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Final Report

Manual Testing and Continuous Emissions Monitoring, Lime Kiln Nos. 3 and 4 Baghouses

Chemical Lime Company
Montevallo, Alabama

Office of Air Quality
Clean Air
OAQPS
Planning and Standards

FINAL REPORT

MANUAL TESTING AND CONTINUOUS EMISSIONS MONITORING LIME KILN NOS. 3 AND 4 BAGHOUSES CHEMICAL LIME COMPANY MONTEVALLO, ALABAMA

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1.0 INTRODUCTION

The U.S. Environmental Protection Agency (EPA) Emission Standards Division (ESD) is investigating the lime manufacturing industry to identify and quantify hazardous air pollutants (HAPs) emitted from lime kilns. ESD requested that EPA's Emissions, Monitoring and Analysis Division (EMAD) conduct the required testing. EMAD issued a work assignment to Pacific Environmental Services, Inc. (PES) to conduct a screening test to collect air emissions data as specified in the ESD test request. The planning and initial preparation activities of the program were conducted through EPA Contract No. 68-D7-0002, Work Assignment No. 0/005. Remaining preparation, testing, and generation of the Draft Final Report were completed under EPA Contract No. 68-D7-0002, Work Assignment No. 1/007. Generation of the Final Report, incorporating EPA's comments on the Draft Final Report, was completed under EPA Contract No. 68D70069, Work Assignment No. 2-17.

The primary objective was to characterize HAP emissions from two lime kilns at the Chemical Lime Company's facility located in Montevallo, Alabama. Based on the pollutant concentrations and emission rates calculated from the results of the screening tests, some of the kilns may be selected by EPA for further testing.

The tests were conducted to quantify the uncontrolled and controlled air emissions of hydrogen chloride (HCl), total hydrocarbons (THC), and polychlorinated dibenzo-*p*-dioxins and polychlorinated dibenzofurans (PCDDs/PCDFs). Emissions from each kiln were controlled by a baghouse dedicated to each kiln. Over a two-day period, testing was conducted at each baghouse inlet and at the common stack. Inlet and outlet runs on each kiln were conducted simultaneously. Oxygen (O_2) and carbon dioxide (CO_2) were also monitored at each location. During the testing, Research Triangle Institute (RTI), an ESD contractor, recorded plant operational data.

PES used three subcontractors for this effort: Air Pollution Characterization and Control Ltd. (APCC), of Toland, Connecticut; Triangle Laboratories, Inc. (TLI), of Durham, North Carolina; and Atlantic Technical Services, Inc. (ATS), of Chapel Hill, North Carolina. APCC provided equipment and manpower for quantification of HCl, O_2, CO_2, and THC; TLI provided analytical services for the analysis of the PCDDs/PCDFs samples; and ATS provided technical support for preparation of the Quality Assurance Project Plan (QAPP), Site Specific Test Plan (SSTP), for reduction of the test data, and for preparation of the Draft Final Report.

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

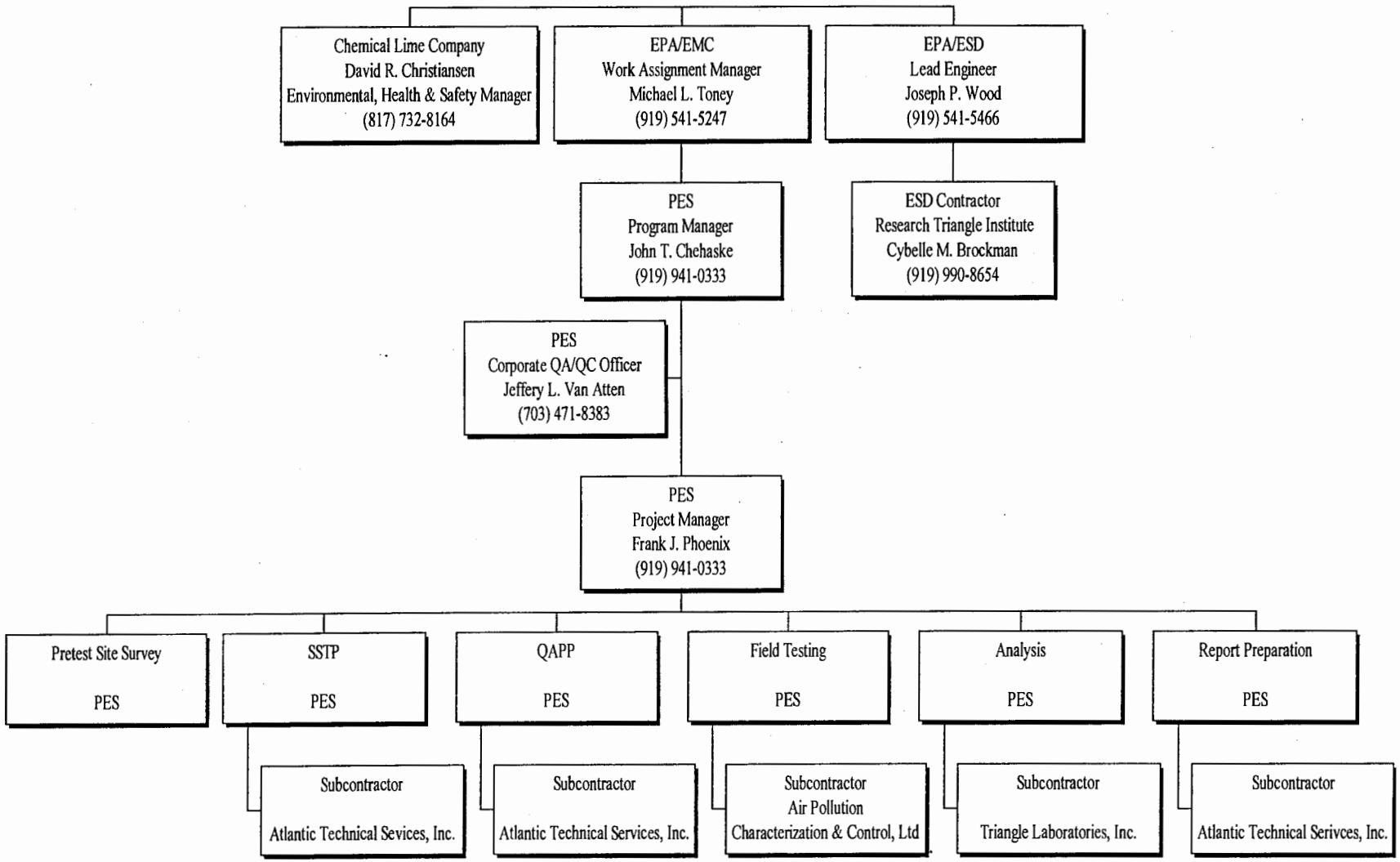


Figure 1.1 Key Personnel and Responsibility for Testing at Chemical Lime Company - Montevallo, Alabama

2.0 SUMMARY OF RESULTS

This section provides summaries of the test results for testing at the Chemical Lime Company in Montevallo, Alabama. Included are results of the tests conducted for PCDDs/PCDFs, HCl, and THC emissions at the Kiln No. 3 baghouse inlet, Kiln No. 4 baghouse inlet, and the Kiln No. 3 and Kiln No. 4 baghouses shared stack.

2.1 EMISSIONS TEST LOG

Testing was conducted on Kiln No. 4 on the first day, and on Kiln No. 3 on the second day. During the testing on a kiln, a velocity traverse was conducted on the other kiln to quantify the air flow contribution of both kilns to the combined outlet (stack). In addition, velocity traverses were conducted on a gas slipstream which branches off prior to the stack sampling location. Additional velocity traverses, THC, and HCl testing were conducted at the stack location due to difficulties encountered with the Quality Assurance spikes associated with the HCl sampling. These issues are discussed in Section 2.4

Sampling was performed on March 23, 24, and 25, 1998. Table 2.1 presents the emissions test log. Presented are the run numbers, test dates, pollutants, run times, and downtimes for response times and port changes.

2.2 PCDDs/PCDFs

PES employed EPA Method 23 for the measurement of PCDDs and PCDFs. The results of the PCDD/PCDF results are presented in Tables 2.2 through 2.7. PCDDs/PCDFs results are presented as 1) actual concentrations and mass emission rates, 2) concentrations adjusted to 7 percent (%) O_2, and 3) concentrations adjusted to 7 % O_2 and 2378 tetra-chlorinated dibenzo-*p*-dioxin (TCDD) toxic equivalent basis. Adjustment of the congeners to a 2378 toxic equivalent basis was calculated using the Toxic Equivalency Factor (TEF) values developed by the NATO Committee on the Challenges of Modern Society, August 1988.

The Method 23 sample fractions consisted of a sample train front-half solvent rinse, a particulate filter, a back-half solvent rinse, and an XAD®-2 sorbent resin module. During analysis, each of the sample fractions was extracted, concentrated, combined, and analyzed using a Gas Chromatograph with a Mass Spectrometer detector (GC/MS), according to the procedures outlined in Method 23. During analysis, the combined sample extract was separated with a DB-5 capillary column. Where the results of that analysis indicated the presence of 2378 TCDF congeners, the analysis was repeated using a DB-225 capillary column so that the TCDF congeners could be more readily separated and quantified.

TABLE 2.1

EMISSIONS TEST LOG
CHEMICAL LIME COMPANY - MONTEVALLO, ALABAMA

Run No.	Date	Pollutant	Run Time	Downtime, Minutes [a]
Kiln No. 4 Baghouse Inlet				
M23-I-1	03/23/98	PCDDs/PCDFs	1400-1808	68
M3A-I-1	03/23/98	CO_2 / O_2	1425-1800	125
M25A-I-1	03/23/98	THC	1425-1800	125
M322-I-1	03/23/98	HCl	1425-1800	125
M2-4-I-2	03/24/98	Air Flow Rate	1430-1450	-
Kiln No. 3 Baghouse Inlet				
M2-3-I-1	03/23/98	Air Flow Rate	1440-1455	-
M23-I-2	03/24/98	PCDDs/PCDFs	1332-1709	37
M3A-I-2	03/24/98	CO_2 / O_2	1350-1725	125
M25A-I-2	03/24/98	THC	1350-1725	125
M322-I-2	03/24/98	HCl	1350-1725	125
Kiln No. 3 Baghouse & Kiln No. 4 Baghouse Stack				
M23-O-1	03/23/98	PCDDs/PCDFs	1400-1806	66
M3A-O-1	03/23/98	CO_2 / O_2	1400-1740	125
M25A-O-1	03/23/98	THC	1400-1740	125
M322-O-1	03/23/98	HCl	1400-1740	125
M23-O-2	03/24/98	PCDDs/PCDFs	1332-1709	37
M3A-O-2	03/24/98	CO_2 / O_2	1330-1705	125
M25A-O-2	03/24/98	THC	1330-1705	125
M322-O-2	03/24/98	HCl	1330-1705	125
M2-O-3	03/25/98	Air Flow Rate	0910	-
M322-O-3	03/25/98	HCl	0855-0910	0
CO_2 Bubbler Slipstream				
M2-CBS-1	03/23/98	Air Flow Rate	1440-1455	
M2-CBS-2	03/24/98	Air Flow Rate	1430-1450	

[a] The CEMs sample acquisition system operated on a time-shared basis, switching between the baghouse inlet and stack locations after 15 minutes of sampling. This applies to Methods 3A, 25A, and 322.

The results of the analyses indicated the presence of several congeners that were qualified as Estimated Maximum Possible Concentrations, or EMPCs. From time to time during the Method 23 analyses, a peak elutes at the position expected for a particular congener, but the peak fails validation based on the theoretical split of chlorine isotopes. That is to say that the number of Cl^{35} isotopes and the number of Cl^{37} isotopes attached to the PCDDs/PCDFs congeners should agree with the Cl^{35}/Cl^{37} ratio found in nature. For each congener, this ratio must agree within 15%. If the mass ratio of chlorine isotopes does not agree with the natural chlorine isotope ratio, then the peak is flagged as an EMPC.

The values presented as "Total PCDDs" are the sum of the "12346789 OCDD" polychlorinated dibenzo-p-dioxin and all of the dioxins labeled "Total"; "Total PCDFs" values are the sum of the "12346789 OCDF" polychlorinated dibenzofuran and all of the furans labeled "Total". "Total PCDDs + Total PCDFs" values are the sum of the "Total PCDDs" and "Total PCDFs" values. Values that have been qualified as being EMPC have been included in the sums. Concentrations and emission rates based on or including EMPC values are denoted by braces ({ }).

2.2.1 Kiln No. 3

Tables 2.2, 2.3, and 2.4 summarize the PCDDs/PCDFs test results from the Kiln No. 3 baghouse inlet and stack. Table 2.2 summarizes the PCDDs/PCDFs emissions sampling and air stream parameters. Table 2.3 presents the PCDDs/PCDFs air stream concentrations and emission rates. The PCDDs/PCDFs concentrations and 2378-TCDD toxic equivalent concentrations adjusted to 7% oxygen are tabulated in Table 2.4.

2.2.2 Kiln No. 4

Tables 2.5, 2.6, and 2.7 summarize the PCDDs/PCDFs test results from the Kiln No. 4 baghouse inlet and stack. Table 2.5 summarizes the PCDDs/PCDFs emissions sampling and air stream parameters. Table 2.6 presents the PCDDs/PCDFs air stream concentrations and emission rates. The PCDDs/PCDFs concentrations and 2378-TCDD toxic equivalent concentrations adjusted to 7% oxygen are tabulated in Table 2.7.

2.3 AIR FLOW RATES

2.3.1 Kiln No. 3 Baghouse Inlet & Kiln No. 4 Baghouse Inlet

A velocity traverse was performed at the Kiln No. 3 Baghouse Inlet while the Method 23 testing was being performed on Kiln No. 4; on the next day, a velocity traverse was done at the Kiln No. 4 Baghouse Inlet during the Kiln No. 3 Method 23 testing. Results of the two velocity traverses are presented in Table 2.8. The moisture, CO_2, and O_2 content at each inlet location were assumed to be unchanged from the results generated by the Method 23 testing.

2.3.2 CO_2 Bubbler Slipstream

The results of the velocity traverses conducted at the CO_2 Bubbler Slipstream during both tests at the stack are presented in Table 2.9. Moisture, CO_2, and O_2 content of the slipstream were estimated to be the same as that measured during the two tests conducted at the stack.

2.3.3 Kiln No. 3 Baghouse & Kiln No. 4 Baghouse Stack

During the additional Proposed Draft Method 322 data acquisition on 3/25/98, air flow rate parameters were measured; the results are tabulated in Table 2.10. The moisture was estimated to be 14%. Method 3A was used to measure the CO_2, and O_2 content.

2.4 HCL AND THC

Table 2.11 presents the results of the HCl and THC measurements conducted by APCC at the Kiln No. 3 and Kiln No. 4 baghouse inlets, and at the stack. HCl and THC data collected over a three-day period are presented in this table. Also presented in the table are mass emission rate data.

APCC encountered significant QA/QC problems during the analyte spiking of the HCl sampling system. The curves generated during calibration of the HCl analyzer met the method requirements of no greater than 7.5 % (of span) calibration error. HCl recoveries during analyte spiking on Kiln No. 4 were 38% and 56% for the inlet and outlet locations, respectively. HCl recoveries on Kiln No. 3 were 0% at the inlet location, since no HCl was detected during analyte spiking, and 29% at the outlet location. None of these recoveries met the method requirement of ±30% recovery of the analyte spike. Additional testing was conducted at the stack location on March 25, and the HCl analyte spike recovery was 88%. On March 25, the sampling system was modified and the sample flowrate was increased to approximately 15 liters per minute; the sample flowrate was approximately 8 liters per minute during the testing on March 23 and March 24. A more detailed discussion of the QA/QC issues may be found in APCC's letter of April 30, 1998, which may be found in Appendix B.1.

The low HCl recovery efficiencies observed during the testing on March 23 and March 24 suggest that the measured HCl concentrations may be biased low compared to the true in-stack concentrations. The additional testing on March 25, for which an acceptable analyte spike was observed, indicated an increase in the in-stack HCl concentration of approximately 35%, however, it is impossible to ascertain if this ratio is an accurate measurement of any negative bias of the HCl measurements.

Corrections of the HCl and THC concentrations from the wet basis to dry basis used the moisture values from the concurrent PCDDs/PCDFs testing at the same locations. Volumetric flow rates for emission rate calculations are also from the PCDDs/PCDDFs testing. During the HCl and THC testing conducted on March 25, velocity traverses were conducted, but moisture values were assumed from the data developed over the previous two days.

Three of the five runs conducted for THC resulted in measured concentrations of THC below the nominal detection limit of the THC analyzer of 1 part per million (ppm). Concurrently with these three runs, the post-run calibration checks of the THC analyzer demonstrated a zero-drift of approximately -4 % of span, or -4 ppm. The analyzer zero drift, combined with a negative span drift during the three runs, most likely resulted in a negative bias in the measurement of THC concentrations at the baghouse inlet during testing on Kiln No. 4, as well at the stack location during testing on both kilns.

TABLE 2.2

PCDDs/PCDFs SAMPLING AND AIR STREAM PARAMETERS
KILN NO. 3 BAGHOUSE INLET AND STACK
CHEMICAL LIME COMPANY - MONTEVALLO, ALABAMA

Run No.	M23-3-I-2	M23-O-2
Sampling Location	Baghouse Inlet	Stack [a]
Date	3/24/98	3/24/98
Total Sampling Time, minutes	180	180
Average Sampling Rate, dscfm [b]	0.566	0.629
Sample Volume:		
dscf [c]	101.881	113.279
dscm [d]	2.885	3.208
Average Exhaust Gas Temperature, °F	902	416
O_2 Concentration, % by Volume	5.3	10.0
CO_2 Concentration, % by Volume	26.6	18.6
Moisture, % by Volume	7.8	14.4
Exhaust Gas Volumetric Flow Rate:		
acfm [e]	152,000	277,000
dscfm [b]	54,300	141,000
dscmm [f]	1,540	4,000
Isokinetic Sampling Ratio, %	104.2	102.8

[a] The outlet sampling location was downstream of the point where the kiln exhausts merged. Therefore depending on the parameter, the data presented is either the sum (e.g. flow rate) or the weighted average (e.g., gas temperature) of the two kilns.

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

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

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

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

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

TABLE 2.3

PCDDs/PCDFs CONCENTRATIONS AND EMISSION RATES
KILN NO. 3 BAGHOUSE INLET AND STACK
CHEMICAL LIME COMPANY - MONTEVALLO, ALABAMA

CONGENER	CONCENTRATION [a] (ng/dscm, as measured)		EMISSION RATE [b] (µg/hr)	
	M23-3-I-2 Baghouse Inlet	M23-O-2 Stack	M23-3-I-2 Baghouse Inlet	M23-O-2 Stack
DIOXINS:				
2378 TCDD	(0.0139)	(0.00187)	(1.28)	(0.449)
Total TCDD	0.0867	0.0249	7.99	5.98
12378 PeCDD	(0.0243)	(0.00281)	(2.24)	(0.673)
Total PeCDD	{0.0381}	0.00935	{3.52}	2.24
123478 HxCDD	(0.0312)	(0.00312)	(2.88)	(0.748)
123678 HxCDD	(0.0277)	(0.00312)	(2.56)	(0.748)
123789 HxCDD	(0.0277)	(0.00312)	(2.56)	(0.748)
Total HxCDD	0.0243	(0.00312)	2.24	(0.748)
1234678 HpCDD	(0.0347)	0.00312	(3.20)	0.748
Total HpCDD	(0.0347)	0.00312	(3.20)	0.748
12346789 OCDD	{0.101}	{0.00935}	{9.27}	{2.24}
Total PCDDs	**(0.284)**	**(0.0499)**	**(26.2)**	**(12.0)**
FURANS:				
2378 TCDF	0.177	0.00312	16.3	0.748
Total TCDF	4.19	0.0779	387	18.7
12378 PeCDF	0.0728	(0.00187)	6.71	(0.449)
23478 PeCDF	0.0728	(0.00187)	6.71	(0.449)
Total PeCDF	0.936	0.00624	86.3	1.50
123478 HxCDF	0.0347	(0.00249)	3.20	(0.598)
123678 HxCDF	{0.0173}	(0.00218)	{1.60}	(0.523)
234678 HxCDF	(0.0208)	(0.00281)	(1.92)	(0.673)
123789 HxCDF	(0.0243)	(0.00312)	(2.24)	(0.748)
Total HxCDF	0.114	{0.00218}	10.6	{0.523}
1234678 HpCDF	{0.0173}	{0.00312}	{1.60}	{0.748}
1234789 HpCDF	(0.0347)	(0.00624)	(3.20)	(1.50)
Total HpCDF	{0.0173}	{0.00312}	{1.60}	{0.748}
12346789 OCDF	(0.0347)	(0.00935)	(3.20)	(2.24)
Total PCDFs	**(5.30)**	**(0.0988)**	**(489)**	**(23.7)**
Total PCDDs + PCDFs	**(5.58)**	**(0.149)**	**(515)**	**(35.7)**

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

[b] Micrograms per hour.

( ) Not Detected. Value shown is the detection limit and is included in totals.

{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

TABLE 2.4

PCDDs/PCDFs CONCENTRATIONS AND 2378-TCDD TOXIC EQUIVALENT CONCENTRATIONS ADJUSTED TO 7 PERCENT OXYGEN KILN NO. 3 BAGHOUSE INLET AND STACK CHEMICAL LIME COMPANY - MONTEVALLO, ALABAMA

CONGENER	CONCENTRATION [a] (ng/dscm, adjusted to 7 percent O_2)		2378-TCDD Toxicity Equivalence Factor	2378 TOXIC EQUIVALENCIES (ng/dscm, adjusted to 7 percent O_2)	
	M23-3-I-2 Baghouse Inlet	M23-O-2 Stack		M23-3-I-2 Baghouse Inlet	M23-O-2 Stack
DIOXINS:					
2378 TCDD	(0.0124)	(0.00239)	1.000	(0.0124)	(0.00239)
Total TCDD	0.0772	0.0318			
12378 PeCDD	(0.0216)	(0.00358)	0.500	(0.0108)	(0.00179)
Total PeCDD	{0.0340}	0.0119			
123478 HxCDD	(0.0278)	(0.00398)	0.100	(0.00278)	(0.000398)
123678 HxCDD	(0.0247)	(0.00398)	0.100	(0.00247)	(0.000398)
123789 HxCDD	(0.0247)	(0.00398)	0.100	(0.00247)	(0.000398)
Total HxCDD	0.0216	(0.00398)			
1234678 HpCDD	(0.0309)	0.00398	0.010	(0.000309)	0.0000398
Total HpCDD	(0.0309)	0.00398			
12346789 OCDD	{0.0896}	{0.0119}	0.001	(0.0000896)	{0.0000119}
Total PCDDs	**(0.253)**	**(0.0636)**	**Total PCDDs TEQ**	**(0.0313)**	**(0.00542)**
FURANS:					
2378 TCDF	0.158	0.00398	0.100	(0.0158)	0.000398
Total TCDF	3.74	0.0994			
12378 PeCDF	0.0649	(0.00239)	0.050	(0.00324)	(0.000119)
23478 PeCDF	0.0649	(0.00239)	0.500	(0.0324)	(0.00119)
Total PeCDF	0.834	0.00795			
123478 HxCDF	0.0309	(0.00318)	0.100	(0.00309)	(0.000318)
123678 HxCDF	{0.0154}	(0.00278)	0.100	(0.00154)	(0.000278)
234678 HxCDF	(0.0185)	(0.00358)	0.100	(0.00185)	(0.000358)
123789 HxCDF	(0.0216)	(0.00398)	0.100	(0.00216)	(0.000398)
Total HxCDF	0.102	{0.00278}			
1234678 HpCDF	{0.0154}	{0.00398}	0.010	(0.000154)	{0.0000398}
1234789 HpCDF	(0.0309)	(0.00795)	0.010	(0.000309)	(0.0000795)
Total HpCDF	{0.0154}	{0.00398}			
12346789 OCDF	(0.0309)	(0.0119)	0.001	(0.0000309)	(0.0000119)
Total PCDFs	**(4.72)**	**(0.126)**	**Total PCDFs TEQ**	**(0.0416)**	**(0.00268)**
Total PCDDs + PCDFs	**(4.97)**	**(0.190)**	**Total TEQ**	**(0.0729)**	**(0.00809)**

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

( ) Not Detected. Value shown is the detection limit and is included in totals.

{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

TABLE 2.5

PCDDs/PCDFs SAMPLING AND AIR STREAM PARAMETERS
KILN NO. 4 BAGHOUSE INLET AND STACK
CHEMICAL LIME COMPANY - MONTEVALLO, ALABAMA

Run No.	M23-4-I-1	M23-O-1
Sampling Location	Baghouse Inlet	Stack [a]
Date	3/23/98	3/23/98
Total Sampling Time, minutes	180	180
Average Sampling Rate, dscfm [b]	0.640	0.604
Sample Volume:		
dscf [c]	115.145	108.805
dscm [d]	3.261	3.081
Average Exhaust Gas Temperature, °F	878	417
O_2 Concentration, % by Volume	8.1	10.0
CO_2 Concentration, % by Volume	20.1	19.0
Moisture, % by Volume	4.6	14.4
Exhaust Gas Volumetric Flow Rate:		
acfm [e]	166,000	282,000
dscfm [b]	61,900	145,000
dscmm [f]	1,750	4,110
Isokinetic Sampling Ratio, %	103.3	96.0

[a] The outlet sampling location was downstream of the point where the kiln exhausts merged. Therefore depending on the parameter, the data presented is either the sum (e.g. flow rate) or the weighted average (e.g., gas temperature) of the two kilns.

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

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

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

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

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

TABLE 2.6

PCDDs/PCDFs CONCENTRATIONS AND EMISSION RATES
KILN NO. 4 BAGHOUSE INLET AND STACK
CHEMICAL LIME COMPANY - MONTEVALLO, ALABAMA

CONGENER	CONCENTRATION [a] (ng/dscm, as measured)		EMISSION RATE [b] (µg/hr)	
	M23-4-I-1 Baghouse Inlet	M23-O-1 Stack	M23-4-I-1 Baghouse Inlet	M23-O-1 Stack
DIOXINS:				
2378 TCDD	(0.00920)	(0.00325)	(0.968)	(0.800)
Total TCDD	(0.00920)	0.00974	(0.968)	2.40
12378 PeCDD	(0.0153)	(0.00649)	(1.61)	(1.60)
Total PeCDD	(0.0153)	(0.00649)	(1.61)	(1.60)
123478 HxCDD	(0.0184)	(0.00649)	(1.94)	(1.60)
123678 HxCDD	(0.0184)	(0.00649)	(1.94)	(1.60)
123789 HxCDD	(0.0184)	(0.00649)	(1.94)	(1.60)
Total HxCDD	(0.0184)	(0.00649)	(1.94)	(1.60)
1234678 HpCDD	(0.0276)	(0.00974)	(2.90)	(2.40)
Total HpCDD	(0.0276)	(0.00974)	(2.90)	(2.40)
12346789 OCDD	(0.0307)	(0.0162)	(3.23)	(4.00)
Total PCDDs	**(0.101)**	**(0.0487)**	**(10.6)**	**(12.0)**
FURANS:				
2378 TCDF	{0.00215}	(0.00325)	{0.226}	{0.800}
Total TCDF	0.0276	{0.00649}	2.90	{1.60}
12378 PeCDF	(0.00920)	(0.00325)	(0.968)	(0.800)
23478 PeCDF	(0.0123)	(0.00325)	(1.29)	(0.800)
Total PeCDF	{0.0184}	(0.00325)	(1.94)	(0.800)
123478 HxCDF	(0.0123)	(0.00325)	(1.29)	(0.800)
123678 HxCDF	(0.0123)	(0.00325)	(1.29)	(0.800)
234678 HxCDF	(0.0123)	(0.00325)	(1.29)	(0.800)
123789 HxCDF	(0.0153)	(0.00325)	(1.61)	(0.800)
Total HxCDF	(0.0123)	(0.00325)	(1.29)	(0.800)
1234678 HpCDF	(0.0184)	(0.00649)	(1.94)	(1.60)
1234789 HpCDF	(0.0245)	(0.00649)	(2.58)	(1.60)
Total HpCDF	(0.0184)	(0.00649)	(1.94)	(1.60)
12346789 OCDF	(0.0307)	(0.0130)	(3.23)	(3.20)
Total PCDFs	**(0.107)**	**(0.0325)**	**(11.3)**	**(8.00)**
Total PCDDs + PCDFs	**(0.209)**	**(0.0811)**	**(21.9)**	**(20.0)**

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

[b] Micrograms per hour.

( ) Not Detected. Value shown is the detection limit and is included in totals.

{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

TABLE 2.7

PCDDs/PCDFs CONCENTRATIONS AND 2378-TCDD TOXIC EQUIVALENT CONCENTRATIONS ADJUSTED TO 7 PERCENT OXYGEN KILN NO. 4 BAGHOUSE INLET AND STACK CHEMICAL LIME COMPANY - MONTEVALLO, ALABAMA

CONGENER	CONCENTRATION [a] (ng/dscm, adjusted to 7 percent O_2)		2378-TCDD Toxicity Equivalence Factor	2378 TOXIC EQUIVALENCIES (ng/dscm, adjusted to 7 percent O_2)	
	M23-4-I-1 Baghouse Inlet	M23-O-1 Stack		M23-4-I-1 Baghouse Inlet	M23-O-1 Stack
DIOXINS:					
2378 TCDD	(0.00999)	(0.00414)	1.000	(0.00999)	(0.00414)
Total TCDD	(0.00999)	0.0124			
12378 PeCDD	(0.0167)	(0.00828)	0.500	(0.00833)	(0.00414)
Total PeCDD	(0.0167)	(0.00828)			
123478 HxCDD	(0.0200)	(0.00828)	0.100	(0.00200)	(0.000828)
123678 HxCDD	(0.0200)	(0.00828)	0.100	(0.00200)	(0.000828)
123789 HxCDD	(0.0200)	(0.00828)	0.100	(0.00200)	(0.000828)
Total HxCDD	(0.0200)	(0.00828)			
1234678 HpCDD	(0.0300)	(0.0124)	0.010	(0.000300)	(0.000124)
Total HpCDD	(0.0300)	(0.0124)			
12346789 OCDD	(0.0333)	(0.0207)	0.001	(0.0000333)	(0.0000207)
Total PCDDs	**(0.110)**	**(0.0621)**	**Total PCDDs TEQ**	**(0.0246)**	**(0.0109)**
FURANS:					
2378 TCDF	{0.00233}	(0.00414)	0.100	{0.000233}	(0.000414)
Total TCDF	0.0300	{0.00828}			
12378 PeCDF	(0.00999)	(0.00414)	0.050	(0.000500)	(0.000207)
23478 PeCDF	(0.0133)	(0.00414)	0.500	(0.00666)	(0.00207)
Total PeCDF	{0.0200}	(0.00414)			
123478 HxCDF	(0.0133)	(0.00414)	0.100	(0.00133)	(0.000414)
123678 HxCDF	(0.0133)	(0.00414)	0.100	(0.00133)	(0.000414)
234678 HxCDF	(0.0133)	(0.00414)	0.100	(0.00133)	(0.000414)
123789 HxCDF	(0.0167)	(0.00414)	0.100	(0.00167)	(0.000414)
Total HxCDF	(0.0133)	(0.00414)			
1234678 HpCDF	(0.0200)	(0.00828)	0.010	(0.000200)	(0.0000828)
1234789 HpCDF	(0.0266)	(0.00828)	0.010	(0.000266)	(0.0000828)
Total HpCDF	(0.0200)	(0.00828)			
12346789 OCDF	(0.0333)	(0.0166)	0.001	(0.0000333)	(0.0000166)
Total PCDFs	**(0.117)**	**(0.0414)**	**Total PCDFs TEQ**	**(0.0128)**	**(0.00391)**
Total PCDDs + PCDFs	**(0.226)**	**(0.103)**	**Total TEQ**	**(0.0375)**	**(0.0148)**

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

( ) Not Detected. Value shown is the detection limit and is included in totals.

{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

TABLE 2.8

AIR STREAM PARAMETERS
DURING PCDDs/PCDFs TESTING ON OPPOSITE KILN
KILN NO. 3 BAGHOUSE AND KILN NO. 4 BAGHOUSE INLETS
CHEMICAL LIME COMPANY - MONTEVALLO, ALABAMA

Run No.	M2-3-I-1	M2-4-I-2
Date	3/23/98	3/24/98
Sampling Location	Kiln No. 3	Kiln No. 4
Average Exhaust Gas Temperature, °F	934	885
O_2 Concentration, % by Volume [a]	5.3	8.1
CO_2 Concentration, % by Volume [a]	26.6	20.1
Estimated Moisture, % by Volume [a]	7.8	4.6
Exhaust Gas Volumetric Flow Rate:		
acfm [b]	189,000	175,000
dscfm [c]	65,500	65,400
dscmm [d]	1,860	1,850

[a] O_2, CO_2, and moisture data taken from non-concurrent Method 23 test performed at same location.
[b] Actual cubic feet per minute at exhaust gas conditions.
[c] Dry standard cubic feet per minute at 68° F (20° C) and 1 atm.
[d] Dry standard cubic meters at 68° F (20° C) and 1 atm.

TABLE 2.9

AIR STREAM PARAMETERS
DURING PCDDs/PCDFs TESTING
CO_2 BUBBLER SLIPSTREAM OFF KILN NO. 3 AND KILN NO. 4 STACK
CHEMICAL LIME COMPANY - MONTEVALLO, ALABAMA

Run No.	M2-CBS-1	M2-CBS-2	Average
Date	3/23/98	3/24/98	
Average Exhaust Gas Temperature, °F	303	315	309
O_2 Concentration, % by Volume [a]	10.0	10.0	10.0
CO_2 Concentration, % by Volume [a]	19.0	18.6	18.8
Estimated Moisture, % by Volume [a]	14.4	14.4	14.4
Exhaust Gas Volumetric Flow Rate:			
acfm [b]	9,260	8,230	8,750
dscfm [c]	5,480	4,790	5,140
dscmm [d]	155	136	146

[a] O_2, CO_2, and moisture data taken from concurrent Method 23 test performed at stack location.
[b] Actual cubic feet per minute at exhaust gas conditions.
[c] Dry standard cubic feet per minute at 68° F (20° C) and 1 atm.
[d] Dry standard cubic meters at 68° F (20° C) and 1 atm.

TABLE 2.10

AIR STREAM PARAMETERS
DURING EXTRA HCl TESTING
KILN NO. 3 BAGHOUSE AND KILN NO. 4 BAGHOUSE STACK
CHEMICAL LIME COMPANY - MONTEVALLO, ALABAMA

Run No.	M2-O-3
Sampling Location	Stack [a]
Date	3/25/98
Average Exhaust Gas Temperature, °F	409
O_2 Concentration, % by Volume	10.0
CO_2 Concentration, % by Volume	17.7
Estimated Moisture, % by Volume	14.0
Exhaust Gas Volumetric Flow Rate:	
acfm [b]	272,000
dscfm [c]	142,000
dscmm [d]	4,020

[a] The outlet sampling location was downstream of the point where the kiln exhausts merged. Therefore depending on the parameter, the data presented is either the sum (e.g., flow rate) or the weighted average (e.g., gas temperature) of the two kilns.

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

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

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

TABLE 2.11

HCL AND THC CONCENTRATIONS AND EMISSION RATES
KILN NO. 3 BAGHOUSE AND KILN NO. 4 BAGHOUSE INLETS AND STACK
CHEMICAL LIME COMPANY - MONTEVALLO, ALABAMA

Run No.	3-I-2	O-2	4-I-1	O-1	O-3
Date	3/24/98	3/24/98	3/23/98	3/23/98	3/25/98
Kiln Tested	No. 3	Nos. 3 & 4	No. 4	Nos. 3 & 4	Nos. 3 & 4
Sampling Location	Inlet	Stack	Inlet	Stack	Stack
Total Sampling Time, minutes	90	90	90	95	15
O_2 Concentration, % by Volume	5.3	10.0	8.1	10.0	10.0
CO_2 Concentration, % by Volume	26.6	18.6	20.1	19.0	17.7
Estimated Moisture, % by Volume	7.8	14.4	4.6	14.4	14.0
Volumetric Flow Rate, dscfm [a]	54,300	141,000	61,900	145,000	142,000
Hydrogen Chloride:					
Formula Weight, lb/lb-mole	36.47	36.47	36.47	36.47	36.47
Concentration, ppmvw [b]	68.5	37.9	10.2	20.4	27.9
Concentration, ppmvd [c]	74.3	44.3	10.7	23.8	32.4
Concentration, ppmvd @ 7% O_2 [d]	66.2	56.5	11.6	30.4	41.4
Emission Rate, lb/hr [e]	22.9	35.5	3.76	19.6	26.2
Total Hydrocarbons (as methane):					
Formula Weight, lb/lb-mole	16.04	16.04	16.04	16.04	16.04
Concentration, ppmvw [b]	3.8	(1.0)	(1.0)	(1.0)	3.1
Concentration, ppmvd [c]	4.1	(1.2)	(1.0)	(1.2)	3.6
Concentration, ppmvd @ 7% O_2 [d]	3.7	(1.5)	(1.1)	(1.5)	4.6
Emission Rate, lb/hr [e]	0.56	(0.4)	(0.2)	(0.4)	1.3
Total Hydrocarbons as Propane:					
Formula Weight, lb/lb-mole	44.09	44.09	44.09	44.09	44.09
Concentration, ppmvw [b]	11.4	(3.0)	(3.0)	(3.0)	9.3
Concentration, ppmvd [c]	12.4	(3.5)	(3.1)	(3.5)	11
Concentration, ppmvd @ 7% O_2 [d]	11.0	(4.5)	(3.4)	(4.5)	14
Emission Rate, lb/hr [e]	4.61	(3.4)	(1.3)	(3.5)	11

[a] Dry standard cubic feet per minute at 68° F (20° C) and 1 atm.
[b] Parts per million by volume wet.
[c] Parts per million by volume dry.
[d] Parts per million by volume dry, corrected to 7% oxygen.
[e] Pounds per hour.
( ) Not Detected. Value shown is the detection limit and is included in averages.

3.0 PROCESS DESCRIPTION

During the testing, an EPA ESD contractor, Research Triangle Institute, monitored and recorded kiln process operation data. The Chemical Lime Company has made a claim of confidentially regarding this data, and EPA designated this data as Confidential Business Information (CBI). Therefore, no process information or operations data has been included with this report.

4.0 SAMPLING LOCATIONS

As stated previously, source sampling was conducted to determine uncontrolled and controlled emissions of HCl, PCDDs/PCDFs, and THC from two lime kilns located at Chemical Lime Company's Montevallo, Alabama facility. Testing was conducted at the inlets of each kiln baghouse, and at the stack common to both baghouses. Figure 4.1 presents the process air stream schematic showing the testing locations. Descriptions and schematic diagrams of the test locations are presented below.

4.1 KILN NO 3 BAGHOUSE INLET

The Kiln No. 3 baghouse inlet measurement site was located in a 98-inch inside diameter (ID) round, vertical duct, 540 inches (5.5 duct diameters) downstream of the nearest flow disturbance (90° bend) and 420 inches (4.3 duct diameters) upstream of another bend in the duct. According to EPA Method 1 criteria, this site required 20 sample traverse points, 10 along each of two perpendicular diameters.

Only two ports were available to accommodate the Method 23 and the CEM sampling probes. Because of the limited access to the ports, the Method 23 sampling was done using only one of the traverse diameters. The traverse was conducted twice to achieve the desired test time. Figure 4.2 shows a simplified schematic of the inlet measurement site and the sample traverse point locations.

4.2 KILN NO. 4 BAGHOUSE INLET

The baghouse inlet measurement site was located in a 98-inch inside diameter (ID) round, vertical duct, 540 inches (5.5 duct diameters) downstream of the nearest flow disturbance (90° bend) and 420 inches (4.3 duct diameters) upstream of the nearest flow disturbance, a bend in the duct. According to EPA Method 1 criteria, this site required 20 sample traverse points, 10 along each of two perpendicular diameters. The Method 23 sampling was performed using four ports to access the two traverse diameters (a half-axis per port). Figure 4.3 shows a simplified schematic of the inlet measurement site and 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 average yaw angle of 2.5 degrees was less than the Method 1 requirement of 20 degrees.

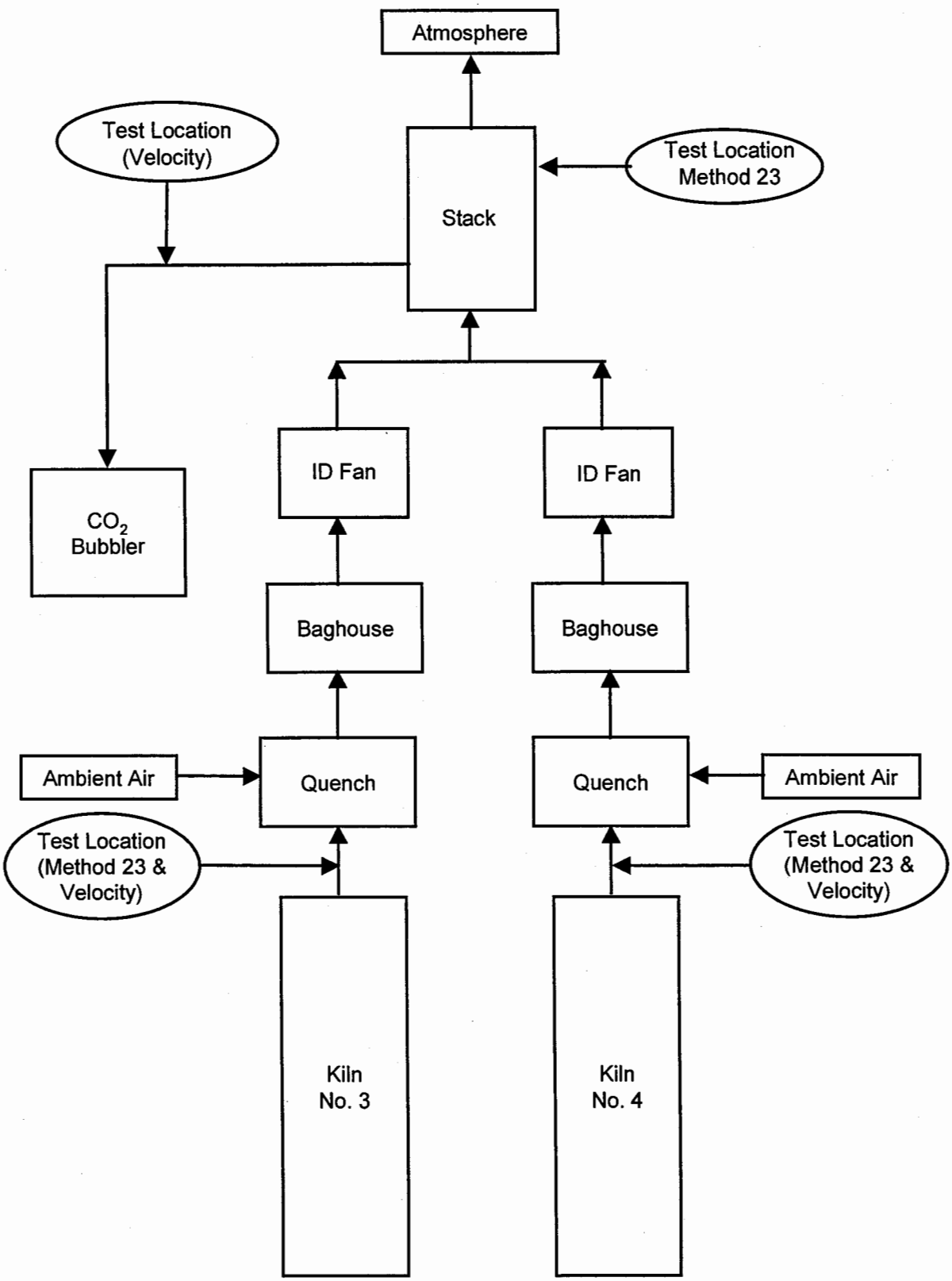
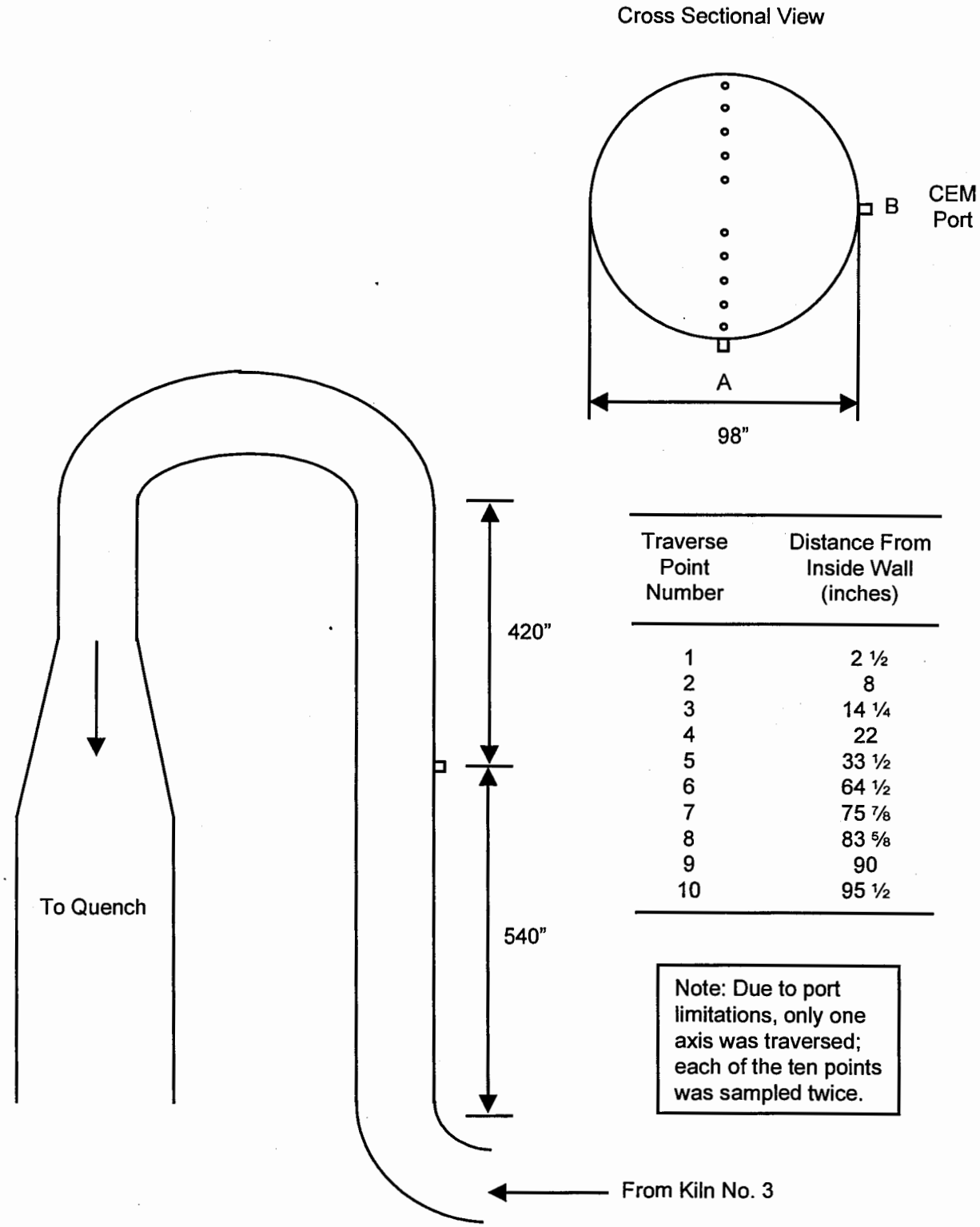


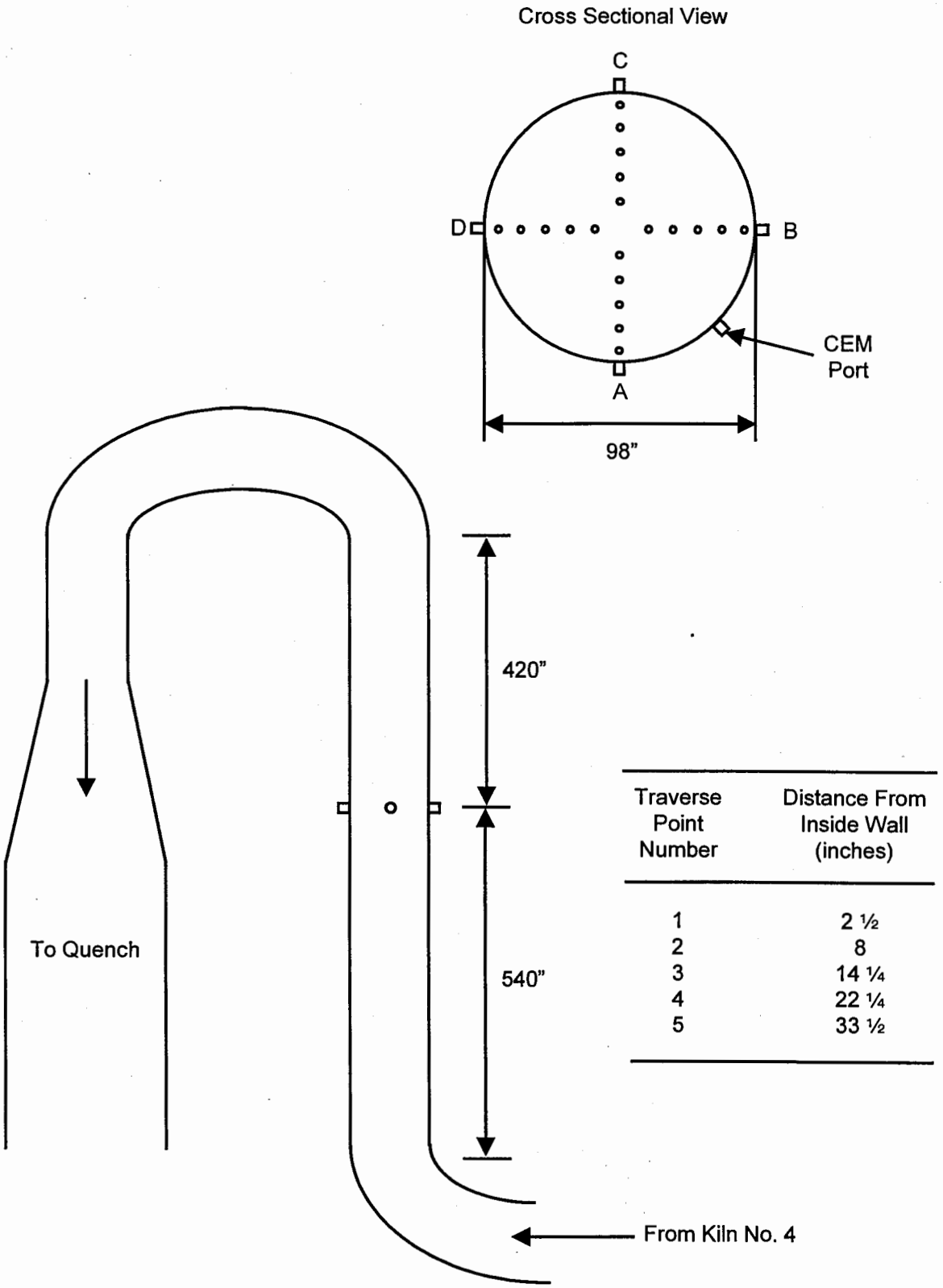
Figure 4.1 Kiln No. 3 and Kiln No. 4 Process Flow Schematic Showing Testing Locations, Chemical Lime Company - Montevallo, Alabama



Traverse Point Number	Distance From Inside Wall (inches)
1	2 ½
2	8
3	14 ¼
4	22
5	33 ½
6	64 ½
7	75 ⅞
8	83 ⅝
9	90
10	95 ½

Note: Due to port limitations, only one axis was traversed; each of the ten points was sampled twice.

