) : 1.0

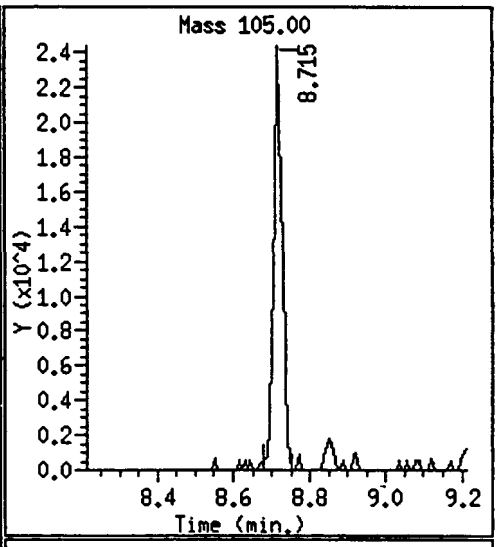
21 Cumene

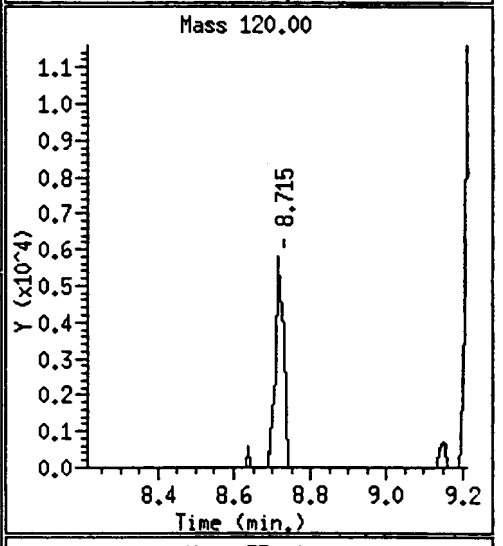


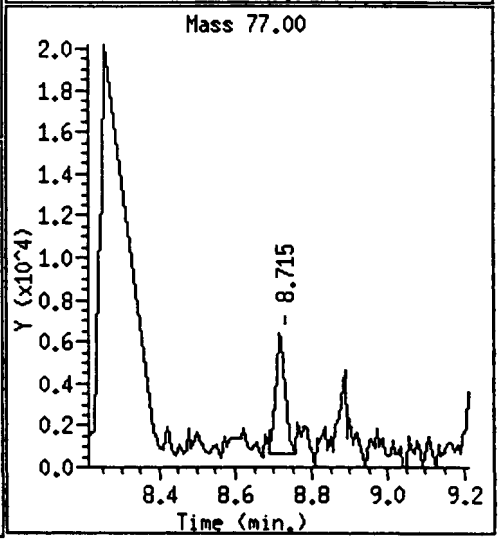












Data File: /chem/Y.i/10-23-97.b/CAA/YP790.d

Date : 23-OCT-97 15:09

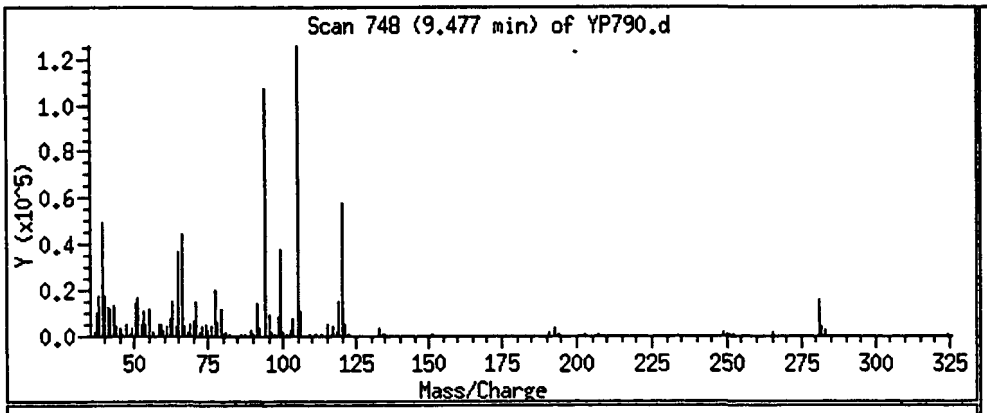
Instrument : Y.i

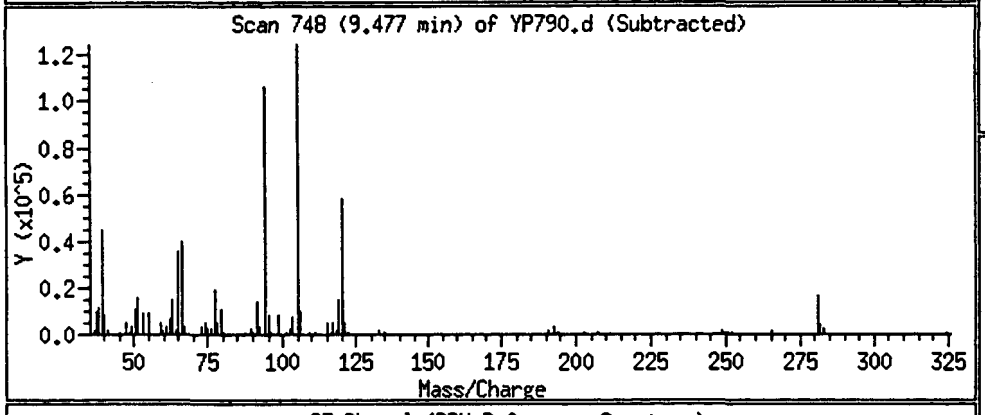
Sample ID : SO-MM5-3-37

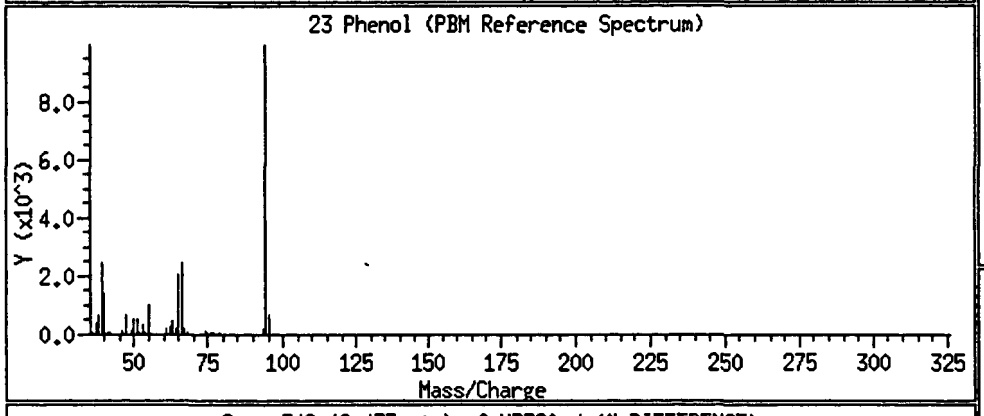
Column phase : DB.5-625 Column diameter : 0.32

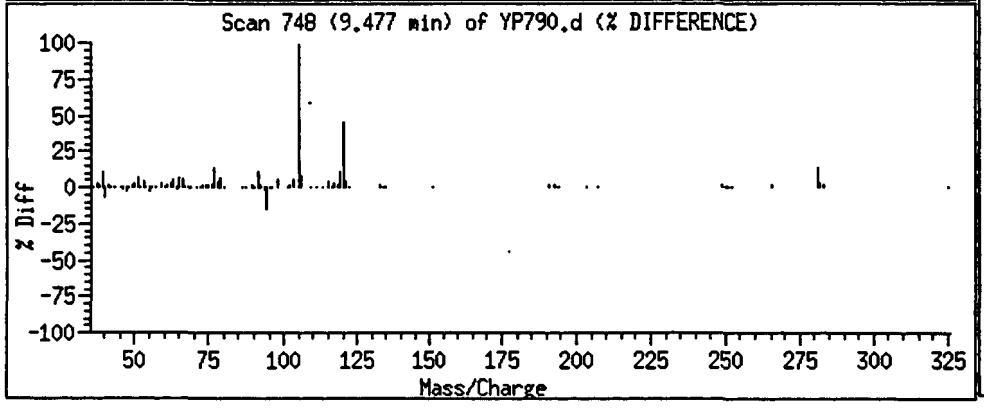
Volume Injected (uL) : 1.0

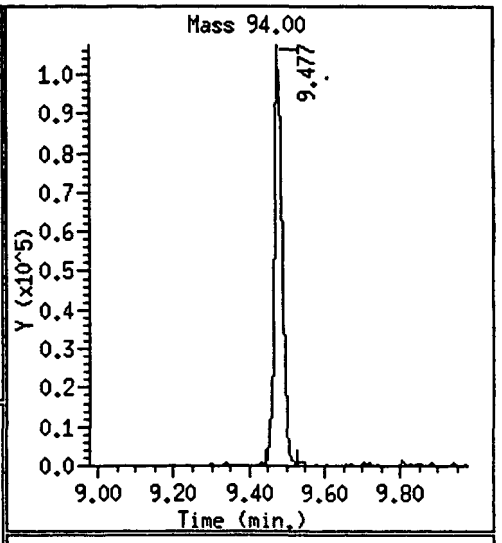
23 Phenol

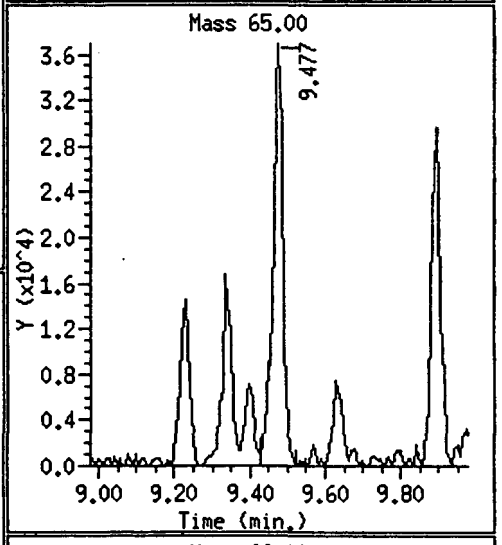


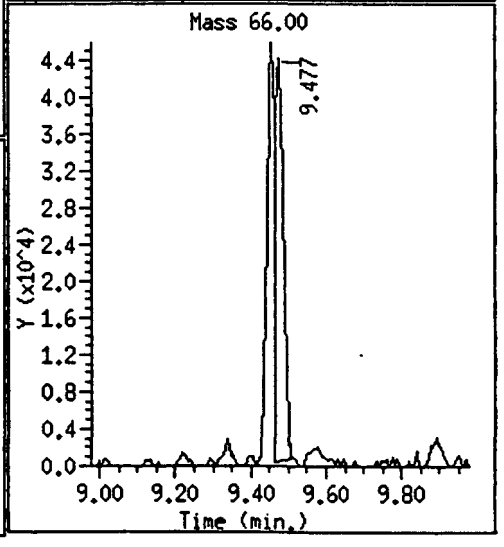












Data File: /chem/Y.i/10-23-97.b/CAA/YP790.d

Date : 23-OCT-97 15:09

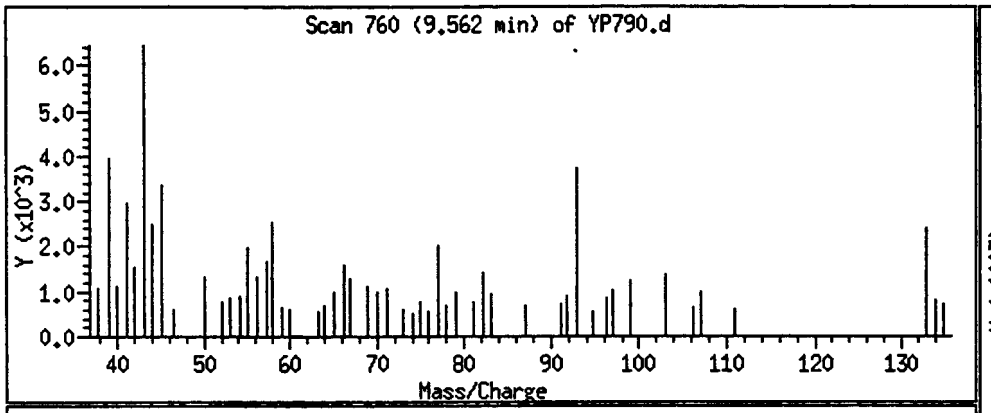
Instrument : Y.i

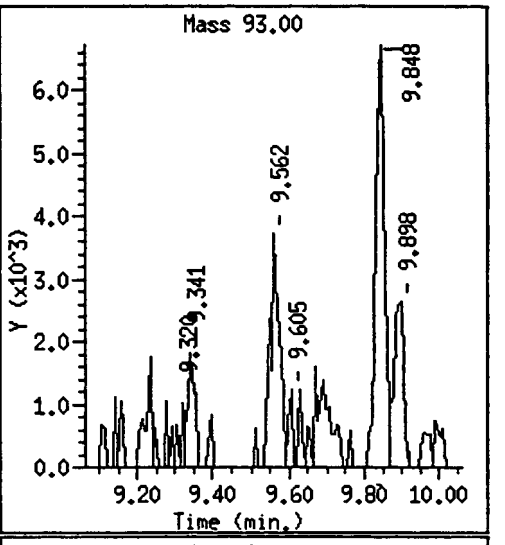
Sample ID : SO-MM5-3-37

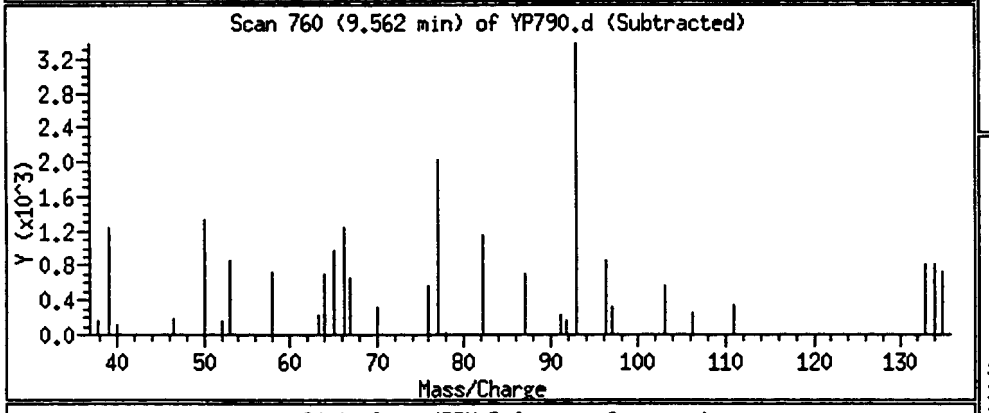
Column phase : DB.5-625 Column diameter : 0.32

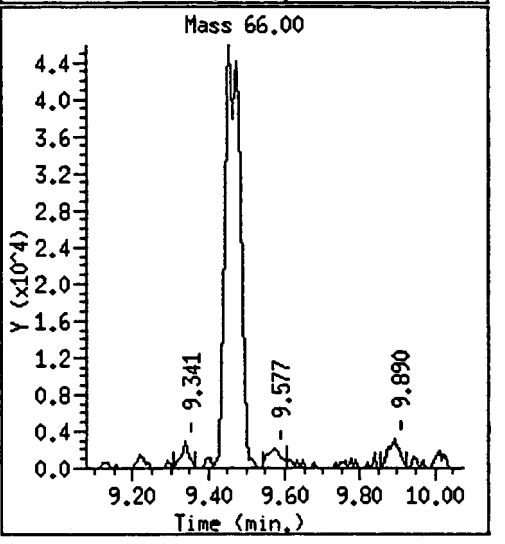
Volume Injected (uL) : 1.0

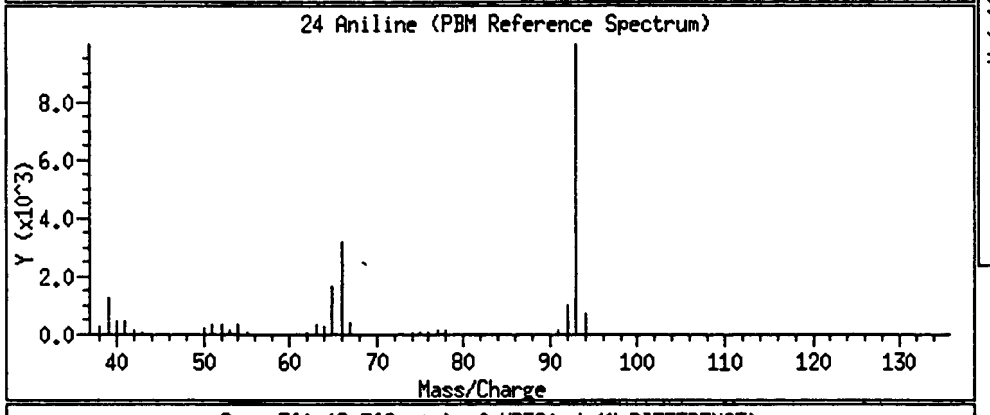
24 Aniline

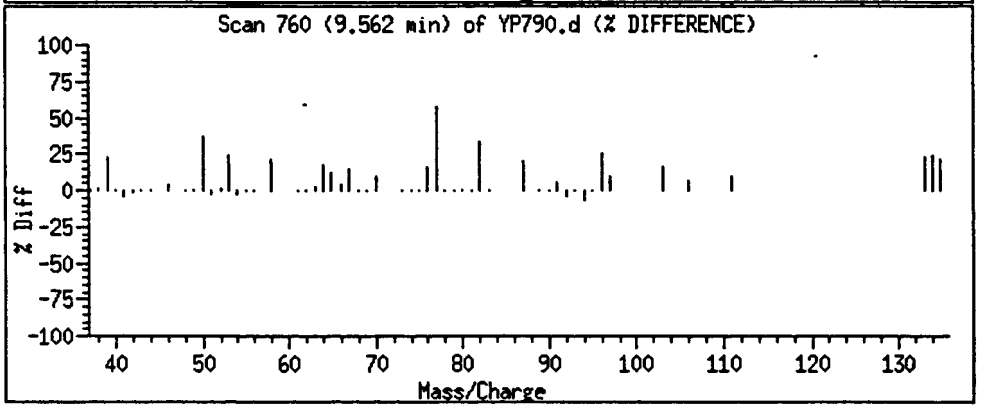












Data File: /chem/Y.i/10-23-97.b/CAA/YP790.d

Date : 23-OCT-97 15:09

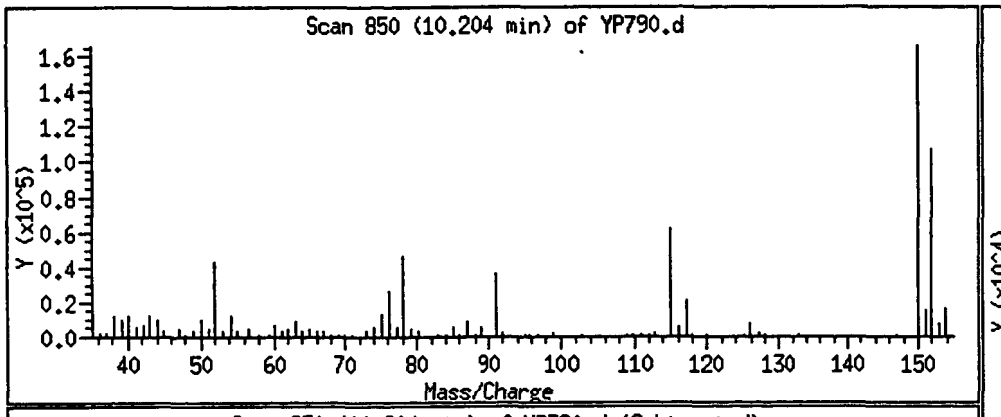
Instrument : Y.i

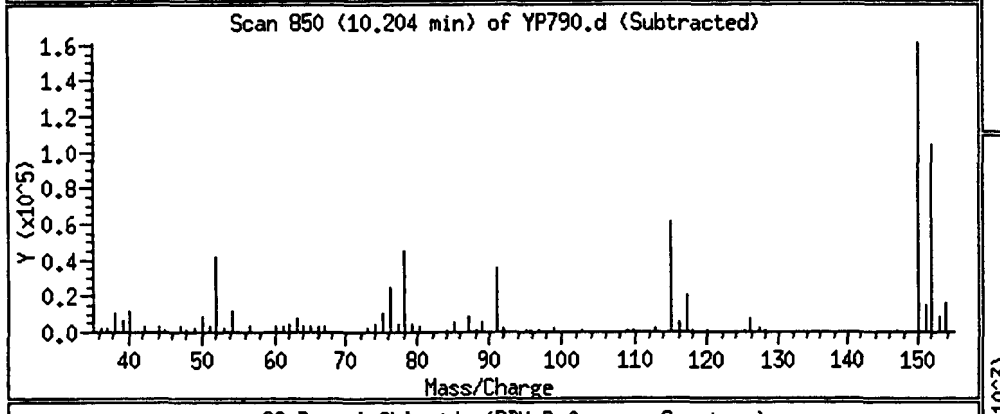
Sample ID : SO-MM5-3-37

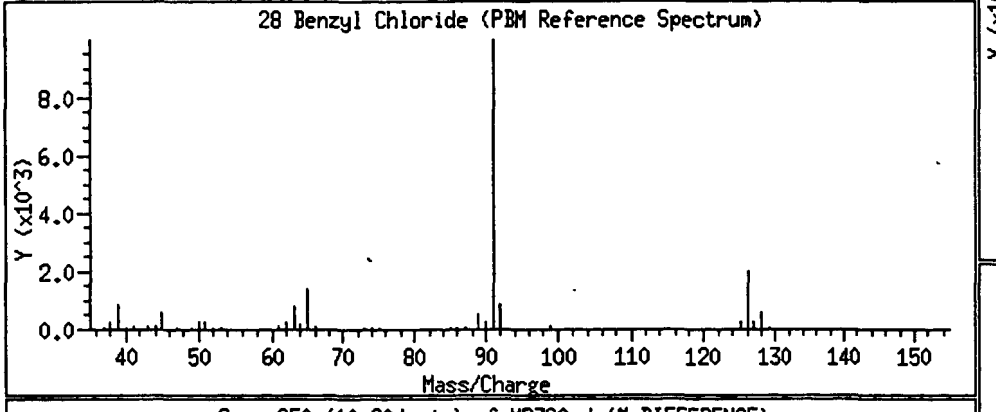
Column phase : DB.5-625 Column diameter : 0.32

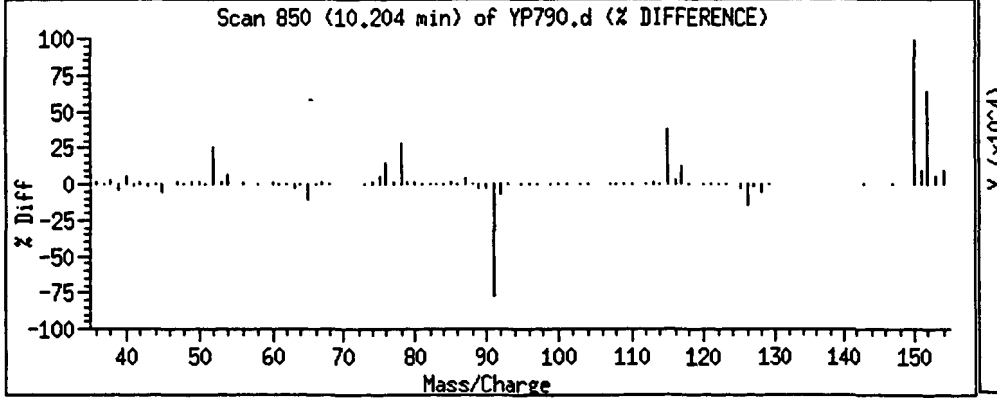
Volume Injected (uL) : 1.0

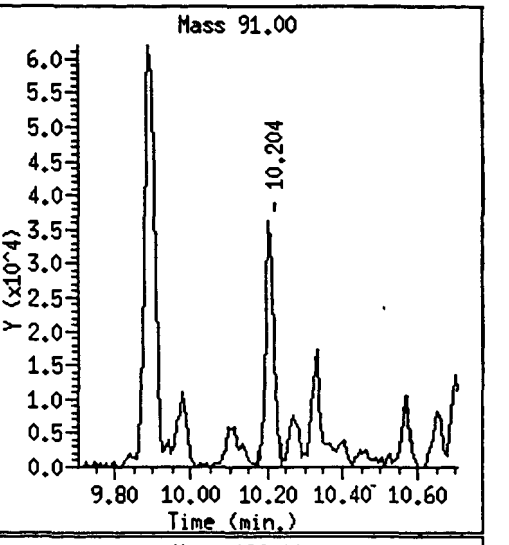
28 Benzyl Chloride

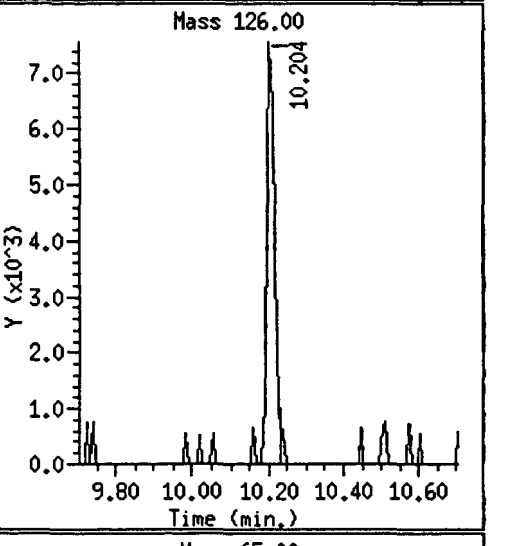


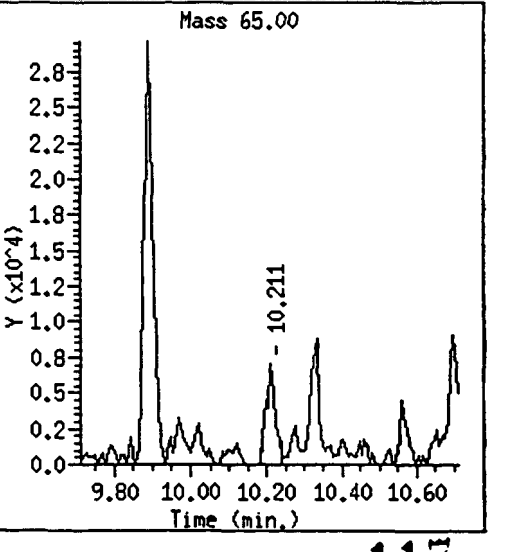












Data File: /chem/Y.i/10-23-97.b/CAA/YP790.d

Date : 23-OCT-97 15:09

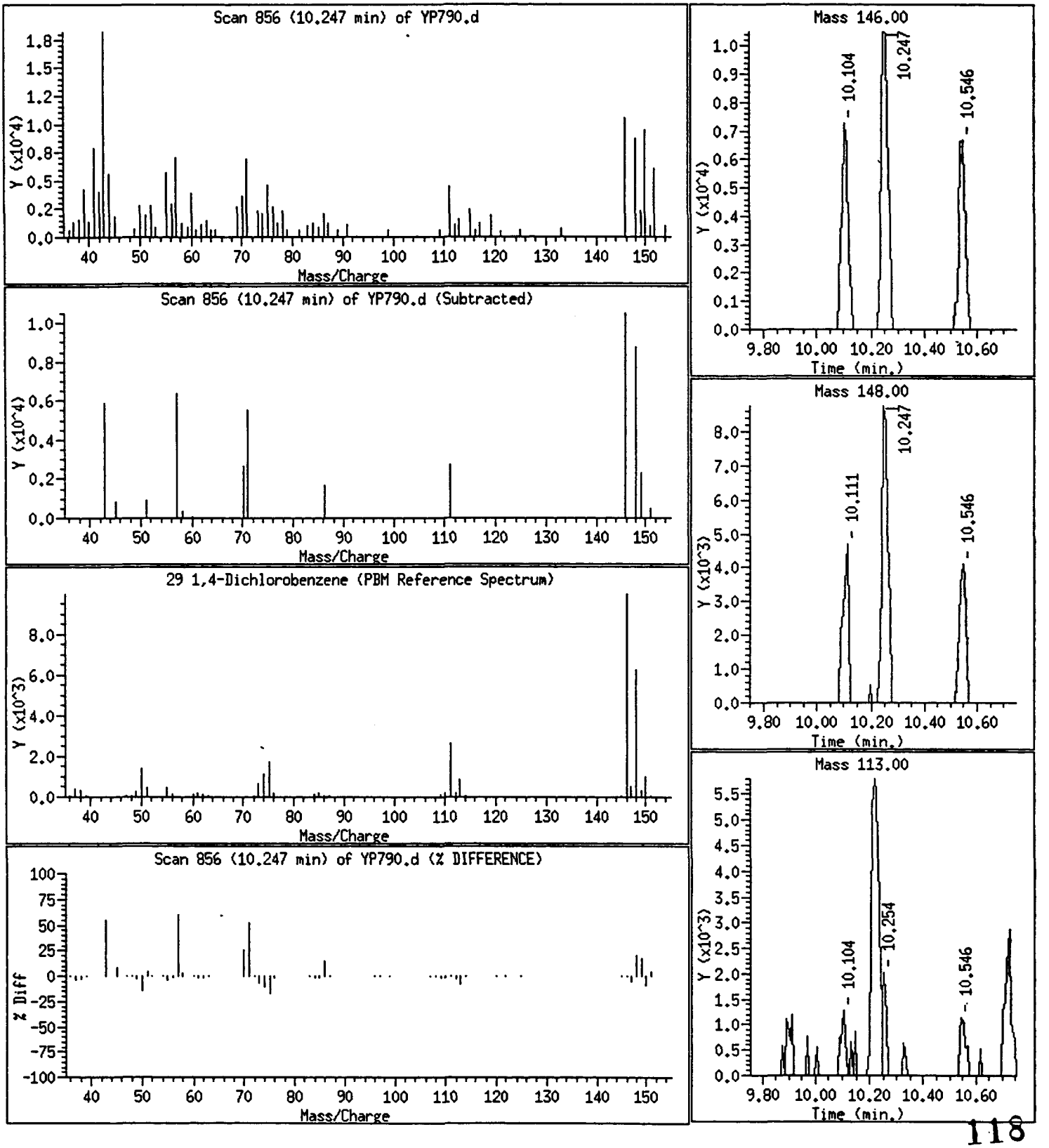
Instrument : Y.i

Sample ID : SO-MM5-3-37

Column phase : DB.5-625 Column diameter : 0.32

Volume Injected (uL) : 1.0

29 1,4-Dichlorobenzene



Data File: /chem/Y.i/10-23-97.b/CAA/YP790.d

Date : 23-OCT-97 15:09

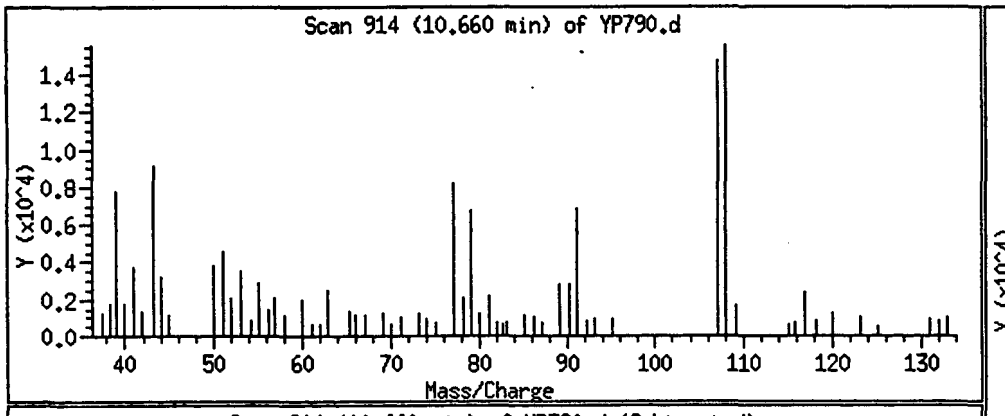
Instrument : Y.i

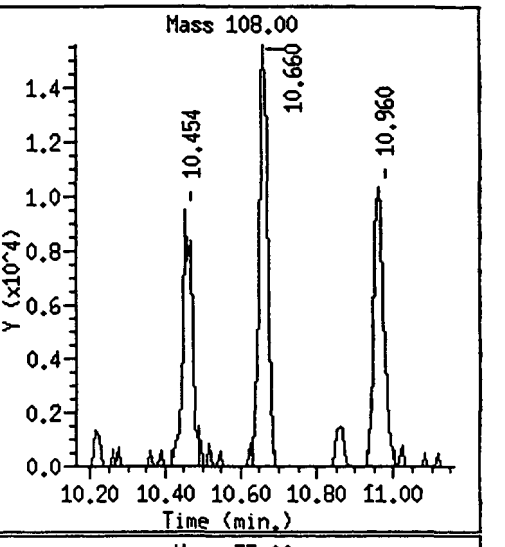
Sample ID : SO-MM5-3-37

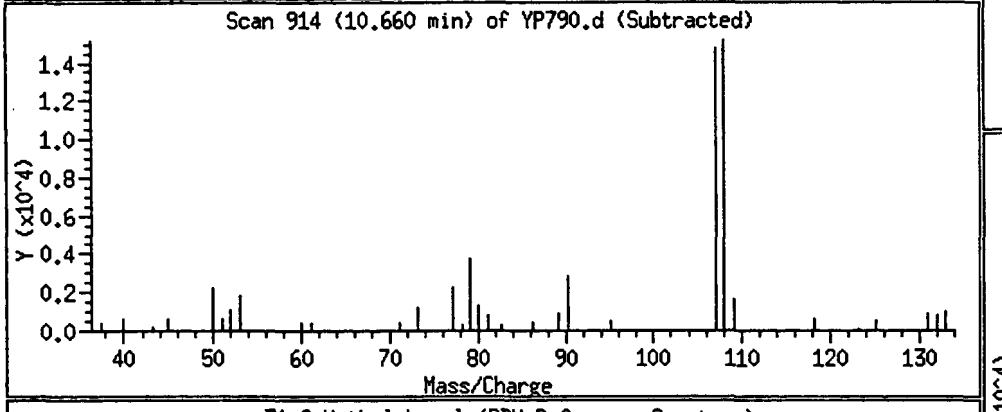
Column phase : DB.5-625 Column diameter : 0.32

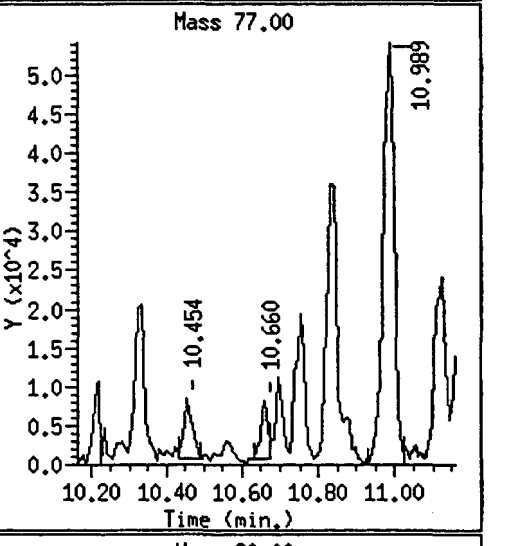
Volume Injected (uL) : 1.0

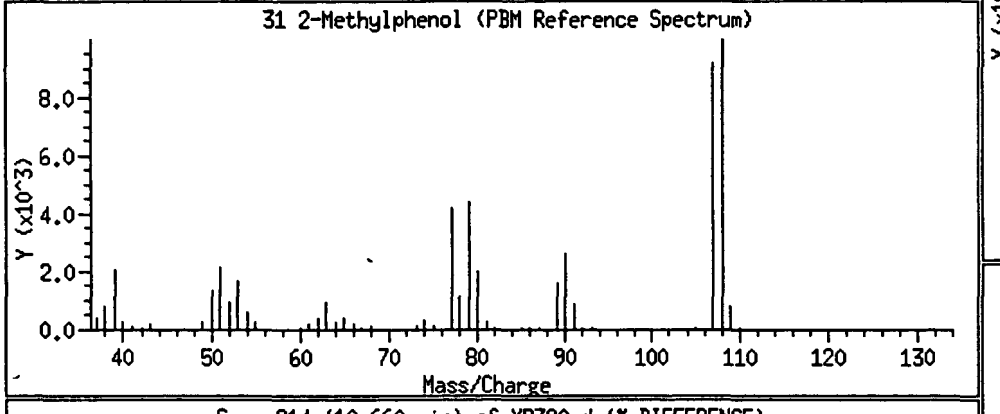
31 2-Methylphenol

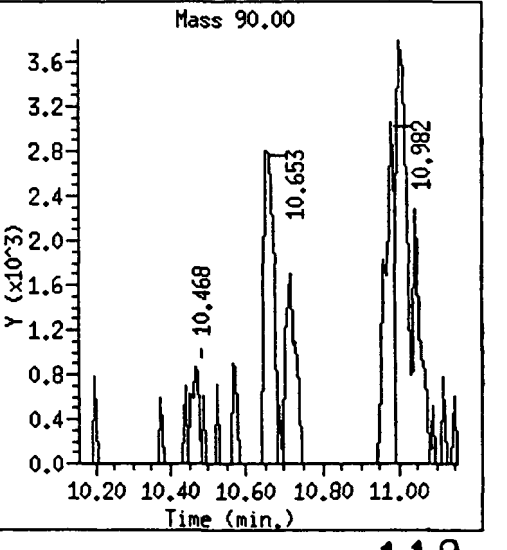


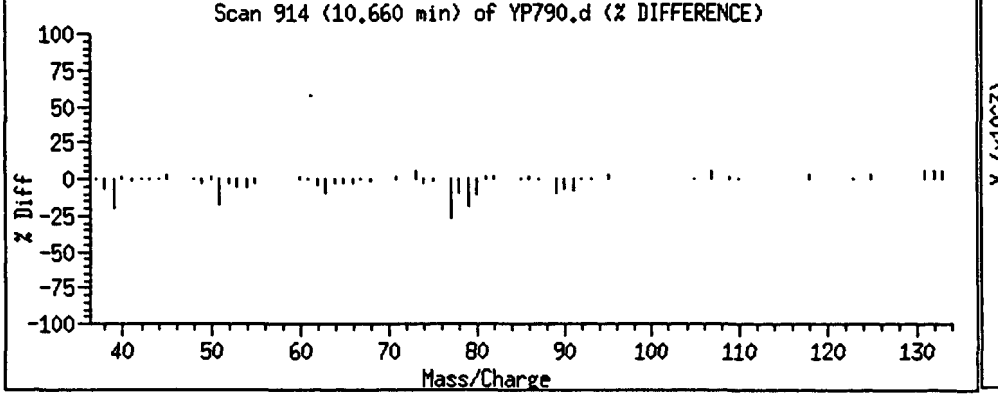












Data File: /chem/Y.i/10-23-97.b/CAA/YP790.d

Date : 23-OCT-97 15:09

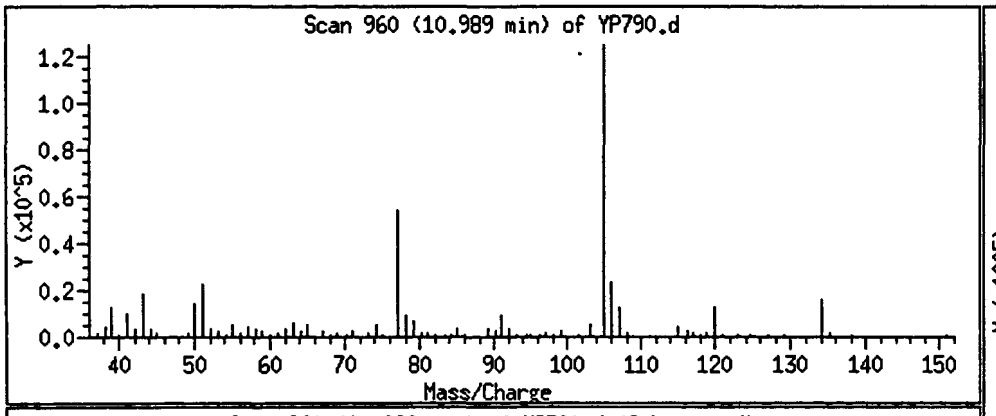
Instrument : Y.i

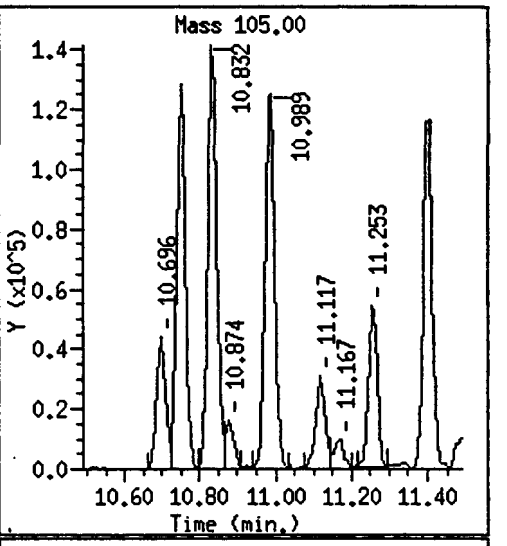
Sample ID : SO-MM5-3-37

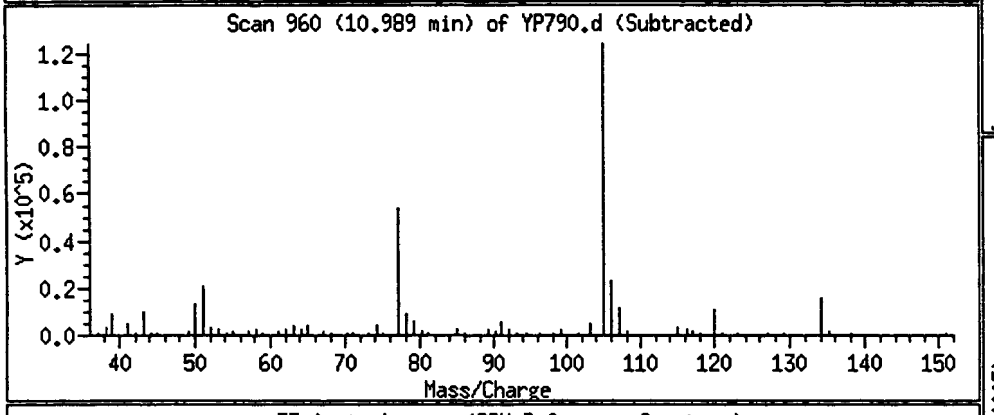
Column phase : DB.5-625 Column diameter : 0.32

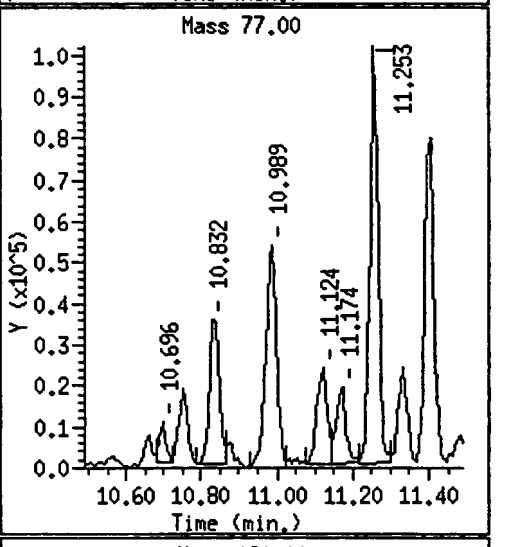
Volume Injected (uL) : 1.0

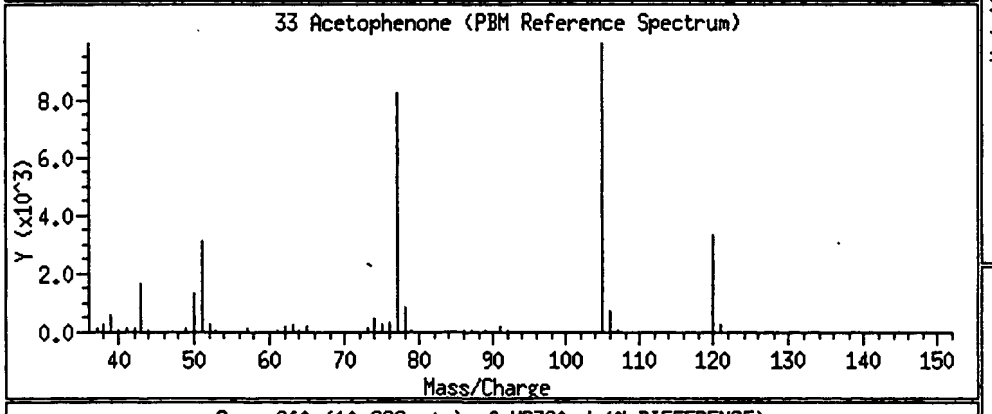
33 Acetophenone

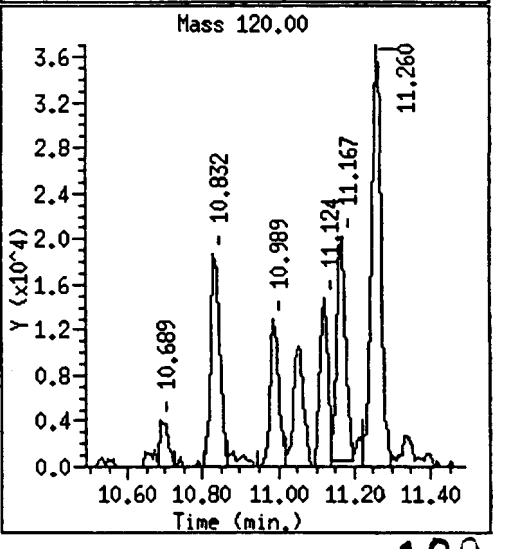


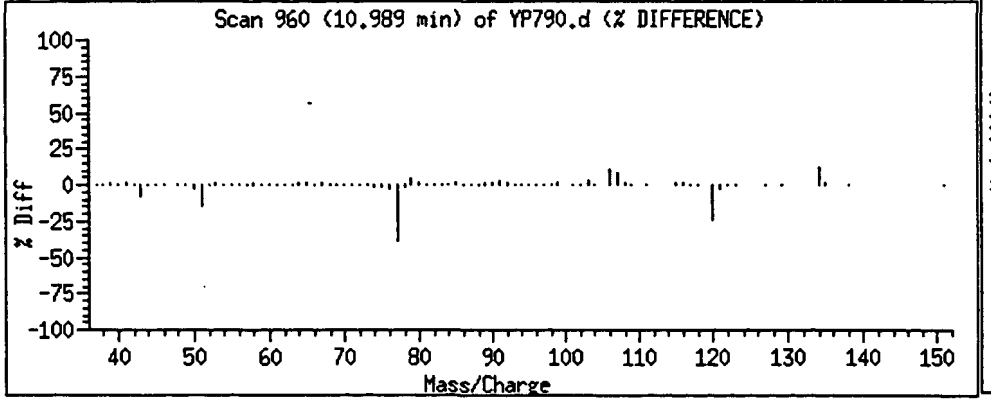












Data File: /chem/Y.i/10-23-97.b/CAA/YP790.d

Date : 23-OCT-97 15:09

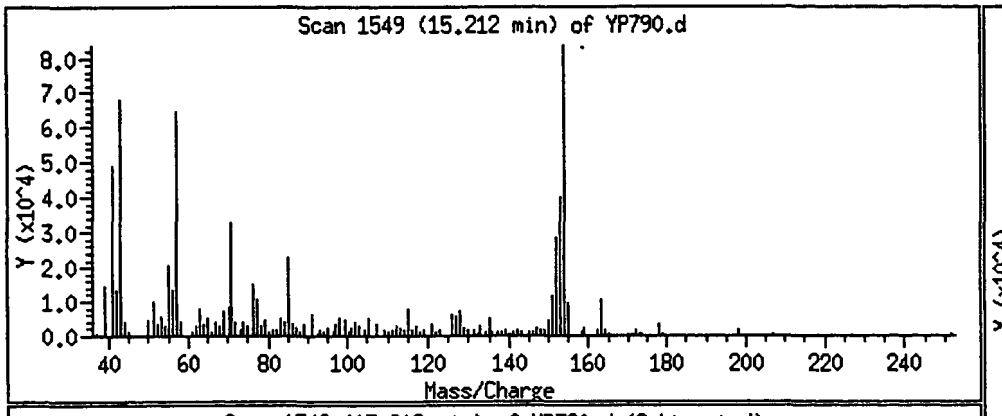
Instrument : Y.i

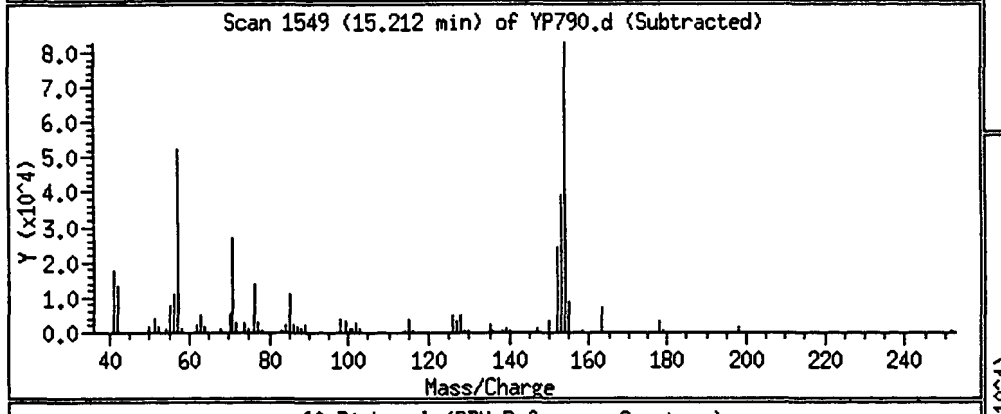
Sample ID : SO-MM5-3-37

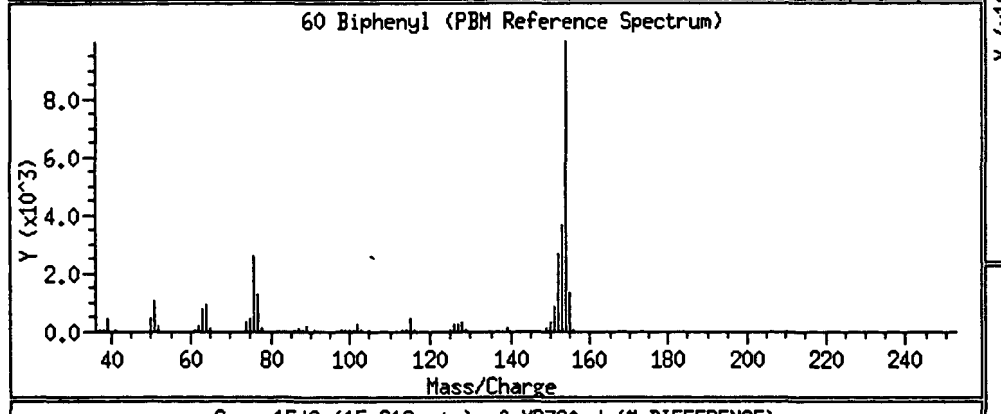
Column phase : DB.5-625 Column diameter : 0.32

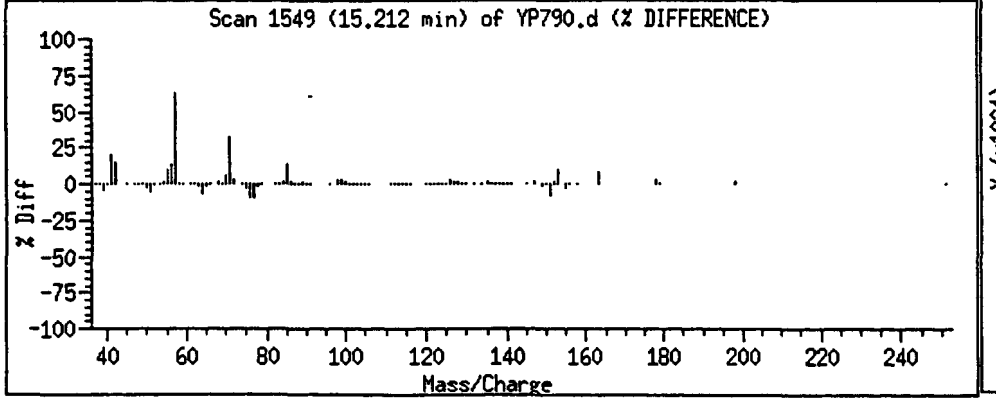
Volume Injected (uL) : 1.0

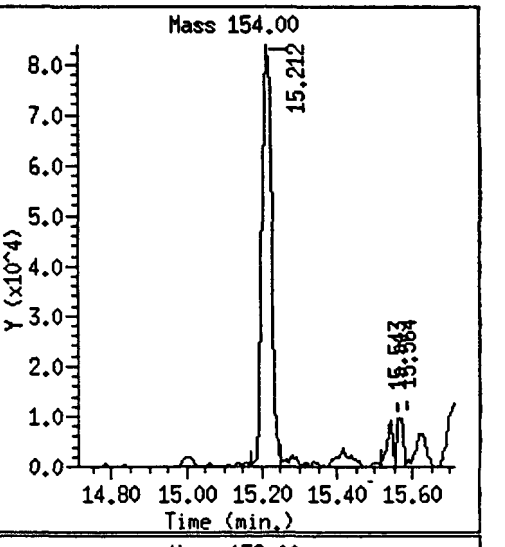
60 Biphenyl

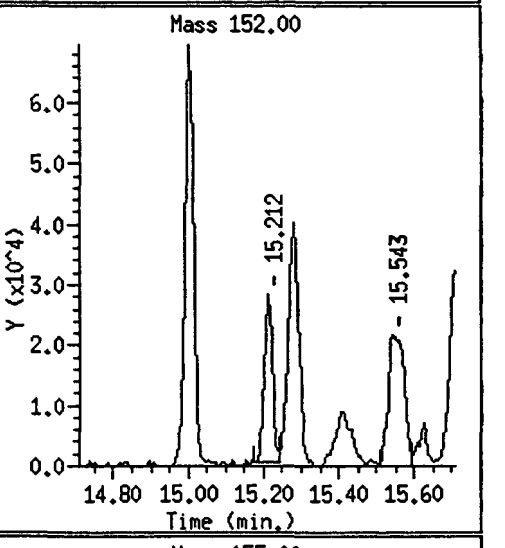


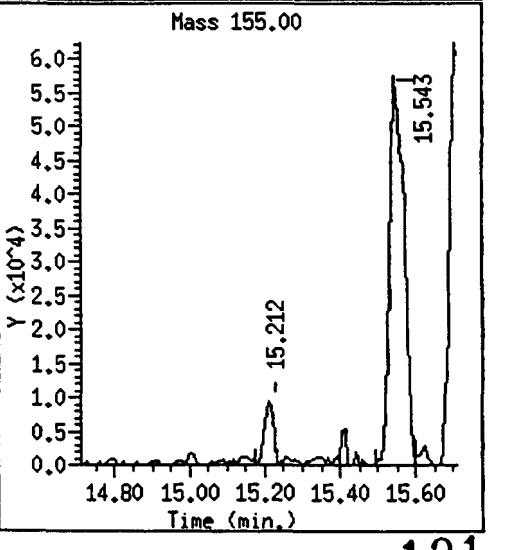












Data File: /chem/Y.i/10-23-97.b/CAA/YP790.d

Date : 23-OCT-97 15:09

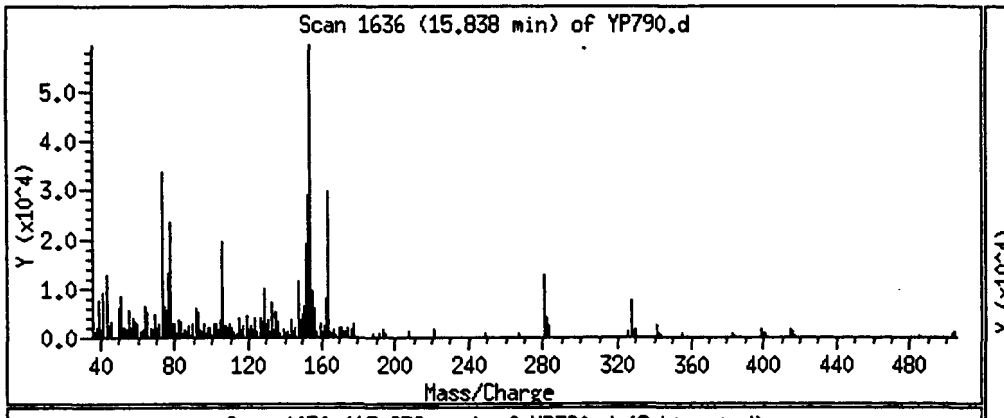
Instrument : Y.i

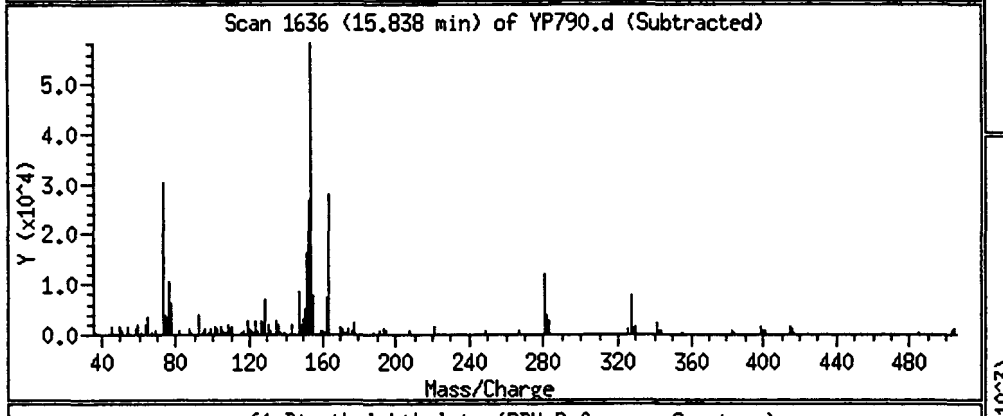
Sample ID : SO-MM5-3-37

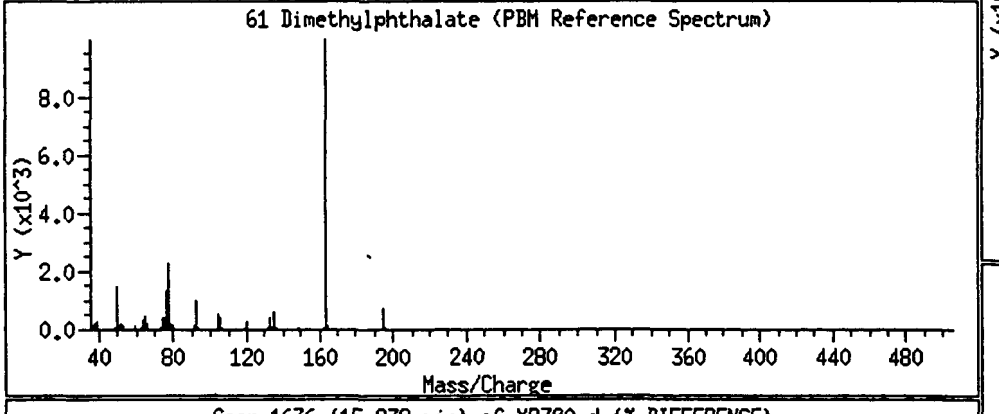
Column phase : DB.5-625 Column diameter : 0.32

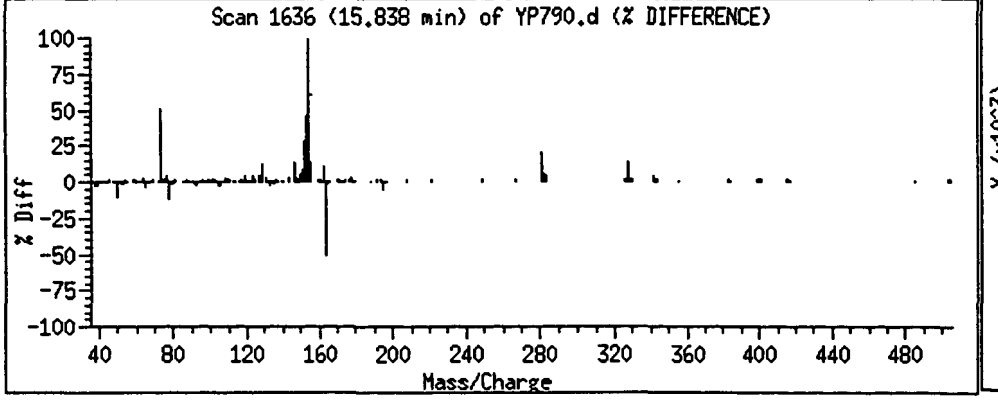
Volume Injected (uL) : 1.0

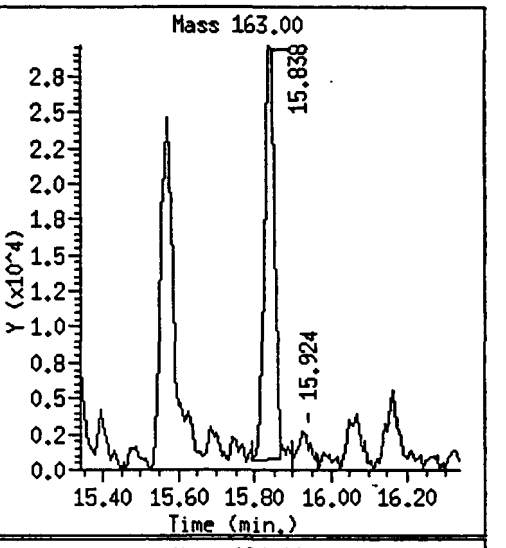
61 Dimethylphthalate

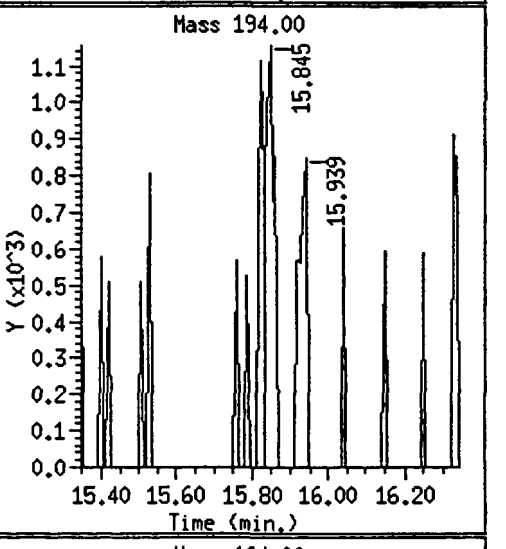


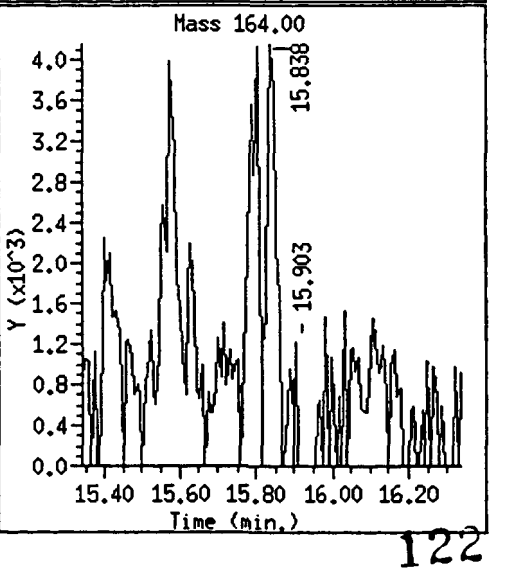






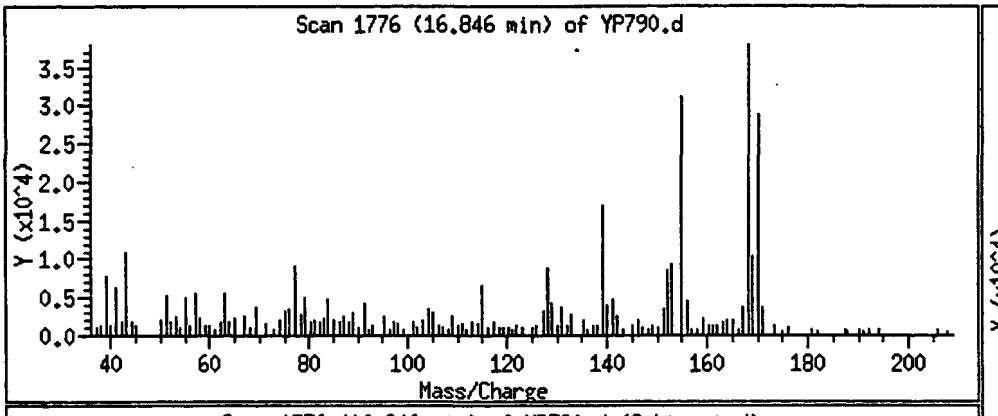


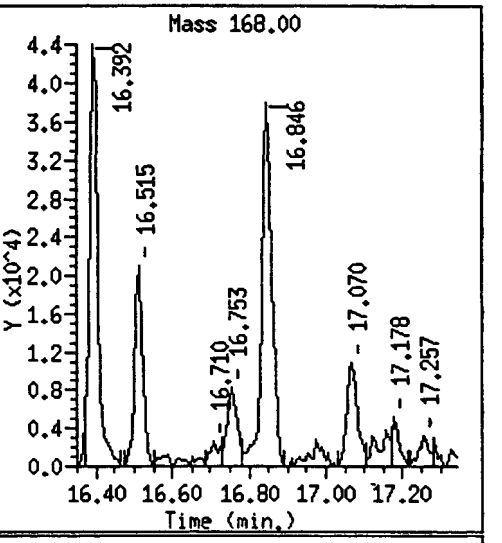


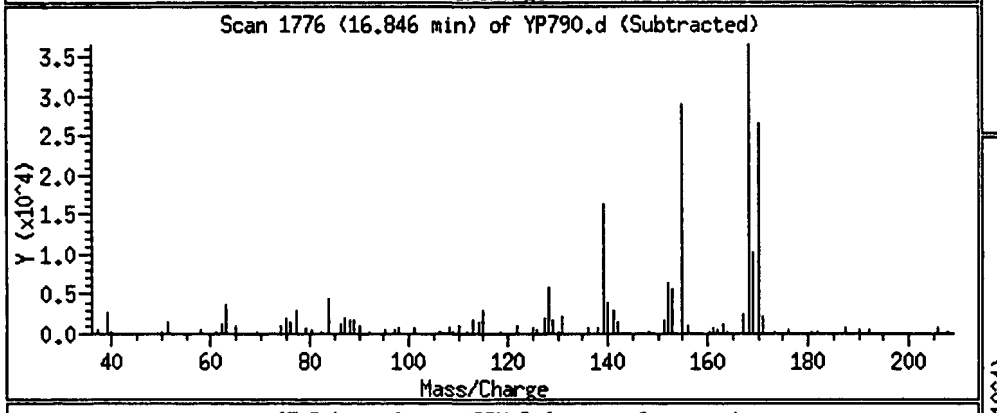


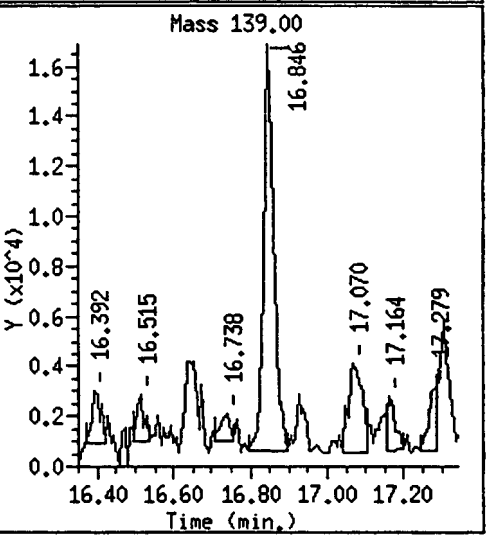
Data File: /chem/Y.i/10-23-97.b/CAA/YP790.d
Date : 23-OCT-97 15:09
Instrument : Y.i
Sample ID : SO-MM5-3-37
Column phase : DB.5-625 Column diameter : 0.32
Volume Injected (uL) : 1.0