Figure 4.2 Kiln No. 3 Baghouse Inlet Test Location and Traverse Point Locations, Chemical Lime Company - Montevallo, Alabama



Traverse Point Number	Distance From Inside Wall (inches)
1	2 ½
2	8
3	14 ¼
4	22 ¼
5	33 ½

Figure 4.3 Kiln No. 4 Baghouse Inlet Test Location and Traverse Point Locations, Chemical Lime Company - Montevallo, Alabama

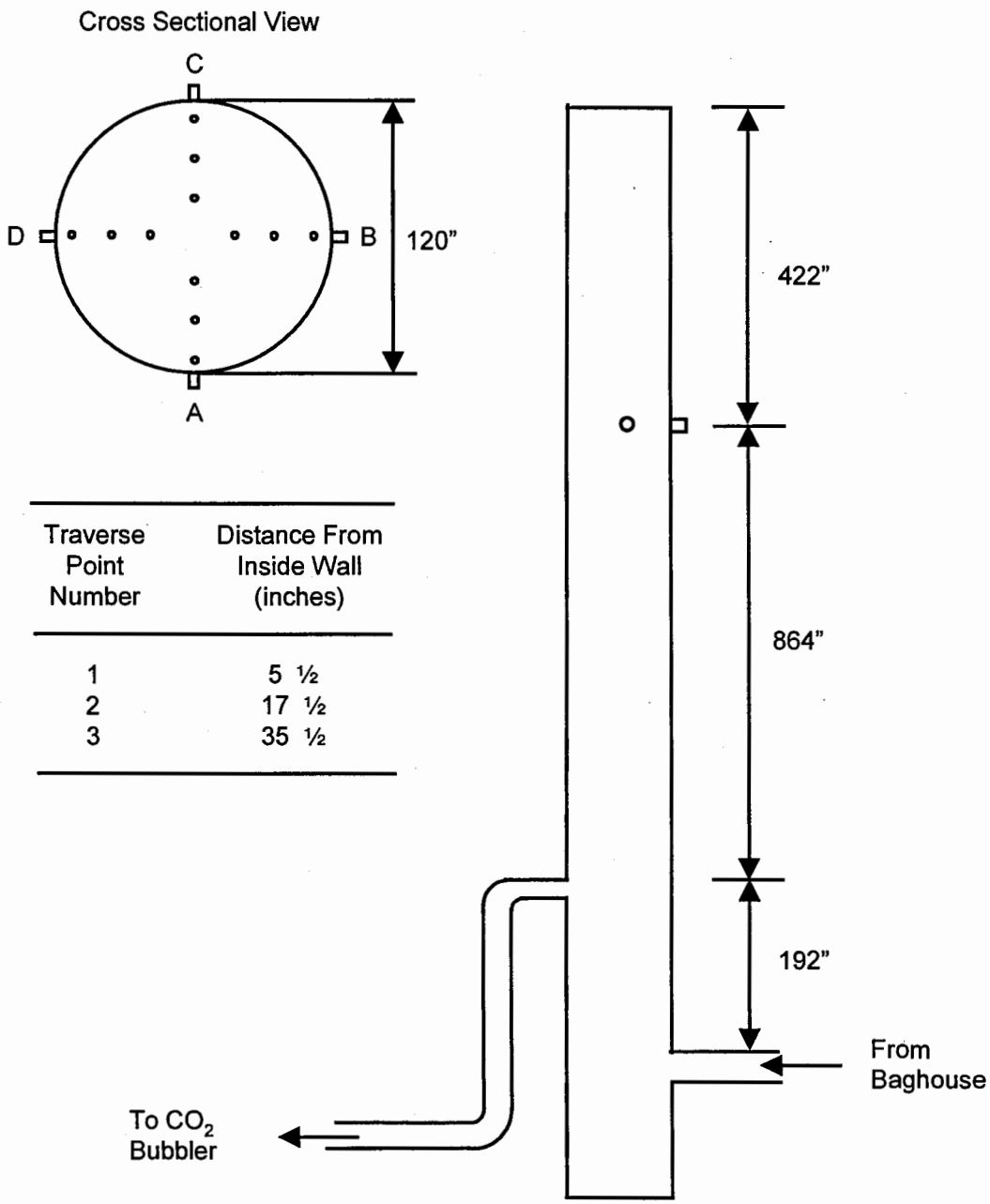
4.3 KILN NO. 3 BAGHOUSE AND KILN NO. 4 BAGHOUSE STACK

The stack location was located in a 120-inch ID round, vertical stack. Sampling ports were located 864 inches (7.2 duct diameters) downstream of the CO_2 bubbler slipstream breeching and 422 inches (3.5 duct diameters) upstream of the exhaust to atmosphere. According to EPA Method 1 criteria, this site required 12 sample traverse points, six along each of two perpendicular diameters; for purposes of sampling, each of the four half-axes were accessed using four ports, with three points per half-axis. Figure 4.4 is a schematic of the outlet test location and 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 yaw angle averaged 2.6 degrees, which is less than the EPA Method 1 requirement of 20 degrees.

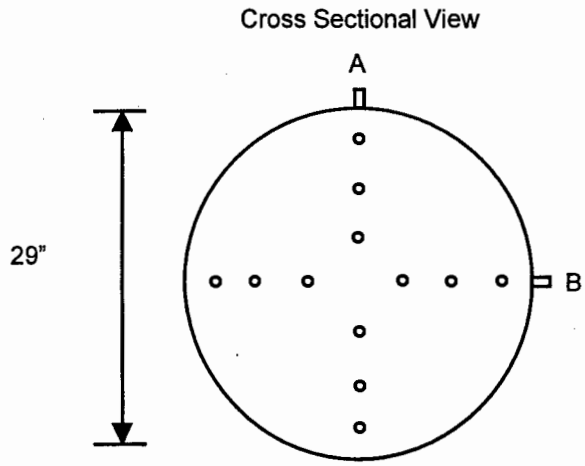
4.4 CO_2 BUBBLER SLIPSTREAM

The slipstream traversing location was located in a 29.5-inch ID round duct between the common stack servicing Kiln Nos. 3 and 4 baghouses and the CO_2 bubbler. Traversing ports were located 300 inches (10.2 duct diameters) downstream of a bend and 96 inches (3.3 duct diameters) upstream of the fan. Figure 4.5 is a schematic of the slipstream test location and the sample traverse point locations.



Traverse Point Number	Distance From Inside Wall (inches)
1	5 ½
2	17 ½
3	35 ½

Figure 4.4 Kiln No. 3 Baghouse & Kiln No. 4 Baghouse Stack Test Location and Traverse Point Locations, Chemical Lime Company - Montevallo, Alabama



Traverse Point Number	Distance From Inside Wall (inches)
1	1 ¼
2	4 ¼
3	8 ¾
4	20 ¾
5	25 ⅛
6	28 ¼

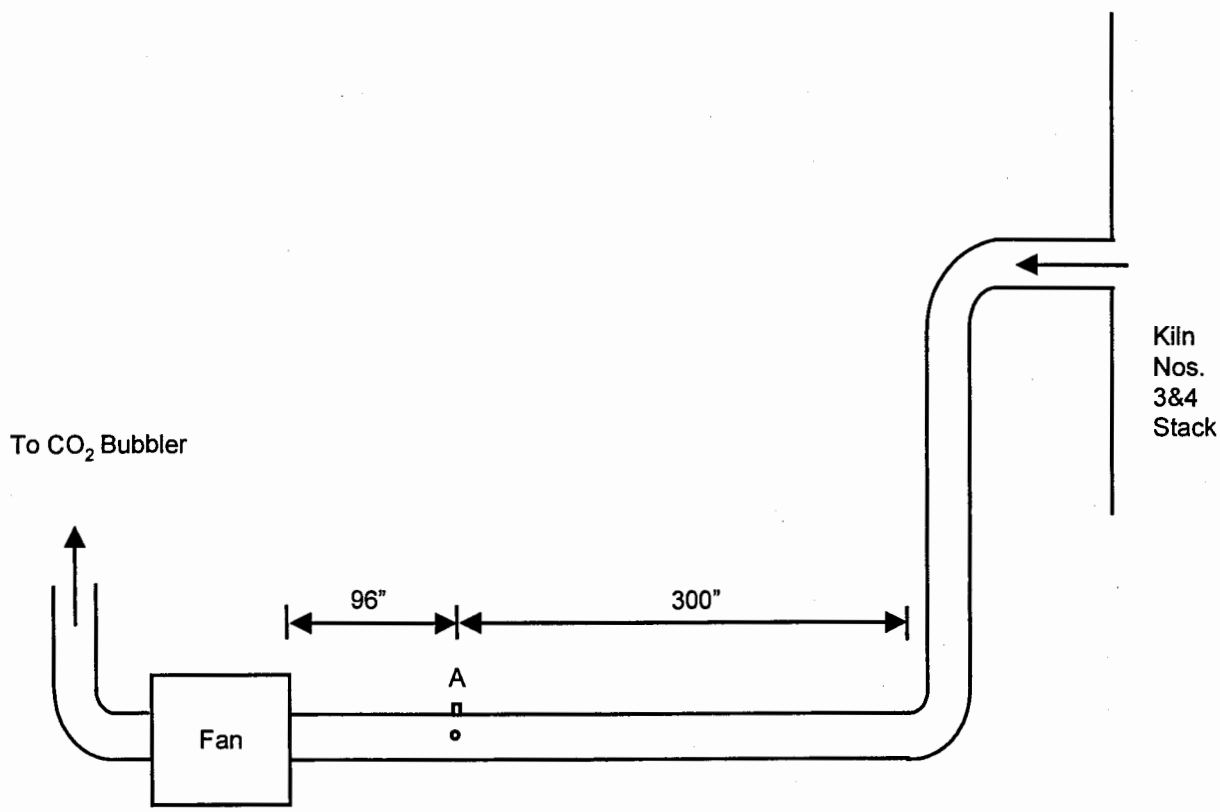


Figure 4.5 CO_2 Bubbler Slipstream Off Kiln Nos. 3 & 4 Baghouses Stack Test Location and Traverse Point Locations, Chemical Lime Company - Montevallo, Alabama

5.0 SAMPLING AND ANALYTICAL PROCEDURES

Source sampling was performed at the two baghouse inlets and the shared baghouses stack to determine the concentrations and mass emission rates of HCl, THC, and PCDDs/PCDFs. One three-hour test run was performed at each location. During the PCDDs/PCDFs testing at each kiln, velocity measurements were made at the baghouse inlet not being tested. In addition, velocity measurements were made at the slipstream from the stack to the CO_2 bubbler.

HCl and THC results are presented in parts per million (ppm), and pounds per hour (lb/hr). PCDDs/PCDFs results are presented in nanograms per dry standard cubic meter (ng/dscm), nanograms per dry standard cubic meter corrected to 7 % oxygen (ng/dscm @ 7% O_2) and micrograms per hour (μg/hr). In Table 5.1, the parameters measured, the sampling methods, the number of tests performed, and the duration of each test are presented. Brief descriptions of the sampling and analysis procedures used are presented below.

5.1 LOCATION OF MEASUREMENT SITES AND SAMPLE/VELOCITY TRAVERSE POINTS

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

5.2 DETERMINATION OF AIR STREAM VOLUMETRIC FLOW RATE

EPA Method 2, "Determination of Stack Gas Velocity and Volumetric Flow Rate (Type S Pitot Tube)," was used to determine exhaust gas velocity. A Type S Pitot tube, constructed according to Method 2 criteria and having an assigned coefficient of 0.84, was connected to an inclined-vertical manometer and used to measure the velocity pressure (Δp) at each traverse point. The air stream temperature was also recorded at each traverse point using a Type K thermocouple. The average gas velocity was calculated from the average square roots of the velocity pressure, average air stream temperature, air stream molecular weight, and absolute stack pressure. The volumetric flow rate is the product of velocity and the cross-sectional area of the duct/stack at the sampling location.

TABLE 5.1

SUMMARY OF SAMPLING LOCATIONS, TEST PARAMETERS, SAMPLING METHODS, AND NUMBER AND DURATION OF TESTS, CHEMICAL LIME COMPANY - MONTEVALLO, ALABAMA

Sampling Location	Parameter	Sampling Methods	Number of Tests	Duration, (minutes)
Baghouse Inlets (Kiln Nos. 3 & 4)	Air Stream Flow Rate	EPA Method 2	2	180
	CO_2 & O_2	EPA Method 3A	1	90
	Moisture Content	EPA Method 4	1	180
	PCDDs/PCDFs	EPA Method 23	1	180
	THC	EPA Method 25A	1	90
	HCl	EPA Proposed Method 322	1	90
Baghouses' Stack	Air Stream Flow Rate	EPA Method 2	2	180
	CO_2 & O_2	EPA Method 3A	2	90
	Moisture Content	EPA Method 4	2	180
	PCDDs/PCDFs	EPA Method 23	2	180
	THC	EPA Method 25A	2	90
	HCl	EPA Proposed Method 322	2	90 / 95
CO_2 Bubbler Slipstream	Flue Gas Flow Rate	EPA Method 2	2	20

5.3 DETERMINATION OF AIR STREAM MOISTURE CONTENT

EPA Method 4, "Determination of Moisture Content in Stack Gases," was used to determine the air stream moisture content. EPA Method 4 was performed in conjunction with each EPA Method 23 test run. Integrated, multi-point, isokinetic sampling was performed. Condensed moisture was determined by recording pre-test and post-test weights of the impingers, reagents, and silica gel.

5.4 DETERMINATION OF PCDDs/PCDFs

EPA Method 23, "Determination of Polychlorinated Dibenzo-P-Dioxins and Polychlorinated Dibenzofurans from Stationary Sources," was used to collect dioxins and furans at each location. In addition, the proposed rules amending Method 23 as published in the Federal Register, Volume 60, No. 104, May 31, 1995 were incorporated. These proposed rules correct existing errors in the method, eliminate the methylene chloride rinse, and clarify the quality assurance requirements of the method.

A multi-point integrated sample was extracted isokinetically from the traverse points shown in Section 4.0. At each traverse point, sampling was performed for 7.5 (at the baghouse stack) or 15 (at the baghouse inlet) minutes for a total run time of 180 minutes per test. The EPA Method 23 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 g of XAD®-2 adsorbent resin. The EPA Method 23 sampling train is shown in Figure 5.1.

TLI prepared the filters and adsorbent traps and performed the analyses. The samples were extracted and analyzed according to EPA Method 23 and the above mentioned proposed rules amendment. The sample components (filter, XAD, and rinses) were Soxhlet extracted and combined. The sample was then split with half being archived and the other half analyzed. Analysis was performed on a high resolution GC/MS.

5.5 DETERMINATION OF HYDROGEN CHLORIDE

EPA Proposed Method 322, "Measurement of Hydrogen Chloride Emissions from Portland Cement Kilns by GFC/IR," was used to monitor HCl emissions at each location. The stack gas sample was extracted from the sampling locations and transported to the HCl analyzer (a Perkin Elmer (PE) MCS-100) through a heated sample probe, heated sample line, and a heated sample pump. Sampling components were maintained at a minimum temperature of 375°F. A heated three-way valve was attached to the probe assembly to allow for sampling of stack gas or for the introduction of HCl calibration standards. The sample exits the pump and passes through a heated rotameter and into the analyzer containing the gas filter correlation infrared spectrometer (GFC/IR). A schematic of this system is presented in Figure 5.2.

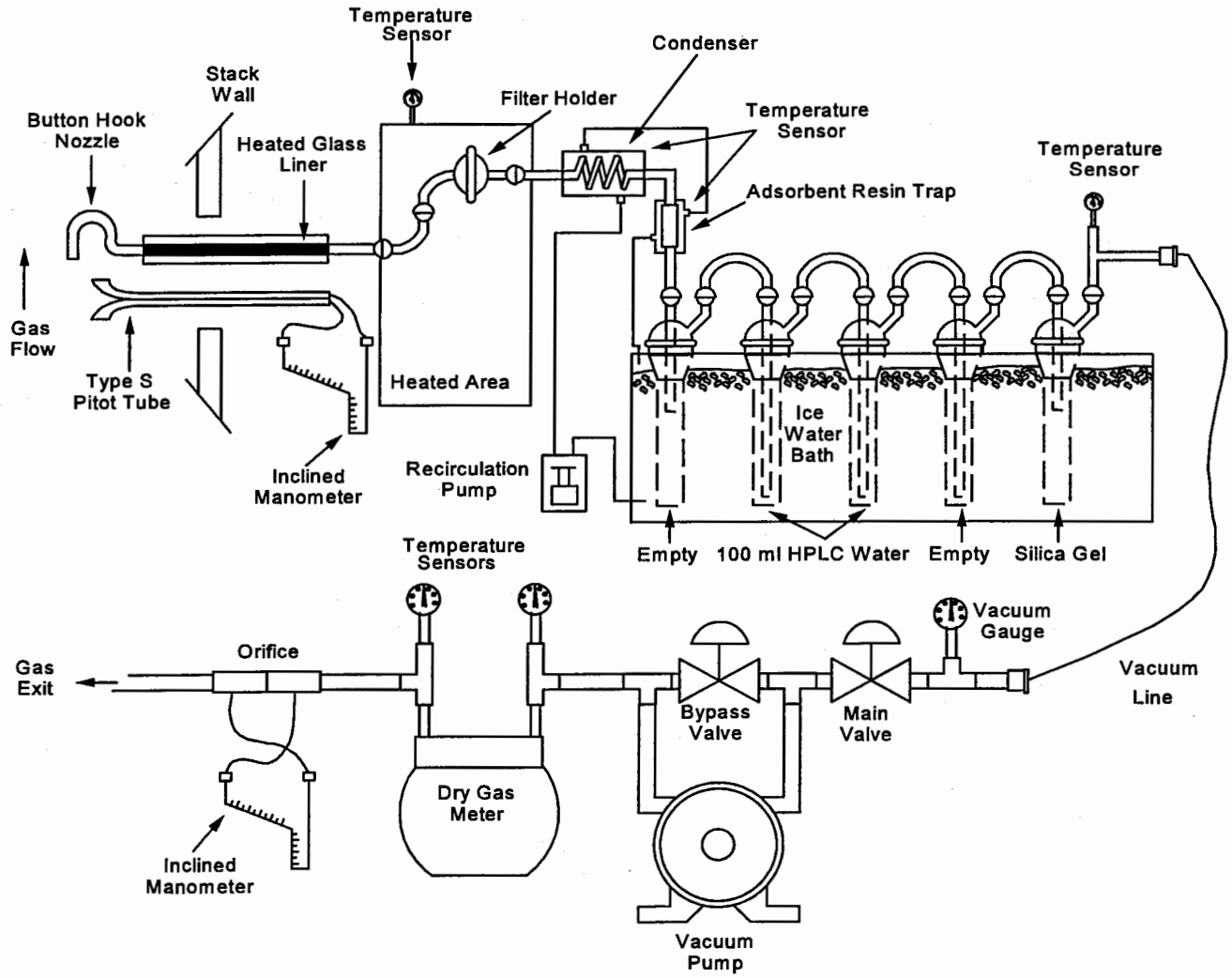


Figure 5.1 Sampling Train Schematic for EPA Method 23

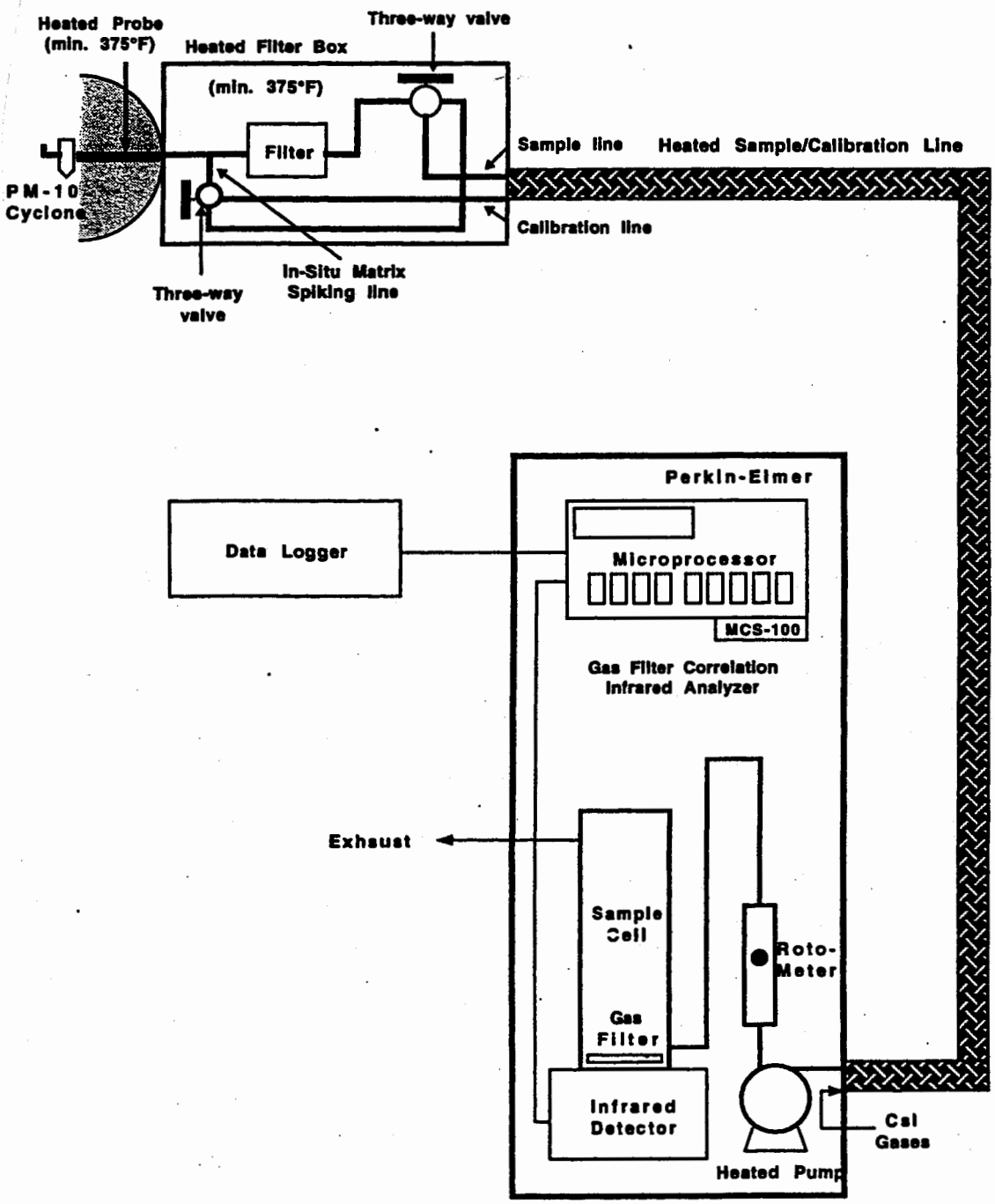


Figure 5.2 Sampling Train Schematic for Proposed EPA Method 322.

HCl in the sample cell attenuates an infrared light source. The intensity of the attenuated beam is measured by a detector positioned at the end of the cell. The amount of HCl in the sample gas stream is related to the amount of light attenuated.

5.6 DETERMINATION OF CARBON DIOXIDE, OXYGEN, AND TOTAL HYDROCARBONS

Continuous Emission Monitoring (CEM) was performed at each baghouse inlet and the common stack. All CEM data was recorded using a Tracor/Westronics 3000 automatic digital data logger. The CEM system was housed in the APCC Environmental Monitoring Laboratory positioned at the base of the exhaust stack. Stack gas was drawn from the stack through a heated Teflon® sample line (320°F nominal), and sample conditioning system (except the THC sample) to remove moisture from the gas stream. A leakless Teflon® diaphragm pump then drew the sample through an unheated dry Teflon® sample line and pump, and through a manifold under slightly positive pressure with a bypass to the atmosphere. CO_2 and O_2 samples were continuously drawn from this manifold to their respective analyzers. A heated sample was introduced directly to the THC analyzer. Figure 5.3 shows a schematic of the sampling system.

5.6.1 Carbon Dioxide and Oxygen

EPA Method 3A, "Determination of Oxygen and Carbon Dioxide Concentrations in Stationary Sources," was used to determine the CO_2 and O_2 concentrations at both test locations.

An Horiba CMA 321 NDIR analyzer was used to monitor CO_2 and O_2 concentrations. This instrument operates on the principle of CO_2 having a known characteristic absorption spectra in the infrared range. Radiation absorbed by CO_2 in the sample cell produces a capacitance change in the detector which is proportional to the CO_2 concentration. Oxygen was measured using the paramagnetic analytical procedure.

5.6.2 Total Hydrocarbons

EPA Method 25A, "Determination of Total Gaseous Organic Concentration using a Flame Ionization Analyzer," was used to determine the THC concentrations at both test locations. A VIG Industries Total Hydrocarbon Analyzer, which utilizes a flame ionization detector (FID), was used to measure hydrocarbons. Approximately 5.0 liters per minute (lpm) of sample gas is drawn from the source through a heated Teflon® sample line. The sample gas is drawn through a heated filter and valves by a heated pump. The sample gas is introduced into the FID chamber and any hydrocarbons in the sample are ionized by a hydrogen flame. The flame is positioned between two charged plates, and the associated electric field induces the migration of the ions towards the charged plates. The ion migration results in the generation of a current, which is directly proportional the amount of hydrocarbons present in the sample.

The analyzer was calibrated using methane calibration gas standards; therefore, the THC concentrations are in methane-equivalents.

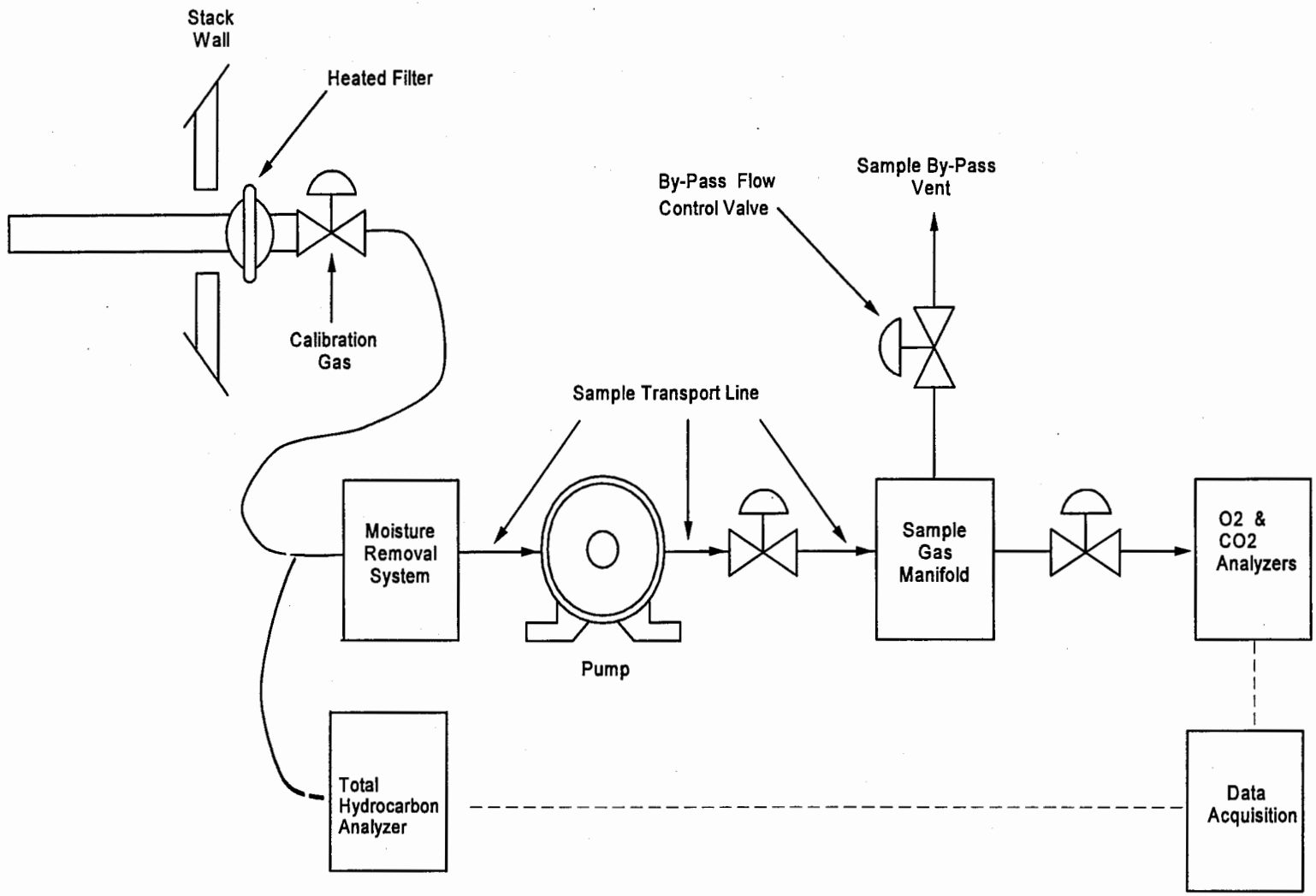


Figure 5.3 Sampling Train Schematic for EPA Methods 3A and 25A

5.6.3 Data Acquisition and Handling

All data was monitored by a Tracor/Westronics 3000 digital data logger which recorded using its integral color printer. Trends were monitored using the strip chart mode with averages printed digitally for 5-minute intervals and/or the test period. Emissions data was "sampled" by the data logger at 5-second intervals.

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 Calibration Procedure 2a of EPA/600/R-94/038c. 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 thermocouple displays 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
CHEMICAL LIME COMPANY - MONTEVALLO, ALABAMA

Temp. Sensor I.D.	Usage	Temperature, °R		Temperature Difference	Tolerances
		Reference	Sensor		
4E	Stack Gas	534	534	0.0%	<±1.5%
		498	498	0.0%	<±1.5%
		663	662	-0.15%	<±1.5%
		799	800	0.13%	<±1.5%
4F	Stack Gas	536	536	0.0%	<±1.5%
		498	498	0.0%	<±1.5%
		664	664	0.0%	<±1.5%
		801	802	0.12%	<±1.5%
MB-10	Meter Box Inlet	493	494	0.20%	<±1.5%
		536	536	0.0%	<±1.5%
		666	665	-0.15%	<±1.5%
	Outlet	492	494	0.40%	<±1.5%
		536	537	0.19%	<±1.5%
		666	665	-0.15%	<±1.5%
RMB-15	Meter Box Inlet	493	495	0.40%	<±1.5%
		534	534	0.0%	<±1.5%
		668	670	0.30%	<±1.5%
	Outlet	493	493	0.00%	<±1.5%
		534	535	0.19%	<±1.5%
		668	668	0.00%	<±1.5%

TABLE 6.2

SUMMARY OF PITOT TUBE DIMENSIONAL DATA
CHEMICAL LIME COMPANY - MONTEVALLO, ALABAMA

Measurement	Criteria	Results		
		Pitot Tube Identification		
		4E	4F	RP-21
α_1	<10°	0	1	0
α_2	<10°	1	0	1
β_1	<5°	1	1	1
β_2	<5°	3	0	0
γ	-	0	1	1
θ	-	1	0	0
A	-	0.973	0.94	1.023
Z	≤ 0.125"	0	0.017	0.0179
W	≤ 0.03125"	0.017	0	0
D_t	0.1875" ≤ D_t ≤ 0.375"	0.375	0.375	0.375
$A/2D_t$	1.05 D_t ≤ A≤ 1.50 D_t	1.30	1.25	1.364
	Acceptable	Yes	Yes	Yes
	Assigned Coefficient	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 were 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 EPA Method 23 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.

TABLE 6.3

SUMMARY OF DRY GAS METER AND ORIFICE CALIBRATION DATA CHEMICAL LIME COMPANY - MONTEVALLO, ALABAMA

Meter No.	γ				Orifice Coefficient		
	Pre-test	Post-test	% Diff.	EPA Criteria	Average	Range	EPA Criteria
MB-10	1.021	0.985	-3.6	± 5%	1.72	1.59 - 1.79	1.72 ± 0.20
RMB-15	1.000	1.002	0.2	± 5%	1.56	1.56 - 1.56	1.56 ± 0.20

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 axes 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 1/16 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.

6.2.3 Method 3A (Air Stream Composition) / Method 25A

The field QA/QC activities for Method 3A and Method 25A included the use of EPA Protocol calibration gases; pretest calibration error tests, system bias checks, and response time tests; and post-test zero and calibration drift determinations. Table 6.4 lists the calibration gas cylinder numbers, concentrations, and expiration dates. Calibration error tests, system bias checks, calibration drift checks, and response time checks are shown in Appendix D.

TABLE 6.4

SUMMARY OF CALIBRATION GAS CYLINDERS
CHEMICAL LIME COMPANY - MONTEVALLO, ALABAMA

Cylinder Number	Contents	Expiration Date
A018685	10.7 ppm HCl in nitrogen	08-26-98
A018704	26.0 ppm HCl in nitrogen	08-12-98
A018749	37.6 ppm HCl in nitrogen	08-25-98
A017718	101. ppm HCl in nitrogen	08-12-98
CC79006	29.97 ppm CH_4 in nitrogen	none listed
SX-27307	51.1 ppm CH_4 in nitrogen	08-20-99
CC46103	84.8 ppm CH_4 in nitrogen	none listed
CC84096	10.99 % CO_2 in $N_2/O_2/CO_2$	03-02-01
CC84096	11.05 % O_2 in $N_2/O_2/CO_2$	03-02-01
CC60029	20.2 % CO_2 in $N_2/O_2/CO_2$	04-03-99
CC60029	20.4 % O_2 in $N_2/O_2/CO_2$	04-03-99

6.2.4 Moisture

The EPA Method 23 sampling train was 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 module from the EPA Method 23 sampling train was also weighed and its weight included in the moisture catch.

6.2.5 Method 23

Table 6.5 summarizes the EPA Method 23 critical field sampling QA/QC 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 4% from 100%, thereby meeting the method criteria of 90-110%.

EPA Method 23 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 at the sampling site, depending on the location.

6.2.6 Proposed Method 322

Quality control and quality assurance procedures conducted by APCC in the determination of HCl by GFCIR are discussed in detail in the narrative which accompanies the APCC report which was reproduced and is presented in Appendix B-1.

6.3 EPA METHOD 23 PCDDs/PCDFs LABORATORY ANALYSES

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:

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.

TABLE 6.5

SUMMARY OF EPA METHOD 23 FIELD SAMPLING QA/QC DATA
CHEMICAL LIME COMPANY - MONTEVALLO, ALABAMA

Date	Sampling Location	Run No.	Sample Train Leak Checks			Isokinetic Ratio	
			Pre-Test (acfm)	Post-Test (acfm)	EPA Criteria (acfm)	Actual (%)	EPA Criteria (%)
03/23/98	Kiln 4 Baghouse Inlet	M23-4-I-1	0.004 @ 15" Hg	0.004 @ 12" Hg	0.02	102.8	90-110%
	Kiln Nos. 3 & 4 Baghouses Stack	M23-O-1	0.003 @ 15" Hg	0.001 @ 6" Hg	0.02	97.4	90-110%
03/24/98	Kiln 3 Baghouse Inlet	M23-3-I-2	0.003 @ 17" Hg	0.009 @ 18" Hg	0.02	103.7	90-110%
	Kiln Nos. 3 & 4 Baghouses Stack	M23-O-2	0.003 @ 15" Hg	0.001 @ 6" Hg	0.02	102.3	90-110%

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.

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 6.6 summarizes the recovery efficiencies for the various standards and the respective quality control limits. In general, 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.

TABLE 6.6

SUMMARY OF EPA METHOD 23 STANDARDS RECOVERY EFFICIENCIES CHEMICAL LIME COMPANY - MONTEVALLO, ALABAMA

	Percent Recovery								QC Limits
	TLI M23 Blank	M23 -4- I-1	M23 -3- I-2	M23 O-1	M23 O-2	FB-1	FB-2	RB 1-4	
FULL SCREEN ANALYSIS									
Internal Standards									
2378-TCDF	65.8	71.2	73.1	22.9	57.4	74.4	70.4	66.0	40-130%
2378-TCDD	67.9	78.1	74.0	22.3	54.3	63.1	66.2	59.9	40-130%
12378-PeCDF	68.6	68.5	64.9	25.6	54.4	70.1	72.1	62.5	40-130%
12378-PeCDD	99.4	71.8	68.3	31.3	62.6	83.6	95.3	76.1	40-130%
123678-HxCDF	68.1	119	87.9	35.4	74.0	72.8	96.7	81.6	40-130%
123678-HxCDD	78.7	115	93.0	36.3	71.9	91.7	104	97.6	40-130%
1234678-HpCDF	83.7	115	100	33.7	67.7	80.5	102	82.8	25-130%
1234678-HpCDD	92.5	116	107	38.7	77.0	106	133	101	25-130%
12346789-OCDD	83.0	103	95.4	25.1	47.7	119	114	115	25-130%
Surrogate Standards									
2378-TCDD	87.9	83.3	84.7	92.6	87.1	93.5	92.1	83.8	70-140%
23478-PeCDF	106	89.3	88.8	107	98.8	106	107	101	70-140%
123478-HxCDF	108	78.3	81.0	91.3	91.0	90.4	84.6	82.5	70-140%
123478-HxCDD	114	75.5	75.6	99.4	95.9	92.9	85.0	82.5	70-140%
1234789-HpCDF	90.1	83.6	85.1	84.8	82.2	110	82.6	95.2	70-140%
Alternate Standards									
123789-HxCDF	84.5	82.4	90.3	38.5	66.8	84.9	85.6	87.7	40-130%
234678-HxCDF	81.8	114	78.2	39.2	73.2	87.4	87.6	89.1	40-130%
CONFIRMATION ANALYSIS									
Internal Standards									
2378-TCDF	69.2	80.4	73.5	21.4	54.0	*	73.7	*	40-130%

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

APPENDIX A

RAW FIELD DATA

Appendix A.1

Raw Field Data
Kiln No. 3 Baghouse Inlet

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

Plant: montevallo

Date: 3-23-98

Sampling Location: Kiln #3 Inlet

Inside of Far Wall to Outside of Nipple: 103

Inside of Near Wall to Outside of Nipple (Nipple Length): 5"

Stack I.D.: 98" => 52.38 ft²

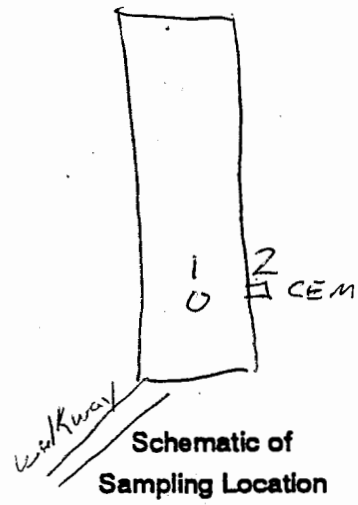
Distance Downstream from Flow Disturbance (Distance B):

540 inches / Stack I.D. = 5.5 dd

Distance Upstream from Flow Disturbance (Distance A):

420 inches / Stack I.D. = 4.3 dd

Calculated By: TA



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	98"	2 1/2	5"	7 1/2
2	.082		8		13
3	.146		14 1/4		19 1/4
4	.226		22		27 1/8
5	.342		33 1/2		38 1/2
6	.658		64 1/2		69 1/2
7	.774		75 7/8		80 7/8
8	.854		~~90~~ 83 5/8		~~95.0~~ 88 5/8
9	.918		90		95.0
10	.974		95 1/2		100 1/2

GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant: Chemical Lime Montevallo Date: 3-23-98
Sampling Location: Kiln #3 Inlet Clock Time: 1440
Run #: ~~Pretest~~ TOP RUN #1 (aka m2-3-I-1) Operators: MM / FP
Barometric Pressure, in. Hg: 30.0 EWS Static Pressure, in. H_2O: -3.4
Moisture, %: 6 Molecular wt., Dry: Pitot Tube, Cp: .84
Stack Dimension, in. Diameter or Side 1: 96" Side 2:
Wet Bulb, °F: Dry Bulb, °F:

Degree	Direction	Traverse Point Number	Velocity Head in. H_2O	Stack Temp. °F
	A	1	0.24	–
		2	0.34	881
		3	0.42	943
		4	0.45	944
		5	0.27	944
		6	0.39	943
		7	0.42	942
		8	0.52	943
		9	0.49	944
	A	10	0.40	939
		1	0.80	950
		2	0.85	950
		3	0.79	948
		4	0.66	940
		5	0.54	932
		6	0.45	929
		7	0.51	927
		8	0.38	916
		9	0.45	915
		10	0.27	~~896~~ 910
			.6841	
			$\overline{\sqrt{\Delta P}}$ = ~~.6849~~	$\overline{Ts}$ = ~~935~~

$\overline{\Delta P}$ ~~.4835~~ 934

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

$Md = (0.44 \times 12) + (0.32 \times 8) + (0.28 \times \quad)$

$Md =$

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

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

$Ms =$

$\overline{Ts} =$ °F = °R (°F + 460)

.52 $Ps = Pb + \frac{S.P.}{13.6} = (\quad) + \frac{\quad}{13.6}$

$Ps =$ in. Hg

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

0.60 TOP

0.60 $Vs = 85.49 \times Cp \times \overline{\sqrt{\Delta P}} \times \sqrt{\frac{Ts\,(°R)}{Ps \times Ms}}$

0.60

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

$Vs =$ ft/s

$As =$ ft^2

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

$Qs = \quad \times \quad \times 60$

$Qs =$ 190,313 acfm

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

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

$Qs_{std} =$ 70,954 dscfm

K = 9.78

FIELD DATA SHEET

Y = 1.021 cus

Plant: Chemical Lime - Montevallo
Sampling Location: Inlet Kiln #3
Run Number: m23-3 I-2 Date: 3-24-98
Pretest Leak Rate: .003 cfm @ 17 in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: —

Sample Type: m-23 Operator: TA/MM
Pbar: 30.0 Ps: -1.9
CO2: 12 O2: 9
Probe Length/Type: 8' Glass Pitot #:
Stack Diameter: 98" As: 52.38

Nozzle ID: .31 Thermocouple #:
Assumed Bws: .06 Filter #: N/A
Meter Box #: 10 Y: 1.016 ΔH@: 1.940
Post-Test Leak Rate: .009 cfm @ 18 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: —

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 Trap ~~Probe~~	Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Outlet (Tm out °F)	Pump Vacuum (in. Hg)	Leak Check
1	0	0	1332	337.450											.270
	1	9	1341	342.9	.35	1.4	1.4	890	55	240	55	79	80	3	.340
	2	18	1350	348.1	.32	1.2	1.2	892	52	240	53	81	83	5	=.070
	3	27	1359	353.5	.35	1.4	1.4	892	56	241	48	83	79	5	
	4	36	1408	358.0	.32	1.2	1.2	889	55	241	47	83	80	6	
	5	45	1417	363.9	.35	1.4	1.4	889	56	240	46	83	80	8	
	6	54	1440	369.9	.35	1.4	1.4	888	50	240	46	84	80	10	
	7	63	1449	374.2	.35	1.4	1.4	889	57	239	46	79	80	10	
	8	72	1459	379.5	.32	1.2	1.2	891	56	240	46	80	81	10	
	9	81	1508	384.3	.28	1.1	1.1	888	59	238	50	88	84	15	
	10	90	1517	389.270	.28	1.1	1.1	891	55	240	55	88	84	16	
			1524												
2	1	99	1538	394.2	.23	.90	.90	885	56	240	55	89	20	3	
	2	108	1546	398.4	.23	.90	.90	901	56	240	56	94	89	3	
	3	117	1555	403.5	.32	1.2	1.2	911	56	240	56	93	88	5	
	4	126	1604	408.6	.28	1.1	1.1	919	53	239	52	87	84	5	
	5	135	1613	413.307	.28	1.1	1.1	914	52	240	52	85	82	7	
	6	144	1633	418.2	.35	1.4	1.4	936	50	241	47	76	76	7	
	7	153	1642	423.8	.35	1.4	1.4	930	49	240	47	75	75	10	
	8	162	1651	429.3	.35	1.4	1.4	919	48	240	47	76	75	12	
	9	171	1700	434.3	.32	1.2	1.2	913	48	240	48	75	75	15	
	10	180	1709	439.376	.30	1.1	1.1	906	48	240	48	75	74	16	
				Leak Check	-.070										56, 812
															57, 259

ΔVm= 101.856 $\overline{\sqrt{\Delta p}}$= .5592 $\overline{\Delta H}$= 1.23 $\overline{Ts}$= 902 $\overline{Tm}$= 82

MULTI-METALS SAMPLE RECOVERY DATA

m23-3-I-2

Plant: Chem-Lime Montevallo		Run No.: M23-I-2
Date: 3/24/98	Sample Box No.:	Job No.: R012-002
Sample Location: Baghouse Inlet, Kiln #3		
Sample Type: US EPA Method 23		
Sample Recovery Person: MDM		

Container	Description	Volume, ml	Sealed/Level Marked
Front Half			
1	Filter No.(s)		
2	Acetone Rinse		
3	Nitric Rinse		
Back Half			
4	Nitric Rinse - Imp. 1,2,3, + Back 1/2 Filter		
5A	Nitric Rinse - Impinger No. 4		
5B	KMNO4/H2O Rinse - Impingers 5 & 6		
5C	HCl Rinse - Impingers 5 & 6		

Moisture Data

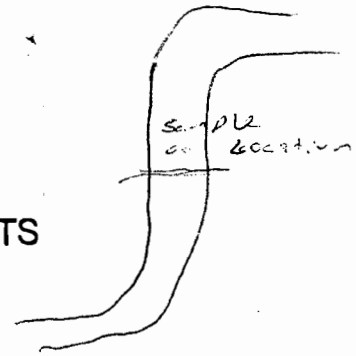
Impinger No.	Contents 104.2	Initial Volume, ml	Weight, grams Initial	Final	Net
XAD	XAD resin	-	311.9	317.5	
1	K.O.	0	474.3	613.3	
2	H_2O	150	764.0	752.0	
3	MT	0	530.1	531.7	
4	S.Gl	-	863.7	889.5	
Total					

Comments:

Appendix A.2

Raw Field Data
Kiln No. 4 Baghouse Inlet

H 1½



TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

Plant: CHEMLIME MONTEVALLO, AL

Date: 3-23-98

Sampling Location: B4 INLET KILN #4

Inside of Far Wall to Outside of Nipple: 104"

Inside of Near Wall to Outside of Nipple (Nipple Length): 4" + 2" refrac.