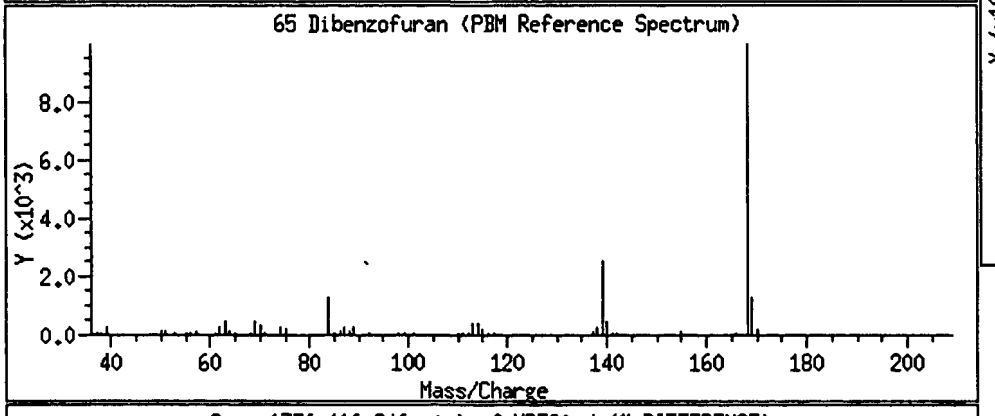
65 Dibenzofuran

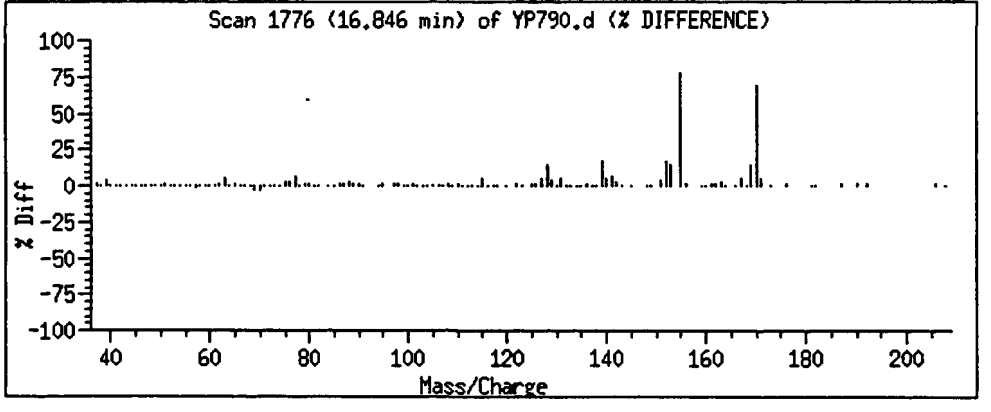












Data File: /chem/Y.i/10-23-97.b/CAA/YP790.d

Date : 23-OCT-97 15:09

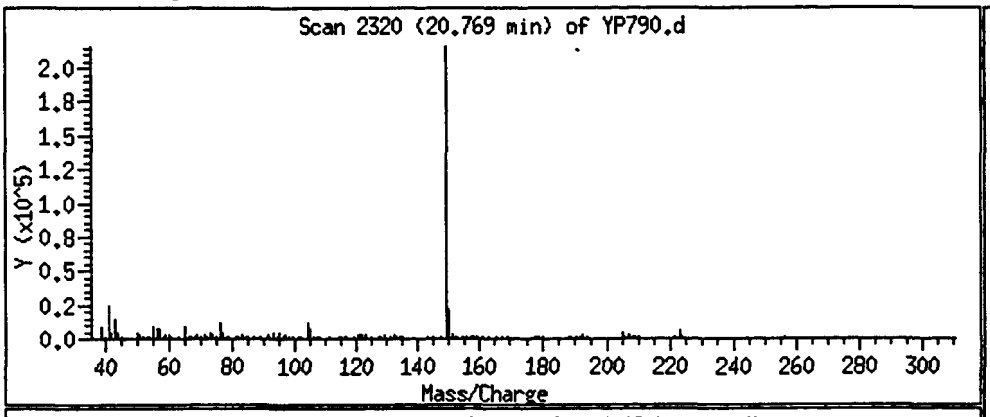
Instrument : Y.i

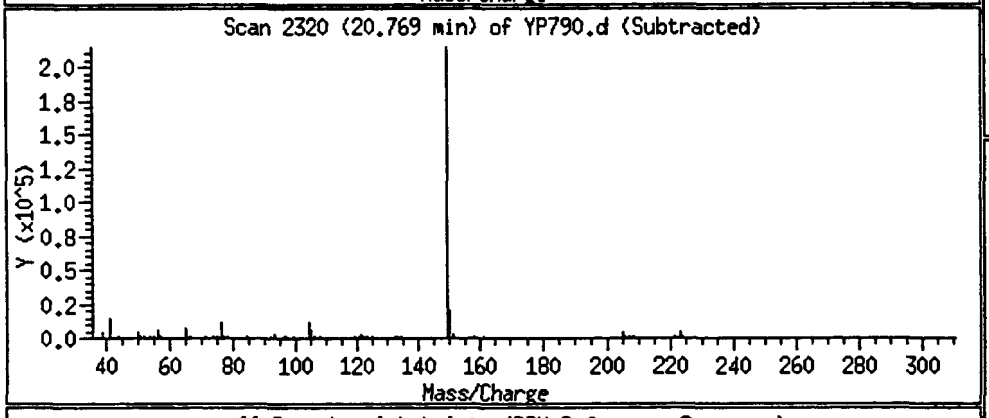
Sample ID : SO-MM5-3-37

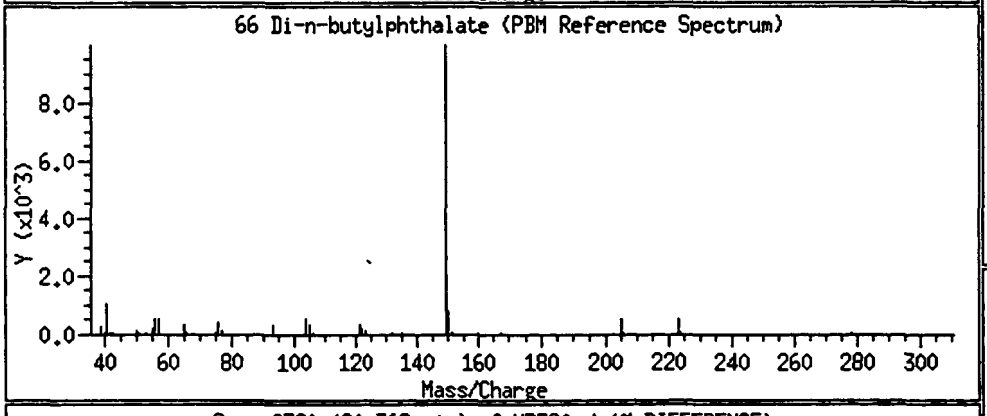
Column phase : DB.5-625 Column diameter : 0.32

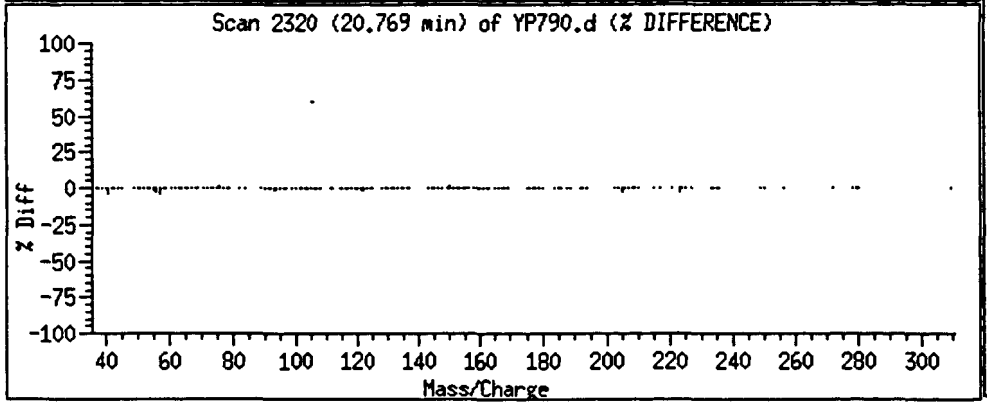
Volume Injected (uL) : 1.0

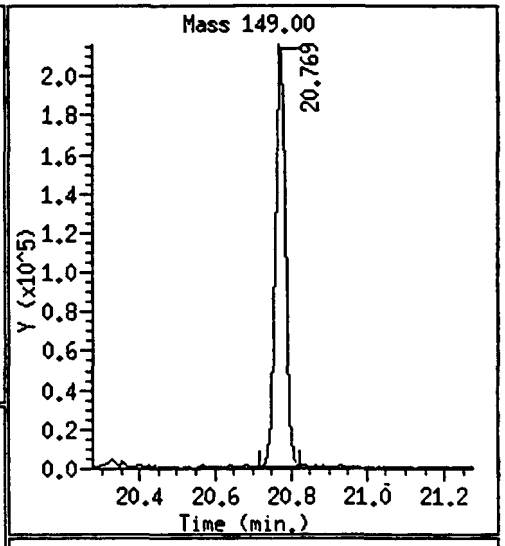
66 Di-n-butylphthalate

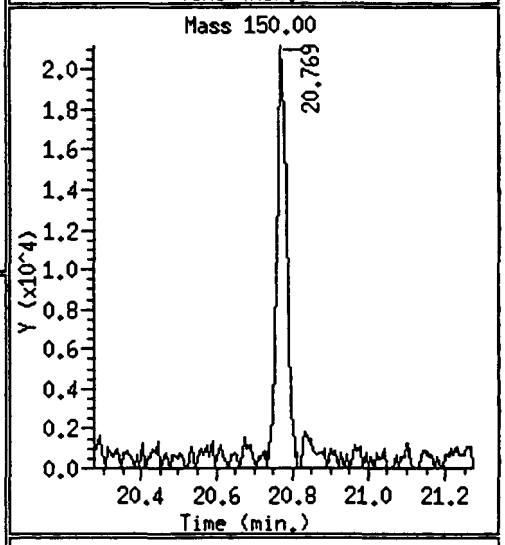


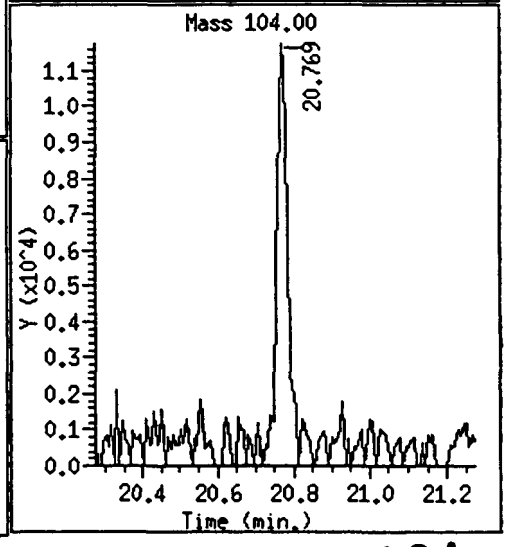












Data File: /chem/Y.i/10-23-97.b/CAA/YP790.d

Date : 23-OCT-97 15:09

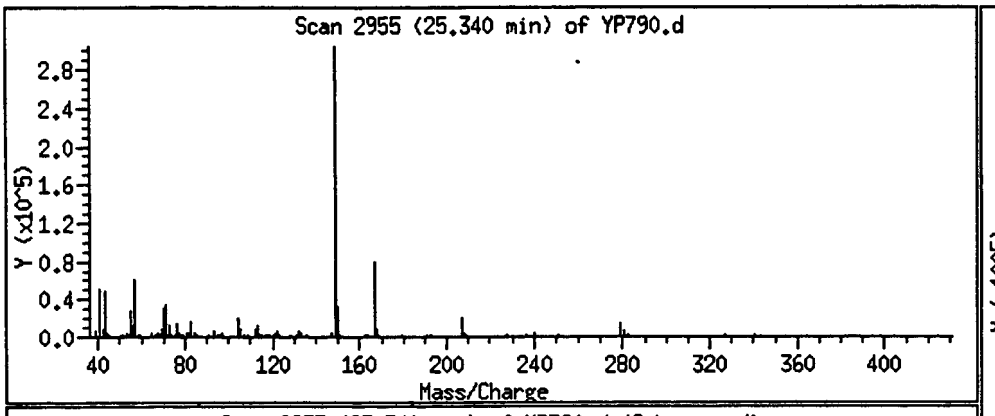
Instrument : Y.i

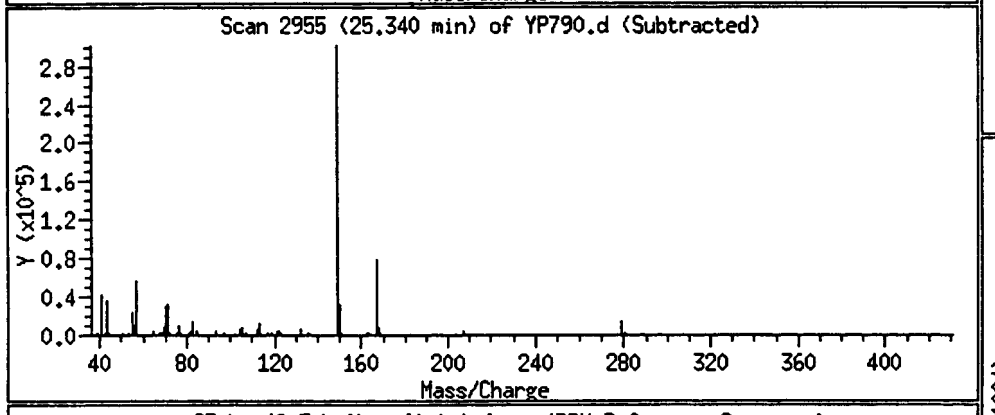
Sample ID : SO-MM5-3-37

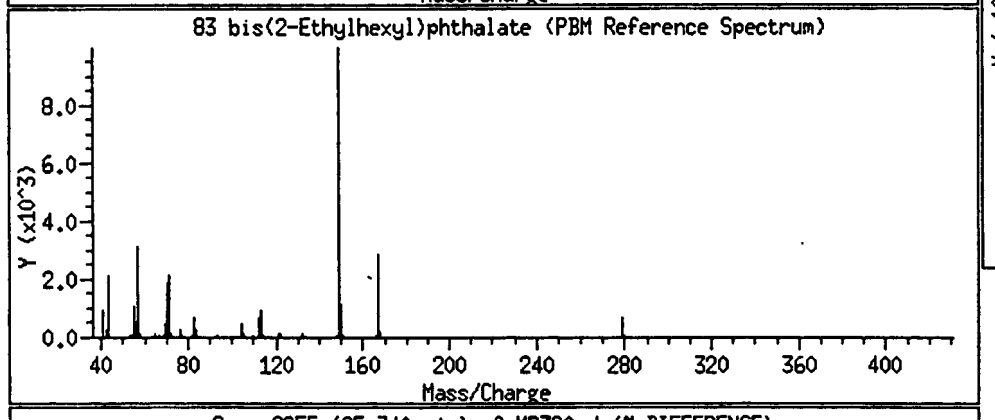
Column phase : DB.5-625 Column diameter : 0.32

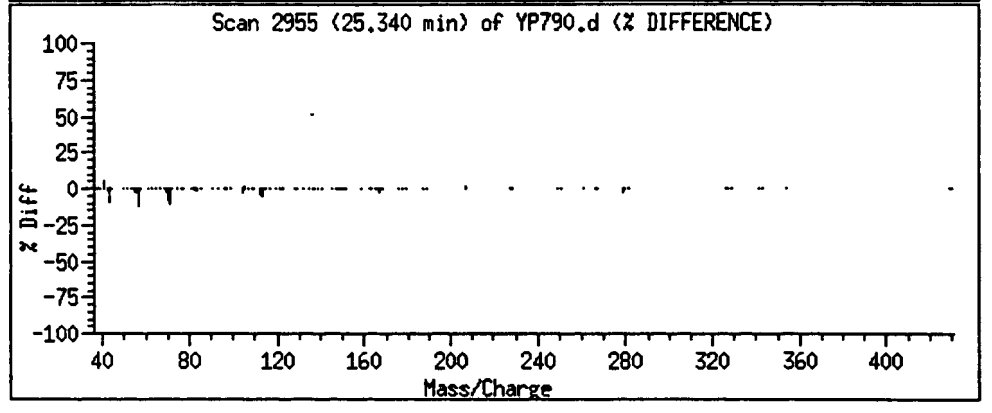
Volume Injected (uL) : 1.0

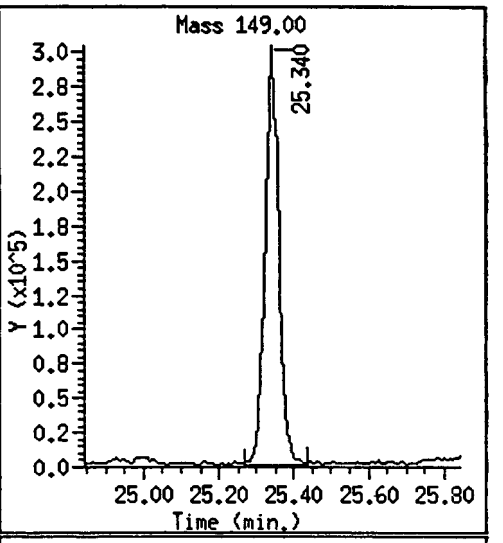
83 bis(2-Ethylhexyl)phthalate

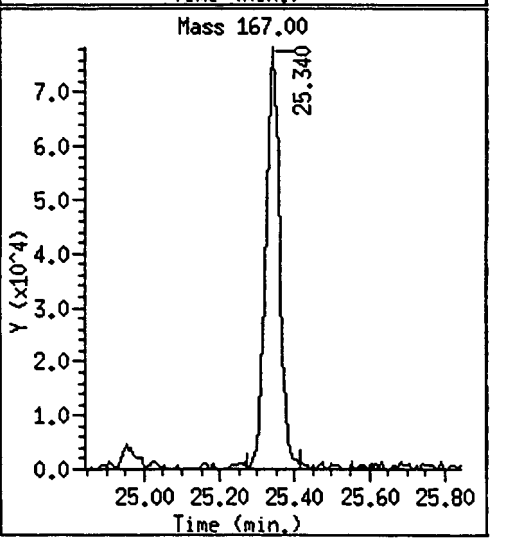












Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP791 | **Sample ID: SO-MM5-4-51**

Client Project: Saginaw, MI	Date Received: 09/29/97	Response File: YP783
TLI ID: 185-7-5A-E	Date Extracted: 10/14/97	
	Date Analyzed : 10/23/97	

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
Naphthalene-d_8		IS 2	12.76		
Naphthalene	45.94	B	12.81		10
2-Methylnaphthalene	58.46		14.24		10
Acenaphthene-d_{10}		IS 3	16.42		
2-Chloronaphthalene		U		0.40	10
Acenaphthylene	1.10	J	16.13		10
Acenaphthene	0.62	J	16.49		10
Fluorene	0.77	J	17.57		10
Phenanthrene-d_{10}		IS 4	19.54		
Phenanthrene	1.17	J	19.59		10
Anthracene	0.28	J	19.70		10
Fluoranthene	0.91	J	22.10		10
Chrysene-d_{12}		IS 5	25.28		
Pyrene	0.98	J	22.58		10
Benzo(a)anthracene		U		0.19	10
Chrysene		U		0.19	10
Perylene-d_{12}		IS 6 High	29.40		
Benzo(b)fluoranthene		U		0.16	10
Benzo(k)fluoranthene		U		0.17	10
Benzo(e)pyrene		U		0.15	10
Benzo(a)pyrene		U		0.17	10
Perylene		U		0.16	10
Indeno(1,2,3-cd)pyrene		U		0.15	10
Dibenz(a,h)anthracene		U		0.20	10
Benzo(g,h,i)perylene		U		0.16	10

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP791 | **Sample ID: SO-MM5-4-51**

Client Project: Saginaw, MI | Date Received: 09/29/97 | Response File: YP783
TLI ID: 185-7-5A-E | Date Extracted: 10/14/97
Date Analyzed : 10/23/97

Dilution Factor: 1.00

Surrogate Summary	Amount (ug)	RT	IS Ref	%REC
Phenol-d_5	74.76	9.45	1	75
Nitrobenzene-d_5	63.35	11.29	2	63
1,3,5-Trichlorobenzene-d_3	57.85	11.98	2	58
1,4-Dibromobenzene-d_4	70.52	12.87	1	71
2-Fluorobiphenyl	80.59	15.01	3	81
2,4,6-Tribromophenol	118.77	18.07	3	119
Anthracene-d_{10}	90.99	19.66	4	91
Pyrene-d_{10}	78.62	22.54	5	79
Terphenyl-d_{14}	86.10	22.90	5	86

Reviewed by Sat Date 11/13/97

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Triangle Laboratories of RTP, Inc.
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

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Printed: 17:21 11/13/1997

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP791 | **Sample ID: SO-MM5-4-51**

Client Project: Saginaw, MI | Date Received: 09/29/97 | Response File: YP784
TLI ID: 185-7-5A-E | Date Extracted: 10/14/97
Date Analyzed : 10/23/97

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
1,4-Dichlorobenzene-d_4		IS 1	10.22		
n-Nitrosodimethylamine		U		1.39	10
Cumene	0.45	J	8.71		10
Phenol	19.44		9.48		10
Aniline		U		0.46	10
bis-(2-Chloroethyl)ether		U		0.99	10
Benzyl Chloride		U		0.36	10
1,4-Dichlorobenzene	1.30	J	10.25		10
2-Methylphenol	0.70	J	10.67		10
Acetophenone	8.68	BJ	10.99		10
n-Nitrosomorpholine		U		1.34	10
o-Toluidine		U		0.49	10
Hexachloroethane		U		1.27	10
1,2-Dibromo-3-chloropropane		U		1.32	10
N,N-Diethylaniline		U		0.48	10
Naphthalene-d_8		IS 2	12.76		
3/4-Methylphenol	0.99	J	10.97		10
Nitrobenzene		U		0.49	10
N,N-Dimethylaniline		U		0.47	10
Isophorone		U		0.41	10
o-Anisidine		U		0.86	10
1,4-Phenylenediamine		U		0.68	10
1,2,4-Trichlorobenzene	1.29	J	12.64		10
Hexachlorobutadiene		U		1.27	10
a,a,a-Trichlorotoluene		U		0.60	10
Hydroquinone		U		0.72	10

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP791 | **Sample ID: SO-MM5-4-51**

Client Project: Saginaw, MI | **Date Received: 09/29/97** | **Response File: YP784**
TLI ID: 185-7-5A-E | **Date Extracted: 10/14/97**
Date Analyzed : 10/23/97

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
2-Chloroacetophenone		U		0.33	10
Acenaphthene-d_{10}		IS 3	16.42		
Hexachlorocyclopentadiene		U		1.40	10
2,4,6-Trichlorophenol		U		1.20	10
2,4,5-Trichlorophenol		U		1.12	10
Biphenyl	2.50	J	15.22		10
Dimethylphthalate	1.43	J	15.84		10
2,4-Dinitrophenol		U		3.48	25
4-Nitrophenol		U		1.59	25
2,4-Dinitrotoluene		U		1.31	10
Dibenzofuran	1.25	J	16.85		10
4,6-Dinitro-2-methylphenol		U		2.60	25
Trifluralin		U		1.94	10
Phenanthrene-d_{10}		IS 4	19.54		
Di-n-butylphthalate	5.85	BJ	20.78		10
Hexachlorobenzene		U		0.84	10
4-Aminobiphenyl		U		0.35	10
Pentachlorophenol		U		1.49	25
Pentachloronitrobenzene		U		3.26	10
4-Nitrobiphenyl		U		0.90	10
Chrysene-d_{12}		IS 5	25.28		
Benzidine		U		0.26	10
4,4'-Methylenedianiline		U		0.63	10
Dimethylaminoazobenzene		U		0.56	10
3,3'-Dimethylbenzidine		U		0.32	10
3,3'-Dimethoxybenzidine		U		0.64	10

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Triangle Laboratories of RTP, Inc.
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Phone: (919) 544-5729 • Fax: (919) 544-5491

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Printed: 12:43 11/13/1997

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP791 | **Sample ID: SO-MM5-4-51**

Client Project: Saginaw, MI	Date Received: 09/29/97	Response File: YP784
TLI ID: 185-7-5A-E	Date Extracted: 10/14/97	
	Date Analyzed : 10/23/97	

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
3,3'-Dichlorobenzidine		U		0.47	10
Methylene bis-chloroaniline		U		1.09	10
bis(2-Ethylhexyl)phthalate	9.14	BJ	25.34		10

Reviewed by Sat Date 11/13/97

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit

IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

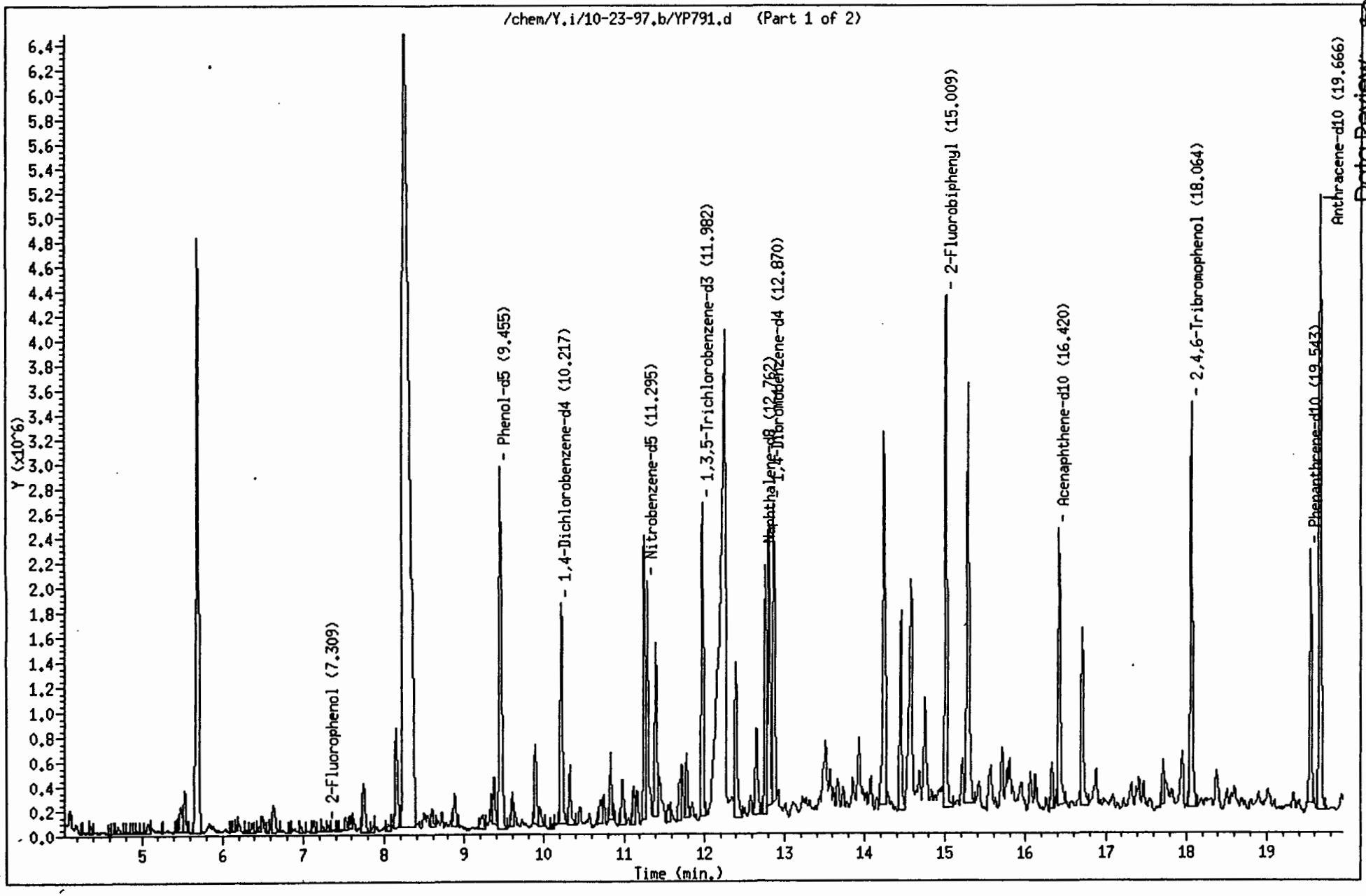
Data File: /chem/Y.i/10-23-97.b/YP791.d
Date : 23-OCT-97 16:00
Instrument : Y.i
Sample ID : SO-MM5-4-51
Column phase : DB-5
Volume Injected (uL) : 1.0

Triangle Laboratories of RTP, Inc.

Column diameter : 0.32

131

Data Review: [illegible]
Date: 11/12/97

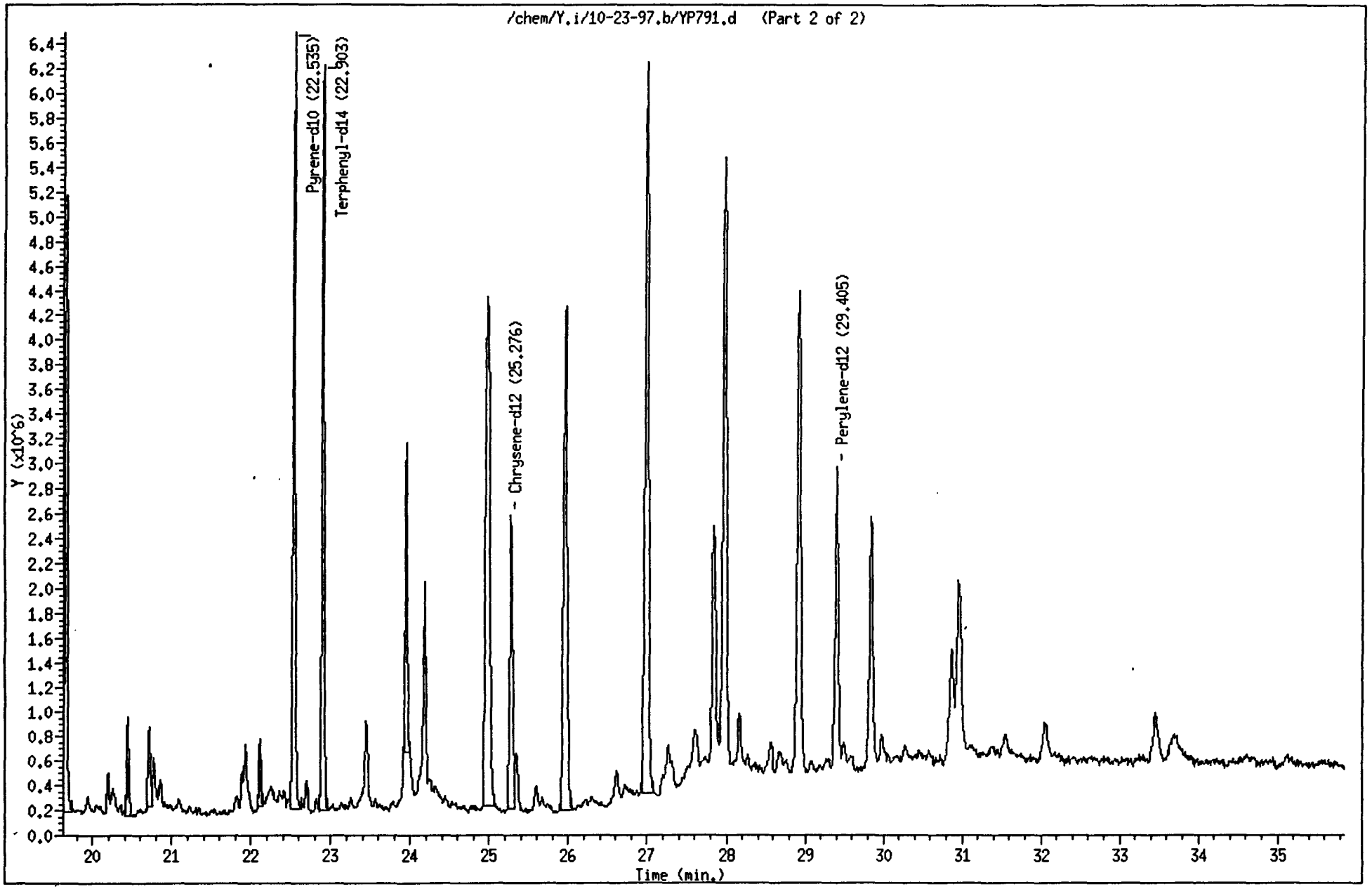


132

Data File: /chem/Y.i/10-23-97.b/YP791.d
Date : 23-OCT-97 16:00
Instrument : Y.i
Sample ID : SO-MM5-4-51
Column phase : DB-5
Volume Injected (uL) : 1.0

Triangle Laboratories of RTP, Inc.

Column diameter : 0.32



TRIANGLE LABORATORIES, INC.

SEMI-VOLATILE QUANTITATION REPORT

Data file : /chem/Y.i/10-23-97.b/YP791.d
Lab. Id. : 43433
Inj Date : 23-OCT-97 16:00 Autotune Date: 22-Oct-97 09:14:0
Operator : DD Inst ID: Y.i
Smp Info : SO-MM5-4-51
Misc Info : 185-7-5A-E
Comment :
Method : /chem/Y.i/10-23-97.b/cclist.m
Meth Date : 24-Oct-1997 06:51 target
Cal Date : 23-OCT-1997 09:12 Cal File: YP783.d
Als bottle: 7
Dil Factor: 1.000 Target Version: Target 2.20
Integrator: HP RTE Compound Sublist: pah.sub
Sample Type: AIR

	Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)
*	1 1,4-Dichlorobenzene-d4	152.00	10.217(1.000)	494079	40.00	
*	2 Naphthalene-d8	136.00	12.762(1.000)	1584565	40.00	
*	3 Acenaphthene-d10	164.00	16.420(1.000)	926997	40.00	
*	4 Phenanthrene-d10	188.00	19.543(1.000)	1555065	40.00	
*	5 Chrysene-d12	240.00	25.276(1.000)	1960428	40.00	
*	6 Perylene-d12	264.00	29.405(1.000)	2515943	40.00	
$	7 2-Fluorophenol	112.00	7.316(0.716)	32064	2.20	2.20(aQR)
$	8 Phenol-d5	99.00	9.455(0.925)	1552200	74.76	74.76
$	9 2-Chlorophenol-d4	Compound Not Detected.				
$	10 1,2-Dichlorobenzene-d4	Compound Not Detected.				
$	11 Nitrobenzene-d5	82.00	11.295(0.885)	946163	63.37	63.37
$	12 1,3,5-Trichlorobenzene-d3	185.00	11.982(0.939)	760854	57.76	57.76
$	13 1,4-Dibromobenzene-d4	239.80	12.870(1.260)	810046	70.52	70.52
$	14 2-Fluorobiphenyl	172.00	15.009(0.914)	2319718	80.56	80.56
$	15 2,4,6-Tribromophenol	329.80	18.072(1.101)	820242	118.57	118.57
$	16 Anthracene-d10	188.00	19.659(1.006)	3795484	90.97	90.97
$	17 Pyrene-d10	212.00	22.535(0.892)	4531145	78.64	78.64
$	18 Terphenyl-d14	244.00	22.903(0.906)	3447432	86.05	86.05
	42 Naphthalene	128.00	12.813(1.004)	1841526	45.92	45.92
	46 2-Methylnaphthalene	142.00	14.240(1.116)	1535484	58.44	58.44
	50 2-Chloronaphthalene	162.00	~~15.247(0.929)~~	~~3406~~	~~0.14~~	~~0.14(aQ)~~ FP salt
	56 Acenaphthylene	152.00	16.132(0.982)	45451	1.10	1.10(a)
	58 Acenaphthene	154.00	16.492(1.004)	14989	0.62	0.62(a)
	65 Fluorene	166.00	17.574(1.070)	20802	0.77	0.77(a)
	73 Phenanthrene	178.00	19.594(1.003)	46422	1.17	1.17(a)
	74 Anthracene	178.00	19.702(1.008)	10564	0.28	0.28(aQ)
	77 Fluoranthene	Compound Not ~~Detected.~~ 22.095		37079		M salt
	78 Pyrene	202.00	22.579(0.893)	63327	0.98	0.98(aQ)
	83 Benzo(a)anthracene	228.00	~~25.247(0.999)~~	~~3327~~	~~0.06~~	~~0.06(aQ)~~ FP salt
	84 Chrysene	228.00	~~25.343(1.003)~~	~~664~~	~~0.01~~	~~0.01(aQ)~~
	86 Benzo(b)fluoranthene	252.00	~~28.550(0.971)~~ 28.362	~~547~~ 5430	0.01	0.01(aQ) M salt

Data Review: salt
Date: 11/12/97

Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	CONCENTRATIONS FINAL (ug)
87 Benzo(k)fluoranthene	252.00	~~28.449(0.967)~~	~~504~~	~~0.01~~	~~0.01(aQ)~~
88 Benzo(e)pyrene	252.00	~~29.100(0.990)~~	~~1574~~	~~0.02~~	~~0.02(aQ)~~
89 Benzo(a)pyrene	252.00	~~28.919(0.983)~~	~~7234~~	~~0.12~~	~~0.12(aQ)~~
90 Perylene	252.00	~~29.670(1.002)~~	~~904~~	~~0.01~~	~~0.01(aQ)~~
91 Indeno(1,2,3-cd)pyrene	276.00	~~32.642(1.110)~~	~~493~~	~~0.01~~	~~0.01(aQ)~~
92 Dibenz(a,h)anthracene	Compound Not Detected.				
93 Benzo(g,h,i)perylene	Compound Not Detected.				

FP sat

QC Flag Legend

a - Target compound detected but, quantitated amount Below Limit Of Quantitation(BLOQ).
Q - Qualifier signal failed the ratio test.
R - Spike/Surrogate failed recovery limits.

TRIANGLE LABORATORIES, INC.

SEMI-VOLATILE QUANTITATION REPORT

Data file : /chem/Y.i/10-23-97.b/CAA/YP791.d
Lab. Id. : 43433
Inj Date : 23-OCT-97 16:00 Autotune Date: 22-Oct-97 09:14:0
Operator : DD Inst ID: Y.i
Smp Info : SO-MM5-4-51
Misc Info : 185-7-5A-E
Comment :
Method : /chem/Y.i/10-23-97.b/tlicaa.m
Meth Date : 23-Oct-1997 10:51
Cal Date : 23-OCT-97 09:56 Cal File: YP784.d
Als bottle: 7
Dil Factor: 1.000 Target Version: Target 2.20
Integrator: HP RTE Compound Sublist: CAA1.sub
Sample Type: mm5

	Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)	
*	1 1,4 Dichlorobenzene-d4	152.00	10.217(1.000)	494079	40.00		
*	2 Naphthalene-d8	136.00	12.762(1.000)	1584565	40.00		
*	3 Acenaphthene-d10	164.00	16.420(1.000)	926997	40.00		
*	4 Phenanthrene-d10	188.00	19.543(1.000)	1555065	40.00		
*	5 Chrysene-d12	240.00	25.276(1.000)	1960428	40.00		
*	6 Perylene-d12	264.00	29.405(1.000)	2515943	40.00		
$	7 2-Fluorophenol	112.00	7.316(0.716)	32064	2.36	2.36	
$	8 Phenol-d5	99.00	9.455(0.925)	1552200	84.81	84.81	
$	9 2-Chlorophenol-d4	Compound Not Detected.					
$	10 1,2-Dichlorobenzene-d4	Compound Not Detected.					
$	11 Nitrobenzene-d5	82.00	11.295(0.885)	946163	59.47	59.47	
$	12 1,3,5-Trichlorobenzene-d3	185.00	11.982(0.939)	760854	51.49	51.49	
$	13 1,4-Dibromobenzene-d4	240.00	12.870(1.260)	810046	69.78	69.78	
$	14 2-Fluorobiphenyl	172.00	15.009(0.914)	2319718	85.29	85.29	
$	15 2,4,6-Tribromophenol	329.80	18.072(1.101)	820242	133.15	133.15	
$	16 Anthracene-d10	188.00	19.659(1.006)	3795484	91.76	91.76	
$	17 Pyrene-d10	212.00	22.535(0.892)	4531145	74.01	74.01	
$	18 Terphenyl-d14	244.00	22.903(0.906)	3447432	87.30	87.30	
	20 n-Nitrosodimethylamine	74.00	~~4.703(0.460)~~	~~20073~~	~~2.78~~	~~2.78~~	FP SAH
	21 Cumene	105.00	8.715(0.853)	12845	0.45	0.45	
	23 Phenol	94.00	9.476(0.927)	314379	19.44	19.44	
	24 Aniline	Compound Not Detected.					
	27 bis-(2-Chloroethyl)ether	Compound Not Detected.					
	28 Benzyl Chloride	91.00	~~10.210(0.999)~~	~~23162~~	~~0.84~~	~~0.84~~	
	29 1,4-Dichlorobenzene	146.00	10.253(1.004)	21408	1.29	1.29	
	31 2-Methylphenol	108.00	10.667(1.044)	8765	0.69	0.69	
	32 3/4-Methylphenol	108.00	10.966(0.859)	13944	0.98	0.98	
	33 Acetophenone	105.00	10.988(1.075)	158759	8.68	8.68	
	34 n-Nitrosomorpholine	56.00	~~11.102(1.087)~~	~~3138~~	~~0.42~~	~~0.42~~	FP SAH
	35 o-Toluidine	106.00	~~10.973(1.074)~~	~~84072~~	~~4.08~~	~~4.08~~	
	36 Hexachloroethane	Compound Not Detected.					

Data Review: SAH
Date: 11/12/97

Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)	
37 Nitrobenzene	77.00	~~11.230(0.888)~~	~~42530~~	~~2.07~~	~~2.07~~	FP salt
38 N,N-Dimethylaniline	120.00	~~11.259(0.882)~~	~~43589~~	~~2.04~~	~~2.04~~	
39 1,2-Dibromo-3-chloropropane	Compound Not Detected.					
40 Isophorone	Compound Not Detected.					
41 o-Anisidine	Compound Not Detected.					
42 1,4-Phenylenediamine	108.00	~~13.623(1.067)~~	~~604~~	~~0.04~~	~~0.04~~	FP salt
43 1,2,4-Trichlorobenzene	180.00	12.641(0.990)	16551	1.28	1.28	
44 Naphthalene	128.00	12.813(1.004)	1841526	49.39	49.39	
46 Hexachlorobutadiene	Compound Not Detected.					
47 N,N-Diethylaniline	134.00	~~13.120(1.285)~~	~~11057~~	~~0.56~~	~~0.56~~	
48 a,a,a-Trichlorotoluene	159.00	~~12.870(1.008)~~	~~302050~~	~~18.13~~	~~18.13~~	FP salt
49 Hydroquinone	110.00	~~13.516(1.059)~~	~~1076~~	~~0.07~~	~~0.07~~	
51 2-Chloroacetophenone	105.00	~~13.939(1.092)~~	~~32534~~	~~1.07~~	~~1.07~~	
52 Hexachlorocyclopentadiene	Compound Not Detected.					
53 2,4,6-Trichlorophenol	196.00	~~14.815(0.902)~~	~~1262~~	~~0.15~~	~~0.15~~	FP salt
54 2,4,5-Trichlorophenol	196.00	~~14.815(0.902)~~	~~1262~~	~~0.14~~	~~0.14~~	
60 Biphenyl	154.00	15.218(0.927)	79149	2.50	2.50	
61 Dimethylphthalate	163.00	15.844(0.965)	37203	1.43	1.43	
62 2,4-Dinitrophenol	184.00	~~16.658(1.014)~~	~~493~~	~~0.17~~	~~0.17~~	
63 4-Nitrophenol	139.00	~~16.637(1.013)~~	~~1993~~	~~0.31~~	~~0.31~~	
64 2,4-Dinitrotoluene	165.00	~~16.882(1.028)~~	~~13854~~	~~1.81~~	~~1.81~~	
65 Dibenzofuran	168.00	16.853(1.026)	40497	1.24	1.24	
66 Di-n-butylphthalate	149.00	20.776(1.063)	321779	5.84	5.84	
67 4,6-Dinitro-2-methylphenol	198.00	~~17.711(1.078)~~	~~453~~	~~0.11~~	~~0.11~~	FP salt
68 Trifluralin	Compound Not Detected.					
69 Hexachlorobenzene	Compound Not Detected.					
70 4-Aminobiphenyl	169.00	~~19.096(0.977)~~	~~2740~~	~~0.09~~	~~0.09~~	FP salt
71 Pentachlorophenol	Compound Not Detected.					
72 Pentachloronitrobenzene	Compound Not Detected.					
73 4-Nitrobiphenyl	152.00	~~20.127(1.030)~~	~~526~~	~~0.04~~	~~0.04~~	FP salt
74 Benzidine	184.00	~~22.535(0.892)~~	~~46285~~	~~1.19~~	~~1.19~~	
75 4,4'-Methylenedianiline	Compound Not Detected.					
77 Dimethylaminoazobenzene	120.00	~~22.896(0.906)~~	~~51351~~	~~2.86~~	~~2.86~~	
78 3,3'-Dimethylbenzidine	212.00	~~23.906(0.946)~~	586	0.01	~~0.01~~	FP salt
80 3,3'-Dimethoxybenzidine	244.00	~~25.240(0.999)~~	~~232~~	~~0.01~~	~~0.01~~	
81 3,3'-Dichlorobenzidine	Compound Not Detected.					
82 Methylene bis-chloroaniline	Compound Not Detected.					
83 bis(2-Ethylhexyl)phthalate	149.00	25.341(1.003)	428009	9.14	9.14	

Data File: /chem/Y.i/10-23-97.b/YP791.d

Date : 23-OCT-97 16:00

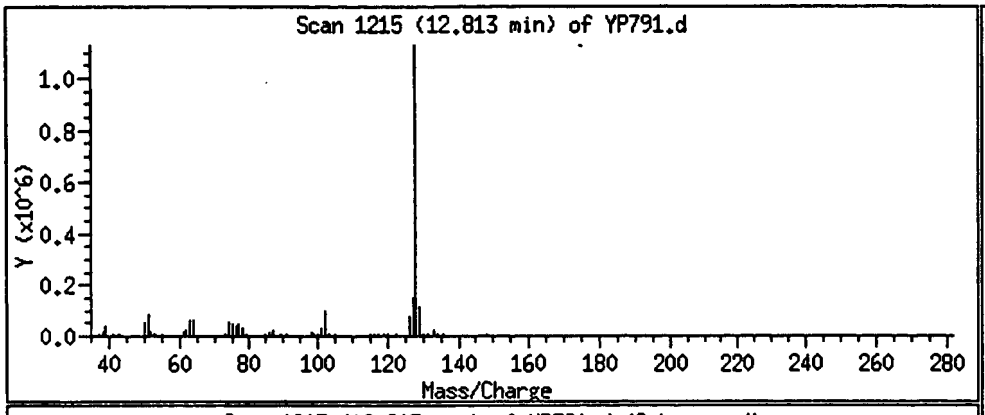
Instrument : Y.i

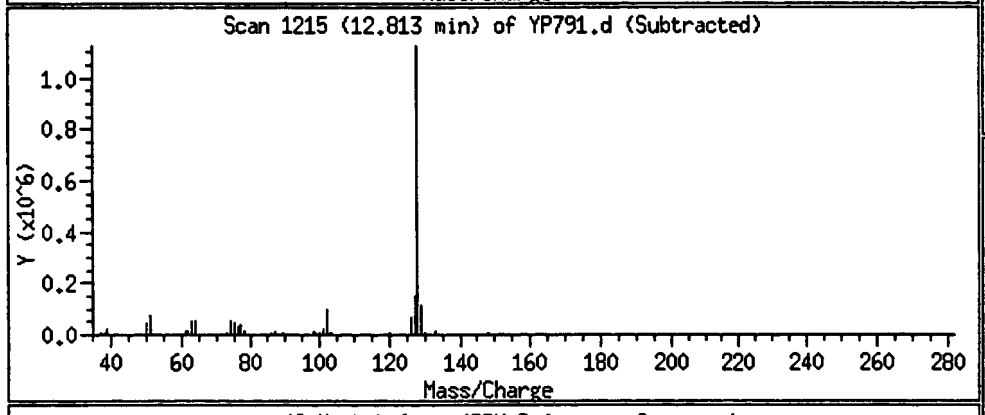
Sample ID : SO-MM5-4-51

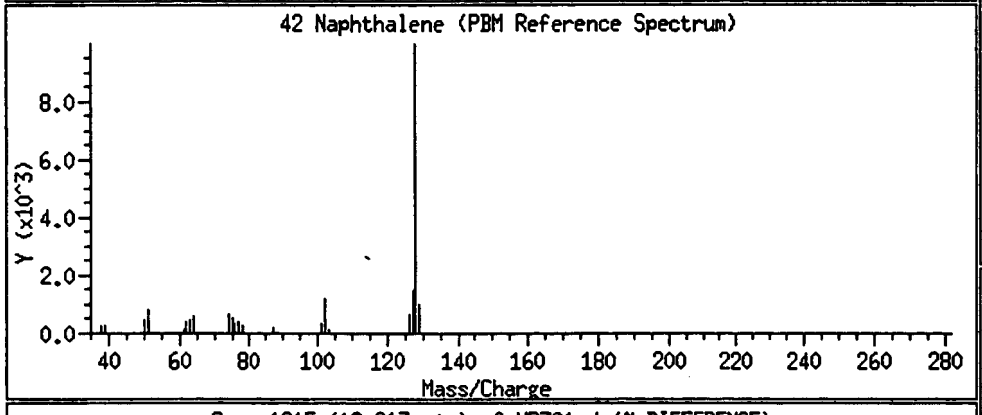
Column phase : DB-5 Column diameter : 0.32

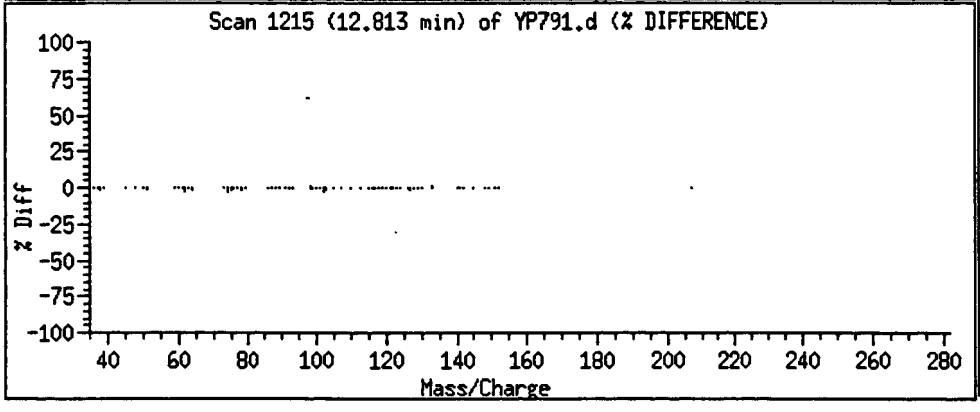
Volume Injected (uL) : 1.0

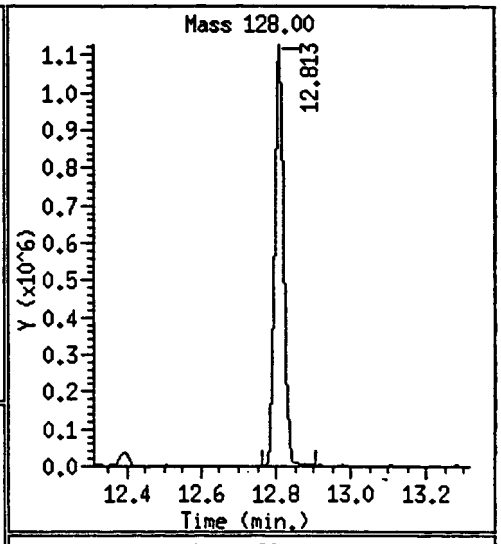
42 Naphthalene

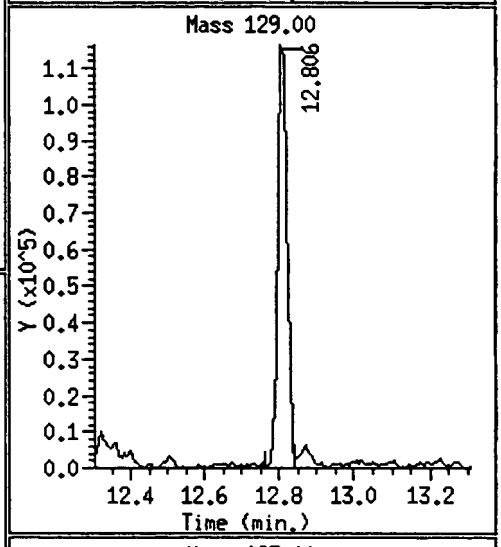


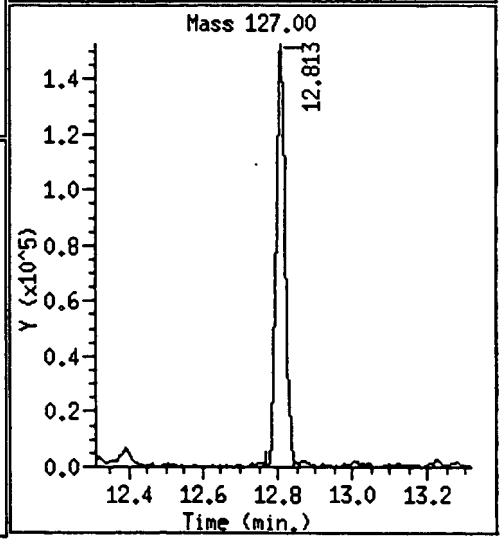












Data File: /chem/Y.i/10-23-97.b/YP791.d

Date : 23-OCT-97 16:00

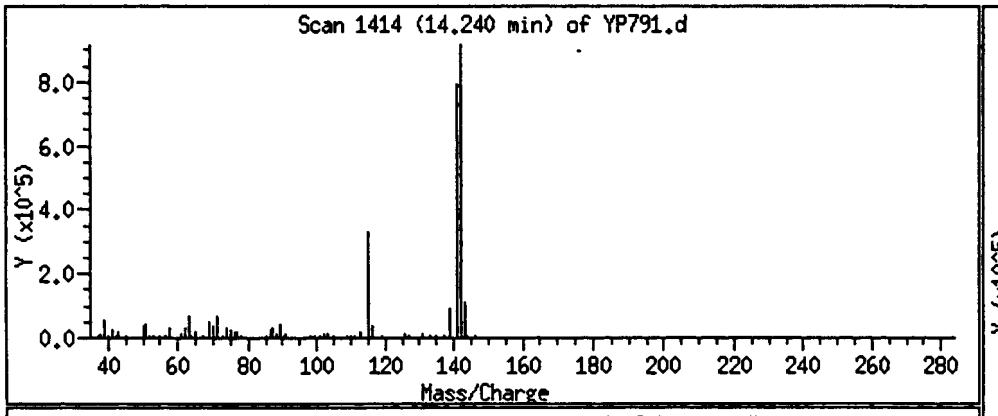
Instrument : Y.i

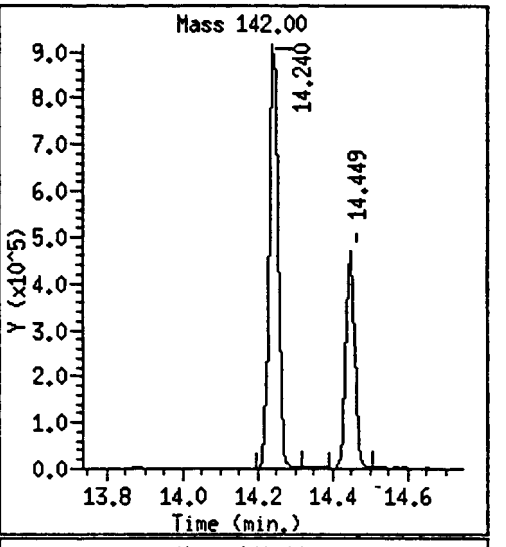
Sample ID : SO-MM5-4-51

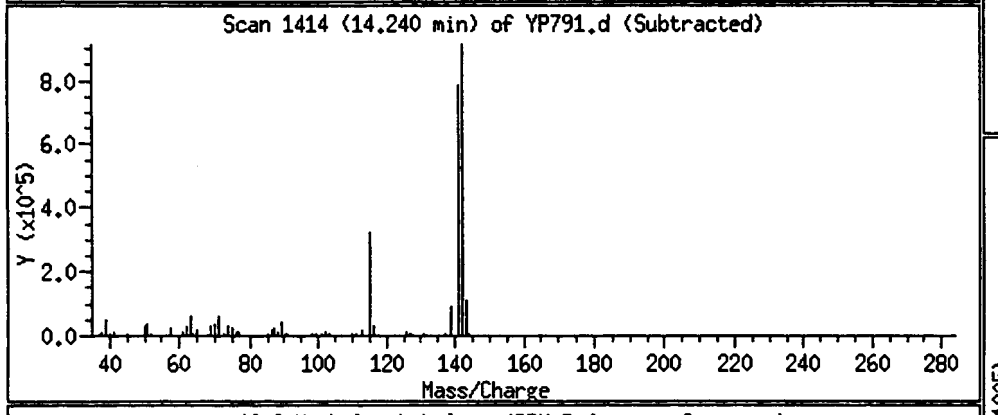
Column phase : DB-5 Column diameter : 0.32