Stack I.D.: 98"

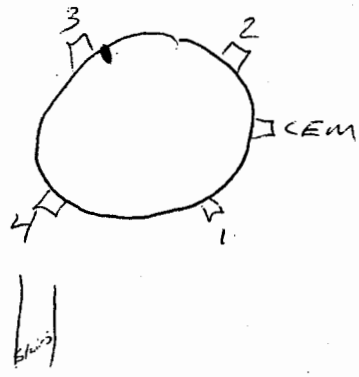
Distance Downstream from Flow Disturbance (Distance B):

≈ 45' 540 inches / Stack I.D. = 5.5 dd

Distance Upstream from Flow Disturbance (Distance A):

≈ 35' 420 inches / Stack I.D. = 4.3 dd

Calculated By: TA/GG



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	0.026	98	2 ½	6"	8½
2	.082	↓	8	↓	14
3	.146	↓	14 ¼	↓	20½
4	.226	↓	22 ¼	↓	28¼
5	.342	↓	33½	↓	39½

GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant: Monticello - ChemLime Date: 3-22-98
Sampling Location: Inlet - Kiln #4 Clock Time: 1352
Run #: Preliminary Operators: TA/CG
Barometric Pressure, in. Hg: _____ Static Pressure, in. H_2O: -2.4
Moisture, %: 7% Molecular wt., Dry: _____ Pitot Tube, Cp: .84
Stack Dimension, in. Diameter or Side 1: _____ Side 2: _____
Wet Bulb, °F: _____ Dry Bulb, °F: _____

Degrees	Direction	Port	Traverse Point Number	Velocity Head in. H_2O	Stack Temp. °F
5	CC	1	1	.21	764
0	—		2	.24	781
0	—		3	.20	761
0	~~CC~~		4	.19	695
7	CC		5	.17	680
5	CC		6	.14	560
0	—	4	1	.33	800
7	CW		2	.28	780
7	CW		3	.31	771
11	CW		4	.35	752
0	—		5	.29	700
3	CW		6	.30	654
4	CW	2	1	.38	787
0	—		2	.38	785
0	—		3	.41	781
4	CW		4	.35	742
4	CW		5	.31	711
0	—		6	.26	635
4	CW	3	1	.37	788
0	—		2	.47	787
0	—		3	.50	796
0	—		4	.49	776
0	—		5	.40	623
0	—		6	.29	590
2.5°					
				$\overline{\sqrt{\Delta P}}$ = .5566	$\overline{Ts}$ =

.3175

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

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

$Md =$

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

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

$Ms =$

$\overline{Ts} =$ °F = °R (°F + 460)

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

$Ps =$ 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

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

$Qs = \quad \times \quad \times 60$

$Qs =$ acfm

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

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

$Qs_{std} =$ dscfm

DN CAL
.341
31
K = 4.9

GAS VELOCITY AND VOLUMETRIC FLOW RATE

Probe 4E

Plant: Chem lime Montevallo Date: 3-24-98

Sampling Location: Kiln #4 Inlet Clock Time: ~ 14:30

Run #: I-2 (aka m2-4-I-2) Operators: TA / MM

Barometric Pressure, in. Hg: 30.0 Static Pressure, in. H_2O: -2.6

Moisture, %: 6.0 Molecular wt., Dry: _____ Pitot Tube, Cp: .84

Stack Dimension, in. Diameter or Side 1: 98" Side 2: _____

Wet Bulb, °F: _____ Dry Bulb, °F: _____

	Traverse Point Number	Velocity Head in. H_2O	Stack Temp. °F
4	1	.34	880
	2	.36	892
	3	.38	907
	4	.46	873
	5	.19	810
1	1	.25	885
	2	.27	899
	3	.36	891
	4	.32	883
	5	.18	810
2	1	.45	903
	2	.42	900
	3	.50	915
	4	.46	904
	5	.23	790
3	1	.70	903
	2	.75	910
	3	.86	920
	4	.65	920
	5	.55	900
		$\overline{\sqrt{\Delta P}}$ = .0426	$\overline{Ts}$ = 884

885

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

$Md = (0.44 \times 12) + (0.32 \times 9) + (0.28 \times \quad)$

$Md = 30.28$

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

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

$Ms = 29.54$

$\overline{Ts} = \quad °F = \quad °R \ (°F + 460)$

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

$Ps = 29.02$ in. Hg

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

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

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

$Vs = 57.0$ ft/s

$As = 52.38$ ft^2

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

$Qs = \quad \times \quad \times 60$

$Qs = 179,220$ acfm

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

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

$Qs_{std} = 65,900$ dscfm

FIELD DATA SHEET

K = 9.45 4.6% H_2O

Y = 1.021 cons

Plant: Chemline - Montevallo
Sampling Location: Inlet Kiln #4 m23-4
Run Number: I-1 Date: 3-23-98
Pretest Leak Rate: .004 cfm @ 15 in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: —

Sample Type: M-23 Operator: TA/MM
Pbar: 30.00 Ps: -3.4
CO2: 12 O2: 9
Probe Length/Type: 5' Glass Pitot #: 4E
Stack Diameter: 98" As: 52.38

Nozzle ID: .31 Thermocouple #: 4E
Assumed Bws: 7% Filter #: Glass
Meter Box #: 10 Y: 1.016 ΔH@: 1.94
Post-Test Leak Rate: ~~[illegible]~~ cfm @ 12 in. Hg.
Post-Test Leak Check: Pitot: ✓ Orsat: —

Port	Traverse Point Number	Sampling Time (min)	Clock Time (24-hour clock)	Gas Meter Reading (Vm) ft^3	Velocity Head (Δp) in H2O	Orifice Pressure Differential (ΔH) in H2O Desired	Actual	Stack Temp. (Ts)	Temperature °F Trap ~~Probe~~	Filter	Impinger Temp. °F	Dry Gas Meter Temp. Inlet (Tm in °F)	Outlet (Tm out °F)	Pump Vacuum (in. Hg)	Leak clocks
4	0	0	1400	222.852											
	1	9	1409	229.2	.50	1.8	1.8	908	55	250	50	65	63	7	
	2	18	1418	235.4	.48	1.8	1.8	912	50	244	42	71	70	8	2.185
	3	27	1427	241.5	.50	1.8	1.8	910	53	244	48	72	70	12	2.631
	4	36	1436	247.3	.38	1.4	1.4	884	54	244	48	72	70	10	-0.446
	5	45	1445/1448	252.185	.22	0.91	0.91	780	53	243	48	73	71	8	
1	1	54	1514	257.4	.28	1.1	1.1	874	50	246	50	73	71	6	
	2	63	1526	263.1	.32	1.2	1.2	878	53	244	49	75	72	8	.180
	3	72	1535	268	.32	1.2	1.2	875	55	242	48	75	71	8	.277
	4	81	1544	273.0	.25	.97	0.97	876	55	235	50	76	72	8	-.097
	5	90	1553	277.180	.22	0.91	0.91	874	53	239	53	76	72	8	
Stop @ 106 to change Filter	1	99	1610/16	282.2	.31	1.2	1.2	890	53	240	53	73	71	8	.948
2	2	108	1628	288	.45	1.7	1.7	896	52	241	52	73	71	13	.995
	3	117	1636	294.3	.49	1.8	1.8	899	52	240	52	73	72	6	-.047
	4	126	1646	300.7	.49	1.8	1.8	887	51	238	53	75	72	8	
	5	135	1655/1700	306.831	.28	1.1	1.1	850	52	241	53	75	72	7	.831
3	1	144	1731	312.2	.55	2.1	2.1	885	53	240	53	74	71	12	
	2	153	1740	319.0	.32	1.2	1.2	897	51	240	53	74	71	7	
	3	162	1749	326.2	.47	1.8	1.8	890	51	241	52	74	72	10	
	4	171	1759	330.9	.40	1.5	1.5	870	51	240	52	74	72	10	
	5	180	1808	336.453	.30	1.2	1.2	820	51	241	53	75	72	8	
			Leak Check												
			#1	-0.446											
			#2	-0.097											
			#3	-0.047											
			#4												
			Total	-0.590											

ΔVm = 113.011 $\overline{\sqrt{\Delta p}}$ = 1.0080 $\overline{\Delta H}$ = 1.42 $\overline{Ts}$ = 878 $\overline{Tm}$ = 72

ACFM 169,308

62,600 DSCFM

MULTI-METALS SAMPLE RECOVERY DATA

aka M23-4-I-1
M23-I-1

Plant: Chem-Lime Montevallo, AL		Run No.: M23-4-I
Date: 3/23/98	Sample Box No.:	Job No.: S R012-002
Sample Location: Kiln #4 Inlet to Baghouse		
Sample Type: Method 23		
Sample Recovery Person: MPM		

Container	Description	Volume, ml	Sealed/Level Marked
Front Half			
1	Filter No.(s)		
2	Acetone Rinse		
3	Nitric Rinse		
Back Half			
4	Nitric Rinse - Imp. 1,2,3, + Back 1/2 Filter		
5A	Nitric Rinse - Impinger No. 4		
5B	KMNO4/H2O Rinse - Impingers 5 & 6		
5C	HCl Rinse - Impingers 5 & 6		

Moisture Data

Impinger No.	Contents Tag # (104-5)	Initial Volume, ml	Weight, grams Initial	Final	Net
XAD	313.0	-	313.0	318.7	5.7
1	K.O	0	475.1	559.8	84.7
2	DI H_2O	100	691.7	685.1	-6.6
3	DI H_2O	100	679.0	680.7	1.7 ~~0.3~~
4	MT	0	619.0	621.5	2.5
5	Si Gel	-	936.3	967.2	30.9 ~~30.6~~
					118.9
Total					~~117.2~~

Comments:

MULTI-METALS SAMPLE RECOVERY DATA

Plant: Chem Lime Montevallo		Run No.: M23-FB-1
Date: 3/23/98	Sample Box No.:	Job No.: R012-002
Sample Location: Inlet - Kiln #4		
Sample Type: Method 23		
Sample Recovery Person: MDM		

Container	Description	Volume, ml	Sealed/Level Marked
Front Half			
1	Filter No.(s)		
2	Acetone Rinse		
3	Nitric Rinse		
Back Half			
4	Nitric Rinse - Imp. 1,2,3, + Back 1/2 Filter		
5A	Nitric Rinse - Impinger No. 4		
5B	KMNO4/H2O Rinse - Impingers 5 & 6		
5C	HCl Rinse - Impingers 5 & 6		

Moisture Data

Impinger No.	Contents 103-C	Initial Volume, ml	Weight, grams		
			Initial	Final	Net
XAD	XAD	-	304.7	304.8	
1	K.O.	0	474.5	474.6	
2	H_2O	150 ml	764.9	764.2	
3	MT	0	530.6	530.6	
4	SiGel	-	863.5	864.2	
Total					

Comments:

Appendix A.3

Raw Field Data
Kiln No. 3 Baghouse and Kiln No. 4 Baghouse Stack

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

Plant: Chemical Lime Montevallo

Date: 3-22-97

Sampling Location: Kiln Outlet - 3+4 Common Stack

Inside of Far Wall to Outside of Nipple: 126 1/4

Inside of Near Wall to Outside of Nipple (Nipple Length): 6.25

Stack I.D.: 10' 120" => 78.54 ft2

Distance Downstream from Flow Disturbance (Distance B):

864 inches / Stack I.D. = 7.2 dd

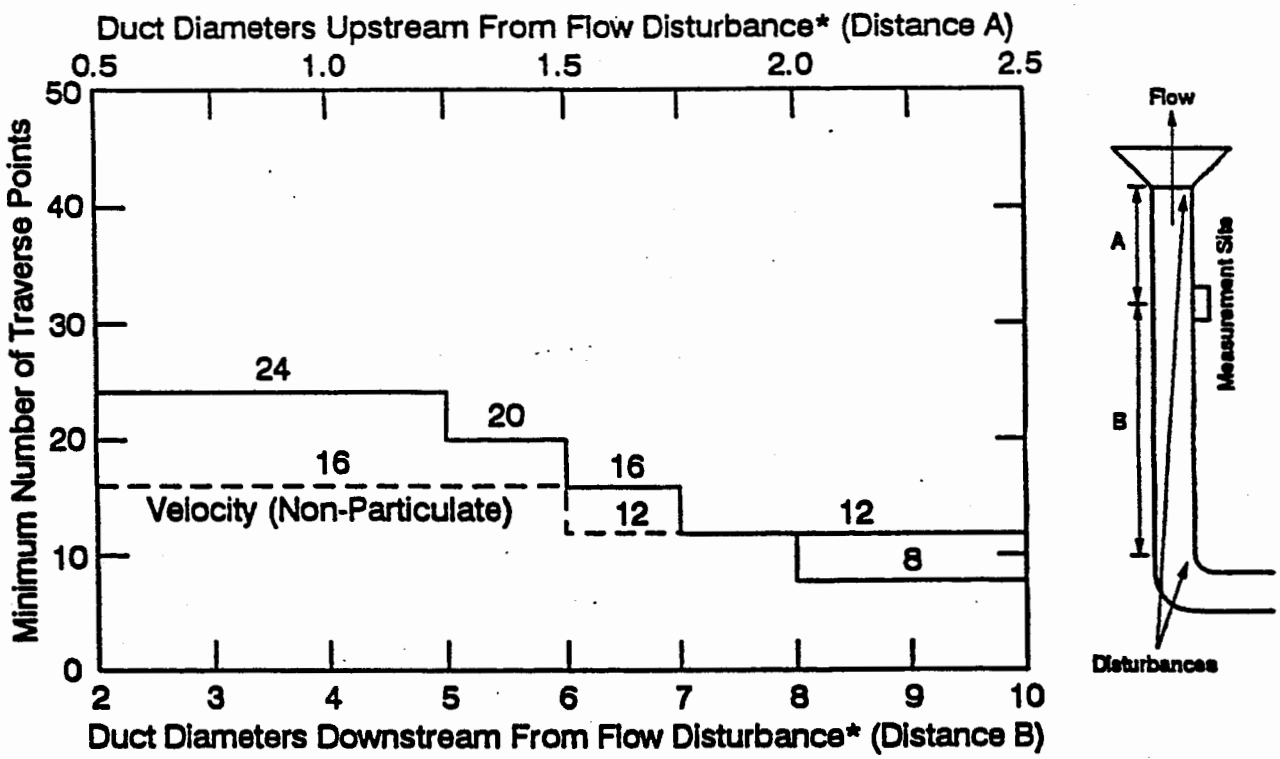
Distance Upstream from Flow Disturbance (Distance A):

422 inches / Stack I.D. = 3.5 dd

Calculated By: TA

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	.044	120	5.50	6 1/4	11.75
2	.146	↓	17.5	↓	23.75
3	.296	↓	35.5	↓	41.75



* From Point of Any Type of Disturbance (Bend, Expansion, Contraction, etc)

LOCATION OF TRAVERSE POINTS IN CIRCULAR DUCTS
(Fraction of Stack Diameter from Inside Wall to Traverse Point)

Traverse Point Number on a Diameter	Number of Traverse Points on a Diameter				
	4	6	8	10	12
1	0.067	0.044	0.032	0.026	0.021
2	0.250	0.146	0.105	0.082	0.067
3	0.750	0.296	0.194	0.146	0.118
4	0.933	0.704	0.323	0.226	0.177
5		0.854	0.677	0.342	0.250
6		0.956	0.806	0.658	0.356
7			0.895	0.774	0.644
8			0.968	0.854	0.750
9				0.918	0.823
10				0.974	0.882
11					0.933
12					0.979

.24
K= 1.564

DN= .257

K= 2.5

GAS VELOCITY AND VOLUMETRIC FLOW RATE

.350
K=7.04

Plant: Chemline Montevallo Date: 3-22-98

Sampling Location: Outlet Kiln 3 + 4 Common Stack Clock Time: 15:0

Run #: PRELIMINARY Operators: TA

Barometric Pressure, in. Hg: Static Pressure, in. H_2O: -.72

Moisture, %: 13.6 Molecular wt., Dry: Pitot Tube, Cp: .84

.30
K=3.82

Stack Dimension, in. Diameter or Side 1: Side 2:

Wet Bulb, °F: Dry Bulb, °F:

		Traverse Point Number	Velocity Head in. H_2O	Stack Temp. °F
.5	cc	1	.72	413
6	cc	2	.68	414
5	cc	3	.68	415
0	—	4	.75	414
0	—	5	.77	415
0	—	6	.81	416
5	cw	7	.82	417
8	cw	8	.82	417
7	cw	9	.80	418
0	—	10	.79	418
0	—	11	.80	418
0	—	12	.79	417
0	—	1	.65	
0	—	2	.63	
0	—	3	.63	
5	cc	4	.72	
6	cc	5	.77	
0	—	6	.84	
0	—	7	.88	
7	cw	8	.93	
8	cw	9	.92	
0	—	10	.90	
0	—	11	.83	415
0	—	12	.80	410
		$\sqrt{\overline{\Delta P}}$ = .8821	$\overline{Ts}$ =	

2.6°

.7804

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

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

$Md =$

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

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

$Ms =$

$\overline{Ts} =$ °F = °R (°F + 460)

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

$Ps =$ in. Hg

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

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

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

$Vs =$ ft/s

$As =$ ft^2

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

$Qs = \quad \times \quad \times 60$

$Qs =$ acfm

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

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

$Qs_{std} =$ dscfm

GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant: CHEMICAL LIME PLANT, MONTEVALLO Date: 3-25-98
Sampling Location: OUTLET OF KILNS #3 & #4 Clock Time: 9:10
Run #: M2-O-3 Operators: PS
Barometric Pressure, in. Hg: 30.0 Static Pressure, in. H_2O: -0.65
Moisture, %: _____ Molecular wt., Dry: _____ Pitot Tube, Cp: 0.84
Stack Dimension, in. Diameter or Side 1: 10' = 120" Side 2: _____
Wet Bulb, °F: _____ Dry Bulb, °F: _____

Traverse Point Number	Velocity Head in. H_2O	Stack Temp. °F
A 1	0.61	407
2	0.83	413
3	0.90	417
B 1	0.54	398
2	0.75	415
3	0.81	419
C 1	0.40	382
2	0.62	409
3	0.64	418
D 1	0.47	402
2	0.62	412
3	0.73	416
	$\overline{\sqrt{\Delta P}}$ = 0.8074	$\overline{T_s}$ = 409

$()^2 = 0.652$

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

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

$Md =$

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

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

$Ms =$

$\overline{T_s} =$ °F = °R (°F + 460)

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

$Ps =$ 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

$Qs = \quad \times \quad \times 60$

$Qs =$ acfm

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

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

$Qs_{std} =$ dscfm

FIELD DATA SHEET

K = 3.53
Y = 1.000 avg

Plant: Chemical Lime Montanelli
Sampling Location: Kiln Outlet (#443)
Run Number: M230-1 Date: 5-23-94
Pretest Leak Rate: .003 cfm @ 15 in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: NA

Sample Type: M23 Operator: G Gay
Pbar: 30.0 Ps: -.48
CO2: 17 O2: 9
Probe Length/Type: 4' Glass Pitot #: 4F
Stack Diameter: 10 As: 78.53

Nozzle ID: .25 Thermocouple #: 4F
Assumed Bws: 13 Filter #:
Meter Box #: RMB-15 Y: ~~.995~~ ΔH@: 1.92
Post-Test Leak Rate: .001 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)	
		1400 2:00	019.352											
1	7.5	207	025.1	.99 ~~.99~~	2.1	2.1	416	255	252	66	65	65	5	cond/Tcm 57
	15	217	030.6	.99	2.1	2.1	419	247	251	58	65	66	6	
2	22.5	225	036.8	.92	1.9	1.9	419	252	255	52	65	66	5	
	30	232	041.2	.92	1.9	1.9	419	258	246	53	65	66	5	52
3	37.5	240	045.6	.55	1.2	1.2	409	255	244	53	68	67	5	
	45	248	049.7	.55	1.2	1.2	407	248	242	52	68	67	5	52
1	52.5	317	054.8	.85	1.8	1.8	418	259	250	58	68	69	5	
	60	315	059.7	.85	1.8	1.8	418	256	243	66	68	67	5	50
2	67.5	322	065.2	.84	1.8	1.8	419	260	253	55	68	67	5	
	75.0	330	069.2	.84	1.8	1.8	417	257	255	52	67	68	5	50
3	82.5	337	—	.68	1.45	1.4	418	255	249	53	67	68	5	
	90	345	074.8	.68	1.45	1.4	417	255	250	53	67	69	5	51
1	97.5	409	079.5	.64	1.3	1.3	418	256	257	60	67	67	5	
	105	416.5	083.8	.64	1.3	1.3	418	252	255	52	67	68	5	50
2	112.5	432	088.5	.64	1.3	1.3	417	253	258	47	67	67	5	
	120	439	093.1	.64	1.3	1.3	419	250	251	50	67	67	5	
3	127.5	447	097.1	.48	1.0	1.0	419	251	247	49	67	68	5	50
	135	455	100.803	.49	1.0	1.0	415	255	252	50	67	69	5	
1	142.5	530	106.0	.75	1.6	1.6	418	250	256	52	68	68	5	
	150	537.5	110.6	.75	1.6	1.6	418	253	252	45	68	69	5	49
2	157.5	545	115.3	.63	1.3	1.3	419	255	254	42	68	69	5	
	165.0	552	119.5	.63	1.3	1.3	417	251	250	45	72	69	5	
3	172.5	559	~~123.8~~	.50	1.0	1.0	416	252	251	46	70	73		50
	180.0	606	127.468	.50	1.0	1.0	410	253	250	46	74	70		

Stop 500 3.05 2.86
Stop 308 Start
Stop 345 Start 401
Stop 417 Start 426
527

ΔVm = 108.116 $\overline{\sqrt{\Delta p}}$ = .8298 $\overline{\Delta H}$ = 1.47 $\overline{Ts}$ = 416 $\overline{Tm}$ = 68

28534
149726

FIELD DATA SHEET

K = 3.85
Y = 1.000 eyes

Plant: Chemical Lime Montevillo
Sampling Location: Kiln Outlet
Run Number: M23-0-2 Date: 3-29-94
Pretest Leak Rate: .003 cfm @ 15 in. Hg.
Pretest Leak Check: Pitot: ✓ Orsat: NA

Sample Type: M23 Operator: GGM
Pbar: 30 Ps: -.62
CO2: 12 O2: 9
Probe Length/Type: 4' Glass Pitot #: 4E
Stack Diameter: 10' As: 78.53

Nozzle ID: .250 Thermocouple #: 4E
Assumed Bws: 8.9 Filter #:
Meter Box #: RnB15 Y: .995 ΔH@: 1.92
Post-Test Leak Rate: .001 cfm @ 6 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	132	128.232											Cont. Test
1	7.5	139	132.4	.68	1.58	1.6	416	253	250	69	71	70	5	60
	15	147	137.5	.68	1.58	1.6	418	249	252	64	72	70	5	52
2	22.5	155	142.1	.62	1.4	1.4	416	250	240	59	74	72	5	
	30	202	146.4	.62	1.4	1.4	418	253	248	53	76	73	5	
3	37.5	209	151.3	.51	1.47	1.5	411	252	249	50	78	74	5	48
	45	218	155.278	.51	1.27	1.2	409	255	255	48	80	75	5	
1	52.5	239	159.9	.58	1.3	1.3	413	252	247	50	81	75	5	
	60	246	164.1	.58	1.3	1.3	419	250	245	47	81	78	5	48
2	67.5	253	168.1	.61	1.4	1.4	417	248	247	46	83	78	5	
	75	301	172.9	.61	1.4	1.4	420	256	247	46	88	82	5	46
3	82.5	309	177.6	.44	1.0	1.0	418	247	245	47	90	83	5	
	90	316	181.3	.44	1.0	1.0	415	245	247	48	91	88	5	48
1	97.5	326	186.2	.80	1.9	1.9	419	243	245	47	92	85	6	
	105	343	191.9	.80	1.9	1.9	420	252	246	47	90	86	6	
2	112.5	350	197.5	.79	1.9	1.9	418	254	248	47	90	86	6	47
	120	358	200.9	.79	1.8	1.8	420	251	245	46	87	85	6	
3	127.5	406	207.1	.60	1.4	1.4	414	247	248	44	84	83	5	44
	135	413	211.5	.60	1.4	1.4	413	245	250	44	84	83	5	
1	142.5	431	218.1	.85	2.0	2.0	415	243	249	46	80	79	6	44
	150	439	222.8	.85	2.0	2.0	415	246	248	44	76	75	6	
2	157.5	447	228.5	.81	1.9	1.9	414	248	254	45	77	74	6	
	165	455	233.7	.81	1.9	1.9	414	254	245	47	76	73	6	46
3	172.5	502	238.4	.78	1.8	1.8	412	250	246	47	76	73	6	
	180	509	243.307	.78	1.8	1.8	412	248	247	47	76	73	6	

Leak check measure. 155.358 231

START 328

424

114.995 ΔVm= 115.075 $\overline{\sqrt{\Delta p}}$= .8163 $\overline{\Delta H}$= 1.575 $\overline{Ts}$= 416 $\overline{Tm}$= 80.0 PTS

MULTI-METALS SAMPLE RECOVERY DATA

Plant: Chan Lime Manufacturing		Run No.: M23-0-1
Date: 3/23/99	Sample Box No.:	Job No.: 2012.002
Sample Location: ~~Scrubber~~ Baghouse Outlet (#3 & #4 Kiln - Common)		
Sample Type: US EPA Method 23		
Sample Recovery Person: MMM		

Container	Description	Volume, ml	Sealed/Level Marked
Front Half			
1	Filter No.(s)		
2	Acetone Rinse		
3	Nitric Rinse		
Back Half			
4	Nitric Rinse - Imp. 1,2,3, + Back 1/2 Filter		
5A	Nitric Rinse - Impinger No. 4		
5B	KMNO4/H2O Rinse - Impingers 5 & 6		
5C	HCl Rinse - Impingers 5 & 6		

Moisture Data

Impinger No.	Contents (104.6 - Trap)	Initial Volume, ml	Weight, grams		
			Initial	Final	Net
XAD	XAD	-	297.9	306.4	8.5
1	~~H_2O~~ K.O	~~100~~ 0	492.6	845.7	353.1
2	H_2O	100 ml	709.0	707.9	-1.1
3	H_2O	100	733.9	735.4	1.5
4	MT	0	613.5	615.7	2.2
5	Si Gel	-	908.6	934.7	26.1
Total					390.3

Comments:

MULTI-METALS SAMPLE RECOVERY DATA

Plant: Cibem Lime Montevallo		Run No.: M23-0-2
Date: 3/24/99	Sample Box No.:	Job No.: R012-002
Sample Location: Baghouse Outlet - Kilns 3+4		
Sample Type: US EPA Method 23		
Sample Recovery Person: MDM		

Container	Description	Volume, ml	Sealed/Level Marked
Front Half			
1	Filter No.(s)		
2	Acetone Rinse		
3	Nitric Rinse		
Back Half			
4	Nitric Rinse - Imp. 1,2,3, + Back 1/2 Filter		
5A	Nitric Rinse - Impinger No. 4		
5B	KMNO4/H2O Rinse - Impingers 5 & 6		
5C	HCl Rinse - Impingers 5 & 6		

Moisture Data

Impinger No.	Contents (Numbered - Trap)	Initial Volume, ml	Weight, grams		
			Initial	Final	Net
XAD	XAD Resin.	-	341.2	348.0	
1	K.O.	0	475.1	847.7	
2	H_2O	100	690.5	687.1	
3	H_2O	100	687.9	684.5	
4	MT	0	621.0	622.0	
5	Si Gel	-	930.2	957.6	
Total					

Comments:

MULTI-METALS SAMPLE RECOVERY DATA

FIELD BLANK

Plant: Cibolo Lime Monterrico		Run No.: M23-F6-2
Date: 3/24/98	Sample Box No.:	Job No.: 8017-002
Sample Location: Baghouse Outlet - Kilns 3+4		
Sample Type: US EPA Method 23		
Sample Recovery Person: MDM		

Container	Description	Volume, ml	Sealed/Level Marked
Front Half			
1	Filter No.(s)		
2	Acetone Rinse		
3	Nitric Rinse		
Back Half			
4	Nitric Rinse - Imp. 1,2,3, + Back 1/2 Filter		
5A	Nitric Rinse - Impinger No. 4		
5B	KMNO4/H2O Rinse - Impingers 5 & 6		
5C	HCl Rinse - Impingers 5 & 6		

Moisture Data

Impinger No.	Contents ~~Un-Dumped-Trap~~	Initial Volume, ml	Weight, grams Initial	Final	Net
XAD.	XAD resin	-	333.7	334.0	
1	K.O	0	493.9	493.7	
2	~~100~~ H_2O	100	728.8	728.9	
3	H_2O	100	712.6	712.8	
4	Int	0	614.9	614.8	
5	Si Gel	-	933.4	931.9	
Total					

Comments:

Appendix A.4

Raw Field Data
CO_2 Bubbler Slipstream

TRAVERSE POINT LOCATION FOR CIRCULAR DUCTS

Plant: CHEMICAL LIME - MONTEVALLO

Date: 3/23/98

Sampling Location: CO_2 BUBBLER Slipstream

Inside of Far Wall to Outside of Nipple: 33.5"

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

Stack I.D.: 29.5"

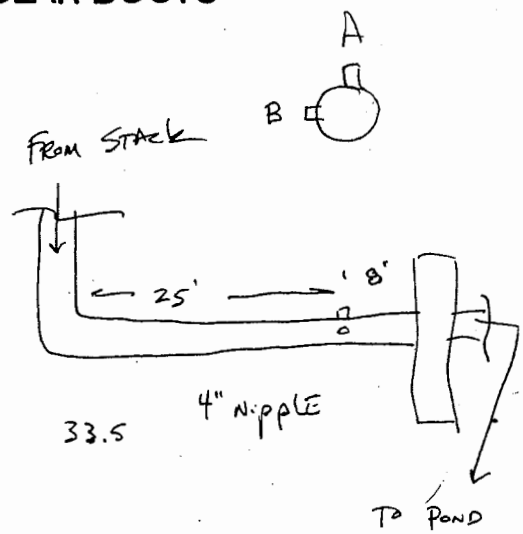
Distance Downstream from Flow Disturbance (Distance B):

25' inches / Stack I.D. = 10.2 dd

Distance Upstream from Flow Disturbance (Distance A):

8' inches / Stack I.D. = 3.3 dd

Calculated By: FRANK PHOENIX



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	0.067	2.0	2	4	6
2	0.250	7.4	7 3/8	4	11 3/8
3	0.750	22.1	22	4	26
4	0.933	27.5	27½	4	31½
1	.044	29.5	1.30	4	5 1/4
2	0.146	29.5	4.31	4	8 1/4
3	0.296	29.5	8.73	4	12 3/4
4	0.704	29.5	20.77	4	24 3/4
5	0.854	29.5	25.19	4	29 1/8
6	0.956	29.5	28.20	4	32 1/4

GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant: CHEMICAL LIME - MONTEVALLO, AL Date: 3/23/98

Sampling Location: CO_2 BUBBLER (slipstream) Clock Time: _____

Run #: 1 (aka m2-CBS-1) Operators: MDM & FJP

Barometric Pressure, in. Hg: 30.0 Static Pressure, in. H_2O: -1.5"

Moisture, %: ~ 1% Molecular wt., Dry: – Pitot Tube, Cp: 0.84

Stack Dimension, in. Diameter or Side 1: 29.5" Side 2: _____

Wet Bulb, °F: – Dry Bulb, °F: _____

Traverse Point Number	Velocity Head in. H_2O	Stack Temp. °F
H A 1	~~0.08~~ 0.11	253
2	0.28	254
3	0.31	289
4	0.30	320
5	0.22	330
6	0.08	331
V B 1	0.25	284
2	0.30	292
3	0.35	303
4	0.35	319
5	0.22	327
6	0.18	330
	$\overline{\sqrt{\Delta P}}$ = .4868	$\overline{Ts}$ = 303

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

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

$Md =$

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

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

$Ms =$

$\overline{Ts} =$ °F = °R (°F + 460)

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

$Ps =$ in. Hg

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

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

$Vs = 85.49 \times (.4868) \times (.84) \times \sqrt{\frac{763}{(30)(29)}}$

$Vs =$ 32.7 ft/s

$As =$ 4.75 ft^2

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

$Qs = \quad \times \quad \times 60$

$Qs =$ 9313 acfm

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

$Qs_{std} = 9313 \times 17.647 \times \frac{30}{763} \times (1 - \frac{8}{100})$

$Qs_{std} =$ 5943 dscfm

28150

GAS VELOCITY AND VOLUMETRIC FLOW RATE

Plant: Chem-Lime Montevallo Date: 3/24/98
Sampling Location: CO_2 Bubbler - off 3+4 stack Clock Time: 1430
Run #: m2-2 (aka m2-CB5-2) Operators: MPM & FJP
Barometric Pressure, in. Hg: 30.15 Static Pressure, in. H_2O:
Moisture, %: Molecular wt., Dry: Pitot Tube, Cp: 0.84
Stack Dimension, in. Diameter or Side 1: Side 2:
Wet Bulb, °F: Dry Bulb, °F:

	Traverse Point Number	Velocity Head in. H_2O	Stack Temp. °F
V	A-1	0.11	289
	-2	0.20	280
	-3	0.24	292
	-4	0.24	329
	-5	0.24	337
	-6	0.23	~~316~~ 339
H	B-1	0.05	295
	-2	0.16	308
	-3	0.25	322
	-4	0.29	335
	-5	0.19	~~0~~ 330
	-6	~~36~~ 326	0.10
		$\overline{\sqrt{\Delta P}}$ =	$\overline{Ts}$ =

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

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

$Md =$

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

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

$Ms =$

$\overline{Ts} =$ °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

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

$Qs = \quad \times \quad \times 60$

$Qs =$ 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

CEMS AND ANALYTICAL DATA

Appendix B.1

CEMs and Analytical Data
CEMs, Methods 3A, 25A, and 322

APCC AIR POLLUTION CHARACTERIZATION AND CONTROL, LTD.

30 April 1998

Mr. Frank J. Phoenix, PE
Pacific Environmental Services, Inc.
PO Box 12077
Research Triangle Park, NC 27709-2077

919-941-0234 FAX

APCC Project 98018 Revision (1)

Dear Frank:

Air Pollution Characterization and Control, Ltd. (APCC) was retained by Pacific Environmental Services (PES) to perform Hydrogen Chloride emission measurements utilizing Draft EPA Method 322 and gas filter correlation infrared (GFCIR) technology. APCC performed these measurements with a Perkin Elmer (PE) MCS-100 GFCIR during the week of 23 March 1998. It should be noted that APCC developed and successfully validated the test method for HCl by GFCIR, now tentatively identified as EPA Method 322, during a project performed for the cement industry and in conjunction with Portland Cement Association (PCA).

PES was contracted by US EPA OAQPS Emission Measurement Center, Emissions Standards Division to perform emission measurements from Lime Kilns in Alabama. Measurements were performed at the following facilities;

Company	Location	Kiln Nos.	Control Equipment
Chem Lime	Alabaster, AL	Kiln 1	Wet Scrubber
Chem Lime	Montevallo, AL	Kilns 3 & 4	Baghouse
Dravo	Saginaw, AL	Kiln 4	Baghouse

It was planned to perform a single 180-minute test to determine emission concentrations of HCl by the GFCIR method at each source. The instrumentation was modified at the request of PES and EPA to operate on a time shared basis, split between the inlet and outlet of air pollution control equipment at each source (15-minutes on inlet/outlet) to equal 90-minutes of sampling at each location. In hindsight, this modification may have been the cause of some of the difficulties encountered during the test program.

Kiln Nos. 3 and 4 at the Chemical Lime's Montevallo plant were sampled and analyzed at the inlet and outlet consecutively over a two day period of time. It should be noted that while all calibrations to the MCS-100 were successful (HCl calibrations were within the ±7.5% of span), significant trouble was encountered in attaining the in-situ matrix spike required by the method. This is described in detail below.

APCC attempted to recover the in-situ matrix spike at the Montevallo facility on 4 occasions while sampling the outlet for periods ranging from 15 minutes to 1.5 hours. Two unsuccessful attempts to recover the matrix spike were performed at the inlet sampling system. In order to overcome a possible filter/lime dust interference the spike gas flowrate was increased to 3 lpm, but no spike was recovered. Another unsuccessful attempt of the spike was performed which required the probe to be pulled from the stack and ambient air drawn through while spiking. Due to time constraints this procedure was only performed for a period of 15 minutes.

Calibration determinations for the O_2, CO_2, and THC analysis were performed in accordance with EPA Methods 3A and 25A, respectively. The THC analyzer had significant drift (instrument calibrations exceeding ±5.0%)during the sampling periods on the outlet of Kiln No. 4 at the Montevallo facility. The instrument drift can be attributed to the length of time between calibrations, significant temperature changes in the trailer, and pressure changes. Methods 3A and 25A calibration information can be found on attached Tables C-3 through C-5.

60 Industrial Park Road West
Tolland, Connecticut 06084
(860) 871-8557
(860) 871-8675 FAX

93 Warren Avenue
Portland, Maine 04103
(207) 797-7313
FAX (207) 878-3536

Upon completion of the required test program at the Montevallo facility, APCC modified the outlet sampling system to achieve the necessary percent recovery associated with the in-situ matrix spike required by the method. On 25 March 1998, APCC modified the sampling system in order to achieve 15 lpm sample flow. A single in-situ spike matrix procedure was performed. After an hour of sampling, the spike indicated an 88% spike recovery, 2.5 ppm of the expected 6.5 ppm was detected. Further discussion on this issue is presented below. The data are presented in attached Table A-1.

Chemical Lime's Alabaster plant was not sampled, due to process upsets during the GFCIR equilibrium period that flooded the instrument with scrubber liquor in an aerosol form and caused significant damage to the PE MCS-100. The instrument was moved to the next facility before the final repairs and adjustments were completed. No data, therefore, are presented

Kiln No. 4 at the Dravo Lime Company's Saginaw plant was sampled at the outlet only. This was due to the restricted amount of time remaining after final instrument repairs (time restrictions were imposed by the plant). It should be noted that not all final calibrations to the instrument were not successful (37.6 ppm HCl calibration drift exceed the ±7.5% of span). It should be noted that the low end calibration drift was acceptable. Excess drift was probably due to the rapid schedule which eliminated the analyzer stabilization period (recommended twelve hours).

Calibrations would indicate that the data was biased high at the upscale end (typical emissions measured approximately 6 ppm) of the instrument range (0 - 50 ppm). However the instrument was recalibrated and demonstrated the same concentration (once stabilization was complete HCl was sampled for 10 minutes) when sampling from the stack. This would indicate that the measurements taken during the 1.5-hour sampling period would be representative of actual stack gas concentrations at this facility with limits of the draft method. Data from this facility is presented in Table A-2.

Attached Tables A-1 and A-2 present the results of the sampling periods run for the Chemical Lime's Montevallo plant and the Dravo Lime Company's Saginaw plant. No data from Chemical Lime's Alabaster plant was collected. The calibration error/drift tests and in-situ matrix spikes are presented in Tables C-1 and C-2, respectively .

Calibration and operation of the MCS-100 GFCIR analyzer were straightforward and successful, with the exception of performance spike recoveries which were demonstrated successful at Montevallo on 25 March 1998 only. Based on lessons learned during the PCA method development program discussed above, a hot sampling system (>375°F) without any cold spots was used to minimize HCl losses. Only one spike recovery (at Montevallo) met the 100%±30% criteria. This could be the result of a number of factors, which are discussed below and which also could, most likely, be rectified for further test programs given a little engineering research and development.

- HCl spike gas was introduced into the actual sample stream at the back of the probe and preceding the heated filter before and following each test performed. All spike recoveries were negligible with one exception of 88% test spike recovery, as discussed above along with procedures to improve recovery. Reasons for the consistently low or nonexistent spike recoveries, when higher than 100% was expected (Method equations tend to bias recovery efficiency high) , are still not known at this time, but there are at least four possible explanations:

- It may be, in part, that the overall flowrate through the sample train played a significant role. Due to the significantly smaller inside diameter of the plumbing utilized to accommodate the dual sampling systems, as well as additional heated sample lines provided by PES (1/4" tube vs. 3/8" typically used), a lower flowrate than originally operated was achieved by the instrument.

  While the PE MCS-100 was designed to operate at 15 lpm (nominal), the modification utilized to convert to a time shared system reduced this flowrate to approximately 8 lpm, slightly more than half the design flowrate. While performing a matrix spike at the APCC laboratory, it was determined that a conditioning period of approximately 1-hour at 15 lpm was required before the spike could be recovered.

While this worked fine in the laboratory, as well as in the field for calibration purposes; it essentially doubled the residence time of the sample gas in the sample conditioning system and allowed time for reactions (i.e. HCl disassociation) to take place that may not have occurred with shorter residence times.
While the chemistry of a lime kiln is significantly different from that encountered during the PCA program discussed above (i.e. absorption and reactivity of HCl), these differences may be less significant at increased sample flowrates and decreased residence times in the sample conditioning system.

Incomplete spike recoveries were attempted during the initial and final stages of sampling at the inlet/outlet of Kiln Nos. 3 and 4 at the Chemical Lime facility located Montevallo. Upon completion of the sampling periods for both kilns, APCC modified the sampling system in order to increase the sample flowrate. Upon establishment of sampling system equilibrium, the matrix spike procedure attempted. The spike percent recovery was determined to be 88%, which is well within the 100% ±30% recovery. Due to time constraints APCC was unable to perform further matrix spikes.

- A theory was hypothesized on-site that ammonia present in the gas stream could be dissociating and then reacting to form ammonium chloride with the pure HCl introduced in the spike gas. This could be verified by calibrating the MCS-100 to measure and record the NH_3 concentration during the analytical spike procedures to determine if the NH_3 is present to interfere with the HCl spike gas.

- An experiment was performed (at the Chemical Lime facility at Montevallo) using the actual probe, filter, and heated sample line from the outlet of the lime kiln at Montevallo. Ambient air was drawn through the system while injecting spike gas to determine the matrix spike recovery. This spike procedure was performed for a duration of 15 minutes. During the ambient spiking procedure, the MCS-100 sample flowrate was still below 10 lpm, which also caused a slow response. No spike recovery was not achieved. Had the experiment been allowed to continue, spike recovery may have been achieved.

- Calibration standards are accurate to ±5%, and are expected to degrade quite rapidly. The gases utilized for this program should be recertified, as they are beyond the 30-day window specified by Method 322. It is possible that the actual concentration within the bottle actually is below the measured analytical standard.

APCC is confident that the difficulties encountered during this initial program can be resolved, as many were already resolved in the field. The system flowrate problem was resolved in the field by eliminating the time-shared aspect. Further modifications can achieve both design flowrate as well as time-sharing. Other modifications prior to subsequent field efforts would include an additional level of refined filtration. APCC is looking forward to working with PES and EPA and subsequent field efforts for this project. It was a pleasure performing this test program for you and PES. Feel free to contact me if you have any comments, questions, or require additional information.