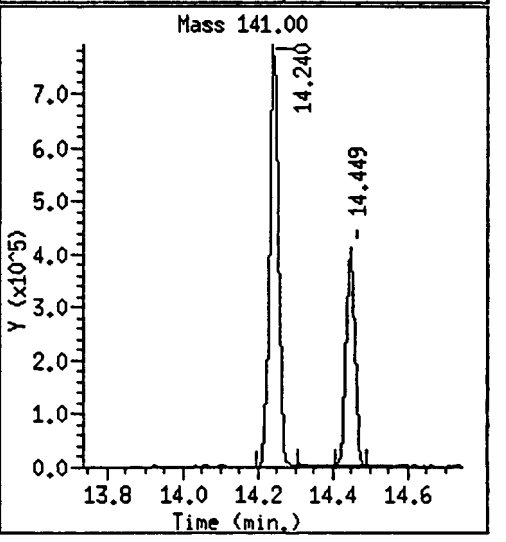
Volume Injected (uL) : 1.0

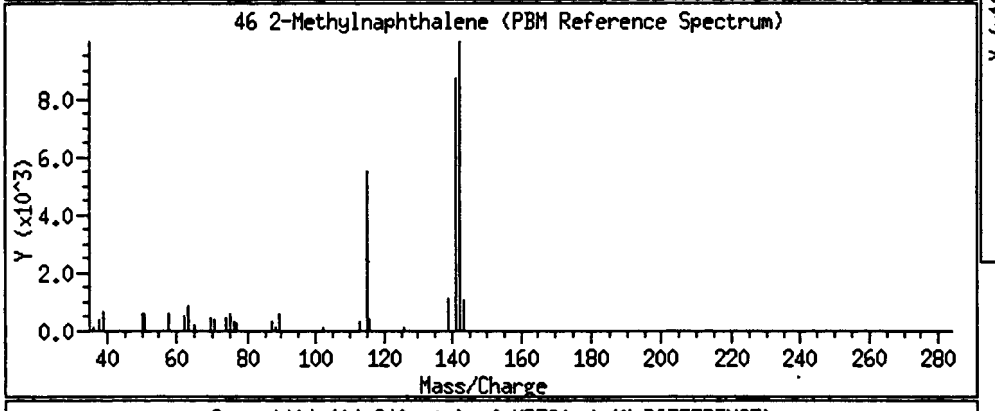
46 2-Methylnaphthalene

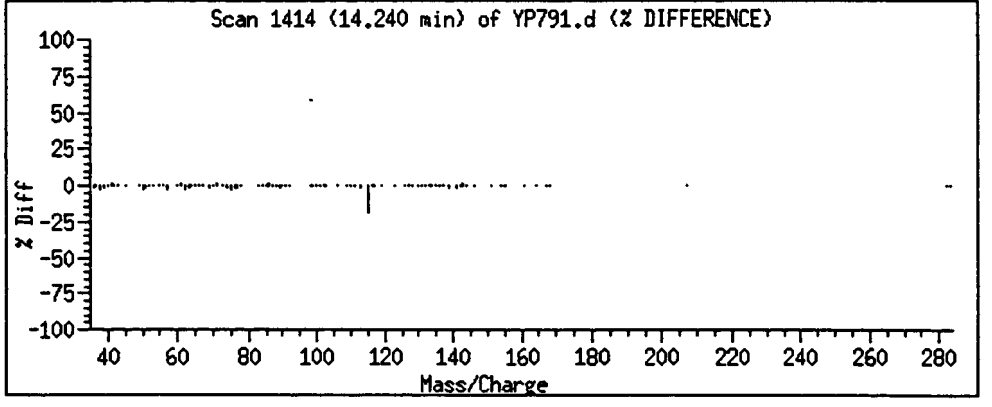












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Date : 23-OCT-97 16:00

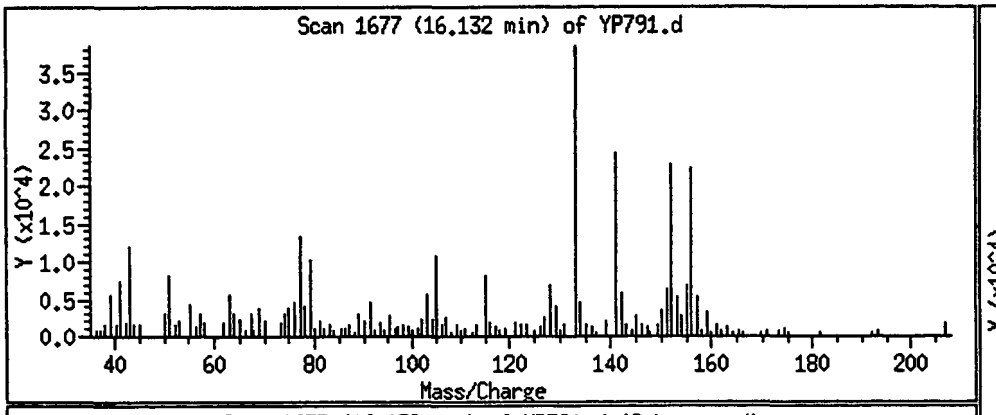
Instrument : Y.i

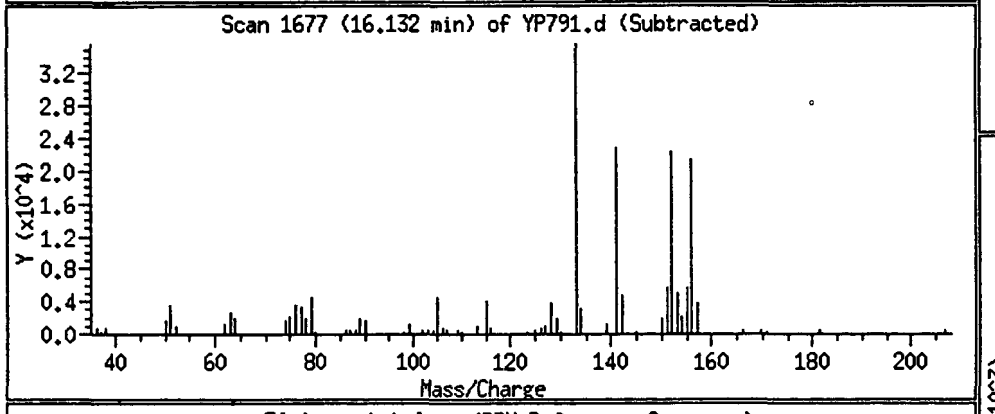
Sample ID : SO-MM5-4-51

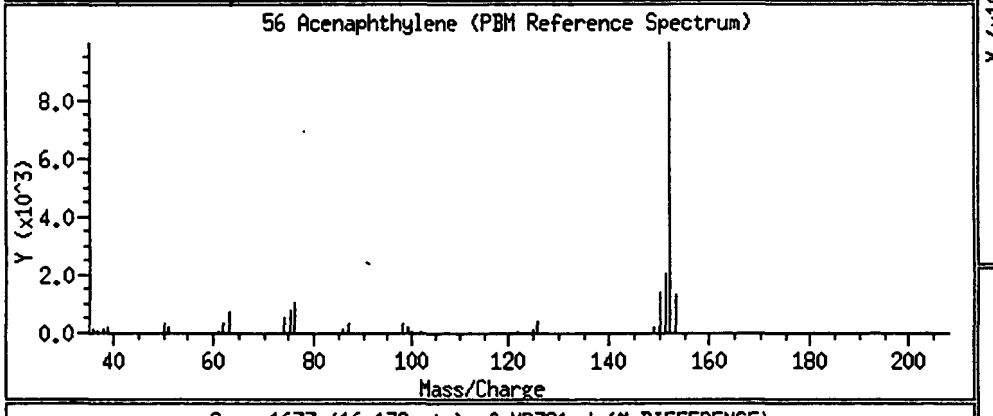
Column phase : DB-5 Column diameter : 0.32

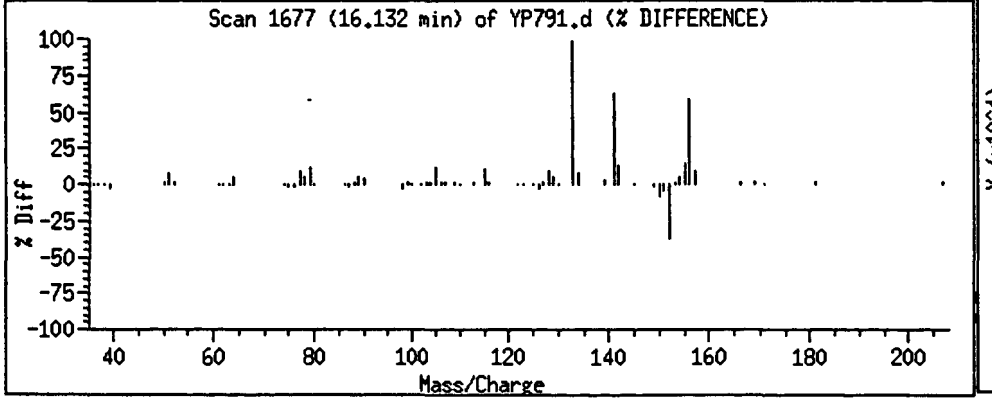
Volume Injected (uL) : 1.0

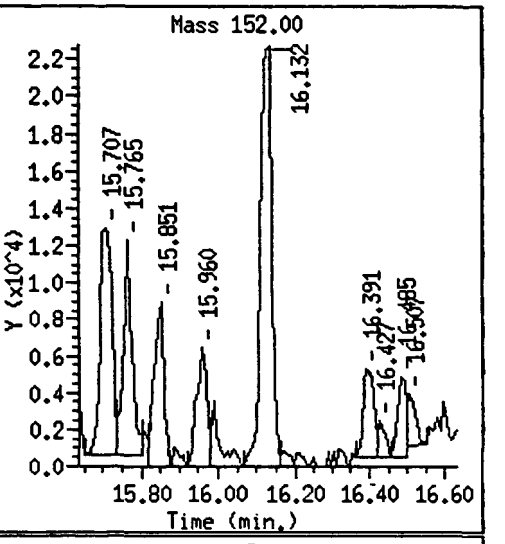
56 Acenaphthylene

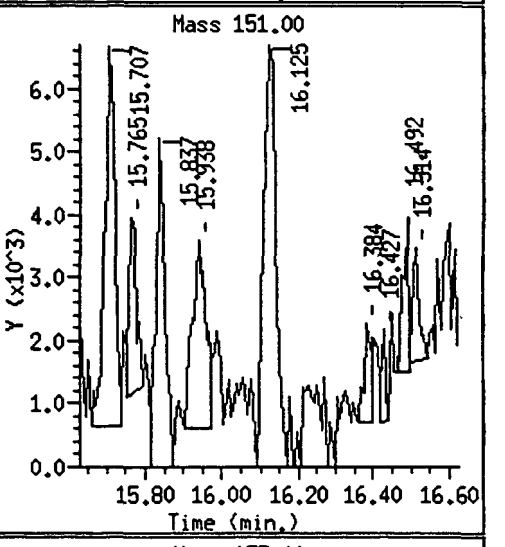


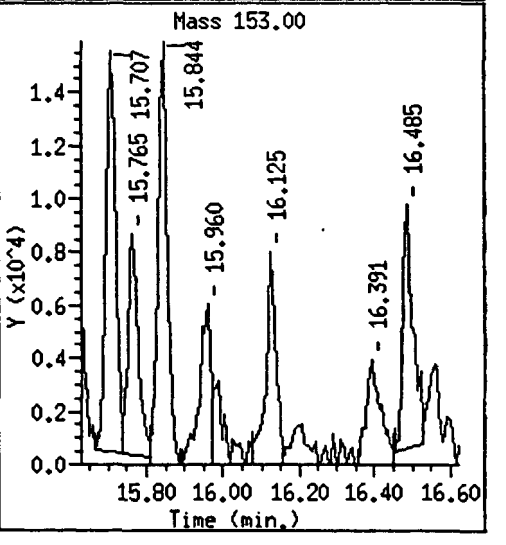












Data File: /chem/Y.i/10-23-97.b/YP791.d

Date : 23-OCT-97 16:00

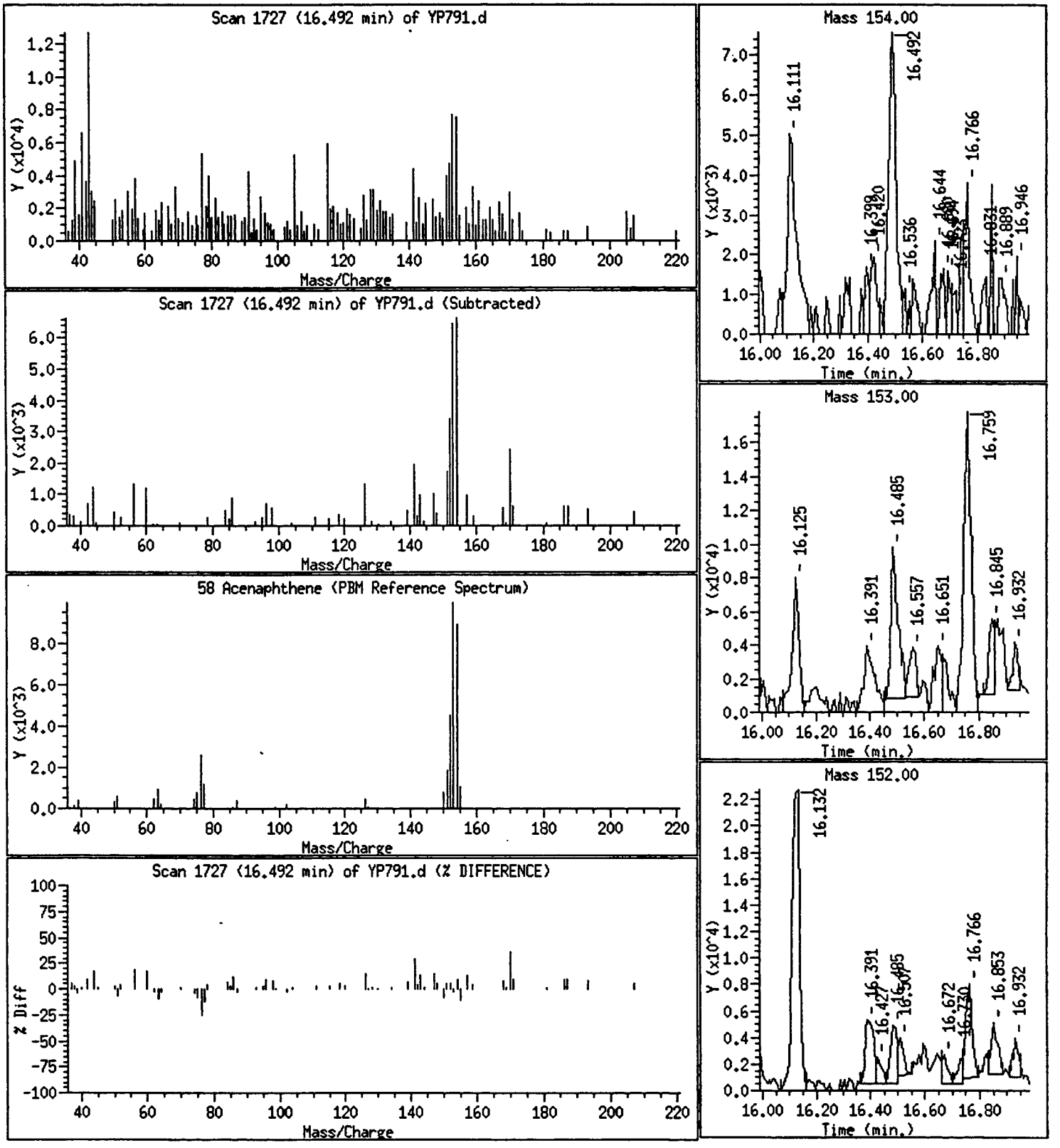
Instrument : Y.i

Sample ID : SO-MM5-4-51

Column phase : DB-5 Column diameter : 0.32

Volume Injected (uL) : 1.0

58 Acenaphthene



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Date : 23-OCT-97 16:00

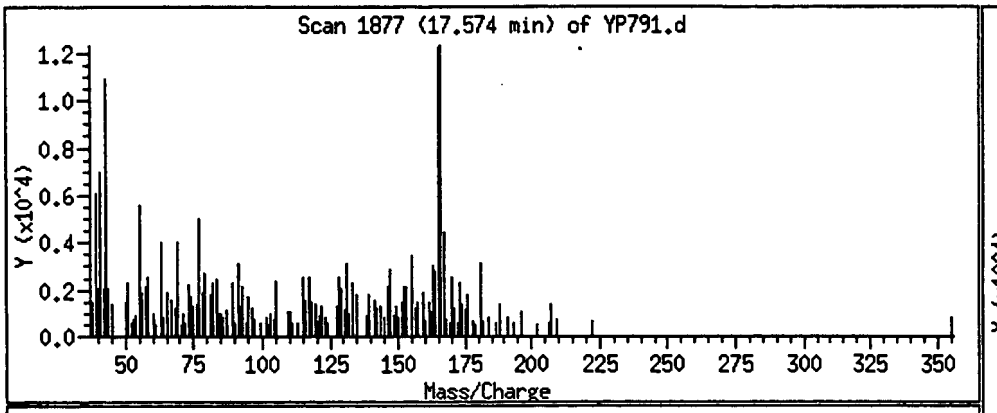
Instrument : Y.i

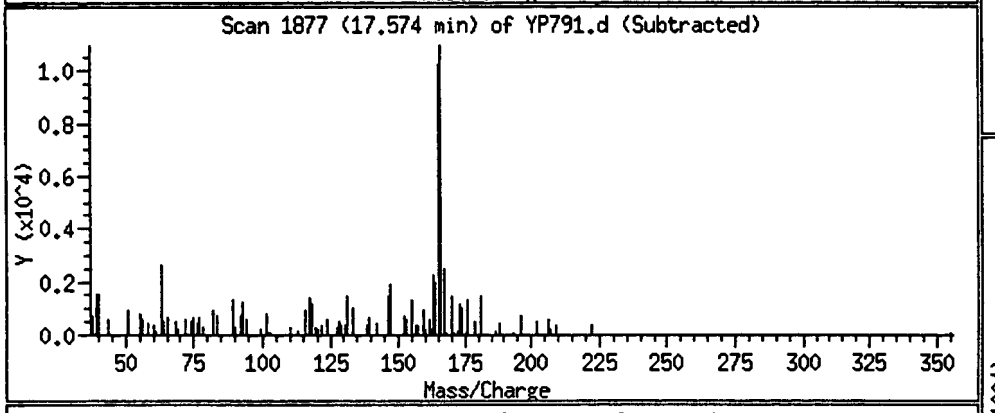
Sample ID : SO-MM5-4-51

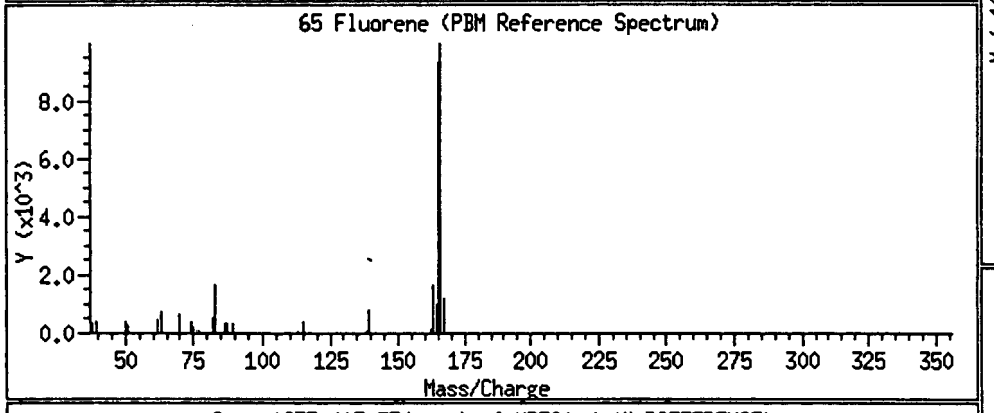
Column phase : DB-5 Column diameter : 0.32

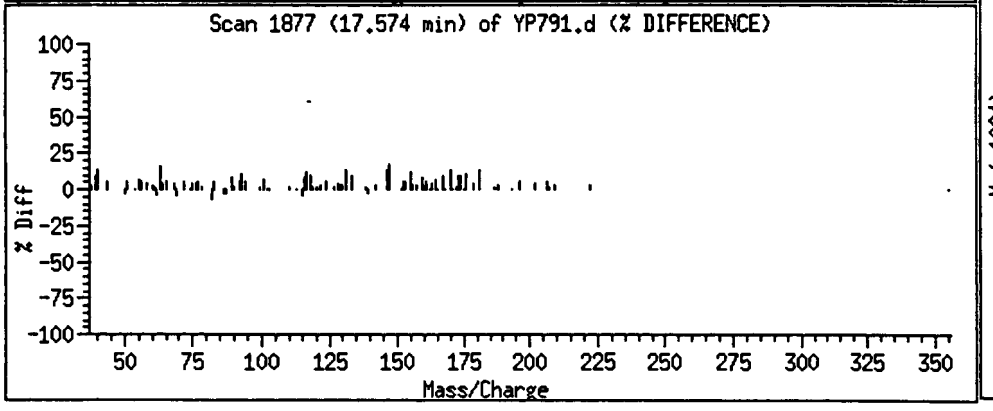
Volume Injected (uL) : 1.0

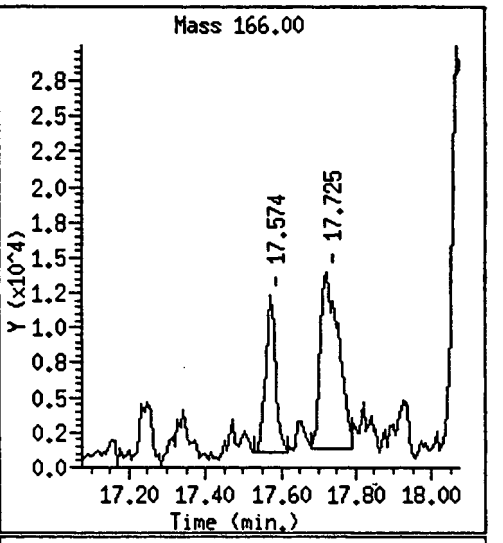
65 Fluorene

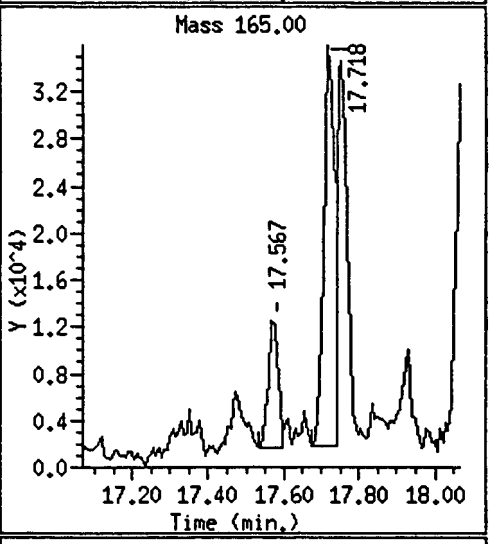


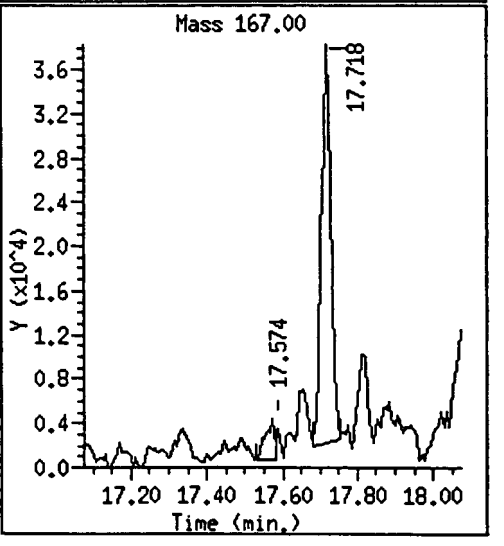












Data File: /chem/Y.i/10-23-97.b/YP791.d

Date : 23-OCT-97 16:00

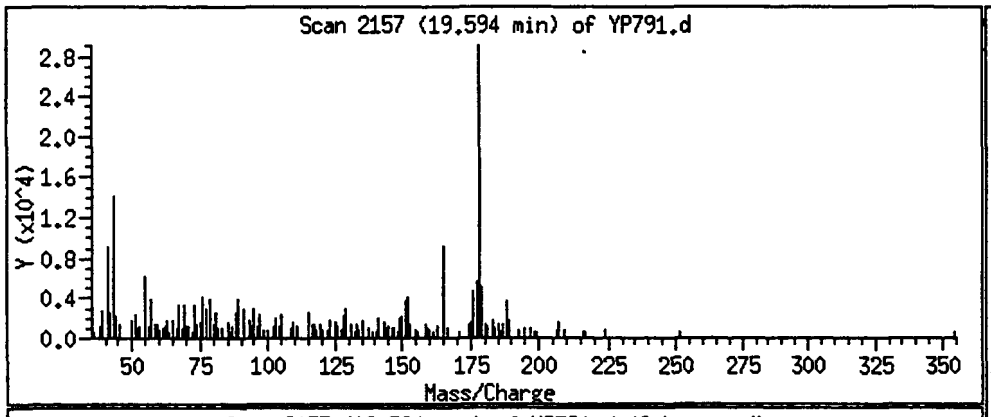
Instrument : Y.i

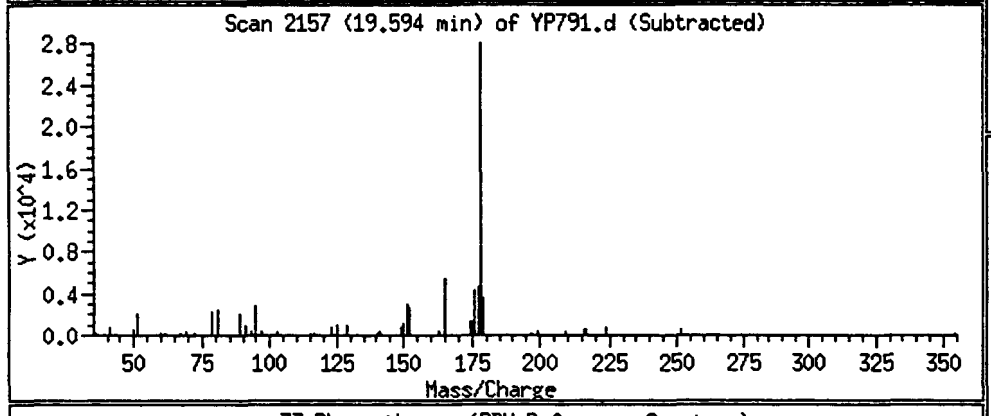
Sample ID : SO-MM5-4-51

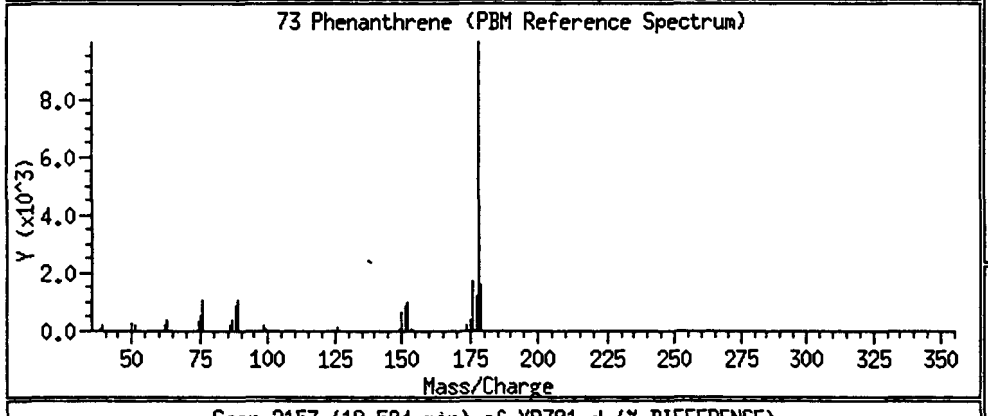
Column phase : DB-5 Column diameter : 0.32

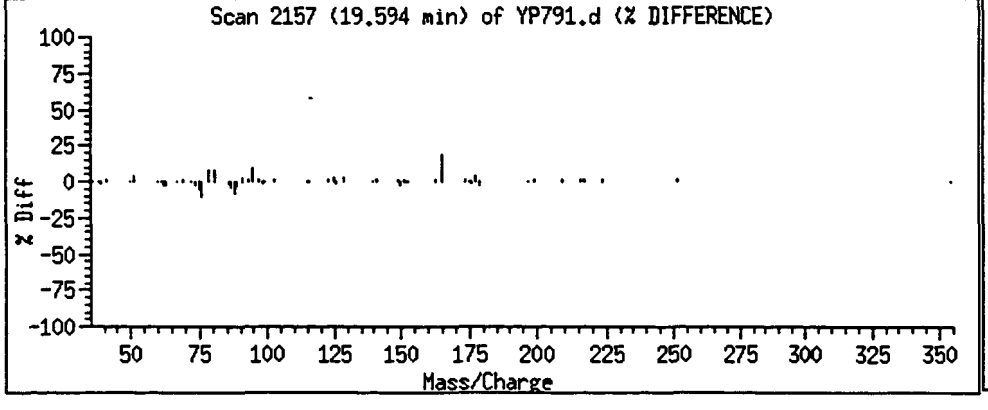
Volume Injected (uL) : 1.0

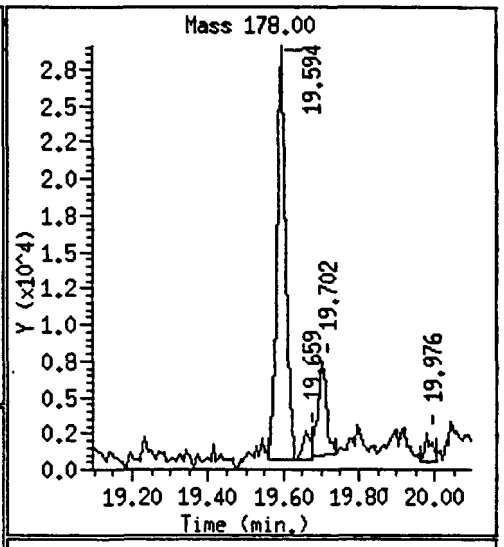
73 Phenanthrene

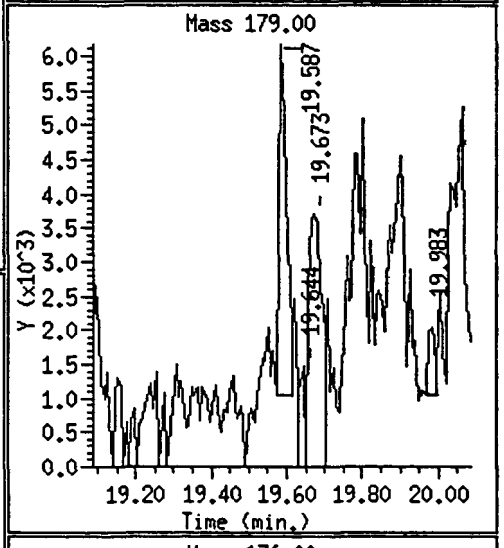


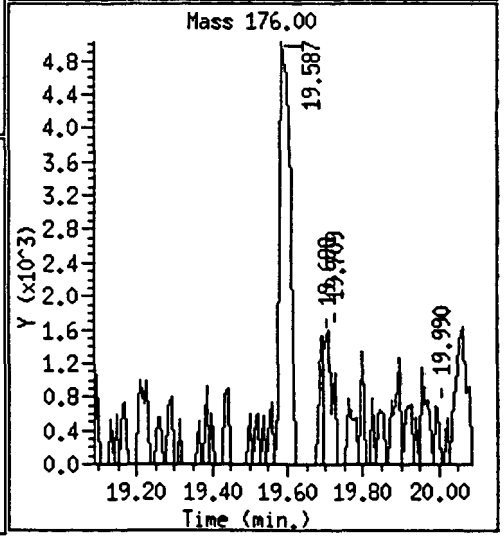












Data File: /chem/Y.i/10-23-97.b/YP791.d

Date : 23-OCT-97 16:00

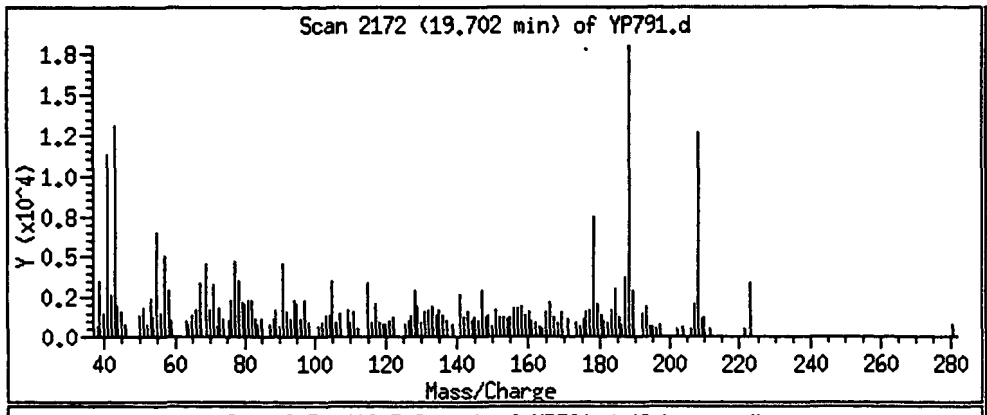
Instrument : Y.i

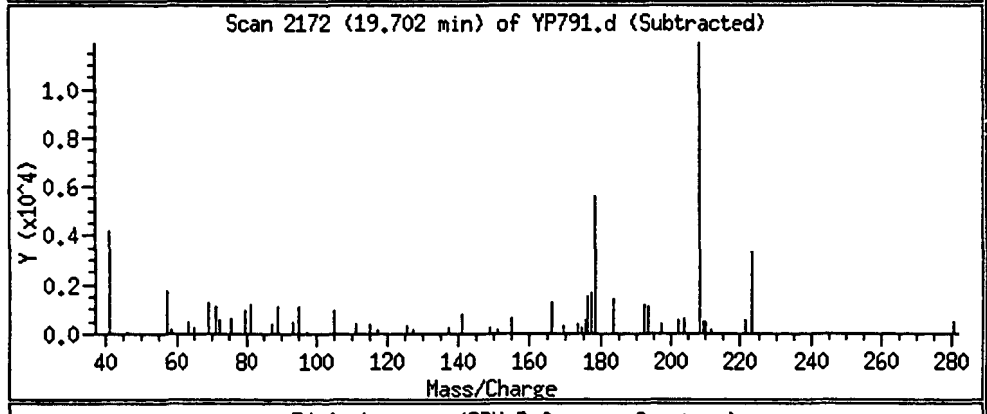
Sample ID : SO-MM5-4-51

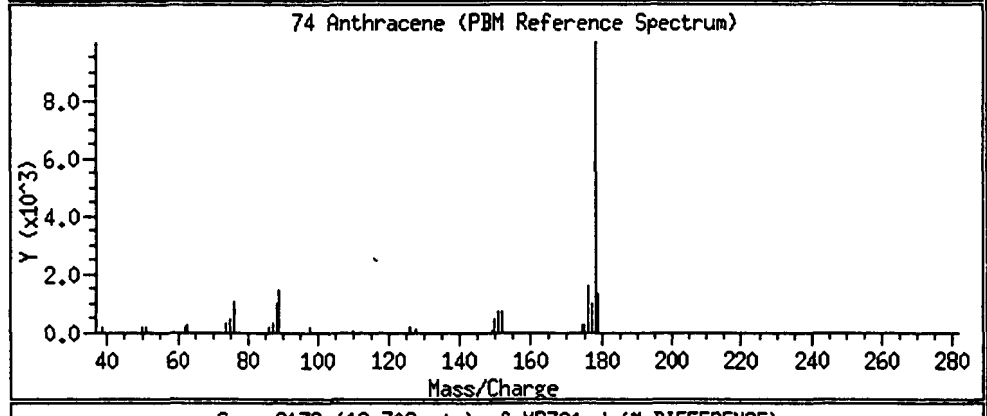
Column phase : DB-5 Column diameter : 0.32

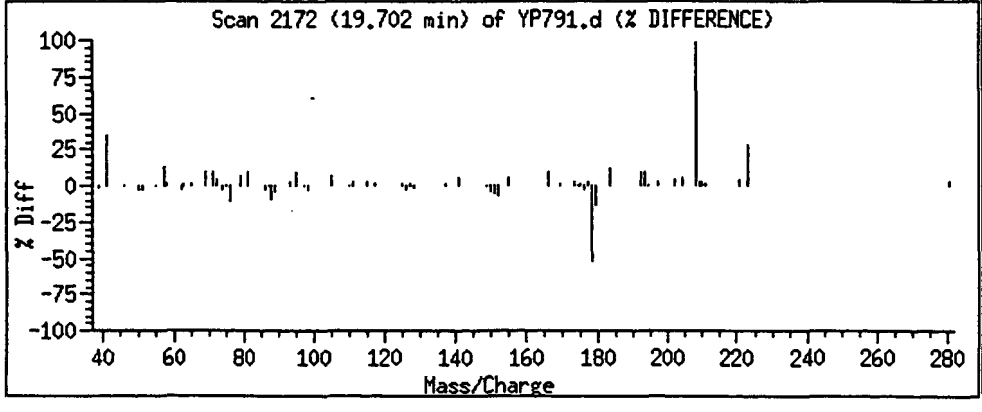
Volume Injected (uL) : 1.0

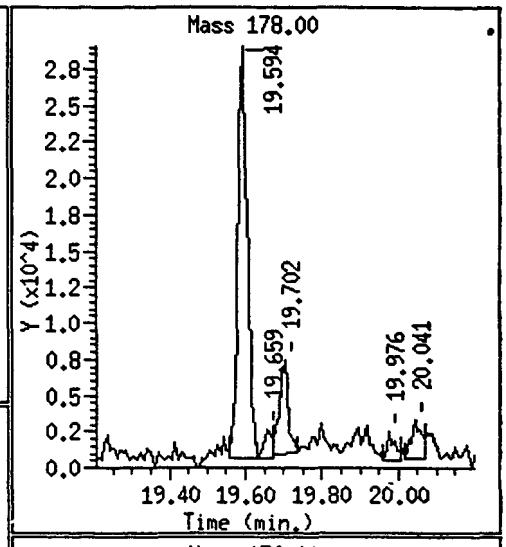
74 Anthracene

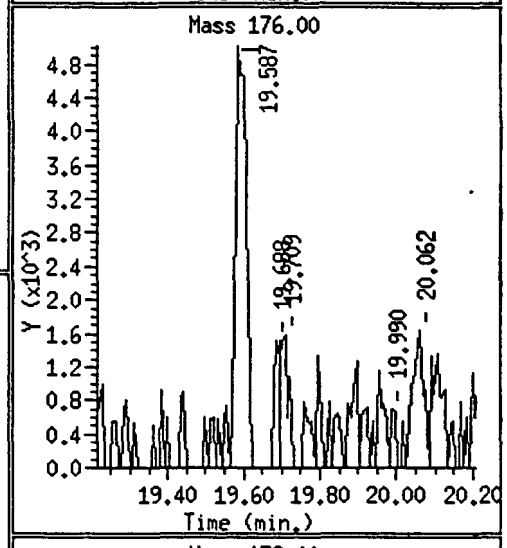


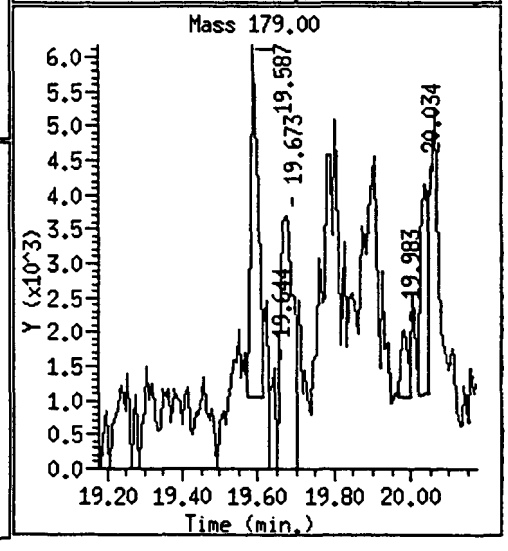












Data File: /chem/Y.i/10-23-97.b/YP791.d

Date : 23-OCT-97 16:00

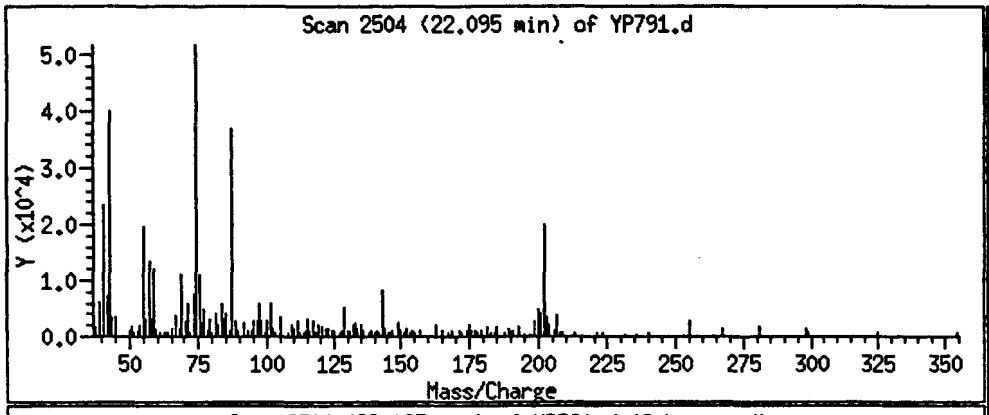
Instrument : Y.i

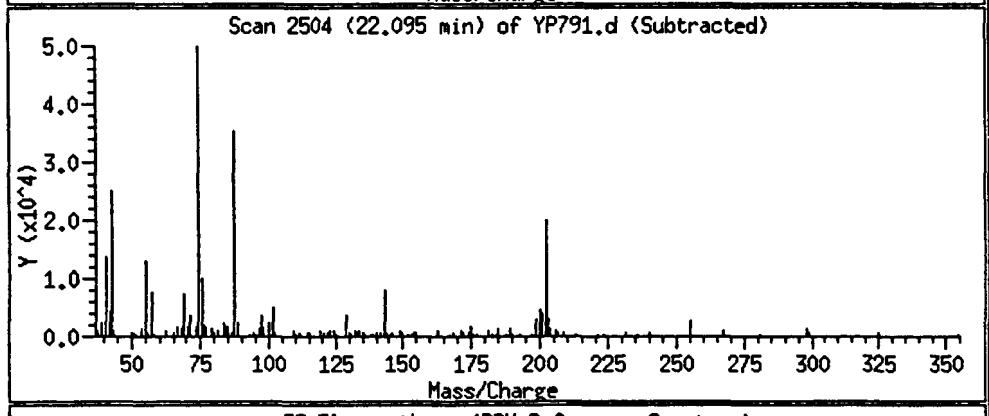
Sample ID : SO-MM5-4-51

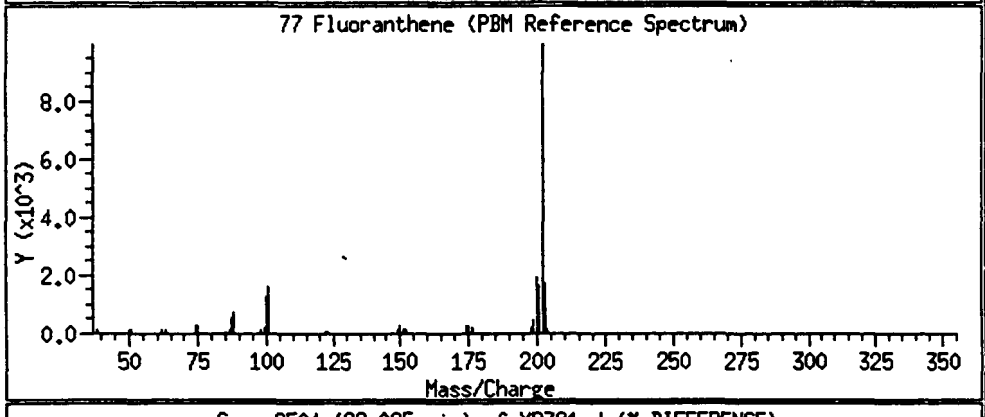
Column phase : DB-5 Column diameter : 0.32

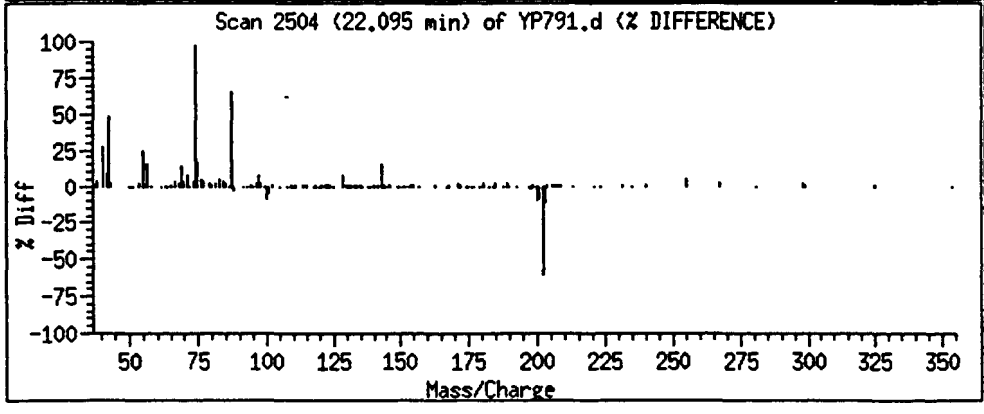
Volume Injected (uL) : 1.0

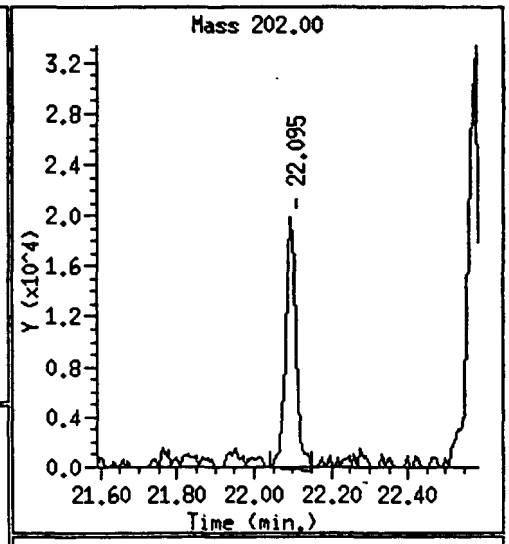
77 Fluoranthene

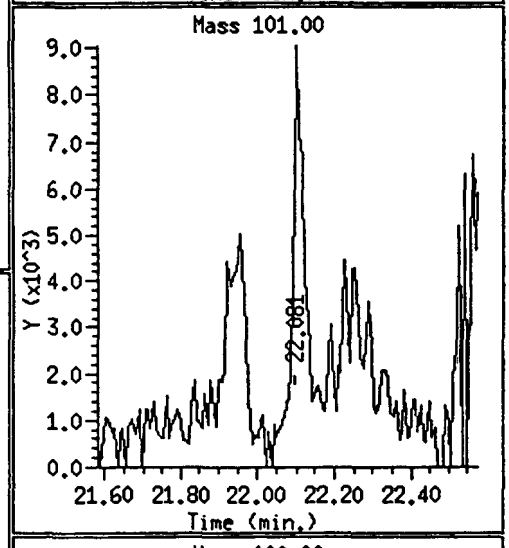


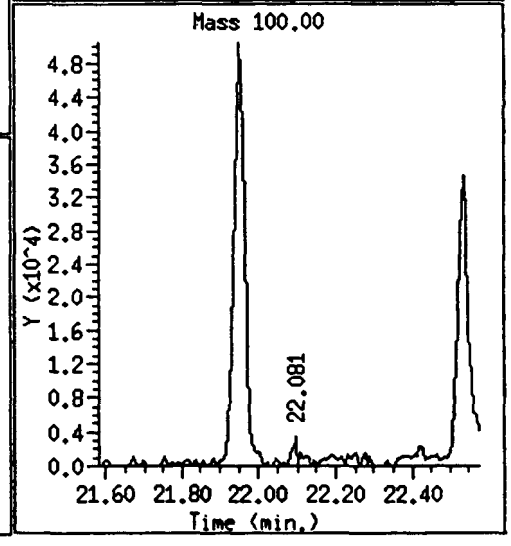












Data File: /chem/Y.i/10-23-97.b/YP791.d

Date : 23-OCT-97 16:00

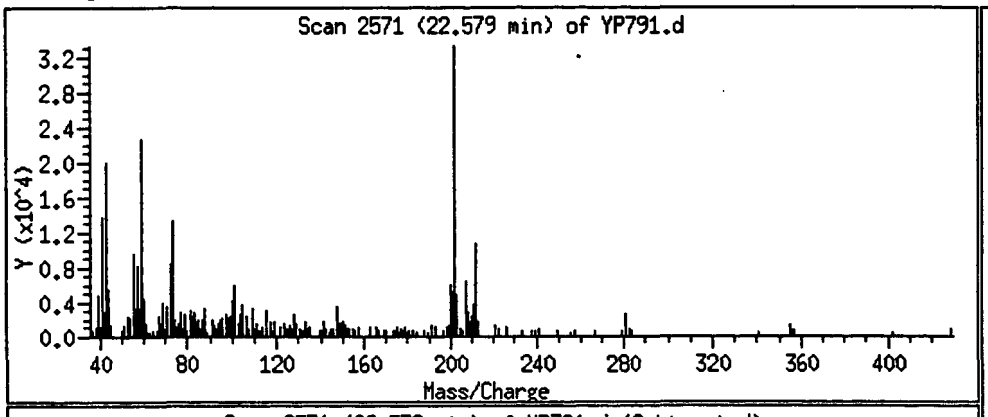
Instrument : Y.i

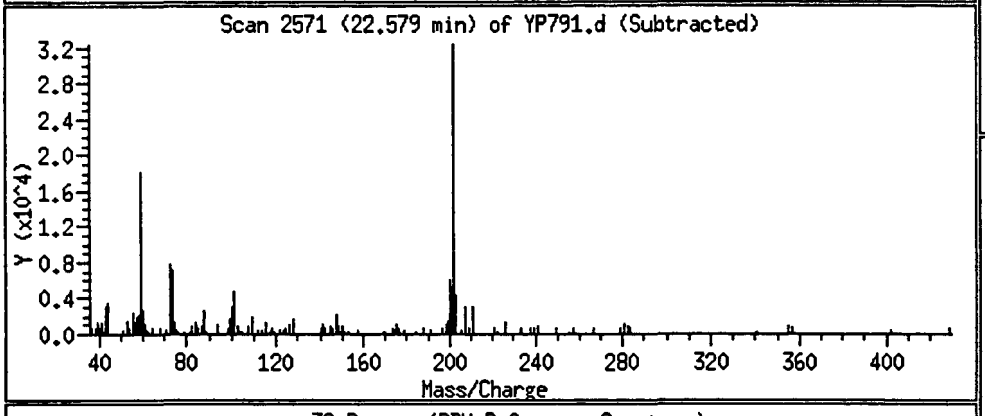
Sample ID : SO-MM5-4-51

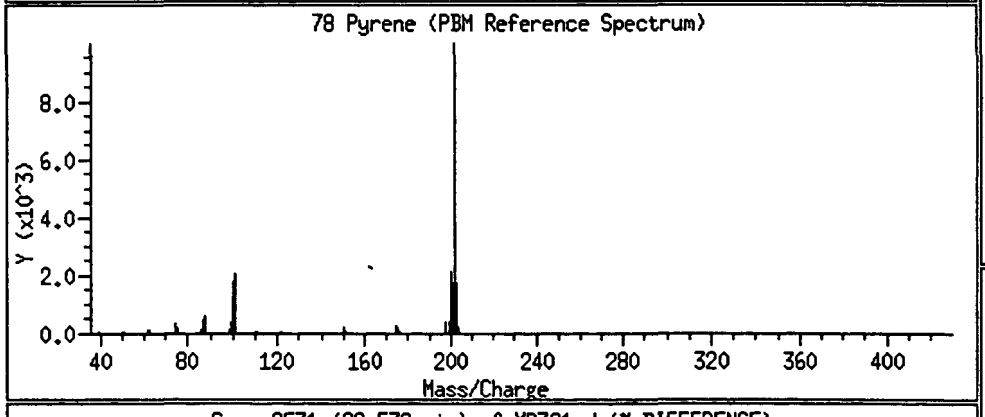
Column phase : DB-5 Column diameter : 0.32

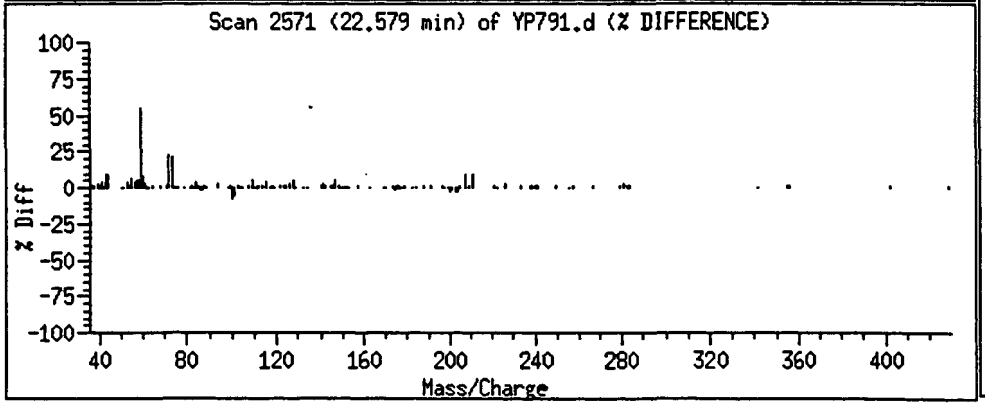
Volume Injected (uL) : 1.0

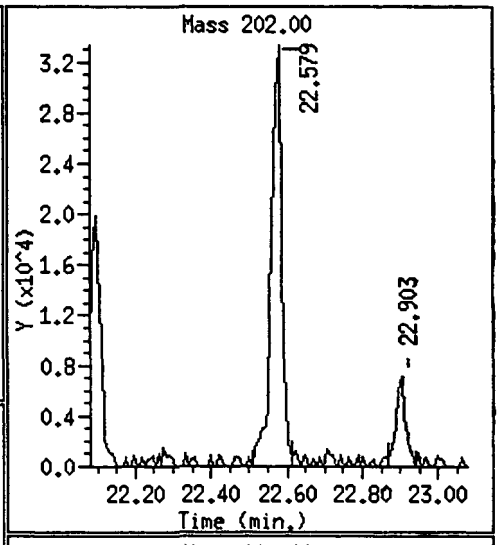
78 Pyrene

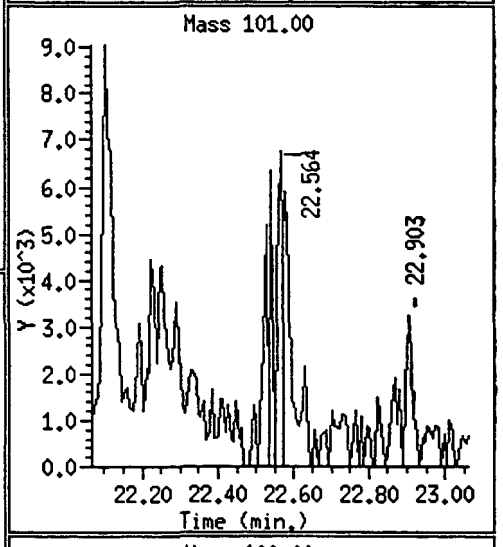


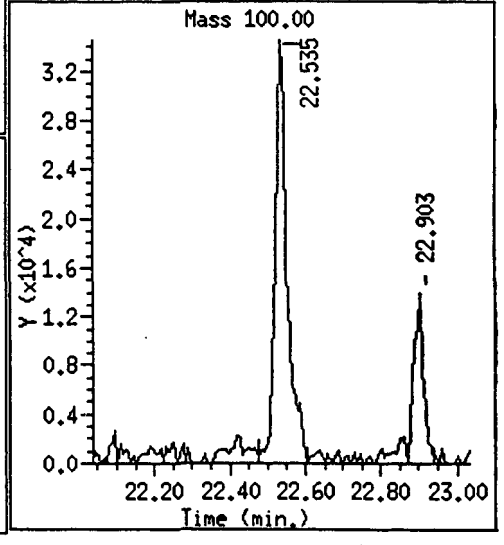












Data File: /chem/Y.i/10-23-97.b/CAA/YP791.d

Date : 23-OCT-97 16:00

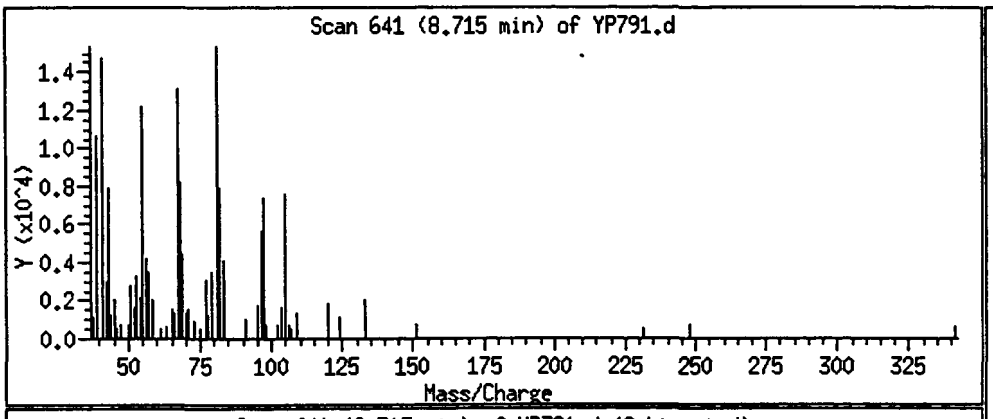
Instrument : Y.i

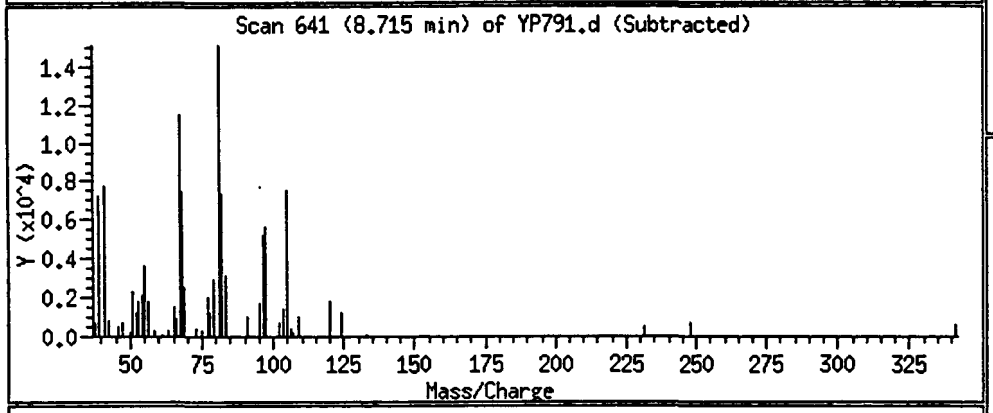
Sample ID : SO-MM5-4-51

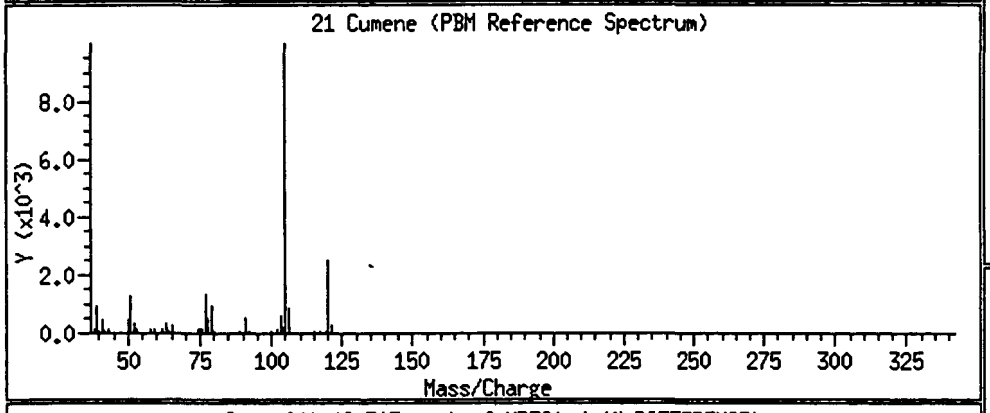
Column phase : DB.5-625 Column diameter : 0.32

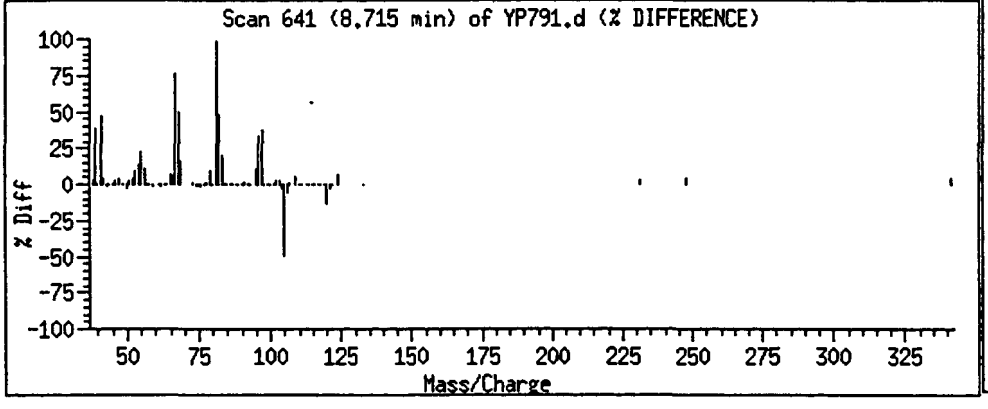
Volume Injected (uL) : 1.0

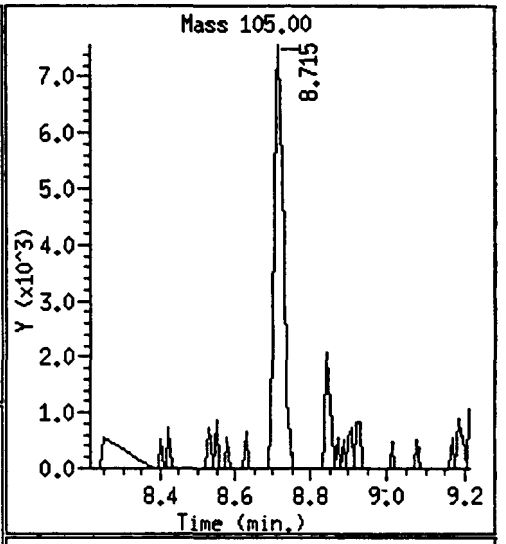
21 Cumene

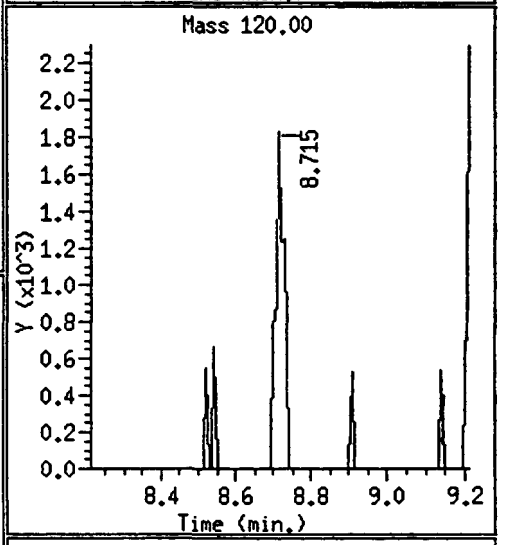


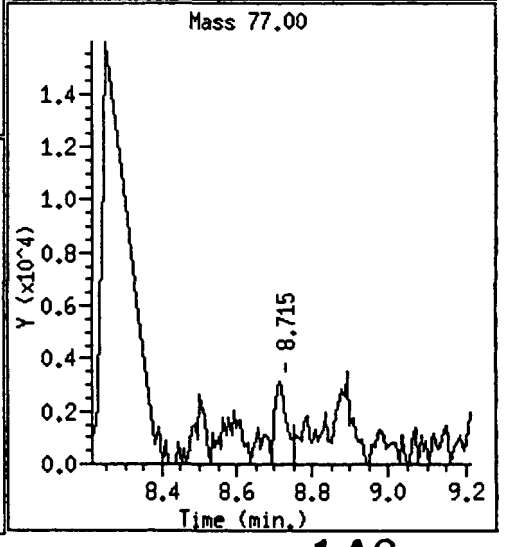












Data File: /chem/Y.i/10-23-97.b/CAA/YP791.d

Date : 23-OCT-97 16:00

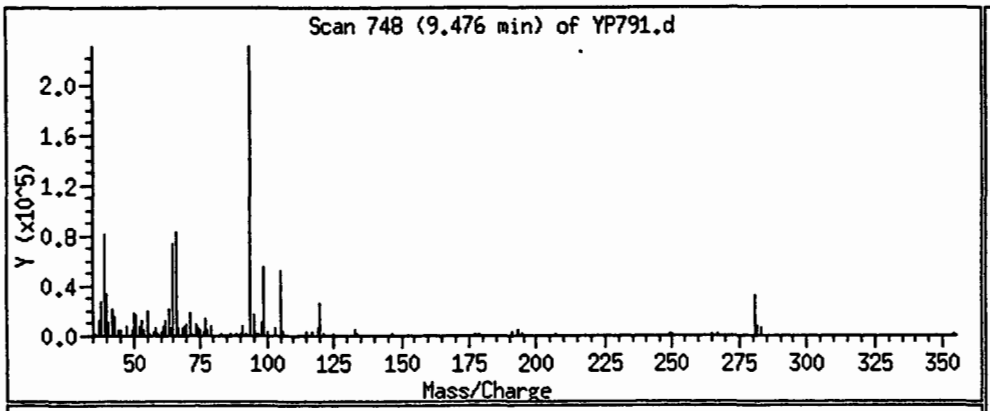
Instrument : Y.i

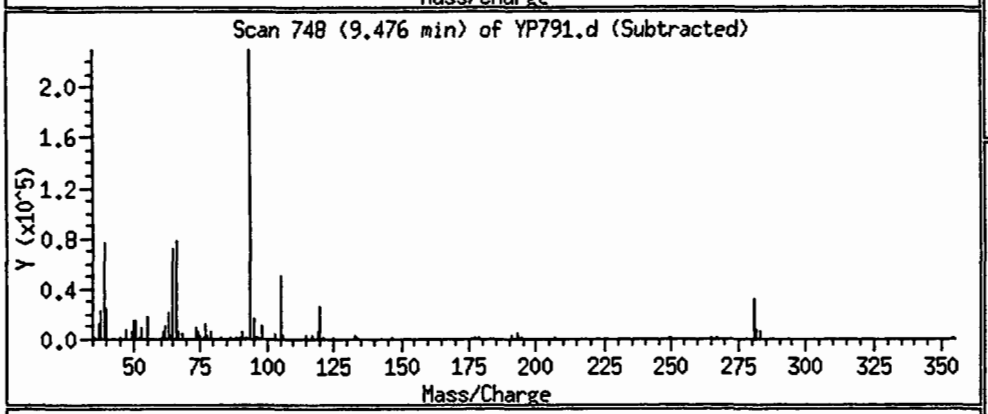
Sample ID : SO-MM5-4-51

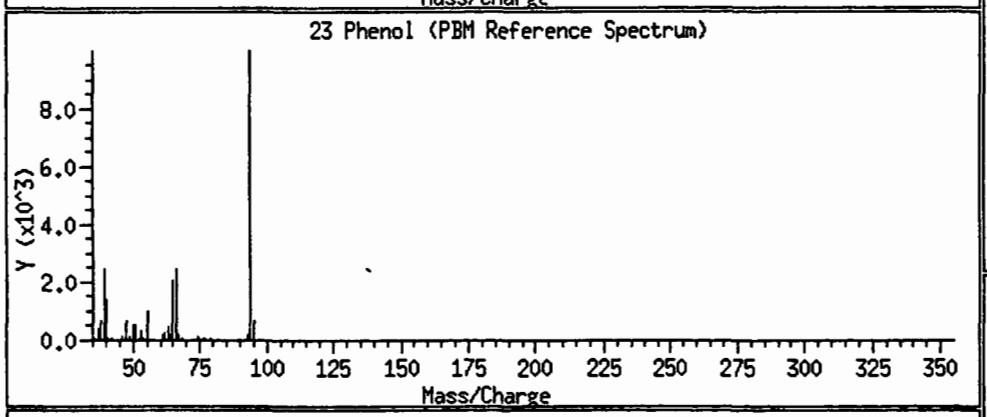
Column phase : DB.5-625 Column diameter : 0.32

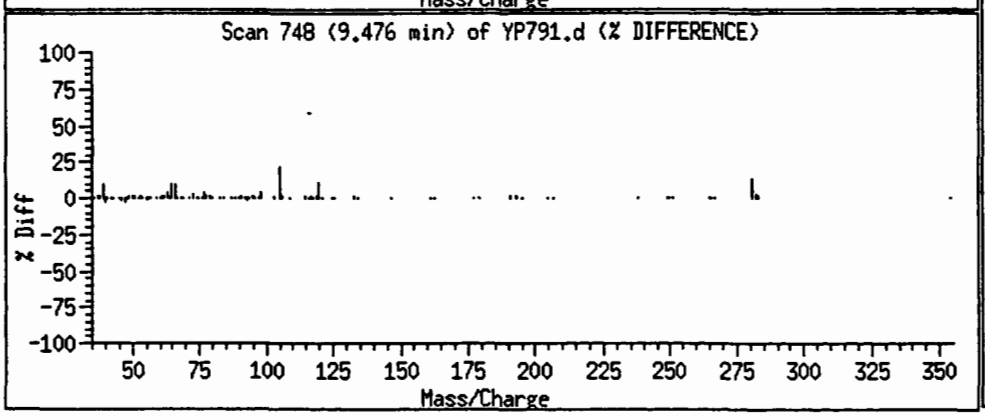
Volume Injected (uL) : 1.0

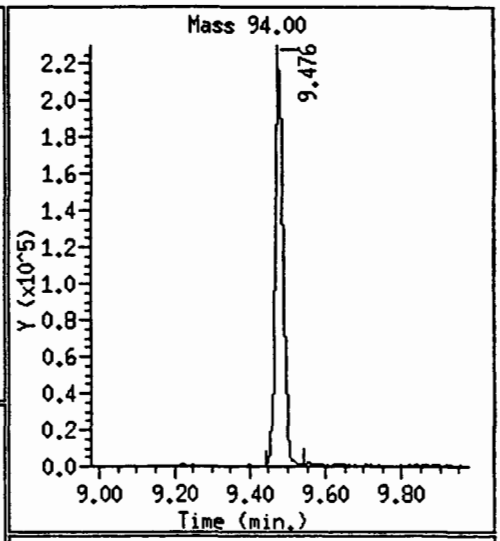
23 Phenol

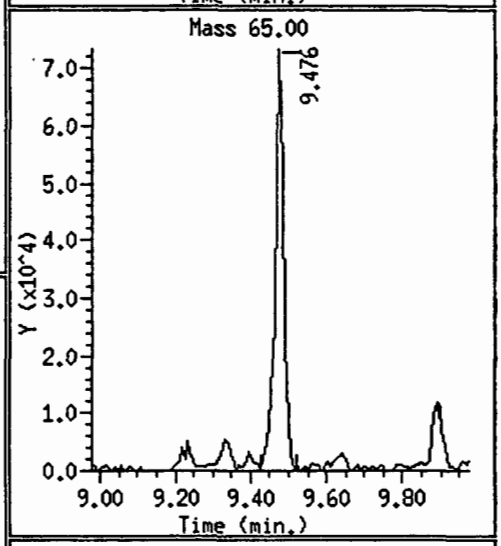


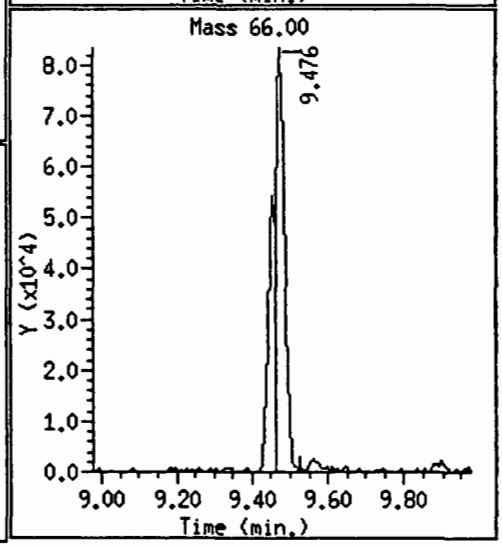






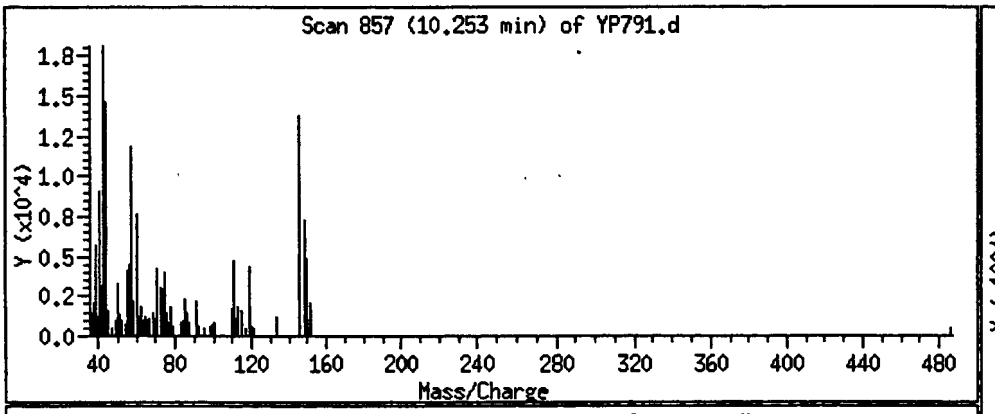


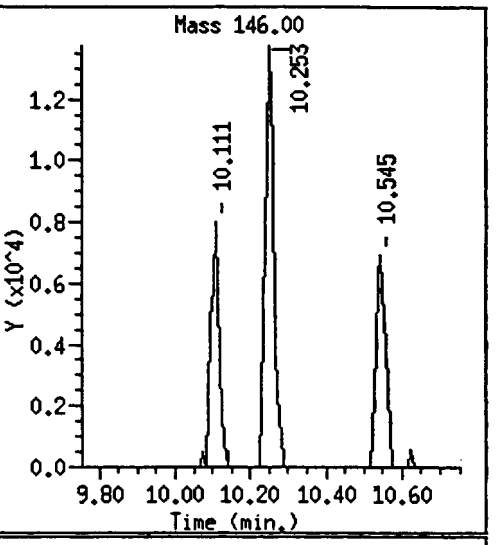


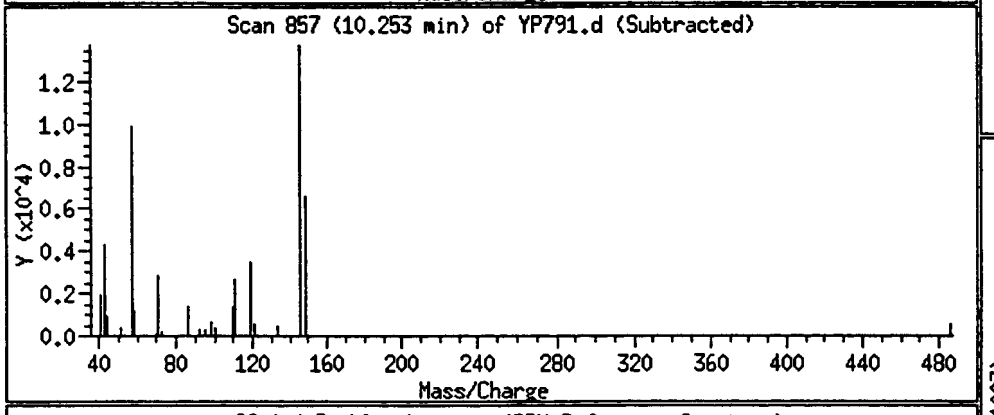


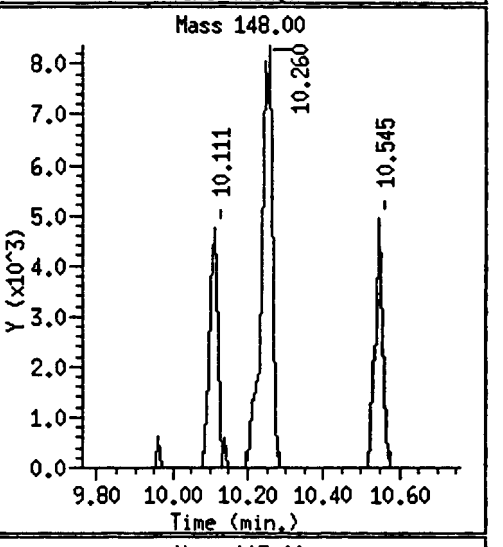
Data File: /chem/Y.i/10-23-97.b/CAA/YP791.d
Date : 23-OCT-97 16:00
Instrument : Y.i
Sample ID : SO-MM5-4-51
Column phase : DB.5-625 Column diameter : 0.32
Volume Injected (uL) : 1.0

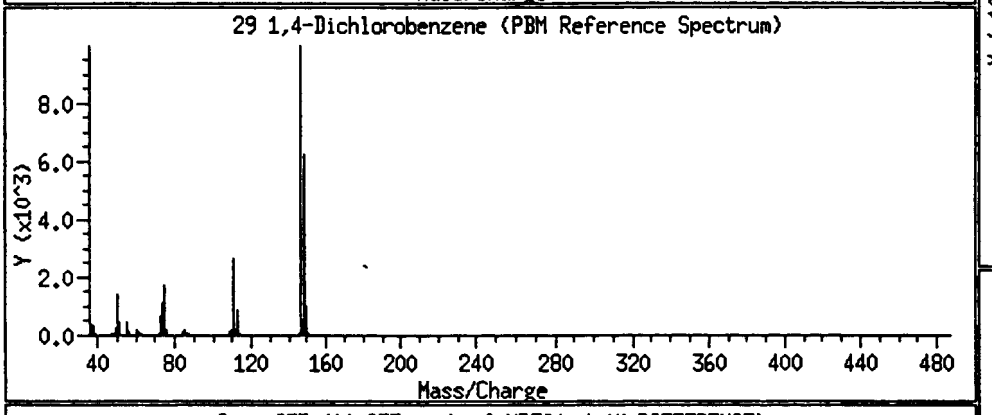
29 1,4-Dichlorobenzene

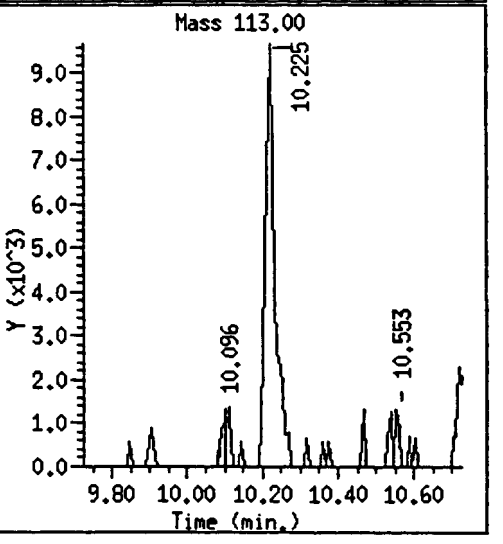


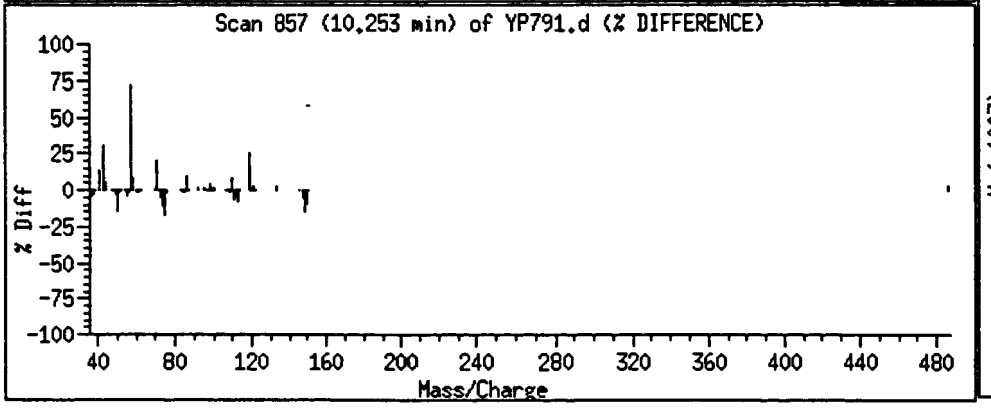












Data File: /chem/Y.i/10-23-97.b/CAA/YP791.d

Date : 23-OCT-97 16:00

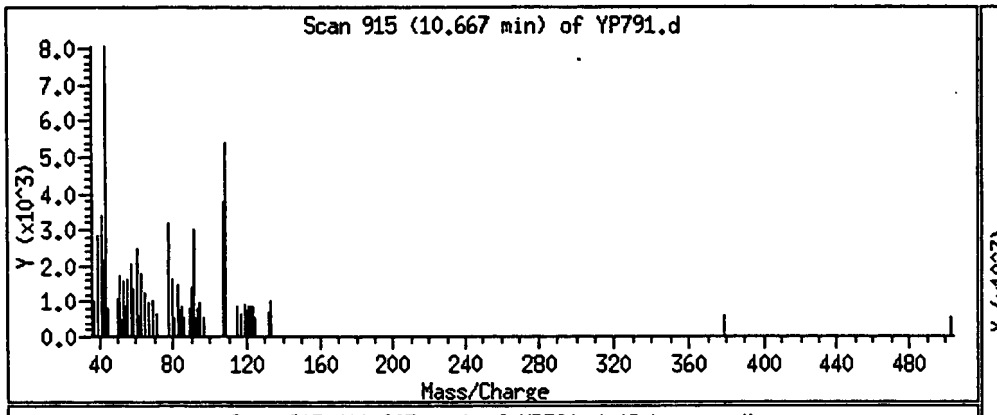
Instrument : Y.i

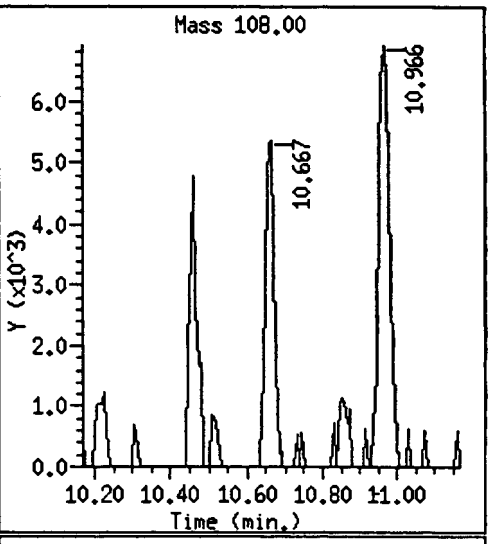
Sample ID : SO-MM5-4-51

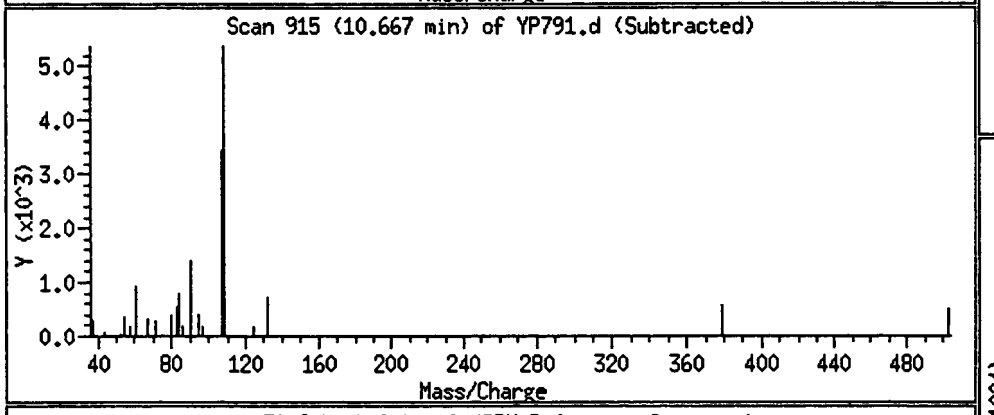
Column phase : DB.5-625 Column diameter : 0.32

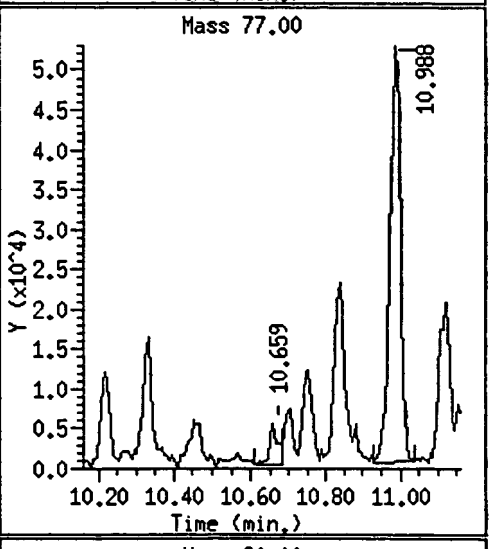
Volume Injected (uL) : 1.0

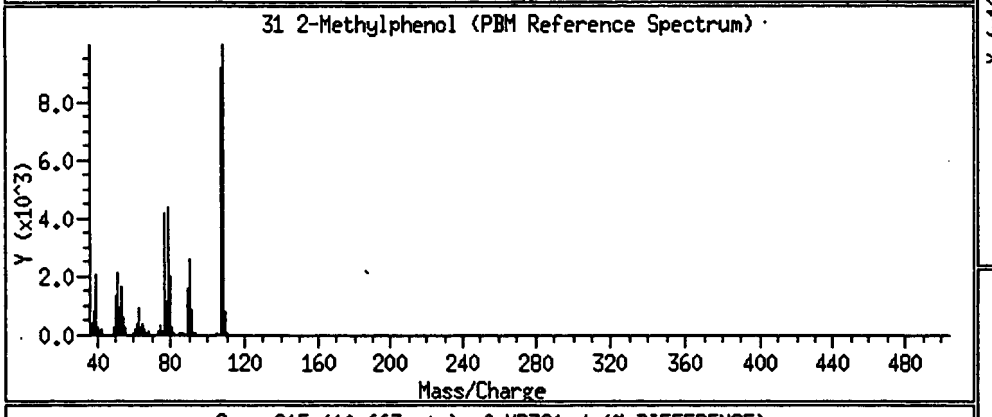
31 2-Methylphenol

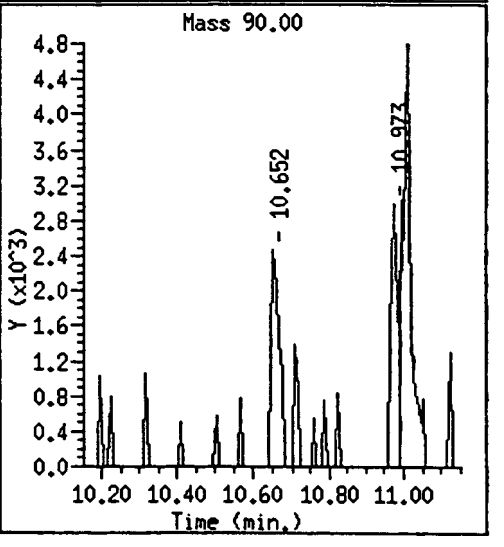


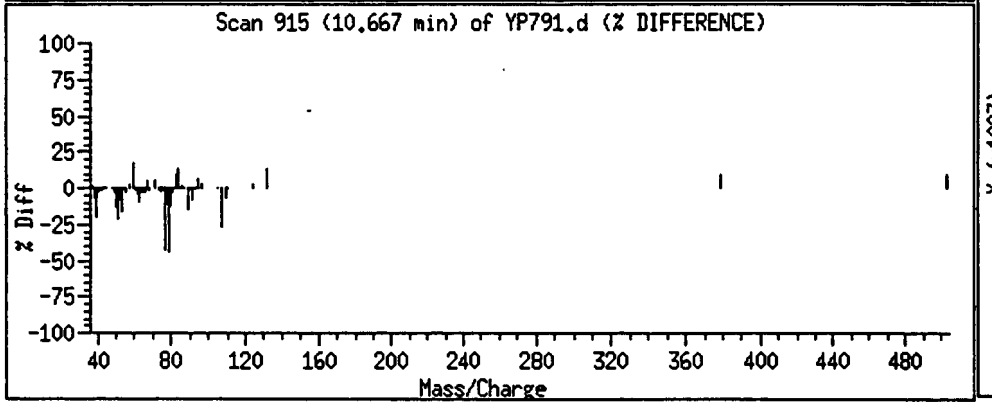












Data File: /chem/Y.i/10-23-97.b/CAA/YP791.d

Date : 23-OCT-97 16:00

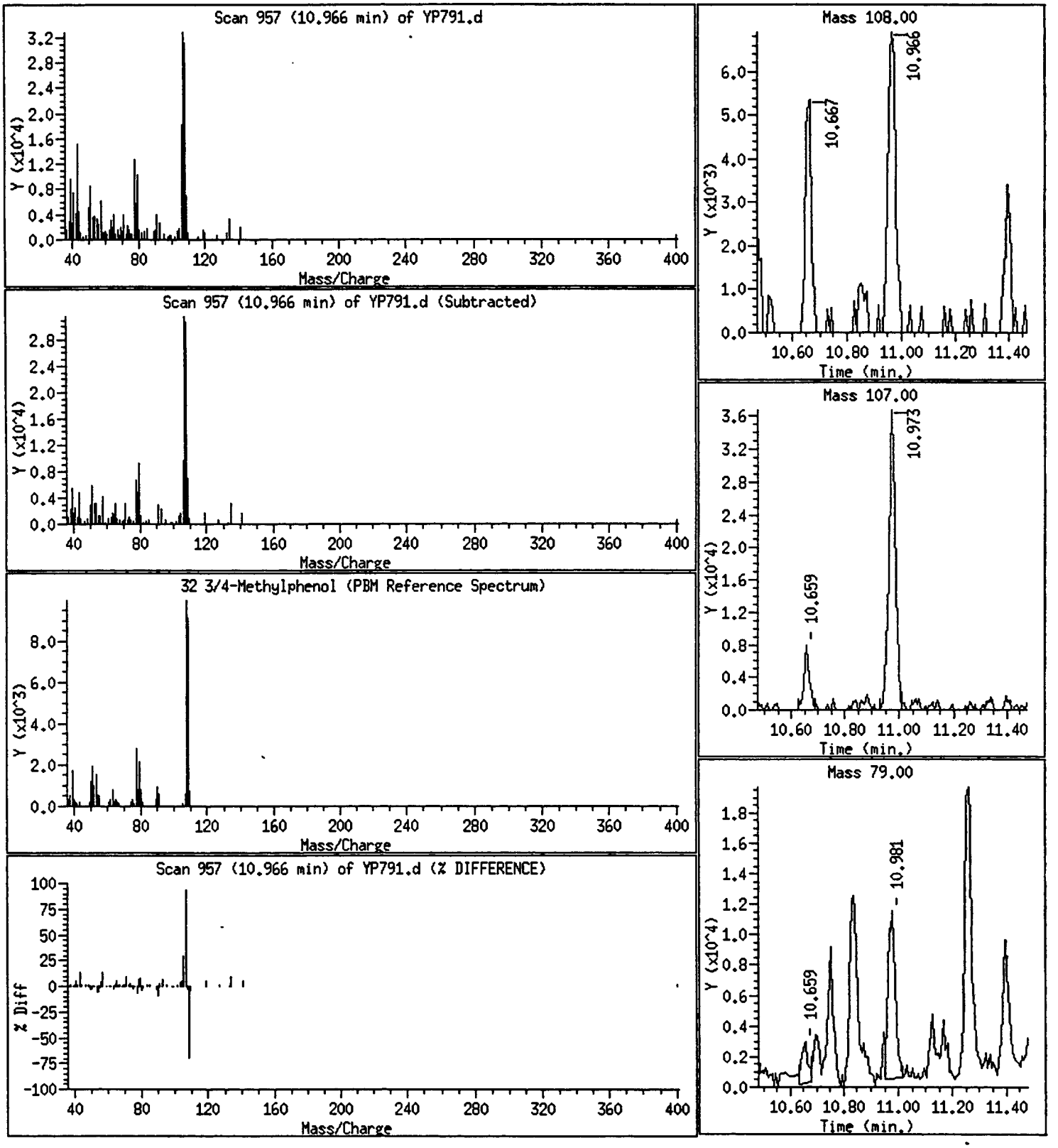
Instrument : Y.i

Sample ID : SO-MM5-4-51

Column phase : DB.5-625 Column diameter : 0.32

Volume Injected (uL) : 1.0

32 3/4-Methylphenol



Data File: /chem/Y.i/10-23-97.b/CAA/YP791.d

Date : 23-OCT-97 16:00

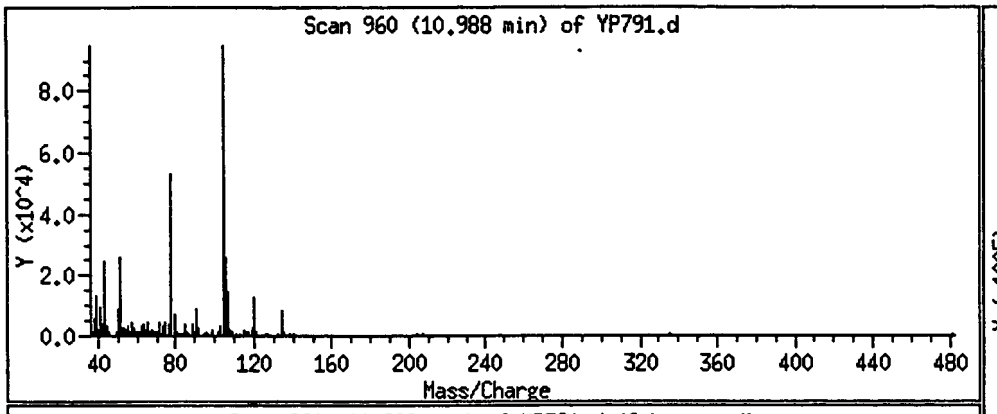
Instrument : Y.i

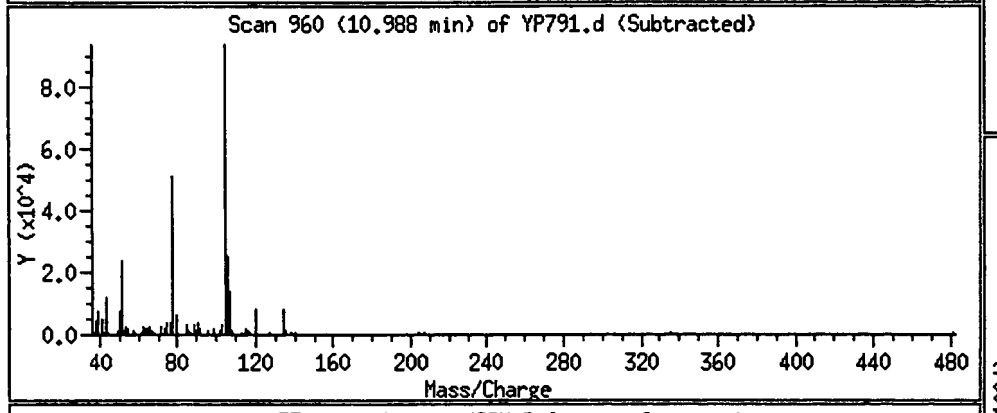
Sample ID : SO-MM5-4-51

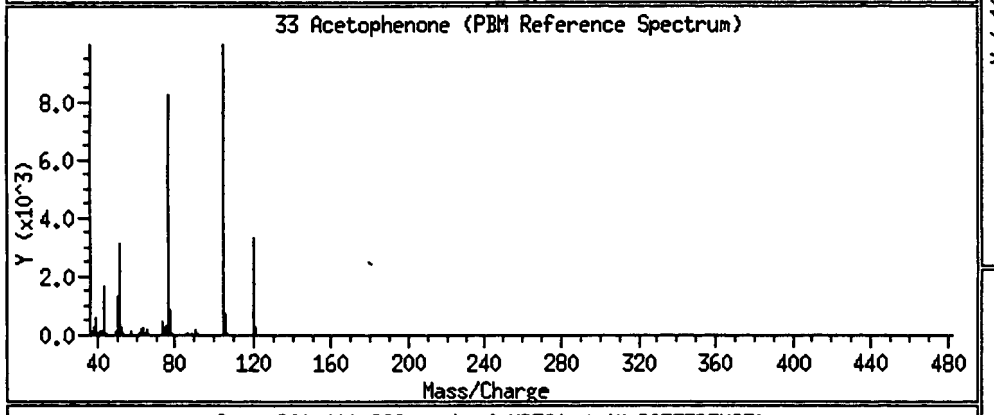
Column phase : DB.5-625 Column diameter : 0.32

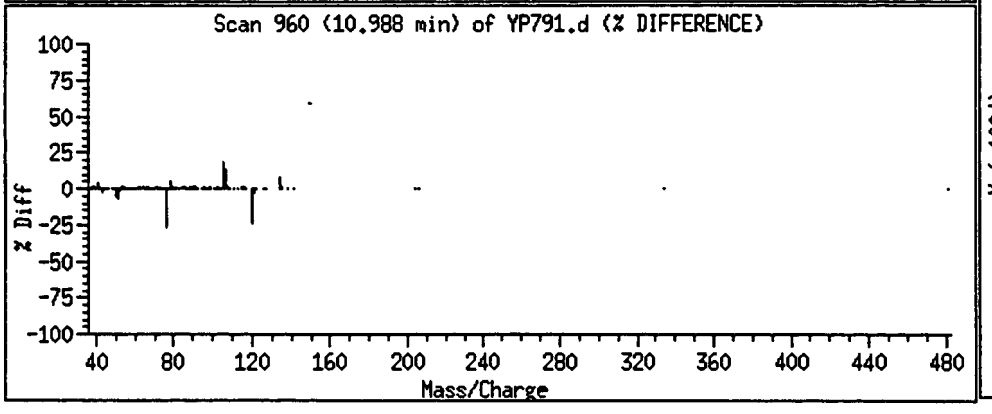
Volume Injected (uL) : 1.0

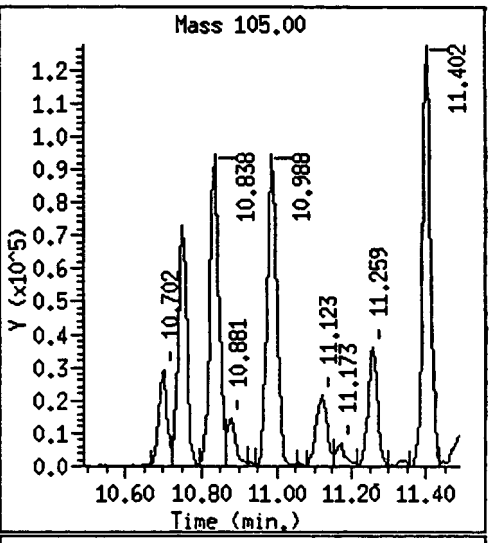
33 Acetophenone

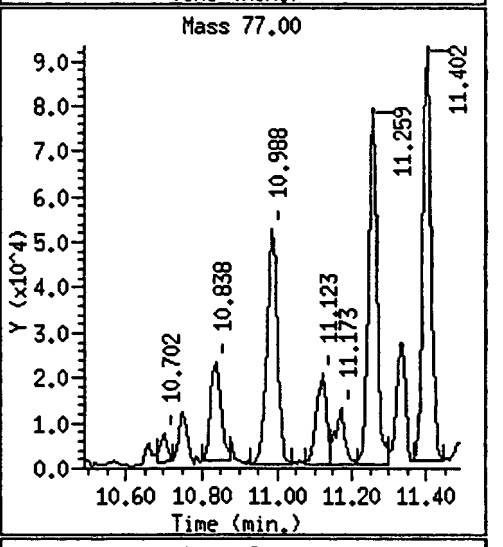


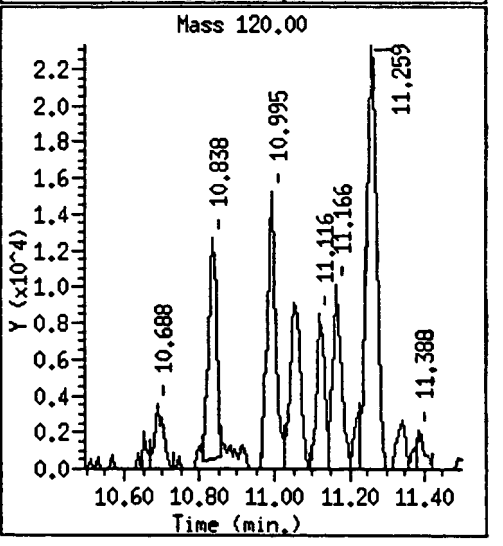












Data File: /chem/Y.i/10-23-97.b/CAA/YP791.d

Date : 23-OCT-97 16:00

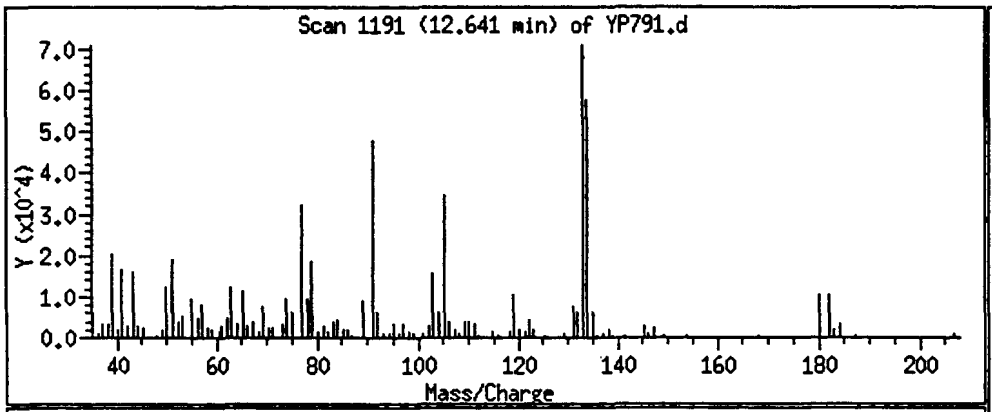
Instrument : Y.i

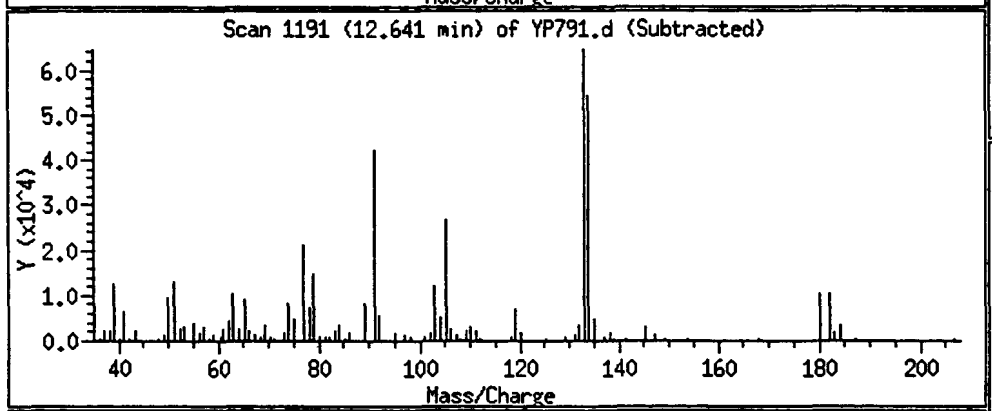
Sample ID : SO-MM5-4-51

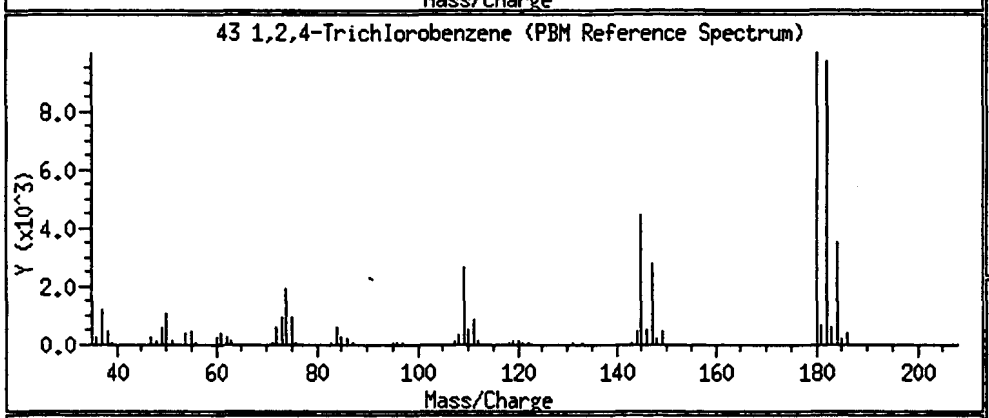
Column phase : DB.5-625 Column diameter : 0.32

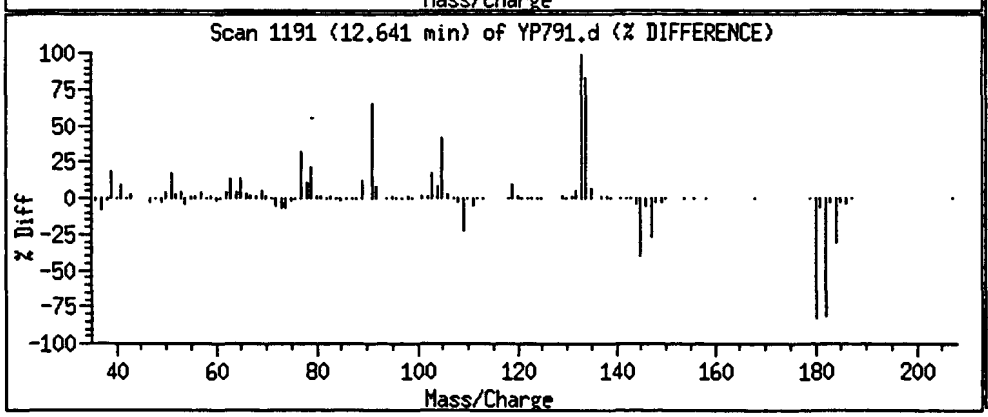
Volume Injected (uL) : 1.0

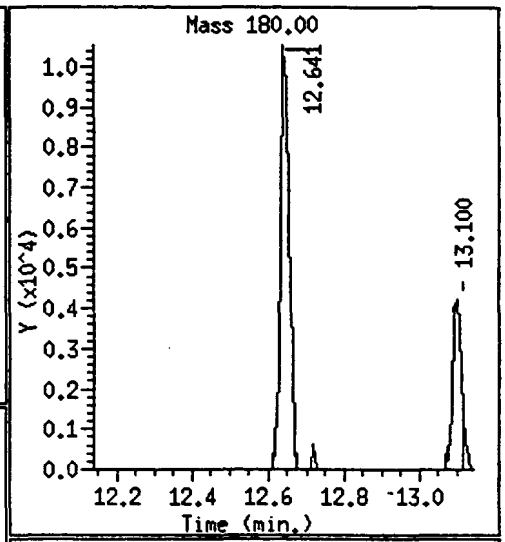
43 1,2,4-Trichlorobenzene

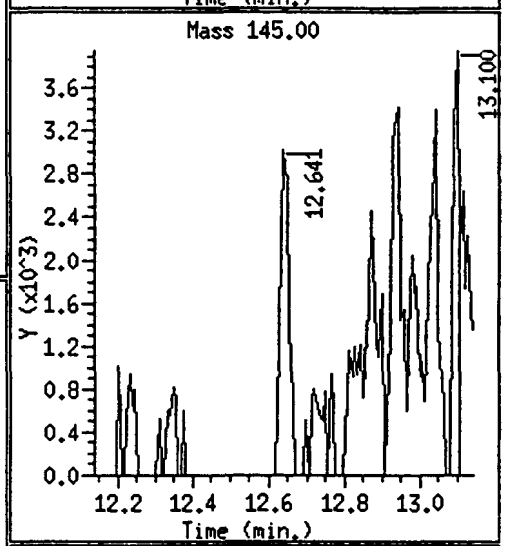


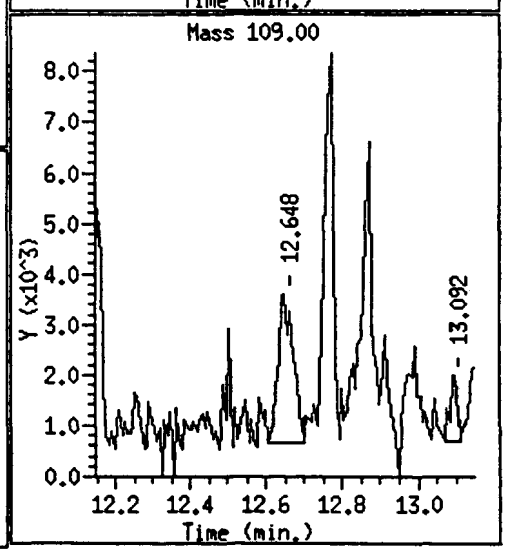












Data File: /chem/Y.i/10-23-97.b/CAA/YP791.d

Date : 23-OCT-97 16:00

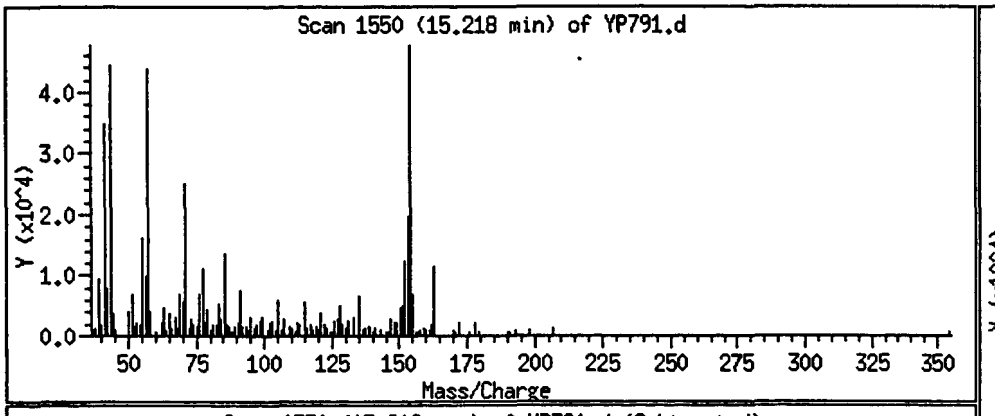
Instrument : Y.i

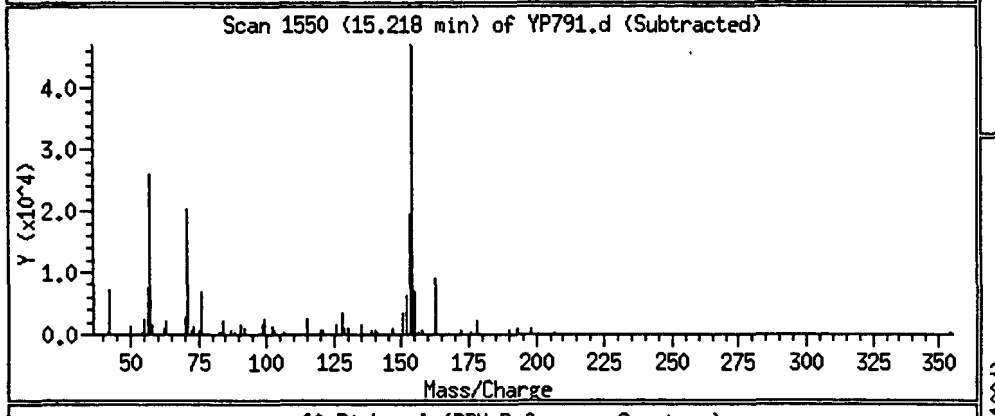
Sample ID : SO-MM5-4-51

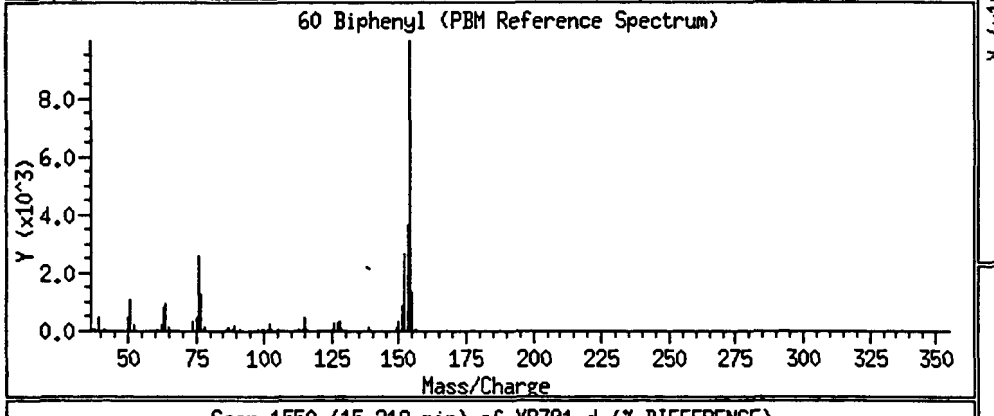
Column phase : DB.5-625 Column diameter : 0.32

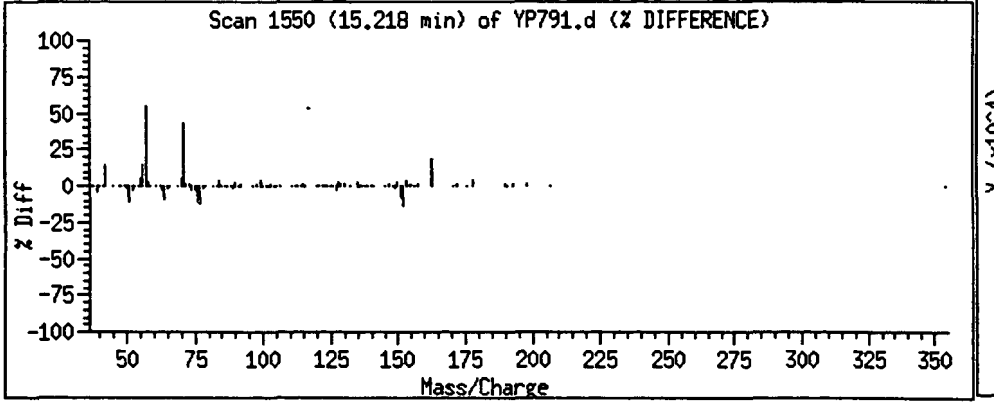
Volume Injected (uL) : 1.0

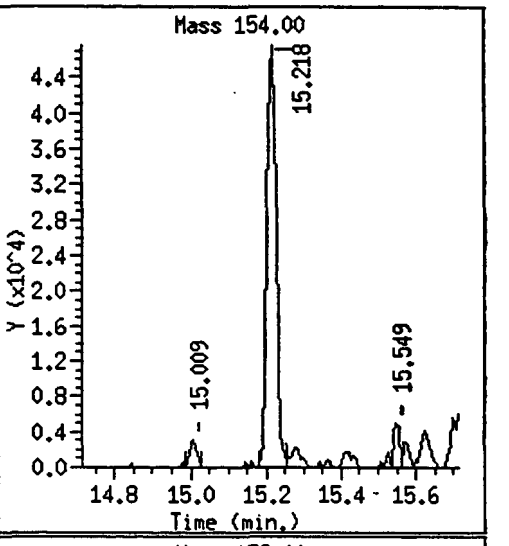
60 Biphenyl

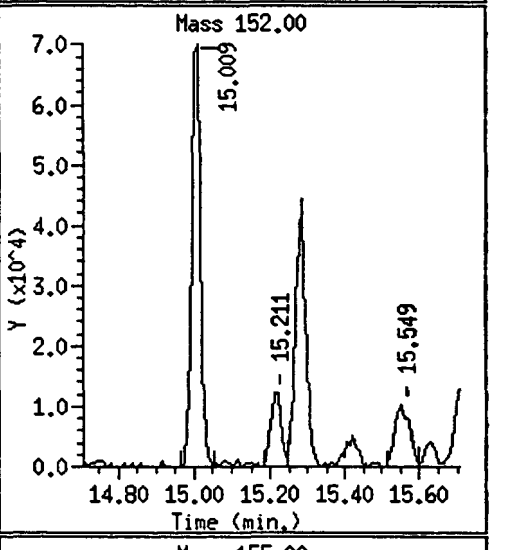


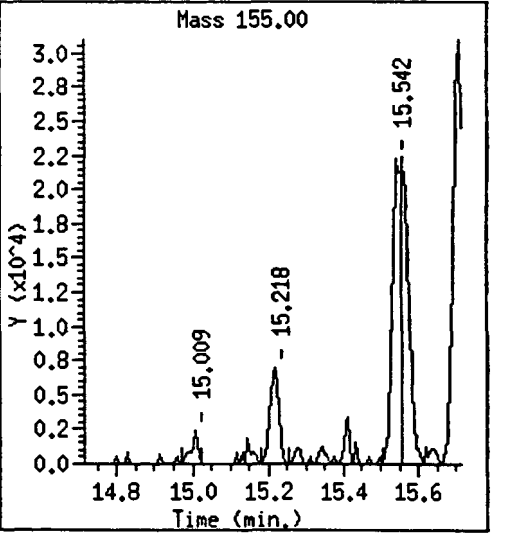












*Data File: /chem/Y.i/10-23-97.b/CAA/YP791.d

Date : 23-OCT-97 16:00

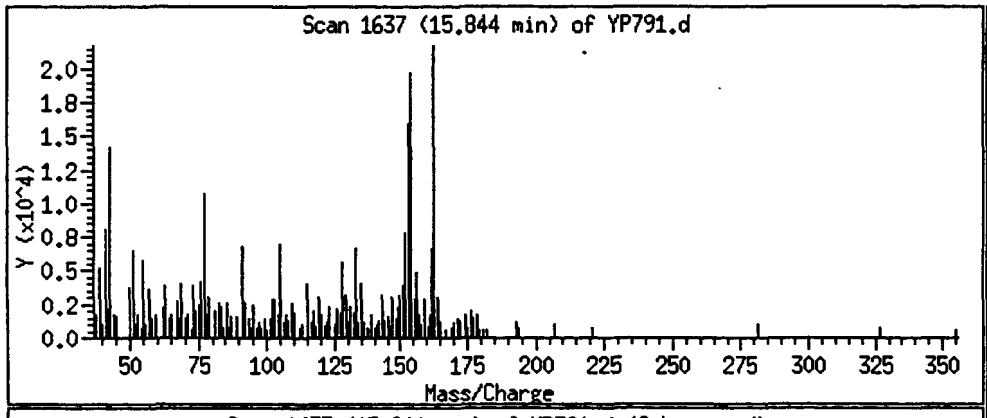
Instrument : Y.i

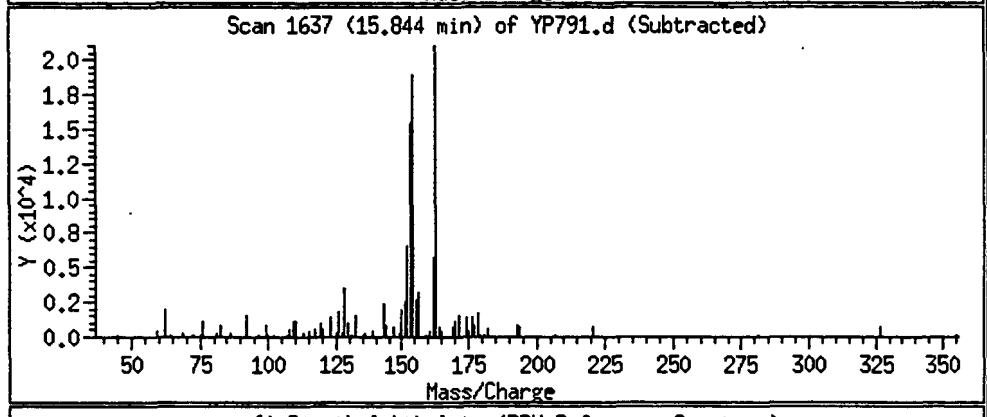
Sample ID : SO-MM5-4-51

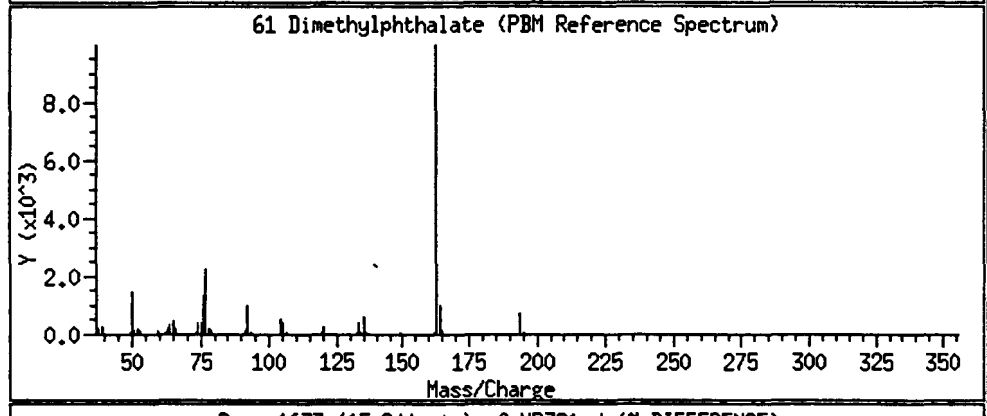
Column phase : DB.5-625 Column diameter : 0.32

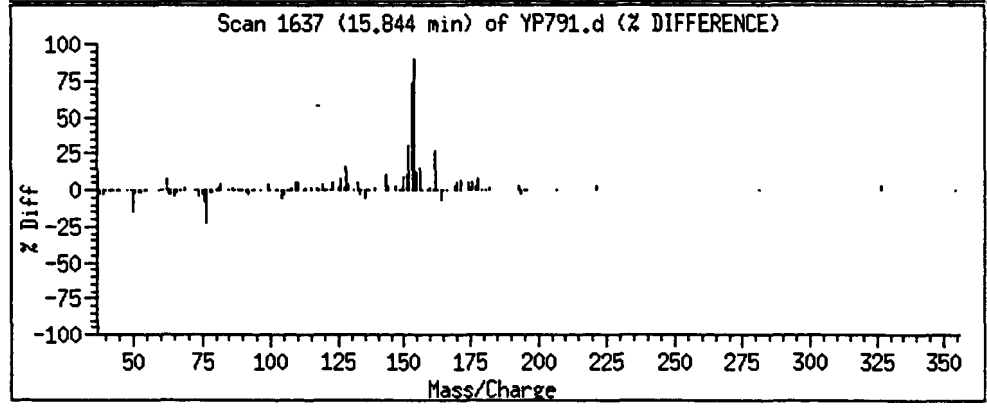
Volume Injected (uL) : 1.0

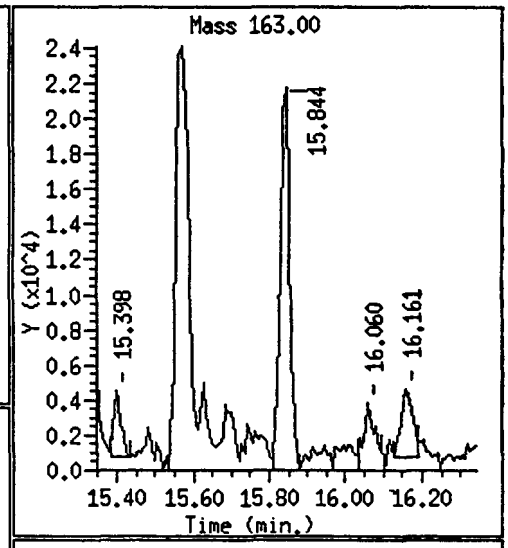
61 Dimethylphthalate

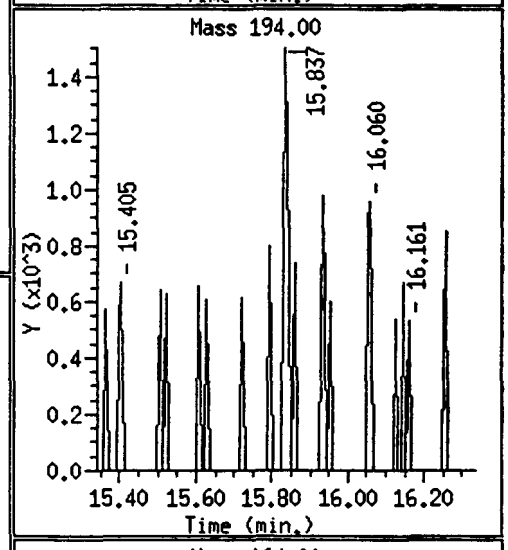


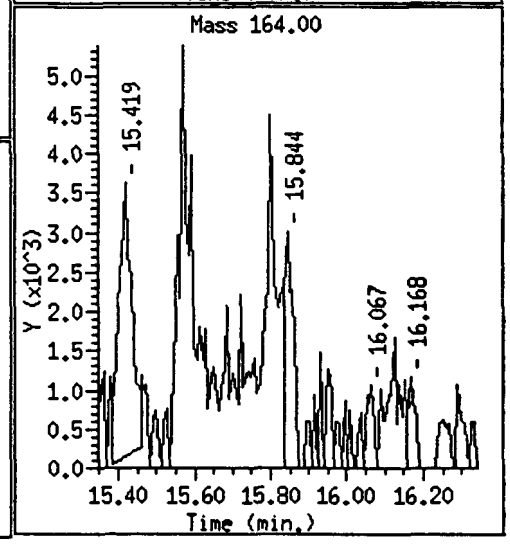












Data File: /chem/Y.i/10-23-97.b/CAA/YP791.d

Date : 23-OCT-97 16:00

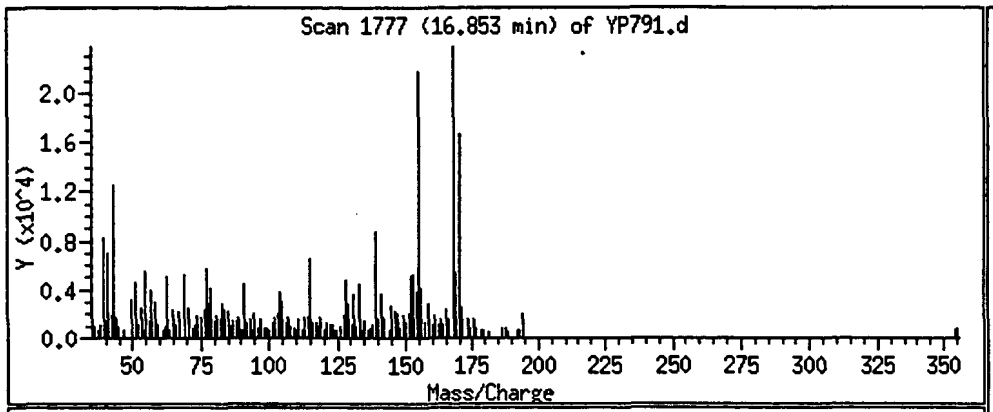
Instrument : Y.i

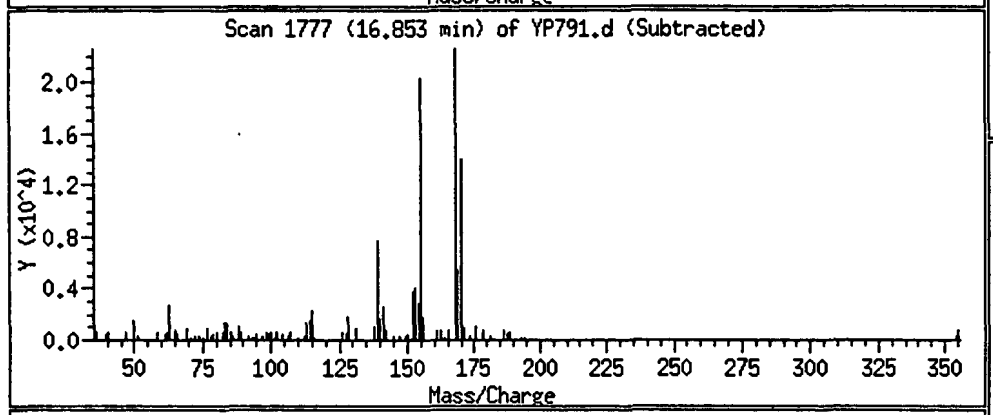
Sample ID : SO-MM5-4-51

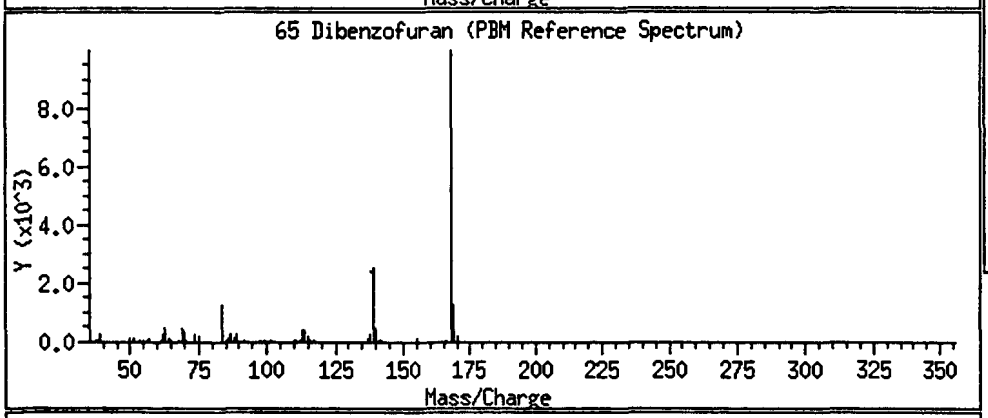
Column phase : DB.5-625 Column diameter : 0.32