Sincerely,
APCC, Ltd.

Eric C. Dithrich
Senior Engineer

John H. Powell
Principal

cc: Michael Toney, US EPA

Table A-1
HCl Emission Measurements from Two Lime Kilns
Chemical Lime Montevallo Plant
Montevallo, Alabama
3/23/98 thru 3/25/98

Time	Date	Inlet/Outlet	HCl ppm W	THC ppm W	O2 %	CO2 %
Kiln No. 4			avs	avs		
14:25-14:40	3/23/98	Inlet	10.4	<1.0	8.4	19.4
15:05-15:20	3/23/98	Inlet	10.7	<1.0	7.5	21.7
15:45-16:00	3/23/98	Inlet	10.2	<1.0	7.9	21.1
16:25-16:40	3/23/98	Inlet	10.1	<1.0	8.0	20.5
17:05-17:20	3/23/98	Inlet	10.1	<1.0	8.3	19.2
17:45-18:00	3/23/98	Inlet	9.5	<1.0	8.4	18.7
Average			**10.2**	**<1.0**	**8.1**	**20.1**
Kiln No. 4						
14:00-14:20	3/23/98	Outlet	20.2	<1.0	10.1	18.5
14:45-15:00	3/23/98	Outlet	21.7	<1.0	10.1	19.1
15:25-15:40	3/23/98	Outlet	22.0	<1.0	9.8	19.8
16:05-16:20	3/23/98	Outlet	17.3	<1.0	10.0	19.5
16:45-17:00	3/23/98	Outlet	21.3	<1.0	10.0	19.0
17:25-17:40	3/23/98	Outlet	19.7	<1.0	10.1	18.1
Average			**20.4**	**<1.0**	**10.0**	**19.0**
Kiln No. 3						
13:50-14:05	3/24/98	Inlet	80.3	3.7	5.4	25.8
14:30-14:45	3/24/98	Inlet	71.9	1.7	5.3	27.3
15:10-15:25	3/24/98	Inlet	65.2	5.4	5.2	27.4
15:50-16:05	3/24/98	Inlet	57.5	2.1	5.2	26.7
16:30-16:45	3/24/98	Inlet	71.4	4.6	5.2	26
17:10-17:25	3/24/98	Inlet	64.8	5.2	5.2	26.4
Average			**68.5**	**3.8**	**5.3**	**26.6**
Kiln No. 3						
13:30-13:45	3/24/98	Outlet	49.9	<1.0	10	17.8
14:10-14:25	3/24/98	Outlet	46.8	<1.0	9.9	18.2
14:50-15:05	3/24/98	Outlet	38.5	<1.0	9.9	19.1
15:30-15:45	3/24/98	Outlet	33.9	<1.0	10	19.2
16:10-16:25	3/24/98	Outlet	30.4	<1.0	10	18.8
16:50-17:05	3/24/98	Outlet	28.1	<1.0	10	18.5
Average			**37.9**	**<1.0**	**10.0**	**18.6**
0855-0910	**3/25/98**	**Outlet**	**27.9**	**3.1**	**10.0**	**17.7**

NOTE: lbs/hr calculations include a flowrate of 155,000 dscfm @ 8.0% H2O for the outlet and 63,000 dscfm @5.0% H2O for kiln #4 70,900 dscfm @ 5.0% H2O for kiln #3.

Table C-1
Montevallo and Saginaw Calibration Table

Montevallo — **CALIBRATION ERROR TEST(METHOD 6C-6.3) 3/23/98**

Kiln #4 Initial Outlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	0.4	0.4	0.80%
LOW RANGE	10.7	10.7	0	0.00%
MID RANGE	26	27.7	1.7	3.40%
HIGH RANGE	37.6	38.2	0.6	1.20%

Kiln #4 Final Outlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	1.1	1.1	2.20%
LOW RANGE	10.7	10.8	0.1	0.20%
MID RANGE	26	27.8	1.8	3.60%
HIGH RANGE	37.6	37.5	0.1	0.20%

Kiln #4 Initial Inlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	0.3	0.3	0.60%
LOW RANGE	10.7	8.3	2.4	4.80%
MID RANGE	26	27.4	1.4	2.80%
HIGH RANGE	37.6	38.1	0.5	1.00%

Kiln #4 Final Inlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	1.2	1.2	2.40%
LOW RANGE	10.7	10.2	0.5	1.00%
MID RANGE	26	26.9	0.9	1.80%
HIGH RANGE	37.6	38.3	0.7	1.40%

Montevallo — **CALIBRATION ERROR TEST(METHOD 6C-6.3) 3/24/98**

Kiln #3 Initial Outlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	0.8	0.8	1.60%
LOW RANGE	10.7	10.9	0.2	0.40%
MID RANGE	26	26.3	0.3	0.60%
HIGH RANGE	37.6	37.5	0.1	0.20%

Kiln #3 Final Outlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	1.1	1.1	2.20%
LOW RANGE	10.7	11.4	0.7	1.40%
MID RANGE	26	28.5	2.5	5.00%
HIGH RANGE	37.6	38.9	1.3	2.60%

Kiln #3 Initial Inlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	0.8	0.8	1.60%
LOW RANGE	10.7	10.9	0.2	0.40%
MID RANGE	26	26.3	0.3	0.60%
HIGH RANGE	37.6	37.5	0.1	0.20%

Kiln #3 Final Inlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	1.7	1.7	3.40%
LOW RANGE	10.7	10.7	0	0.00%
MID RANGE	26	25.5	0.5	1.00%
HIGH RANGE	37.6	37.2	0.4	0.80%

Saginaw — **CALIBRATION ERROR TEST(METHOD 6C-6.3) 3/28/98**

Kiln #4Initial Outlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	0	0	0.00%
LOW RANGE	10.7	12.5	1.8	3.60%
MID RANGE	26	24.9	1.1	2.20%
HIGH RANGE	37.6	37.6	0	0.00%

Kiln #4 Final Outlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	2.5	2.5	5.00%
LOW RANGE	10.7	12.2	1.5	3.00%
MID RANGE	26	29.5	3.5	7.00%
HIGH RANGE	37.6	43.5	5.9	11.80%

Table C-2
HCl In-Situ Matrix Spike
Recovery Efficiencies

Plant	**Chem Lime Montevallo,AL**		
Date	24-Mar-98	Cs-Spike Gas Conc. (ppm)	101
Project No.	97018		
Test 1	Su-Native Concentration (ppm)	28.1	
Initial	Qt-Analyzer Flow (lpm)	15	
	Qs-Dilution Rate (lpm)	1.5	
	Sm-Observed Concentration (ppm)	30.6	
	Ce-Expected Concentration (ppm)	**34.7**	
	Spike Recovery (%)	**88%**	

Table C-3
Montevallo Kiln #4
Continuous Emissions Monitoring Data Sheet
EPA Methods 3A, 6C, 7E, 10, and 25A
23-Mar-98

INLET Analyzer	Range		Gas Conc.	Pre Test Sys. Cal.	Cal. Bias % of Span	Post Test Sys. Cal.	Cal. Bias % of Span	Drift % of Span
Oxygen	0-25%	zero	0	0.5	2.0%	0.3	1.2%	0.8%
		upscale	11.1	11.3	0.8%	11.2	0.4%	0.4%
Carbon Dioxide	0-40%	zero	0	0.2	0.5%	0.1	0.3%	0.3%
		upscale	20.4	20.8	1.0%	18.8	-4.0%	5.0%
Total Hydrocarbon	0-100ppm	zero	0	-1.1	-1.1%	-4.0	-4.0%	2.9%
		upscale	51.1	50.5	-0.6%	46.1	-5.0%	4.4%
					±5%		±5%	±3%

OUTLET Analyzer	Range		Gas Conc.	Pre Test Sys. Cal.	Cal. Bias % of Span	Post Test Sys. Cal.	Cal. Bias % of Span	Drift % of Span
Oxygen	0-25%	zero	0	0.4	1.6%	0.5	2.0%	-0.4%
		upscale	11.1	11.3	0.8%	11.3	0.8%	0.0%
Carbon Dioxide	0-40%	zero	0	0.1	0.3%	0.1	0.3%	0.0%
		upscale	20.4	20.4	0.0%	18.8	-4.0%	4.0%
Total Hydrocarbon	0-100ppm	zero	0	-0.3	-0.3%	-4.4	-4.4%	4.1%
		upscale	51.1	50.8	-0.3%	43.3	-7.8%	7.5%
					±5%		±5%	±3%

Analyzer Calibration Check

Analyzer	Gas Conc.	Response	Error
O2 High	20.2	20.1	-0.40%
O2 Mid	11.1	11.3	0.80%
O2 zero	0.0	0.4	1.60%
CO2 High	20.4	20.4	0.00%
CO2 Mid	11.0	11.0	0.02%
CO2 zero	0.0	0.1	0.25%
THC High	84.8	83.8	-1.00%
THC Mid	51.1	50.8	-0.30%
THC High	30.0	27.0	-2.99%
THC zero	0.0	-2.4	-2.40%

Table C-4
Montevallo Kiln #3
Continuous Emissions Monitoring Data Sheet
EPA Methods 3A, 6C, 7E, 10, and 25A
24-Mar-98

INLET Analyzer	Range		Gas Conc.	Pre Test Sys. Cal.	Cal. Bias % of Span	Post Test Sys. Cal.	Cal. Bias % of Span	Drift % of Span
Oxygen	0-25%	zero	0.0	0.3	1.2%	0.4	1.6%	-0.4%
		upscale	11.1	11.1	0.0%	11.2	0.4%	-0.4%
Carbon Dioxide	0-40%	zero	0.0	0.2	0.5%	0.1	0.3%	0.3%
		upscale	20.4	20.1	-0.7%	19	-3.5%	2.8%
Total Hydrocarbon	0-100ppm	zero	0.0	0.5	0.5%	-2.5	-2.5%	3.0%
		upscale	51.1	51.0	-0.1%	50.8	-0.3%	0.2%
					±5%		±5%	±3%

OUTLET Analyzer	Range		Gas Conc.	Pre Test Sys. Cal.	Cal. Bias % of Span	Post Test Sys. Cal.	Cal. Bias % of Span	Drift % of Span
Oxygen	0-25%	zero	0.0	0.4	1.6%	0.3	1.2%	0.4%
		upscale	11.1	11.1	0.0%	11.4	1.2%	-1.2%
Carbon Dioxide	0-40%	zero	0.0	0.1	0.3%	0.1	0.3%	0.0%
		upscale	20.4	20.4	0.0%	19.6	-2.0%	2.0%
Total Hydrocarbon	0-100ppm	zero	0.0	-0.3	-0.3%	-0.6	-0.6%	0.3%
		upscale	51.1	50.8	-0.3%	47.4	-3.7%	3.4%
					±5%		±5%	±3%

Analyzer Calibration Check

Analyzer	Gas Conc.	Response	Error
O2 High	20.2	20.1	-0.40%
O2 Mid	11.1	11.1	0.00%
O2 zero	0.0	0.3	1.20%
CO2 High	20.4	20.1	-0.75%
CO2 Mid	11.0	10.9	-0.23%
CO2 zero	0.0	0.2	0.50%
THC High	84.8	85.0	0.20%
THC Mid	51.1	51.0	-0.10%
THC High	30.0	31.2	1.21%
THC zero	0.0	0.5	0.50%

PROJECT # 98018

SAMPLE CALCULATION

4/30/98

IN-SITU SPIKE MATRIX
MONTEVALLO, AL

EQUATION #1 $C_E = C_S(Q_S/Q_T) + S_U(1 - Q_S/Q_T)$

$= 101[1.5/(1.5+15.0)] + 28.1[1 - 1.5/(1.5+15.0)]$

$= 101(0.09) + 28.1(0.91)$

$= 9.09 + 25.5$

$C_E = 34.6$

EQUATION #2

$\%R = (S_M/C_E) \times 100$

$= (30.6/34.6) \times 100$

%R = 88% SPIKE RECOVERY

C_S - CONCENTRATION OF HCl SPIKE GAS
Q_S - SPIKE GAS FLOW RATE.
Q_T - TOTAL SAMPLE FLOW RATE (SAMPLE + SPIKE)
S_U - NATIVE CONCENTRATION OF HCl IN UNSPIKED EFFLUENT.

C_E - CALCULATED CONCENTRATION
S_M - OBSERVED CONCENTRATION

INLET

HCl In-Situ Matrix Spike Recovery Efficiencies

Plant	ChemLime Montevallo		
Date	23-Mar-98	Cs-Spike Gas Conc. (ppm)	101
Project No.	98018		
Test 1	Su-Native Concentration (ppm)	21.7	
Initial	Qt-Analyzer Flow (lpm)	6	
	Qs-Dilution Rate (lpm)	1.5	
	Sm-Observed Concentration (ppm)	14.4	
	Ce-Expected Concentration (ppm)	37.6	
	Spike Recovery (%)	38%	

Outlet

HCl In-Situ Matrix Spike Recovery Efficiencies

Plant	ChemLime Montevallo		
Date	23-Mar-98	Cs-Spike Gas Conc. (ppm)	101
Project No.	98018		
Test 1	Su-Native Concentration (ppm)	18.1	
Initial	Qt-Analyzer Flow (lpm)	10	
	Qs-Dilution Rate (lpm)	1.5	
	Sm-Observed Concentration (ppm)	16.1	
	Ce-Expected Concentration (ppm)	28.9	
	Spike Recovery (%)	56%	

Outlet

HCl In-Situ Matrix Spike Recovery Efficiencies

Plant	ChemLime Montevallo		
Date	24-Mar-98	Cs-Spike Gas Conc. (ppm)	101
Project No.	98018		
Test 1	Su-Native Concentration (ppm)	4.5	
Initial	Qt-Analyzer Flow (lpm)	10	
	Qs-Dilution Rate (lpm)	1.5	
	Sm-Observed Concentration (ppm)	4.9	
	Ce-Expected Concentration (ppm)	17.1	
	Spike Recovery (%)	29%	

Appendix B.2

CEMs and Analytical Data
Method 23 Analytical Data

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:	April 21, 1998
Client ID:	Pacific Environmental Services
P.O. Number:	104-98-0159
TLI Project Number:	45399

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Rev. 11/19/97

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Research Triangle Park, NC 27709-3485
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Overview

The sample(s) and associated QC samples were extracted and analyzed according to procedures described in Method 23 (6/93). Any particular difficulties encountered during the sample handling by Triangle Laboratories will be discussed in the QC Remarks section below. This report contains results only from the Method 23 dioxin/furan analyses of the M23 sample(s).

Quality Control Samples

A laboratory method blank, identified as the TLI M23 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 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. Specific QC issues associated with this particular project are:

Sample receipt: Twelve M23 sample(s) were received from Pacific Environmental Services in good condition on April 01, 1998 at ambient temperature and stored in a refrigerator at 4 °C. On the sample labeled M23-0-1-2, acetone was marked through and toluene was written above it. On the sample labeled M23-0-1-3, toluene was marked through and acetone was written above it. Neither of these labels agreed with the clients' chain of custody.

Sample Preparation Laboratory: None

Mass Spectrometry: None

Data Review: Sample M23-O-1 indicated low internal standard recoveries. However, the signal-to-noise ratio is above ten-to-one in all cases and all standards are valid for quantitation. TCDF was the only analyte detected in this sample and is below Target Detection Limit (TDL).

Other Comments: No 2,3,7,8-substituted target analytes were detected in the TLI Blank above the target detection limit (TDL).

The analytical data presented in this report are consistent with the guidelines of EPA Method 23 (6/93). Any exceptions 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, Rose West, at 919/544-5729 ext. 270.

For Triangle Laboratories, Inc.,

Released by

Girgis Mikhael

Girgis Mikhael
Report Preparation Chemist

The total number of pages in the data package is : 381 .

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, 1998. Laboratory I.D. # 40950. Dioxin in drinking water.

State of Alaska, Department of Environmental Conservation. Expires December 21, 1998. 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, 1999. Pulp/paper, soil, water, and Hazardous Waste for Dioxin/Furan; AOX/TOX, Volatiles, Semi-volatiles, and Metals.

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, 1999. Registration # PH-0117. Dioxin in drinking water.

Delaware Health and Social Services. Expires December 31, 1998. 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.

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Hawaii Department of Health. Expires March 1, 1999. Dioxin in drinking water. "Accepted" status for regulatory purposes .

Idaho Department of Health and Welfare. Expires December 31, 1998. Dioxin in drinking water.

State of Kansas, Department of Health and Environment. Expires January 31, 1999. Environmental Analyses/Non portable 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, 1998. 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, 1998. Dioxin in drinking water.

State of New Jersey, Department of Environmental Protection and Energy. Expires June 30, 1998. 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, 2000. Certificate # 485. Metals, pesticides & PCBs, semi-volatiles and volatiles; TCLP.

North Dakota State Department of Health and Consolidated Laboratories. Expires December 31, 1998. Certificate # R-076. Effective October 4, 1993. Dioxin in drinking water.

Revised 3/2/98 RM
y:certific\certlist.mem

State of West Virginia, Department of Health. Expires December 31, 1998. 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, 1998. 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 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

54/72
7

COPY

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

Chain of Custody Record

Project Num: r012.002

Project Name: US EPA Lime Kiln Screening - Alabama Lime

Samplers: Abernathy, Gay, Maret, Phoenix, Siegal

Date	Time	Field Sample ID	Sample Description	PCDD's	PCDF's						Remarks
3/23/98		M23-I-1-1	Container No. 1 - Filter	•	•						
3/23/98		M23-I-1-2	Container No. 2 - Train Acetone Rinse	•	•						
3/23/98		M23-I-1-3	Container No. 3 - Train Toluene Rinse	•	•						
3/23/98		M23-I-1-4	Container No. 4 - XAD Sorbent Resin	•	•						
3/24/98		M23-I-2-1	Container No. 1 - Filter	•	•						
3/24/98		M23-I-2-2	Container No. 2 - Train Acetone Rinse	•	•						
3/24/98		M23-I-2-3	Container No. 3 - Train Toluene Rinse	•	•						
3/24/98		M23-I-2-4	Container No. 4 - XAD Sorbent Resin	•	•						
3/26/98		M23-I-3-1	Container No. 1 - Filter	•	•						
3/26/98		M23-I-3-2	Container No. 2 - Train Acetone Rinse	•	•						
3/26/98		M23-I-3-3	Container No. 3 - Train Toluene Rinse	•	•						
3/26/98		M23-I-3-4	Container No. 4 - XAD Sorbent Resin	•	•						
3/28/98		M23-I-4-1	Container No. 1 - Filter	•	•						
3/28/98		M23-I-4-2	Container No. 2 - Train Acetone Rinse	•	•						
3/28/98		M23-I-4-3	Container No. 3 - Train Toluene Rinse	•	•						
3/28/98		M23-I-4-4	Container No. 4 - XAD Sorbent Resin	•	•						
3/23/98		M23-O-1-1	Container No. 1 - Filter	•	•						
3/23/98		M23-O-1-2	Container No. 2 - Train Acetone Rinse	•	•						
3/23/98		M23-O-1-3	Container No. 3 - Train Toluene Rinse	•	•						

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Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

Chain of Custody Record

Project Num: r012.002

Project Name: US EPA Lime Kiln Screening - Alabama Lime

Samplers: Abernathy, Gay, Maret, Phoenix, Siegal

Date	Time	Field Sample ID	Sample Description	PCDD's	PCDF's						Remarks
3/23/98		M23-O-1-4	Container No. 4 - XAD Sorbent Resin	•	•						
3/24/98		M23-O-2-1	Container No. 1 - Filter	•	•						
3/24/98		M23-O-2-2	Container No. 2 - Train Acetone Rinse	•	•						
3/24/98		M23-O-2-3	Container No. 3 - Train Toluene Rinse	•	•						
3/24/98		M23-O-2-4	Container No. 4 - XAD Sorbent Resin	•	•						
3/26/98		M23-O-3-1	Container No. 1 - Filter	•	•						
3/26/98		M23-O-3-2	Container No. 2 - Train Acetone Rinse	•	•						
3/26/98		M23-O-3-3	Container No. 3 - Train Toluene Rinse	•	•						
3/26/98		M23-O-3-4	Container No. 4 - XAD Sorbent Resin	•	•						
3/28/98		M23-O-4-1	Container No. 1 - Filter	•	•						
3/28/98		M23-O-4-2	Container No. 2 - Train Acetone Rinse	•	•						
3/28/98		M23-O-4-3	Container No. 3 - Train Toluene Rinse	•	•						
3/28/98		M23-O-4-4	Container No. 4 - XAD Sorbent Resin	•	•						
3/23/98		M23-FB-1-1	Container No. 1 - Filter	•	•						FIELD BLANK 1
3/23/98		M23-FB-1-2	Container No. 2 - Train Acetone Rinse	•	•						FIELD BLANK 1
3/23/98		M23-FB-1-3	Container No. 3 - Train Toluene Rinse	•	•						FIELD BLANK 1
3/23/98		M23-FB-1-4	Container No. 4 - XAD Sorbent Resin	•	•						FIELD BLANK 1
3/24/98		M23-FB-2-1	Container No. 1 - Filter	•	•						FIELD BLANK 2
3/24/98		M23-FB-2-2	Container No. 2 - Train Acetone Rinse	•	•						FIELD BLANK 2

COPY

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

Chain of Custody Record

Project Num: r012.002

Project Name: US EPA Lime Kiln Screening - Alabama Lime

Samplers: Abernathy, Gay, Maret, Phoenix, Siegal

Date	Time	Field Sample ID	Sample Description	PCDD's	PCDF's						Remarks
3/24/98		M23-FB-2-3	Container No. 3 - Train Toluene Rinse	•	•						FIELD BLANK 2
3/24/98		M23-FB-2-4	Container No. 4 - XAD Sorbent Resin	•	•						FIELD BLANK 2
3/26/98		M23-FB-3-1	Container No. 1 - Filter	•	•						FIELD BLANK 3
3/26/98		M23-FB-3-2	Container No. 2 - Train Acetone Rinse	•	•						FIELD BLANK 3
3/26/98		M23-FB-3-3	Container No. 3 - Train Toluene Rinse	•	•						FIELD BLANK 3
3/26/98		M23-FB-3-4	Container No. 4 - XAD Sorbent Resin	•	•						FIELD BLANK 3
3/27/98		M23-RB-1	Container No. 1 - Filter	•	•						REAGENT BLANK
3/27/98		M23-RB-2	Container No. 2 - Train Acetone Rinse	•	•						REAGENT BLANK
3/27/98		M23-RB-3	Container No. 3 - Train Toluene Rinse	•	•						REAGENT BLANK
3/27/98		M23-RB-4	Container No. 4 - XAD Sorbent Resin	•	•						REAGENT BLANK

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)

Relinquished by: (Signature)	Date/Time	Received for lab by: (Signature)	REMARKS
	1594 4/1/98	R. Davis	

4/1/98

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 45399
Client: PES03 - Pacific Environmental Services

Date Received 04/01/98 By Mark Stone

Ice Chest/Box NO COOLANT

Carrier and Number

Book 204 Page 92

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
204-92-1A	M23-I-1-1	FILTER	MW 4/2/98	Used							
	M23-I-1-1	C02									
204-92-1B	M23-I-1-2	ACETONE RINSE									
	M23-I-1-2	C02									
204-92-1C	M23-I-1-3	TOLUENE RINSE									
	M23-I-1-3	C02									
204-92-1D	M23-I-1-4	XAD									
	M23-I-1-4	C02									
204-92-2A	M23-I-2-1	FILTER									
	M23-I-2-1	C02									
204-92-2B	M23-I-2-2	ACETONE RINSE									
	M23-I-2-2	C02									
204-92-2C	M23-I-2-3	TOLUENE RINSE									
	M23-I-2-3	C02									
204-92-2D	M23-I-2-4	XAD									
	M23-I-2-4	C02									
204-92-3A	M23-I-3-1	FILTER									
	M23-I-3-1	C02									
204-92-3B	M23-I-3-2	ACETONE RINSE									
	M23-I-3-2	C02									
204-92-3C	M23-I-3-3	TOLUENE RINSE									
	M23-I-3-3	C02									
204-92-3D	M23-I-3-4	XAD									
	M23-I-3-4	C02									
204-92-4A	M23-I-4-1	FILTER									
	M23-I-4-1	C02									
204-92-4B	M23-I-4-2	ACETONE RINSE	MW 4/2/98	Used							
	M23-I-4-2	C02									

Receiving Remarks: ON SAMPLE LABEL:M23-O-1-2, ACETONE WAS MARKED THROUGH AND TOLUENE WRITTEN ABOVE IT; TOLUENE WAS MARKED THROUGH WITH ACETONE WRITTEN ABOVE FOR SAMPLE M23-O-1-3; NEITHER AGGREED WITH CLIENT'S COC.

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 45399
Client: PES03 - Pacific Environmental Services

Date Received 04/01/98 By Mark Stowe

Ice Chest/Box NO COOLANT

Carrier and Number

Book 204 Page 92

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
204-92-4C	M23-I-4-3	TOLUENE RINSE	MS 4/2/98	used							
	M23-I-4-3	C02									
204-92-4D	M23-I-4-4	XAD									
	M23-I-4-4	C02									
204-92-5A	M23-O-1-1	FILTER									
	M23-O-1-1	C02									
204-92-5B	M23-O-1-2	TOLUENE RINSE									
	M23-O-1-2	C02									
204-92-5C	M23-O-1-3	ACETONE RINSE									
	M23-O-1-3	C02									
204-92-5D	M23-O-1-4	XAD									
	M23-O-1-4	C02									
204-92-6A	M23-O-2-1	FILTER									
	M23-O-2-1	C02									
204-92-6B	M23-O-2-2	ACETONE RINSE									
	M23-O-2-2	C02									
204-92-6C	M23-O-2-3	TOLUENE RINSE									
	M23-O-2-3	C02									
204-92-6D	M23-O-2-4	XAD									
	M23-O-2-4	C02									
204-92-7A	M23-O-3-1	FILTER									
	M23-O-3-1	C02									
204-92-7B	M23-O-3-2	ACETONE RINSE									
	M23-O-3-2	C02									
204-92-7C	M23-O-3-3	TOLUENE RINSE									
	M23-O-3-3	C02									
204-92-7D	M23-O-3-4	XAD	MS 4/2/98	used							
	M23-O-3-4	C02									

Receiving Remarks: ON SAMPLE LABEL:M23-O-1-2, ACETONE WAS MARKED THROUGH AND TOLUENE WRITTEN ABOVE IT; TOLUENE WAS MARKED THROUGH WITH ACETONE WRITTEN ABOVE FOR SAMPLE M23-O-1-3; NEITHER AGGREED WITH CLIENT'S COC.

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 45399
Client: PES03 - Pacific Environmental Services

Date Received 04/01/98 By Mark Stones

Ice Chest/Box NO COOLANT

Carrier and Number

Book 204 Page 92

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
204-92-8A	M23-O-4-1	FILTER	MJ 4/2/98	used							
	M23-O-4-1	C02									
204-92-8B	M23-O-4-2	ACETONE RINSE									
	M23-O-4-2	C02									
204-92-8C	M23-O-4-3	TOLUENE RINSE									
	M23-O-4-3	C02									
204-92-8D	M23-O-4-4	XAD									
	M23-O-4-4	C02									
204-92-9A	M23-FB-1-1	FILTER									
	M23-FB-1-1	C02									
204-92-9B	M23-FB-1-2	ACETONE RINSE									
	M23-FB-1-2	C02									
204-92-9C	M23-FB-1-3	TOLUENE RINSE									
	M23-FB-1-3	C02									
204-92-9D	M23-FB-1-4	XAD									
	M23-FB-1-4	C02									
204-92-10A	M23-FB-2-1	FILTER									
	M23-FB-2-1	C02									
204-92-10B	M23-FB-2-2	ACETONE RINSE									
	M23-FB-2-2	C02									
204-92-10C	M23-FB-2-3	TOLUENE RINSE									
	M23-FB-2-3	C02									
204-92-10D	M23-FB-2-4	XAD									
	M23-FB-2-4	C02									
204-92-11A	M23-FB-3-1	FILTER									
	M23-FB-3-1	C02									
204-92-11B	M23-FB-3-2	ACETONE RISE	MJ 4/2/98	used							
	M23-FB-3-2	C02									

Receiving Remarks: ON SAMPLE LABEL:M23-O-1-2, ACETONE WAS MARKED THROUGH AND TOLUENE WRITTEN ABOVE IT; TOLUENE WAS MARKED THROUGH WITH ACETONE WRITTEN ABOVE FOR SAMPLE M23-O-1-3; NEITHER AGGREED WITH CLIENT'S COC.

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 45399
Client: PES03 - Pacific Environmental Services

Book 204

Date Received 04/01/98 By Mark Stone

Page 92

Ice Chest/Box NO COOLANT

Carrier and Number

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
204-92-11C	M23-FB-3-3	TOLUENE RINSE									
	M23-FB-3-3	C02	4/2/98	used							
204-92-11D	M23-FB-3-4	XAD									
	M23-FB-3-4	C02									
204-92-12A	M23-RB-1	FILTER									
	M23-RB-1	C02									
204-92-12B	M23-RB-2	ACETONE RINSE									
	M23-RB-2	C02									
204-92-12C	M23-RB-3	TOLUENE RINSE									
	M23-RB-3	C02									
204-92-12D	M23-RB-4	XAD									
	M23-RB-4	C02	4/2/98	used							

Receiving Remarks: ON SAMPLE LABEL:M23-O-1-2, ACETONE WAS MARKED THROUGH AND TOLUENE WRITTEN ABOVE IT; TOLUENE WAS MARKED THROUGH WITH ACETONE WRITTEN ABOVE FOR SAMPLE M23-O-1-3; NEITHER AGGREED WITH CLIENT'S COC.

Archive Remarks:

TRIANGLE LABORATORIES, INC.
SAMPLE TRACKING AND PROJECT MANAGEMENT FORM

----------ADMINISTRATIVE INFORMATION----------

TLI Proj#: 45399-	Samples: 12	TurnAround.: 21 Day(s)
Prod Code: D23451	Matrix.: M23	Hold Time..: 30 Day(s)
DetectLim: 0.05 ng	Type...: A	Start Date.: 04/02/98
	Recvd..: 04/01/98	Ship By....: 04/21/98
		DWL Due Dt.: 04/09/98

Analyte List.: Tetra-Octa CDDs/CDFs

Method.....: Method 23: T-O, Toluene Combined
Client Proj..: r012.002/Lime Kiln
Client.....: Pacific Environmental Services (PES03)
P.O. No.....: 104-98-0159 Collect Dt/Tm: SeeCOC
Contact.....: Mike Maret Phone.....: 919-941-0333
Proj. Mgr....: Rose West Fax.....: 919-941-0234
Sample Origin: AL

----------SPECIAL INSTRUCTIONS / QA REQUIREMENTS----------

Prep Project: 04228
Prespike Standard: USF-CS
Prespike Amount..: 4.0ng
Extraction Exp...: 04/22/98

----------REPORTING REQUIREMENTS----------

Reporting Format: Report Option II

See MILES for Instructions/Communications.

Completed by: Rose V. West DATE: 4-2-98

Reviewed by: RVW DATE: 4-2-98 (PMGT0197)

TLI Project Number: 45399

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.

Date	Name	Comment / Decision / Resolution / Action / Observation
4/03/98	TLW	003 - Grey solid & filter in thimble already.
		PES03-Pacific Environmental Services M23-I-3-4 Project:45399 204-92-3D
		US EPA Lime Kiln Screening - Alabama Lime - R012.002 Pacific Environmental Services, Inc. Research Triangle Park, North Carolina Run No. M23-I-3 Container No. M23-I-3-4 XAD sorbent module
		Triangle Laboratories, Inc. TLI PROJECT #04228 DATE: 03-17-98 SPIKE: USF-C & USF-S SPIKED BY: PREPED BY: AC PACIFIC ENVIRONMENTAL
		White XAD White glasswool. No odor. TLW 04/03/98
		004 - Brown solid & filter in thimble already.
		PES03-Pacific Environmental Services M23-I-4-4 Project:45399 204-92-4D
		US EPA Lime Kiln Screening - Alabama Lime - R012.002 Pacific Environmental Services, Inc. Research Triangle Park, North Carolina Run No. M23-I-1 Container No. M23-I-4-4 XAD sorbent module
		Triangle Laboratories, Inc. TLI PROJECT #04228 03-17-98 USF-C & USF-S SPIKED BY: PREPED BY: AC PACIFIC ENVIRONMENTAL
		White XAD White glasswool. No odor. TLW 04/03/98

005 - White filter already in Thimble.

PES03-Pacific Environmental Services
M23-O-1-4
Project:45399
204-92-5D

US EPA Lime Kiln Screening - Alabama Lime - R012.002
Pacific Environmental Services, Inc.
Research Triangle Park, North Carolina
Run No. M23-O-1
Container No. M23-O-1-4 XAD sorbent module

Triangle Laboratories, Inc.
TLI PROJECT #04228
DATE: 03-17-98
SPIKE: USF-C & USF-S
SPIKER_____
PREPED BY AC
PACIFIC ENVIRONMENTAL

white XAD
white glasswool.
No odor. TLW 04/03/98

006 - white filters already in Thimble.

PES03-Pacific Environmental Services
M23-O-2-4
Project:45399
204-92-6D

US EPA Lime Kiln Screening - Alabama Lime - R012.002
Pacific Environmental Services, Inc.
Research Triangle Park, North Carolina
Run No. M23-O-2
Container No. M23-O-2-4 XAD sorbent module

Triangle Laboratories, Inc.
TLI PROJECT #04228
DATE: 03-17-98
SPIKE: USF-C & USF-S
SPIKER_____
PREPED BY AC
PACIFIC ENVIRONMENTAL

white XAD
white glasswool.
No odor. TLW 04/03/98

000 -

Triangle Laboratories, Inc.
TLI PROJECT #04228
DATE: 03-17-98 TLI BLANK
SPIKE: USF-C & USF-S
SPIKER_____
PREPED BY AC
PACIFIC ENVIRONMENTAL

Dry white XAD. No odor.
TLW 04/03/98

PROJECT COMMUNICATION TRACKING FORM

page ___ of ___

TLI Project Number: 45399

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.

Date	Name	Comment / Decision / Resolution / Action / Observation
4/2/98		204-92-12A,D filter is white, XAD is white (sample #12)
		204-92-11A,D filter is white, XAD is white (sample #11)
		204-92-10A,D filter is white, XAD is white (Sample #10)
		204-92-8A,D filter is gray, XAD is white (sample #8)
		204-92-9A,D filter is white, XAD is white (sample #9)
		204-92-7A,D filter is gray, XAD is white (sample #7)
		204-92-6A,D filter is flesh/white, XAD is white (sample #6)
		4/2/98
		204-92-5A,D filter light gray/white, X/AD white (sample #5)
		204-92-3A,D filter gray powder (on filter), XAD white (sample #3)
		4/2/98

PROJECT COMMUNICATION TRACKING FORM page ___ of ___

TLI Project Number: 45399-

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.

Date	Name	Comment / Decision / Resolution / Action / Observation
4/2/98	JW	Sample 204-92-5A-D; 204-92-6A-D; 204-92-10A-D and 204-92-11A-D. 204-92-12A-D Didn't have and Extract added into the thimble before we add the samples from the traps.
		- Sample 204-92-1A - Contained filter with gray powder residue and a gray power - Solid. The filter and solid was combine with solid gray extract in the thimble.
		Sample 204-92-2A Contained a filter with gray powder residue also contained a gray powder solid. The filter and powder was combined with the solid extract 4/2

TRIANGLE LABORATORIES, INC.
Wet Lab MM5/PUF Observations
Project: 45399

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 M23 Blank	0	WHITE	NA	NA	NA	NONE	04228	WHIGHAM	04/03	10:59	F
001		204-92-1A-D	M23-I-1	1	WHITE	GREY	WHITE	NA	NONE	04228	WHIGHAM	04/03	10:59	F
002		204-92-2A-D	M23-I-2	1	WHITE	GREY	WHITE	NA	NONE	04228	WHIGHAM	04/03	10:59	F
003		204-92-3A-D	M23-I-3	1	WHITE	GREY	WHITE	NA	NONE	04228	WHIGHAM	04/03	10:59	F
004		204-92-4A-D	M23-I-4	1	WHITE	BROWN	WHITE	NA	NONE	04228	WHIGHAM	04/03	10:59	F
005		204-92-5A-D	M23-O-1	1	WHITE	WHITE	WHITE	NA	NONE	04228	WHIGHAM	04/03	10:59	F
006		204-92-6A-D	M23-O-2	1	WHITE	WHITE	WHITE	NA	NONE	04228	WHIGHAM	04/03	10:59	F
007		204-92-7A-D	M23-O-3	1	WHITE	GREY	WHITE	NA	NONE	04228	WHIGHAM	04/03	10:59	F
008		204-92-8A-D	M23-O-4	1	WHITE	GRAY	WHITE	NA	NONE	04228	WHIGHAM	04/03	10:59	F
009		204-92-9A-D	M23-FB-1	1	WHITE	WHITE	WHITE	NA	NONE	04228	WHIGHAM	04/03	10:59	F
010		204-92-10A-D	M23-FB-2	1	WHITE	WHITE	WHITE	NA	NONE	04228	WHIGHAM	04/03	10:59	F
011		204-92-11A-D	M23-FB-3	1	WHITE	WHITE	WHITE	NA	NONE	04228	WHIGHAM	04/03	10:59	F
012		204-92-12A-D	M23-RB-1-4	1	WHITE	WHITE	WHITE	NA	NONE	04228	WHIGHAM	04/03	10:59	F
013		TLI LCS	TLI LCS	0	WHITE	NA	NA	NA	NONE	NA	WHIGHAM	04/03	10:59	F
014		TLI LCSD	TLI LCSD	0	WHITE	NA	NA	NA	NONE	NA	WHIGHAM	04/03	10:59	F

*** End of Report ***

TRIANGLE LABORATORIES, INC.

Dioxin Sample Preparation Tracking & Management Form

Project: 45399 Client: Pacific Environmental Services (PES03)

Solvent(s)/Acid(s): Toluene / _____ / _____ Method: Method 23: T-O, Toluene Combined Matrix: XAD

Lot Numbers: V560 KUPH-P / _____ / _____ Extraction Date: 04/03/98

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

					TLW	TLW	TLW	SBM	Chemist
					60146	5670J	5814F	5863B	Spike #
					USF-I	USF-MX	USF-CS	USF-A	" ID
					12/04/98	12/01/98	11/24/98	11/6/98	" Expir
					04/03/98	04/03/98	04/03/98	4/4/98	" Date
					11 : 10am	11 : 10am	11 : 10am	10 : 35	" Time
S#.crd	TLI SAMPLE ID / CLIENT SAMPLE ID	GROSS WEIGHT Before	GROSS WEIGHT After	SAMPLE SIZE ~~g / ml~~	0.1 ng/µl 40 µl	0.01 ng/µl 40 µl	0.1 ng/µl 40 µl	0.1 ng/µl 40 µl	" Conc. " Vol.
000	TLI Blank / TLI M23 Blank	—	—	1	SBM			SBM	Any Left yes/no
001	204-92-1A-D / M23-I-1	—	—	1	SBM			SBM	Any Left yes/no
002	204-92-2A-D / M23-I-2	—	—	1	SBM			SBM	Any Left yes/no
003	204-92-3A-D / M23-I-3	—	—	1	SBM			SBM	Any Left yes/no
004	204-92-4A-D / M23-I-4	—	—	1	SBM			SBM	Any Left yes/no
005	204-92-5A-D / M23-O-1	—	—	1	SBM			SBM	Any Left yes/no
006	204-92-6A-D / M23-O-2	—	—	1	SBM			SBM	Any Left yes/no
007	204-92-7A-D / M23-O-3	—	—	1	SBM			SBM	Any Left yes/no
008	204-92-8A-D / M23-O-4	—	—	1	SBM			SBM	Any Left yes/no
009	204-92-9A-D / M23-FB-1	—	—	1	SBM			SBM	Any Left yes/no

Gross weight of sample container + sample before/after aliquot removal.

Comments: Supelco Supelpak 2 (Lot # P1111) used for TLI LCS, LCSD. Prepre paved blank (# 04228) used for TLI blank. TLW 04/02/98

Initials: _____ Date: __/__/__

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 Preparation Tracking & Management Form

Project: 45399

Client: Pacific Environmental Services (PES03)

Solvent(s)/Acid(s): Toluene / _____ / _____

Lot Numbers: V560 KVPH-P / _____ / _____

Method: Method 23: T-O, Toluene Combined Matrix: XAD

Extraction Date: 04/03/98

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

S#.crd	TLI SAMPLE ID / CLIENT SAMPLE ID	GROSS WEIGHT Before	GROSS WEIGHT After	SAMPLE SIZE ~~g / ml~~					
					TLW	TLW	TLW	SBM	Chemist
					6014G	5670J	5814F	5863B	Spike #
					USF-I	USF-MX	USF-CS	USF-A	" ID
					12/04/99	12/01/98	11/24/98	11/6/98	" Expir
					04/03/98	04/03/98	04/03/98	4/4/98	" Date
					11 : 10 a.m.	11 : 19 a.m.	11 : 21 a.m.	__ : __	" Time
					0.1 ng/µl	0.01 ng/µl	0.1 ng/µl	0.1 ng/µl	" Conc.
					40 µl	40 µl	40 µl	40 µl	" Vol.
010	204-92-10A-D / M23-FB-2	—	—	1	SBM			SBM	Any Left yes/no (no)
011	204-92-11A-D / M23-FB-3	—	—	1	SBM			SBM	Any Left yes/no (no)
012	204-92-12A-D / M23-RB-1-4	—	—	1	SBM			SBM	Any Left yes/no (no)
013	TLI LCS / TLI LCS	—	—	1	SBM	SBM	SBM	SBM	~~Any Left yes/no~~
014	TLI LCSD / TLI LCSD	—	—	1	SBM	SBM	SBM	SBM	~~Any Left yes/no~~
									Any Left yes/no
									Any Left yes/no
									Any Left yes/no
									Any Left yes/no
									Any Left yes/no

ross weight of sample container + sample before/after aliquot removal.

mments: Supelco Supelpak 2 (Lot # P1111) used for TLI LCS, LCSD. Preprepared Blank (# 04228) sed for TLI blank TLW 04/02/98

Initials: _____ Date: __/__/__

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.: 45399

Ext S#.crd and TLI Number	1	2	3	4a	5	4b	6	4a	7	8	9
000 TLI Blank	TLW 04/03/98	SDH 4/4/98	JOD 4.5.98	—	—	JOD 4.4.98	JOD 4.14.98	JOD 4.15.98	JOD 4.15.98	CPH/AWW 4/6/98	4/6/98
001 204-92-1A-D				JOD 4.14.98	JOD 4.14.98						4/7/98 JLE
002 204-92-2A-D				JOD 4.14.98							
003 204-92-3A-D				JOD 4.14.98	JOD 4.14.98						
004 204-92-4A-D				—	—						
005 204-92-5A-D				—	—						
006 204-92-6A-D				—	—						
007 204-92-7A-D				—	—						2 4/7/98
008 204-92-8A-D				—	—						
009 204-92-9A-D	TLW 04/03/98			—	—					CPH/AWW 4/6/98	

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....	SOP.#.	.v..	DETAILS (circle)
1) EXTRACTION			Time On __ : __ Time Off __ : __
			Soxhlet / Jar / Sep Funnel / Steam Dist / Cont LL / ASE / Waste Dilution
2) SPIKE AFTER EXT'N			
3) ADD TRIDECANE			Lot# TRI 1.5.71
4) ROTOVAP	124	8	40mL / 1L 10mL / a Dryness → Samples 001, 002, 003; Parts 1A 2 combine.
5) COMBINE			
6) DIV/LIP. DETERM.			20%/80% 50%/50% 5mL/20mL Other_____
7) SOLVENT EXCHANGE			Iso-Octane Lot# C/77/C4 Heptane Lot#_____
8) CLEANUP		V.5	DSP 260 / DSP 225 / DSP 115 / DSP 215 / DSP 267 / Other_____
9) TRANSFER	272	2	
10) ADDITIONAL CLEANUP			Mod. DSP 260 / DSP 225 / DSP 115 / DSP 215 / DSP 267 / DSP260(10g)
11) FINAL TRANSFER			

Comments: _____

Rev 11/25/97 (PSTMF 4)

TRIANGLE LABORATORIES, INC.
DIOXIN SAMPLE EXTRACTION and CLEANUP TRACKING FORM
TLI Project No.: 45399

Ext S#.crd and TLI Number	1	2	3	4a	5	4b	6	4a	7	8	9
010 204-92-10A-D	TZW 04/03/98	SPM 4/4/98	JNP 4.5.98	—	—	JNP 4/4/98	JNP 4/5/98	JNP 4/5/98	JNP 4/5/98	CPT/ANW HB 4/6/98	JR 4/7/98
011 204-92-11A-D				—	—						
012 204-92-12A-D				—	—						
013 TLI LCS				—	—						
014 TLI LCSD	TZW 04/03/98			—	—					CPT/ANW #3 4/6/98	JR 4/7/98

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....	SOP.#.	.v..	DETAILS (circle)
(1) EXTRACTION	_____	____	Time On __ : __ Time Off __ : __
			(Soxhlet) / Jar / Sep Funnel / Steam Dist / Cont LL / ASE / Waste Dilution
(2) SPIKE AFTER EXT'N			
(3) ADD TRIDECANE			Lot# TRI 1.5.71
(4) ROTOVAP	124	1	40mL (b 10mL) (a Dryness)
(5) COMBINE	_____	____	
(6) DIV./LIP. DETERM.	_____	____	20%/80% (50%/50%) 5mL/20mL Other_____
(7) SOLVENT EXCHANGE			Iso-Octane Lot# 977164 Heptane Lot#_____
(8) CLEANUP		V.5	(DSP 260) / DSP 225 / DSP 115 / DSP 215 / DSP 267 / Other _____
(9) TRANSFER	272	2	
10) ADDITIONAL CLEANUP		____	Mod. DSP 260 / DSP 225 / DSP 115 / DSP 215 / DSP 267 / DSP260(10g)
11) FINAL TRANSFER	_____	____	

Comments: _____

Rev 11/25/97 (PSTMF 4)

TRIANGLE LABORATORIES, INC.
Transfer Chain-of-Custody Form
Project 45399

Transfer From: DWLH5 To: DMS5

	Initials..	Date.....	Time...
Released by:	[illegible]	4/7/98	11:18
Accepted by:	[illegible]	4/8/98	8:30

MILES.ID.....		TLI_No.....	Cust.Id.....
45399-	-000	TLI Blank	TLI M23 Blank
45399-	-001	204-92-1A-D	M23-I-1
45399-	-002	204-92-2A-D	M23-I-2
45399-	-003	204-92-3A-D	M23-I-3
45399-	-004	204-92-4A-D	M23-I-4
45399-	-005	204-92-5A-D	M23-O-1
45399-	-006	204-92-6A-D	M23-O-2
45399-	-007	204-92-7A-D	M23-O-3
45399-	-008	204-92-8A-D	M23-O-4
45399-	-009	204-92-9A-D	M23-FB-1
45399-	-010	204-92-10A-D	M23-FB-2
45399-	-011	204-92-11A-D	M23-FB-3
45399-	-012	204-92-12A-D	M23-RB-1-4
45399-	-013	TLI LCS	TLI LCS
45399-	-014	TLI LCSD	TLI LCSD

XfrCOC (Rev 11/01/94)

Additional comments or instructions:

TRIANGLE LABORATORIES, INC.