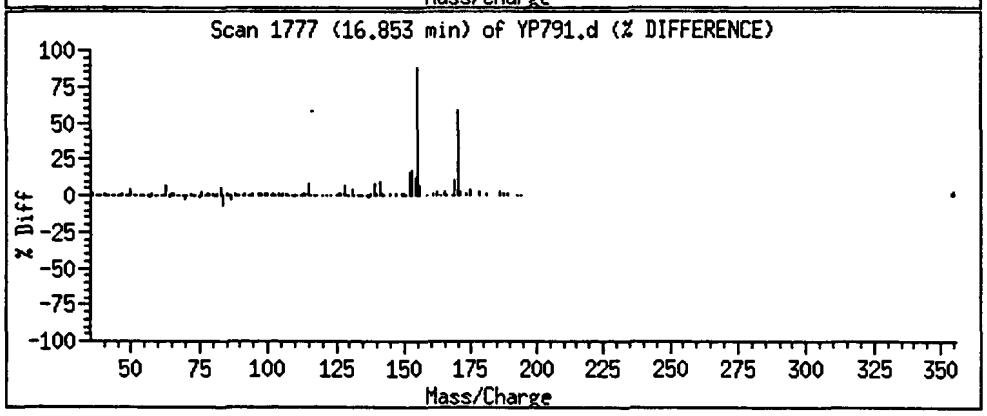
Volume Injected (uL) : 1.0

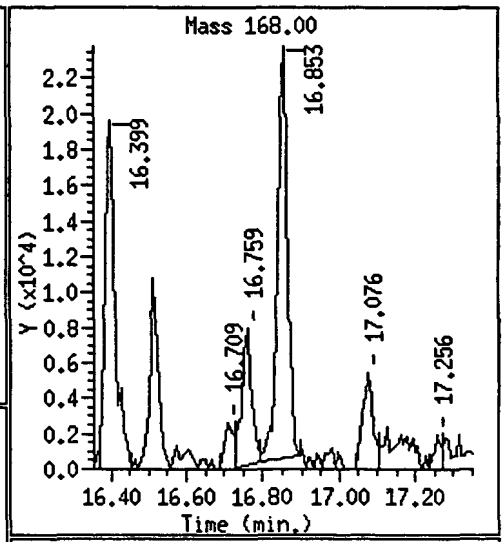
65 Dibenzofuran

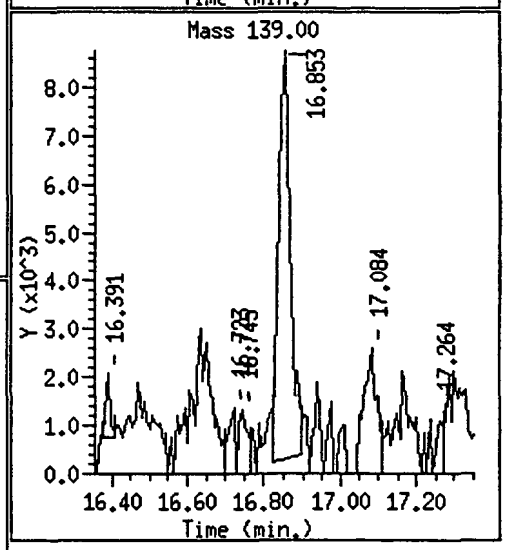












Data File: /chem/Y.i/10-23-97.b/CAA/YP791.d

Date : 23-OCT-97 16:00

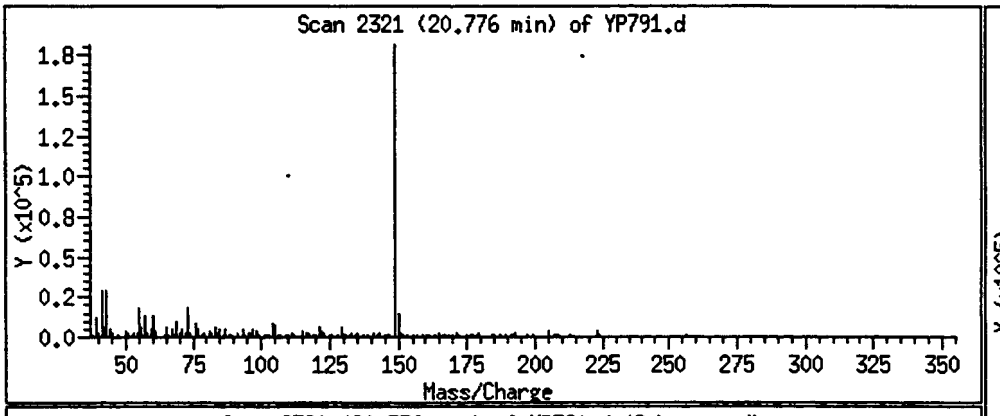
Instrument : Y.i

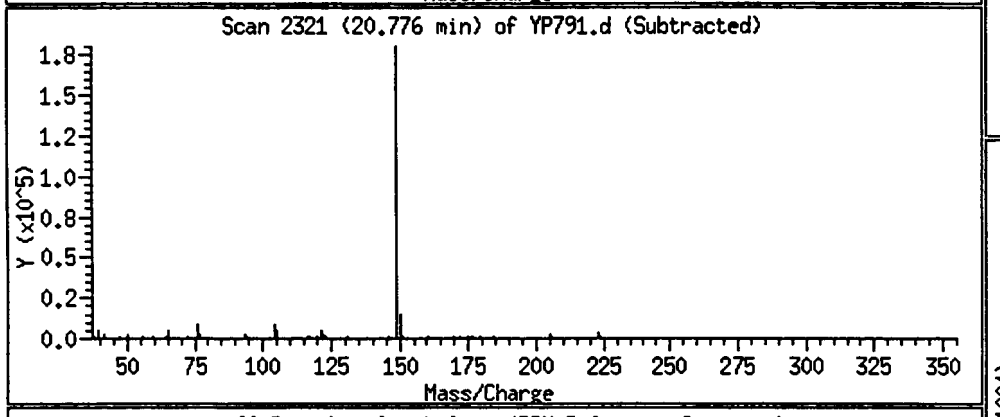
Sample ID : SO-MM5-4-51

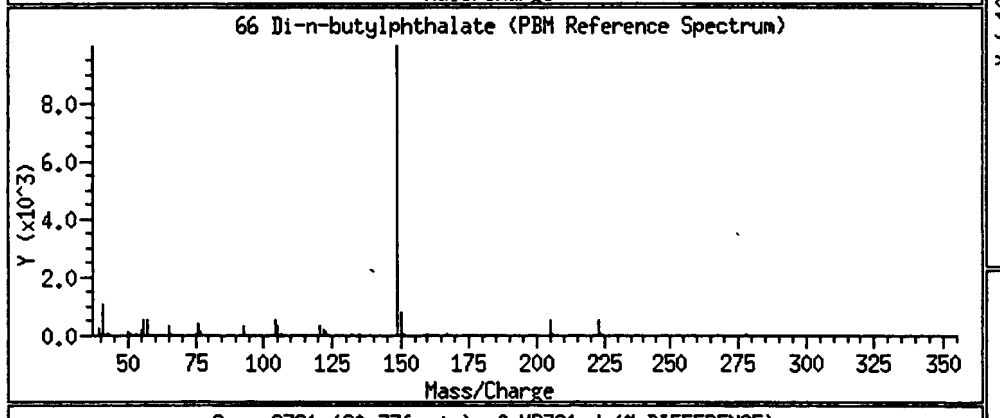
Column phase : DB.5-625 Column diameter : 0.32

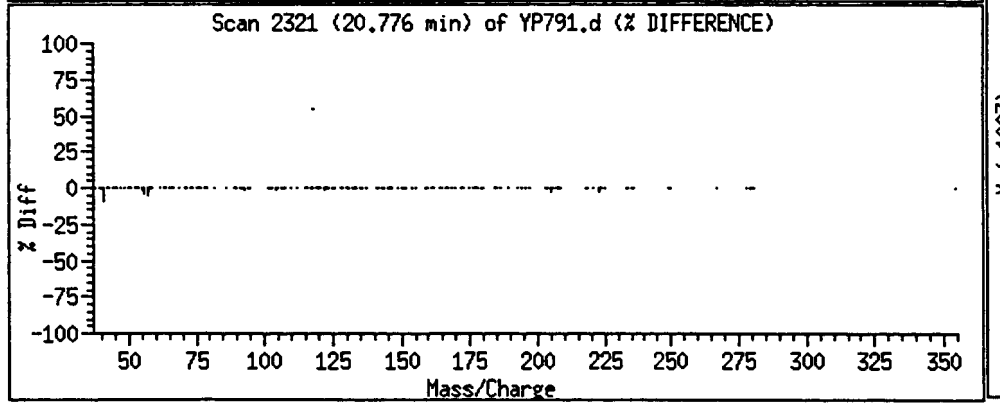
Volume Injected (uL) : 1.0

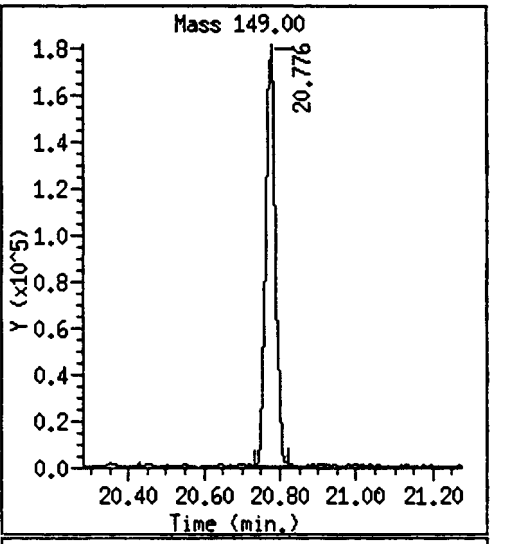
66 Di-n-butylphthalate

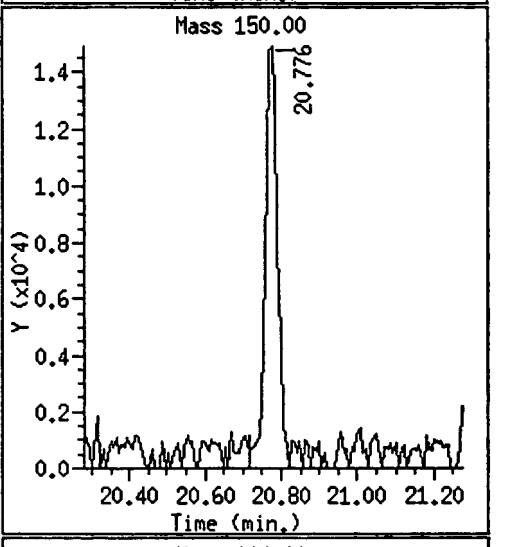


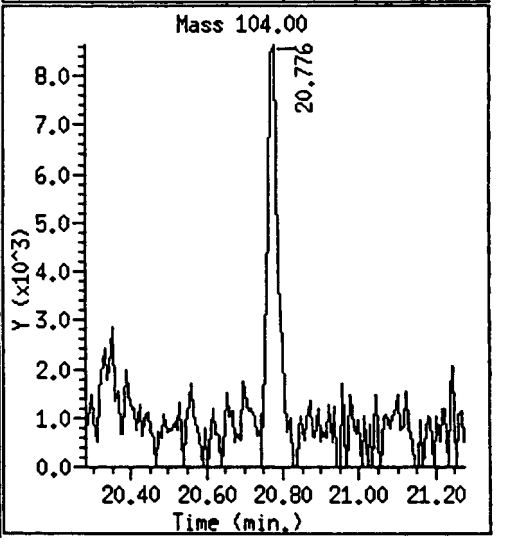












Data File: /chem/Y.i/10-23-97.b/CAA/YP791.d

Date : 23-OCT-97 16:00

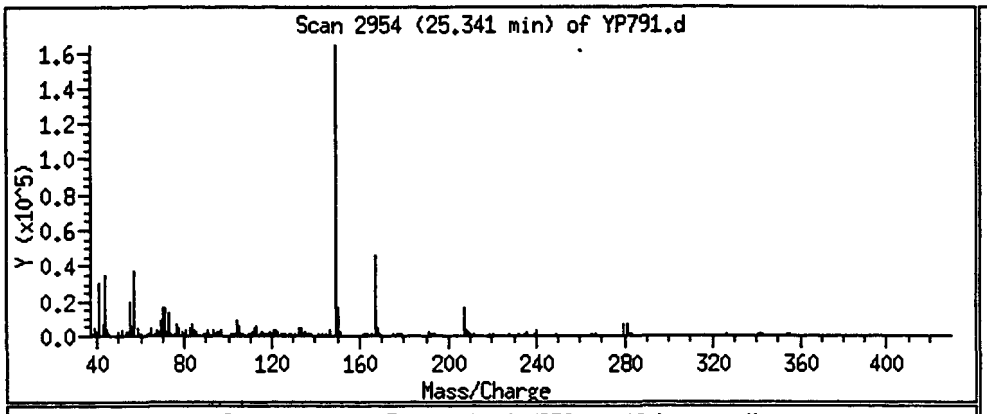
Instrument : Y.i

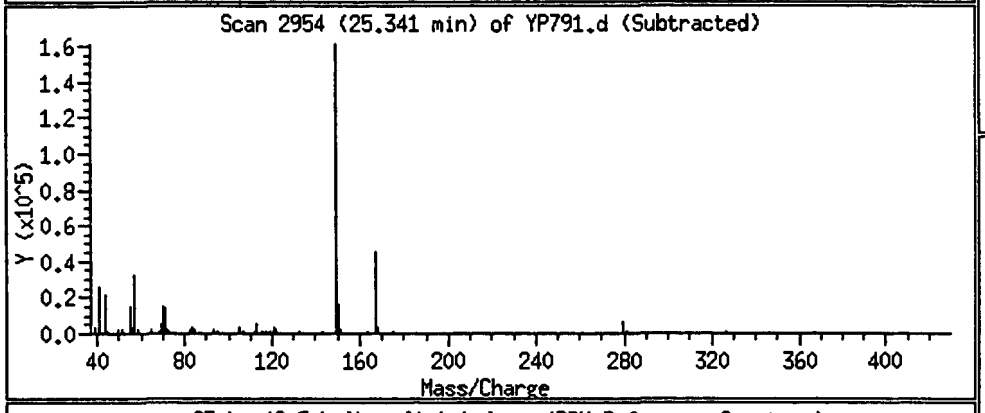
Sample ID : SO-MM5-4-51

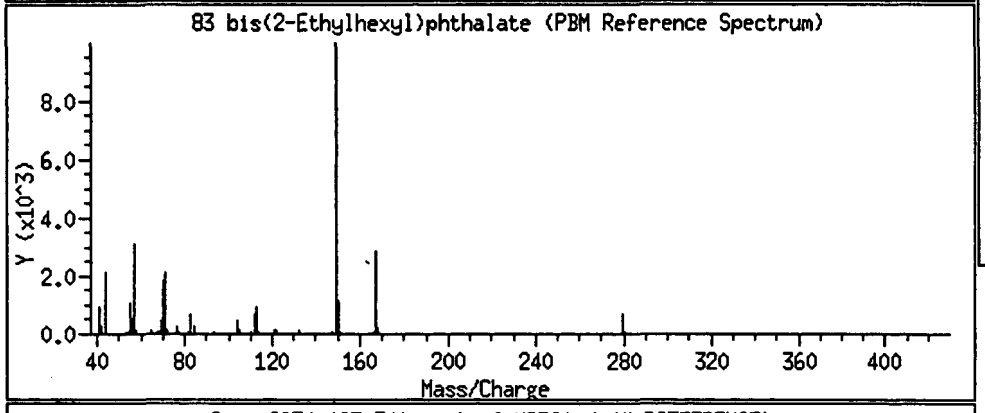
Column phase : DB.5-625 Column diameter : 0.32

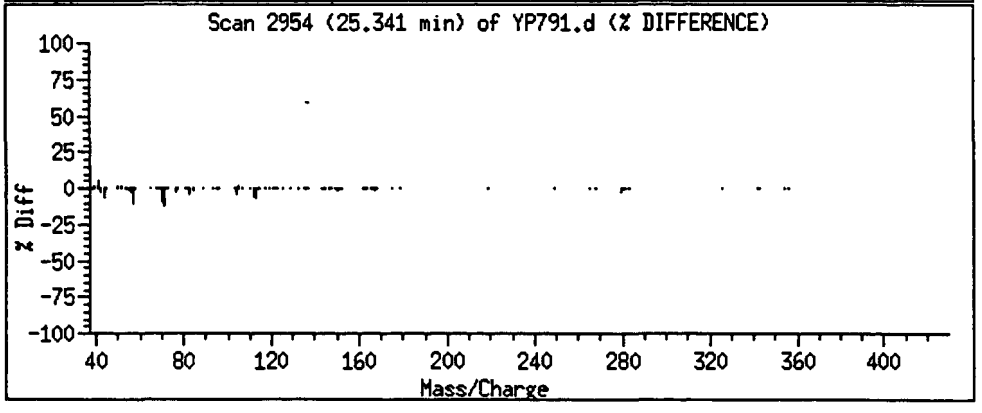
Volume Injected (uL) : 1.0

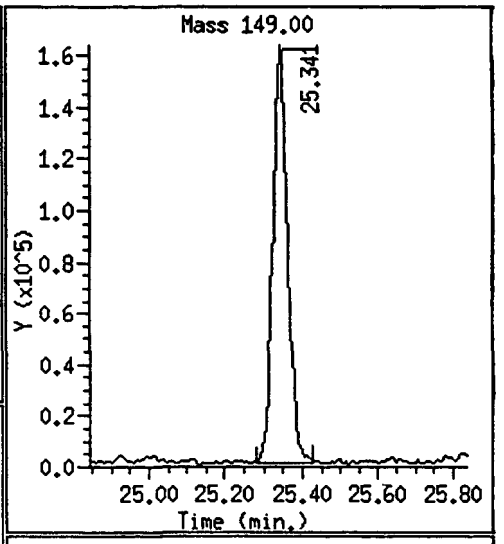
83 bis(2-Ethylhexyl)phthalate

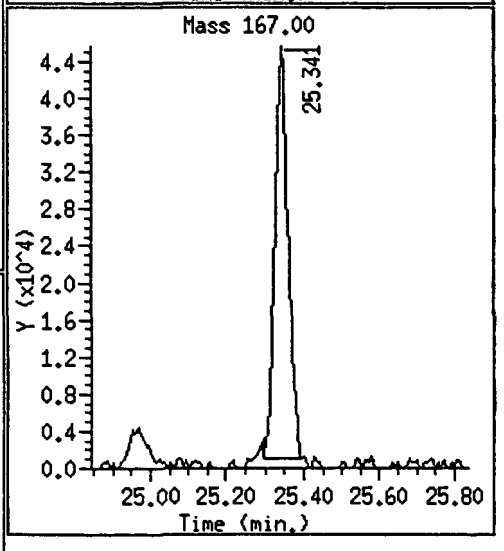












Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP775 | **Sample ID: FBI-MM5-1**

Client Project: Saginaw, MI | Date Received: 09/29/97 | Response File: YP766
TLI ID: 185-7-1A-D | Date Extracted: 10/14/97
Date Analyzed : 10/22/97

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
Naphthalene-d_8		IS 2	12.77		
Naphthalene	5.85	BJ	12.81		10
2-Methylnaphthalene	0.52	J	14.25		10
Acenaphthene-d_{10}		IS 3	16.42		
2-Chloronaphthalene		U		0.40	10
Acenaphthylene		U		0.25	10
Acenaphthene		U		0.42	10
Fluorene		U		0.41	10
Phenanthrene-d_{10}		IS 4	19.54		
Phenanthrene	0.13	J	19.59		10
Anthracene		U		0.31	10
Fluoranthene		U		0.29	10
Chrysene-d_{12}		IS 5	25.28		
Pyrene		U		0.26	10
Benzo(a)anthracene		U		0.30	10
Chrysene		U		0.30	10
Perylene-d_{12}		IS 6	29.41		
Benzo(b)fluoranthene		U		0.24	10
Benzo(k)fluoranthene		U		0.23	10
Benzo(e)pyrene		U		0.22	10
Benzo(a)pyrene		U		0.25	10
Perylene		U		0.23	10
Indeno(1,2,3-cd)pyrene		U		0.22	10
Dibenz(a,h)anthracene		U		0.29	10
Benzo(g,h,i)perylene		U		0.24	10

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Triangle Laboratories of RTP, Inc.
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP775 | **Sample ID: FBI-MM5-1**

Client Project: Saginaw, MI
TLI ID: 185-7-1A-D

Date Received: 09/29/97
Date Extracted: 10/14/97
Date Analyzed : 10/22/97

Response File: YP766

Dilution Factor: 1.00

Surrogate Summary	Amount (ug)	RT	IS Ref	%REC
Phenol-d_5	66.16	9.45	1	66
Nitrobenzene-d_5	61.74	11.30	2	62
1,3,5-Trichlorobenzene-d_3	60.34	11.98	2	60
1,4-Dibromobenzene-d_4	68.04	12.87	1	68
2-Fluorobiphenyl	71.51	15.01	3	72
2,4,6-Tribromophenol	92.50	18.07	3	92
Anthracene-d_{10}	90.07	19.66	4	90
Pyrene-d_{10}	86.70	22.54	5	87
Terphenyl-d_{14}	107.63	22.90	5	108

Reviewed by _____ Date 11/13/97

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP775 | **Sample ID: FBI-MM5-1**

Client Project: Saginaw, MI | Date Received: 09/29/97 | Response File: YP771
TLI ID: 185-7-1A-D | Date Extracted: 10/14/97
Date Analyzed : 10/22/97

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
1,4-Dichlorobenzene-d_4		IS 1	10.22		
n-Nitrosodimethylamine		U		1.44	10
Cumene		U		0.39	10
Phenol	3.22	J	9.47		10
Aniline		U		0.52	10
bis-(2-Chloroethyl)ether		U		1.11	10
Benzyl Chloride		U		0.40	10
1,4-Dichlorobenzene	0.43	J	10.26		10
2-Methylphenol		U		0.82	10
Acetophenone	3.78	BJ	10.99		10
n-Nitrosomorpholine		U		1.44	10
o-Toluidine		U		0.52	10
Hexachloroethane		U		1.35	10
1,2-Dibromo-3-chloropropane		U		1.43	10
N,N-Diethylaniline		U		0.49	10
Naphthalene-d_8		IS 2	12.77		
3/4-Methylphenol		U		0.83	10
Nitrobenzene		U		0.52	10
N,N-Dimethylaniline		U		0.53	10
Isophorone		U		0.44	10
o-Anisidine		U		0.95	10
1,4-Phenylenediamine		U		0.69	10
1,2,4-Trichlorobenzene		U		0.80	10
Hexachlorobutadiene		U		1.37	10
a,a,a-Trichlorotoluene		U		0.65	10
Hydroquinone		U		0.71	10

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP775 | **Sample ID: FBI-MM5-1**

Client Project: Saginaw, MI | **Date Received: 09/29/97** | **Response File: YP771**
TLI ID: 185-7-1A-D | **Date Extracted: 10/14/97**
Date Analyzed : 10/22/97

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
-Chloroacetophenone		U		0.35	10
Acenaphthene-d_{10}		IS 3	16.42		
Hexachlorocyclopentadiene		U		1.34	10
2,4,6-Trichlorophenol		U		1.22	10
2,4,5-Trichlorophenol		U		1.06	10
Biphenyl		U		0.33	10
Dimethylphthalate	3.32	J	15.84		10
2,4-Dinitrophenol		U		4.70	25
-Nitrophenol		U		1.79	25
2,4-Dinitrotoluene		U		1.38	10
Dibenzofuran		U		0.30	10
4,6-Dinitro-2-methylphenol		U		3.05	25
Trifluralin		U		2.22	10
Phenanthrene-d_{10}		IS 4	19.54		
Di-n-butylphthalate	3.41	BJ	20.78		10
Hexachlorobenzene		U		0.88	10
-Aminobiphenyl		U		0.38	10
Pentachlorophenol		U		1.68	25
Pentachloronitrobenzene		U		3.55	10
-Nitrobiphenyl		U		0.96	10
Chrysene-d_{12}		IS 5	25.28		
Benzidine		U		0.44	10
4,4'-Methylenedianiline		U		1.02	10
Dimethylaminoazobenzene		U		0.88	10
3,3'-Dimethylbenzidine		U		0.55	10
3,3'-Dimethoxybenzidine		U		1.13	10

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP775 | **Sample ID: FBI-MM5-1**

Client Project: Saginaw, MI	Date Received: 09/29/97	Response File: YP771
TLI ID: 185-7-1A-D	Date Extracted: 10/14/97	
	Date Analyzed : 10/22/97	

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
3,3'-Dichlorobenzidine		U		0.74	10
Methylene bis-chloroaniline		U		1.68	10
bis(2-Ethylhexyl)phthalate	21.61	B	25.36		10

Reviewed by Sa H Date 11/13/97

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit

IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Triangle Laboratories of RTP, Inc.
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

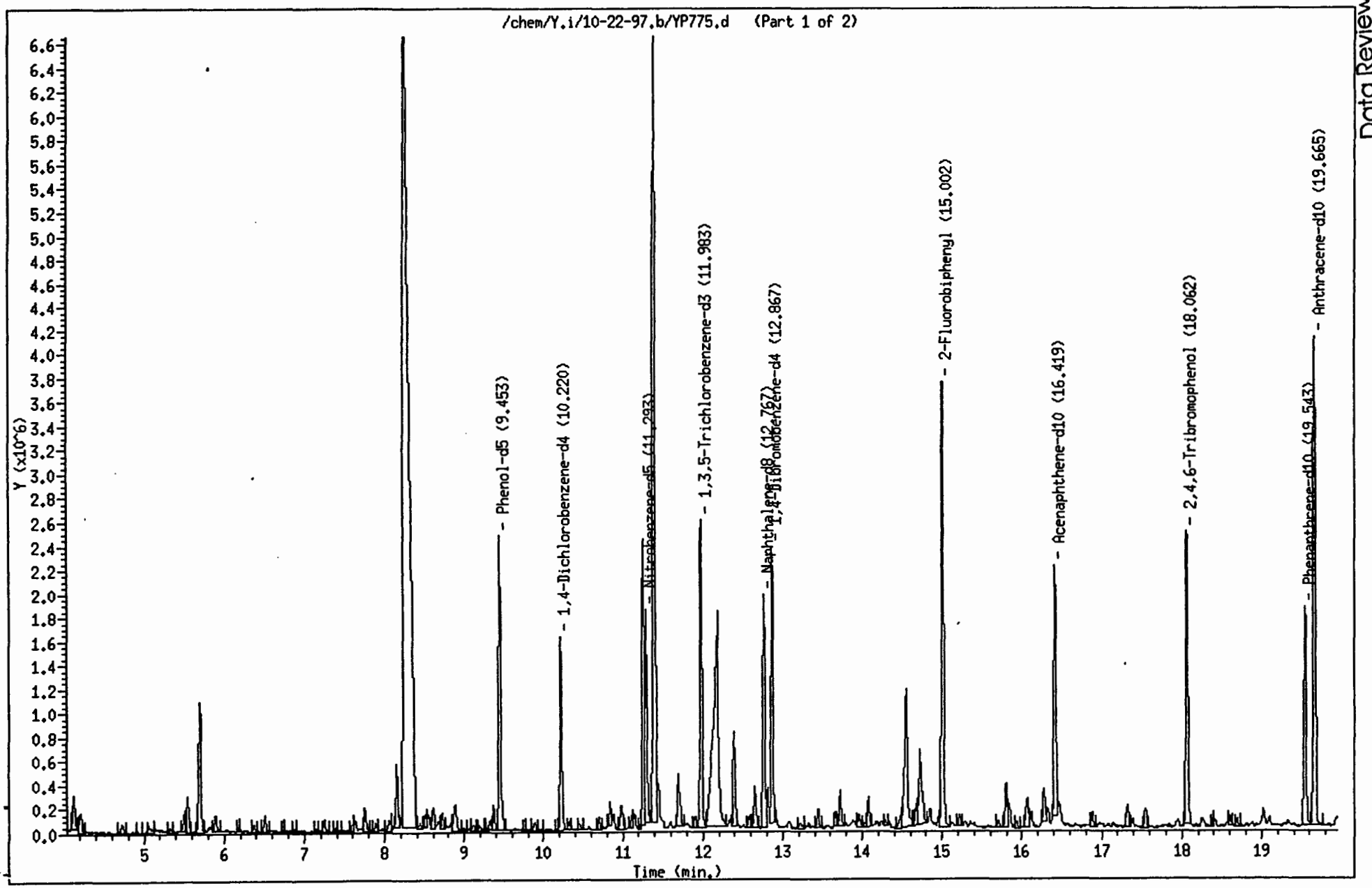
Savar v3.5
Printed: 12:42 11/13/1997

Data File: /chem/Y.i/10-22-97.b/YP775.d
Date : 22-OCT-97 19:06
Instrument : Y.i
Sample ID : FBI-MM5-1
Column phase : DB-5
Volume Injected (uL) : 1.0

Triangle Laboratories of RTP, Inc.

Column diameter : 0.32

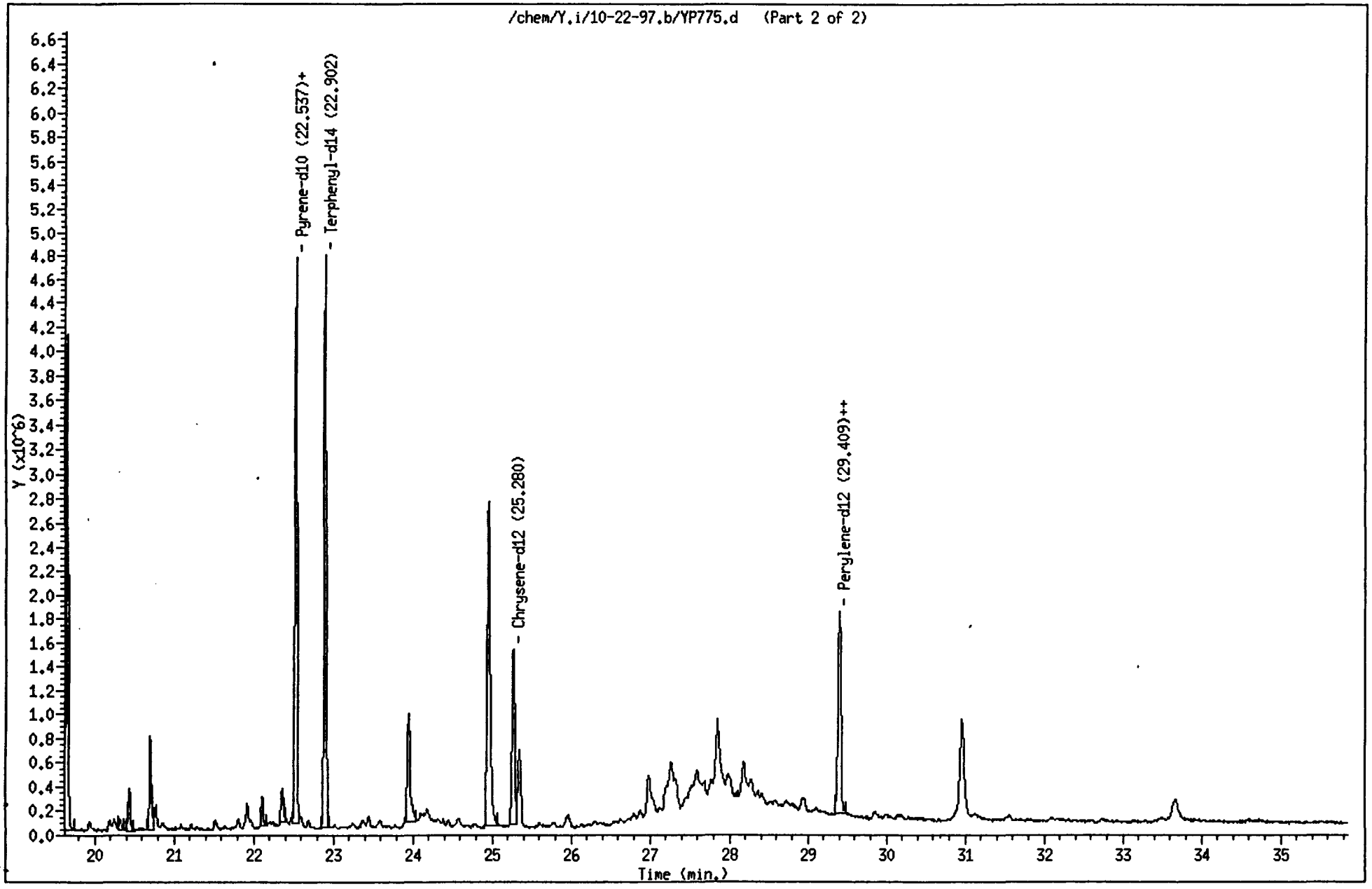
Data Review: [illegible] 163
Date: 11/12/97



Data File: /chem/Y.i/10-22-97.b/YP775.d
Date : 22-OCT-97 19:06
Instrument : Y.i
Sample ID : FBI-MM5-1
Column phase : DB-5
Volume Injected (uL) : 1.0

Triangle Laboratories of RTP, Inc.

Column diameter : 0.32



TRIANGLE LABORATORIES, INC.

SEMI-VOLATILE QUANTITATION REPORT

Data file : /chem/Y.i/10-22-97.b/YP775.d
Lab. Id. : 43433
Inj Date : 22-OCT-97 19:06 — Autotune Date: 22-Oct-97 09:14:0
Operator : DD — Inst ID: Y.i
Smp Info : FBI-MM5-1
Misc Info : 185-7-1A-D
Comment :
Method : /chem/Y.i/10-22-97.b/cclist.m
Meth Date : 23-Oct-1997 11:29 target
Cal Date : 22-OCT-1997 11:59 — Cal File: YP766.d
Als bottle: 13
Dil Factor: 1.000 — Target Version: Target 2.20
Integrator: HP RTE — Compound Sublist: pah.sub
Sample Type: AIR

	Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)
*	1 1,4-Dichlorobenzene-d4	152.00	10.220(1.000)	451015	40.00	
*	2 Naphthalene-d8	136.00	12.767(1.000)	1574677	40.00	
*	3 Acenaphthene-d10	164.00	16.419(1.000)	905865	40.00	
*	4 Phenanthrene-d10	188.00	19.543(1.000)	1341363	40.00	
*	5 Chrysene-d12	240.00	25.280(1.000)	1210767	40.00	
*	6 Perylene-d12	264.00	29.409(1.000)	1760521	40.00	
$	7 2-Fluorophenol	Compound Not Detected.				
$	8 Phenol-d5	99.00	9.453(0.925)	1265141	66.17	66.17
$	9 2-Chlorophenol-d4	Compound Not Detected.				
$	10 1,2-Dichlorobenzene-d4	Compound Not Detected.				
$	11 Nitrobenzene-d5	82.00	11.300(0.885)	921129	61.73	61.73
$	12 1,3,5-Trichlorobenzene-d3	185.00	11.983(0.939)	810054	60.34	60.34
$	13 1,4-Dibromobenzene-d4	239.80	12.867(1.259)	748761	68.06	68.06
$	14 2-Fluorobiphenyl	172.00	15.010(0.914)	2003232	71.52	71.52
$	15 2,4,6-Tribromophenol	329.80	18.070(1.101)	569785	92.51	92.51
$	16 Anthracene-d10	188.00	19.665(1.006)	3183532	90.05	90.05
$	17 Pyrene-d10	212.00	22.537(0.891)	3154323	86.70	86.70
$	18 Terphenyl-d14	244.00	22.902(0.906)	2534736	107.67	107.67
	42 Naphthalene	128.00	12.810(1.003)	241772	5.85	5.85(a)
	46 2-Methylnaphthalene	142.00	14.247(1.116)	13020	0.52	0.52(a)
	50 2-Chloronaphthalene	Compound Not Detected.				
	56 Acenaphthylene	152.00	~~16.398(0.999)~~	~~6708~~	~~0.17~~	~~0.17(aQ)~~
	58 Acenaphthene	154.00	~~16.484(1.004)~~	~~613~~	~~0.03~~	~~0.03(aQ)~~
	65 Fluorene	Compound Not Detected.				
	73 Phenanthrene	178.00	19.593(1.003)	4478	0.13	0.13(aQ)
	74 Anthracene	178.00	~~19.622(1.004)~~	~~472~~	~~0.01~~	~~0.01(aQ)~~
	77 Fluoranthene	202.00	~~22.537(1.153)~~	~~4173~~	~~0.12~~	~~0.12(aQ)~~
	78 Pyrene	202.00	~~22.580(0.893)~~	~~1405~~	~~0.04~~	~~0.04(aQ)~~
	83 Benzo(a)anthracene	Compound Not Detected.				
	84 Chrysene	Compound Not Detected.				
	86 Benzo(b)fluoranthene	Compound Not Detected.				

FP SAH

FP SAH

Data Review: SAH
Date: 11/12/97

Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	CONCENTRATIONS FINAL (ug)
87 Benzo(k)fluoranthene	Compound Not Detected.				
88 Benzo(e)pyrene	Compound Not Detected.				
89 Benzo(a)pyrene	252.00	29.402(1.000)	5925	0.15	0.15(a)
90 Perylene	252.00	29.402(1.000)	5925	0.14	0.14(a)
91 Indeno(1,2,3-cd)pyrene	Compound Not Detected.				
92 Dibenz(a,h)anthracene	Compound Not Detected.				
93 Benzo(g,h,i)perylene	Compound Not Detected.				

QC Flag Legend

a - Target compound detected but, quantitated amount
Below Limit Of Quantitation(BLOQ).
Q - Qualifier signal failed the ratio test.

TRIANGLE LABORATORIES, INC.

SEMI-VOLATILE QUANTITATION REPORT

Data file : /chem/Y.i/10-22-97.b/CAA/YP775.d
Lab. Id. : 43433
Inj Date : 22-OCT-97 19:06 Autotune Date: 22-Oct-97 09:14:0
Operator : DD Inst ID: Y.i
Smp Info : FBI-MM5-1
Misc Info : 185-7-1A-D
Comment :
Method : /chem/Y.i/10-22-97.b/tlicaa.m
Meth Date : 23-Oct-1997 08:05 target
Cal Date : 22-OCT-1997 15:55 Cal File: YP771.d
Als bottle: 13
Dil Factor: 1.000 Target Version: Target 2.20
Integrator: HP RTE Compound Sublist: CAA1.sub
Sample Type: mm5

		Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)	
*	1	1,4 Dichlorobenzene-d4	152.00	10.220(1.000)	451015	40.00		
*	2	Naphthalene-d8	136.00	12.767(1.000)	1574677	40.00		
*	3	Acenaphthene-d10	164.00	16.419(1.000)	905865	40.00		
*	4	Phenanthrene-d10	188.00	19.543(1.000)	1341363	40.00		
*	5	Chrysene-d12	240.00	25.280(1.000)	1210767	40.00		
*	6	Perylene-d12	264.00	29.409(1.000)	1760521	40.00		
$	7	2-Fluorophenol	Compound Not Detected.					
$	8	Phenol-d5	99.00	9.453(0.925)	1265141	71.18	71.18	
$	9	2-Chlorophenol-d4	Compound Not Detected.					
$	10	1,2-Dichlorobenzene-d4	Compound Not Detected.					
$	11	Nitrobenzene-d5	82.00	11.300(0.885)	921132	60.26	60.26	
$	12	1,3,5-Trichlorobenzene-d3	185.00	11.983(0.939)	810054	63.16	63.16	
$	13	1,4-Dibromobenzene-d4	240.00	12.867(1.259)	748761	68.70	68.70	
$	14	2-Fluorobiphenyl	172.00	15.010(0.914)	2003232	71.13	71.13	
$	15	2,4,6-Tribromophenol	329.80	18.070(1.101)	569785	103.80	103.80	
$	16	Anthracene-d10	188.00	19.665(1.006)	3183532	84.31	84.31	
$	17	Pyrene-d10	212.00	22.537(0.891)	3154323	77.62	77.62	
$	18	Terphenyl-d14	244.00	22.902(0.906)	2534736	100.38	100.38	
	20	n-Nitrosodimethylamine	74.00	~~4.734(0.462)~~	~~22751~~	~~3.27~~	~~3.27~~	FP Sat
	21	Cumene	Compound Not Detected.					
	23	Phenol	94.00	9.475(0.927)	50400	3.21	3.21	
	24	Aniline	93.00	~~9.461(0.926)~~	~~315~~	~~0.01~~	~~0.01~~	FP Sat
	27	bis-(2-Chloroethyl)ether	63.00	~~9.482(0.928)~~	~~5887~~	~~0.89~~	~~0.65~~	
	28	Benzyl Chloride	Compound Not Detected.					
	29	1,4-Dichlorobenzene	146.00	10.255(1.003)	6664	0.42	0.42	
	31	2-Methylphenol	108.00	~~10.950(1.072)~~	~~1347~~	~~0.11~~	~~0.11~~	FP Sat
	32	3/4-Methylphenol	108.00	~~11.378(0.891)~~	~~214~~	0.01	0.01	
	33	Acetophenone	105.00	10.986(1.075)	64637	3.77	3.77	
	34	n-Nitrosomorpholine	56.00	~~11.392(1.113)~~	~~423214~~	~~60.77~~	~~60.77~~	FP Sat
	35	o-Toluidine	106.00	~~10.986(1.075)~~	~~4504~~	~~0.23~~	~~0.23~~	
	36	Hexachloroethane	Compound Not Detected.					

Data Review: Sat
Date: 11/12/97

Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)	
37 Nitrobenzene	Compound Not Detected.					
38 N,N-Dimethylaniline	120.00	~~11.257(0.882)~~	~~1515~~	~~0.08~~	~~0.08~~	FP satd
39 1,2-Dibromo-3-chloropropane	Compound Not Detected.					
40 Isophorone	82.00	~~11.392(0.892)~~	~~11309~~	~~0.49~~	~~0.49~~	FP satd
41 o-Anisidine	Compound Not Detected.					
42 1,4-Phenylenediamine	Compound Not Detected.					
43 1,2,4-Trichlorobenzene	Compound Not Detected.					
44 Naphthalene	128.00	12.810(1.003)	241772	6.61	6.61	
46 Hexachlorobutadiene	Compound Not Detected.					
47 N,N-Diethylaniline	134.00	~~12.767(1.249)~~	~~136919~~	~~6.68~~	~~6.68~~	FP satd
48 a,a,a-Trichlorotoluene	Compound Not Detected.					
49 Hydroquinone	110.00	~~13.528(1.060)~~	~~324~~	~~0.02~~	~~0.02~~	FP satd
51 2-Chloroacetophenone	105.00	~~13.955(1.093)~~	~~4778~~	~~0.16~~	~~0.16~~	
52 Hexachlorocyclopentadiene	Compound Not Detected.					
53 2,4,6-Trichlorophenol	Compound Not Detected.					
54 2,4,5-Trichlorophenol	Compound Not Detected.					
60 Biphenyl	154.00	~~15.002(0.914)~~	~~2753~~	~~0.09~~	~~0.09~~	FP satd
61 Dimethylphthalate	163.00	15.842(0.965)	86325	3.31	3.31	
62 2,4-Dinitrophenol	Compound Not Detected.					
63 4-Nitrophenol	139.00	~~16.612(1.012)~~	~~1479~~	~~0.26~~	~~0.26~~	FP satd
64 2,4-Dinitrotoluene	165.00	~~16.419(1.000)~~	~~119091~~	~~16.38~~	~~16.38~~	
65 Dibenzofuran	Compound Not Detected.					
66 Di-n-butylphthalate	149.00	20.776(1.063)	175808	3.41	3.41	
67 4,6-Dinitro-2-methylphenol	198.00	~~18.062(1.100)~~	~~2070~~	~~0.62~~	~~0.62~~	FP satd
68 Trifluralin	Compound Not Detected.					
69 Hexachlorobenzene	Compound Not Detected.					
70 4-Aminobiphenyl	Compound Not Detected.					
71 Pentachlorophenol	Compound Not Detected.					
72 Pentachloronitrobenzene	Compound Not Detected.					
73 4-Nitrobiphenyl	Compound Not Detected.					
74 Benzidine	184.00	~~22.537(0.891)~~	~~31568~~	~~1.37~~	~~1.37~~	FP satd
75 4,4'-Methylenedianiline	Compound Not Detected.					
77 Dimethylaminoazobenzene	120.00	~~22.902(0.906)~~	~~40045~~	~~3.52~~	~~3.52~~	FP satd
78 3,3'-Dimethylbenzidine	Compound Not Detected.					
80 3,3'-Dimethoxybenzidine	Compound Not Detected.					
81 3,3'-Dichlorobenzidine	Compound Not Detected.					
82 Methylene bis-chloroaniline	Compound Not Detected.					
83 bis(2-Ethylhexyl)phthalate	149.00	25.359(1.003)	617438	21.61	21.61	

Data File: /chem/Y.i/10-22-97.b/YP775.d

Date : 22-OCT-97 19:06

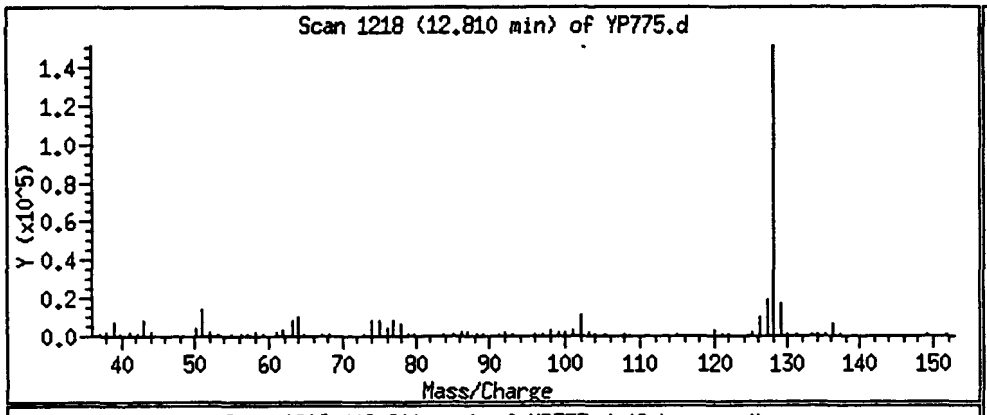
Instrument : Y.i

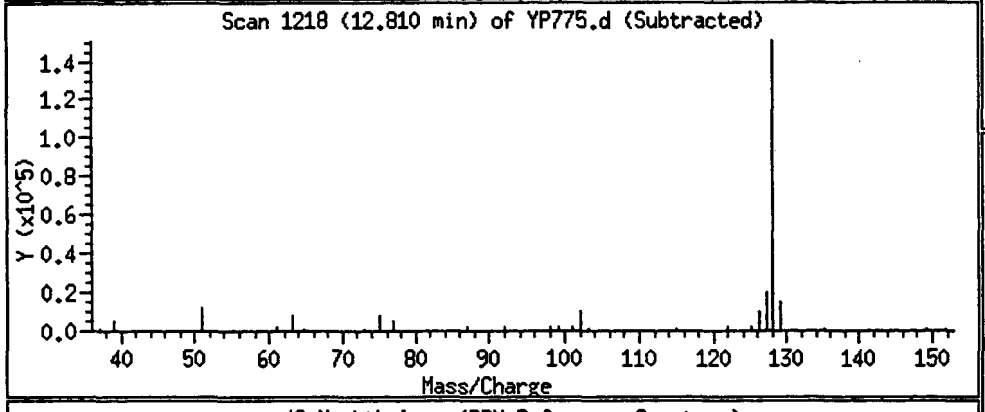
Sample ID : FBI-MM5-1

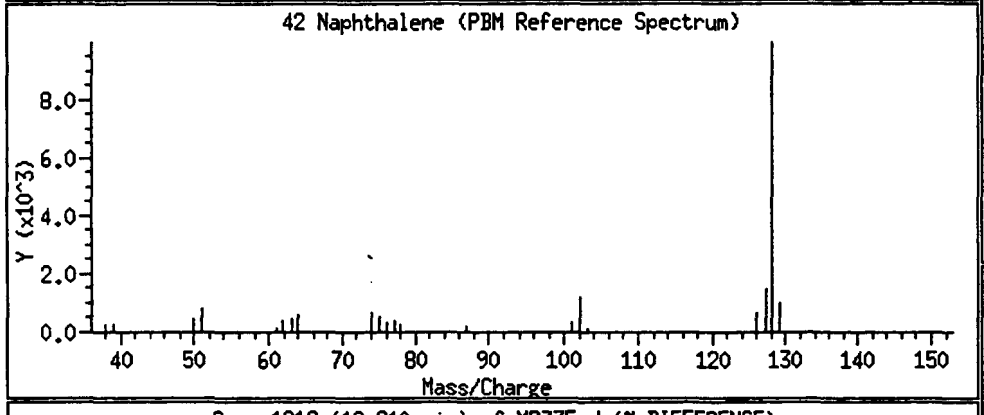
Column phase : DB-5 Column diameter : 0.32

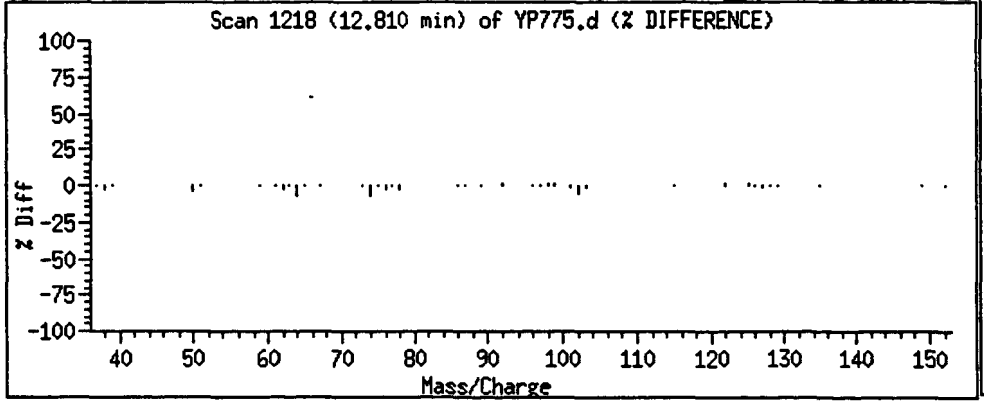
Volume Injected (uL) : 1.0

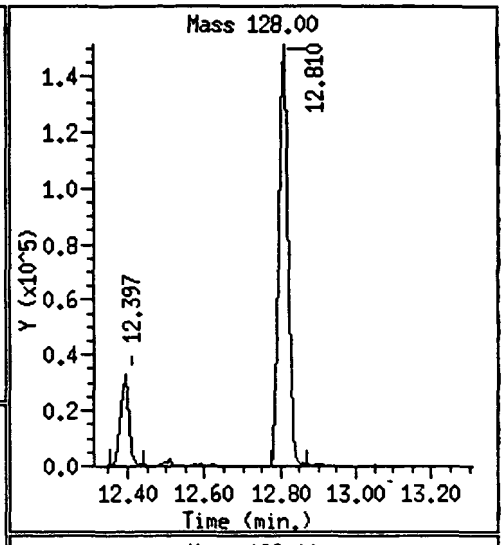
42 Naphthalene

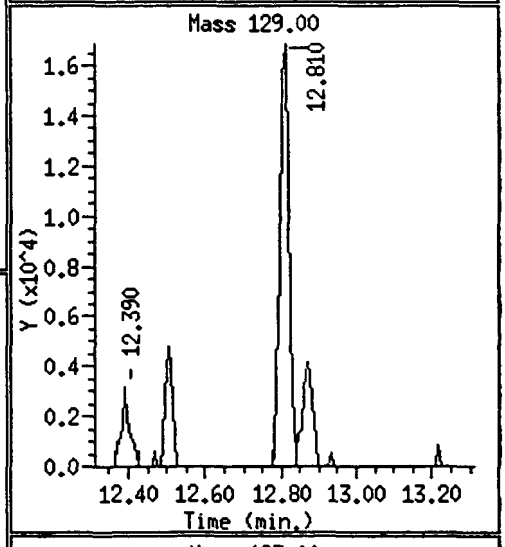


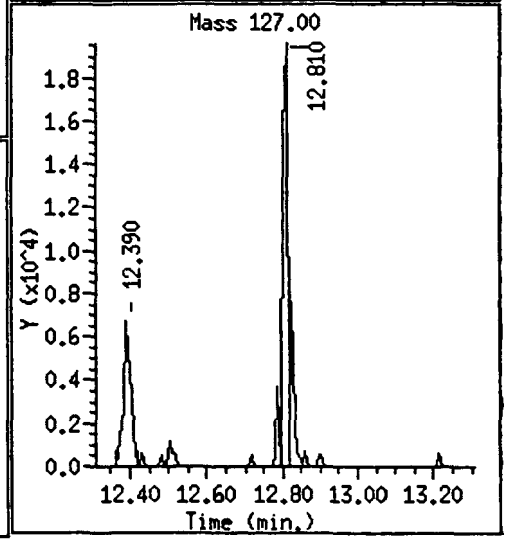












Data File: /chem/Y.i/10-22-97.b/YP775.d

Date : 22-OCT-97 19:06

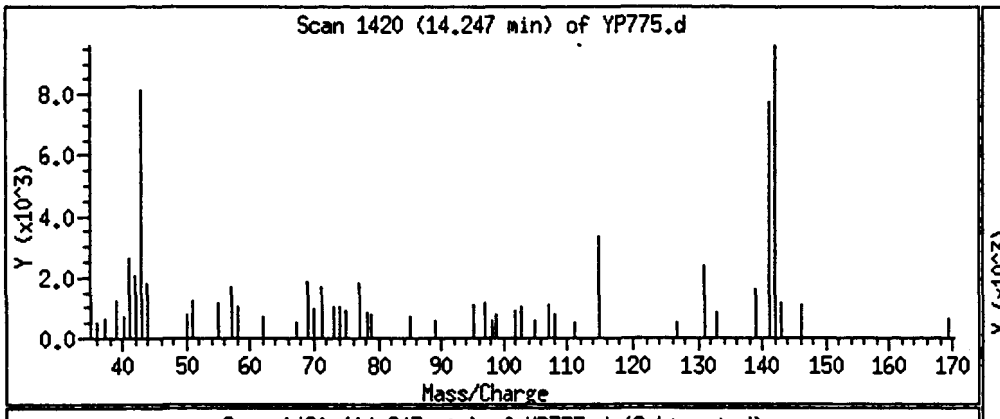
Instrument : Y.i

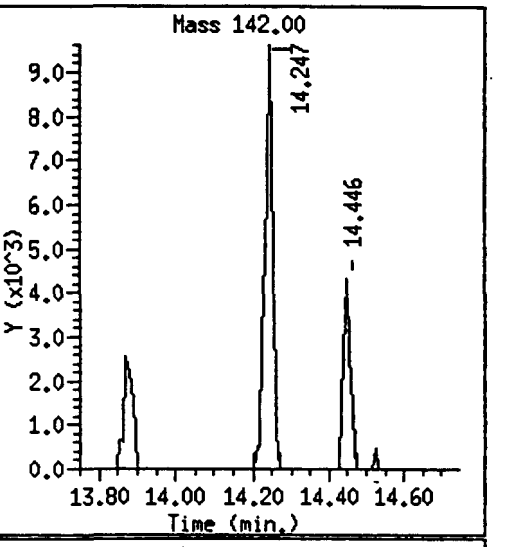
Sample ID : FBI-MM5-1

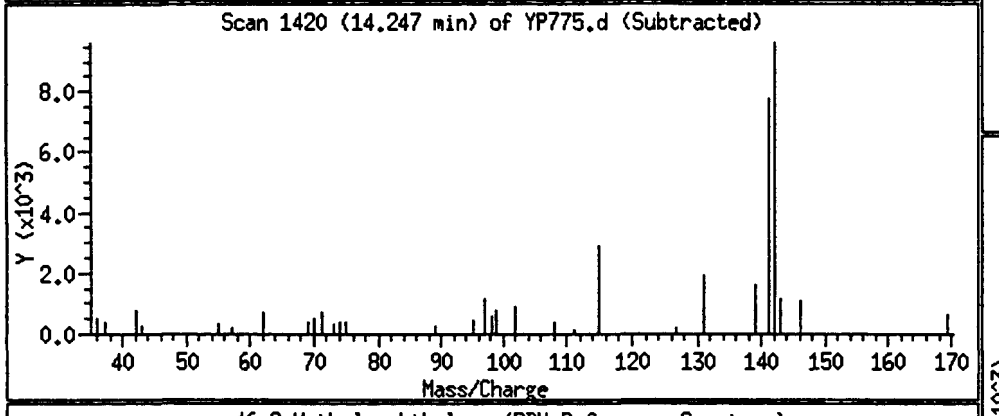
Column phase : DB-5 Column diameter : 0.32

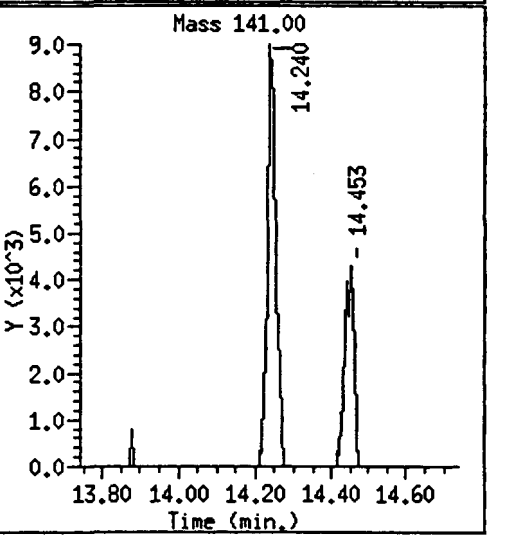
Volume Injected (uL) : 1.0

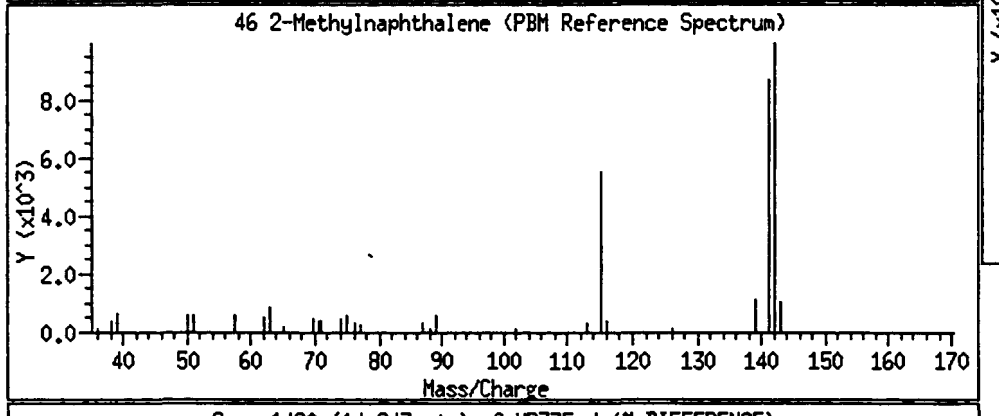
46 2-Methylnaphthalene

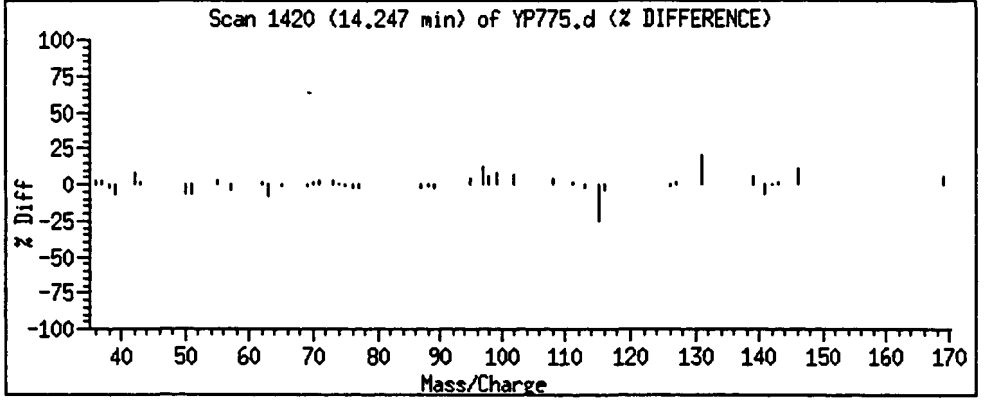












Data File: /chem/Y.i/10-22-97.b/YP775.d

Date : 22-OCT-97 19:06

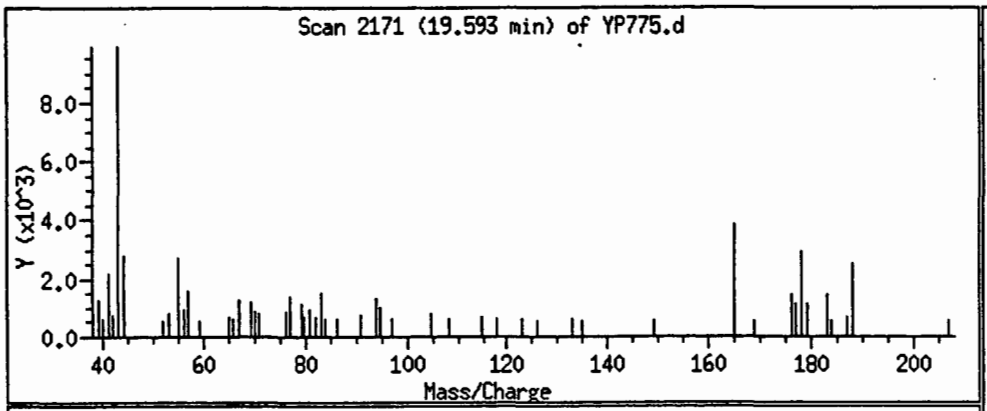
Instrument : Y.i

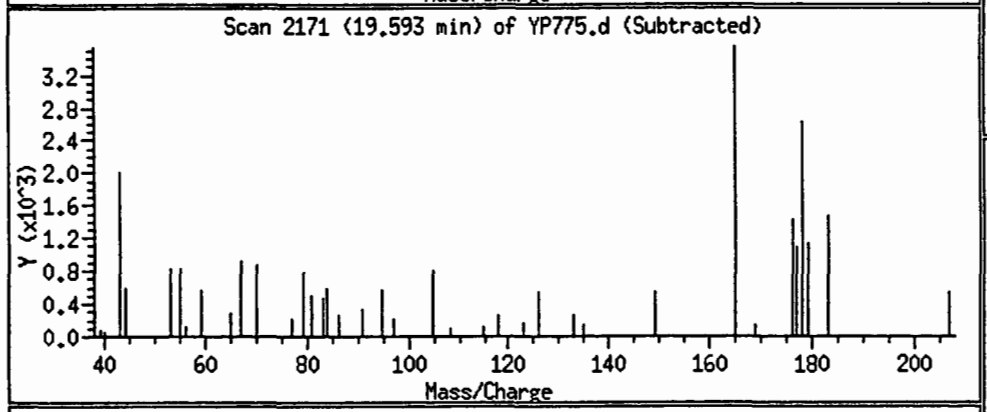
Sample ID : FBI-MM5-1

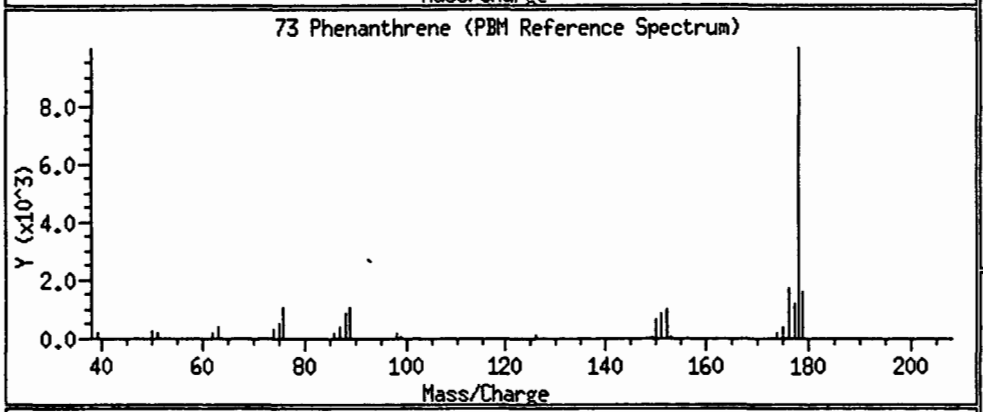
Column phase : DB-5 Column diameter : 0.32

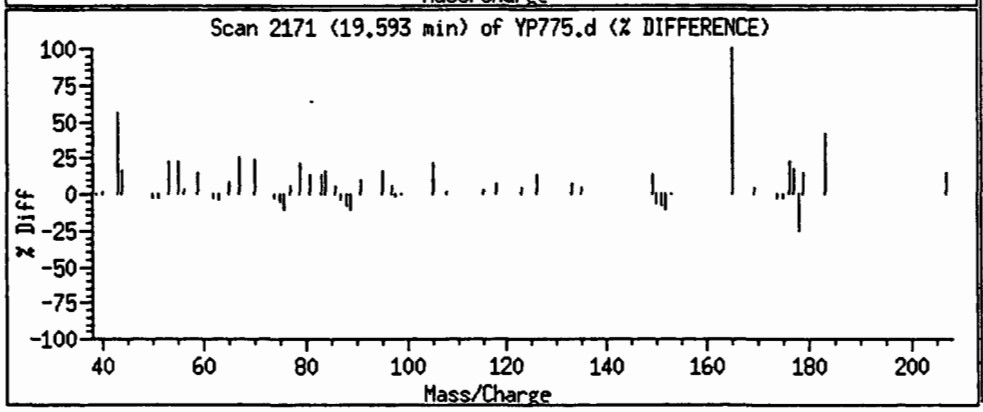
Volume Injected (uL) : 1.0

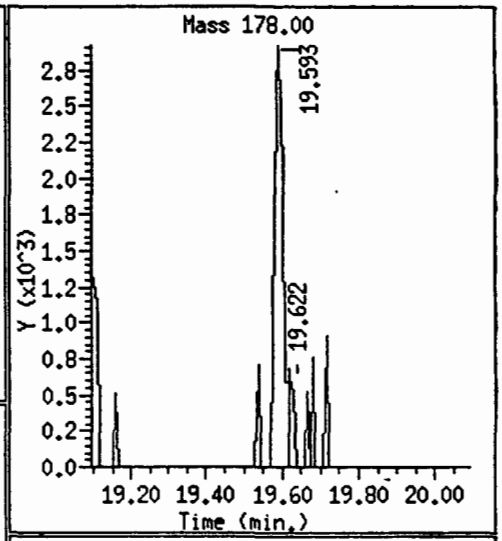
73 Phenanthrene

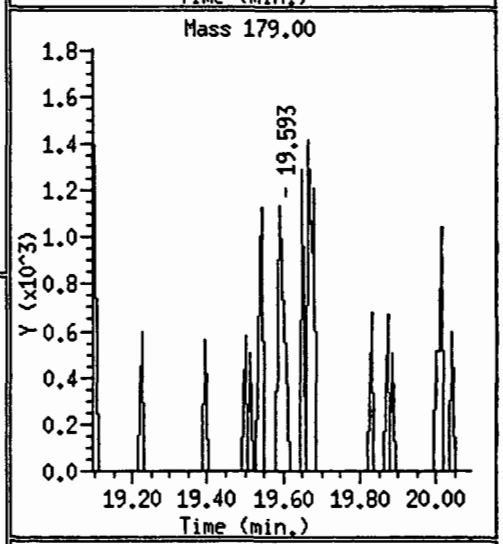


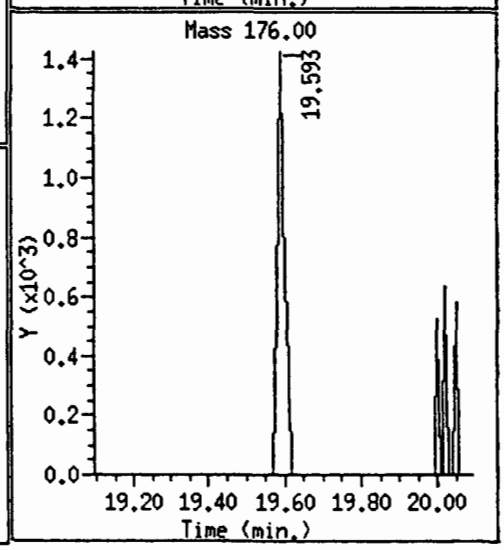












Data File: /chem/Y.i/10-22-97.b/CAA/YP775.d

Date : 22-OCT-1997 19:06

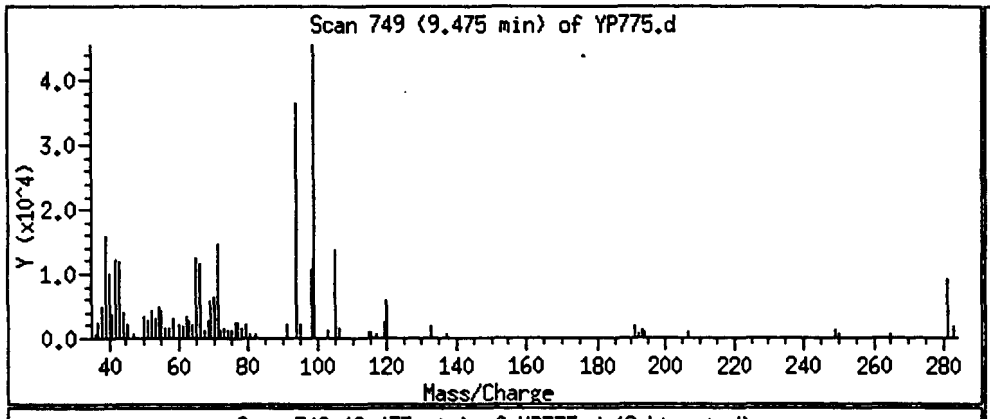
Instrument : Y.i

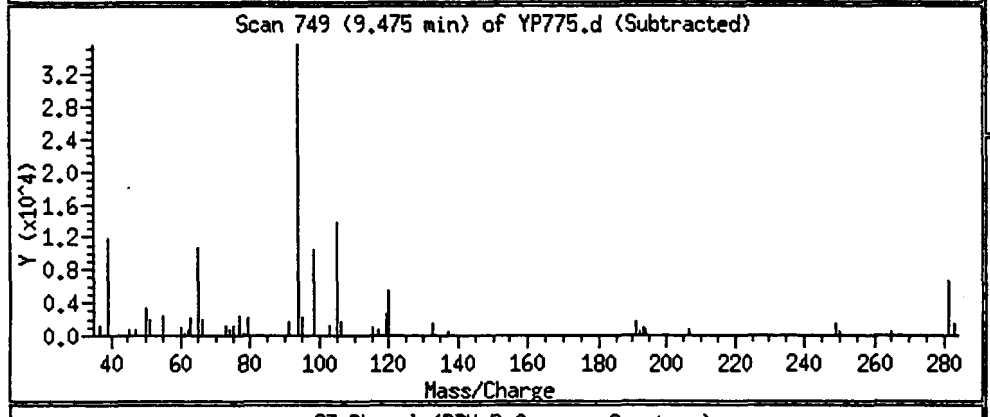
Sample ID : FBI-MM5-1

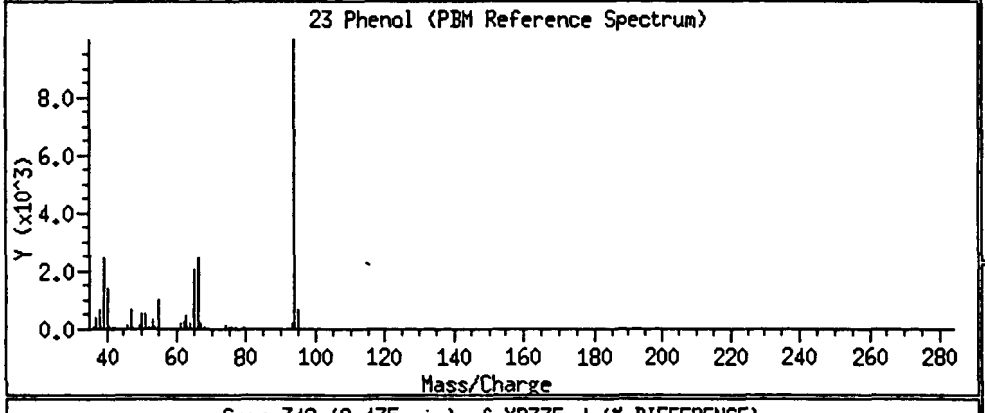
Column phase : DB.5-625 Column diameter : 0.32

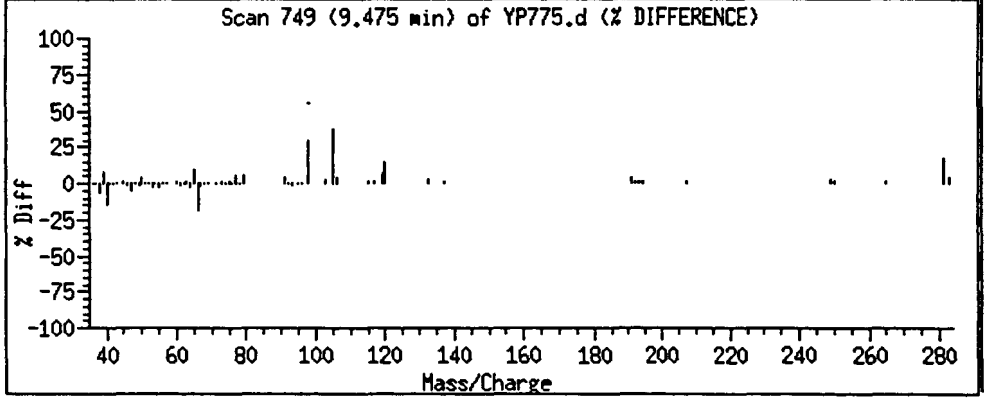
Volume Injected (uL) : 1.0

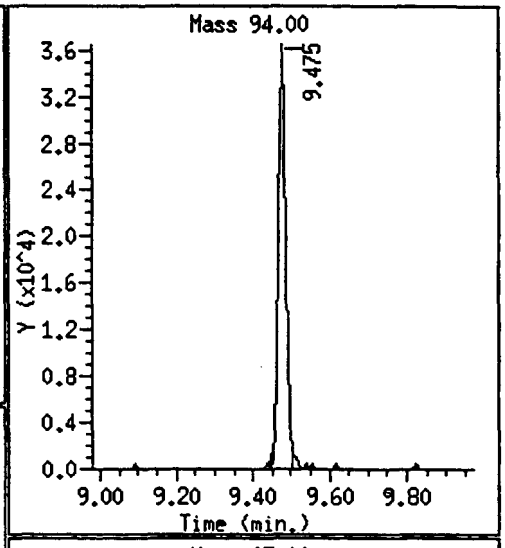
23 Phenol

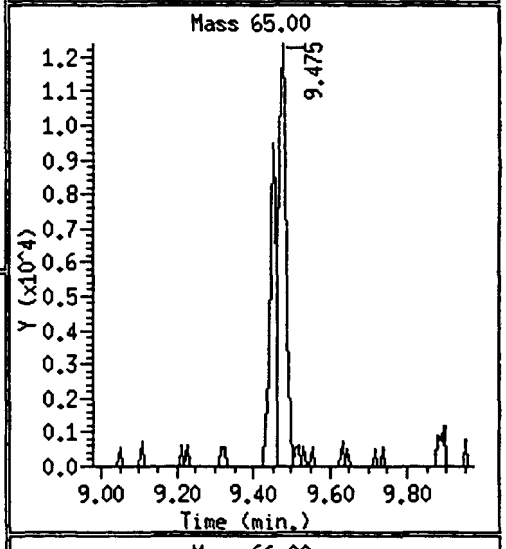


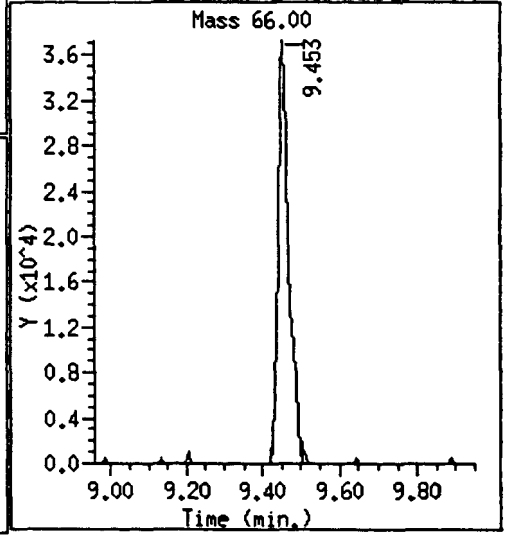












Data File: /chem/Y.i/10-22-97.b/CAA/YP775.d

Date : 22-OCT-1997 19:06

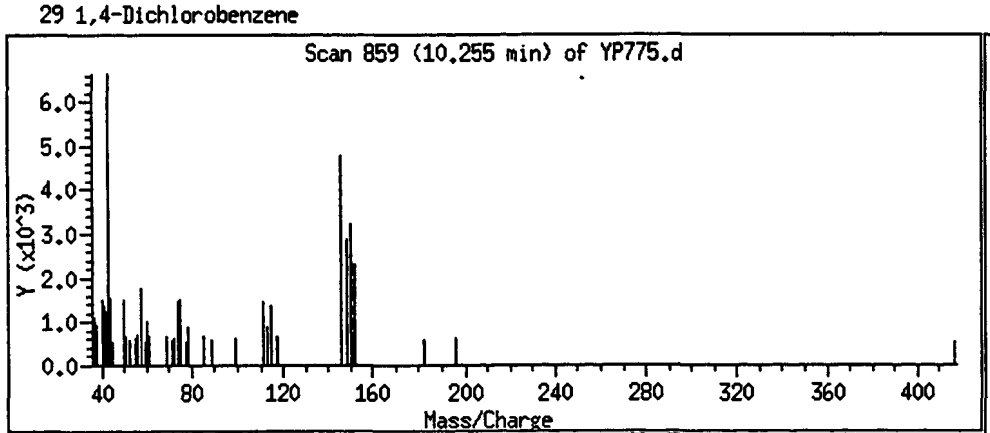
Instrument : Y.i

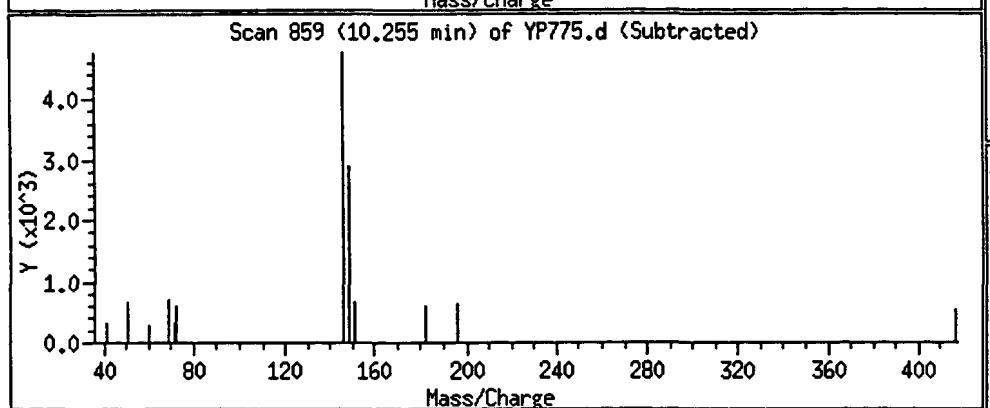
Sample ID : FBI-MM5-1

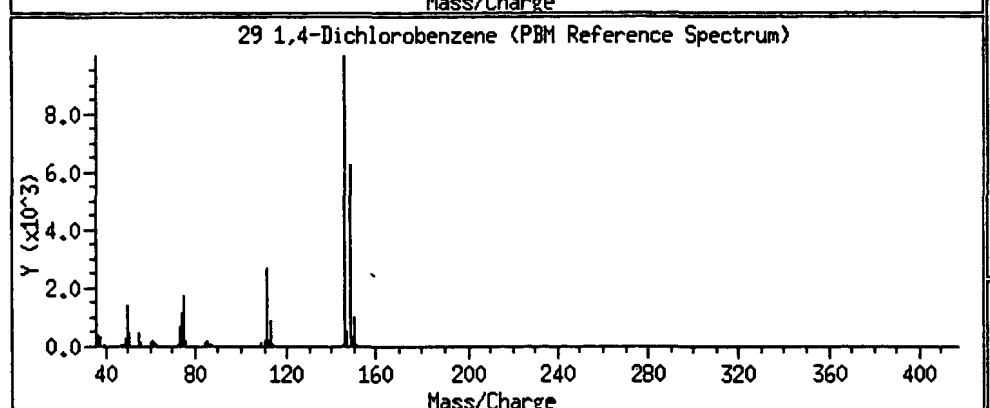
Column phase : DB.5-625 Column diameter : 0.32

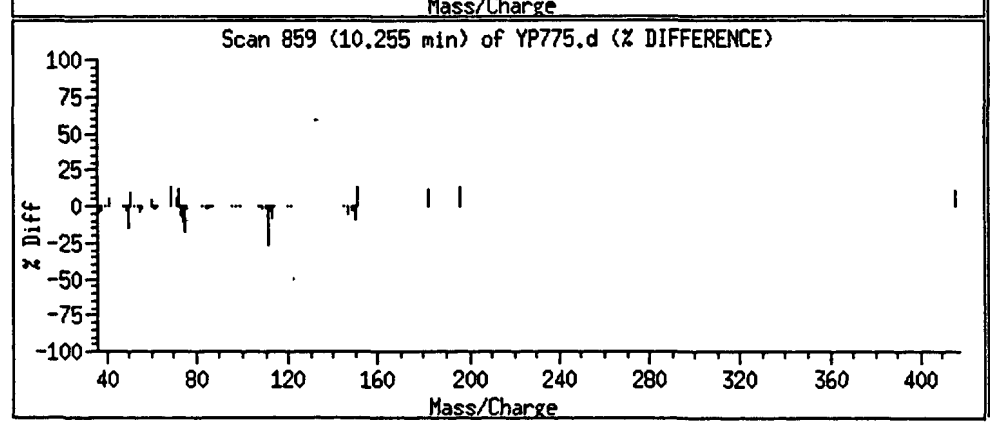
Volume Injected (uL) : 1.0

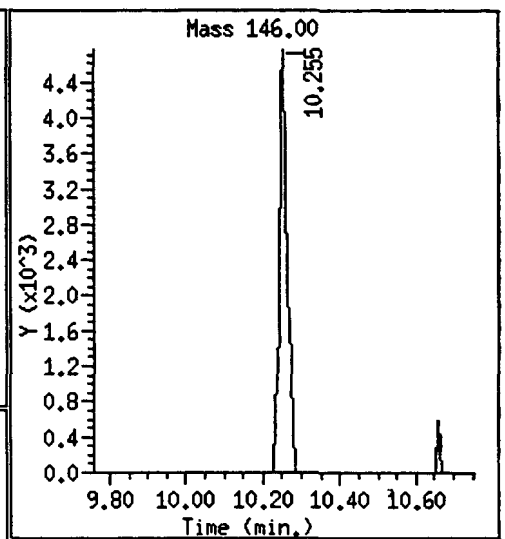
29 1,4-Dichlorobenzene

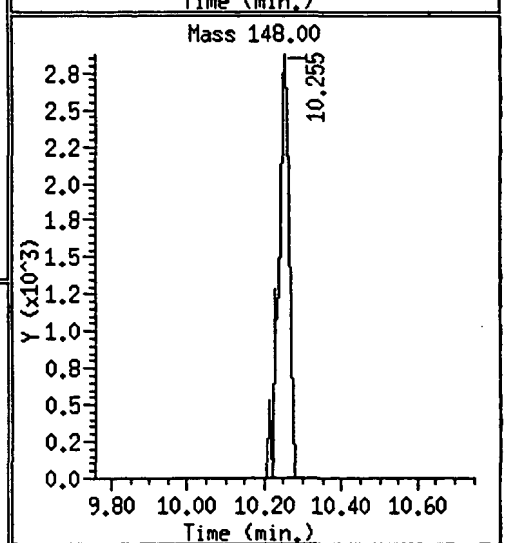


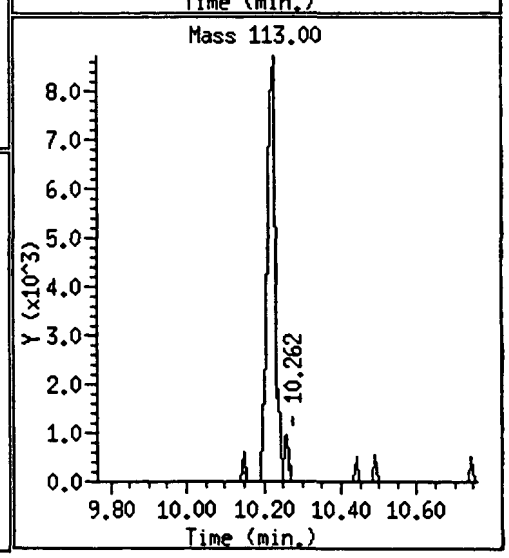












Data File: /chem/Y.i/10-22-97.b/CAA/YP775.d

Date : 22-OCT-1997 19:06

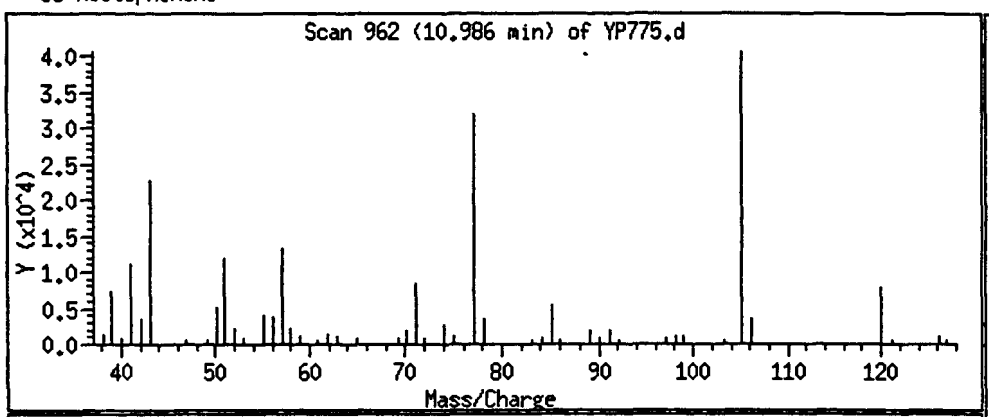
Instrument : Y.i

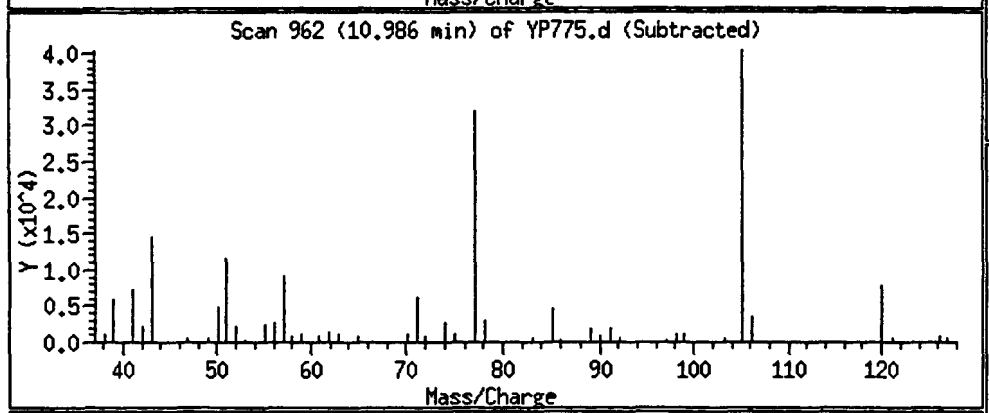
Sample ID : FBI-MM5-1

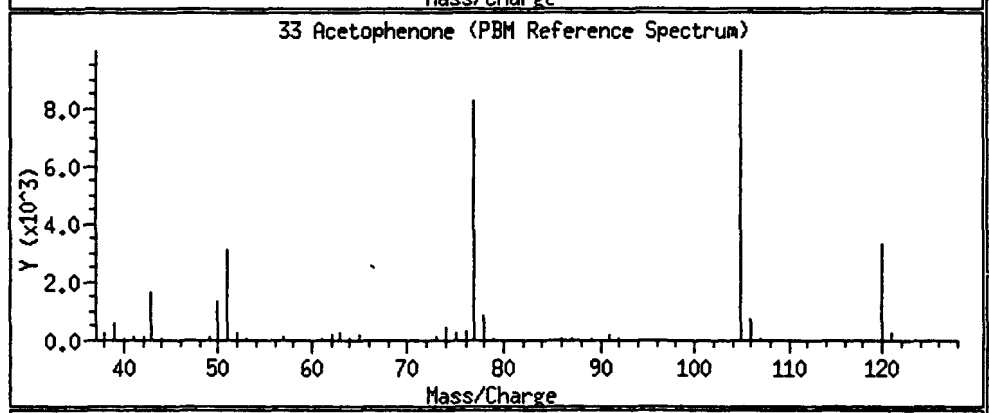
Column phase : DB.5-625 Column diameter : 0.32

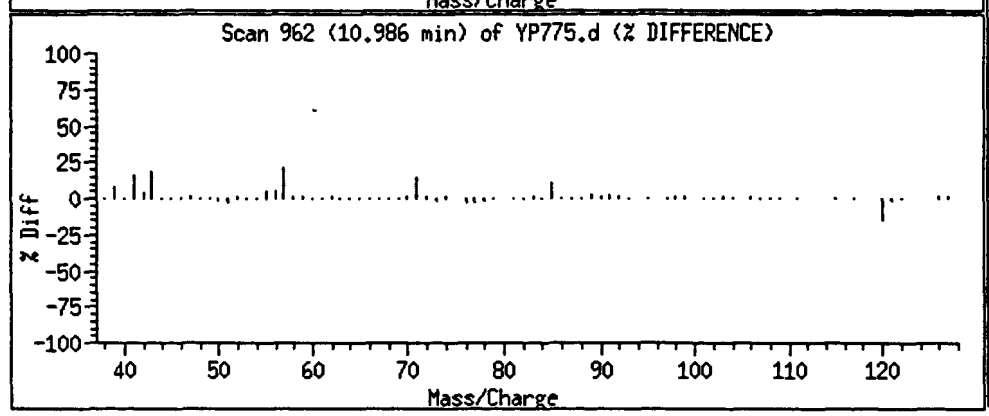
Volume Injected (uL) : 1.0

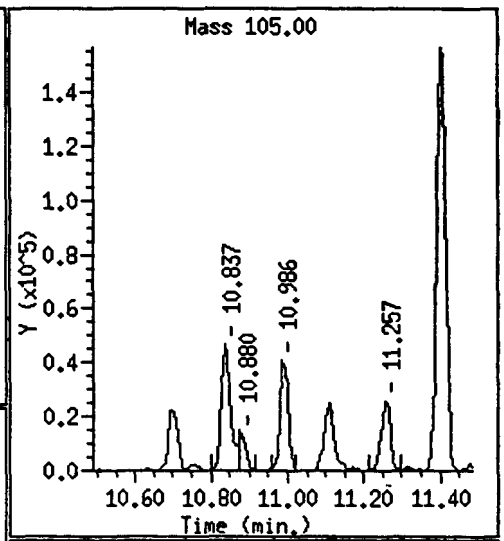
33 Acetophenone

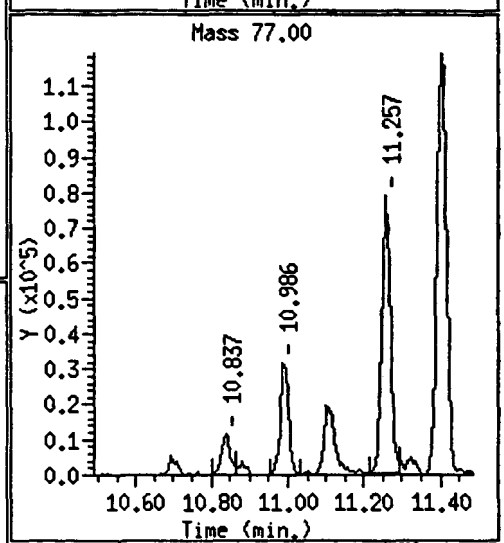


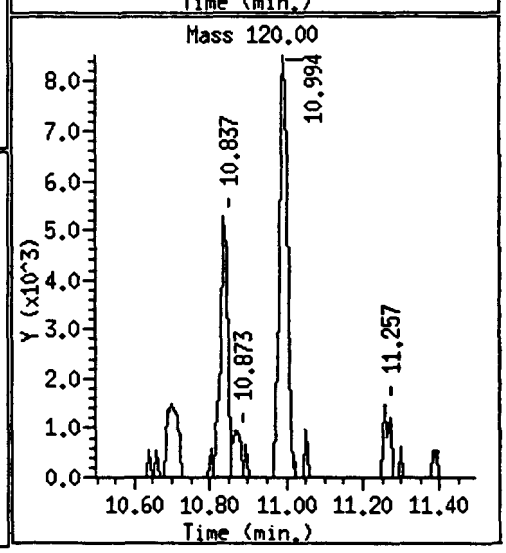












Data File: /chem/Y.i/10-22-97.b/CAA/YP775.d

Date : 22-OCT-1997 19:06

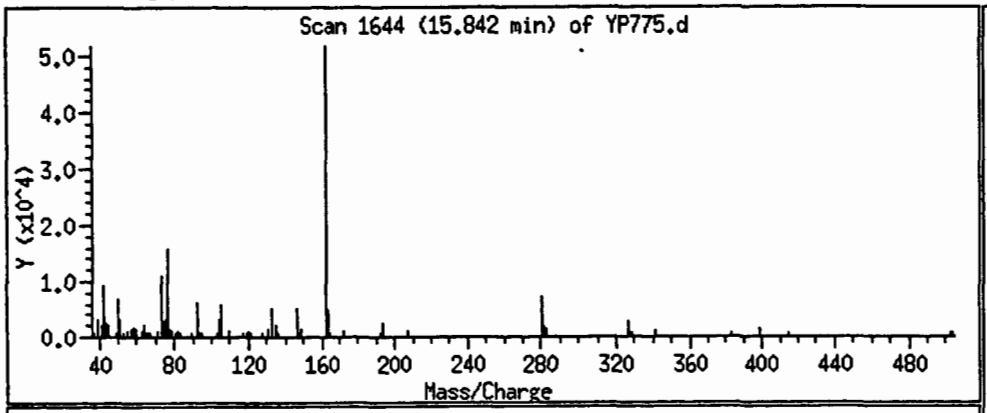
Instrument : Y.i

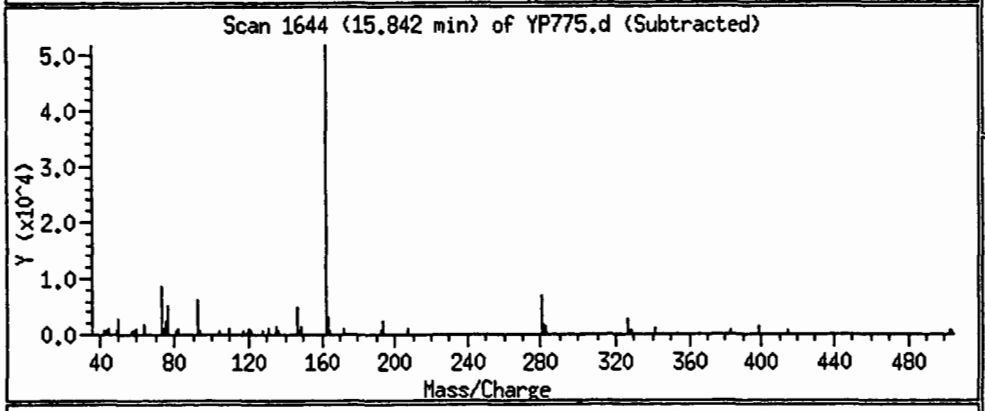
Sample ID : FBI-MM5-1

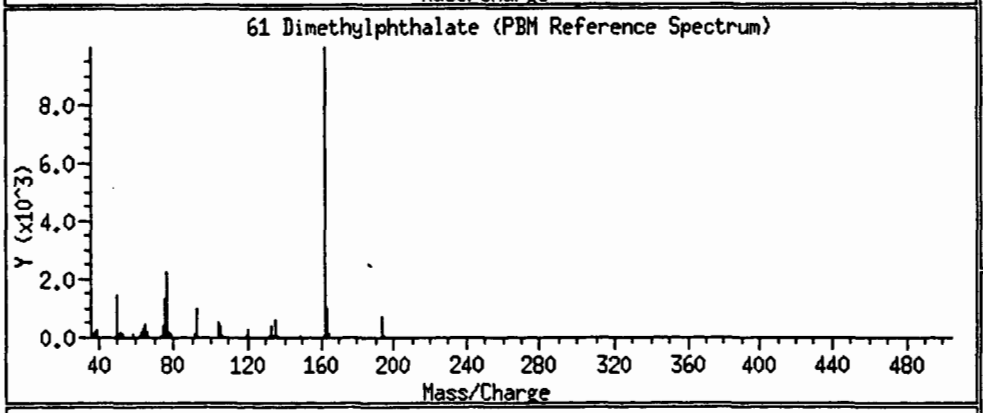
Column phase : DB.5-625 Column diameter : 0.32

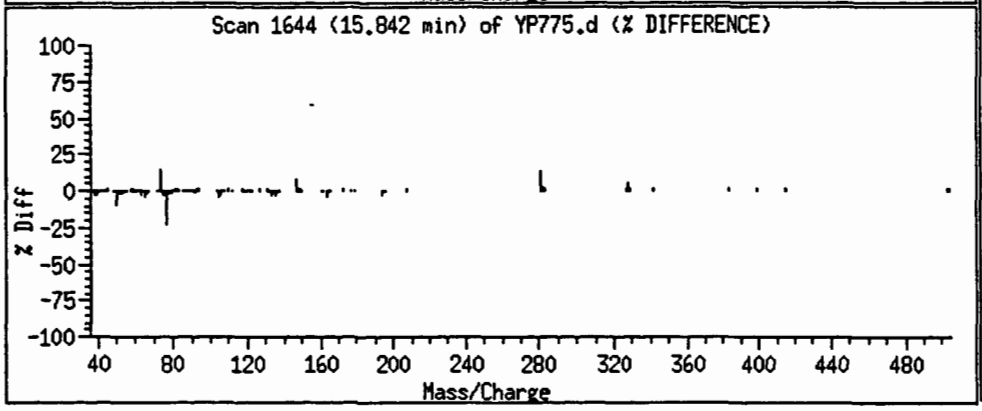
Volume Injected (uL) : 1.0

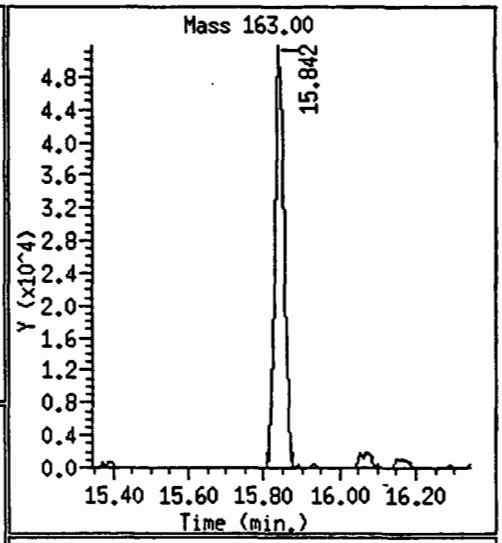
61 Dimethylphthalate

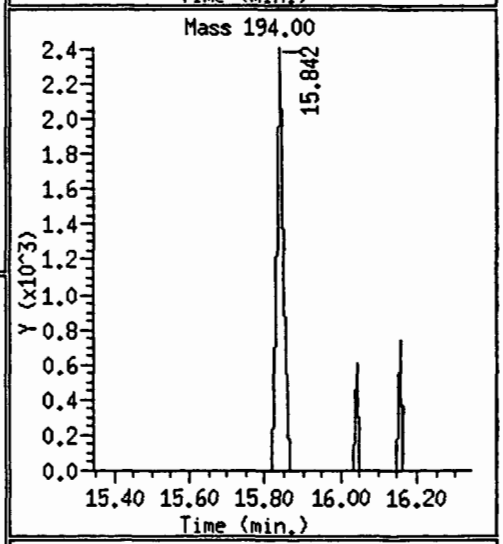


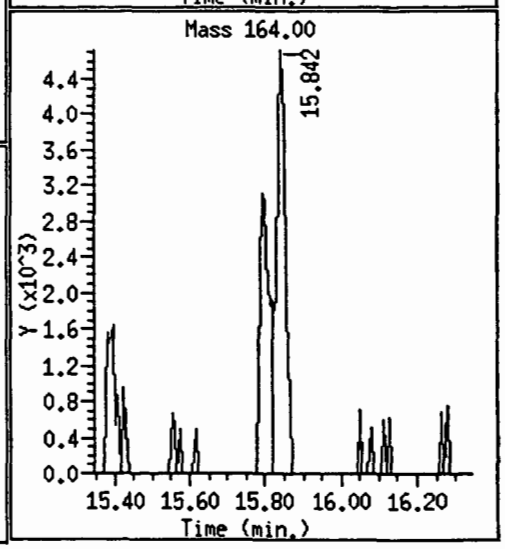












Data File: /chem/Y.i/10-22-97.b/CAA/YP775.d

Date : 22-OCT-1997 19:06

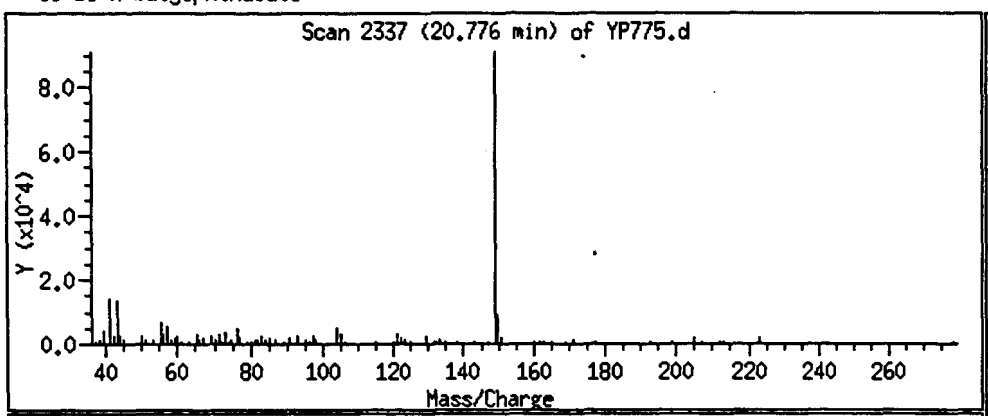
Instrument : Y.i

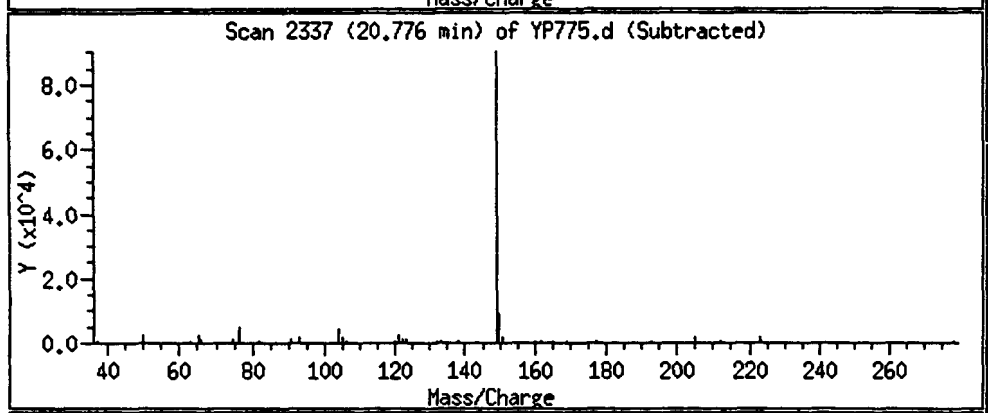
Sample ID : FBI-MM5-1

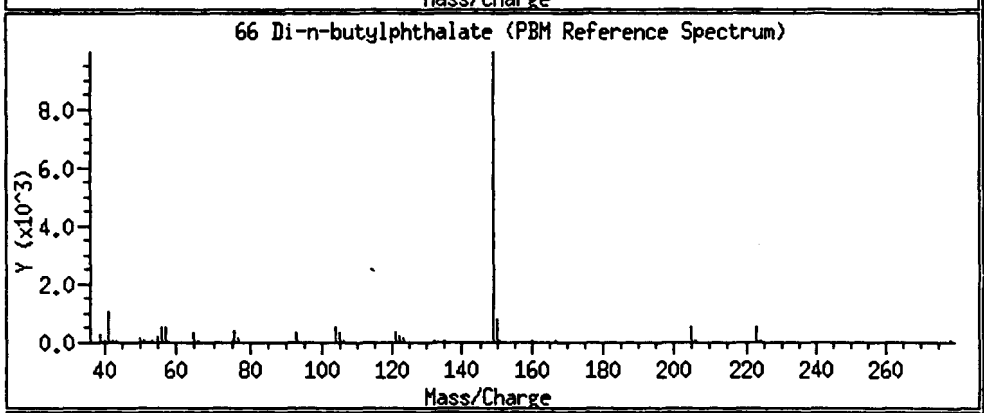
Column phase : DB.5-625 Column diameter : 0.32

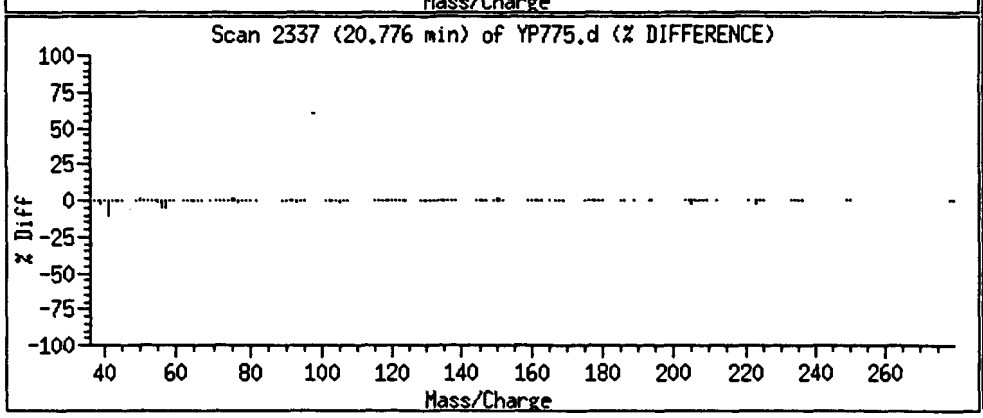
Volume Injected (uL) : 1.0

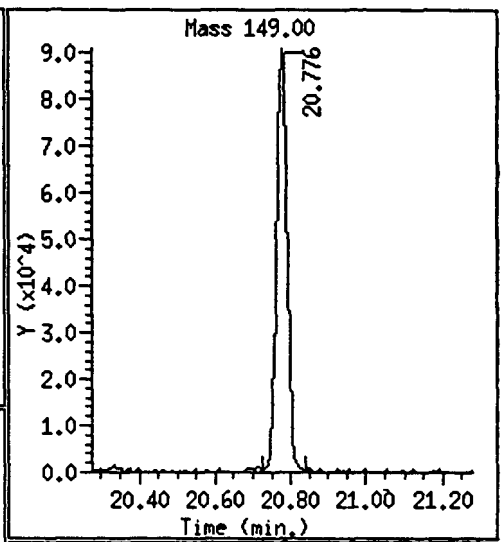
66 Di-n-butylphthalate

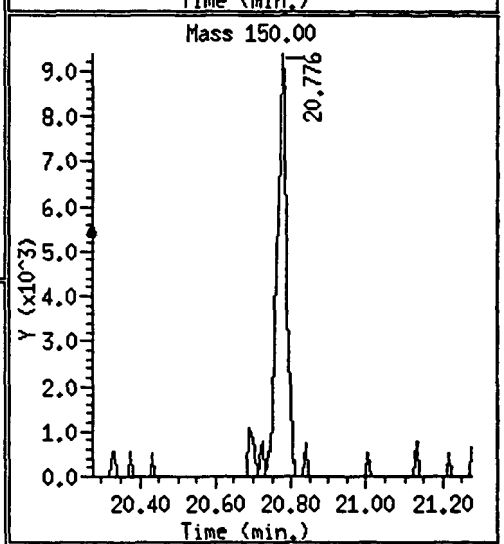


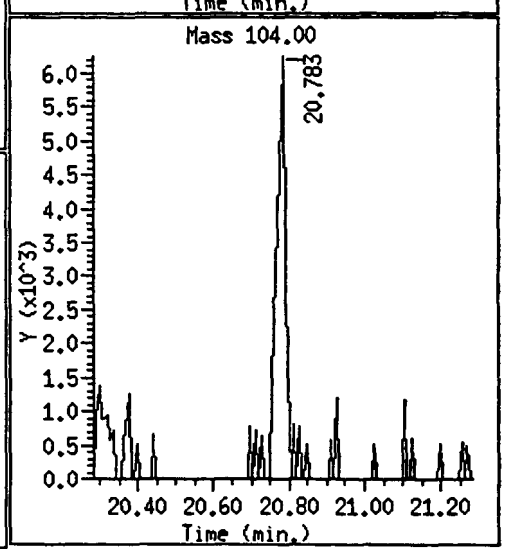






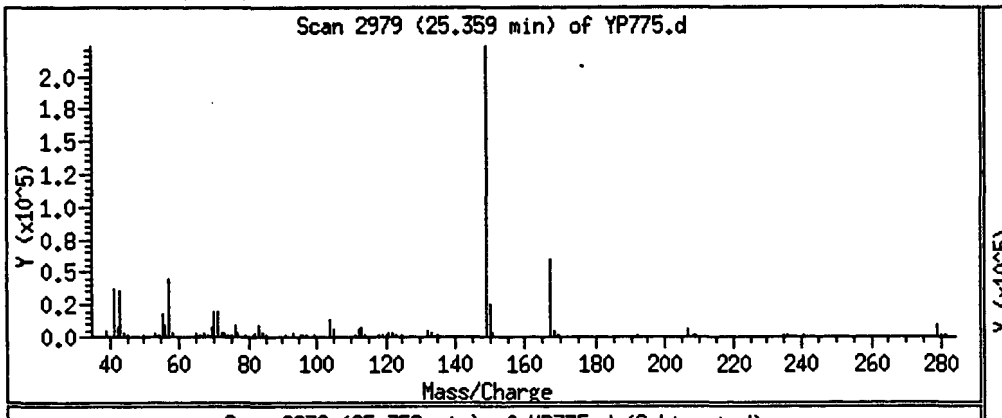


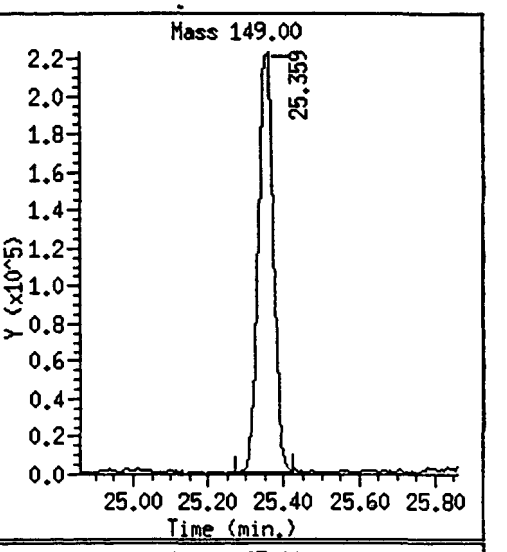


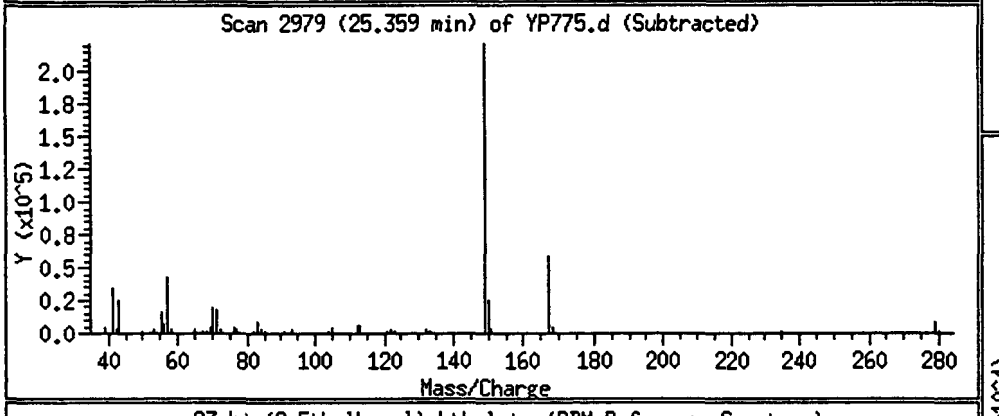


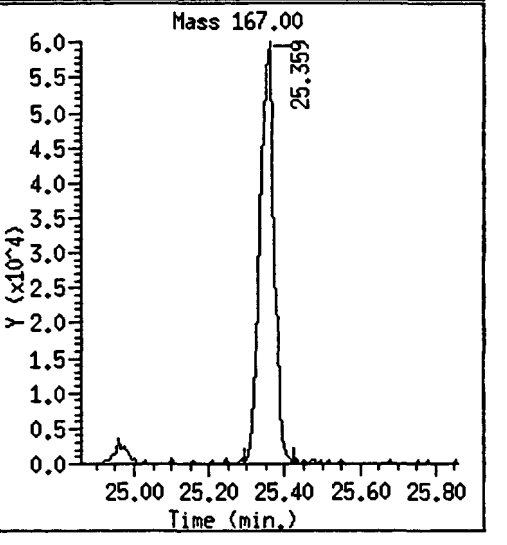
Data File: /chem/Y.i/10-22-97.b/CAA/YP775.d
Date : 22-OCT-1997 19:06
Instrument : Y.i
Sample ID : FBI-MM5-1
Column phase : DB.5-625 Column diameter : 0.32
Volume Injected (uL) : 1.0

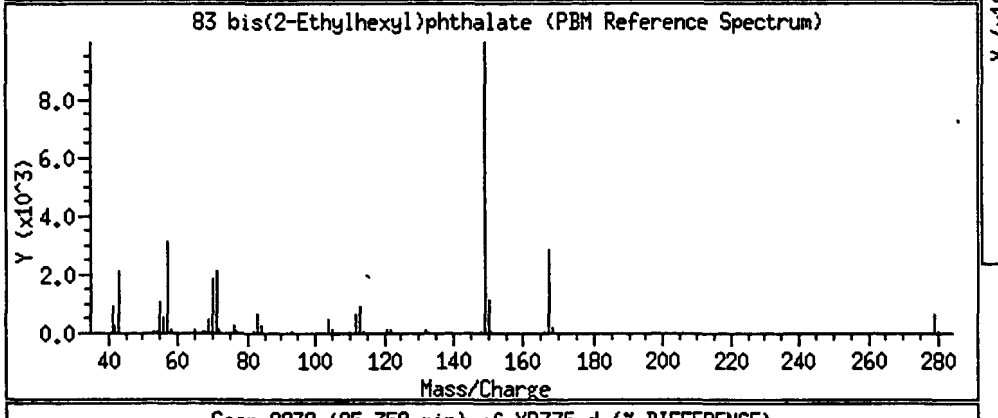
83 bis(2-Ethylhexyl)phthalate

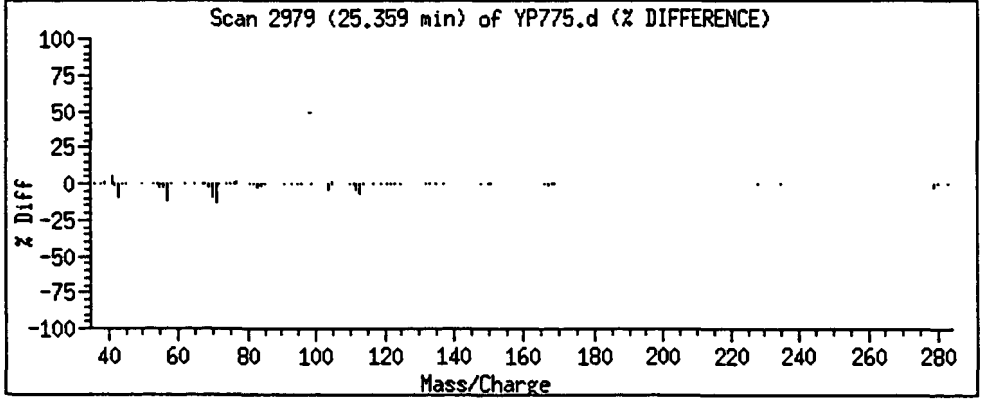












Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP774 | **Sample ID: LAB BLANK-MM5-28**

Client Project: Saginaw, MI | Date Received: 09/29/97 | Response File: YP766
TLI ID: 185-7-6A-C | Date Extracted: 10/14/97
Date Analyzed : 10/22/97

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
Naphthalene-d_8		IS 2	12.76		
Naphthalene		U		0.29	10
2-Methylnaphthalene		U		0.47	10
Acenaphthene-d_{10}		IS 3	16.42		
2-Chloronaphthalene		U		0.43	10
Acenaphthylene		U		0.27	10
Acenaphthene		U		0.45	10
Fluorene		U		0.44	10
Phenanthrene-d_{10}		IS 4	19.55		
Phenanthrene		U		0.32	10
Anthracene		U		0.33	10
Fluoranthene		U		0.31	10
Chrysene-d_{12}		IS 5	25.28		
Pyrene		U		0.31	10
Benzo(a)anthracene		U		0.37	10
Chrysene		U		0.37	10
Perylene-d_{12}		IS 6	29.40		
Benzo(b)fluoranthene		U		0.36	10
Benzo(k)fluoranthene		U		0.34	10
Benzo(e)pyrene		U		0.33	10
Benzo(a)pyrene		U		0.37	10
Perylene		U		0.34	10
Indeno(1,2,3-cd)pyrene		U		0.32	10
Dibenz(a,h)anthracene		U		0.43	10
Benzo(g,h,i)perylene		U		0.35	10

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP774 | **Sample ID: LAB BLANK-MM5-28**

Client Project: Saginaw, MI
TLI ID: 185-7-6A-C

Date Received: 09/29/97
Date Extracted: 10/14/97
Date Analyzed : 10/22/97

Response File: YP766

Dilution Factor: 1.00

Surrogate Summary	Amount (ug)	RT	IS Ref	%REC
Phenol-d_5	69.13	9.45	1	69
Nitrobenzene-d_5	74.18	11.29	2	74
1,3,5-Trichlorobenzene-d_3	62.82	11.98	2	63
1,4-Dibromobenzene-d_4	74.39	12.87	1	74
2-Fluorobiphenyl	71.68	15.01	3	72
2,4,6-Tribromophenol	91.27	18.07	3	91
Anthracene-d_{10}	91.72	19.66	4	92
Pyrene-d_{10}	97.11	22.54	5	97

Reviewed by Sat Date 11/13/97

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Triangle Laboratories of RTP, Inc.
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

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Printed: 09:53 11/13/1997

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP774 | **Sample ID: LAB BLANK-MM5-28**

Client Project: Saginaw, MI	Date Received: 09/29/97	Response File: YP771
TLI ID: 185-7-6A-C	Date Extracted: 10/14/97	
	Date Analyzed : 10/22/97	

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
1,4-Dichlorobenzene-d_4		IS 1	10.22		
n-Nitrosodimethylamine		U		1.50	10
Cumene		U		0.41	10
Phenol		U		0.66	10
Aniline		U		0.54	10
bis-(2-Chloroethyl)ether		U		1.15	10
Benzyl Chloride		U		0.41	10
1,4-Dichlorobenzene		U		0.67	10
2-Methylphenol		U		0.86	10
Acetophenone		U		0.61	10
n-Nitrosomorpholine		U		1.49	10
o-Toluidine		U		0.54	10
Hexachloroethane		U		1.41	10
1,2-Dibromo-3-chloropropane		U		1.48	10
N,N-Diethylaniline		U		0.51	10
Naphthalene-d_8		IS 2	12.76		
3/4-Methylphenol		U		0.99	10
Nitrobenzene		U		0.62	10
N,N-Dimethylaniline		U		0.63	10
Isophorone		U		0.52	10
o-Anisidine		U		1.13	10
1,4-Phenylenediamine		U		0.82	10
1,2,4-Trichlorobenzene		U		0.95	10
Hexachlorobutadiene		U		1.63	10
a,a,a-Trichlorotoluene		U		0.77	10
Hydroquinone		U		0.85	10

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP774 | **Sample ID: LAB BLANK-MM5-28**

Client Project: Saginaw, MI | Date Received: 09/29/97 | Response File: YP771
TLI ID: 185-7-6A-C | Date Extracted: 10/14/97
Date Analyzed : 10/22/97

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
2-Chloroacetophenone		U		0.41	10
Acenaphthene-d_{10}		IS 3	16.42		
Hexachlorocyclopentadiene		U		1.44	10
2,4,6-Trichlorophenol		U		1.31	10
2,4,5-Trichlorophenol		U		1.14	10
Biphenyl		U		0.36	10
Dimethylphthalate	1.14	J	15.84		10
2,4-Dinitrophenol		U		5.05	25
4-Nitrophenol		U		1.93	25
2,4-Dinitrotoluene		U		1.48	10
Dibenzofuran		U		0.32	10
4,6-Dinitro-2-methylphenol		U		3.27	25
Trifluralin		U		2.39	10
Phenanthrene-d_{10}		IS 4	19.55		
Di-n-butylphthalate	29.02	B	20.78		10
Hexachlorobenzene		U		0.96	10
4-Aminobiphenyl		U		0.41	10
Pentachlorophenol		U		1.82	25
Pentachloronitrobenzene		U		3.84	10
4-Nitrobiphenyl		U		1.04	10
Chrysene-d_{12}		IS 5	25.28		
Benzidine		U		0.54	10
4,4'-Methylenedianiline		U		1.26	10
Dimethylaminoazobenzene		U		1.08	10
3,3'-Dimethylbenzidine		U		0.67	10
3,3'-Dimethoxybenzidine		U		1.39	10

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Pacific Environmental Services

Project Number: 43433 | **Method 8270A MM5**
Sample File: YP774 | **Sample ID: LAB BLANK-MM5-28**

Client Project: Saginaw, MI	Date Received: 09/29/97	Response File: YP771
TLI ID: 185-7-6A-C	Date Extracted: 10/14/97	
	Date Analyzed : 10/22/97	

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
3,3'-Dichlorobenzidine		U		0.91	10
Methylene bis-chloroaniline		U		2.06	10
bis(2-Ethylhexyl)phthalate	1.19	BJ	25.35		10

Reviewed by Sah Date 11/13/97

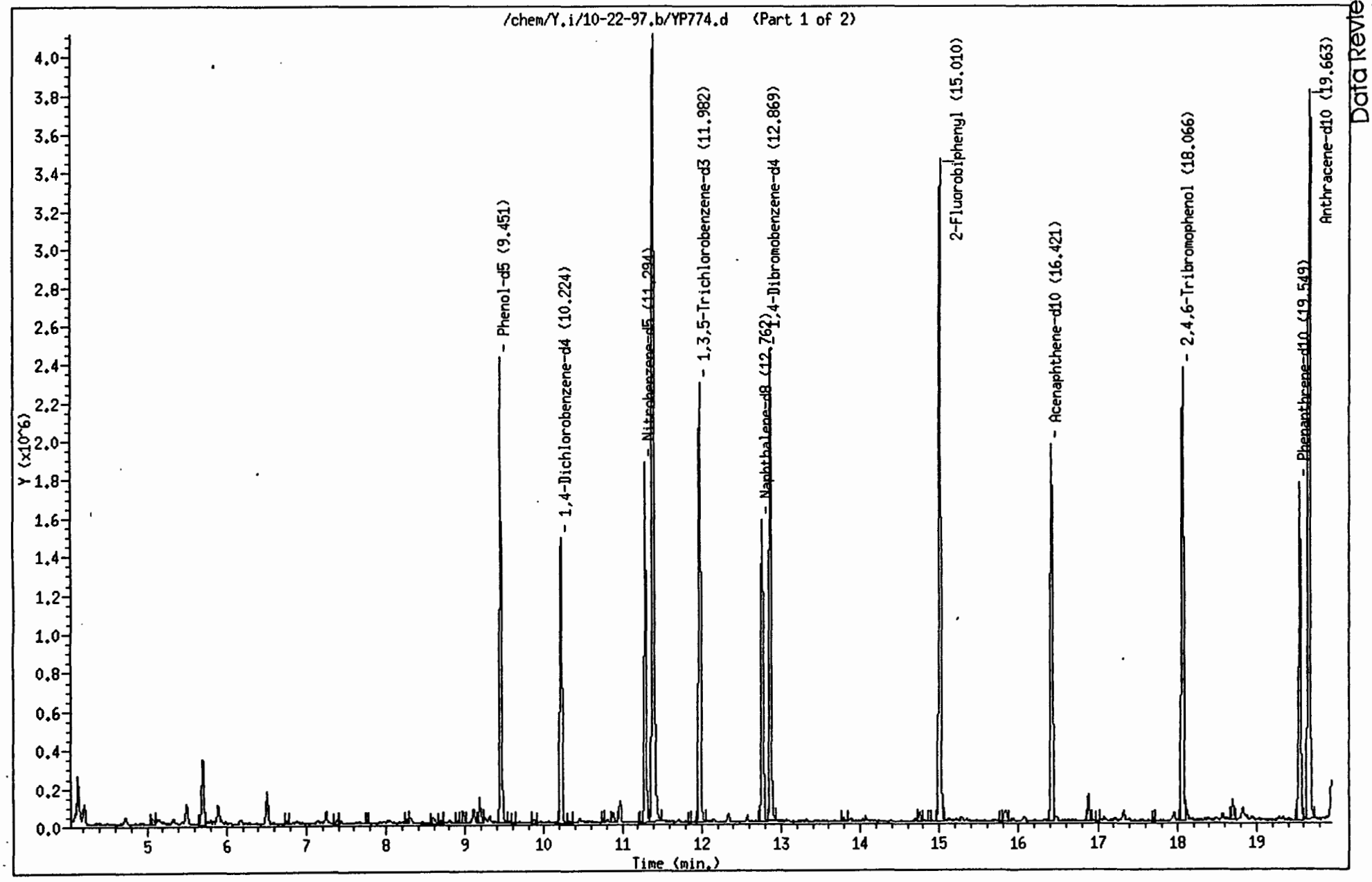
NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit

IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Data File: /chem/Y.i/10-22-97.b/YP774.d
Date : 22-OCT-97 18:18
Instrument : Y.i
Sample ID : LAB BLANK-MM5-28
Column phase : DB-5
Volume Injected (uL) : 1.0

Triangle Laboratories of RTP, Inc.