Method: Method 23: T-O, Toluene Combined — HR GC/HRMS ANALYSIS

Required Detection Limit: 0.05 ng — PROJECT: 45399

SAMPLE INFORMATION — RS Conc 20 µl @ 100.0 PG/µl

S#.crd	TLI / SAMPLE ID / CLIENT SAMPLE ID	1ST COLUMN GC/MS FILENAME COLUMN: DB5	CONFIRM	2ND COLUMN CONFIRM FILENAME COLUMN: DB225	USF-RS VOLUME SOLN ID	USF-RS INIT. DATE	ANALYSIS COMMENTS
000	TLI Blank / TLI M23 Blank	U980780	Y	P981305	20 ul G038A	AAS 4/9/98	
001	204-92-1A-D / M23-I-1	W981017	Y	P981306			
002	204-92-2A-D / M23-I-2	W981018	Y	P981307			
003	204-92-3A-D / M23-I-3	T981957	Y	P981308			
004	204-92-4A-D / M23-I-4	T981958	Y	P981309			
005	204-92-5A-D / M23-O-1	T981959	Y	P981310			
006	204-92-6A-D / M23-O-2	T981960	Y	P981311			
007	204-92-7A-D / M23-O-3	S982305	Y	P981312			
008	204-92-8A-D / M23-O-4	S982306	Y	P981317			
009	204-92-9A-D / M23-FB-1	S982307	N	P981318			
010	204-92-10A-D / M23-FB-2	S982308	Y	P981319			
011	204-92-11A-D / M23-FB-3	S982309	Y	P981320	20 ul G038A	AAS 4/9/98	

Comments: Sample 005 appears to have been double spiked based on observed volume. Mom 4/15/98

Type: A

Spike File: SPMIT204

Amt of Extract: 50%

REV 03/07/95 (PSTMF 6)

TRIANGLE LABORATORIES, INC.

Method: Method 23: T-O, Toluene Combined — HR GC/HRMS ANALYSIS

Required Detection Limit: 0.05 ng — PROJECT: 45399

SAMPLE INFORMATION — RS Conc 20 µl @ 100.0 PG/µl

S#.crd	TLI / SAMPLE ID / CLIENT SAMPLE ID	1ST COLUMN GC/MS FILENAME COLUMN: _____	CONFIRM	2ND COLUMN CONFIRM FILENAME COLUMN: DB-225	USF-RS VOLUME SOLN ID	USF-RS INIT. DATE	ANALYSIS COMMENTS
012	204-92-12A-D / M23-RB-1-4	5982310		P98132'	20 µl 6038A	VAS 4/9/98	
013	TLI LCS / TLI LCS	5982311	—	—	↓	↓	
014	TLI LCSD / TLI LCSD	5982312	—	—	20 µl 6038A	VAS 4/9/98	

Comments: _____

Type: A

Spike File: SPMIT204

Amt of Extract: 50%

REV 03/07/95 (PSTMF 6)

Triangle Laboratories, Inc.
Run Log

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	G/C
705	DB5	5638441	T02	2.0uL	U5	NDB5U5

DL
Signature

4/18/98
Date

Filename	Date*	Time*	Project #	Sample#	No.	Client Sample ID	Syr	332	Operator/Date	Comments**
~~5982300~~			~~45399~~	~~205-83-5A~~	~~6~~	~~5804085572~~	~~Auto~~		~~MS 4/17/98~~	
5982301			45464	OPR	0	OPR Water	↓		↓	
5982302			↓	TU Blank	1	TU Water Blank	↓		↓	
~~5982303~~			~~45464~~	~~205-58-1A~~	~~2~~	~~Sands Pond~~	~~Auto~~		~~MS 4/17/98~~	~~Not run Hm 4/17/98~~
5982297	4/17/98	1:39	45464	OPR	0	OPR Water	Auto	6.7 ES	Hm 4/17/98	
298	↓	2:25	↓	Blank	1	TU Water Blank	↓	5.9 ES	↓	very low BS recovery Hm 4/
299	4/17/98	3:11	45464	205-58-1A	2	Sands Pond	↓	5.7 ES	↓	
300			45470	205-64-1A	2	POS-Entry Point C. Sampler	↓		↓	
~~5982301~~			~~45470~~	~~205-74-1A~~	~~2~~	~~174402-01~~	~~Auto~~		~~Hm 4/17/98~~	~~not run Hm 4/17/98~~
5982302	4/18/98	8:27	—	6462A	—	Rtchk	Rtchk	11%	DL 4/18/98	
5982303	↓	9:28	—	5969B	—	8290/1613 Concal 10	MO #3	5.2 ES	DL 4/18/98	good for 8290T-0 + M2 DL 4/18/98
5982304	↓	10:33	—	6038D	—	RS100	AUTO	4.2 ES	DL 4/18/98	clean
5982305	4/18/98	11:26	45399	204-92-7A-1	7	M23-0-3	AUTO	6.1 ES	DL 4/18/98	

* Transcribed from chromatographic data
** Dated initials required

ConCal Due: 7:53 (was good 1613 EDD only)
ConCal Due: _____

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5982305 → 315
11 samples.

Triangle Laboratories, Inc.
Run Log

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	G/C
705	DB5	5638441	702	2.0ml	US	NDB5US

DL
Signature

4/18/98
Date

Filename	Date*	Time*	Project #	Sample#	No.	Client Sample ID	Syr	332	Operator/Date	Comments**
S982306	4/18/98	12:12	45399	204-92-8A-D	8	M23-0-4	AUTO	6.9 ES	DL 4/18/98	
S982307		12:58		-9A-D	9	M23-FB-1		6.6 ES		
S982308		13:44		-10A-D	10	M23-FB-2		5.7 ES		
S982309		14:27		-11-A-D	11	M23-FB-3		5.3 ES		
S982310		15:16		204-92 -12A-D	12	M23-RB-1-4		5.6 ES		
S982311		1602		TU LCS	13	TU LCS		4.9 ES		
S982312		1648	45399	TU LCSD	14	TU LCSD		4.8 ES		
S982313		1734	45403	TU Blank	0	TU solid blank		8.7 ES		
S982314		1820		204-96-1	1	Soil ~~bl~~ sample #1		1.1 ES		
S982315	4/18/98	1906	45403	204-96-2	2	Soil sample # 2	AUTO	6.7 ES	DL 4/18/98	
S982316	4/18/98	1950	45403	204-96-3	3	Basement NW sample #1	Auto	6.6 ES	ML 4/18/98	
S982317	4/18/98	2041	—	5969B	—	8290 concal 10.0	M-0 #3	6.7 ES	ML 4/18/98	Good ending only
S982318	4/18/98	2136	—	6062A	—	Retention window check	RTCHK	13%	ML 4/18/98	

* Transcribed from chromatographic data
** Dated initials required

ConCal Due: 21:28
ConCal Due: _____

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Run Log

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	G/C
70T	DB5	7631535	TC2	2.0 ul	US	NDBSUS

DLe
Signature

4/17/98
Date

Filename	Date*	Time*	Project #	Sample#	No.	Client Sample ID	Syr	332	Operator/Date	Comments**
T981940	4/17/98	16:22	91591	Mick Carbon 1	7	"Mick's Carbon" Sample #1	AUTO	4.4 ±5	DLe 4/17/98	
T981941		17:09		2	8	#2		3.9 ±5		
T981942		17:55		3	9	#3		4.3 ±5		
T981943		18:42		4	10	#4		4.3 ±5		
T981944	4/17/98	19:28	91591	Mick Carbon 5	11	"Mick's Carbon" Sample #5	AUTO	4.7 ±5	DL 4/17/98	
T981945		20:28	—	60062A	—	Rtchk	Rtchk	17%	BB 4/17/98	
T981946		21:18	—	5969B	—	8290/163 Conal	m-o #3	5.9 ±5	BB 4/17/98	good 8290 BB 4/17/98
T981947		22:18	—	6030C	—	RS 100	auto	6.3 ±5	BB 4/17/98	
~~948~~	~~4/17/98~~		~~45160A~~	TC1 Blank	0	~~TC1 M23 Blank~~				
949				205-54-3	3	980125 = methol Blank				
950				205-54-1	1	980123 = line1				
951				205-54-2	2	980134 = line2				
~~T981952~~			~~45460A~~	TC1LCS	4	~~TC1 LCS~~	auto		~~BB 4/17/98~~	Needle bent at start of run DLe 4/17/98

* Transcribed from chromatographic data
** Dated initials required

ConCal Due: _____
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
70T	DB-5	7631535	T02	20ul	45	NDB545

Brenda Bonafede
Signature

4/18/98
Date

Filename	Date*	Time*	Project #	Sample#	No.	Client Sample ID	Syr	332	Operator/Date	Comments**
~~T981953~~			~~45460r1~~	~~T02LCSD~~	5	T02 LCSD	auto		~~BB 4/18/98~~	not used bm 4/18/98
T981951	4/18/98	1:34	45460r1	Blank	0	TLI M23 Blank	Auto	6.7 ES	bm 4/18/98	
52	4/18/98	2:20		205-54-3	3	980125= Method Blank		5.8 ES		
53	4/18/98	3:06		205-54-1	1	980123: Line1		6.7 ES		
54	4/18/98	3:53		205-54-2	2	980124= Line 2		6.5 ES		
55	4/18/98	4:40		LCS	4	LCS		6.6 ES		
56	4/18/98	05:26	45460r1	LCSD	5	LCSD		6.1 ES		
T981957	4/18/98	06:13	45399	204-92-3A-D	3	M23-I-3	Auto	6.4 ES	bm 4/18/98	
58	4/18/98	06:59		204-92-4A-D	4	M23-I-4		9.4 ES		
59	4/18/98	7:46		204-92-5A-D	5	M23-O-1		6.1 ES		
T981960	4/18/98	8:32	45399	204-92-6A-D	6	M23-O-2	Auto	6.2 ES	bm 4/18/98	
T981961	4/18/98	9:56	—	6062A	—	Rtchk	Rtchk	16%	DL 4/18/98	
T981962	4/18/98	10:44	—	5969B	—	8290/1613 ConCal 10	MO #3	4.3 ES	DL 4/18/98	14,000,0000 out DL 4/18/98

* Transcribed from chromatographic data
** Dated initials required

ConCal Due: 9:15
ConCal Due:

srvr1/qa/forms/hrrunlog.doc (02/05/97)

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Triangle Laboratories, Inc.
Log

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	G/C
7DU	DB-5	7586437	T02	2.0 ul	NDB5US	NDB5US

Signature: Rene Bowman
Date: 4/15/98

Filename	Date*	Time*	Project #	Sample#	No.	Client Sample ID	Syr	332	Operator/Date	Comments**
U980763	4/15/98	455	45381B	204-74-10	5	DPG 445	U4091	2.4 E7	KS 4/15/98	
U980764	4/15/98	542	45381B	204-74-11	6	DPG 473	U4091	3.1 E7	KS 4/15/98	
U980765	4/15/98	6:27	45381B	204-74-12	7	DPG 474	U4091	4.8 E7	KS 4/15/98	
U980766	4/15/98	7:33	45381B	LCS	8	LCS	U4091	2.0 E7	[illegible] 4/15/98	
U980767	4/15/98	8:22	45381B	TLI LCSD	9	TLI LCSD	U4091	3.5 E7	DL 4/15/98	
U980768	4/15/98	9:11	—	5969B	—	8290 concal 10	MU #3	3.2 E7	DL 4/15/98	good endeny only DL 4/15
U980769	4/15/98	10:52	—	5994	—	Rtchk	Rtchk	18%	DL 4/15/98	
U980770	4/15/98	12:09	—	5969B	—	8290 concal 10	MU #3	3.3 E7	DL 4/15/98	789 HxCDF analyte out DL 4/15/98
U980771	4/15/98	13:11	—	5969B	—	8290 concal 10	MU #3	2.9 E7	DL 4/15/98	~~789 HxCDF Analyte out~~ KDL 4/15/98 good 8290 T-O DL
U980772	4/15/98	14:17	—	6038C	—	RS100	U4091	2.1 E7	DL 4/15/98	clean DL 4/15/98
U980773	4/15/98	15:12	45473	205-67-1	1	25893-001	U4091	6.9 E7	DL 4/15/98	
U980774	4/15/98	15:59	45473	LCSD	3	TLI LCSD	U4091	4.7 E7	DL 4/15/98	
U980775	4/15/98	1646	45381A	204-74-1	1	DPG 044	U4091	2.5 E7	DL 4/15/98	

* Transcribed from chromatographic data
** Dated initials required

ConCal Due: ~~11:06~~
ConCal Due: 10:0pm

srvr1/qa/forms/hrunlog.doc (02/05/97)

Triangle Laboratories, Inc.
F Log

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	G/C
70W	DB-5	7586437	702	2.0 µl	NDB5M5	NDB5M5

Signature: [illegible] Date: 4/15/98

Filename	Date*	Time*	Project #	Sample#	No.	Client Sample ID	Syr	332	Operator/Date	Comments**
U980776	04/15/98	1732	45381A	204-74-2	2	DPG 903	U4091	2.0 E7	ML 04/15/98	
U980777	04/15/98	1819	45381A	204-74-3	3	DPG 023	U4091	2.8 E7	ML 04/15/98	
U980778	04/15/98	1914	45381A	204-74-4	4	DPG 073	U4091	2.9 E7	ML 04/15/98	
U980779	04/15/98	2001	45381A	204-74-5	5	DPG 024	U4091	2.8 E7	ML 04/15/98	
U980780	04/15/98	2048	45399	TLI Blank	0	TLI MLS Blank	U4091	3.0 E7	ML 04/15/98	
U980781	04/15/98	2158	—	5969B	—	8290 Concal 10.0	M-0 #3	3.3 E7	ML 04/15/98	Good backgrnd. only
U980782	04/15/98	2322	—	5969B	—	8290 Concal 10.0	M-0 #3	3.1 E7	ML 04/15/98	tetrac 8D above Limit.
U980783	04/16/98	0:25	—	5969B	—	8290 Concal 10.0	M-0 #3	3.7 E7	ML 04/16/98	NG [illegible]
~~U980784~~	~~4/16/98~~		—	~~5969B~~	—	~~8290 CONCL 10~~	M-0 #3		~~WK 4/16/98~~	NOT USED WK 4/16/98
U980785	4/16/98		—	5969B	—	8290 CON 10	M-0 #3		WK 4/16/98	LOCO LOW MASS WK 4/16/98
U980786	4/16/98	13:29	—	5969B	—	8290 CONCL 10	M-0 #3	3.7 E7	WK 4/16/98	
U980787	4/16/98		—	5969B	—	8290 CONC 10	M-0 #3		WK 4/16/98	
U980788	4/16/98		—	5969B	—	8290/1613/MIT	M-0 #3		MD 4/16/98	

* Transcribed from chromatographic data
** Dated initials required

ConCal Due: 10:00pm
ConCal Due: _____

Triangle Laboratories, Inc.
Run Log

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	G/C
VG 70W	DB5	867715	TOL	2 ul	NDB5U8	NDB5U8

Signature: [illegible]
Date: 4/15/98

Filename	Date*	Time*	Project #	Sample#	No.	Client Sample ID	Syr	332	Operator/Date	Comments**
W981009	4/15/98		—	5994	—	RT CHK	RTCh		WK 4/15/98	
W981010	4/15/98		—	596913	—	8290/1613/MIT CC 10.0	M-0 #3		MAS 4/15/98	
W981011	4/15/98		—	5969B	—	8290/1613/MIT CC10	W-0 #7		MAS 4/15/98	
W981012	4/16/98	11:12	—	5961A	—	8290/1613A CONCAL 10	M-0 #3	0.7 RT	WK 4/16/98	Good WK 4/16/98
W981013	4/16/98	12:24	—	6062A	—	RT CHK	RTCh	16%	WK 4/16/98	
W981014	4/16/98	13:24	—	6038C	—	RS-1 ion	W4021	7.4 ES	WK 4/16/98	
W981015	4/16/98	14:24	45404	204-97-1A	2	DFN 001	W4021	2.1 ES	WK 4/16/98	
W981016	4/16/98	15:17	45409	205-3-1A	2	98-349G	W4021	1.1 ES	WK 4/16/98	
W981017	4/16/98	16:19	45399	204-92-1A-D	1	M23-I-1	W4021	2.5 ES	WK 4/16/98	
W981018	4/16/98		45399	204-92-1A-D	2	M23-I-2	W4021		MAS 4/16/98	
W981019	4-17-98		—	5969B	—	8290/1613/MIT CONCAL	M-0 #3		GG 4-17-98	
W981020	4-17-98		—	5969B	—	8290/1613/MIT CONCAL 10	M-0 #3		GG 4-17-98	
W981021	4-17-98		—	5969B	—	8290/1613/MIT CONCAL 10	M-0 #3		GG 4-17-98	

* Transcribed from chromatographic data
** Dated initials required

ConCal Due: 22:30 pm MAS 4/16/98
ConCal Due: _____

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Triangle Laboratories, Inc.
Run Log

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	G/C
70P	DB225	7609925	TT1	20ul	DB225	DB225
				Bernard J. Gemm Signature		4/16/98 Date

Filename	Date*	Time*	Project #	Sample#	No.	Client Sample ID	Syr	332	Operator/Date	Comments**
P981300	4/16/98	8:17	—	5994	—	RTCHK	RTCHK	11%	BJG 4/16/98	GOOD BJG 4/16/98
P981301	4/16/98	9:14	—	5787	—	TETRA Conical 5.0	Tetra 5.0	2.8 ES	BJG 4/16/98	NG IS > 30% BJ 4/16
P981302	4/16/98	13:10	—	5787	—	TETRA LONG 5.0	Tetra 5.0	4.0 ES	BJG 4/16/98	GOOD BJG 4/16/98
P981303	4/16/98	14:05	—	6062A	—	RTCHK	RTCHK	13%	BJG 4/16/98	GOOD BJG 4/16/98
P981304	4/16/98	14:55	—	6038C	—	RS-100	P4141	2.3 ES	BJG 4/16/98	Clean BJG 4/16/98
P981305	4/16/98	1542	45399	TC1 BLANK	0	TC1 M23 BLANK	P4141	2.9 ES	BJG 4/16/98	
P981306	4/16/98	1630	45399	204-92-1A-D	1	M23-I-1	P4141	2.7 ES	BJG 4/16/98	
P981307	4/16/98	1812	45399	204-92-2A-D	2	M23-I-2	P4141	4.5 ES	ML 4/16/98	
P981308	4/16/98	1858	45399	204-92-3A-D	3	M23-I-3	P4141	4.4 ES	ML 4/16/98	
P981309	4/16/98	1951	45399	204-92-4A-D	4	M23-I-4	P4141	6.2 ES	ML 4/16/98	
P981310	4/16/98	2038	45399	204-92-5A-D	5	EE ML 4/16/98 ~~M23-I-1~~ M23-O-1	P4141	4.3 ES	ML 4/16/98	
P981311	4/16/98	2124	45399	204-92-6A-D	6	M23-O-2	P4141	3.7 ES	ML 4/16/98	
P981312	4/16/98	2212	45399	204-92-7A-D	7	M23-O-3	P4141	3.8 ES	ML 4/16/98	

* Transcribed from chromatographic data
** Dated initials required

ConCal Due: 11:50 pm KAD 4/14/98
ConCal Due: _____

Triangle Laboratories, Inc.
Run Log

Instrument ID	Column Type	Column ID	Plot Name	Inj. Vol.	Acquisition	G/C
70P	DB225	7609925	T11	2.0 µl	DB225	DB225

Signature: [illegible]
Date: 4/16/98

Filename	Date*	Time*	Project #	Sample#	No.	Client Sample ID	Syr	332	Operator/Date	Comments**
P981313	04/16/98	2300	45473	205-67-1	1	25893-001	P4141	7.2 E4	ML 04/16/98	
P981314	04/16/98	23:58	—	5787	—	Tetra conc 5.0	Tetra 5.0	3.8 ES	ML 04/16/98	Good F&B KB 4/17/98
P981315	4/17/98	01:09	—	6062A	—	RTCHK	RTCHK	10%	KB 4/17/98	Good KB 4/17/98
P981316	4/17/98	154	—	6038C	—	RS-100	P4141	2.2 EC	KB 4/17/98	Clean KB 4/17/98
P981317	4/17/98	241	45399	204-92-8A-D	8	M23-0-4	P4141	24 ES	KB 4/17/98	
P981318	4/17/98	329	45399	204-92-9A-D	9	M23-FB-1	P4141	30 ES	KB 4/17/98	
P981319	4/17/98	418	45399	204-92-10A-D	10	M23-FB-2	P4141	2.3 ES	KB 4/17/98	
P981320	4/17/98	05:04	45399	204-92-11A-D	11	M23-FB-3	P4141	2.5 ES	KB 4/17/98	
P981321	4/17/98	05:49	45399	204-92-12A-D	12	M23-RB-1-4	P4141	2.6 ES	Jm 4/17/98	

* Transcribed from chromatographic data
** Dated initials required

ConCal Due: _____
ConCal Due: _____

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TRIANGLE LABS

SAMPLE 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

TRIANGLE LABORATORIES OF RTP, INC.
Sample Result Summary for Project 45399
Method MIT2 Analysis (DB-5)

04/21/98

Data File	U980780	W981017	W981018	T981957
Sample ID	TLI M23 Blank	M23-I-1	M23-I-2	M23-I-3
Units	ng	ng	ng	ng
Extraction Date	04/03/98	04/03/98	04/03/98	04/03/98
Analysis Date	04/15/98	04/16/98	04/16/98	04/18/98
Instrument	U	W	W	T
Matrix	XAD	M23	M23	M23
Extraction Type	Soxhlet	Soxhlet	Soxhlet	Soxhlet
Analytes				
2378-TCDD	(0.002)	(0.03)	(0.04)	(0.003)
12378-PeCDD	(0.002)	(0.05)	(0.07)	(0.004)
123478-HxCDD	(0.003)	(0.06)	(0.09)	(0.007)
123678-HxCDD	(0.002)	(0.06)	(0.08)	(0.007)
123789-HxCDD	(0.002)	(0.06)	(0.08)	(0.007)
1234678-HpCDD	(0.003)	(0.09)	(0.1)	(0.01)
OCDD	0.01 J	(0.1)	{0.29}	{0.03} JB
2378-TCDF	{0.004}J	0.05 B	1.5	0.02 B
12378-PeCDF	(0.002)	(0.03)	0.21	(0.003)
23478-PeCDF	(0.002)	(0.04)	0.21	(0.003)
123478-HxCDF	(0.002)	(0.04)	0.10 J	{0.007}J
123678-HxCDF	(0.002)	(0.04)	{0.05} J	{0.004}J
234678-HxCDF	(0.002)	(0.04)	(0.06)	(0.004)
123789-HxCDF	(0.002)	(0.05)	(0.07)	(0.005)
1234678-HpCDF	(0.002)	(0.06)	{0.05} J	0.009 J
1234789-HpCDF	(0.002)	(0.08)	(0.1)	(0.008)
OCDF	(0.003)	(0.1)	(0.1)	(0.02)
TOTAL TCDD	(0.002)	(0.03)	0.25	0.01
TOTAL PeCDD	(0.002)	(0.05)	{0.11}	(0.004)
TOTAL HxCDD	(0.002)	(0.06)	0.07	(0.007)
TOTAL HpCDD	(0.003)	(0.09)	(0.1)	(0.01)
TOTAL TCDF	{0.004}	0.09	12.1	0.11
TOTAL PeCDF	(0.002)	{0.06}	2.7	0.02
TOTAL HxCDF	(0.002)	(0.04)	0.33	0.01
TOTAL HpCDF	(0.002)	(0.06)	{0.05}	0.009
Other Standards Percent Recovery Summary (% Rec)				
37Cl-TCDD	87.9	83.3	84.7	84.9
Other Standards Percent Recovery Summary (% Rec)				
13C12-PeCDF 234	106	89.3	88.8	94.9
13C12-HxCDF 478	108	78.3	81.0	87.6
13C12-HxCDD 478	114	75.5	75.6	90.8
13C12-HpCDF 789	90.1	83.6	85.1	68.1
Other Standards Percent Recovery Summary (% Rec)				
13C12-HxCDF 789	84.5	82.4	90.3	80.1
13C12-HxCDF 234	81.8	114	78.2	94.0
Internal Standards Percent Recovery Summary (% Rec)				
13C12-2378-TCDF	65.8	71.2	73.1	76.6
13C12-2378-TCDD	67.9	78.1	74.0	71.7

Sample Result Summary for Project 45399 04/21/98

Method MIT2 Analysis (DB-5)

Data File	U980780	W981017	W981018	T981957
Sample ID	TLI M23 Blank	M23-I-1	M23-I-2	M23-I-3
Units	ng	ng	ng	ng
Extraction Date	04/03/98	04/03/98	04/03/98	04/03/98
Analysis Date	04/15/98	04/16/98	04/16/98	04/18/98
Instrument	U	W	W	T
Matrix	XAD	M23	M23	M23
Extraction Type	Soxhlet	Soxhlet	Soxhlet	Soxhlet
Internal Standards Percent Recovery Summary (% Rec)				
13C12-PeCDF 123	68.6	68.5	64.9	72.6
13C12-PeCDD 123	99.4	71.8	68.3	80.1
13C12-HxCDF 678	68.1	119	87.9	101
13C12-HxCDD 678	78.7	115	93.0	93.2
13C12-HpCDF 678	83.7	115	100.0	99.8
13C12-HpCDD 678	92.5	116	107	101
13C12-OCDD	83.0	103	95.4	65.6

TRIANGLE LABORATORIES OF RTP, INC.
Sample Result Summary for Project 45399
Method MIT2 Analysis (DB-5)

04/21/98

Data File	T981958	T981959	T981960	S982305
Sample ID	M23-I-4	M23-O-1	M23-O-2	M23-O-3
Units	ng	ng	ng	ng
Extraction Date	04/03/98	04/03/98	04/03/98	04/03/98
Analysis Date	04/18/98	04/18/98	04/18/98	04/18/98
Instrument	T	T	T	S
Matrix	M23	M23	M23	M23
Extraction Type	Soxhlet	Soxhlet	Soxhlet	Soxhlet
Analytes				
2378-TCDD	(0.003)	(0.01)	(0.006)	(0.006)
12378-PeCDD	(0.004)	(0.02)	(0.009)	(0.009)
123478-HxCDD	(0.006)	(0.02)	(0.01)	(0.01)
123678-HxCDD	(0.005)	(0.02)	(0.01)	(0.01)
123789-HxCDD	(0.005)	(0.02)	(0.01)	(0.009)
1234678-HpCDD	0.008 J	(0.03)	0.01 J	(0.01)
OCDD	0.04 JB	(0.05)	{0.03} JB	(0.02)
2378-TCDF	0.34	{0.02} B	0.03 B	{0.007}JB
12378-PeCDF	0.04 J	(0.01)	(0.006)	(0.006)
23478-PeCDF	0.04 J	(0.01)	(0.006)	(0.006)
123478-HxCDF	0.01 J	(0.01)	(0.008)	(0.006)
123678-HxCDF	0.008 J	(0.01)	(0.007)	(0.006)
234678-HxCDF	0.008 J	(0.01)	(0.009)	(0.007)
123789-HxCDF	(0.004)	(0.01)	(0.01)	(0.008)
1234678-HpCDF	0.007 J	(0.02)	{0.01} J	(0.01)
1234789-HpCDF	(0.007)	(0.02)	(0.02)	(0.01)
OCDF	(0.02)	(0.04)	(0.03)	(0.01)
TOTAL TCDD	0.02	0.03	0.08	(0.006)
TOTAL PeCDD	{0.003}	(0.02)	0.03	(0.009)
TOTAL HxCDD	0.01	(0.02)	(0.01)	(0.01)
TOTAL HpCDD	0.02	(0.03)	0.01	(0.01)
TOTAL TCDF	2.6	{0.02}	0.25	{0.007}
TOTAL PeCDF	0.38	{0.01}	0.02	(0.006)
TOTAL HxCDF	0.05	(0.01)	{0.007}	(0.007)
TOTAL HpCDF	0.007	(0.02)	{0.01}	(0.01)
Other Standards Percent Recovery Summary (% Rec)				
37Cl-TCDD	88.9	92.6	87.1	96.7
Other Standards Percent Recovery Summary (% Rec)				
13C12-PeCDF 234	96.0	107	98.8	102
13C12-HxCDF 478	92.2	91.3	91.0	97.4
13C12-HxCDD 478	93.2	99.4	95.9	96.5
13C12-HpCDF 789	76.0	84.8	82.2	95.2
Other Standards Percent Recovery Summary (% Rec)				
13C12-HxCDF 789	76.1	38.5 V	66.8	62.9
13C12-HxCDF 234	75.6	39.2 V	73.2	65.3
Internal Standards Percent Recovery Summary (% Rec)				
13C12-2378-TCDF	60.6	22.9 V	57.4	54.8
13C12-2378-TCDD	53.7	22.3 V	54.3	49.0

Data File	T981958	T981959	T981960	S982305
Sample ID	M23-I-4	M23-O-1	M23-O-2	M23-O-3
Units	ng	ng	ng	ng
Extraction Date	04/03/98	04/03/98	04/03/98	04/03/98
Analysis Date	04/18/98	04/18/98	04/18/98	04/18/98
Instrument	T	T	T	S
Matrix	M23	M23	M23	M23
Extraction Type	Soxhlet	Soxhlet	Soxhlet	Soxhlet

Internal Standards Percent Recovery Summary (% Rec)

13C12-PeCDF 123	63.2	25.6	V	54.4	55.4
13C12-PeCDD 123	69.5	31.3	V	62.6	59.7
13C12-HxCDF 678	72.2	35.4	V	74.0	63.9
13C12-HxCDD 678	70.5	36.3	V	71.9	72.6
13C12-HpCDF 678	65.5	33.7		67.7	54.3
13C12-HpCDD 678	68.4	38.7		77.0	65.5
13C12-OCDD	40.3	25.1		47.7	63.1

TRIANGLE LABORATORIES OF RTP, INC.
Sample Result Summary for Project 45399
Method MIT2 Analysis (DB-5)

04/21/98

Data File	S982306	S982307	S982308	S982309
Sample ID	M23-O-4	M23-FB-1	M23-FB-2	M23-FB-3
Units	ng	ng	ng	ng
Extraction Date	04/03/98	04/03/98	04/03/98	04/03/98
Analysis Date	04/18/98	04/18/98	04/18/98	04/18/98
Instrument	S	S	S	S
Matrix	M23	M23	M23	M23
Extraction Type	Soxhlet	Soxhlet	Soxhlet	Soxhlet .
Analytes				
2378-TCDD	(0.004)	(0.003)	(0.004)	(0.003)
12378-PeCDD	(0.006)	(0.005)	(0.005)	(0.005)
123478-HxCDD	(0.008)	(0.005)	(0.006)	(0.005)
123678-HxCDD	(0.007)	(0.005)	(0.006)	(0.005)
123789-HxCDD	(0.007)	(0.004)	(0.006)	(0.005)
1234678-HpCDD	{0.01} J	(0.005)	(0.006)	(0.006)
OCDD	0.05 JB	(0.006)	(0.009)	(0.008)
2378-TCDF	0.02 JB	(0.002)	0.005 JB	(0.002)
12378-PeCDF	(0.004)	(0.004)	(0.004)	(0.004)
23478-PeCDF	(0.004)	(0.004)	(0.004)	(0.004)
123478-HxCDF	(0.005)	(0.003)	(0.004)	(0.004)
123678-HxCDF	(0.005)	(0.003)	(0.004)	(0.003)
234678-HxCDF	(0.006)	(0.004)	(0.004)	(0.004)
123789-HxCDF	(0.006)	(0.004)	(0.004)	(0.004)
1234678-HpCDF	(0.007)	(0.004)	(0.005)	(0.005)
1234789-HpCDF	(0.01)	(0.005)	(0.006)	(0.006)
OCDF	(0.01)	(0.004)	(0.006)	(0.006)
TOTAL TCDD	(0.004)	(0.003)	(0.004)	(0.003)
TOTAL PeCDD	(0.006)	(0.005)	(0.005)	(0.005)
TOTAL HxCDD	{0.009}	(0.005)	(0.006)	(0.005)
TOTAL HpCDD	{0.01}	(0.005)	(0.006)	(0.006)
TOTAL TCDF	0.17	(0.002)	0.005	(0.002)
TOTAL PeCDF	0.01	(0.004)	(0.004)	(0.004)
TOTAL HxCDF	0.008	(0.004)	(0.004)	(0.004)
TOTAL HpCDF	(0.008)	(0.005)	(0.005)	0.008
Other Standards Percent Recovery Summary (% Rec)				
37Cl-TCDD	91.8	93.5	92.1	93.8
Other Standards Percent Recovery Summary (% Rec)				
13C12-PeCDF 234	89.7	106	107	99.6
13C12-HxCDF 478	93.4	90.4	84.6	83.7
13C12-HxCDD 478	83.8	92.9	85.0	90.3
13C12-HpCDF 789	104	110	82.6	85.4
Other Standards Percent Recovery Summary (% Rec)				
13C12-HxCDF 789	87.0	84.9	85.6	88.0
13C12-HxCDF 234	86.1	87.4	87.6	87.6
Internal Standards Percent Recovery Summary (% Rec)				
13C12-2378-TCDF	79.7	74.4	70.4	63.8
13C12-2378-TCDD	64.1	63.1	66.2	63.4

Data File	S982306	S982307	S982308	S982309
Sample ID	M23-O-4	M23-FB-1	M23-FB-2	M23-FB-3
Units	ng	ng	ng	ng
Extraction Date	04/03/98	04/03/98	04/03/98	04/03/98
Analysis Date	04/18/98	04/18/98	04/18/98	04/18/98
Instrument	S	S	S	S
Matrix	M23	M23	M23	M23
Extraction Type	Soxhlet	Soxhlet	Soxhlet	Soxhlet

Internal Standards Percent Recovery Summary (% Rec)

13C12-PeCDF 123	70.7	70.1	72.1	64.2
13C12-PeCDD 123	68.3	83.6	95.3	74.3
13C12-HxCDF 678	80.5	72.8	96.7	84.5
13C12-HxCDD 678	95.3	91.7	104	97.8
13C12-HpCDF 678	74.4	80.5	102	82.6
13C12-HpCDD 678	87.2	106	133	99.2
13C12-OCDD	93.8	119	114	104

Data File	S982310
Sample ID	M23-RB-1-4
Units	ng
Extraction Date	04/03/98
Analysis Date	04/18/98
Instrument	S
Matrix	M23
Extraction Type	Soxhlet

Analytes	
2378-TCDD	(0.003)
12378-PeCDD	(0.004)
123478-HxCDD	(0.004)
123678-HxCDD	(0.004)
123789-HxCDD	(0.004)
1234678-HpCDD	(0.004)
OCDD	(0.005)
2378-TCDF	(0.002)
12378-PeCDF	(0.003)
23478-PeCDF	(0.003)
123478-HxCDF	(0.003)
123678-HxCDF	(0.003)
234678-HxCDF	(0.003)
123789-HxCDF	(0.003)
1234678-HpCDF	(0.003)
1234789-HpCDF	(0.004)
OCDF	(0.004)
TOTAL TCDD	(0.003)
TOTAL PeCDD	(0.004)
TOTAL HxCDD	(0.004)
TOTAL HpCDD	(0.004)
TOTAL TCDF	(0.002)
TOTAL PeCDF	(0.003)
TOTAL HxCDF	(0.003)
TOTAL HpCDF	(0.004)

Other Standards	Percent Recovery Summary (% Rec)
37Cl-TCDD	83.8

Other Standards	Percent Recovery Summary (% Rec)
13C12-PeCDF 234	101
13C12-HxCDF 478	82.5
13C12-HxCDD 478	82.5
13C12-HpCDF 789	95.2

Other Standards	Percent Recovery Summary (% Rec)
13C12-HxCDF 789	87.7
13C12-HxCDF 234	89.1

Internal Standards	Percent Recovery Summary (% Rec)
13C12-2378-TCDF	66.0
13C12-2378-TCDD	59.9

Data File	S982310
Sample ID	M23-RB-1-4
Units	ng
Extraction Date	04/03/98
Analysis Date	04/18/98
Instrument	S
Matrix	M23
Extraction Type	Soxhlet

Internal Standards	Percent Recovery Summary (% Rec)
13C12-PeCDF 123	62.5
13C12-PeCDD 123	76.1
13C12-HxCDF 678	81.6
13C12-HxCDD 678	97.6
13C12-HpCDF 678	82.8
13C12-HpCDD 678	101
13C12-OCDD	115

{Estimated Maximum Possible Concentration}, (Detection Limit).

TRIANGLE LABORATORIES, INC.
Sample Result Summary for Project 45399
Method 23X (DB-225)

04/20/98

Data File	P981305	P981306	P981307	P981308
Sample ID	TLI M23 Blank	M23-I-1	M23-I-2	M23-I-3
Units	ng	ng	ng	ng
Extraction Date	04/03/98	04/03/98	04/03/98	04/03/98
Analysis Date	04/16/98	04/16/98	04/16/98	04/16/98
Instrument	P	P	P	P
Matrix	XAD	M23	M23	M23
Extraction Type				
Analytes				
2378-TCDF	(0.005)	{0.007}JB	0.51	{0.007}JB
Internal Standards Percent Recovery Summary (% Rec)				
13C12-2378-TCDF	69.2	80.4	73.5	79.7

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Sample Result Summary for Project 45399 04/20/98

Method 23X (DB-225)

Data File	P981309	P981310	P981311	P981312
Sample ID	M23-I-4	M23-O-1	M23-O-2	M23-O-3
Units	ng	ng	ng	ng
Extraction Date	04/03/98	04/03/98	04/03/98	04/03/98
Analysis Date	04/16/98	04/16/98	04/16/98	04/16/98
Instrument	P	P	P	P
Matrix	M23	M23	M23	M23
Extraction Type				
Analytes				
2378-TCDF	0.14	(0.01)	0.01 JB	(0.007)
Internal Standards Percent Recovery Summary (% Rec)				
13C12-2378-TCDF	56.1	21.4 V	54.0	60.0

Data File	P981317	P981319
Sample ID	M23-O-4	M23-FB-2
Units	ng	ng
Extraction Date	04/03/98	04/03/98
Analysis Date	04/17/98	04/17/98
Instrument	P	P
Matrix	M23	M23
Extraction Type		
Analytes		
2378-TCDF	(0.005)	(0.005)
Internal Standards Percent Recovery Summary (% Rec)		
13C12-2378-TCDF	75.5	73.7

{Estimated Maximum Possible Concentration}, (Detection Limit).

Method 8290 Sample Calculations:

Analyte Concentration

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

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

Where:

$C_{(\sigma)}$	=	concentration or amount of a given analyte
A_σ	=	integrated current for the characteristic ions of the analyte
A_β	=	integrated current of the characteristic ions of the corresponding internal standard
Q_β	=	amount of internal standard added to the sample before extraction
$RRF_{(\sigma)}$	=	mean analyte relative response factor from the initial calibration
W	=	sample weight or volume

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:

$DL_{(\sigma)}$	=	estimated detection limit for a target analyte
2.5	=	minimum response required for a GC signal
F	=	an empirical number that approximates the area to height ratio for a GC signal. (F = 3.7 for all dioxin/furan analyses)
H	=	height of the noise
A_β	=	integrated current of the characteristic ions of the corresponding internal standard
Q_β	=	amount of internal standard added to the sample before extraction
$RRF_{(\sigma)}$	=	mean analyte relative response factor from the initial calibration
W	=	sample weight or volume

Data Flags

In order to assist with data interpretation, data qualifier flags are used on the final reports. 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 is 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.

An **'E'** flag is used to indicate a concentration based on an analyte to internal standard ratio which exceeds the range of the calibration curve. Values which are outside the calibration curve are estimates only.

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 **'J'** flag is used to indicate a concentration based on an analyte to internal standard ratio which is below the calibration curve. Values which are outside the calibration curve are estimates only.

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.

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.

An **'S'** flag indicates that the response of a specific PCDD/PCDF isomer has exceeded the normal dynamic range of the mass spectrometer detection system. The corresponding signal is saturated and the reported analyte concentration is a 'minimum estimate'. When the 'S' qualifier is used in the reporting of 'totals', there is saturation of one (not

necessarily from a specific isomer) or more saturated signals for a given class of compounds.

A **'U'** flag is used to indicate that a specific isomer cannot be resolved from a large, co-eluting interferent GC peak. The specific isomer is reported as not detected as a valid concentration 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.

An **'X'** flag is used to indicate that a pentachlorodibenzofuran (PCDF) peak has eluted at the same time as the associated diphenyl ether (DPE) and that the DPE peak intensity is at least ten percent of the total PCDF peak intensity. Total PCDF values are flagged 'X' 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 either reported as "estimated maximum possible concentration (EMPC) values without regard to the isotopic abundance ratio, or are included in the detection limit value depending on the analytical method.

Method 23 Sample Calculations:

Analyte Concentration

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

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

Where:

$Amt_{(\sigma)}$	=	amount of a given analyte, expressed in nanograms (ng) or picograms (pg).
A_σ	=	integrated current for the characteristic ions of the analyte
A_β	=	integrated current of the characteristic ions of the corresponding internal standard
Q_β	=	amount of internal standard added to the sample before extraction
$RRF_{(\sigma)}$	=	mean analyte relative response factor from the initial calibration
W	=	sample weight or volume (W = 1.0 for Method 23 samples)

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:

$DL_{(\sigma)}$	=	estimated detection limit for a target analyte, expressed in ng or pg
2.5	=	minimum response required for a GC signal
F	=	an empirical number that approximates the area to height ratio for a GC signal. (F = 3.7 for all dioxin/furan analyses)
H	=	height of the noise
A_β	=	integrated current of the characteristic ions of the corresponding internal standard
Q_β	=	amount of internal standard added to the sample before extraction
$RRF_{(\sigma)}$	=	mean analyte relative response factor from the initial calibration
W	=	sample weight or volume

Pacific Environmental Services

TLI Project: **45399** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **TLI M23 Blank** Analysis File: **U980780**

Client Project:	**r012.002/Lime Kiln**				
Sample Matrix:	**XAD**	Date Received:	**/ /**	Spike File:	**SPMIT204**
TLI ID:	**TLI Blank**	Date Extracted:	**04/03/98**	ICal:	**UF51058**
		Date Analyzed:	**04/15/98**	ConCal:	**U980771**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U980780**	% Lipid:	**n/a**
GC Column:	**DB-5**	Analyst:	**ML**	% Solids:	**n/a**

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	ND	0.002				___
1,2,3,7,8-PeCDD	ND	0.002				___
1,2,3,4,7,8-HxCDD	ND	0.003				___
1,2,3,6,7,8-HxCDD	ND	0.002				___
1,2,3,7,8,9-HxCDD	ND	0.002				___
1,2,3,4,6,7,8-HpCDD	ND	0.003				___
1,2,3,4,6,7,8,9-OCDD	0.01			0.86	38:23	J__
2,3,7,8-TCDF	EMPC		0.004			J__
1,2,3,7,8-PeCDF	ND	0.002				___
2,3,4,7,8-PeCDF	ND	0.002				___
1,2,3,4,7,8-HxCDF	ND	0.002				___
1,2,3,6,7,8-HxCDF	ND	0.002				___
2,3,4,6,7,8-HxCDF	ND	0.002				___
1,2,3,7,8,9-HxCDF	ND	0.002				___
1,2,3,4,6,7,8-HpCDF	ND	0.002				___
1,2,3,4,7,8,9-HpCDF	ND	0.002				___
1,2,3,4,6,7,8,9-OCDF	ND	0.003				___

Totals	Amt. (ng)	Number	DL	EMPC	Flags
Total TCDD	ND		0.002		___
Total PeCDD	ND		0.002		___
Total HxCDD	ND		0.002		___
Total HpCDD	ND		0.003		___
Total TCDF	EMPC			0.004	___
Total PeCDF	ND		0.002		___
Total HxCDF	ND		0.002		___
Total HpCDF	ND		0.002		___

MIT2_PSR v1.04, LARS 6.11.00

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Pacific Environmental Services

TLI Project: **45399** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **TLI M23 Blank** Analysis File: **U980780**

Internal Standards	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	2.6	65.8	40%-130%	0.77	23:21	___
$^{13}C_{12}$-2,3,7,8-TCDD	2.7	67.9	40%-130%	0.81	24:07	___
$^{13}C_{12}$-1,2,3,7,8-PeCDF	2.7	68.6	40%-130%	1.48	27:32	___
$^{13}C_{12}$-1,2,3,7,8-PeCDD	4.0	99.4	40%-130%	1.50	28:38	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	2.7	68.1	40%-130%	0.50	31:15	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	3.1	78.7	40%-130%	1.23	31:57	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	3.3	83.7	25%-130%	0.39	34:04	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	3.7	92.5	25%-130%	1.00	35:03	___
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	6.6	83.0	25%-130%	0.87	38:22	___

Surrogate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,4,7,8-PeCDF	4.2	106	40%-130%	1.46	28:17	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	4.3	108	40%-130%	0.49	31:10	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	4.6	114	40%-130%	1.22	31:53	___
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	3.6	90.1	25%-130%	0.42	35:30	___

Other Standard	Amt. (ng)	% Recovery	QC Limits	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	3.5	87.9	40%-130%	24:08	___

Alternate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	3.4	84.5	40%-130%	0.50	32:30	___
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	3.3	81.8	40%-130%	0.50	31:46	___

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.82	23:55	___
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.20	32:16	___

Data Reviewer: WDN 04/20/98

MIT2_PSR v1.04, LARS 6.11.00

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Printed: 13:40 04/20/98

Initial ....Date...