Column diameter : 0.32



Data Review: [illegible]
Date: 11/2/97

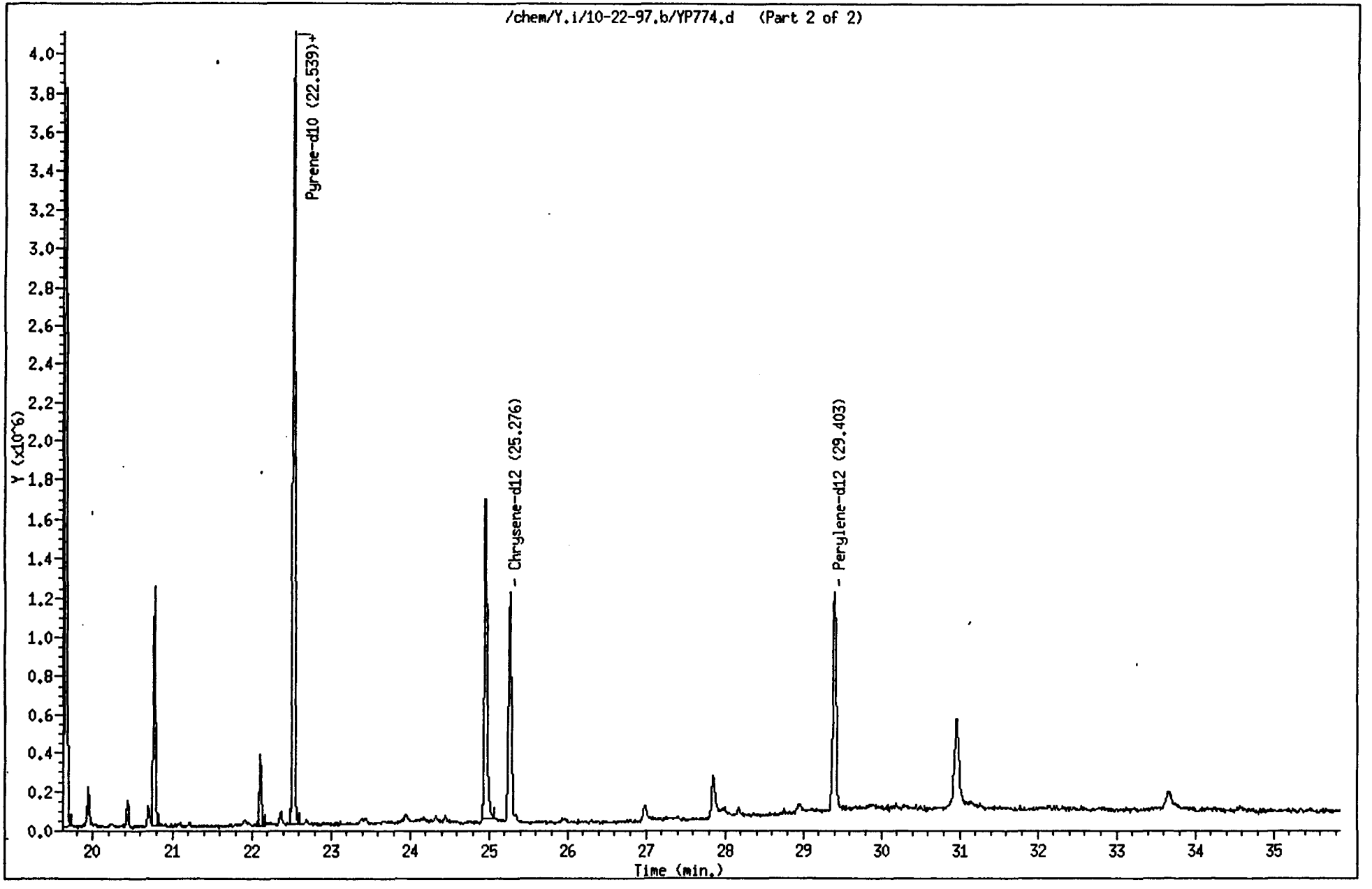
183

Data File: /chem/Y.i/10-22-97.b/YP774.d
Date : 22-OCT-97 18:18
Instrument : Y.i
Sample ID : LAB BLANK-MM5-28
Column phase : DB-5
Volume Injected (uL) : 1.0

Triangle Laboratories of RTP, Inc.

Column diameter : 0.32

184



TRIANGLE LABORATORIES, INC.

SEMI-VOLATILE QUANTITATION REPORT

Data file : /chem/Y.i/10-22-97.b/YP774.d
Lab. Id. : 43433
Inj Date : 22-OCT-97 18:18 Autotune Date: 22-Oct-97 09:14:0
Operator : DD Inst ID: Y.i
Smp Info : LAB BLANK-MM5-28
Misc Info : 185-7-6A-C
Comment :
Method : /chem/Y.i/10-22-97.b/cclist.m
Meth Date : 23-Oct-1997 11:29 target
Cal Date : 22-OCT-1997 11:59 Cal File: YP766.d
Als bottle: 12
Dil Factor: 1.000 Target Version: Target 2.20
Integrator: HP RTE Compound Sublist: pah.sub
Sample Type: AIR

		Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)
*	1	1,4-Dichlorobenzene-d4	152.00	10.224(1.000)	433631	40.00	
*	2	Naphthalene-d8	136.00	12.762(1.000)	1322956	40.00	
*	3	Acenaphthene-d10	164.00	16.421(1.000)	842411	40.00	
*	4	Phenanthrene-d10	188.00	19.549(1.000)	1241220	40.00	
*	5	Chrysene-d12	240.00	25.276(1.000)	985400	40.00	
*	6	Perylene-d12	264.00	29.403(1.000)	1189592	40.00	
$	7	2-Fluorophenol	Compound Not Detected.				
$	8	Phenol-d5	99.00	9.451(0.924)	1270989	69.14	69.14
$	9	2-Chlorophenol-d4	Compound Not Detected.				
$	10	1,2-Dichlorobenzene-d4	Compound Not Detected.				
$	11	Nitrobenzene-d5	82.00	11.294(0.885)	929888	74.18	74.18
$	12	1,3,5-Trichlorobenzene-d3	185.00	11.982(0.939)	708495	62.82	62.82
$	13	1,4-Dibromobenzene-d4	239.80	12.869(1.259)	787094	74.42	74.42
$	14	2-Fluorobiphenyl	172.00	15.010(0.914)	1867470	71.70	71.70
$	15	2,4,6-Tribromophenol	329.80	18.066(1.100)	522817	91.27	91.27
$	16	Anthracene-d10	188.00	19.663(1.006)	2999871	91.70	91.70
$	17	Pyrene-d10	212.00	22.539(0.892)	2875514	97.12	97.12
$	18	Terphenyl-d14	Compound Not Detected.				
	42	Naphthalene	Compound Not Detected.				
	46	2-Methylnaphthalene	Compound Not Detected.				
	50	2-Chloronaphthalene	Compound Not Detected.				
	56	Acenaphthylene	Compound Not Detected.				
	58	Acenaphthene	Compound Not Detected.				
	65	Fluorene	Compound Not Detected.				
	73	Phenanthrene	Compound Not Detected.				
	74	Anthracene	Compound Not Detected.				
	77	Fluoranthene	202.00	~~22.531(1.153)~~	~~2930~~	~~0.09~~	~~0.09(aQ)~~
	78	Pyrene	202.00	~~22.574(0.893)~~	~~749~~	~~0.02~~	~~0.02(aQ)~~
	83	Benzo(a)anthracene	Compound Not Detected.				
	84	Chrysene	Compound Not Detected.				
	86	Benzo(b)fluoranthene	Compound Not Detected.				

FP Scott

Data Review: Scott
Date: 11/12/97

Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)
87 Benzo(k)fluoranthene	Compound Not Detected.				
88 Benzo(e)pyrene	Compound Not Detected.				
89 Benzo(a)pyrene	Compound Not Detected.				
90 Perylene	Compound Not Detected.				
91 Indeno(1,2,3-cd)pyrene	Compound Not Detected.				
92 Dibenz(a,h)anthracene	Compound Not Detected.				
93 Benzo(g,h,i)perylene	Compound Not Detected.				

QC Flag Legend

a - Target compound detected but, quantitated amount
Below Limit Of Quantitation(BLOQ).
Q - Qualifier signal failed the ratio test.

TRIANGLE LABORATORIES, INC.

SEMI-VOLATILE QUANTITATION REPORT

Data file : /chem/Y.i/10-22-97.b/CAA/YP774.d
Lab. Id. : 43433
Inj Date : 22-OCT-97 18:18 Autotune Date: 22-Oct-97 09:14:0
Operator : DD Inst ID: Y.i
Smp Info : LAB BLANK-MM5-28
Misc Info : 185-7-6A-C
Comment :
Method : /chem/Y.i/10-22-97.b/tlicaa.m
Meth Date : 23-Oct-1997 08:05 target
Cal Date : 22-OCT-1997 15:55 Cal File: YP771.d
Als bottle: 12
Dil Factor: 1.000 Target Version: Target 2.20
Integrator: HP RTE Compound Sublist: CAA1.sub
Sample Type: mm5

	Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)	
*	1 1,4 Dichlorobenzene-d4	152.00	10.224(1.000)	433631	40.00		
*	2 Naphthalene-d8	136.00	12.762(1.000)	1322956	40.00		
*	3 Acenaphthene-d10	164.00	16.421(1.000)	842411	40.00		
*	4 Phenanthrene-d10	188.00	19.549(1.000)	1241220	40.00		
*	5 Chrysene-d12	240.00	25.276(1.000)	985400	40.00		
*	6 Perylene-d12	264.00	29.403(1.000)	1189592	40.00		
$	7 2-Fluorophenol	Compound Not Detected.					
$	8 Phenol-d5	99.00	9.451(0.924)	1270989	74.38	74.38	
$	9 2-Chlorophenol-d4	Compound Not Detected.					
$	10 1,2-Dichlorobenzene-d4	Compound Not Detected.					
$	11 Nitrobenzene-d5	82.00	11.294(0.885)	929888	72.41	72.41	
$	12 1,3,5-Trichlorobenzene-d3	185.00	11.982(0.939)	708495	65.75	65.75	
$	13 1,4-Dibromobenzene-d4	240.00	12.869(1.259)	786727	75.08	75.08	
$	14 2-Fluorobiphenyl	172.00	15.010(0.914)	1867470	71.31	71.31	
$	15 2,4,6-Tribromophenol	329.80	18.066(1.100)	522817	102.41	102.41	
$	16 Anthracene-d10	188.00	19.663(1.006)	2999871	85.85	85.85	
$	17 Pyrene-d10	212.00	22.539(0.892)	2875514	86.94	86.94	
$	18 Terphenyl-d14	Compound Not Detected.					
	20 n-Nitrosodimethylamine	74.00	~~4.724(0.462)~~	~~13857~~	~~2.07~~	~~2.07~~	FP salt
	21 Cumene	Compound Not Detected.					
	23 Phenol	94.00	~~9.487(0.920)~~	~~2365~~	~~0.15~~	~~0.15~~	FP salt
	24 Aniline	Compound Not Detected.					
	27 bis-(2-Chloroethyl)ether	Compound Not Detected.					
	28 Benzyl Chloride	Compound Not Detected.					
	29 1,4-Dichlorobenzene	Compound Not Detected.					
	31 2-Methylphenol	Compound Not Detected.					
	32 3/4-Methylphenol	Compound Not Detected.					
	33 Acetophenone	Compound Not Detected.					
	34 n-Nitrosomorpholine	56.00	~~11.394(1.114)~~	~~236765~~	~~30.13~~	~~30.15~~	FP salt
	35 o-Toluidine	Compound Not Detected.					
	36 Hexachloroethane	Compound Not Detected.					

Data Review: [illegible]
Date: 11/12/97

Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	CONCENTRATIONS FINAL (ug)	
37 Nitrobenzene	Compound Not Detected.					
38 N,N-Dimethylaniline	Compound Not Detected.					
39 1,2-Dibromo-3-chloropropane	Compound Not Detected.					
40 Isophorone	Compound Not Detected.					
41 o-Anisidine	Compound Not Detected.					
42 1,4-Phenylenediamine	Compound Not Detected.					
43 1,2,4-Trichlorobenzene	Compound Not Detected.					
44 Naphthalene	Compound Not Detected.					
46 Hexachlorobutadiene	Compound Not Detected.					
47 N,N-Diethylaniline	Compound Not Detected.					
48 a,a,a-Trichlorotoluene	Compound Not Detected.					
49 Hydroquinone	110.00	~~13.520(1.060)~~	~~511~~	0.04	~~0.04~~	FP 8270
51 2-Chloroacetophenone	Compound Not Detected.					
52 Hexachlorocyclopentadiene	Compound Not Detected.					
53 2,4,6-Trichlorophenol	Compound Not Detected.					
54 2,4,5-Trichlorophenol	Compound Not Detected.					
60 Biphenyl	154.00	~~15.002(0.914)~~	~~2400~~	~~0.08~~	~~0.08~~	FP 8270
61 Dimethylphthalate	163.00	15.839(0.965)	27547	1.13	1.13	
62 2,4-Dinitrophenol	Compound Not Detected.					
63 4-Nitrophenol	139.00	~~16.881(1.028)~~	~~557~~	~~0.10~~	~~0.10~~	FP 8270
64 2,4-Dinitrotoluene	165.00	~~16.413(1.000)~~	~~108411~~	~~16.04~~	~~16.04~~	
65 Dibenzofuran	Compound Not Detected.					
66 Di-n-butylphthalate	149.00	20.785(1.063)	1384286	29.02	29.02	
67 4,6-Dinitro-2-methylphenol	Compound Not Detected.					
68 Trifluralin	Compound Not Detected.					
69 Hexachlorobenzene	Compound Not Detected.					
70 4-Aminobiphenyl	Compound Not Detected.					
71 Pentachlorophenol	Compound Not Detected.					
72 Pentachloronitrobenzene	Compound Not Detected.					
73 4-Nitrobiphenyl	Compound Not Detected.					
74 Benzidine	184.00	~~22.531(0.891)~~	~~26365~~	~~1.41~~	~~1.41~~	FP 8270
75 4,4'-Methylenedianiline	Compound Not Detected.					
77 Dimethylaminoazobenzene	Compound Not Detected.					
78 3,3'-Dimethylbenzidine	Compound Not Detected.					
80 3,3'-Dimethoxybenzidine	Compound Not Detected.					
81 3,3'-Dichlorobenzidine	Compound Not Detected.					
82 Methylene bis-chloroaniline	Compound Not Detected.					
83 bis(2-Ethylhexyl)phthalate	149.00	25.355(1.003)	27619	1.18	1.18	

Data File: /chem/Y.i/10-22-97.b/CAA/YP774.d

Date : 22-OCT-1997 18:18

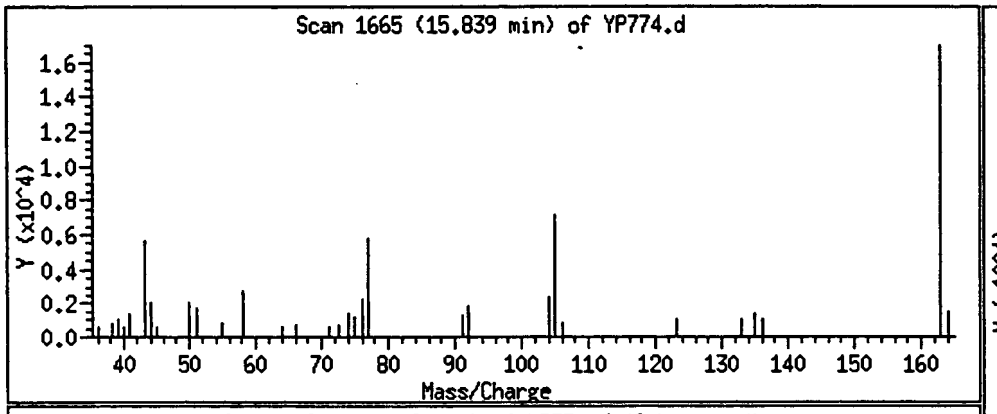
Instrument : Y.i

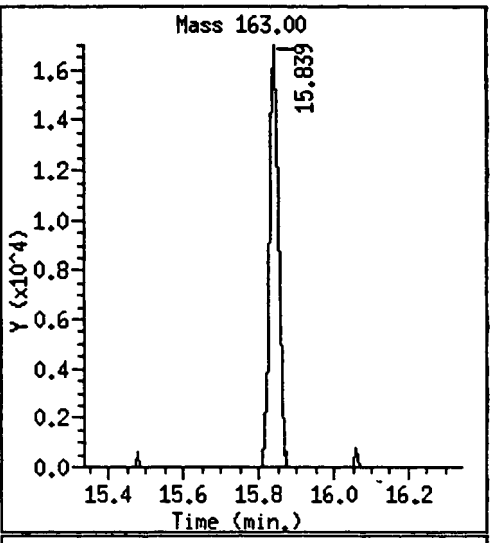
Sample ID : LAB BLANK-MM5-28

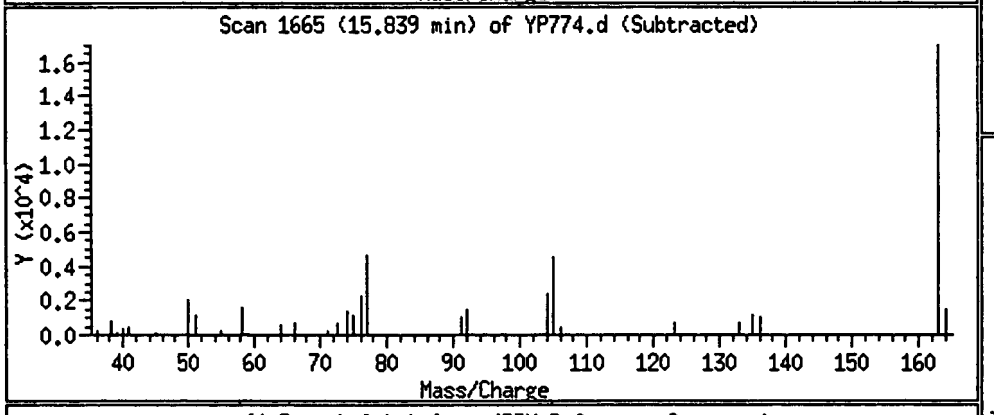
Column phase : DB.5-625 Column diameter : 0.32

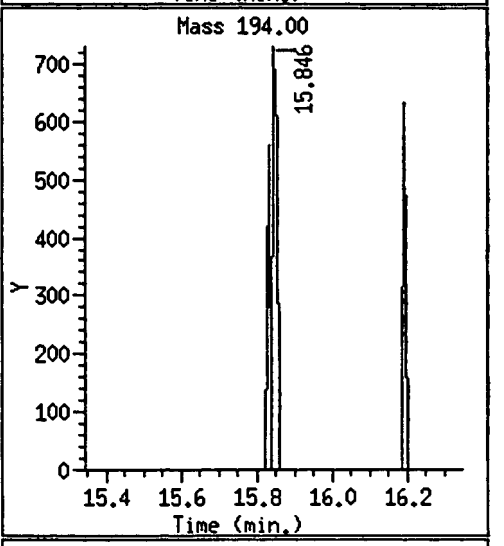
Volume Injected (uL) : 1.0

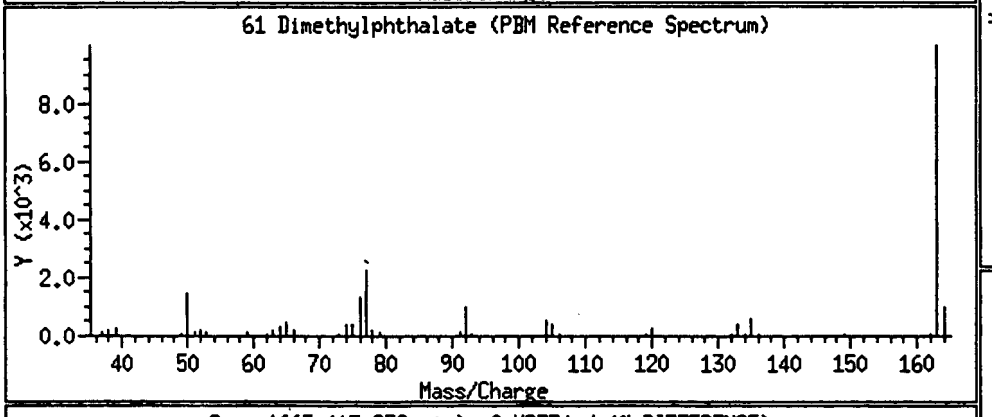
61 Dimethylphthalate

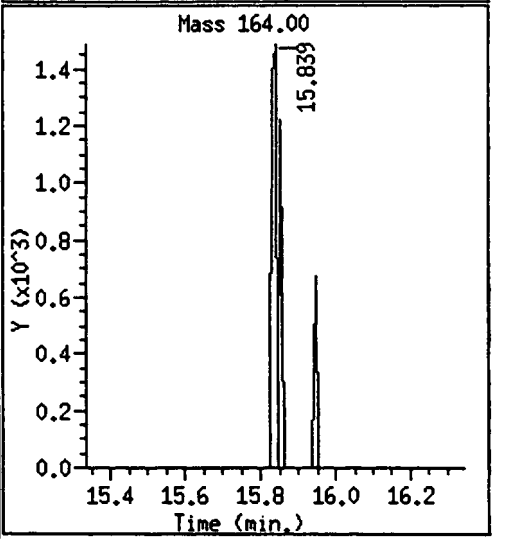


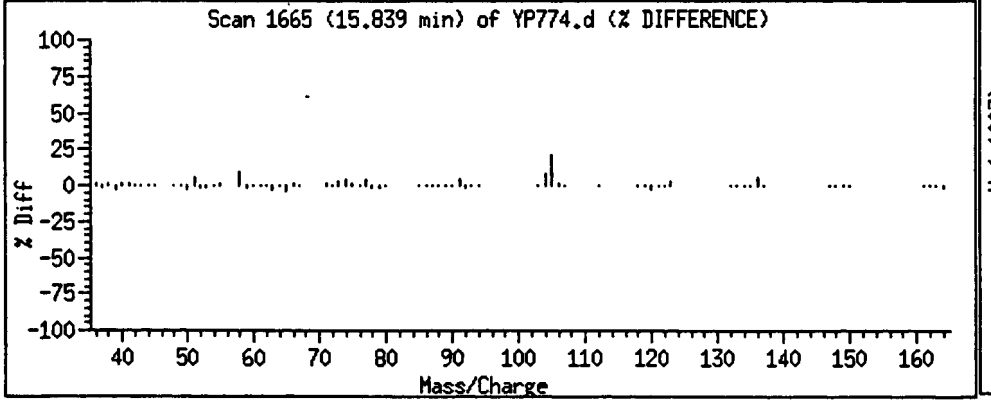












Data File: /chem/Y.i/10-22-97.b/CAA/YP774.d

Date : 22-OCT-1997 18:18

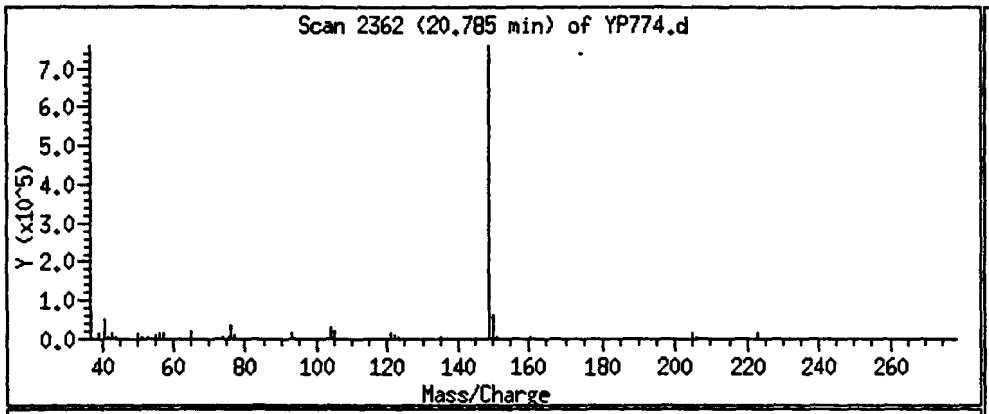
Instrument : Y.i

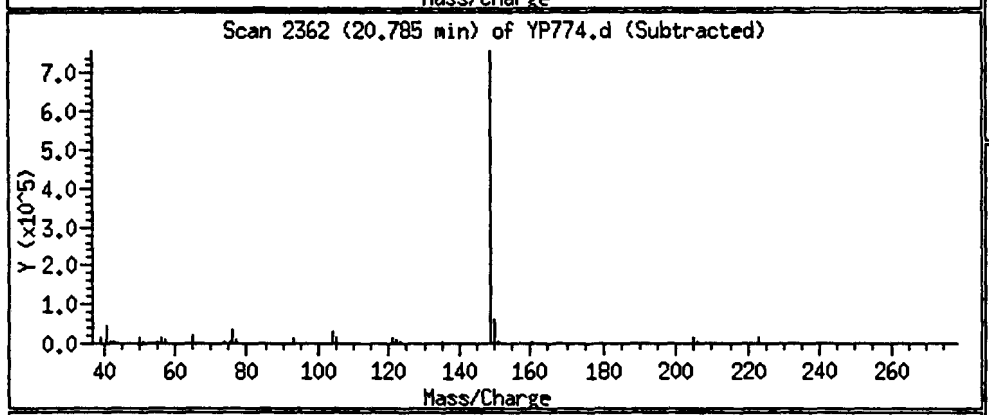
Sample ID : LAB BLANK-MM5-28

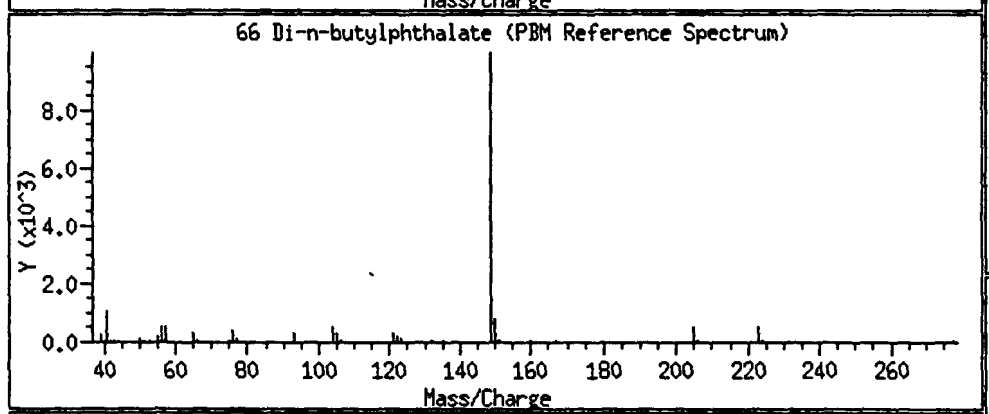
Column phase : DB.5-625 Column diameter : 0.32

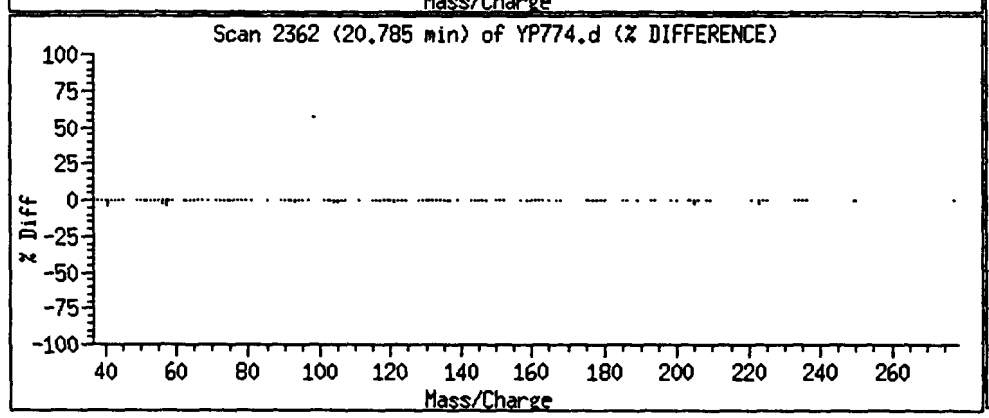
Volume Injected (uL) : 1.0

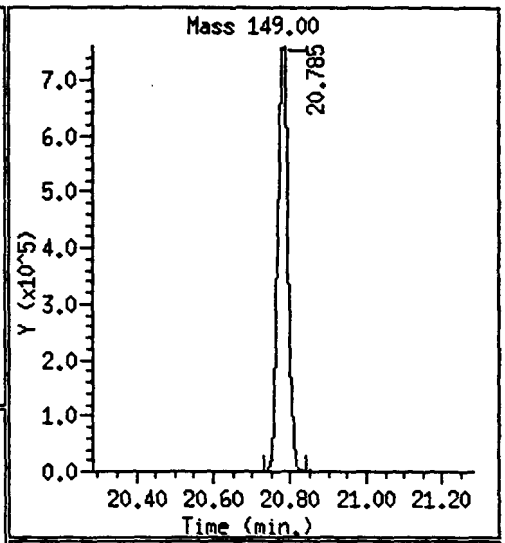
66 Di-n-butylphthalate

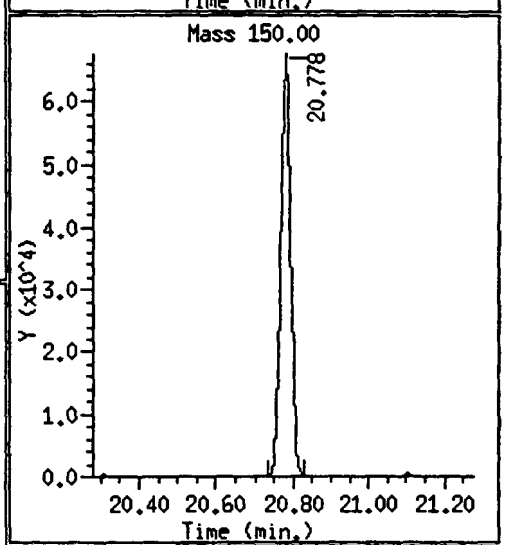


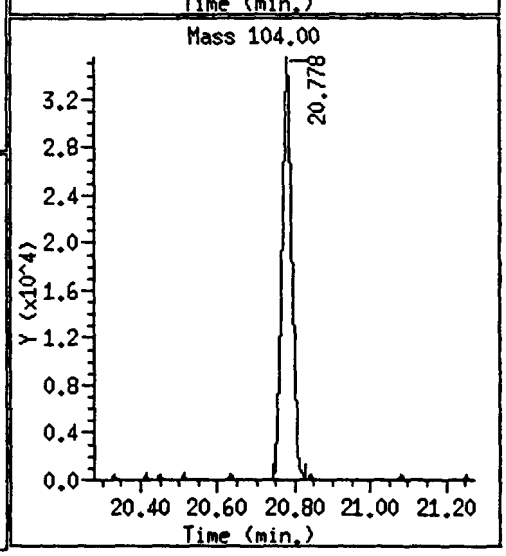












Data File: /chem/Y.i/10-22-97.b/CAA/YP774.d

Date : 22-OCT-1997 18:18

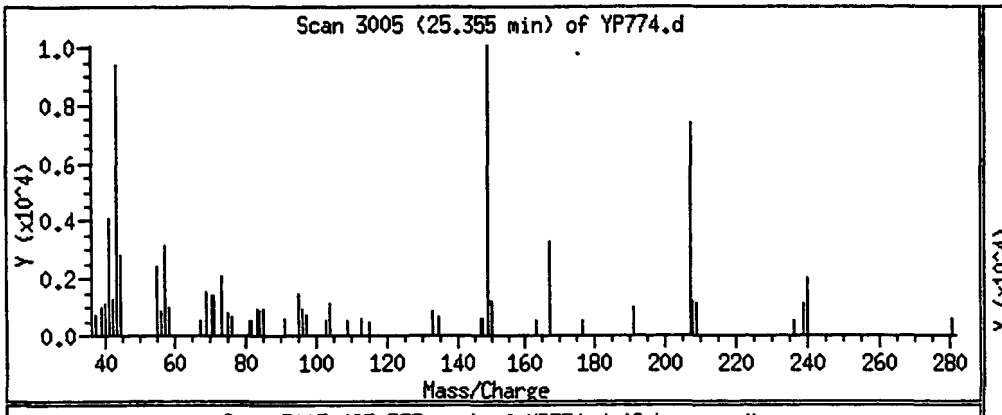
Instrument : Y.i

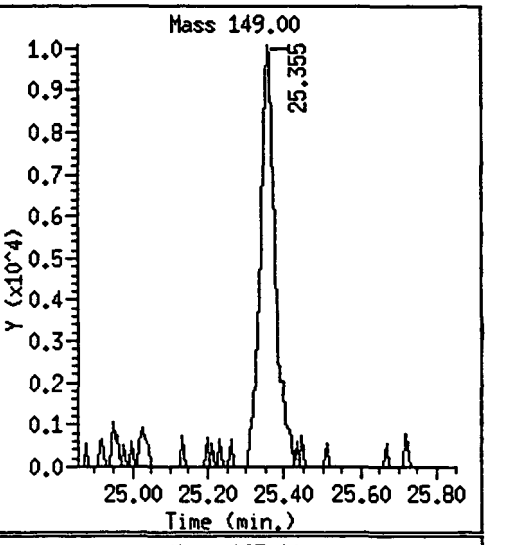
Sample ID : LAB BLANK-MM5-28

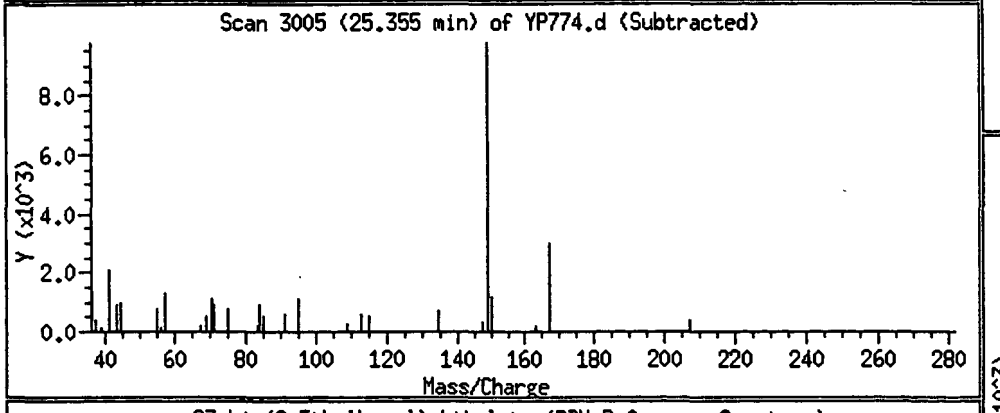
Column phase : DB.5-625 Column diameter : 0.32

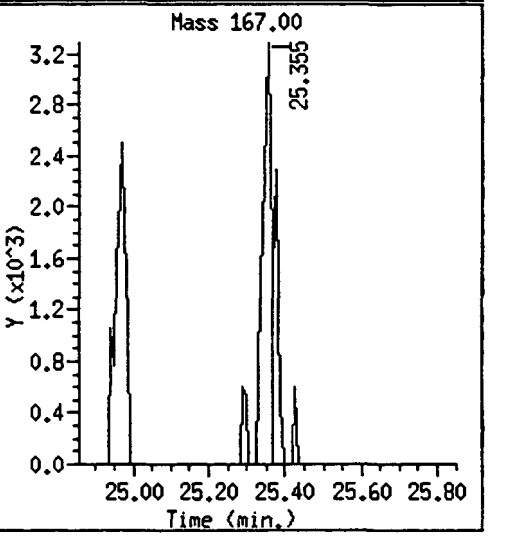
Volume Injected (uL) : 1.0

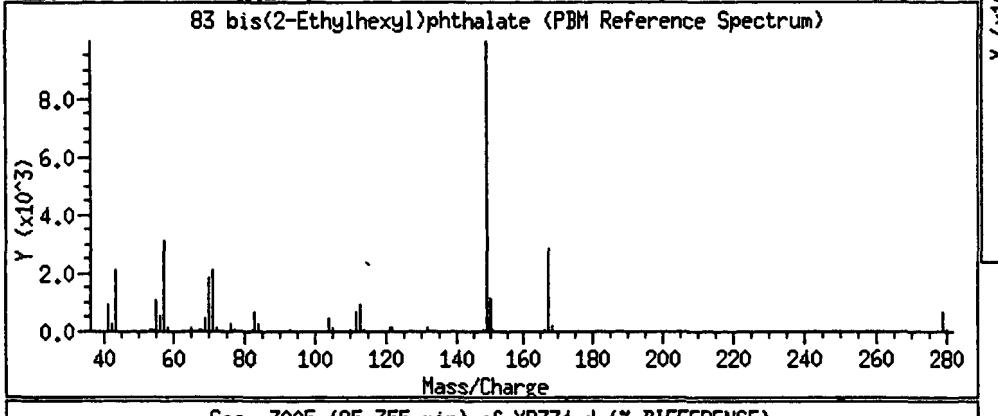
83 bis(2-Ethylhexyl)phthalate

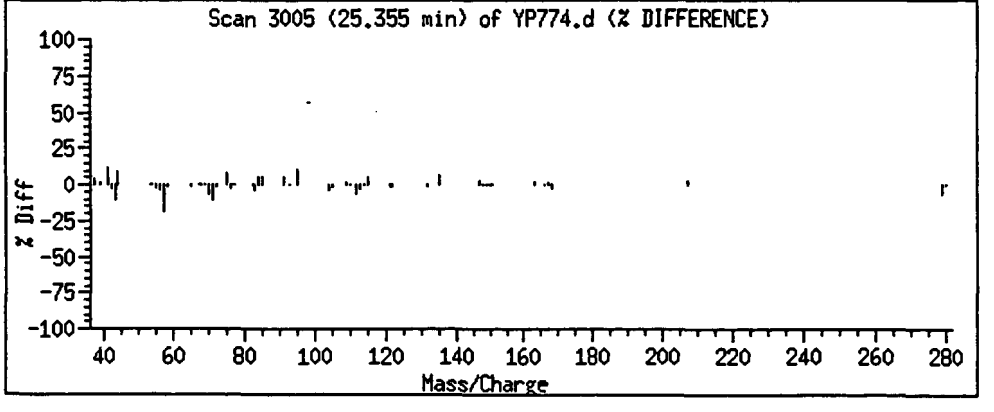












Pacific Environmental Services

Project Number: 43433 | **Method 8270A XAD**
Sample File: YP773 | **Sample ID: SBLK101497**

Client Project: Saginaw, MI	Date Received: / /	Response File: YP766
TLI ID: SBLK101497	Date Extracted: 10/14/97	
	Date Analyzed : 10/22/97	

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
Naphthalene-d_8		IS 2	12.76		
Naphthalene	2.44	J	12.81		10
2-Methylnaphthalene		U		0.43	10
Acenaphthene-d_{10}		IS 3	16.43		
2-Chloronaphthalene		U		0.44	10
Acenaphthylene		U		0.27	10
Acenaphthene		U		0.45	10
Fluorene		U		0.45	10
Phenanthrene-d_{10}		IS 4	19.55		
Phenanthrene		U		0.29	10
Anthracene		U		0.30	10
Fluoranthene		U		0.29	10
Chrysene-d_{12}		IS 5	25.28		
Pyrene		U		0.28	10
Benzo(a)anthracene		U		0.32	10
Chrysene		U		0.33	10
Perylene-d_{12}		IS 6	29.41		
Benzo(b)fluoranthene		U		0.30	10
Benzo(k)fluoranthene		U		0.29	10
Benzo(e)pyrene		U		0.28	10
Benzo(a)pyrene		U		0.31	10
Perylene		U		0.28	10
Indeno(1,2,3-cd)pyrene		U		0.27	10
Dibenz(a,h)anthracene		U		0.36	10
Benzo(g,h,i)perylene		U		0.29	10

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

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Savar v3.5
Printed: 09:47 11/13/1997

Pacific Environmental Services

'roject Number: 43433
Sample File: YP773

Method 8270A XAD
Sample ID: SBLK101497

:lient Project: Saginaw, MI
TLI ID: SBLK101497

Date Received: / /
Date Extracted: 10/14/97
Date Analyzed : 10/22/97

Response File: YP766

Dilution Factor: 1.00

Surrogate Summary	Amount (ug)	RT	IS Ref	%REC
'henol-d_5	56.67	9.45	1	57
Nitrobenzene-d_5	56.00	11.30	2	56
,3,5-Trichlorobenzene-d_3	53.36	11.98	2	53
.,4-Dibromobenzene-d_4	64.21	12.87	1	64
2-Fluorobiphenyl	67.25	15.01	3	67
,4,6-Tribromophenol	99.19	18.07	3	99
Anthracene-d_{10}	95.10	19.67	4	95
Pyrene-d_{10}	105.84	22.54	5	106

Reviewed by _____ Date 11/13/97

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit

IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Pacific Environmental Services

Project Number: 43433 | **Method 8270A XAD**
Sample File: YP773 | **Sample ID: SBLK101497**

Client Project: Saginaw, MI | Date Received: / / | Response File: YP771
TLI ID: SBLK101497 | Date Extracted: 10/14/97
Date Analyzed : 10/22/97

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
1,4-Dichlorobenzene-d_4		IS 1	10.22		
n-Nitrosodimethylamine		U		1.41	10
Cumene		U		0.39	10
Phenol		U		0.63	10
Aniline		U		0.51	10
bis-(2-Chloroethyl)ether		U		1.08	10
Benzyl Chloride		U		0.39	10
1,4-Dichlorobenzene		U		0.63	10
2-Methylphenol		U		0.81	10
Acetophenone	2.53	J	11.00		10
n-Nitrosomorpholine		U		1.41	10
o-Toluidine		U		0.51	10
Hexachloroethane		U		1.33	10
1,2-Dibromo-3-chloropropane		U		1.40	10
N,N-Diethylaniline		U		0.48	10
Naphthalene-d_8		IS 2	12.76		
3/4-Methylphenol		U		0.89	10
Nitrobenzene		U		0.56	10
N,N-Dimethylaniline		U		0.57	10
Isophorone		U		0.47	10
o-Anisidine		U		1.02	10
1,4-Phenylenediamine		U		0.74	10
1,2,4-Trichlorobenzene		U		0.86	10
Hexachlorobutadiene		U		1.47	10
a,a,a-Trichlorotoluene		U		0.70	10
Hydroquinone		U		0.77	10

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Pacific Environmental Services

Project Number: 43433 | **Method 8270A XAD**
Sample File: YP773 | **Sample ID: SBLK101497**

Client Project: Saginaw, MI | Date Received: / / | Response File: YP771
TLI ID: SBLK101497 | Date Extracted: 10/14/97
Date Analyzed : 10/22/97

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
2-Chloroacetophenone	3.83	J	13.86		10
Acenaphthene-d_{10}		IS 3	16.43		
Hexachlorocyclopentadiene		U		1.46	10
2,4,6-Trichlorophenol		U		1.33	10
2,4,5-Trichlorophenol		U		1.15	10
Biphenyl		U		0.36	10
Dimethylphthalate		U		0.42	10
2,4-Dinitrophenol		U		5.12	25
4-Nitrophenol		U		1.96	25
2,4-Dinitrotoluene		U		1.50	10
Dibenzofuran		U		0.32	10
4,6-Dinitro-2-methylphenol		U		3.32	25
Trifluralin		U		2.42	10
Phenanthrene-d_{10}		IS 4	19.55		
Di-n-butylphthalate	1.61	J	20.78		10
Hexachlorobenzene		U		0.87	10
4-Aminobiphenyl		U		0.37	10
Pentachlorophenol		U		1.66	25
Pentachloronitrobenzene		U		3.50	10
4-Nitrobiphenyl		U		0.95	10
Chrysene-d_{12}		IS 5	25.28		
Benzidine		U		0.47	10
4,4'-Methylenedianiline		U		1.11	10
Dimethylaminoazobenzene		U		0.95	10
3,3'-Dimethylbenzidine		U		0.59	10
3,3'-Dimethoxybenzidine		U		1.22	10

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit
IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

Triangle Laboratories of RTP, Inc.
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Phone: (919) 544-5729 • Fax: (919) 544-5491

Pacific Environmental Services

Project Number: 43433 | **Method 8270A XAD**
Sample File: YP773 | **Sample ID: SBLK101497**

Client Project: Saginaw, MI	Date Received: / /	Response File: YP771
TLI ID: SBLK101497	Date Extracted: 10/14/97	
	Date Analyzed : 10/22/97	

Dilution Factor: 1.00

Analyte	Amount ug	FLAG	RT	Det. Limit ug	Quan. Limit ug
3,3'-Dichlorobenzidine		U		0.80	10
Methylene bis-chloroaniline		U		1.81	10
bis(2-Ethylhexyl)phthalate	0.57	J	25.35		10

Reviewed by Batt Date 11/13/97

NA- Not Applicable; Det. Limit: Detection Limit; Quan. Limit: Quantitation Limit

IS: Internal Standard; U: Undetected; B: Present In Blank; J: Estimated- Below Quantitation Limit; E: Estimated- Above Calibration Range

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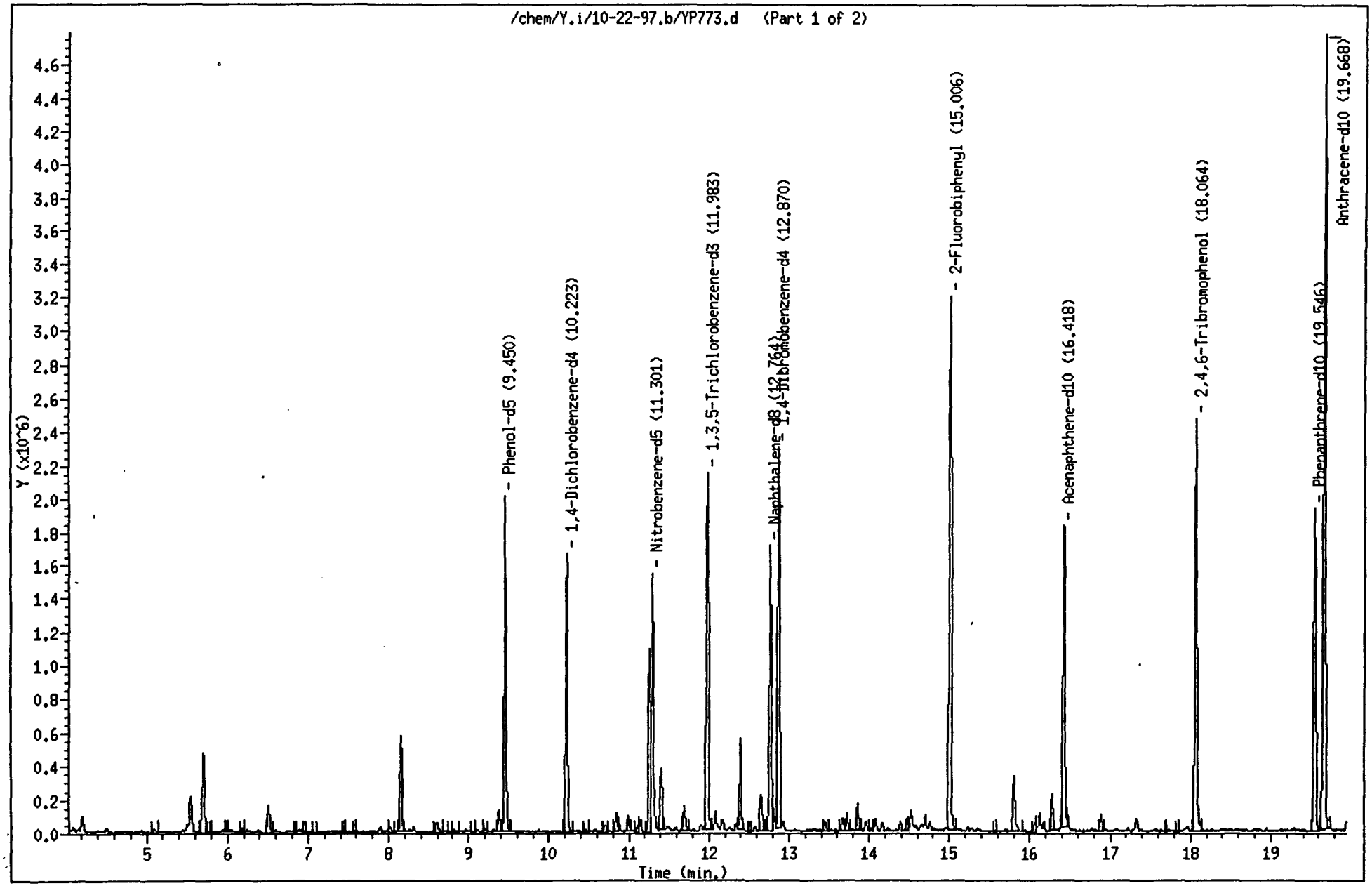
Savar v3.5
Printed: 12:41 11/13/1997

Data File: /chem/Y.i/10-22-97.b/YP773.d
Date : 22-OCT-97 17:30
Instrument : Y.i
Sample ID : SBLK 101497
Column phase : DB-5
Volume Injected (uL) : 1.0

Triangle Laboratories of RTP, Inc.

Column diameter : 0.32

19



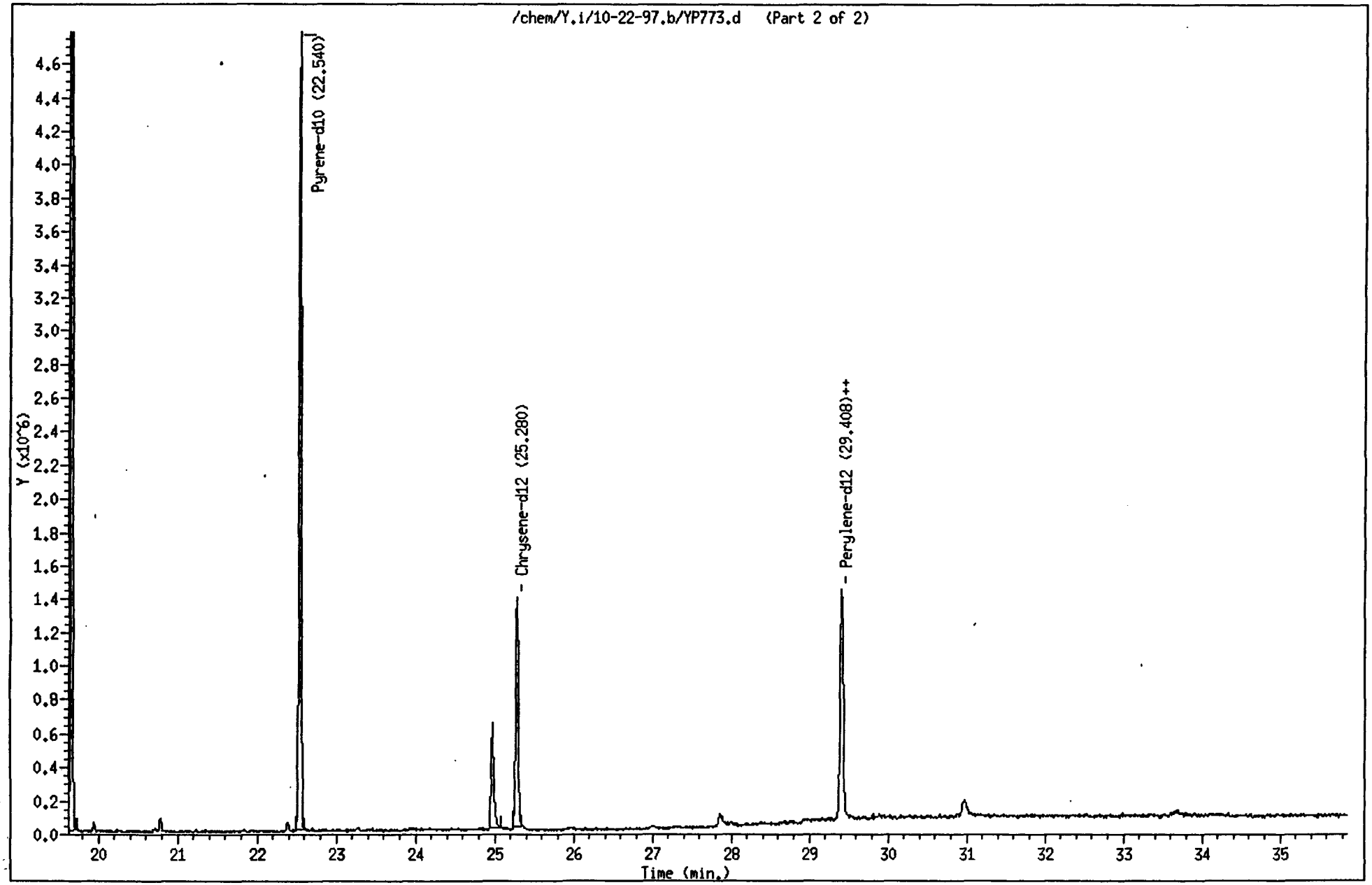
Data Review: [illegible]
Date: 11/12/97

198

Data File: /chem/Y.i/10-22-97.b/YP773.d
Date : 22-OCT-97 17:30
Instrument : Y.i
Sample ID : SBLK 101497
Column phase : DB-5
Volume Injected (uL) : 1.0

Triangle Laboratories of RTP, Inc.

Column diameter : 0.32



TRIANGLE LABORATORIES, INC.

SEMI-VOLATILE QUANTITATION REPORT

Data file : /chem/Y.i/10-22-97.b/YP773.d
Lab. Id. : 43433
Inj Date : 22-OCT-97 17:30 Autotune Date: 22-Oct-97 09:14:0
Operator : DD Inst ID: Y.i
Smp Info : SBLK 101497
Misc Info :
Comment :
Method : /chem/Y.i/10-22-97.b/cclist.m
Meth Date : 23-Oct-1997 11:29 target
Cal Date : 22-OCT-1997 11:59 Cal File: YP766.d
Als bottle: 11
Dil Factor: 1.000 Target Version: Target 2.20
Integrator: HP RTE Compound Sublist: pah.sub
Sample Type: AIR

		Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)
*	1	1,4-Dichlorobenzene-d4	152.00	10.223(1.000)	459693	40.00	
*	2	Naphthalene-d8	136.00	12.764(1.000)	1467052	40.00	
*	3	Acenaphthene-d10	164.00	16.426(1.000)	830491	40.00	
*	4	Phenanthrene-d10	188.00	19.546(1.000)	1360406	40.00	
*	5	Chrysene-d12	240.00	25.280(1.000)	1120374	40.00	
*	6	Perylene-d12	264.00	29.408(1.000)	1424942	40.00	
$	7	2-Fluorophenol	Compound Not Detected.				
$	8	Phenol-d5	99.00	9.450(0.924)	1104585	56.68	56.68
$	9	2-Chlorophenol-d4	Compound Not Detected.				
$	10	1,2-Dichlorobenzene-d4	Compound Not Detected.				
$	11	Nitrobenzene-d5	82.00	11.301(0.885)	778357	55.99	55.99
$	12	1,3,5-Trichlorobenzene-d3	185.00	11.983(0.939)	667324	53.35	53.35
$	13	1,4-Dibromobenzene-d4	239.80	12.870(1.259)	720176	64.23	64.23
$	14	2-Fluorobiphenyl	172.00	15.006(0.914)	1727131	67.26	67.26
$	15	2,4,6-Tribromophenol	329.80	18.071(1.100)	560160	99.20	99.20
$	16	Anthracene-d10	188.00	19.668(1.006)	3408997	95.07	95.07
$	17	Pyrene-d10	212.00	22.540(0.892)	3563308	105.85	105.85
$	18	Terphenyl-d14	Compound Not Detected.				
	42	Naphthalene	128.00	12.806(1.003)	93907	2.44	2.44(a)
	46	2-Methylnaphthalene	Compound Not Detected.				
	50	2-Chloronaphthalene	Compound Not Detected.				
	56	Acenaphthylene	Compound Not Detected.				
	58	Acenaphthene	Compound Not Detected.				
	65	Fluorene	Compound Not Detected.				
	73	Phenanthrene	Compound Not Detected.				
	74	Anthracene	Compound Not Detected.				
	77	Fluoranthene	Compound Not Detected.				
	78	Pyrene	Compound Not Detected.				
	83	Benzo(a)anthracene	Compound Not Detected.				
	84	Chrysene	Compound Not Detected.				
	86	Benzo(b)fluoranthene	Compound Not Detected.				

Data Review: SaH
Date: 11/12/97

Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)
87 Benzo(k)fluoranthene	Compound Not Detected.				
88 Benzo(e)pyrene	Compound Not Detected.				
89 Benzo(a)pyrene	252.00	~~29.415(1.000)~~	~~3419~~	~~0.11~~	~~0.11(aQ)~~
90 Perylene	252.00	~~29.415(1.000)~~	~~3419~~	~~0.10~~	~~0.10(aQ)~~
91 Indeno(1,2,3-cd)pyrene	Compound Not Detected.				
92 Dibenz(a,h)anthracene	Compound Not Detected.				
93 Benzo(g,h,i)perylene	Compound Not Detected.				

> FP 5/97

QC Flag Legend

a - Target compound detected but, quantitated amount Below Limit Of Quantitation(BLOQ).
Q - Qualifier signal failed the ratio test.

TRIANGLE LABORATORIES, INC.

SEMI-VOLATILE QUANTITATION REPORT

Data file : /chem/Y.i/10-22-97.b/CAA/YP773.d
Lab. Id. : 43433
Inj Date : 22-OCT-97 17:30 Autotune Date: 22-Oct-97 09:14:0
Operator : DD Inst ID: Y.i
Smp Info : SBLK 101497
Misc Info :
Comment :
Method : /chem/Y.i/10-22-97.b/tlicaa.m
Meth Date : 23-Oct-1997 08:05 target
Cal Date : 22-OCT-1997 15:55 Cal File: YP771.d
Als bottle: 11
Dil Factor: 1.000 Target Version: Target 2.20
Integrator: HP RTE Compound Sublist: CAA1.sub
Sample Type: mm5

	Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)	
*	1 1,4 Dichlorobenzene-d4	152.00	10.223(1.000)	459693	40.00		
*	2 Naphthalene-d8	136.00	12.764(1.000)	1467052	40.00		
*	3 Acenaphthene-d10	164.00	16.426(1.000)	830491	40.00		
*	4 Phenanthrene-d10	188.00	19.546(1.000)	1360406	40.00		
*	5 Chrysene-d12	240.00	25.280(1.000)	1120374	40.00		
*	6 Perylene-d12	264.00	29.408(1.000)	1424942	40.00		
$	7 2-Fluorophenol	Compound Not Detected.					
$	8 Phenol-d5	99.00	9.450(0.924)	1104585	60.98	60.98	
$	9 2-Chlorophenol-d4	Compound Not Detected.					
$	10 1,2-Dichlorobenzene-d4	Compound Not Detected.					
$	11 Nitrobenzene-d5	82.00	11.301(0.885)	778357	54.66	54.66	
$	12 1,3,5-Trichlorobenzene-d3	185.00	11.983(0.939)	667324	55.85	55.85	
$	13 1,4-Dibromobenzene-d4	240.00	12.870(1.259)	720423	64.85	64.85	
$	14 2-Fluorobiphenyl	172.00	15.006(0.914)	1727131	66.89	66.89	
$	15 2,4,6-Tribromophenol	329.80	18.071(1.100)	560160	111.30	111.30	
$	16 Anthracene-d10	188.00	19.668(1.006)	3408997	89.01	89.01	
$	17 Pyrene-d10	212.00	22.540(0.892)	3563308	94.76	94.76	
$	18 Terphenyl-d14	Compound Not Detected.					
	20 n-Nitrosodimethylamine	74.00	~~4.738(0.463)~~	~~1350~~	~~0.19~~	~~0.19~~	FP Ba11
	21 Cumene	Compound Not Detected.					
	23 Phenol	94.00	~~9.472(0.927)~~	~~4838~~	~~0.30~~	~~0.30~~	FP Ba11
	24 Aniline	Compound Not Detected.					
	27 bis-(2-Chloroethyl)ether	Compound Not Detected.					
	28 Benzyl Chloride	Compound Not Detected.					
	29 1,4-Dichlorobenzene	Compound Not Detected.					
	31 2-Methylphenol	Compound Not Detected.					
	32 3/4-Methylphenol	Compound Not Detected.					
	33 Acetophenone	105.00	10.995(1.076)	44151	2.53	2.53	
	34 n-Nitrosomorpholine	56.00	~~11.265(1.102)~~	~~2523~~	~~0.35~~	~~0.35~~	FP Ba11
	35 o-Toluidine	Compound Not Detected.					
	36 Hexachloroethane	Compound Not Detected.					

Data Review: Ba11
Date: 11/12/97

Compounds	QUANT SIG MASS	RT (REL RT)	RESPONSE	CONCENTRATIONS ON-COLUMN (ng)	FINAL (ug)	
37 Nitrobenzene	Compound Not Detected.					
38 N,N-Dimethylaniline	Compound Not Detected.					
39 1,2-Dibromo-3-chloropropane	Compound Not Detected.					
40 Isophorone	Compound Not Detected.					
41 o-Anisidine	Compound Not Detected.					
42 1,4-Phenylenediamine	Compound Not Detected.					
43 1,2,4-Trichlorobenzene	Compound Not Detected.					
44 Naphthalene	128.00	12.806(1.003)	93907	2.75	2.75	
46 Hexachlorobutadiene	Compound Not Detected.					
47 N,N-Diethylaniline	134.00	12.764(1.249)	~~123155~~	~~5.90~~	~~5.90~~	FP 3a4
48 a,a,a-Trichlorotoluene	Compound Not Detected.					
49 Hydroquinone	110.00	~~13.530(1.060)~~	~~2235~~	~~0.17~~	~~0.17~~	FP 3a4
51 2-Chloroacetophenone	105.00	13.863(1.086)	103008	3.83	3.83	
52 Hexachlorocyclopentadiene	Compound Not Detected.					
53 2,4,6-Trichlorophenol	Compound Not Detected.					
54 2,4,5-Trichlorophenol	Compound Not Detected.					
60 Biphenyl	154.00	~~15.006(0.914)~~	~~2301~~	~~0.08~~	~~0.08~~	FP 3a4
61 Dimethylphthalate	Compound Not Detected.					
62 2,4-Dinitrophenol	Compound Not Detected.					
63 4-Nitrophenol	Compound Not Detected.					
64 2,4-Dinitrotoluene	165.00	~~16.418(1.000)~~	~~110325~~	~~16.55~~	~~16.55~~	FP 3a4
65 Dibenzofuran	Compound Not Detected.					
66 Di-n-butylphthalate	149.00	20.781(1.063)	83913	1.60	1.60	
67 4,6-Dinitro-2-methylphenol	Compound Not Detected.					
68 Trifluralin	Compound Not Detected.					
69 Hexachlorobenzene	Compound Not Detected.					
70 4-Aminobiphenyl	Compound Not Detected.					
71 Pentachlorophenol	Compound Not Detected.					
72 Pentachloronitrobenzene	Compound Not Detected.					
73 4-Nitrobiphenyl	Compound Not Detected.					
74 Benzidine	184.00	~~23.540(0.892)~~	~~33199~~	~~1.56~~	~~1.56~~	FP 3a4
75 4,4'-Methylenedianiline	Compound Not Detected.					
77 Dimethylaminoazobenzene	Compound Not Detected.					
78 3,3'-Dimethylbenzidine	Compound Not Detected.					
80 3,3'-Dimethoxybenzidine	Compound Not Detected.					
81 3,3'-Dichlorobenzidine	Compound Not Detected.					
82 Methylene bis-chloroaniline	Compound Not Detected.					
83 bis(2-Ethylhexyl)phthalate	149.00	25.352(1.003)	15147	0.57	0.57	

Data File: /chem/Y.i/10-22-97.b/YP773.d

Date : 22-OCT-97 17:30

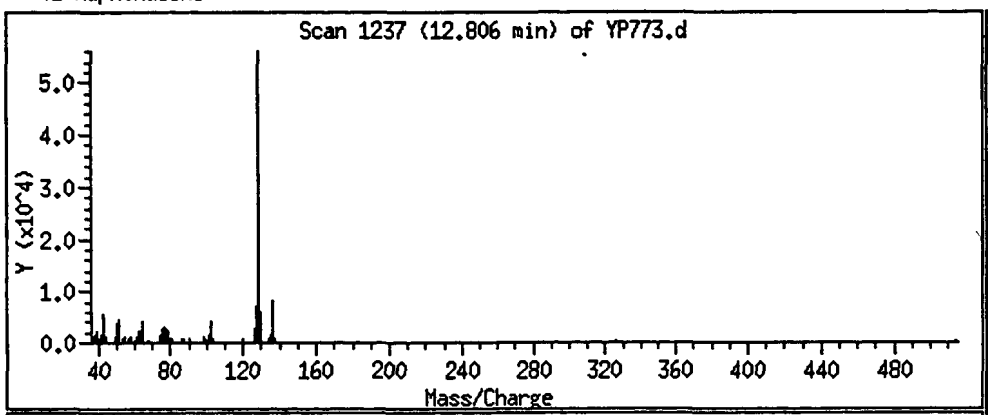
Instrument : Y.i

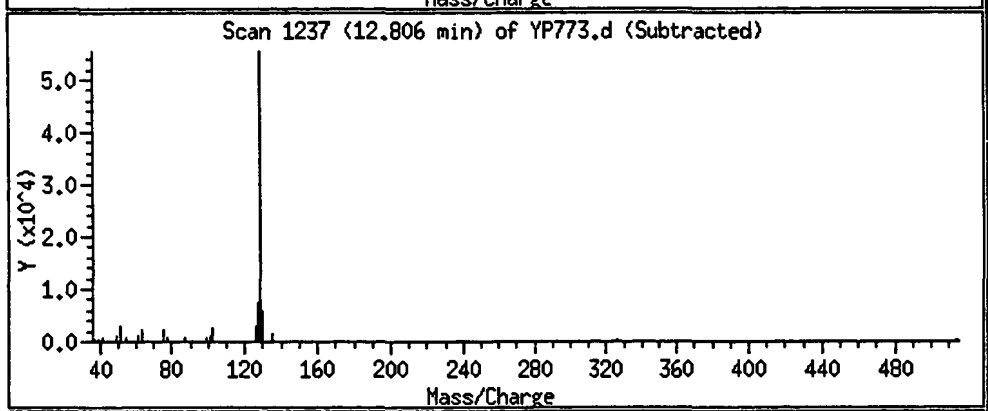
Sample ID : SBLK 101497

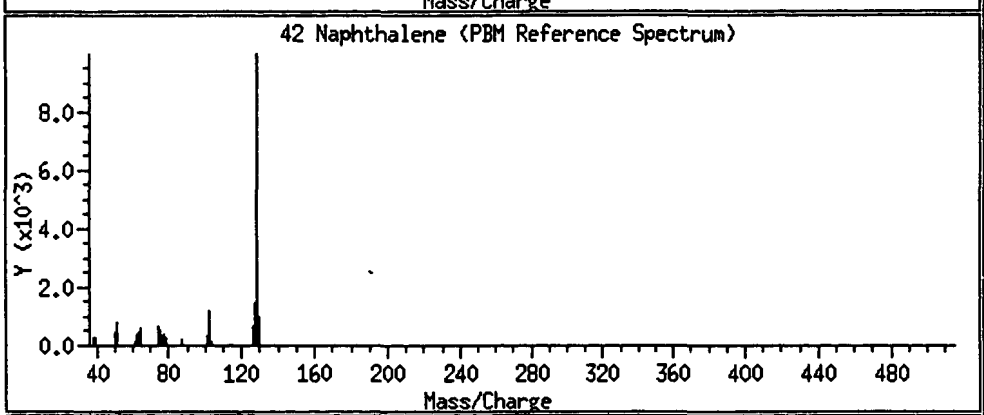
Column phase : DB-5 Column diameter : 0.32

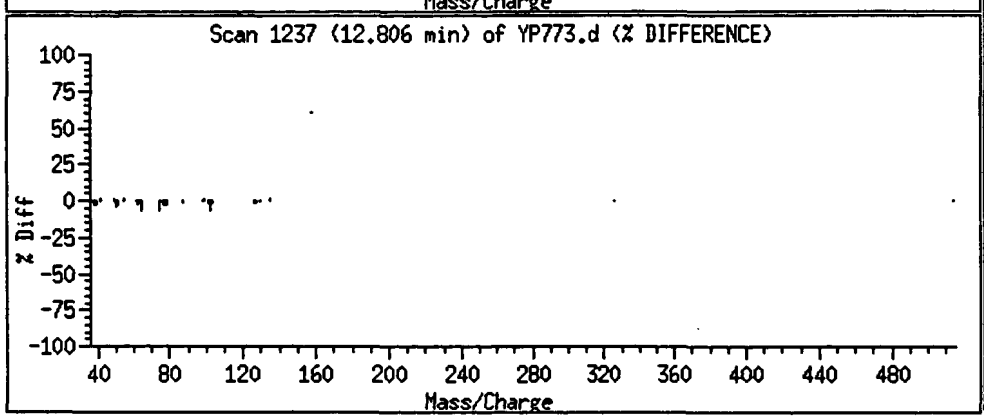
Volume Injected (uL) : 1.0

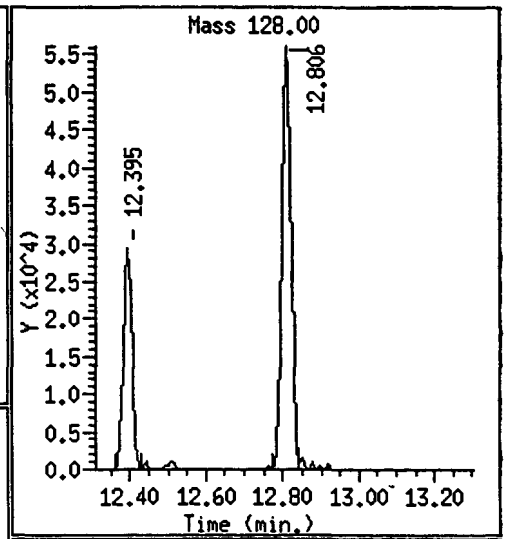
42 Naphthalene

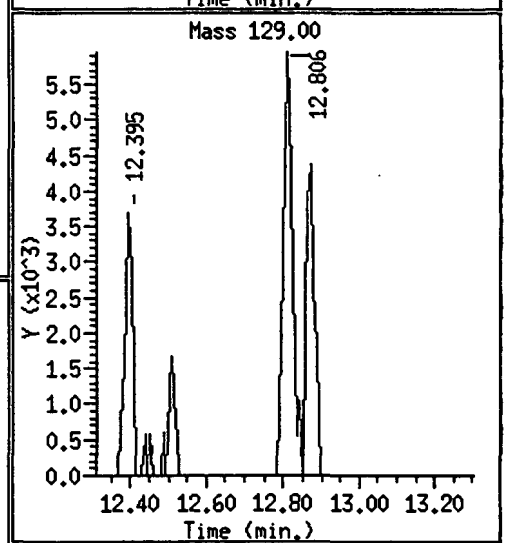


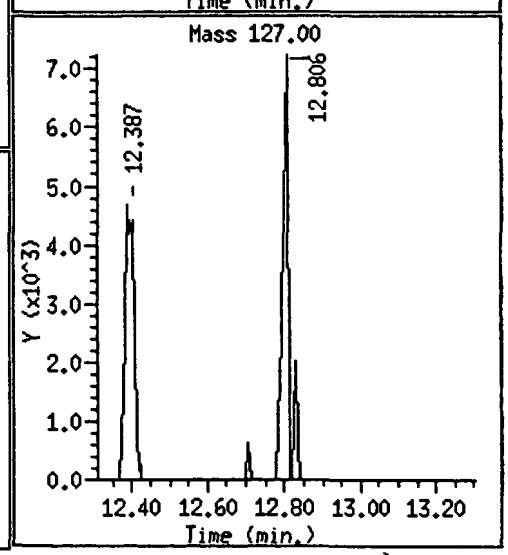












Data File: /chem/Y.i/10-22-97.b/CAA/YP773.d

Date : 22-OCT-1997 17:30

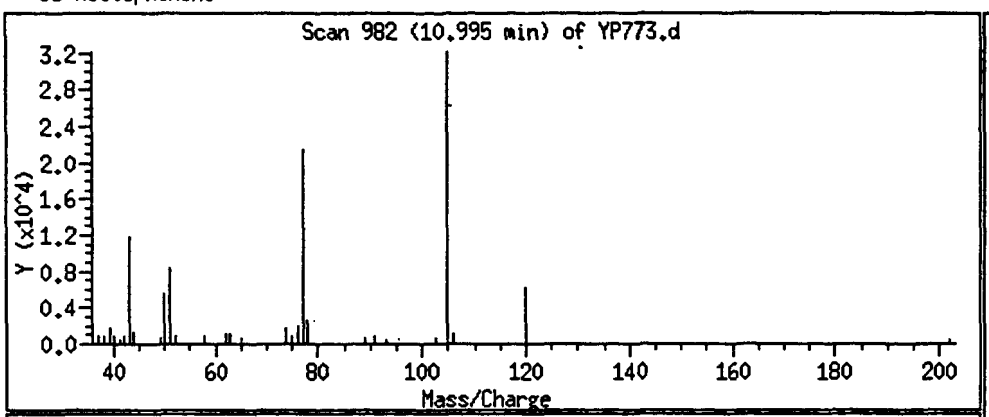
Instrument : Y.i

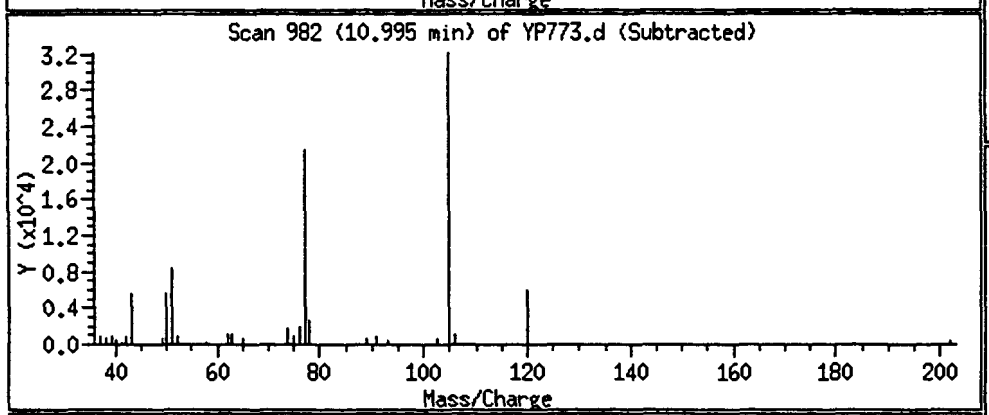
Sample ID : SBLK 101497

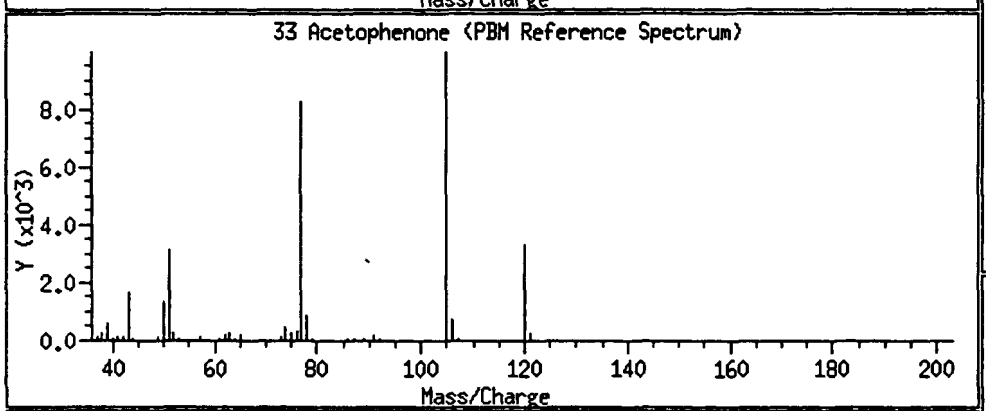
Column phase : DB.5-625 Column diameter : 0.32

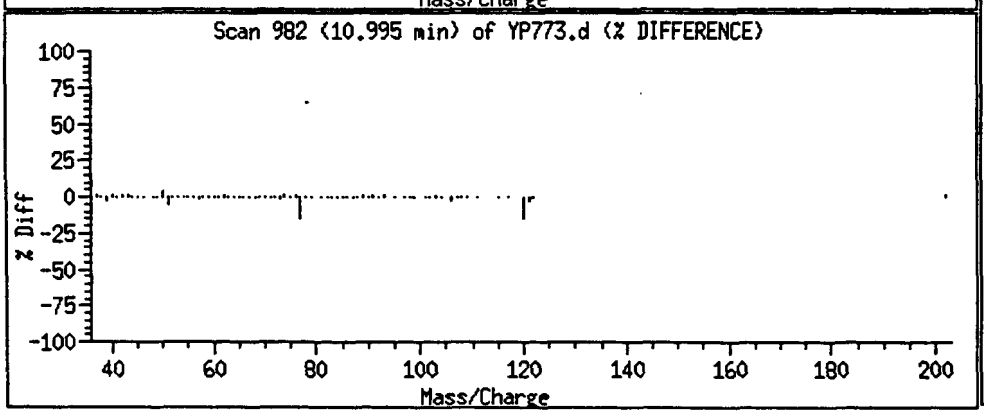
Volume Injected (uL) : 1.0

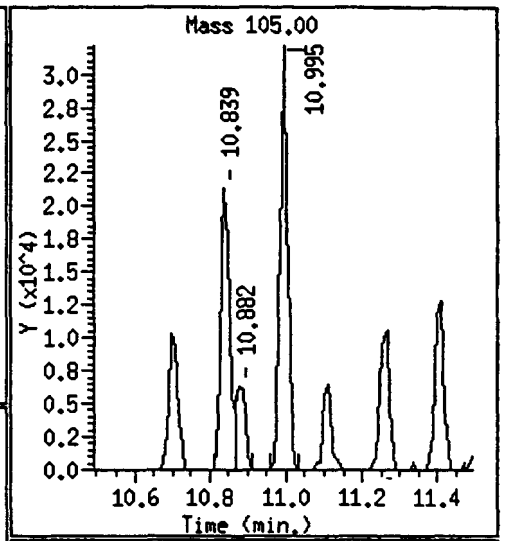
33 Acetophenone

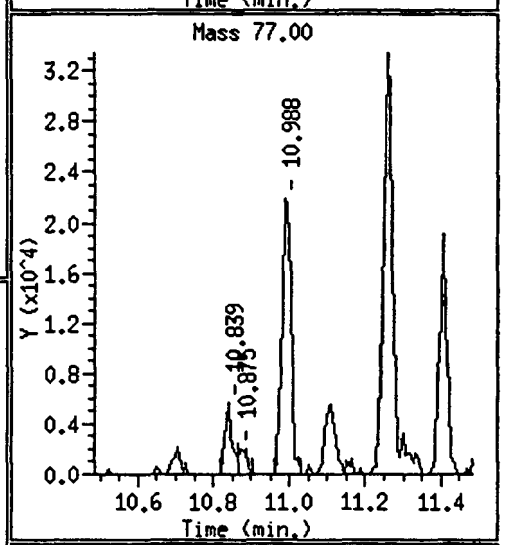


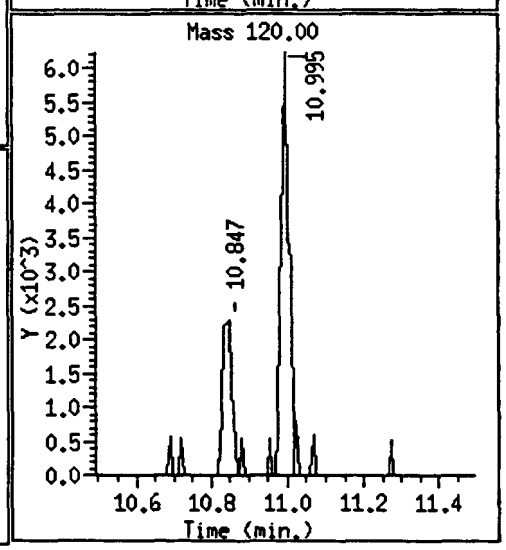












Data File: /chem/Y.i/10-22-97.b/CAA/YP773.d

Date : 22-OCT-1997 17:30

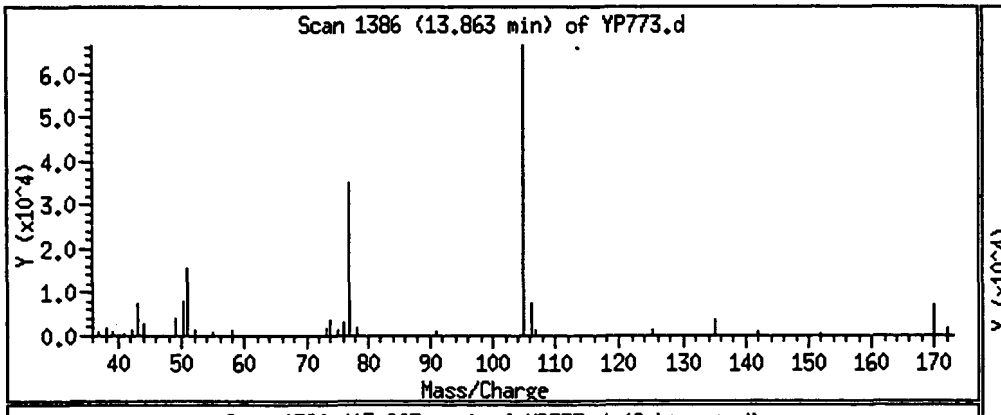
Instrument : Y.i

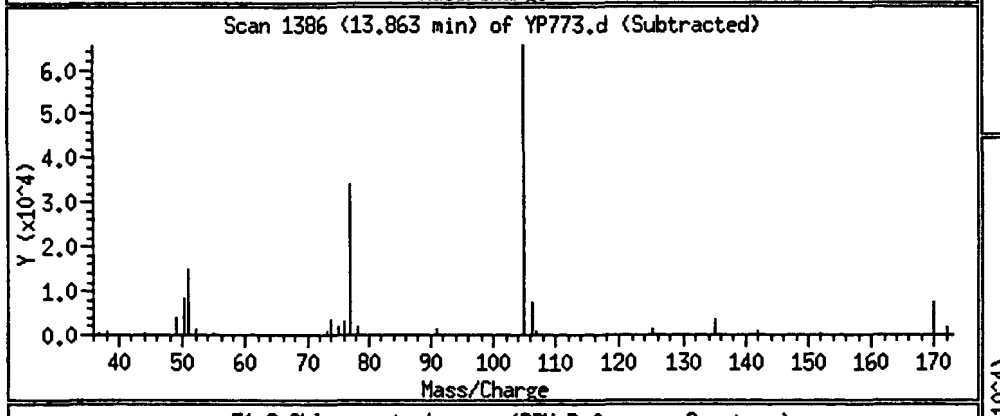
Sample ID : SBLK 101497

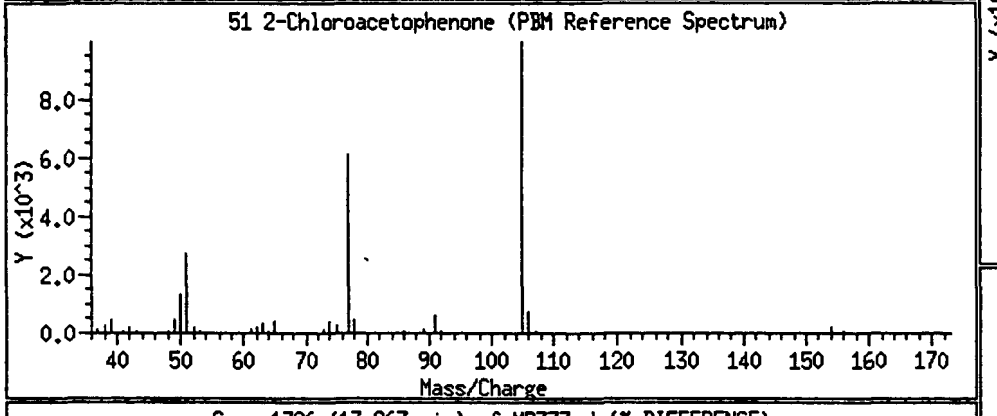
Column phase : DB.5-625 Column diameter : 0.32

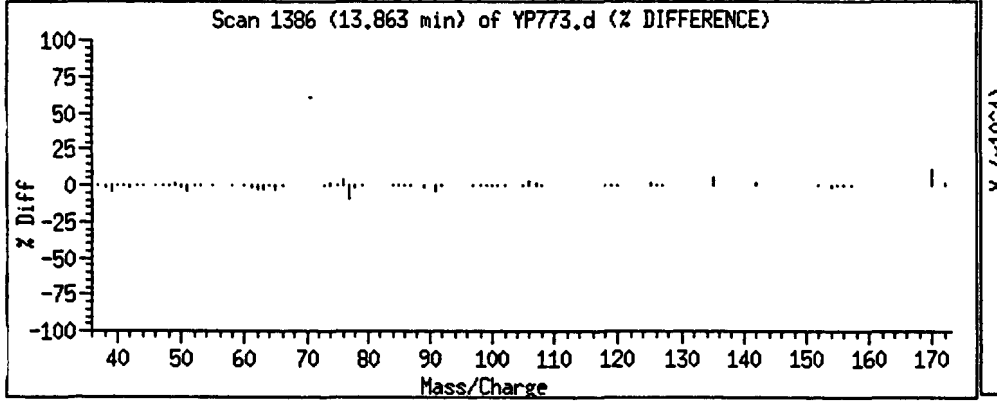
Volume Injected (uL) : 1.0

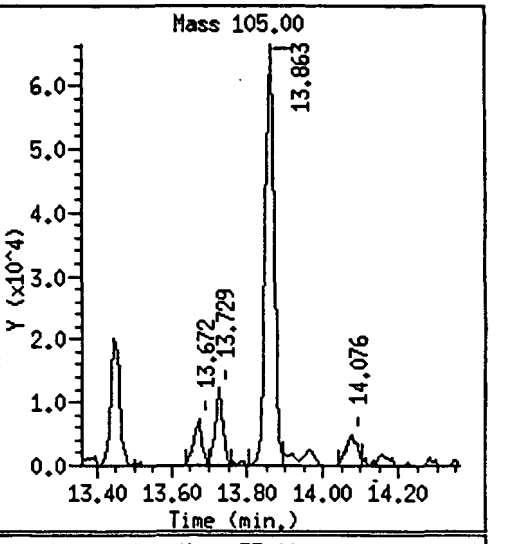
51 2-Chloroacetophenone

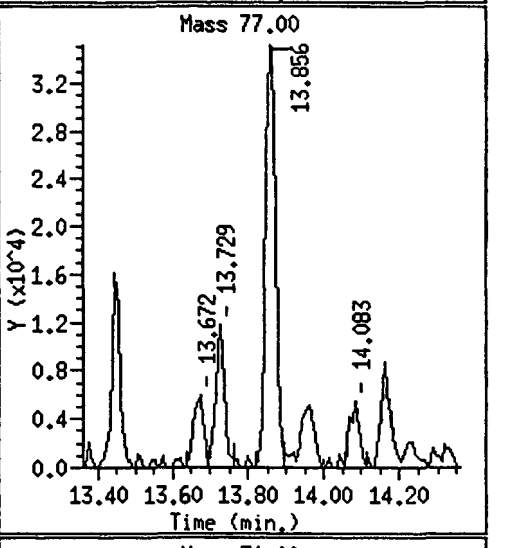


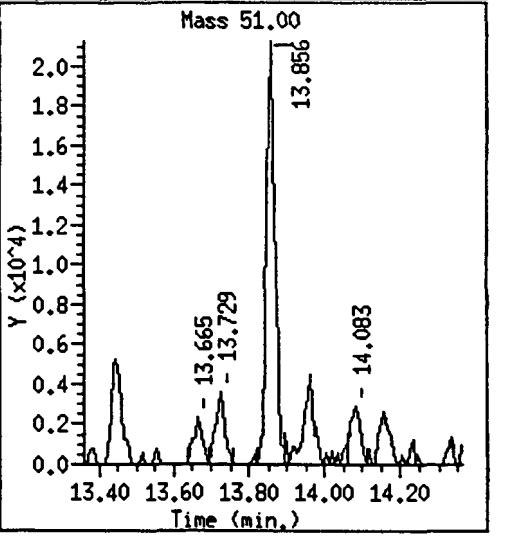












Data File: /chem/Y.i/10-22-97.b/CAA/YP773.d

Date : 22-OCT-1997 17:30

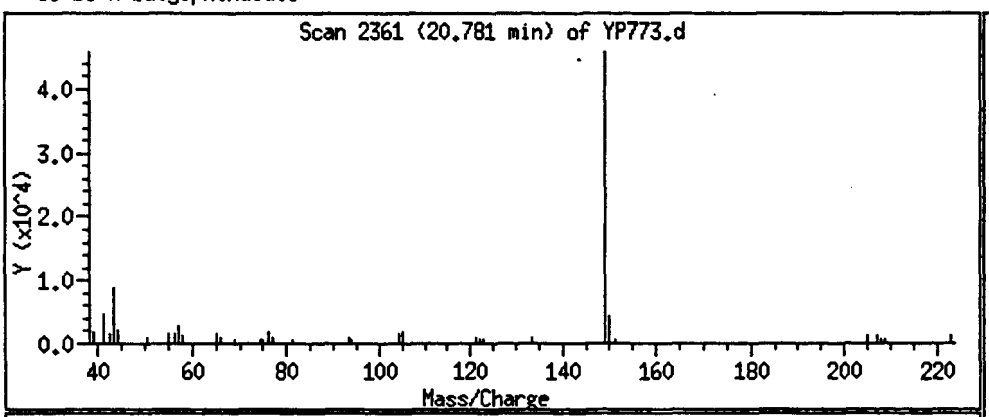
Instrument : Y.i

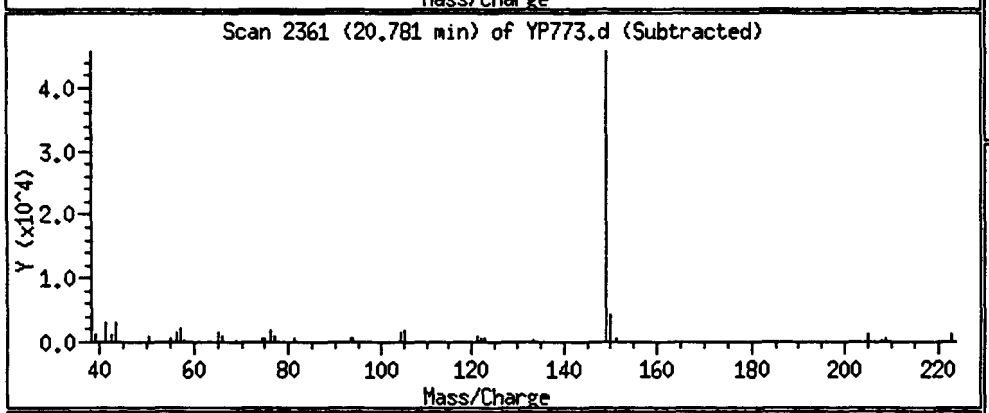
Sample ID : SBLK 101497

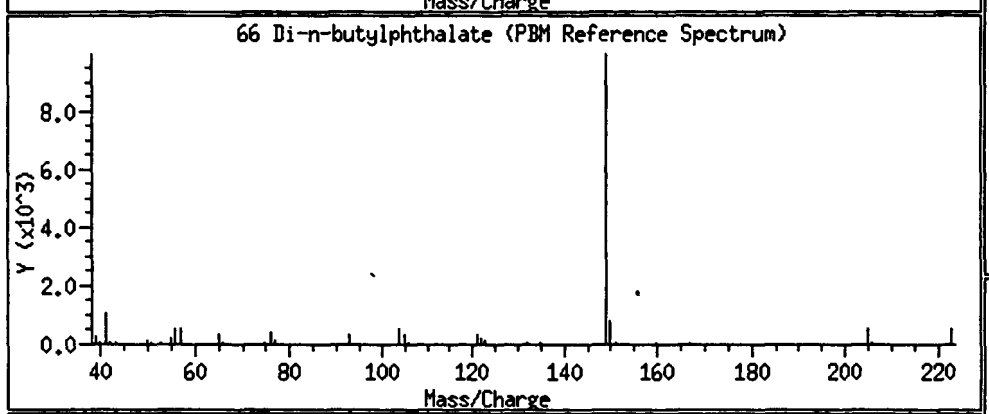
Column phase : DB.5-625 Column diameter : 0.32

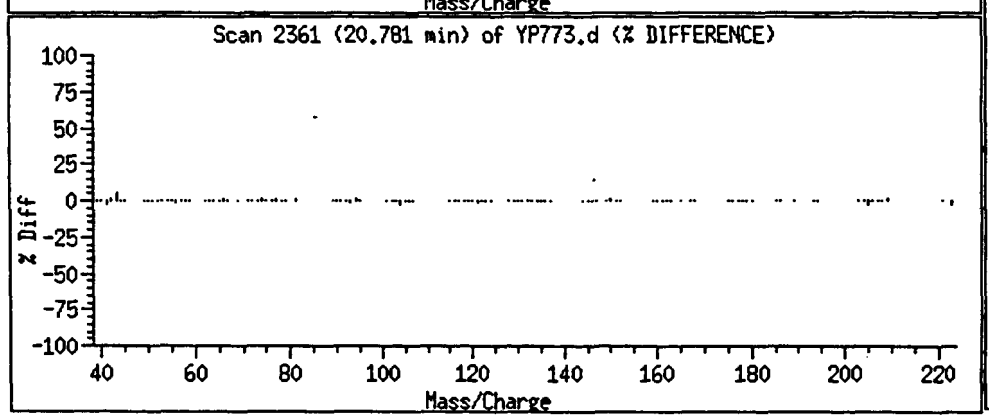
Volume Injected (uL) : 1.0

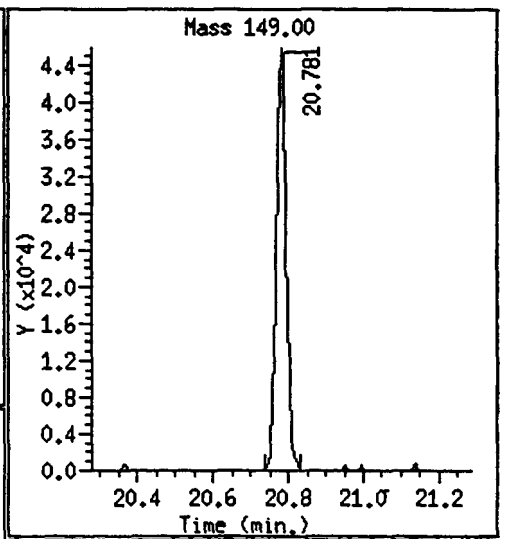
66 Di-n-butylphthalate

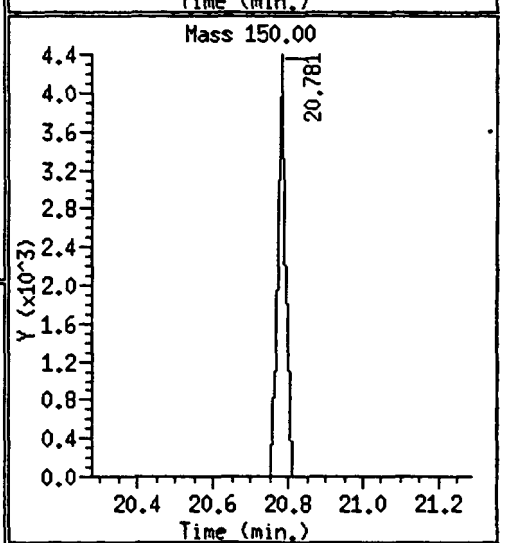


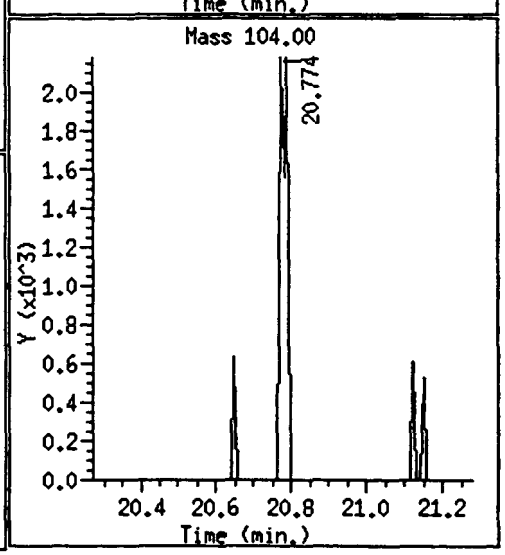












Data File: /chem/Y.i/10-22-97.b/CAA/YP773.d

Date : 22-OCT-1997 17:30

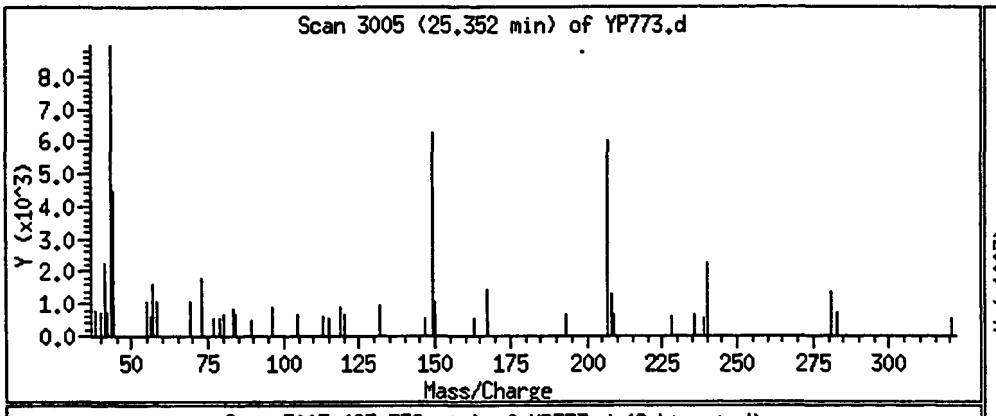
Instrument : Y.i

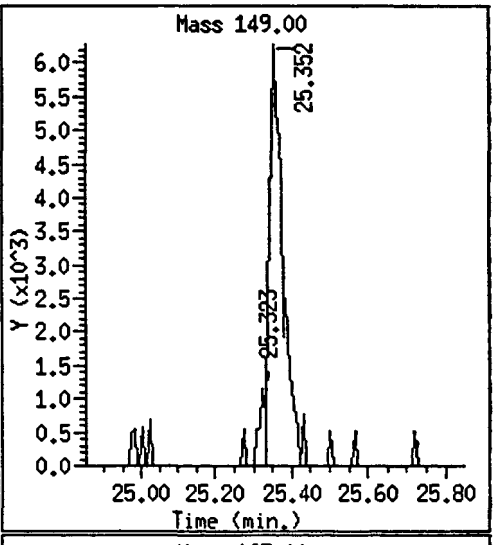
Sample ID : SBLK 101497

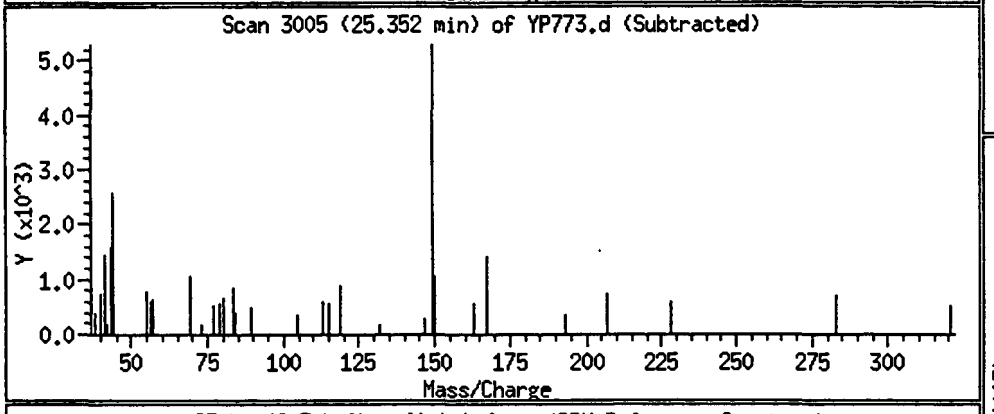
Column phase : DB.5-625 Column diameter : 0.32

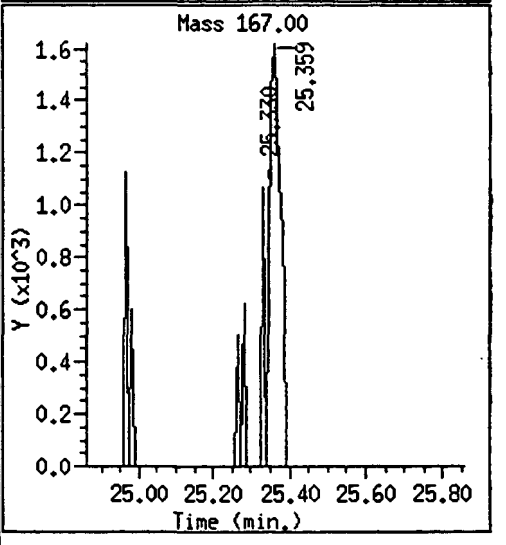
Volume Injected (uL) : 1.0

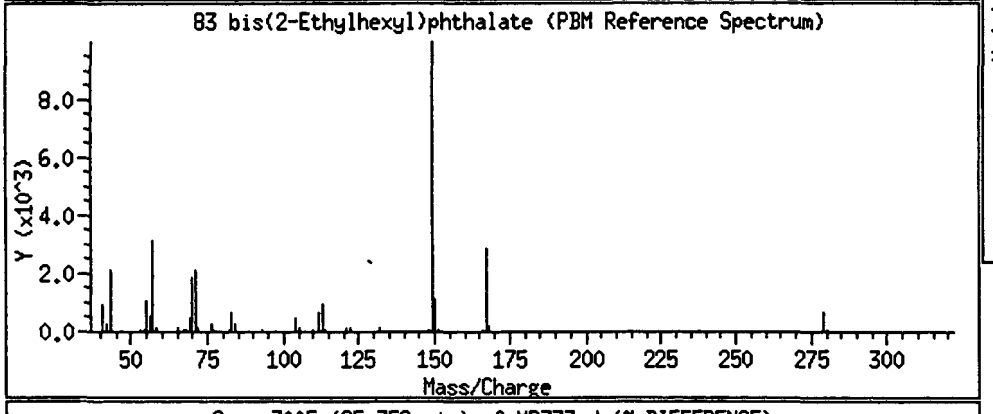
83 bis(2-Ethylhexyl)phthalate

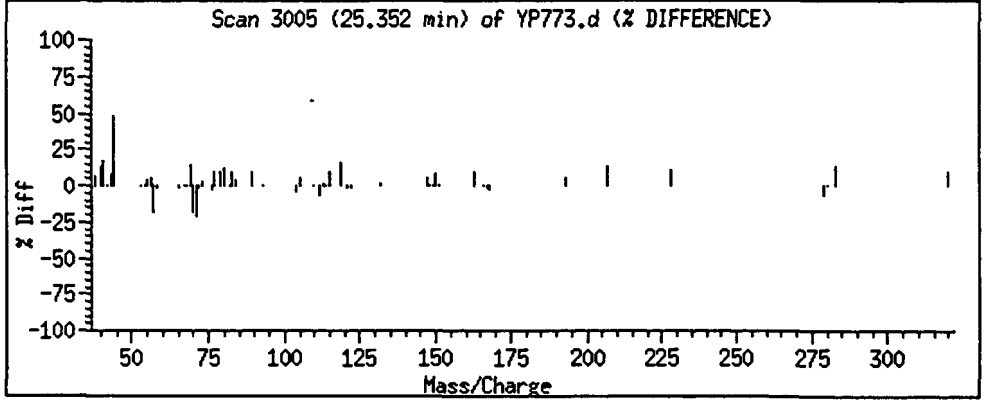












Triangle Laboratories of RTP, Inc.
Continuing Calibration Curve

CCAL File: YP766	Date of Analysis :10/22/97	Analyte List: 8270A
ICAL File: ICALYO22		

Analyte	Flag	RF50	RFMEAN	%D
Naphthalene-d8	I			
Naphthalene		1.050	1.031	-1.8
2-Methylnaphthalene		0.638	0.675	5.5
Acenaphthene-d10	I			
2-Chloronaphthalene		1.105	1.098	-0.6
Acenaphthylene		1.777	1.799	1.2
Acenaphthene	C	1.063	1.054	-0.9
Fluorene		1.082	1.079	-0.3
Phenanthrene-d10	I			
Phenanthrene		1.021	1.033	1.2
Anthracene		0.967	0.990	2.3
Fluoranthene	C	1.030	1.064	3.2
Chrysene-d12	I			
Pyrene		1.293	1.278	-1.2
Benzo(a)anthracene		1.106	1.098	-0.7
Chrysene		1.086	1.080	-0.6
Perylene-d12	I			
Benzo(b)fluoranthene		0.932	1.003	7.1
Benzo(k)fluoranthene		0.977	1.002	2.5
Benzo(e)pyrene		1.013	1.048	3.3
Benzo(a)pyrene	C	0.909	0.946	3.9
Perylene		0.989	1.004	1.5
Indeno(1,2,3-cd)pyrene		1.038	1.075	3.4
Dibenz(a,h)anthracene		0.787	0.823	4.4
Benzo(g,h,i)perylene		0.963	0.974	1.1

Surrogate	Flag	RF50	RFMEAN	%D
Phenol-d5	S	1.696	1.664	-1.9
Nitrobenzene-d5	S	0.379	0.386	1.8
1,3,5-Trichlorobenzene-d3	S	0.341	0.348	2.0
1,4-Dibromobenzene-d4	S	0.976	0.943	-3.5
2-Fluorobiphenyl	S	1.237	1.230	-0.6
2,4,6-Tribromophenol	S	0.272	0.276	1.4
Anthracene-d10	S	1.054	1.063	0.8
Pyrene-d10	S	1.202	1.214	1.0
Terphenyl-d14	S	0.778	0.782	0.5

Approved by: Sa# Date 11/13/97

*- Fails QC Criteria for %D; << - Rf less than minimum QC RF; >>- RF greater than maximum QC RF

Triangle Laboratories of RTP, Inc.
Continuing Calibration Curve

CCAL File: YP783 Date of Analysis :10/23/97 Analyte List: 8270A
ICAL File: ICALYO22

Analyte	Flag	RF50	RFMEAN	%D
Naphthalene-d8	I			
Naphthalene		1.012	1.031	1.8
2-Methylnaphthalene		0.663	0.675	1.8
Acenaphthene-d10	I			
2-Chloronaphthalene		1.088	1.098	0.9
Acenaphthylene		1.784	1.799	0.8
Acenaphthene	C	1.051	1.054	0.3
Fluorene		1.163	1.079	-7.8
Phenanthrene-d10	I			
Phenanthrene		1.022	1.033	1.1
Anthracene		0.969	0.990	2.1
Fluoranthene	C	1.051	1.064	1.2
Chrysene-d12	I			
Pyrene		1.313	1.278	-2.7
Benzo(a)anthracene		1.094	1.098	0.4
Chrysene		1.062	1.080	1.7
Perylene-d12	I			
Benzo(b)fluoranthene		0.983	1.003	2.0
Benzo(k)fluoranthene		0.962	1.002	4.0
Benzo(e)pyrene		1.049	1.048	-0.1
Benzo(a)pyrene	C	0.922	0.946	2.5
Perylene		0.979	1.004	2.5
Indeno(1,2,3-cd)pyrene		1.078	1.075	-0.3
Dibenz(a,h)anthracene		0.810	0.823	1.6
Benzo(g,h,i)perylene		0.979	0.974	-0.5

Surrogate	Flag	RF50	RFMEAN	%D
Phenol-d5	S	1.681	1.664	-1.0
Nitrobenzene-d5	S	0.377	0.386	2.3
1,3,5-Trichlorobenzene-d3	S	0.332	0.348	4.6
1,4-Dibromobenzene-d4	S	0.930	0.943	1.4
2-Fluorobiphenyl	S	1.242	1.230	-1.0
2,4,6-Tribromophenol	S	0.298	0.276	-8.0
Anthracene-d10	S	1.073	1.063	-0.9
Pyrene-d10	S	1.176	1.214	3.1
Terphenyl-d14	S	0.817	0.782	-4.5

Approved by: SAH Date 11/13/97

*- Fails QC Criteria for %D; << - Rf less than minimum QC RF; >>- RF greater than maximum QC RF

Triangle Laboratories of RTP, Inc.
Initial Calibration Curve

ICAL File: ICALYO22	Date of Analysis :10/22/97	Analyte List: 8270A
RF20 YP767	RF50 YP766	RF80 YP765
RF120 YP764	RF160 YP763	

Analyte	Flag	RF20	RF50	RF80	RF120	RF160	MEAN	%RSD
Naphthalene-d8	I							
Naphthalene		1.076	1.050	1.019	0.946	1.063	1.031	5.1
2-Methylnaphthalene		0.683	0.638	0.671	0.682	0.699	0.675	3.4
Acenaphthene-d10	I							
2-Chloronaphthalene		1.201	1.105	1.034	1.091	1.057	1.098	5.8
Acenaphthylene		1.781	1.777	1.742	1.911	1.785	1.799	3.6
Acenaphthene	C	1.093	1.063	1.019	1.041	1.053	1.054	2.6
Fluorene		1.094	1.082	1.028	1.122	1.071	1.079	3.2
Phenanthrene-d10	I							
Phenanthrene		1.025	1.021	1.022	1.079	1.019	1.033	2.5
Anthracene		1.013	0.967	0.996	0.985	0.988	0.990	1.7
Fluoranthene	C	1.038	1.030	1.036	1.118	1.096	1.064	3.8
Chrysene-d12	I							
Pyrene		1.308	1.293	1.317	1.210	1.264	1.278	3.4
Benzo(a)anthracene		1.149	1.106	1.093	1.024	1.119	1.098	4.2
Chrysene		1.136	1.086	1.100	1.040	1.036	1.080	3.9
Perylene-d12	I							
Benzo(b)fluoranthene		1.044	0.932	1.005	1.000	1.035	1.003	4.4
Benzo(k)fluoranthene		1.048	0.977	0.998	0.938	1.048	1.002	4.7
Benzo(e)pyrene		1.117	1.013	1.020	1.015	1.077	1.048	4.5
Benzo(a)pyrene	C	0.985	0.909	0.943	0.917	0.977	0.946	3.6
Perylene		1.041	0.989	0.996	0.956	1.038	1.004	3.6
Indeno(1,2,3-cd)pyrene		1.076	1.038	1.059	1.081	1.120	1.075	2.8
Dibenz(a,h)anthracene		0.836	0.787	0.804	0.827	0.858	0.823	3.4
Benzo(g,h,i)perylene		1.003	0.963	0.963	0.959	0.982	0.974	1.9

Surrogate	Flag	RF20	RF50	RF80	RF120	RF160	Mean	%RSD
Phenol-d5	S	1.646	1.696	1.692	1.622	1.666	1.664	1.9
Nitrobenzene-d5	S	0.372	0.379	0.374	0.387	0.418	0.386	4.8
1,3,5-Trichlorobenzene-d3	S	0.379	0.341	0.333	0.325	0.360	0.348	6.3
1,4-Dibromobenzene-d4	S	0.958	0.976	0.954	0.885	0.941	0.943	3.7
2-Fluorobiphenyl	S	1.282	1.237	1.192	1.240	1.201	1.230	2.9
2,4,6-Tribromophenol	S	0.265	0.272	0.273	0.291	0.280	0.276	3.6
Anthracene-d10	S	1.089	1.054	1.025	1.116	1.031	1.063	3.7
Pyrene-d10	S	1.278	1.202	1.224	1.171	1.197	1.214	3.3
Terphenyl-d14	S	0.804	0.778	0.795	0.754	0.779	0.782	2.5

Approved by: Sa H Date 11 / 13 / 97

***- Fails QC Criteria for %RSD; <<- Rf less than minimum QC RF; >>- RF greater than maximum QC RF**

Triangle Laboratories of RTP, Inc.
Continuing Calibration Curve

CCAL File: YP771 Date of Analysis :10/22/97 Analyte List: 8270A
CAL File: ICALYO22

Analyte	Flag	RF50	RFMEAN	%D
,4 Dichlorobenzene-d4	I			
n-Nitrosodimethylamine		0.616	0.600	-2.7
Cumene		2.248	2.203	-2.0
'henol	C	1.390	1.330	-4.5
.niline		1.695	1.676	-1.1
bis-(2-Chloroethyl)ether		0.802	0.797	-0.6
3enzyl Chloride		2.226	2.193	-1.5
',4-Dichlorobenzene	C	1.384	1.325	-4.5
2-Methylphenol		1.076	1.029	-4.6
\cetophenone		1.517	1.442	-5.2
ı-Nitrosomorpholine		0.618	0.597	-3.5
o-Toluidine		1.709	1.651	-3.5
Hexachloroethane		0.655	0.629	-4.1
ι,2-Dibromo-3-chloropropane		0.622	0.610	-2.0
N,N-Diethylaniline		1.816	1.707	-6.4
Naphthalene-d8	I			
3/4-Methylphenol		0.306	0.312	1.9
Nitrobenzene		0.488	0.477	-2.3
N,N-Dimethylaniline		0.482	0.474	-1.7
Isophorone		0.582	0.576	-1.0
›-Anisidine		0.267	0.260	-2.7
ı,4-Phenylenediamine		0.368	0.357	-3.1
1,2,4-Trichlorobenzene		0.318	0.318	0.0
Hexachlorobutadiene	C	0.186	0.183	-1.6
ı,a,a-Trichlorotoluene		0.391	0.386	-1.3
Hydroquinone		0.356	0.357	0.3
?-Chloroacetophenone		0.733	0.719	-1.9
\cenaphthene-d10	I			
Hexachlorocyclopentadiene	P	0.330	0.336	1.8
2,4,6-Trichlorophenol	C	0.363	0.351	-3.4
',4,5-Trichlorophenol		0.418	0.396	-5.6
3iphenyl		1.337	1.296	-3.2
Dimethylphthalate		1.149	1.090	-5.4
',4-Dinitrophenol	P	0.094	0.121	22.3
l-Nitrophenol	P	0.246	0.260	5.4
2,4-Dinitrotoluene		0.321	0.325	1.2
Dibenzofuran		1.486	1.495	0.6
',6-Dinitro-2-methylphenol		0.145	0.175	17.1

*- Fails QC Criteria for %D; << - Rf less than minimum QC RF; >>- RF greater than maximum QC RF

Triangle Laboratories of RTP, Inc.
Continuing Calibration Curve

CCAL File: YP771	Date of Analysis :10/22/97	Analyte List: 8270A
ICAL File: ICALYO22		

Analyte	Flag	RF50	RFMEAN	%D
Trifluralin		0.199	0.211	5.7
Phenanthrene-d10	I			
Di-n-butylphthalate		1.537	1.432	-7.3
Hexachlorobenzene		0.337	0.299	-12.7
4-Aminobiphenyl		0.791	0.736	-7.5
Pentachlorophenol	C	0.177	0.178	0.6
Pentachloronitrobenzene		0.084	0.079	-6.3
4-Nitrobiphenyl		0.310	0.281	-10.3
Chrysene-d12	I			
Benzidine		0.758	0.766	1.0
4,4'-Methylenedianiline		0.323	0.321	-0.6
Dimethylaminoazobenzene		0.375	0.370	-1.4
3,3'-Dimethylbenzidine		0.605	0.568	-6.5
3,3'-Dimethoxybenzidine		0.293	0.282	-3.9
3,3'-Dichlorobenzidine		0.444	0.434	-2.3
Methylene bis-chloroaniline		0.197	0.185	-6.5
bis(2-Ethylhexyl)phthalate		0.944	0.946	0.2

Approved by: _____ Date 11/13/97

*- Fails QC Criteria for %D; << - Rf less than minimum QC RF; >>- RF greater than maximum QC RF

Triangle Laboratories of RTP, Inc.
Continuing Calibration Curve

CCAL File: YP784 Date of Analysis :10/23/97 Analyte List: 8270A
ICAL File: ICALYO22

Analyte	Flag	RF50	RFMEAN	%D
1,4 Dichlorobenzene-d4	I			
n-Nitrosodimethylamine		0.584	0.600	2.7
Cumene		2.289	2.203	-3.9
Phenol	C	1.309	1.330	1.6
Aniline		1.742	1.676	-3.9
bis-(2-Chloroethyl)ether		0.814	0.797	-2.1
Benzyl Chloride		2.230	2.193	-1.7
1,4-Dichlorobenzene	C	1.337	1.325	-0.9
2-Methylphenol		1.021	1.029	0.8
Acetophenone		1.480	1.442	-2.6
n-Nitrosomorpholine		0.605	0.597	-1.3
o-Toluidine		1.665	1.651	-0.8
Hexachloroethane		0.637	0.629	-1.3
1,2-Dibromo-3-chloropropane		0.613	0.610	-0.5
N,N-Diethylaniline		1.702	1.707	0.3
Naphthalene-d8	I			
3/4-Methylphenol		0.356	0.312	-14.1
Nitrobenzene		0.518	0.477	-8.6
N,N-Dimethylaniline		0.538	0.474	-13.5
Isophorone		0.616	0.576	-6.9
o-Anisidine		0.294	0.260	-13.1
1,4-Phenylenediamine		0.372	0.357	-4.2
1,2,4-Trichlorobenzene		0.325	0.318	-2.2
Hexachlorobutadiene	C	0.199	0.183	-8.7
a,a,a-Trichlorotoluene		0.421	0.386	-9.1
Hydroquinone		0.353	0.357	1.1
2-Chloroacetophenone		0.766	0.719	-6.5
Acenaphthene-d10	I			
Hexachlorocyclopentadiene	P	0.308	0.336	8.3
2,4,6-Trichlorophenol	C	0.360	0.351	-2.6
2,4,5-Trichlorophenol		0.384	0.396	3.0
Biphenyl		1.364	1.296	-5.2
Dimethylphthalate		1.121	1.090	-2.8
2,4-Dinitrophenol	P	0.124	0.121	-2.5
4-Nitrophenol	P	0.271	0.260	-4.2
2,4-Dinitrotoluene		0.329	0.325	-1.2
Dibenzofuran		1.400	1.495	6.4
4,6-Dinitro-2-methylphenol		0.166	0.175	5.1

*- Fails QC Criteria for %D; << - Rf less than minimum QC RF; >>- RF greater than maximum QC RF

Triangle Laboratories of RTP, Inc.
Continuing Calibration Curve

CCAL File: YP784	Date of Analysis :10/23/97	Analyte List: 8270A
ICAL File: ICALYO22		

Analyte	Flag	RF50	RFMEAN	%D
Trifluralin		0.222	0.211	-5.2
Phenanthrene-d10	I			
Di-n-butylphthalate		1.416	1.432	1.1
Hexachlorobenzene		0.307	0.299	-2.7
4-Aminobiphenyl		0.735	0.736	0.1
Pentachlorophenol	C	0.173	0.178	2.8
Pentachloronitrobenzene		0.079	0.079	0.0
4-Nitrobiphenyl		0.286	0.281	-1.8
Chrysene-d12	I			
Benzidine		0.792	0.766	-3.4
4,4'-Methylenedianiline		0.325	0.321	-1.2
Dimethylaminoazobenzene		0.366	0.370	1.1
3,3'-Dimethylbenzidine		0.643	0.568	-13.2
3,3'-Dimethoxybenzidine		0.320	0.282	-13.5
3,3'-Dichlorobenzidine		0.432	0.434	0.5
Methylene bis-chloroaniline		0.187	0.185	-1.1
bis(2-Ethylhexyl)phthalate		0.955	0.946	-1.0

Approved by: SAH Date 11/13/97

*- Fails QC Criteria for %D; << - Rf less than minimum QC RF; >>- RF greater than maximum QC RF

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Savar v3.5

Triangle Laboratories of RTP, Inc.
Initial Calibration Curve

ICAL File: ICALYO22	Date of Analysis :10/22/97	Analyte List: 8270A
F20 YP772	RF50 YP771	RF80 YP770
RF120 YP769	RF160 YP768	

Analyte	Flag	RF20	RF50	RF80	RF120	RF160	MEAN	%RSD
,4 Dichlorobenzene-d4	I							
n-Nitrosodimethylamine		0.550	0.616	0.593	0.620	0.621	0.600	5.1
Cumene		2.256	2.248	2.078	2.195	2.238	2.203	3.3
henol	C	1.287	1.390	1.278	1.366	1.329	1.330	3.7
niline		1.645	1.695	1.642	1.714	1.686	1.676	1.9
bis-(2-Chloroethyl)ether		0.821	0.802	0.758	0.772	0.832	0.797	3.9
enzyl Chloride		2.203	2.226	2.159	2.139	2.237	2.193	1.9
,4-Dichlorobenzene	C	1.383	1.384	1.292	1.274	1.294	1.325	4.0
2-Methylphenol		0.963	1.076	1.005	1.062	1.040	1.029	4.4
cetophenone		1.499	1.517	1.389	1.454	1.352	1.442	4.9
-Nitrosomorpholine		0.610	0.618	0.579	0.601	0.579	0.597	3.0
o-Toluidine		1.668	1.709	1.597	1.712	1.569	1.651	4.0
Hexachloroethane		0.629	0.655	0.615	0.621	0.623	0.629	2.5
,2-Dibromo-3-chloropropane		0.619	0.622	0.599	0.609	0.599	0.610	1.8
J,N-Diethylaniline		1.703	1.816	1.615	1.701	1.700	1.707	4.2
Naphthalene-d8	I							
/4-Methylphenol		0.317	0.306	0.317	0.295	0.325	0.312	3.8
litrobenzene		0.480	0.488	0.479	0.469	0.471	0.477	1.6
N,N-Dimethylaniline		0.480	0.482	0.468	0.473	0.468	0.474	1.4
ophorone		0.559	0.582	0.574	0.565	0.601	0.576	2.8
-Anisidine		0.269	0.267	0.247	0.257	0.260	0.260	3.4
,4-Phenylenediamine		0.358	0.368	0.355	0.348	0.354	0.357	2.1
1,2,4-Trichlorobenzene		0.338	0.318	0.315	0.306	0.313	0.318	3.8
lexachlorobutadiene	C	0.188	0.186	0.181	0.178	0.182	0.183	2.2
,a,a-Trichlorotoluene		0.375	0.391	0.390	0.369	0.404	0.386	3.6
Hydroquinone		0.363	0.356	0.358	0.341	0.368	0.357	2.9
-Chloroacetophenone		0.713	0.733	0.676	0.696	0.779	0.719	5.5
cenaphthene-d10	I							
Hexachlorocyclopentadiene	P	0.292	0.330	0.344	0.363	0.353	0.336	8.2
,4,6-Trichlorophenol	C	0.326	0.363	0.334	0.364	0.371	0.351	5.7
,4,5-Trichlorophenol		0.365	0.418	0.378	0.409	0.409	0.396	5.7
biphenyl		1.278	1.337	1.215	1.341	1.311	1.296	4.0
Dimethylphthalate		1.059	1.149	1.037	1.116	1.088	1.090	4.1
,4-Dinitrophenol	P		0.094	0.105	0.130	0.155	0.121	22.5
-Nitrophenol	P		0.246	0.240	0.263	0.291	0.260	8.8
2,4-Dinitrotoluene		0.281	0.321	0.317	0.341	0.363	0.325	9.4
ibenzofuran		1.508	1.486	1.483	1.478	1.522	1.495	1.2
6-Dinitro-2-methylphenol			0.145	0.159	0.186	0.207	0.175	15.9

*- Fails QC Criteria for %RSD; << - Rf less than minimum QC RF; >>- RF greater than maximum QC RF

Triangle Laboratories of RTP, Inc.
Initial Calibration Curve

ICAL File: ICALYO22	Date of Analysis :10/22/97	Analyte List: 8270A
RF20 YP772	RF50 YP771	RF80 YP770
RF120 YP769	RF160 YP768	

Analyte	Flag	RF20	RF50	RF80	RF120	RF160	MEAN	%RSD
Trifluralin		0.163	0.199	0.210	0.235	0.249	0.211	15.8
Phenanthrene-d10	I							
Di-n-butylphthalate		1.290	1.537	1.388	1.371	1.575	1.432	8.4
Hexachlorobenzene		0.291	0.337	0.285	0.285	0.297	0.299	7.3
4-Aminobiphenyl		0.711	0.791	0.727	0.709	0.743	0.736	4.6
Pentachlorophenol	C		0.177	0.172	0.174	0.187	0.178	3.5
Pentachloronitrobenzene		0.072	0.084	0.079	0.078	0.082	0.079	6.0
4-Nitrobiphenyl		0.199	0.310	0.284	0.292	0.317	0.281	16.9
Chrysene-d12	I							
Benzidine		0.662	0.758	0.747	0.768	0.894	0.766	10.9
4,4'-Methylenedianiline		0.258	0.323	0.316	0.323	0.386	0.321	14.2
Dimethylaminoazobenzene		0.316	0.375	0.375	0.377	0.408	0.370	9.0
3,3'-Dimethylbenzidine		0.472	0.605	0.573	0.522	0.670	0.568	13.4
3,3'-Dimethoxybenzidine		0.211	0.293	0.295	0.289	0.321	0.282	14.8
3,3'-Dichlorobenzidine		0.412	0.444	0.422	0.414	0.481	0.434	6.6
Methylene bis-chloroaniline		0.164	0.197	0.186	0.177	0.200	0.185	8.1
bis(2-Ethylhexyl)phthalate		0.844	0.944	0.957	0.938	1.046	0.946	7.6

Approved by: Saff Date 11/13/97

*- Fails QC Criteria for %RSD; << - Rf less than minimum QC RF; >>- RF greater than maximum QC RF

TECHNICAL REPORT DATA

Please read instructions on the reverse before completing

1. REPORT NO. EPA-454/R-99-025	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE Final Report - Volume I of II, Iron and Steel Foundries Manual Emissions Testing, Cupola Wet Scrubber - General Motors Corp., Saginaw, Michigan		5. REPORT DATE July 1999
		6. PERFORMING ORGANIZATION CODE
7. AUTHOR(S) Franklin Meadows Daniel F. Scheffel		8. PERFORMING ORGANIZATION REPORT NO.
9. PERFORMING ORGANIZATION NAME AND ADDRESS Pacific Environmental Services, Inc. Post Office Box 12077 Research Triangle Park, North Carolina 27709-2077		10. PROGRAM ELEMENT NO.
		11. CONTRACT/GRANT NO. 68-D-70069
12. SPONSORING AGENCY NAME AND ADDRESS U.S. Environmental Protection Agency Office of Air Quality Planning and Standards Emissions, Monitoring and Analysis Division Research Triangle Park, North Carolina 27711		13. TYPE OF REPORT AND PERIOD COVERED Final
		14. SPONSORING AGENCY CODE

15. SUPPLEMENTARY NOTES

16. ABSTRACT

The United States Environmental Protection Agency (EPA) is investigating iron and steel foundries to identify and quantify hazardous air pollutants (HAPs) emitted from cupolas; electric arc furnaces; and pouring, cooling and shakedown operations of sand mold casting processes. General Motors Corporation, Saginaw Casting Operations (GMC), Saginaw, Michigan was selected by the EPA as the host facility at which to 1) characterize HAP emissions from cupolas that are controlled by wet scrubbers, and 2) assess wet scrubber performance in controlling HAP emissions from cupolas. GMC was selected because EPA deemed this facility to be representative of a large segment of the sand casting foundry industry and GMC operates a relatively large cupola that is controlled by a wet scrubber.

This report presents the results of a manual emissions testing program to characterize emissions from a cupola and assess the performance of the wet scrubber in controlling HAP emissions. Testing was conducted at the cupola wet scrubber inlet and outlet to determine air emissions of particulate matter (PM) and metal HAPs; and at the cupola wet scrubber outlet to determine organic HAPs consisting of dibenzo-*p*-dioxins and polychlorinated dibenzodurans (PCDDs/PCDFs) and semi-volatile organic hazardous air pollutnats (SVOHAPs), and volatile organic hazardous air pollutants (VOHAPs) The data may be used by the EPA as potential Maximum Achievable Control Technology (MACT) floor technology for cupolas.

During the testing program, Research Triangle Institute (RTI), another EPA contractor, monitored and recorded process and emission control system operating parameters, and prepared Section 3.0, Process and Control Equipment operation, of this report.

This volume (Volume I) is comprised of 688 pages and consists of the report text, and Appendices: A (Raw Field Data) and B (Analytical Data - PCDFs/PCDDs and SVOHAPs).

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTIONS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COASTI Field/Group
Cupola Dioxins/Furans Emission Measurements Hazardous Air Pollutants Metals Particulate Matter Semi-Volatile Organic Hazardous Air Pollutants Volatile Organic Hazardous Air Pollutants Wet Scrubber		

18. DISTRIBUTION STATEMENT Unlimited	19. SECURITY CLASS *(This Report)* Unclassified	21. NO. OF PAGES 1,159
	20. SECURITY CLASS *(This page)* Unclassified	22. PRICE