Data Review By: WDH 4/20/98 Calculated Noise Area: 4.07

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 U980780B.dbf
04/20/98 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						0.844-1.086			
304-306	DC	NL		0:00	RO	0.62	15.06			0.000			
				23:22	RO	0.45	32.25	14.03	31.51	1.001	2378-TCDF	AN	J
304-306			1	Peak			32.25						
13C12-TCDF				0.65-0.89						0.957-1.043			
316-318	DC	NL		0:00	RO	1.96	6.21			0.000			
	DC	WL		22:13		0.76	318.34			0.951			
				22:54		0.87	121.02	56.22	64.80	0.981			
				23:21		0.77	27,052.70	11,732.50	15,320.20	1.000	13C12-2378-TCDF	IS0	
				23:49	RO	0.99	69.14	38.57	39.06	1.020			
316-318			3	Peaks			27,242.86						

---------- Above: TCDF / TCDD Follows ----------

TCDD				0.65-0.89						0.878-1.050			
320-322	DC	NL		0:00	RO	0.63	4.90			0.000			
	DC	SN		23:20	RO	3.39	8.18			0.968			
D	D	SN		24:08	RO	0.43	18.85			1.001	2378-TCDD	AN	
	DC	SN		24:21	RO	1.36	2.60			1.010			
	DC	SN		24:30	RO	1.70	2.16			1.016			
320-322			0	Peaks			0.00						
37Cl-TCDD										0.917-1.083			
328	DC	NL		0:00			1.39			0.000			
				22:37			17.02	17.02		0.938			
				24:08			18,717.10	18,717.10		1.001	37Cl-TCDD	CLS	
328			2	Peaks			18,734.12						
13C12-TCDD				0.65-0.89						0.917-1.083			
332-334	DC	NL		0:00	RO	2.10	13.54			0.000			
				22:53	RO	1.12	104.54	66.07	59.06	0.949			
				23:55		0.82	28,009.20	12,615.40	15,393.80	0.992	13C12-1234-TCDD	RS1	
				24:07		0.81	21,268.95	9,538.45	11,730.50	1.000	13C12-2378-TCDD	IS1	
				24:29		0.79	318.23	140.18	178.05	1.015			
332-334			4	Peaks			49,700.92						

---------- Above: TCDD / PeCDF Follows ----------

PeCDF				1.32-1.78						0.917-1.068			
340-342	DC	NL		0:00	RO	0.84	4.33			0.000			
	DC	SN		25:29	RO	2.89	5.38			0.926			
	DC	SN		25:48	RO	0.72	3.36			0.937			
	DC	SN		26:05	RO	0.47	3.64			0.947			

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		26:26	RO	0.16	1.07			0.960			
	DC	SN		26:39	RO	0.57	5.74			0.968			
	DC	SN		26:49		1.43	1.65			0.974			
	DC	SN		26:58	RO	0.43	2.50			0.979			
	DC	SN		27:10	RO	0.52	5.91			0.987			
	DC	SN		28:11		1.73	4.61			1.024			
	DC	SN		28:17	RO	2.08	5.99			1.027	23478-PeCDF	AN	
	DC	SN		28:25		1.50	4.95			1.032			
	DC	SN		29:14	RO	0.99	4.95			1.062			
	DC	SN		29:20	RO	0.72	2.50			1.065			
340-342			0 Peaks				0.00						
13C12-PeCDF				1.32-1.78						0.855-1.145			
352-354	DC	NL		0:00		1.46	3.27			0.000			
				26:38		1.49	515.16	308.00	207.16	0.967			
				27:10		1.34	43.38	24.88	18.50	0.987			
				27:32		1.48	21,926.89	13,102.30	8,824.59	1.000	13C12-PeCDF 123	IS2	
				27:51		1.53	168.38	101.84	66.54	1.012			
				28:17		1.46	22,359.52	13,285.30	9,074.22	1.027	13C12-PeCDF 234	SUR1	
				28:38		1.66	44.32	27.66	16.66	1.040			
				29:16		1.58	65.71	40.27	25.44	1.063			
352-354			7 Peaks				45,123.36						
---------- Above: PeCDF / PeCDD Follows ----------													
PeCDD				1.32-1.78						0.928-1.022			
356-358	DC	NL		0:00	RO	0.69	1.83			0.000			
	DC	SN		26:55	RO	0.59	5.26			0.940			
D	D	SN		27:32	RO	1.08	15.14			0.962			
	DC	SN		27:39		1.72	3.13			0.966			
D	D	SN		28:17		1.77	15.90			0.988			
	DC	SN		28:36	RO	2.08	3.70			0.999	12378-PeCDD	AN	
	DC	SN		29:05	RO	0.93	4.28			1.016			
	DC	WH		29:22	RO	0.36	2.37			1.026			
	DC	WH		29:38	RO	1.17	6.70			1.035			
356-358			0 Peaks				0.00						
13C12-PeCDD				1.32-1.78						0.860-1.140			
368-370	DC	NL		0:00	RO	0.98	2.39			0.000			
				27:32		1.64	28.72	17.85	10.87	0.962			
				28:38		1.50	16,427.29	9,847.36	6,579.93	1.000	13C12-PeCDD 123	IS3	
				28:46		1.53	1,424.21	860.99	563.22	1.005			
				29:00	RO	3.03	13.36	15.88	5.24	1.013			
368-370			4 Peaks				17,893.58						
---------- Above: PeCDD / HxCDF Follows ----------													
HxCDF				1.05-1.43						0.959-1.047			
374-376	DC	NL		0:00		1.30	10.44			0.000			
	DC	SN		31:11		1.07	8.09			0.998	123478-HxCDF	AN	
	DC	SN		31:53	RO	0.71	4.15			1.020			
	DC	SN		31:56	RO	0.25	3.16			1.022			

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	32:04	RO	0.34	1.64			1.026			
		DC	SN	32:07	RO	2.02	2.93			1.028			
		DC	SN	32:11	RO	3.67	2.53			1.030			
		DC	SN	32:29	RO	0.73	6.20			1.039	123789-HxCDF		AN
	D	D	SN	32:31		1.11	11.58			1.041			
		DC	WH	32:55	RO	0.42	3.54			1.053			
374-376			0	Peaks			0.00						
13C12-HxCDF				0.43-0.59						0.872-1.128			
384-386		DC	NL	0:00	RO	1.27	11.01			0.000			
				30:10		0.45	211.83	66.19	145.64	0.965			
				30:18		0.47	252.65	80.95	171.70	0.970			
				31:10		0.49	19,894.83	6,563.63	13,331.20	0.997	13C12-HxCDF 478		SUR2
				31:15		0.50	22,345.35	7,415.55	14,929.80	1.000	13C12-HxCDF 678		IS4
				31:46		0.50	24,229.50	8,099.80	16,129.70	1.017	13C12-HxCDF 234		ALT2
				32:30		0.50	19,282.44	6,456.14	12,826.30	1.040	13C12-HxCDF 789		ALT1
384-386			6	Peaks			86,216.60						

---------- Above: HxCDF / HxCDD Follows ----------

HxCDD				1.05-1.43						0.955-1.014			
390-392		DC	NL	0:00	RO	0.83	9.45			0.000			
	D	D	SN	31:10	RO	1.95	13.75			0.975			
	D	D	SN	31:16	RO	2.30	13.53			0.979			
		DC	SN	31:47	RO	3.01	9.61			0.995			
		DC	WH	32:30	RO	8.36	4.75			1.017			
390-392			0	Peaks			0.00						
13C12-HxCDD				1.05-1.43						0.969-1.031			
402-404		DC	NL	0:00	RO	1.03	15.99			0.000			
				31:22		1.17	76.16	40.99	35.17	0.982			
				31:53		1.22	15,985.15	8,798.58	7,186.57	0.998	13C12-HxCDD 478		SUR3
				31:57		1.23	19,092.35	10,538.10	8,554.25	1.000	13C12-HxCDD 678		IS5
				32:16		1.20	24,384.70	13,317.20	11,067.50	1.010	13C12-HxCDD 789		RS2
402-404			4	Peaks			59,538.36						

---------- Above: HxCDD / HpCDF Follows ----------

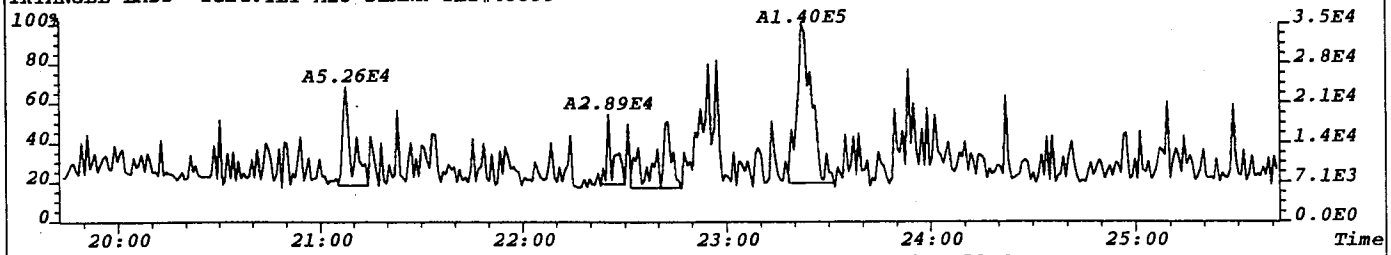
HpCDF				0.88-1.20						0.995-1.047			
408-410		DC	NL	0:00	RO	2.42	4.92			0.000			
		DC	SN	34:06	RO	2.70	6.94			1.001	1234678-HpCDF		AN
		DC	SN	35:27		1.08	3.32			1.041			
		DC	SN	35:36	RO	3.00	4.75			1.045			
		DC	WH	35:43	RO	2.77	3.53			1.048			
408-410			0	Peaks			0.00						
13C12-HpCDF				0.37-0.51						0.941-1.117			
418-420		DC	NL	0:00	RO	0.60	9.13			0.000			
				34:04		0.39	16,774.71	4,735.81	12,038.90	1.000	13C12-HpCDF 678		IS6
				35:30		0.42	12,127.45	3,608.54	8,518.91	1.042	13C12-HpCDF 789		SUR4
418-420			2	Peaks			28,902.16						

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: HpCDF / HpCDD Follows ----------													
HpCDD						0.88-1.20				0.975-1.005			
424-426	DC	NL		0:00	RO	0.36	1.61			0.000			
	DC	WL		34:03	RO	2.59	10.38			0.971			
	DC	SN		34:38	RO	4.74	2.33			0.988			
424-426			0	Peaks			0.00						
13C12-HpCDD						0.88-1.20				0.971-1.029			
436-438	DC	NL		0:00	RO	1.38	13.63			0.000			
				34:21	RO	1.30	80.62	51.37	39.52	0.980			
				35:03		1.00	16,382.49	8,187.87	8,194.62	1.000	13C12-HpCDD	678	IS7
436-438			2	Peaks			16,463.11						
---------- Above: HpCDD / Octa-CDD and CDF Follows ----------													
OCDF						0.76-1.02				0.896-1.104			
442-444	DC	NL		0:00		0.97	4.97			0.000			
	DC	SN		34:34	RO	1.05	1.78			0.901			
	DC	SN		34:39	RO	0.72	4.16			0.903			
				35:03	RO	1.89	10.05	10.07	5.32	0.914			
	DC	SN		35:29	RO	1.15	6.41			0.925			
	DC	SN		35:37	RO	1.35	3.74			0.928			
	DC	SN		35:48	RO	1.10	4.16			0.933			
	DC	SN		35:54	RO	0.63	6.99			0.936			
	DC	SN		36:54	RO	2.02	3.59			0.962			
	DC	SN		38:51	RO	0.35	1.34			1.013			
	DC	SN		40:39	RO	2.08	1.49			1.060			
	DC	SN		40:46	RO	1.91	1.08			1.063			
	DC	SN		40:55	RO	1.18	2.91			1.066			
442-444			1	Peak			10.05						
OCDD						0.76-1.02				0.896-1.104			
458-460	DC	NL		0:00	RO	2.18	2.10			0.000			
				38:23		0.86	37.20	17.20	20.00	1.000	OCDD	AN	J
458-460			1	Peak			37.20						
13C12-OCDD						0.76-1.02				0.995-1.004			
470-472	DC	NL		0:00	RO	2.50	1.91			0.000			
				38:22		0.87	22,056.70	10,248.60	11,808.10	1.000	13C12-OCDD	IS8	
470-472			1	Peak			22,056.70						

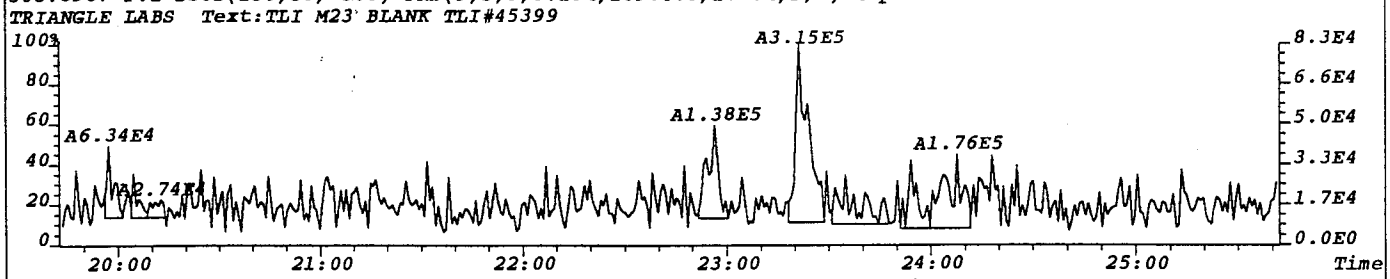
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside 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
		X-Ether Interference

*** End of Report ***

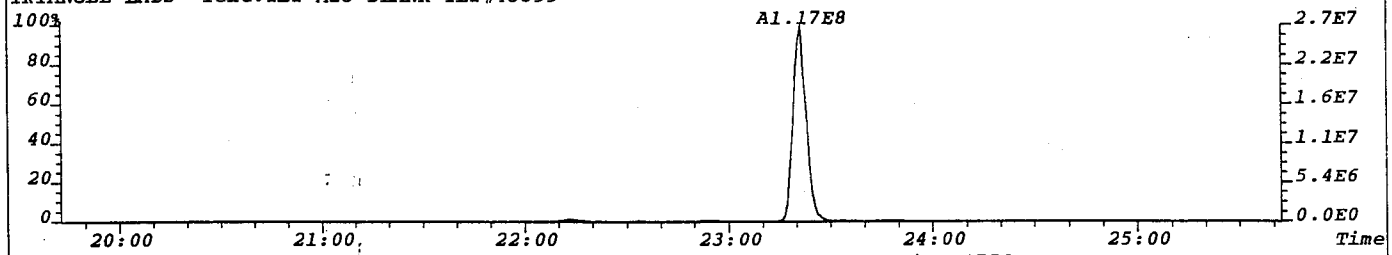
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:3276
303.9016 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,13104.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



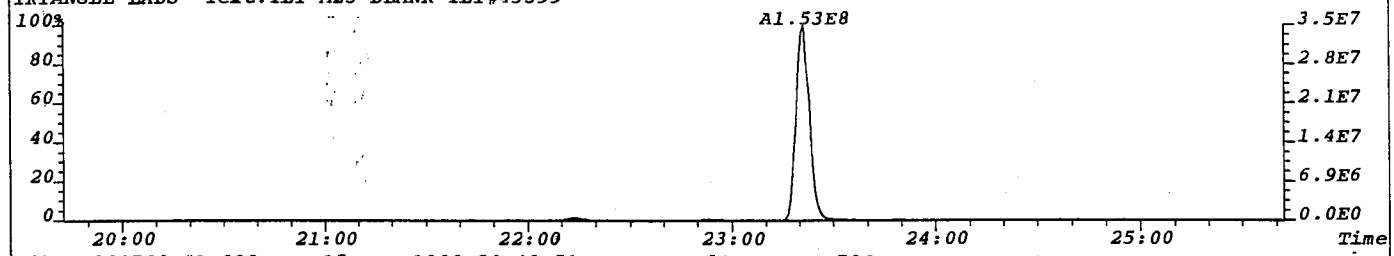
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:5246
305.8987 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,20984.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



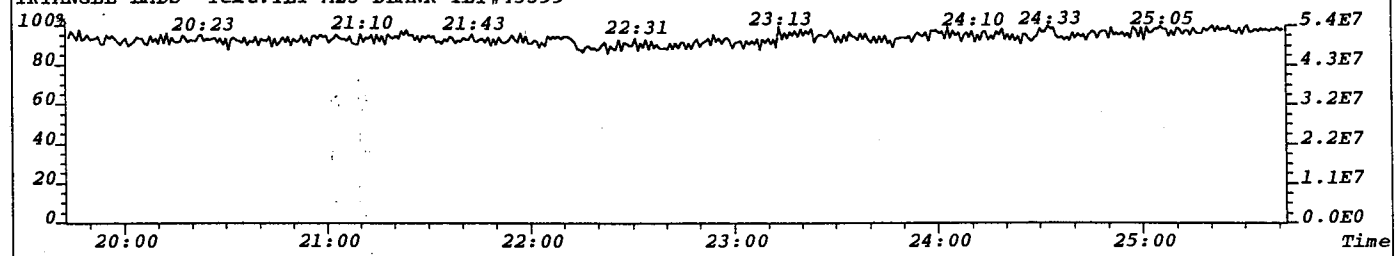
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:3441
315.9419 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,13764.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



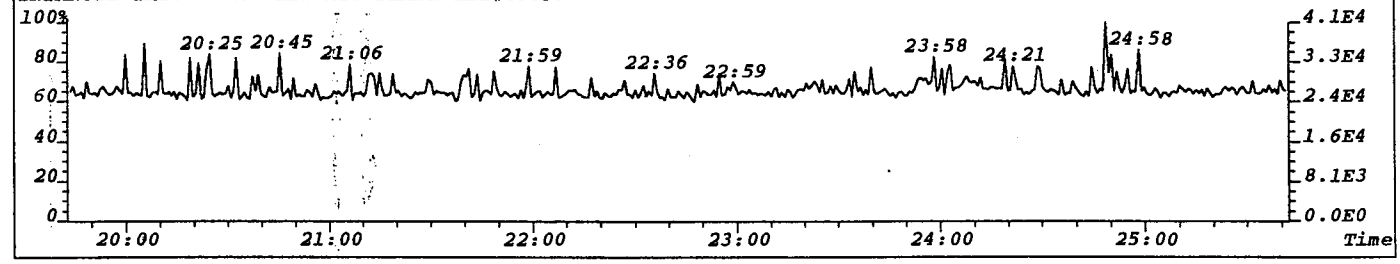
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:1753
317.9389 F:2 BSUB(256,30,-3.0) PKD(9,5,3,0.10%,7012.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



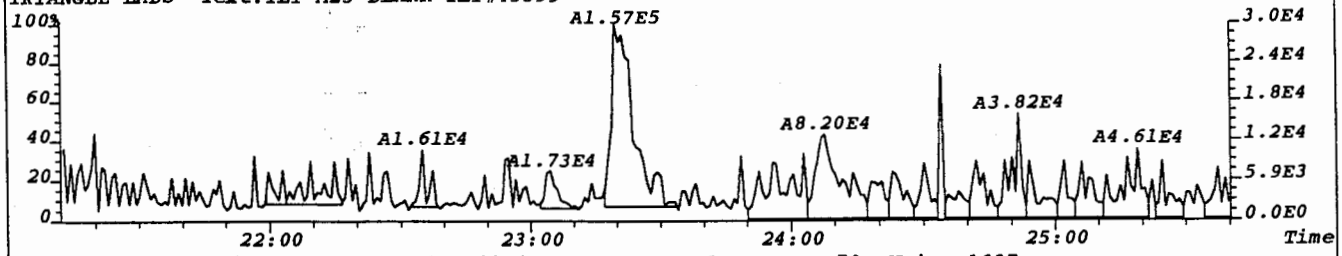
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



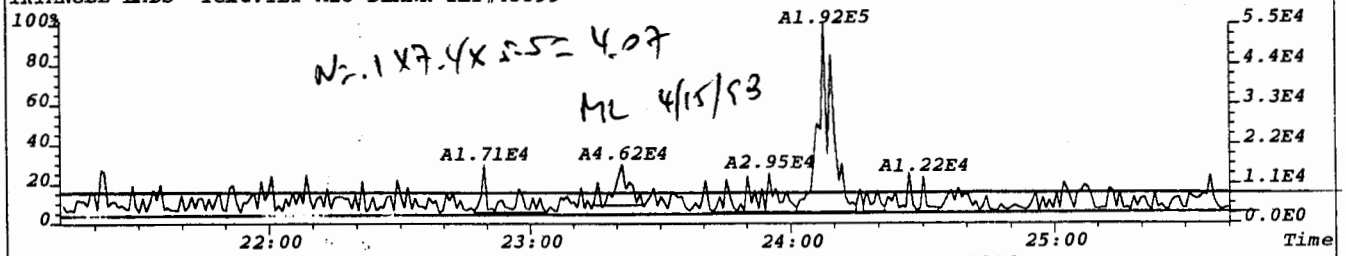
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S
375.8364 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:1065
319.8965 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4260.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399

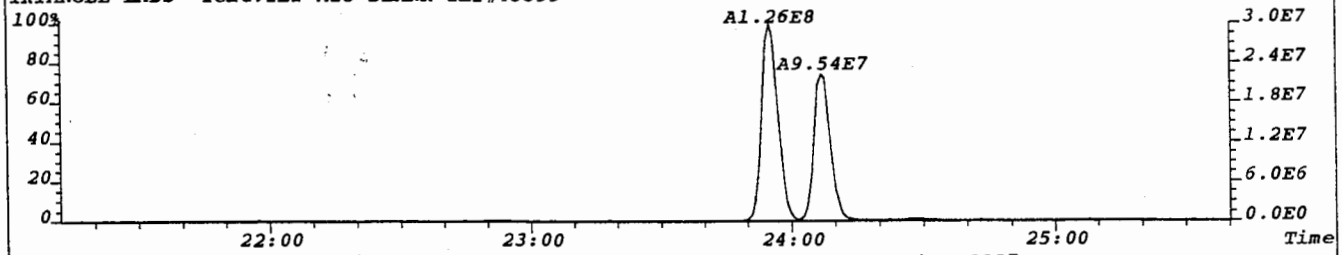


File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:1687
321.8936 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6748.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399

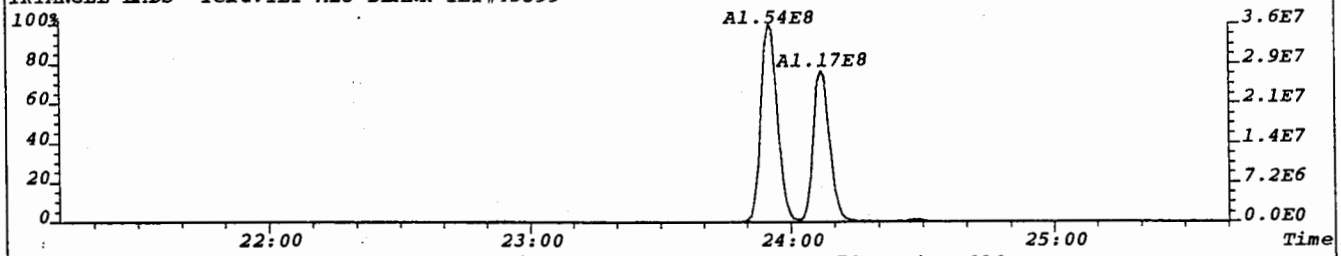


N=.1 X7.4 X 5 = 4.07
ML 4/15/98

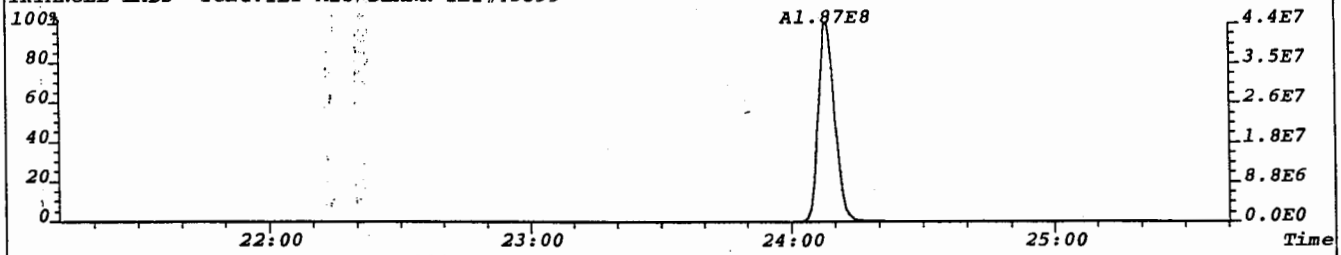
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:8036
331.9368 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,32144.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



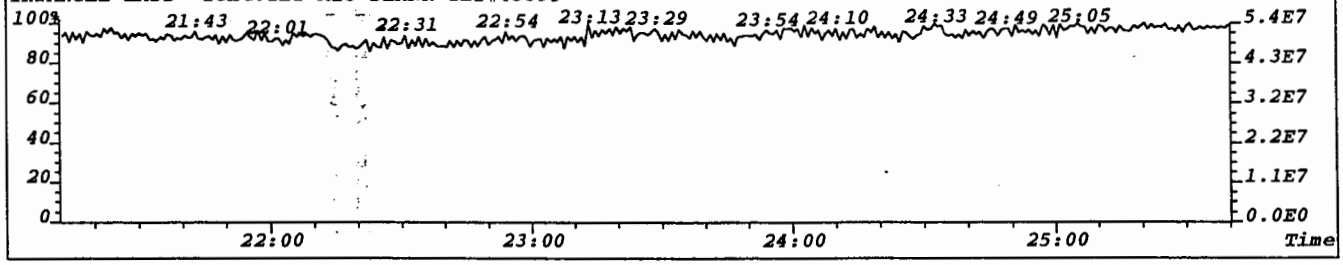
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:3827
333.9338 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,15308.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



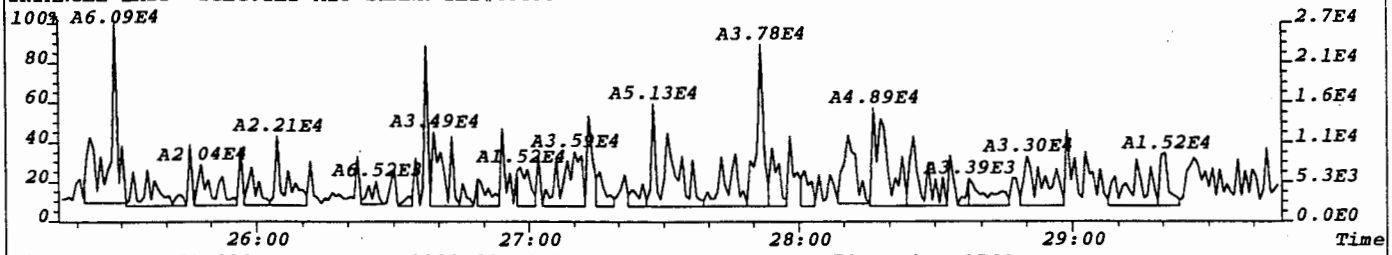
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:696
327.8847 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2784.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



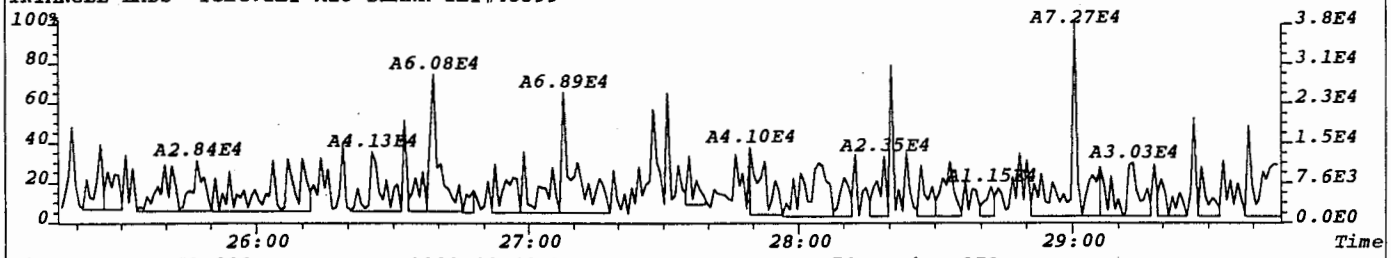
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



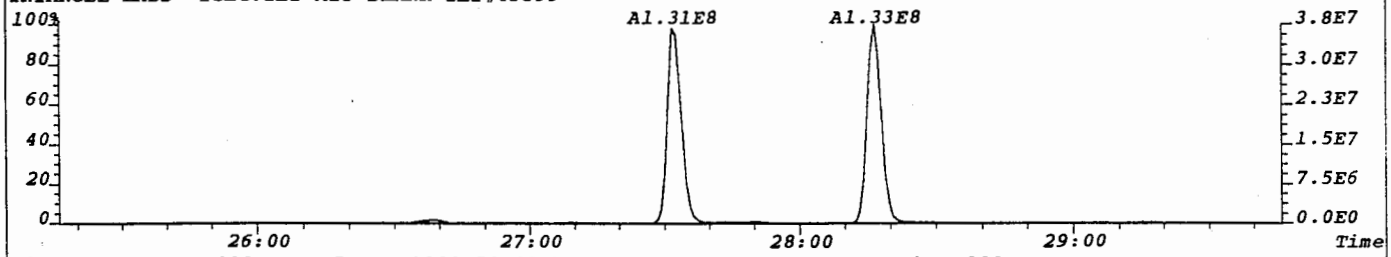
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:1317
339.8597 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5268.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



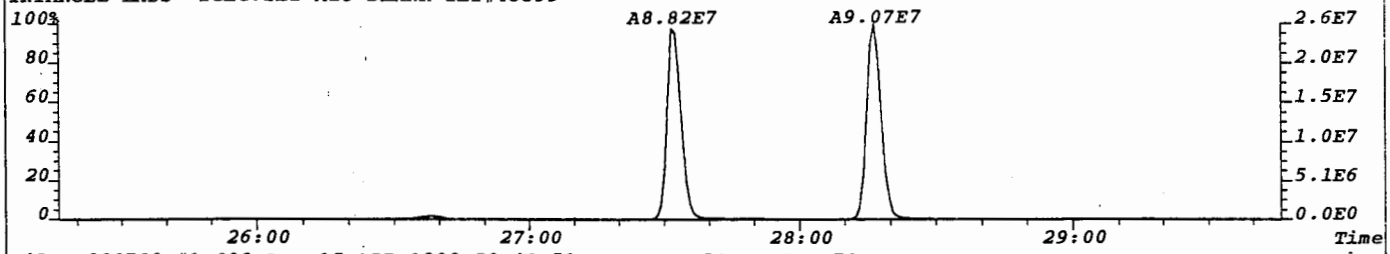
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:1568
341.8567 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,6272.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



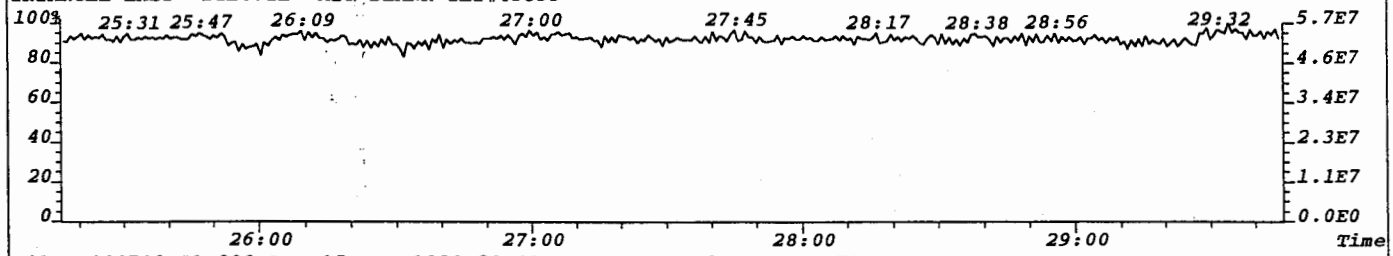
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:971
351.9000 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3884.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



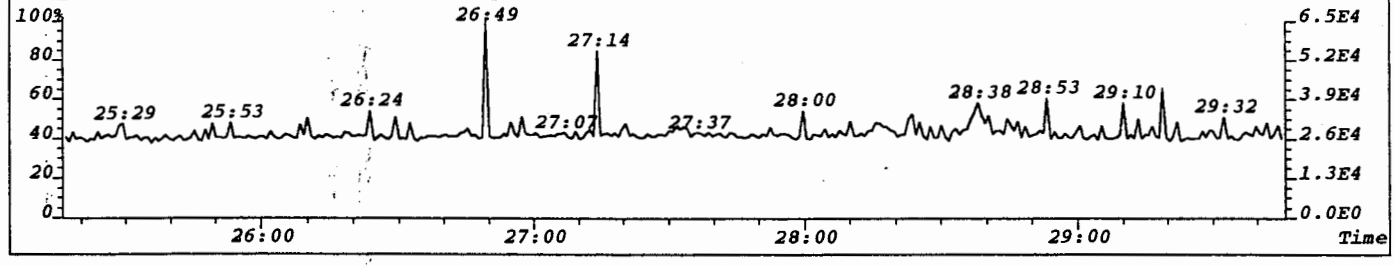
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:666
353.8970 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2664.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



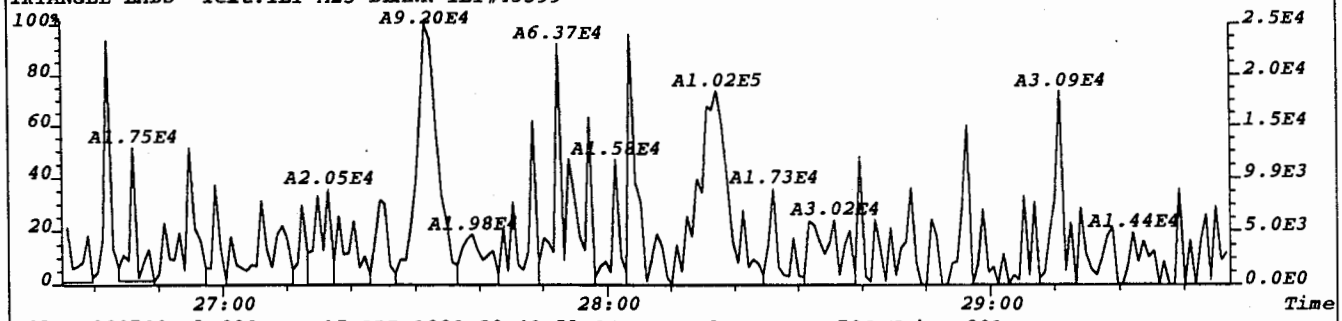
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



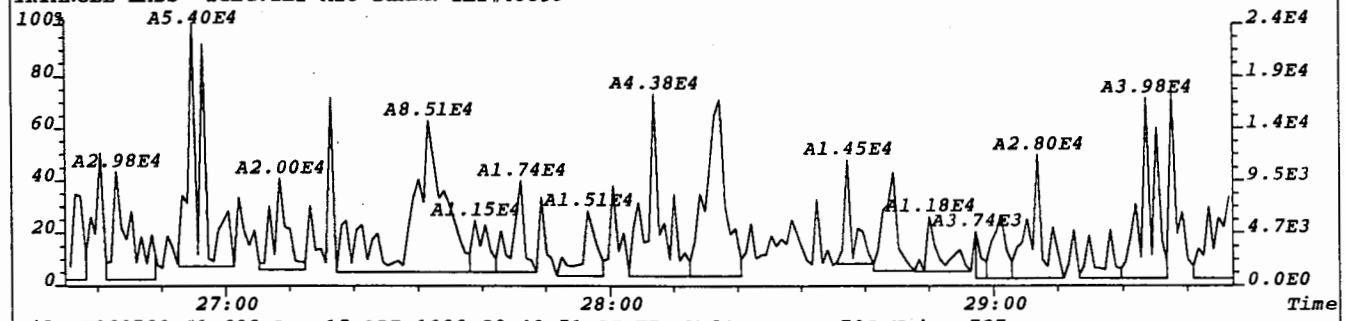
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S
409.7974 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



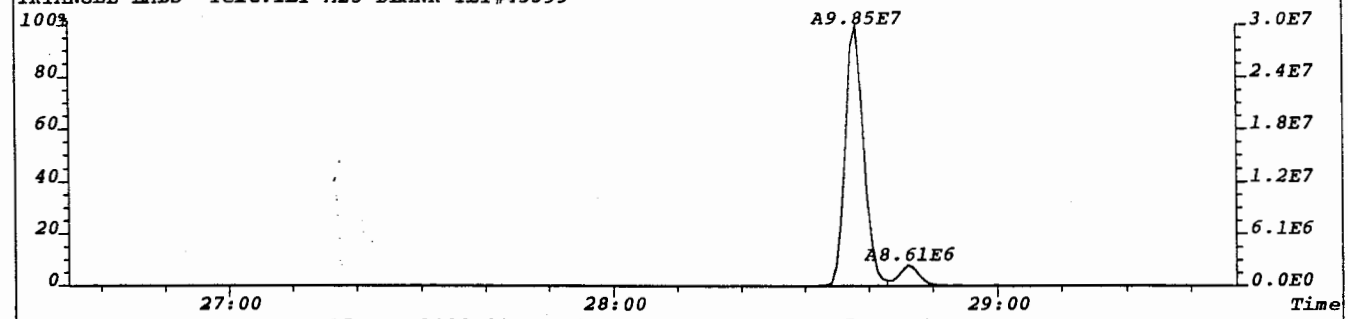
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:555
355.8546 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,2220.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



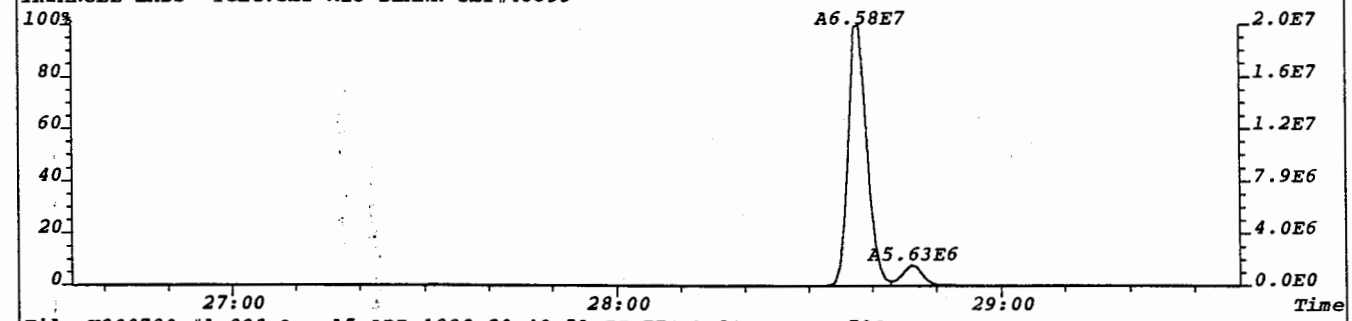
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:801
357.8516 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,3204.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



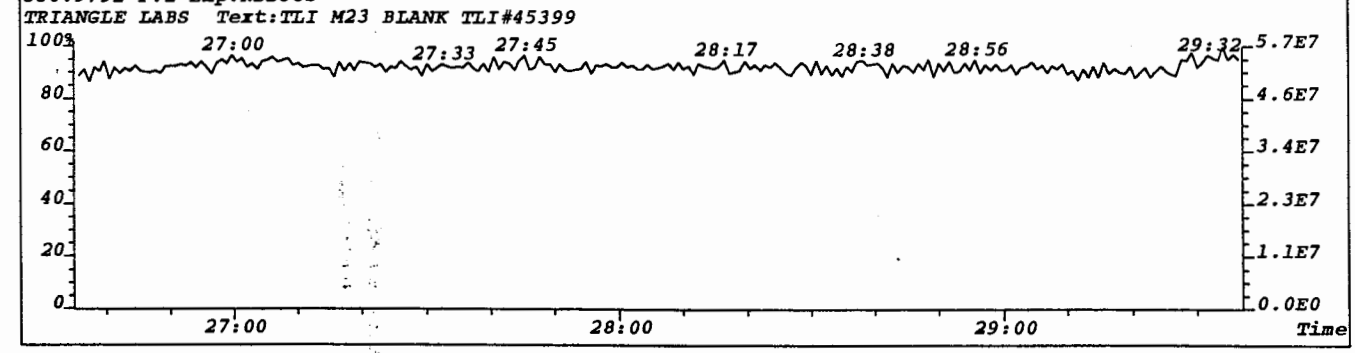
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:727
367.8949 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,2908.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



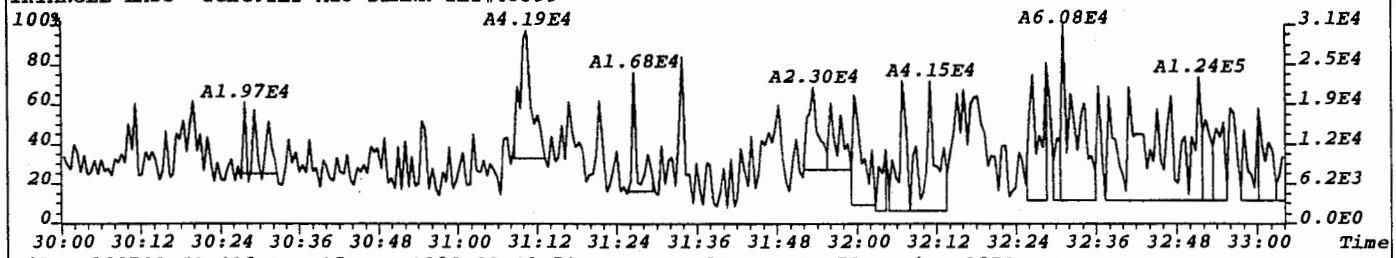
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:740
369.8919 F:2 BSUB(256,30,-3.0) PKD(5,5,3,0.05%,2960.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



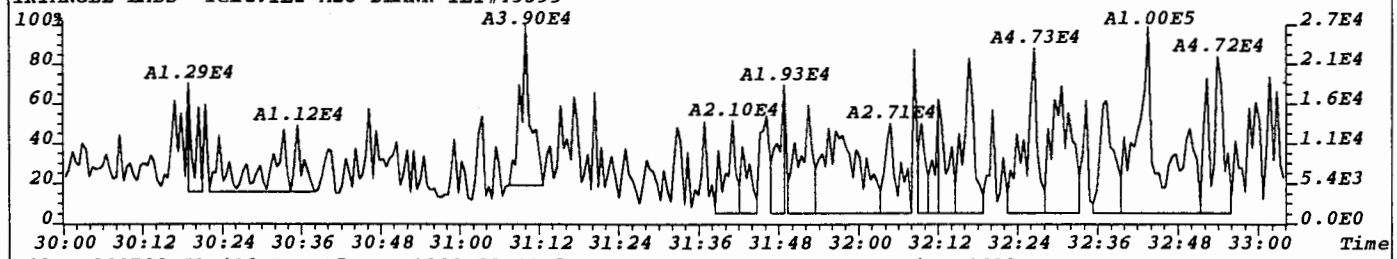
File:U980780 #1-893 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



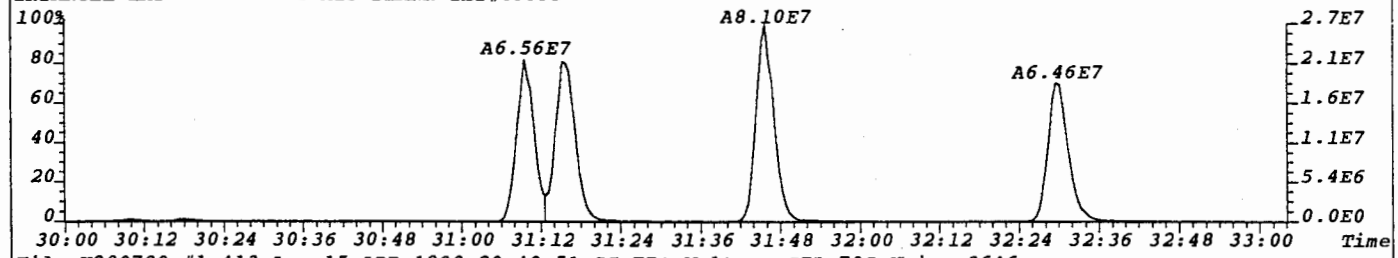
File:U980780 #1-413 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:2952
373.8208 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,11808.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



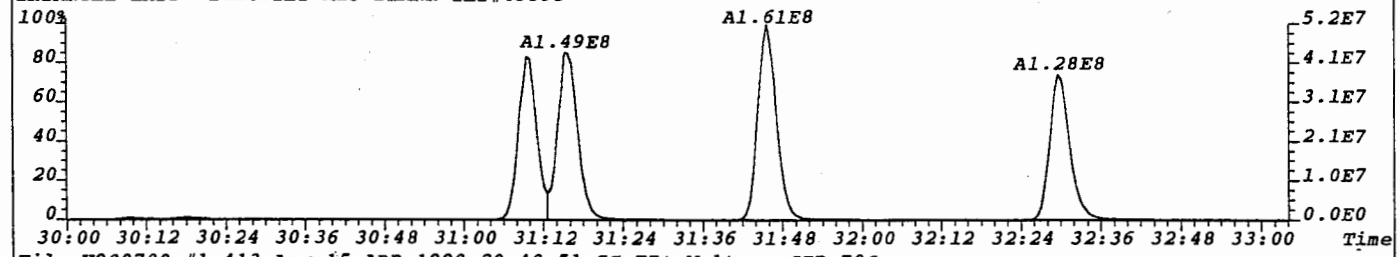
File:U980780 #1-413 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:2272
375.8178 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,9088.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



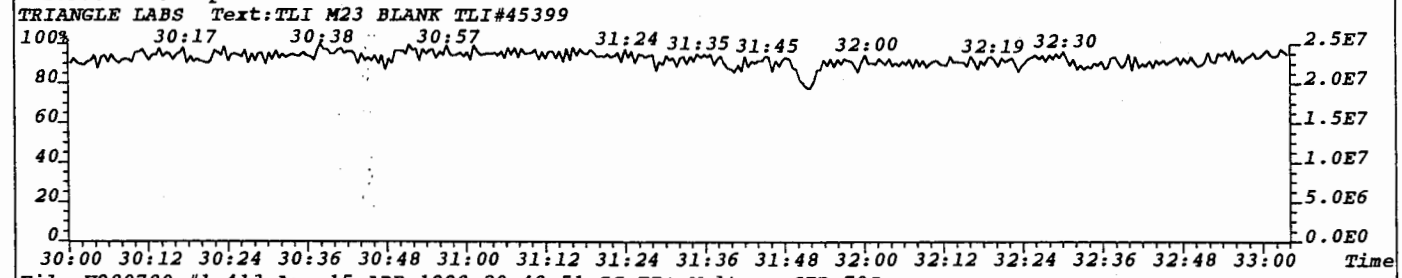
File:U980780 #1-413 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:4632
383.8639 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,18528.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



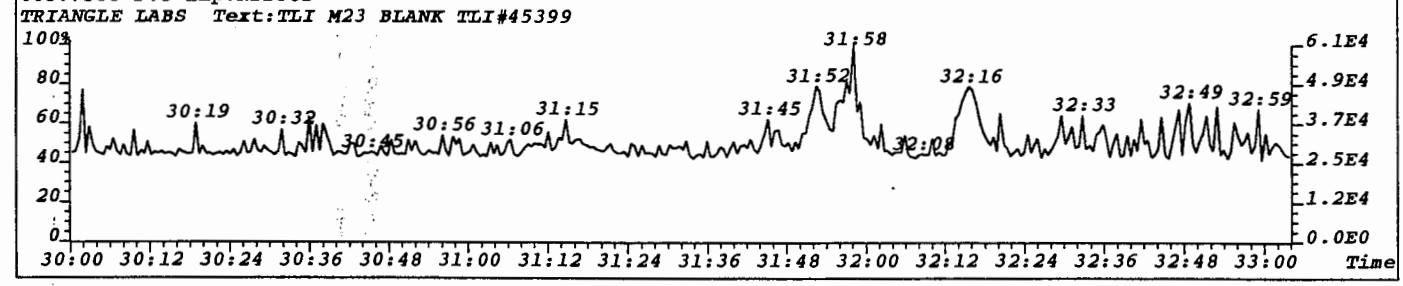
File:U980780 #1-413 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:3646
385.8610 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,14584.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



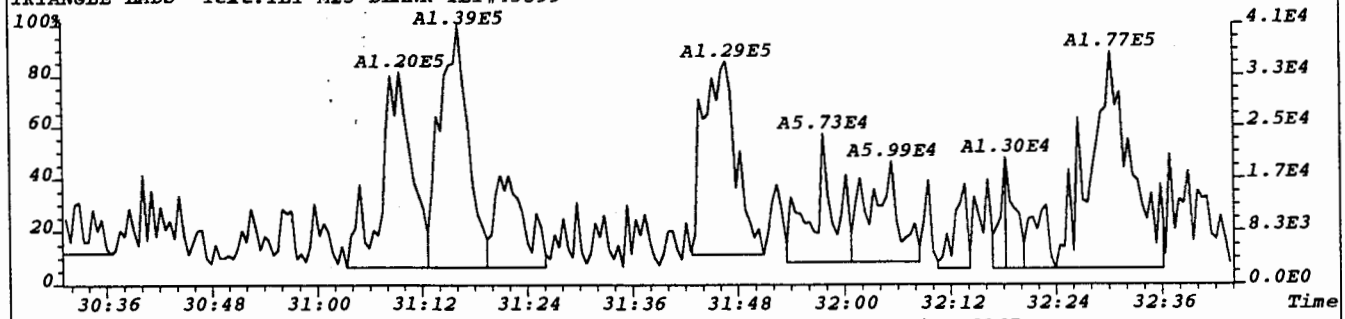
File:U980780 #1-413 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S
392.9760 F:3 Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



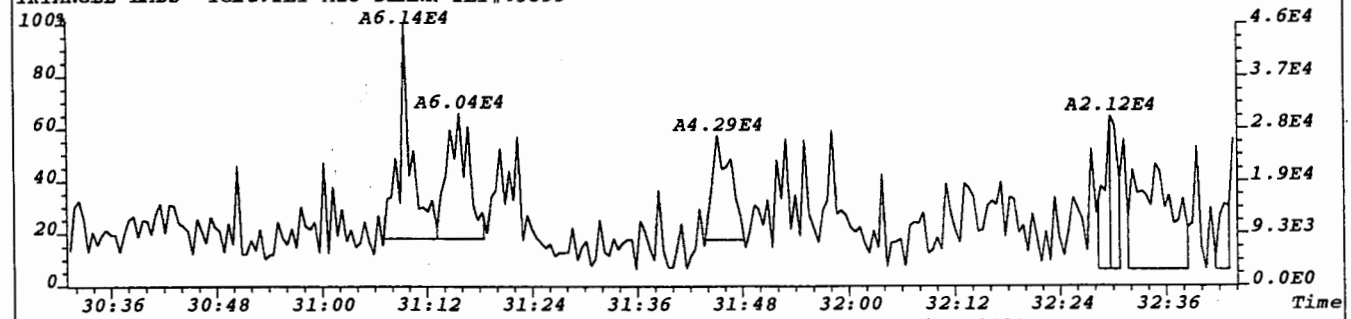
File:U980780 #1-413 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S
445.7555 F:3 Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



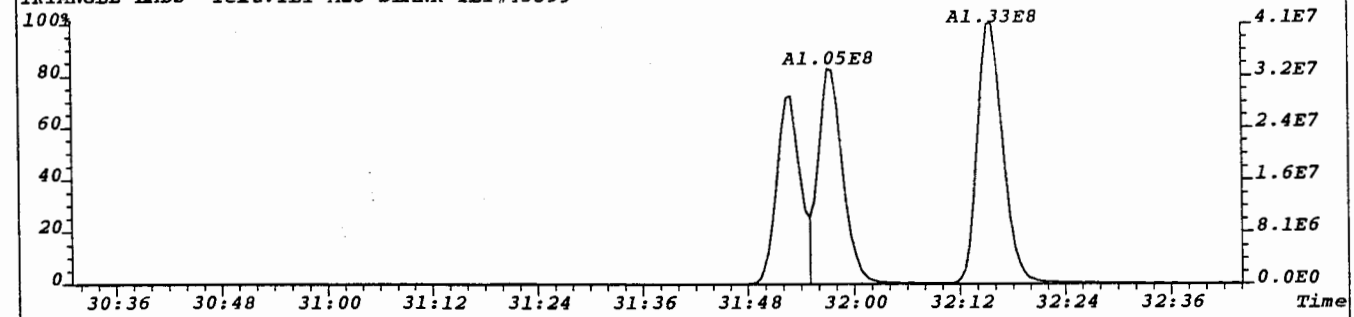
File:U980780 #1-413 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:2614
389.8156 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,10456.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



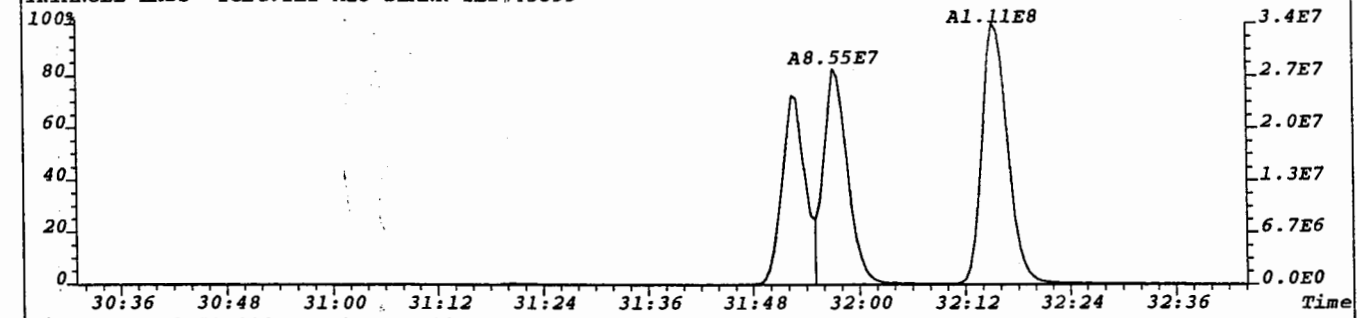
File:U980780 #1-413 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:3167
391.8127 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,12668.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



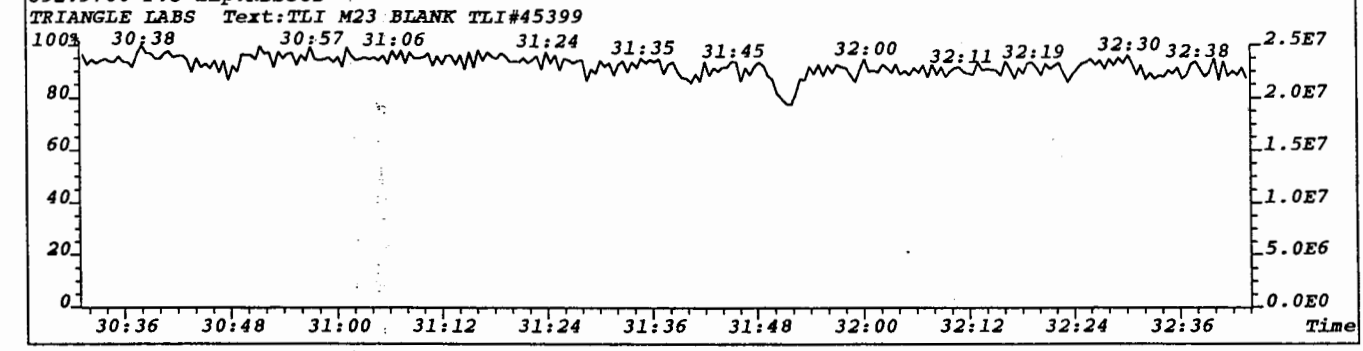
File:U980780 #1-413 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:4424
401.8558 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,17696.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



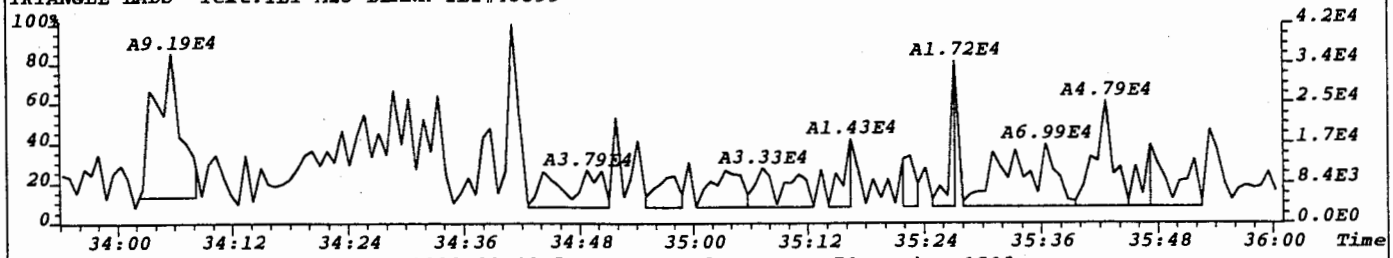
File:U980780 #1-413 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:4307
403.8529 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,17228.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



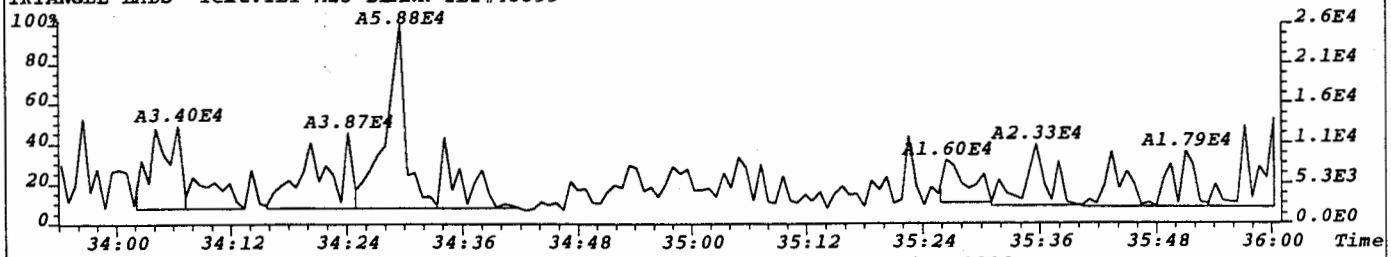
File:U980780 #1-413 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S
392.9760 F:3 Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



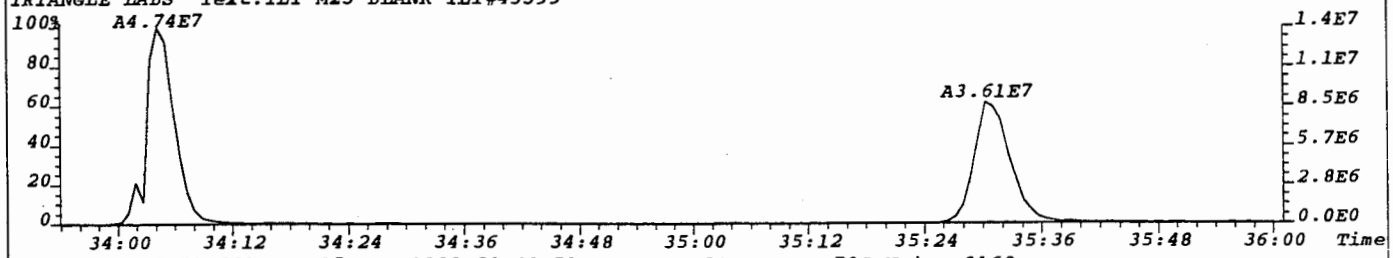
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:2920
407.7818 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,11680.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



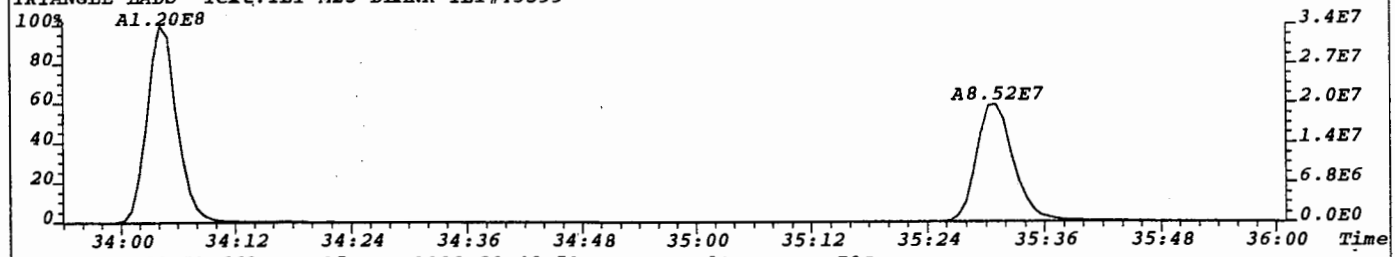
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:1203
409.7789 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4812.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



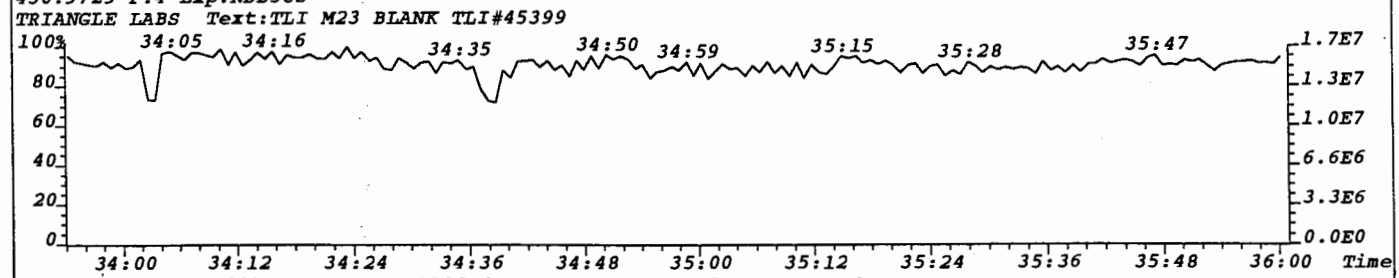
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:1898
417.8253 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,7592.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



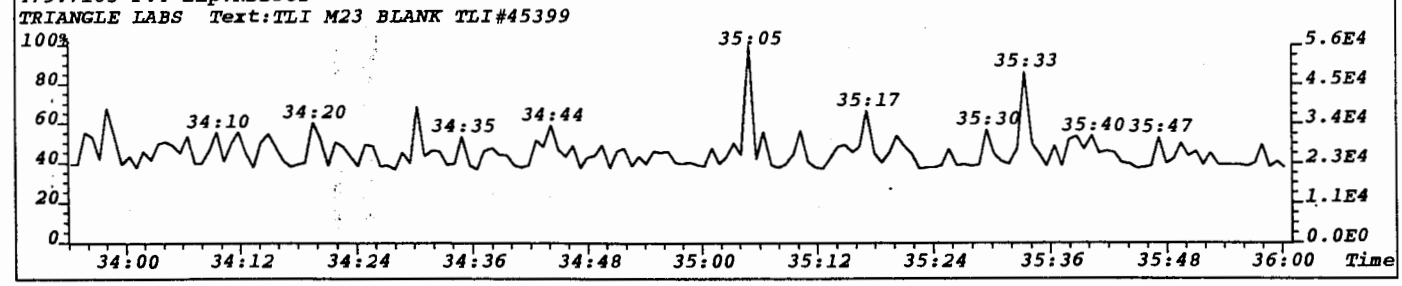
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:3168
419.8220 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,12672.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



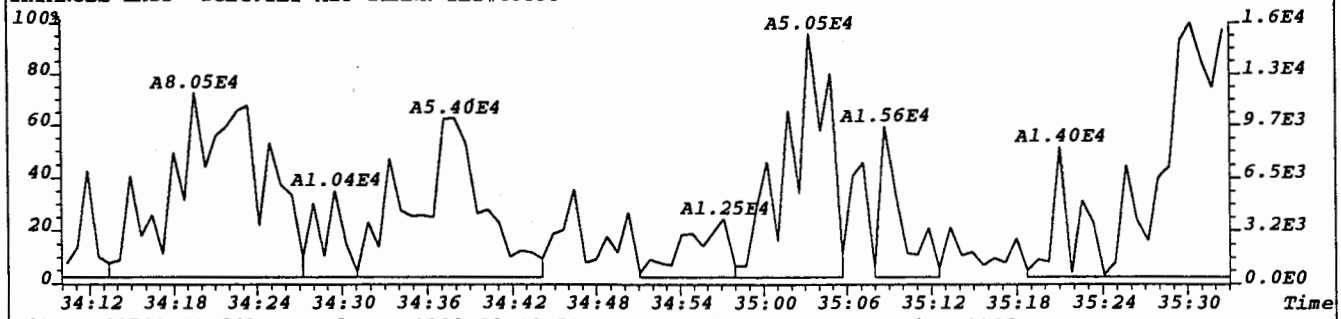
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



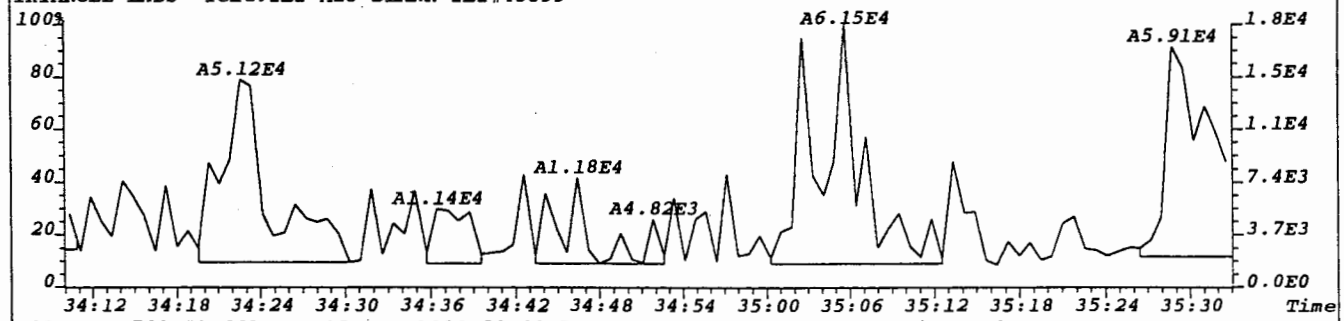
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S
479.7165 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



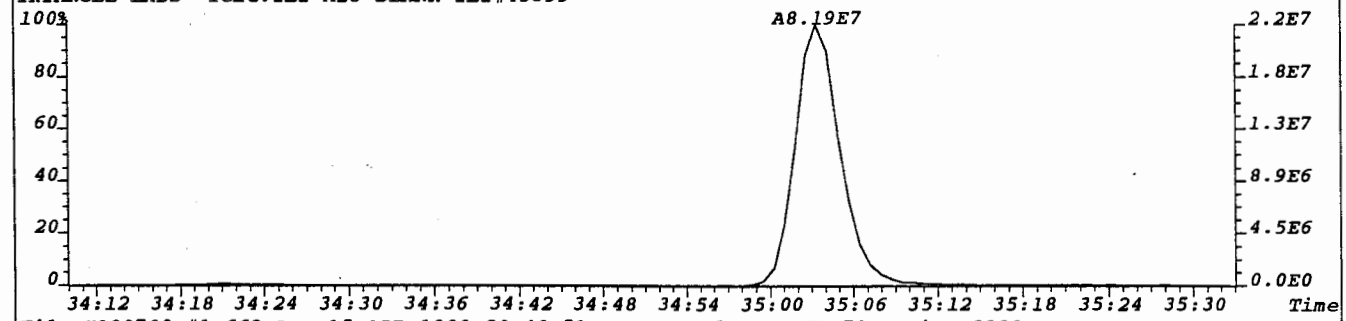
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:409
423.7766 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1636.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



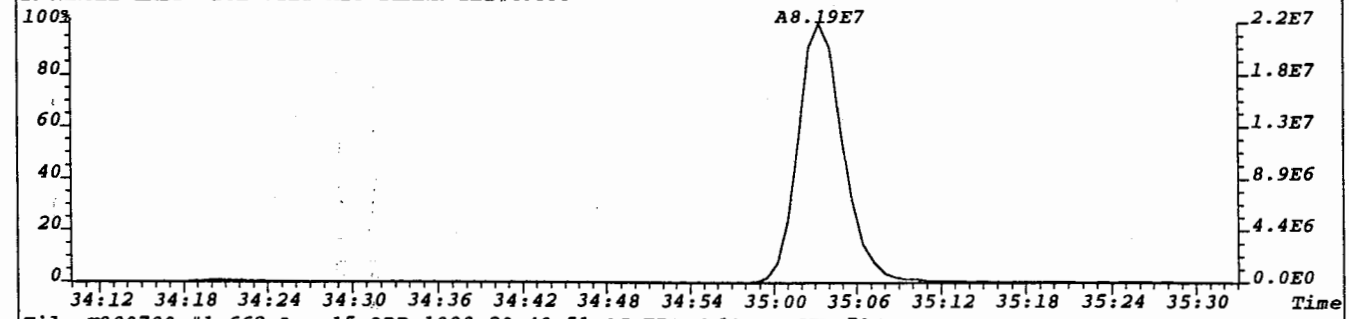
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:1133
425.7737 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4532.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



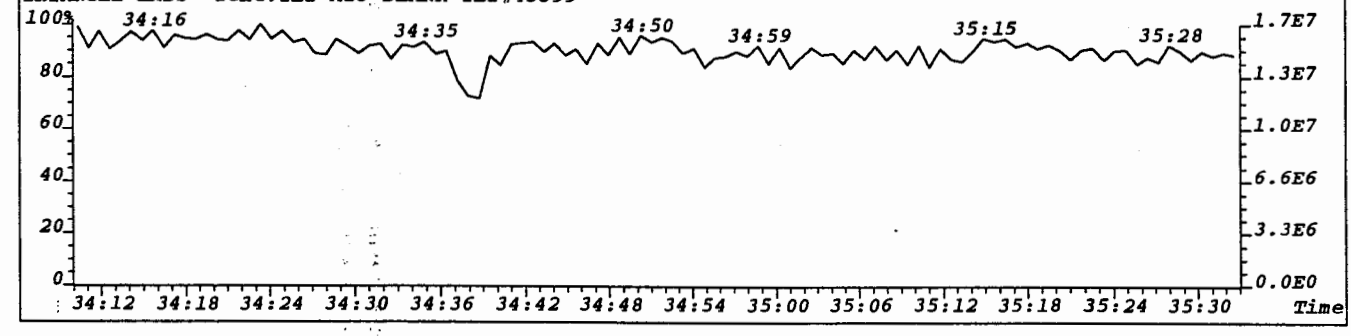
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:4602
435.8169 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,18408.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



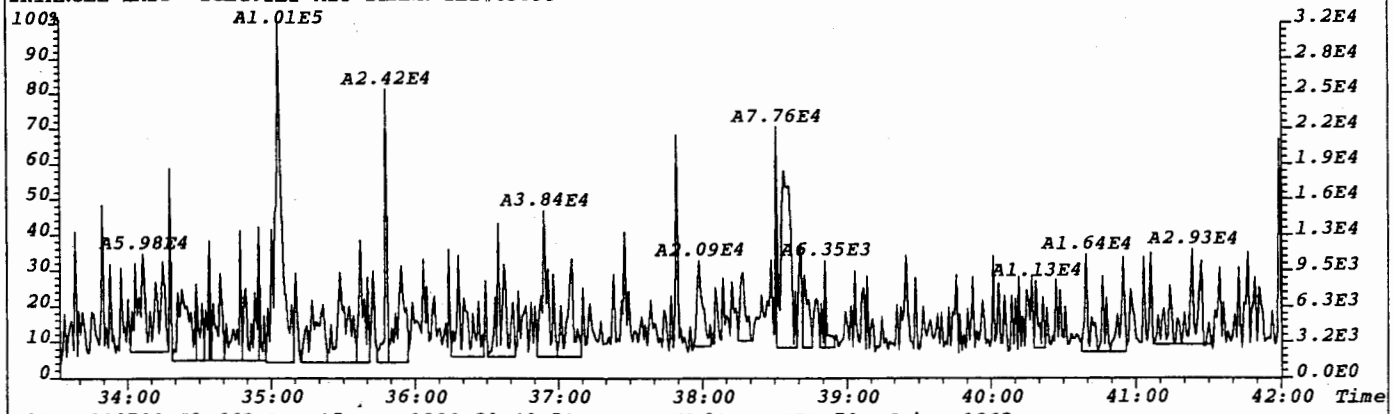
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:3339
437.8140 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,13356.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



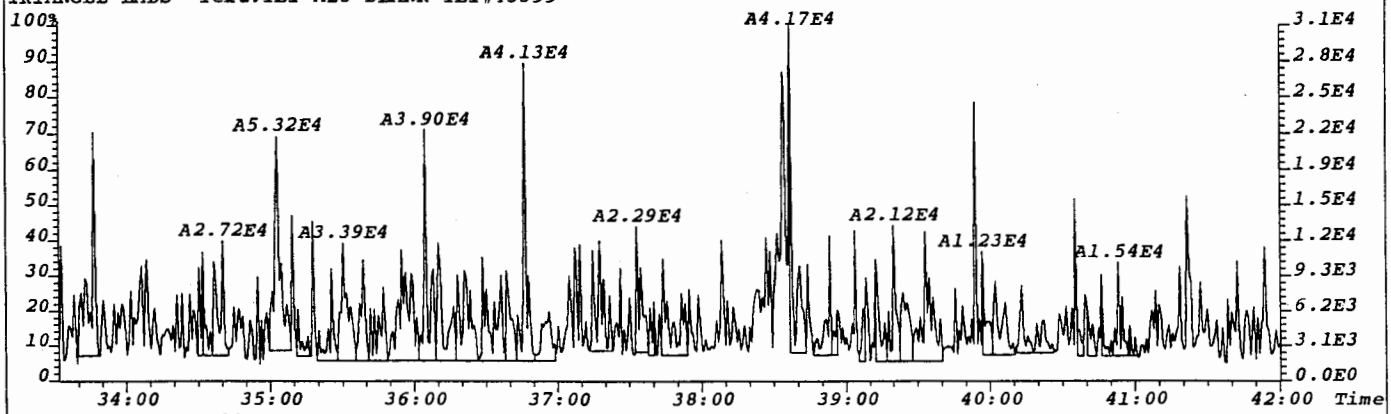
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



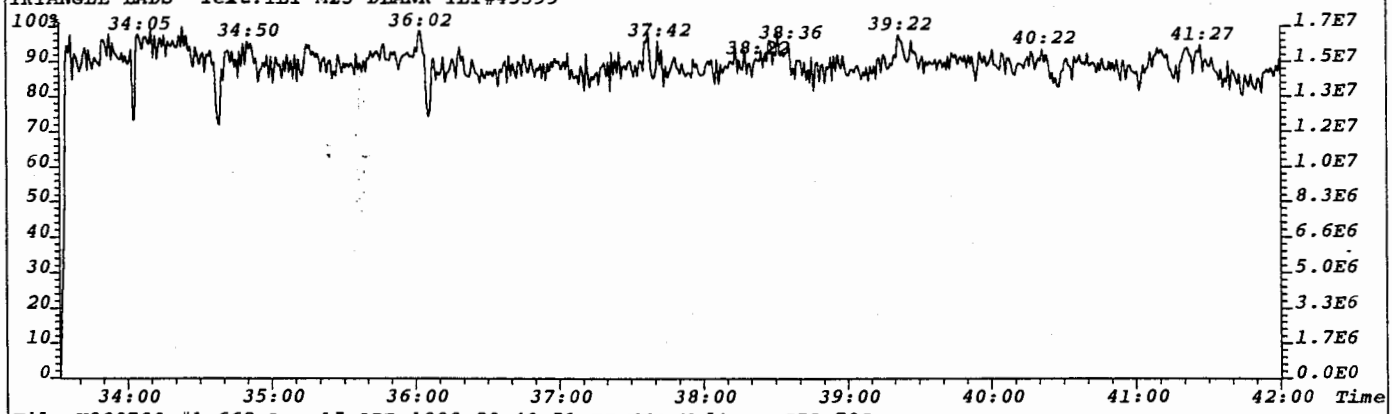
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:1226
441.7428 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4904.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



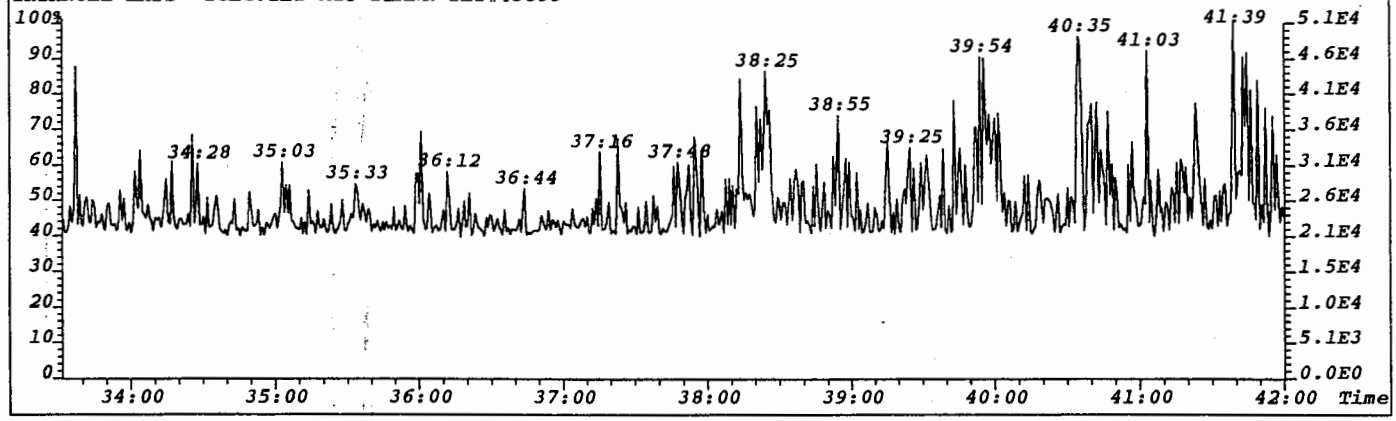
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:1262
443.7399 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5048.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



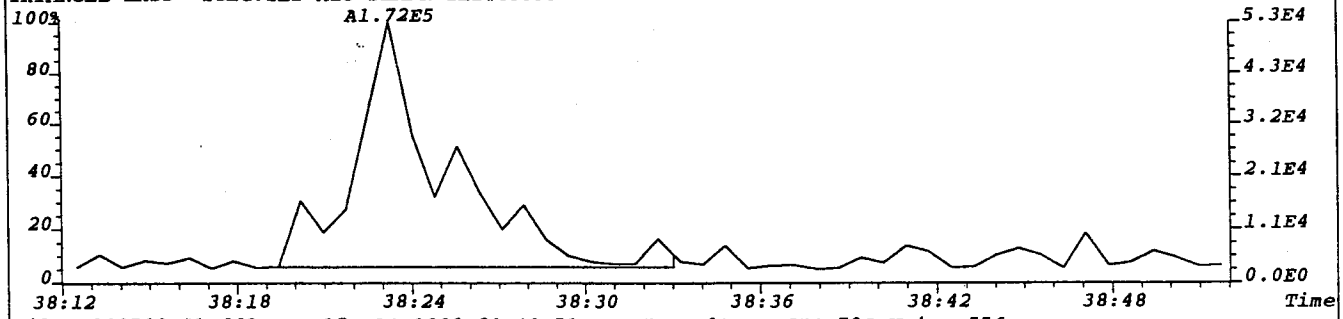
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



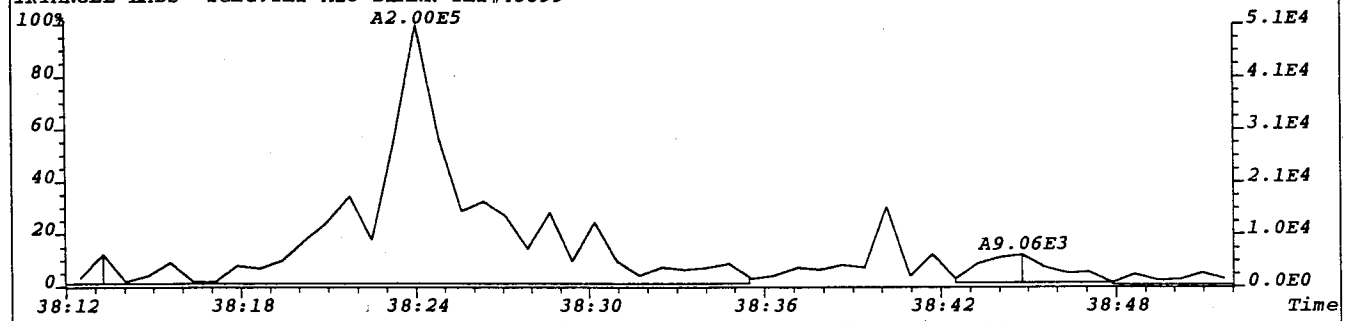
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S
513.6775 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



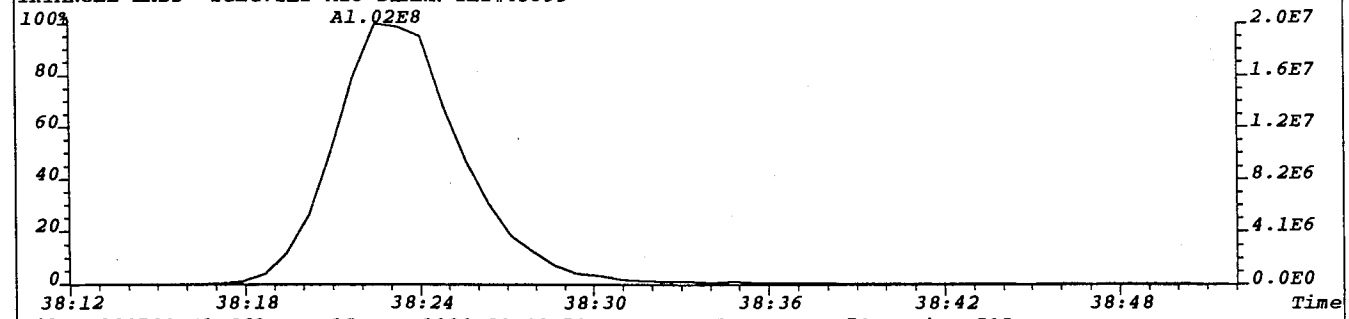
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:1211
457.7377 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4844.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



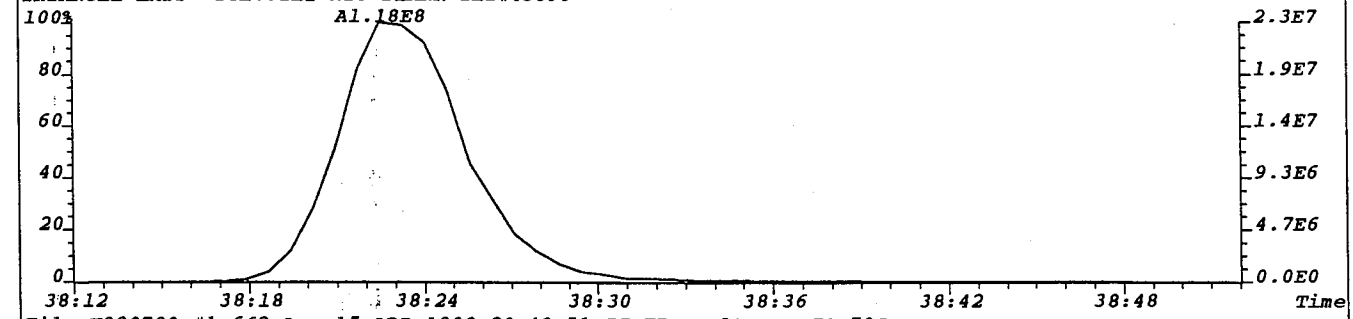
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:556
459.7348 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2224.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



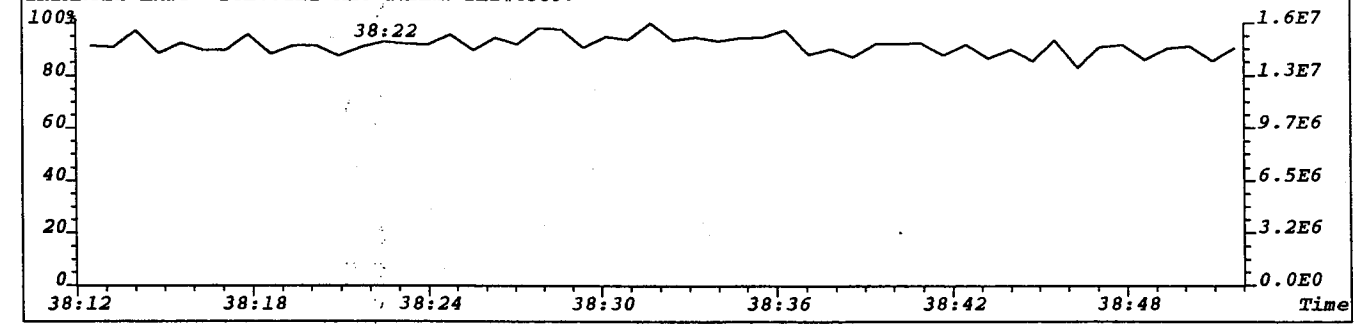
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:1263
469.7779 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5052.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



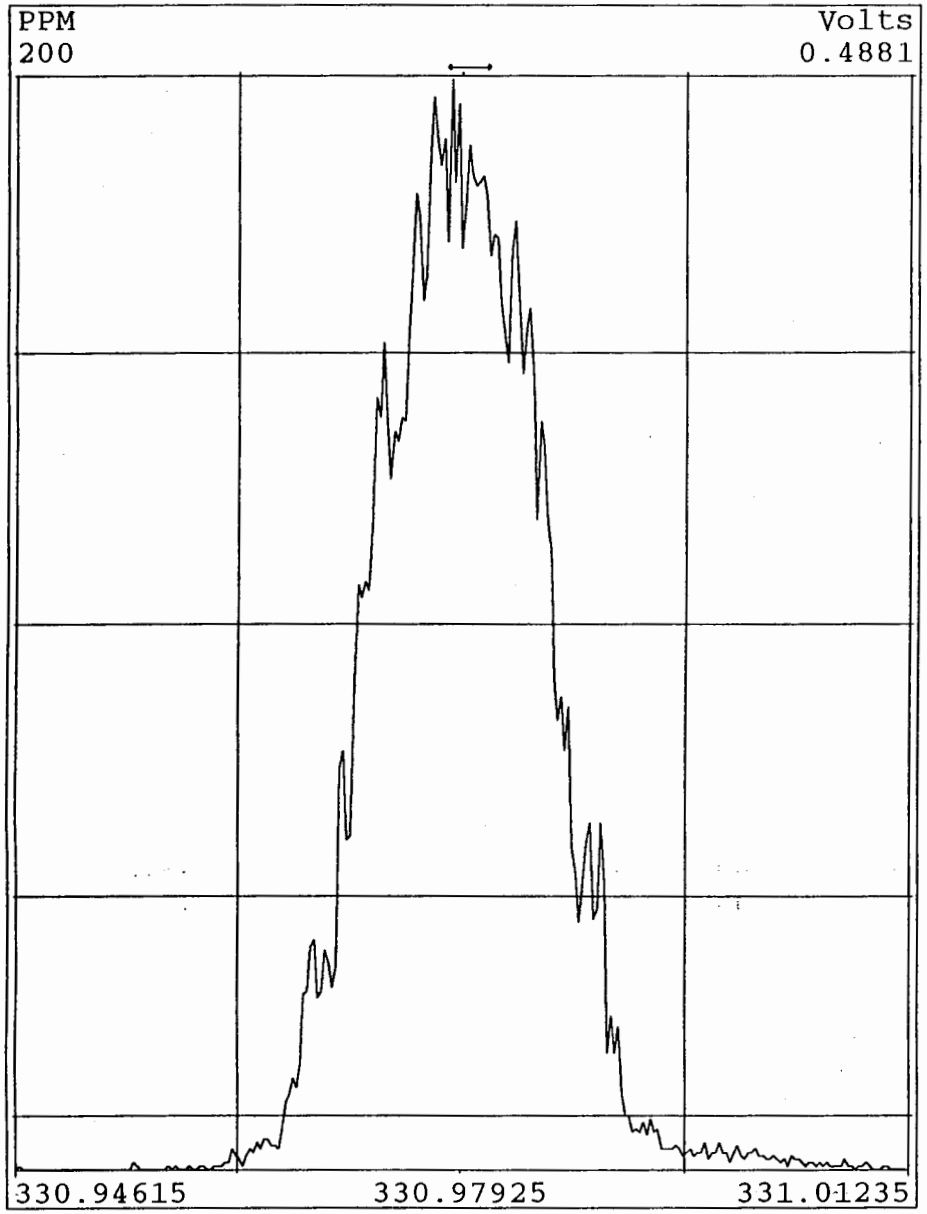
File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S Noise:505
471.7750 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2020.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399

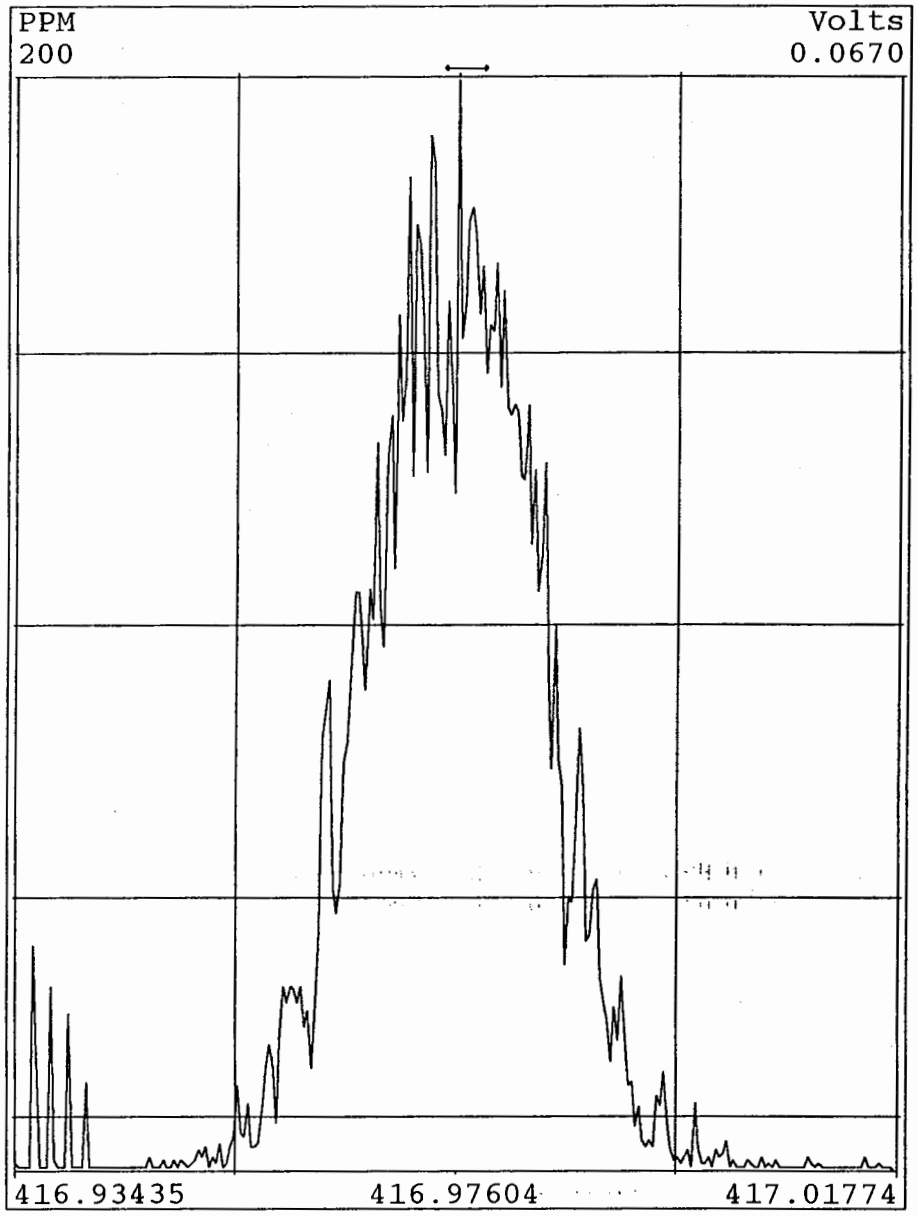


File:U980780 #1-662 Acq:15-APR-1998 20:48:51 GC EI+ Voltage SIR 70S
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



Peak Locate Examination:15-APR-1998:20:47 File:U980780
Experiment:NDB5US Function:2 Reference:PFK





Pacific Environmental Services

TLI Project: **45399** Method 23 TCDD/TCDF Analysis (DB-225)
Client Sample: **TLI M23 Blank** Analysis File: **P981305**

Client Project:	**r012.002/Lime Kiln**				
Sample Matrix:	**XAD**	Date Received:	**/ /**	Spike File:	**SPC2NF04**
TLI ID:	**TLI Blank**	Date Extracted:	**04/03/98**	ICal:	**PF24098**
		Date Analyzed:	**04/16/98**	ConCal:	**P981302**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U980780**	% Lipid:	**n/a**
GC Column:	**DB-225**	Analyst:	**BJG**	% Solids:	**n/a**

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDF	ND	0.005				—

Internal Standard	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	2.8	69.2	40%-130%	0.75	22:23	—

Recovery Standard	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.78	21:17	—

Data Reviewer: Ku 04/20/98

C2NF_PSR v2.02, LARS 6.11.00

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Printed: 21:27 04/20/98

Initial ....Date...

Data Review By: K 4/20/98 Calculated Noise Area: 0.13

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 P981305B.dbf
04/20/98 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						0.790-1.102			
304-306	DC	NL		0:00	RO	1.00	0.14			0.000			
304-306			0 Peaks				0.00						
13C12-TCDF				0.65-0.89						0.955-1.045			
316-318	DC	NL		0:00	RO	1.13	0.14			0.000			
	DC	WL		20:58		0.88	0.81			0.937			
	DC	WL		21:14		0.75	2.19			0.949			
				22:23		0.75	257.47	110.10	147.37	1.000	13C12-2378-TCDF	IS0	
	DC	SN		23:02	RO	1.40	0.27			1.029			
	DC	WH		24:25		0.87	2.62			1.091			
316-318			1 Peak				257.47						

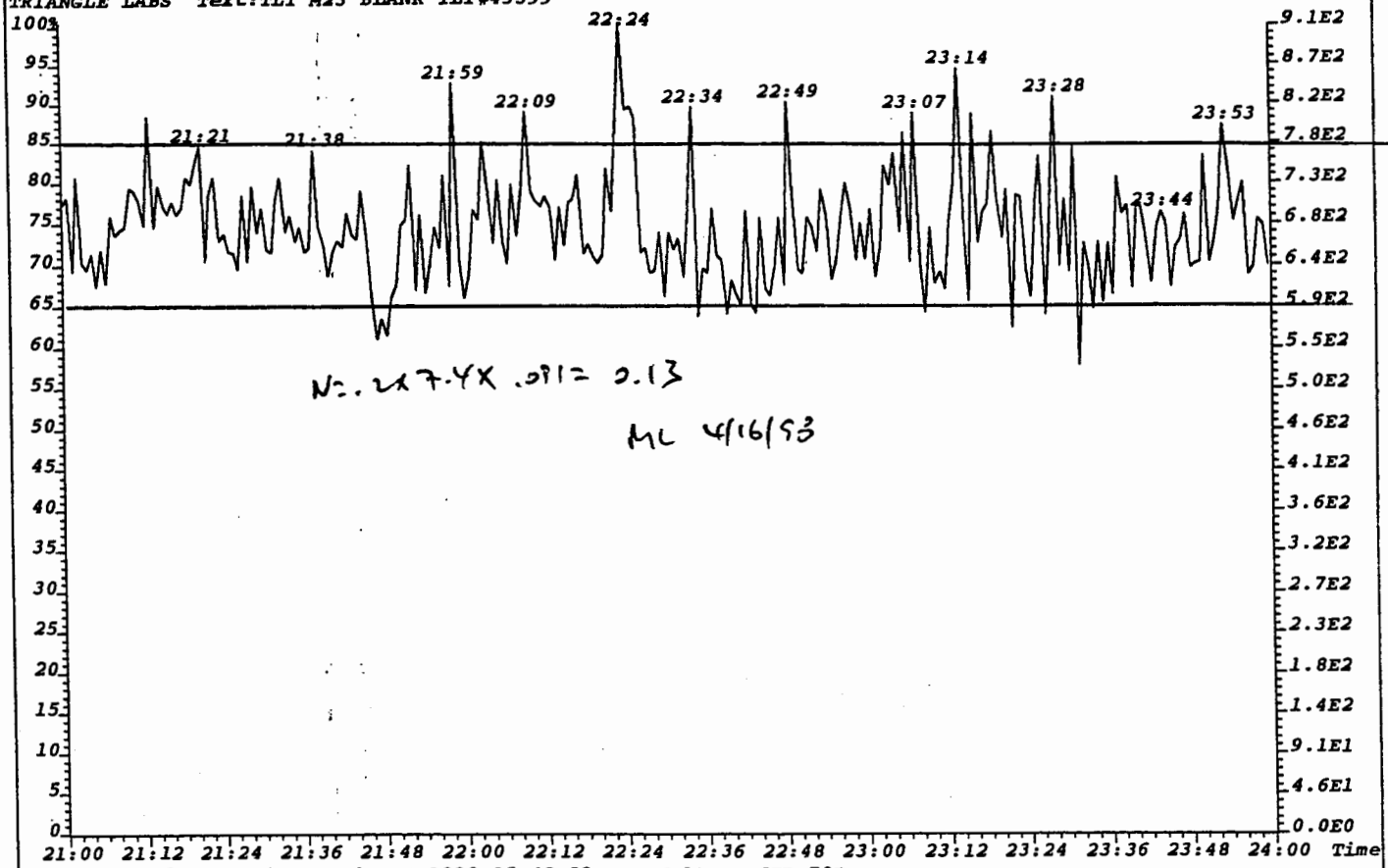
---------- Above: TCDF / TCDD Follows ----------

13C12-TCDD				0.65-0.89						0.905-1.095			
332-334	DC	NL		0:00	RO	1.22	0.16			0.000			
				19:54	RO	1.04	0.42	0.25	0.24	0.948			
				21:00		0.78	181.15	79.63	101.52	1.000	13C12-2378-TCDD	IS1	
				21:17		0.78	276.72	121.27	155.45	1.013	13C12-1234-TCDD	RS1	
				22:00		0.75	1.45	0.62	0.83	1.048			
332-334			4 Peaks				459.74						

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
		X-Ether Interference

*** End of Report ***

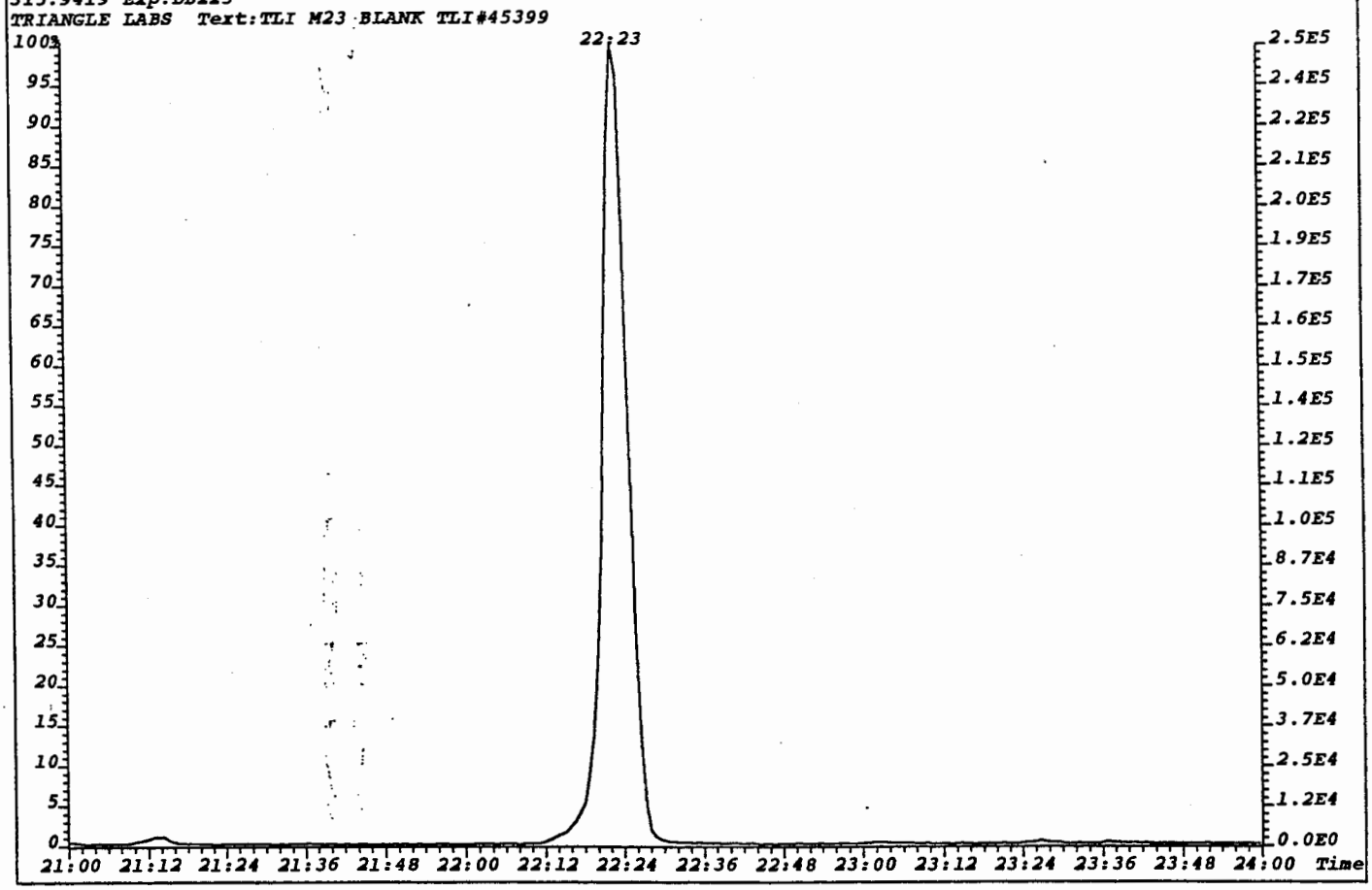
File:P981305 #1-1006 Acq:16-APR-1998 15:42:39 EI+ Voltage SIR 70P
303.9016 Exp:DB225
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



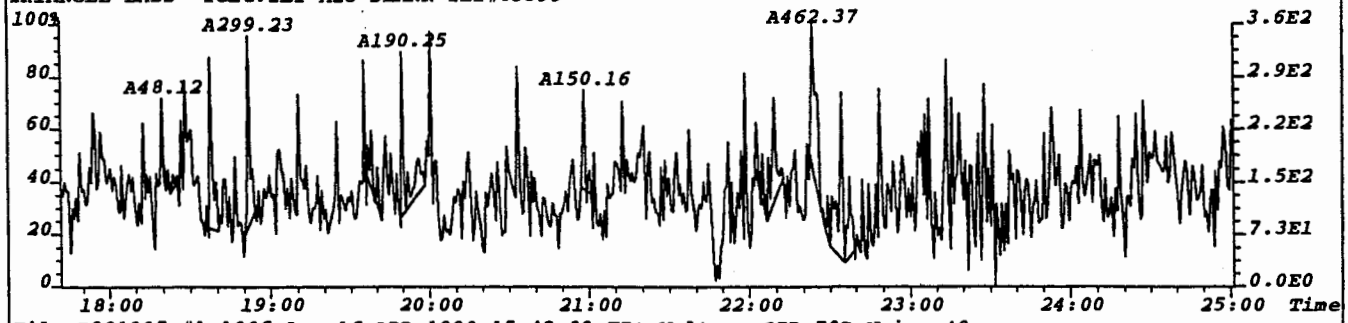
N=.247.YX .091= 0.13

ML 4/16/98

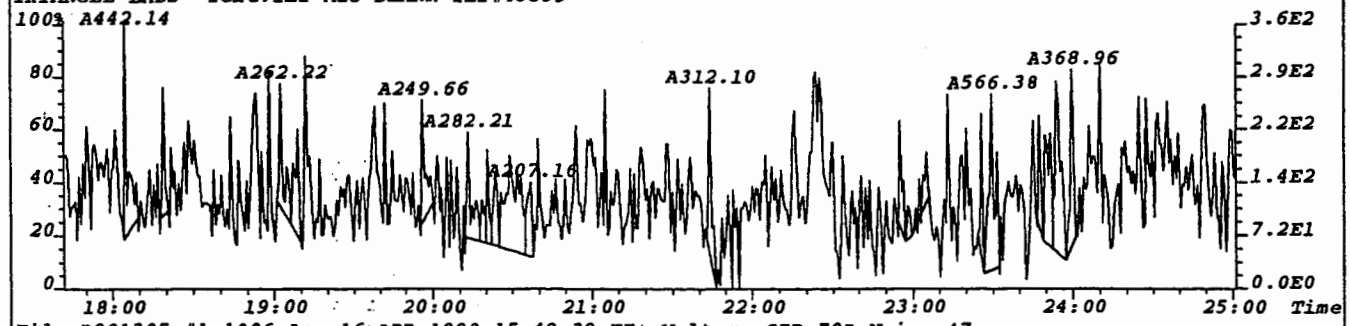
File:P981305 #1-1006 Acq:16-APR-1998 15:42:39 EI+ Voltage SIR 70P
315.9419 Exp:DB225
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



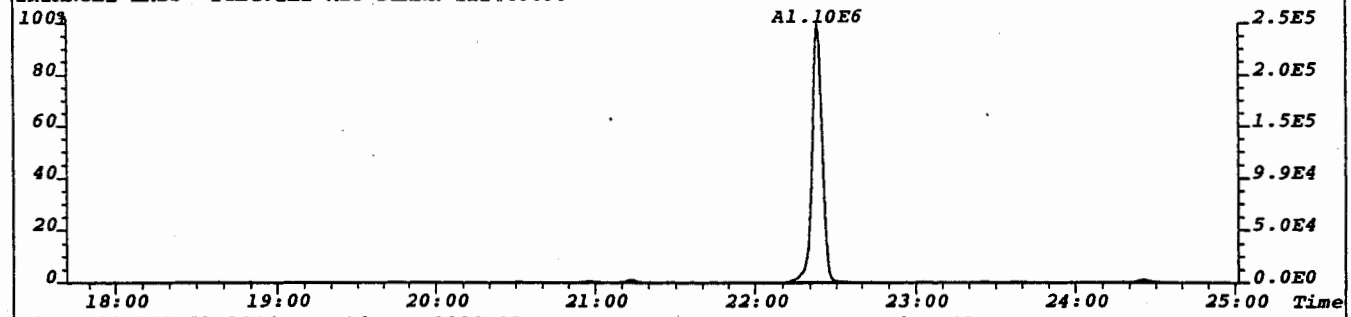
File:P981305 #1-1006 Acq:16-APR-1998 15:42:39 EI+ Voltage SIR 70P Noise:41
303.9016 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,164.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



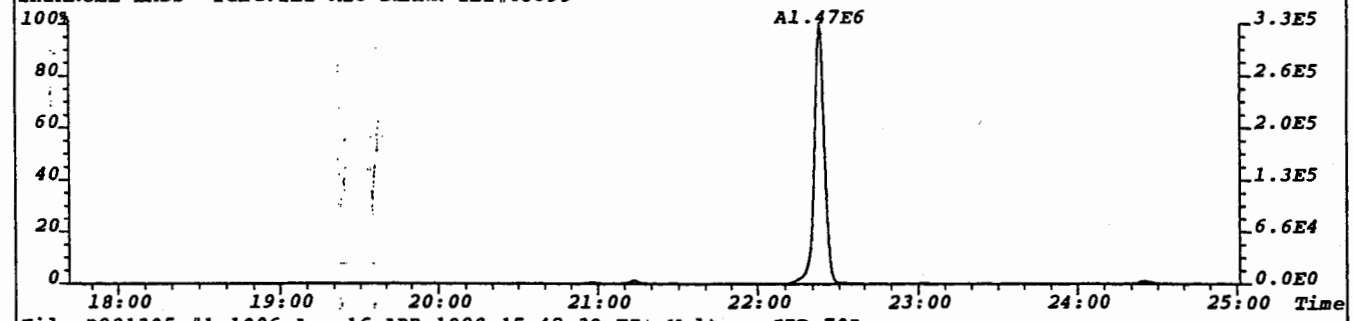
File:P981305 #1-1006 Acq:16-APR-1998 15:42:39 EI+ Voltage SIR 70P Noise:40
305.8987 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,160.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



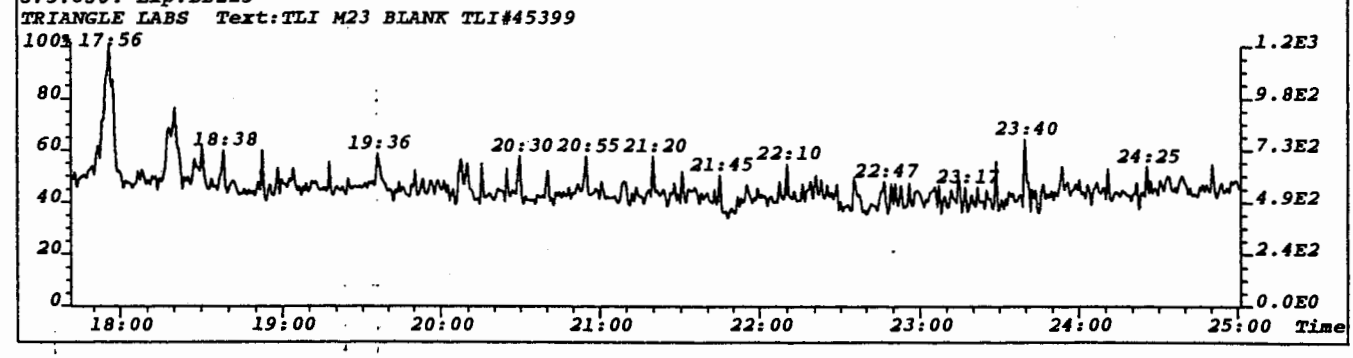
File:P981305 #1-1006 Acq:16-APR-1998 15:42:39 EI+ Voltage SIR 70P Noise:47
315.9419 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,188.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



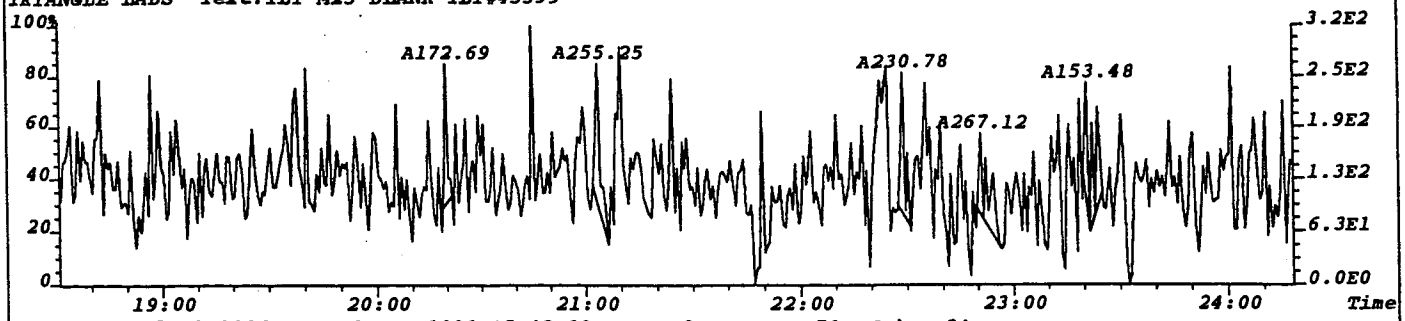
File:P981305 #1-1006 Acq:16-APR-1998 15:42:39 EI+ Voltage SIR 70P Noise:42
317.9389 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,168.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



File:P981305 #1-1006 Acq:16-APR-1998 15:42:39 EI+ Voltage SIR 70P
375.8364 Exp:DB225
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



File:P981305 #1-1006 Acq:16-APR-1998 15:42:39 EI+ Voltage SIR 70P Noise:40
319.8965 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,160.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



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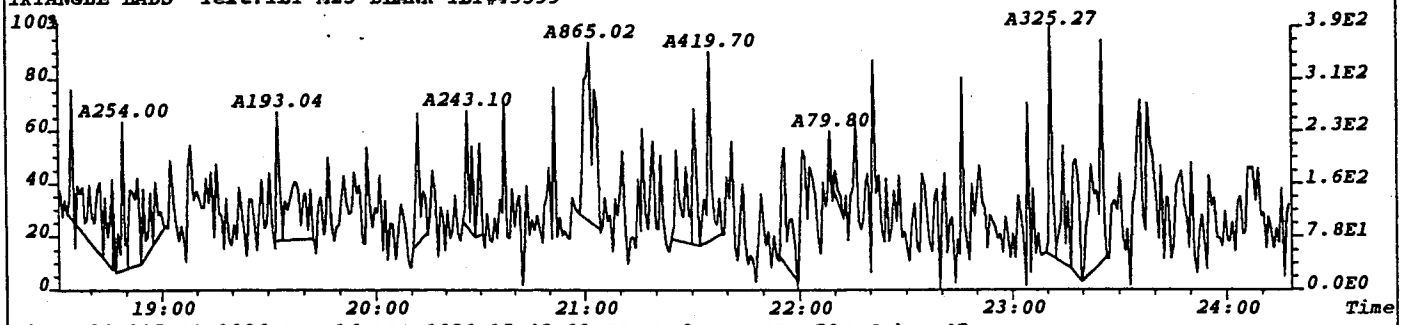
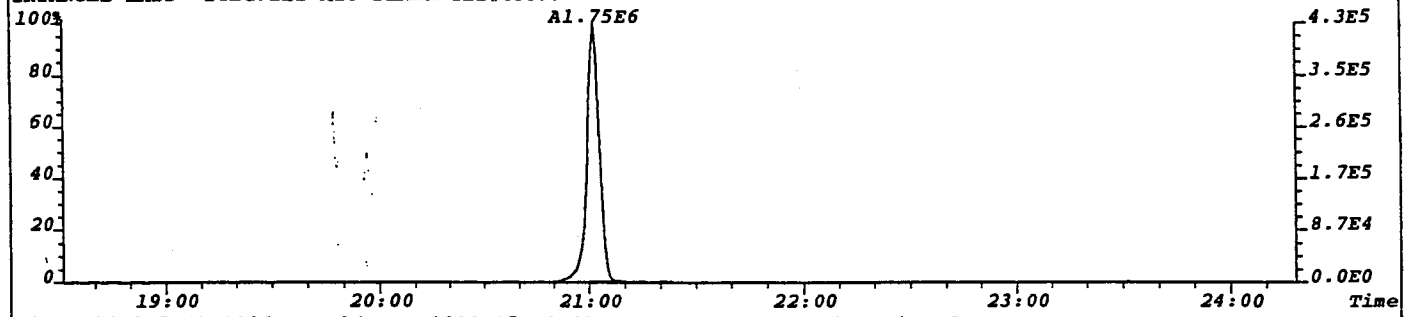
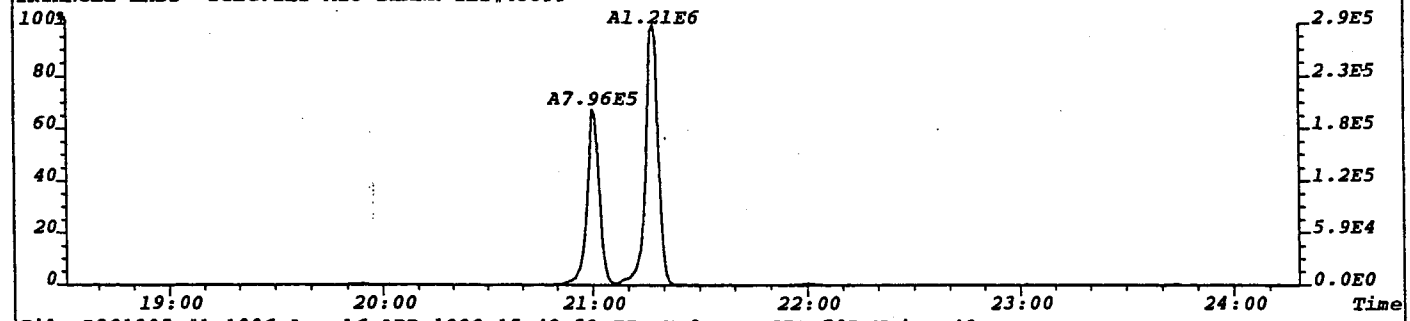
321.8936 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,136.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



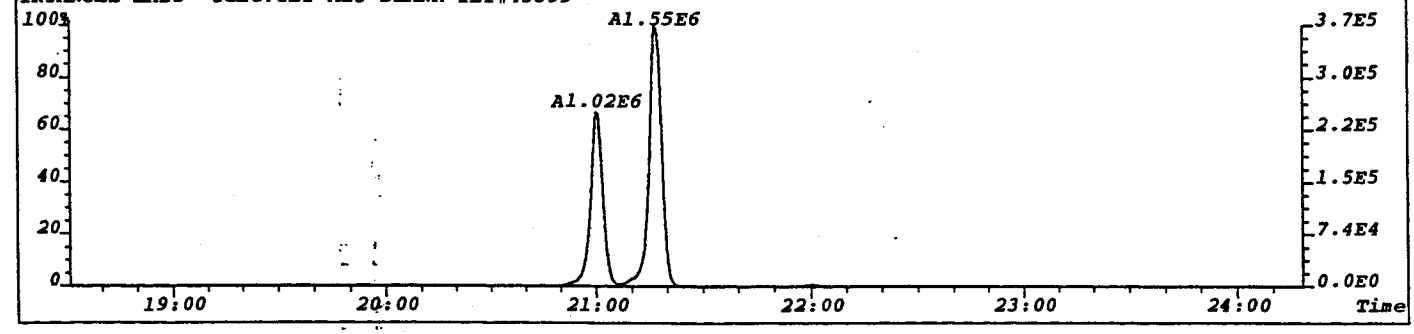
File:P981305 #1-1006 Acq:16-APR-1998 15:42:39 EI+ Voltage SIR 70P Noise:47
327.8847 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,188.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



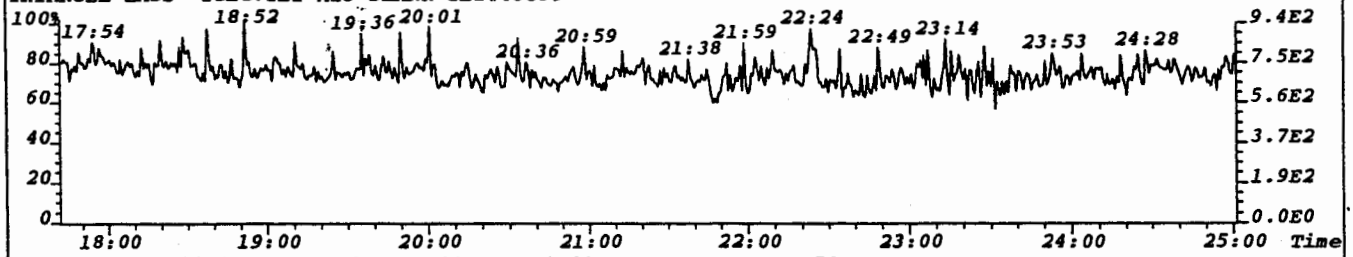
File:P981305 #1-1006 Acq:16-APR-1998 15:42:39 EI+ Voltage SIR 70P Noise:54
331.9368 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,216.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



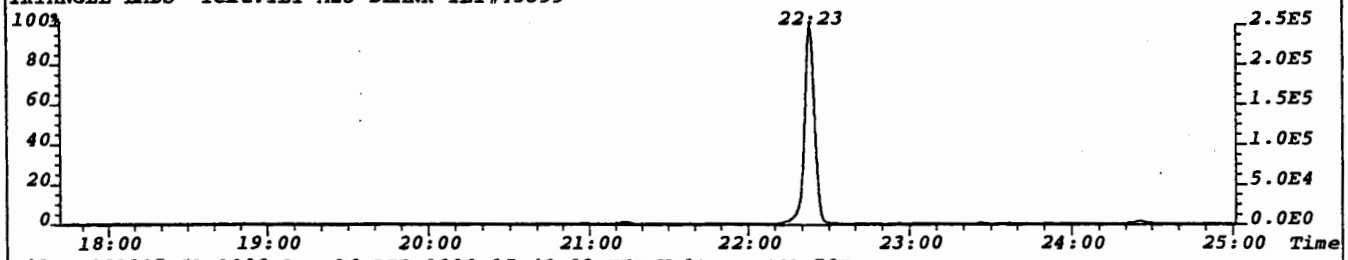
File:P981305 #1-1006 Acq:16-APR-1998 15:42:39 EI+ Voltage SIR 70P Noise:43
333.9338 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,172.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



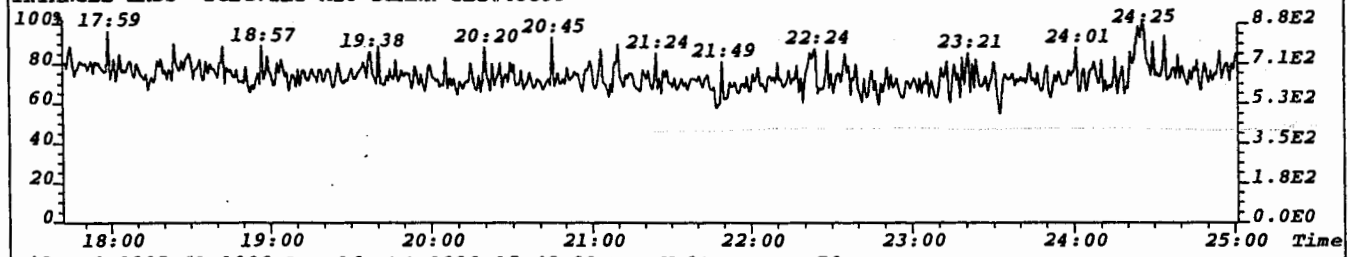
File:P981305 #1-1006 Acq:16-APR-1998 15:42:39 EI+ Voltage SIR 70P
303.9016 Exp:DB225
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



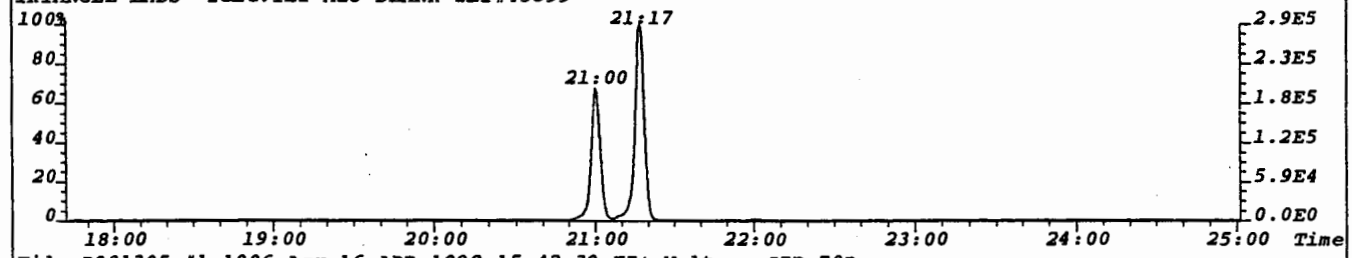
File:P981305 #1-1006 Acq:16-APR-1998 15:42:39 EI+ Voltage SIR 70P
315.9419 Exp:DB225
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



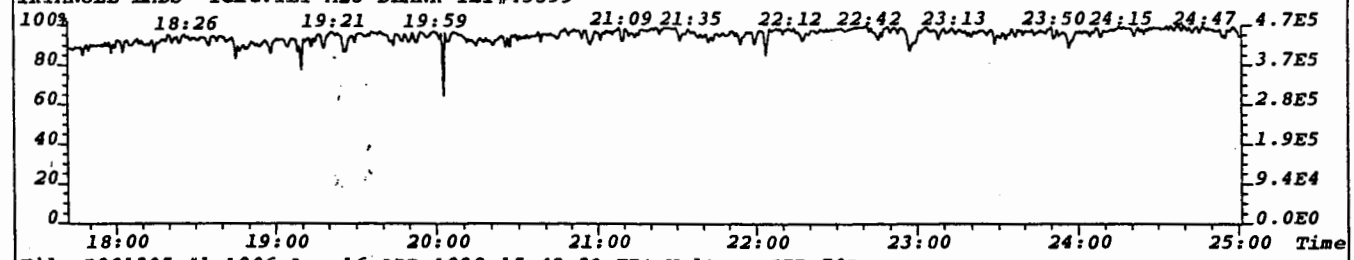
File:P981305 #1-1006 Acq:16-APR-1998 15:42:39 EI+ Voltage SIR 70P
319.8965 Exp:DB225
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



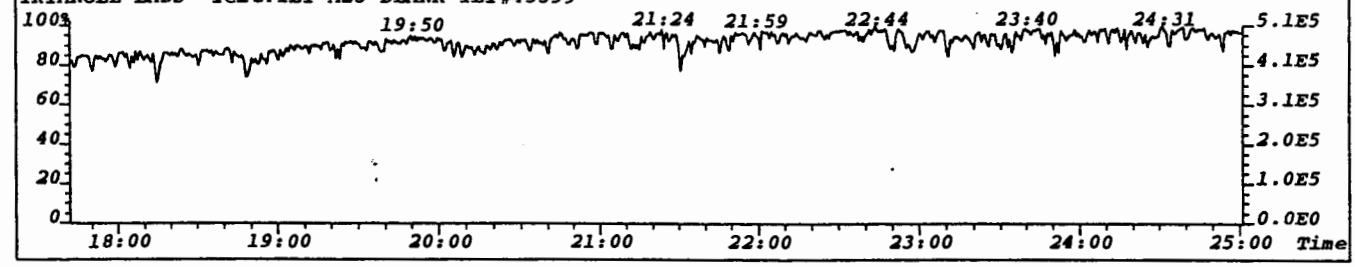
File:P981305 #1-1006 Acq:16-APR-1998 15:42:39 EI+ Voltage SIR 70P
331.9368 Exp:DB225
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399

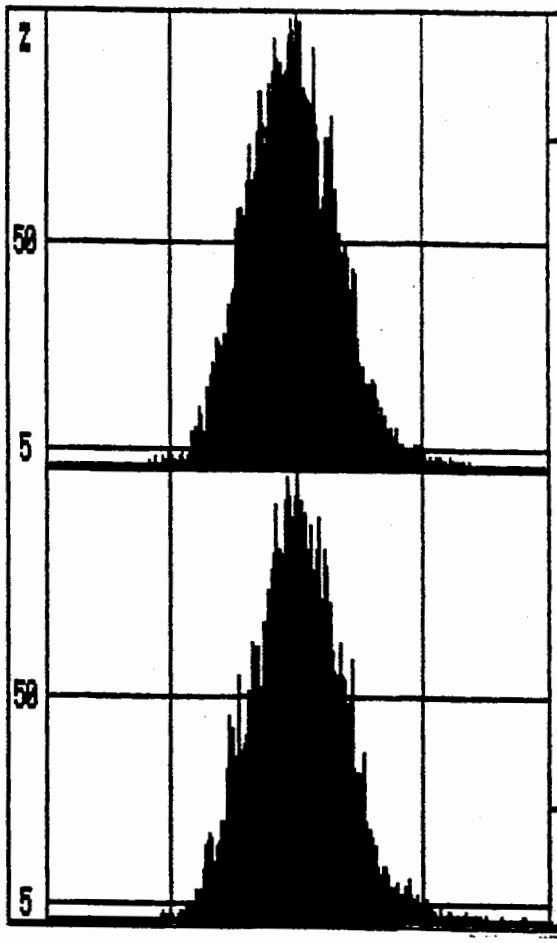


File:P981305 #1-1006 Acq:16-APR-1998 15:42:39 EI+ Voltage SIR 70P
292.9825 Exp:DB225
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399



File:P981305 #1-1006 Acq:16-APR-1998 15:42:39 EI+ Voltage SIR 70P
330.9792 Exp:DB225
TRIANGLE LABS Text:TLI M23 BLANK TLI#45399





Ref. mass 292.9825 Peak top
Height .07 volts Span 200 ppm

System file name	DB225
Data file name	A:P981305
Resolution	10000
Group number	1
Ionization mode	EI+
Switching	VOLTAGE
Ref. masses	292.9825, 300.9761

A	292.9825	J	330.9792
B	303.9016	K	331.9368
C	305.8987	L	333.9338
D	315.9419	M	375.8364
E	317.9389		
F	319.8965		
G	321.8936		
H	327.8847		
I	330.9792		

Channel I 330.9792 Peak top
Height .07 volts Span 200 ppm

Pacific Environmental Services

TLI Project: **45399** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **M23-I-1** Analysis File: **W981017**

Client Project:	**r012.002/Lime Kiln**				
Sample Matrix:	**M23**	Date Received:	**04/01/98**	Spike File:	**SPMIT204**
TLI ID:	**204-92-1A-D**	Date Extracted:	**04/03/98**	ICal:	**WF53178**
		Date Analyzed:	**04/16/98**	ConCal:	**W981012**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U980780**	% Lipid:	**n/a**
GC Column:	**DB-5**	Analyst:	**WK**	% Solids:	**n/a**

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	ND	0.03				__
1,2,3,7,8-PeCDD	ND	0.05				__
1,2,3,4,7,8-HxCDD	ND	0.06				__
1,2,3,6,7,8-HxCDD	ND	0.06				__
1,2,3,7,8,9-HxCDD	ND	0.06				__
1,2,3,4,6,7,8-HpCDD	ND	0.09				__
1,2,3,4,6,7,8,9-OCDD	ND	0.1				__
2,3,7,8-TCDF	0.05			0.67	26:23	B__
1,2,3,7,8-PeCDF	ND	0.03				__
2,3,4,7,8-PeCDF	ND	0.04				__
1,2,3,4,7,8-HxCDF	ND	0.04				__
1,2,3,6,7,8-HxCDF	ND	0.04				__
2,3,4,6,7,8-HxCDF	ND	0.04				__
1,2,3,7,8,9-HxCDF	ND	0.05				__
1,2,3,4,6,7,8-HpCDF	ND	0.06				__
1,2,3,4,7,8,9-HpCDF	ND	0.08				__
1,2,3,4,6,7,8,9-OCDF	ND	0.1				__

Totals	Amt. (ng)	Number	DL	EMPC	Flags
Total TCDD	ND		0.03		__
Total PeCDD	ND		0.05		__
Total HxCDD	ND		0.06		__
Total HpCDD	ND		0.09		__
Total TCDF	0.09	2			__
Total PeCDF	EMPC			0.06	__
Total HxCDF	ND		0.04		__
Total HpCDF	ND		0.06		__

MIT2_PSR v1.04, LARS 6.11.00

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Printed: 13:40 04/20/98

Pacific Environmental Services

TLI Project: **45399** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **M23-I-1** Analysis File: **W981017**

Internal Standards	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	2.8	71.2	40%-130%	0.75	26:19	___
$^{13}C_{12}$-2,3,7,8-TCDD	3.1	78.1	40%-130%	0.82	27:01	___
$^{13}C_{12}$-1,2,3,7,8-PeCDF	2.7	68.5	40%-130%	1.50	30:10	___
$^{13}C_{12}$-1,2,3,7,8-PeCDD	2.9	71.8	40%-130%	1.51	31:10	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	4.8	119	40%-130%	0.49	33:40	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	4.6	115	40%-130%	1.19	34:20	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	4.6	115	25%-130%	0.45	36:35	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	4.6	116	25%-130%	1.10	37:38	___
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	8.3	103	25%-130%	0.90	41:20	___

Surrogate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,4,7,8-PeCDF	3.6	89.3	40%-130%	1.56	30:50	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	3.1	78.3	40%-130%	0.50	33:34	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	3.0	75.5	40%-130%	1.22	34:16	___
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	3.3	83.6	25%-130%	0.42	38:09	___

Other Standard	Amt. (ng)	% Recovery	QC Limits	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	3.3	83.3	40%-130%	27:02	___

Alternate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	3.3	82.4	40%-130%	0.49	34:56	___
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	4.5	114	40%-130%	0.51	34:09	___

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.79	26:51	___
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.19	34:40	___

Data Reviewer: WDH 04/20/98

MIT2_PSR v1.04. LARS 6.11.00

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Printed: 13:40 04/20/98

Initial ....Date...

Data Review By: MSH 4/20/98 Calculated Noise Area: 1.58

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 W981017B.dbf
04/20/98 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						0.878-1.072			
304-306	DC	NL		0:00	RO	1.44	2.83			0.000			
A				24:22		0.74	7.23	3.08	4.15	0.926			J
	DC	SN		25:55	RO	1.46	2.51			0.985			
M				26:23		0.67	8.95	3.60	5.35	1.003	2378-TCDF	AN	
304-306				2 Peaks			16.18						
13C12-TCDF				0.65-0.89						0.962-1.038			
316-318	DC	NL		0:00		0.87	2.77			0.000			
	DC	WL		25:18		0.78	8.01			0.961			
				26:19		0.75	600.62	256.46	344.16	1.000	13C12-2378-TCDF	IS0	
316-318				1 Peak			600.62						

---------- Above: TCDF / TCDD Follows ----------

TCDD				0.65-0.89						0.903-1.042			
320-322	DC	NL		0:00	RO	1.21	1.84			0.000			
	DC	SN		24:32		0.70	2.64			0.908			
	DC	WH		28:30		0.84	2.10			1.055			
320-322				0 Peaks			0.00						
37Cl-TCDD										0.926-1.074			
328	DC	NL		0:00			0.91			0.000			
	DC	WL		24:42			0.58			0.914			
	DC	WL		24:52			0.68			0.920			
				25:42			7.87	7.87		0.951			
	DC	SN		25:54			0.86			0.959			
	DC	SN		26:41			0.36			0.988			
				27:02			423.24	423.24		1.001	37Cl-TCDD	CLS	
				27:26			4.90	4.90		1.015			
	DC	SN		27:35			1.28			1.021			
	DC	SN		27:43			0.83			1.026			
	DC	SN		27:56			1.54			1.034			
328				3 Peaks			436.01						
13C12-TCDD				0.65-0.89						0.926-1.074			
332-334	DC	NL		0:00	RO	2.08	2.09			0.000			
				26:51		0.79	606.53	268.63	337.90	0.994	13C12-1234-TCDD	RS1	
				27:01		0.82	495.22	222.39	272.83	1.000	13C12-2378-TCDD	IS1	
				27:19	RO	0.51	5.72	2.49	4.86	1.011			
332-334				3 Peaks			1,107.47						

---------- Above: TCDD / PeCDF Follows ----------

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
PeCDF				1.32-1.78						0.930-1.060			
340-342	DC	NL		0:00	RO	0.72	1.48			0.000			
	DC	SN		28:04	RO	0.64	1.07			0.930			
D	D	SN		28:15		1.33	4.80			0.936			
	DC	SN		29:12		1.45	2.06			0.968			
				29:20	RO	1.31	6.38	3.88	2.96	0.972			J
	DC	SN		29:27		1.43	3.14			0.976			
	DC	SN		31:47	RO	0.63	1.40			1.054			
	DC	SN		31:57	RO	0.65	0.87			1.059			
	DC	WH		32:04	RO	1.95	1.58			1.063			
	DC	WH		32:17	RO	1.08	1.61			1.070			
340-342			1	Peak			6.38						
13C12-PeCDF				1.32-1.78						0.867-1.133			
352-354	DC	NL		0:00	RO	0.89	1.45			0.000			
	DC	SN		28:29	RO	0.35	0.44			0.944			
	DC	SN		28:33		1.53	1.01			0.946			
	DC	SN		28:58	RO	2.48	1.96			0.960			
				29:18		1.49	9.07	5.43	3.64	0.971			
	DC	SN		29:49	RO	1.28	2.75			0.988			
	DC	SN		30:01	RO	0.25	0.48			0.995			
				30:10		1.50	435.21	260.95	174.26	1.000	13C12-PeCDF 123	IS2	
				30:26		1.59	6.16	3.78	2.38	1.009			
				30:50		1.56	374.22	228.19	146.03	1.022	13C12-PeCDF 234	SUR1	
	DC	SN		32:06	RO	0.49	0.95			1.064			
352-354			4	Peaks			824.66						

---------- Above: PeCDF / PeCDD Follows ----------

PeCDD				1.32-1.78						0.939-1.020			
356-358	DC	NL		0:00	RO	1.26	2.02			0.000			
	DC	SN		29:24	RO	0.90	1.89			0.943			
356-358			0	Peaks			0.00						
13C12-PeCDD				1.32-1.78						0.872-1.128			
368-370	DC	NL		0:00	RO	1.19	1.96			0.000			
	DC	SN		29:20	RO	0.70	0.84			0.941			
				31:10		1.51	252.15	151.74	100.41	1.000	13C12-PeCDD 123	IS3	
				31:18		1.41	32.94	19.28	13.66	1.004			
368-370			2	Peaks			285.09						

---------- Above: PeCDD / HxCDF Follows ----------

HxCDF				1.05-1.43						0.964-1.045			
374-376	DC	NL		0:00	RO	1.46	2.42			0.000			
	DC	SN		32:58	RO	2.68	0.69			0.979			
	DC	SN		33:02	RO	1.59	0.38			0.981			
	DC	SN		33:12		1.20	1.10			0.986			
	DC	SN		35:06		1.19	1.29			1.043			
	DC	WH		35:21	RO	0.48	1.57			1.050			
374-376			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-HxCDF				0.43-0.59						0.881-1.119			
384-386	DC	NL		0:00	RO	0.64	2.91			0.000			
	DC	SN		32:44		0.44	3.17			0.972			
	DC	SN		32:50	RO	0.76	0.51			0.975			
				33:34		0.50	284.21	95.01	189.20	0.997	13C12-HxCDF	478	SUR2
				33:40		0.49	352.74	116.51	236.23	1.000	13C12-HxCDF	678	IS4
				34:09		0.51	319.35	107.65	211.70	1.014	13C12-HxCDF	234	ALT2
				34:56		0.49	175.34	57.94	117.40	1.038	13C12-HxCDF	789	ALT1
384-386			4	Peaks			1,131.64						

---------- Above: HxCDF / HxCDD Follows ----------

HxCDD				1.05-1.43						0.958-1.013			
390-392	DC	NL		0:00	RO	0.84	2.26			0.000			
390-392			0	Peaks			0.00						
13C12-HxCDD				1.05-1.43						0.971-1.029			
402-404	DC	NL		0:00	RO	0.94	3.43			0.000			
				34:16		1.22	181.66	99.82	81.84	0.998	13C12-HxCDD	478	SUR3
				34:20		1.19	258.65	140.79	117.86	1.000	13C12-HxCDD	678	IS5
				34:40		1.19	230.55	125.31	105.24	1.010	13C12-HxCDD	789	RS2
402-404			3	Peaks			670.86						

---------- Above: HxCDD / HpCDF Follows ----------

HpCDF				0.88-1.20						0.996-1.048			
408-410	DC	NL		0:00		1.08	2.25			0.000			
	DC	SN		36:35	RO	3.51	1.00			1.000	1234678-HpCDF		AN
	DC	SN		36:47	RO	0.39	0.31			1.005			
408-410			0	Peaks			0.00						
13C12-HpCDF				0.37-0.51						0.945-1.109			
418-420	DC	NL		0:00	RO	0.85	1.97			0.000			
				36:35		0.45	198.52	61.78	136.74	1.000	13C12-HpCDF	678	IS6
	DC	SN		36:48		0.47	0.69			1.006			
				38:09		0.42	121.32	36.13	85.19	1.043	13C12-HpCDF	789	SUR4
418-420			2	Peaks			319.84						

---------- Above: HpCDF / HpCDD Follows ----------

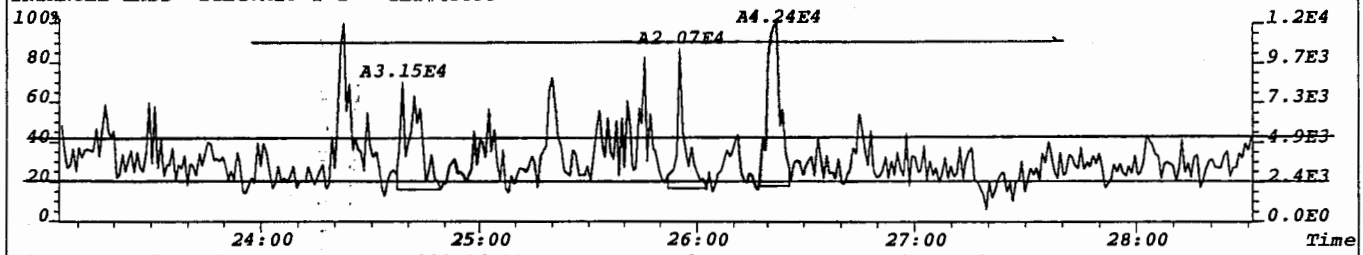
HpCDD				0.88-1.20						0.976-1.004			
424-426	DC	NL		0:00		1.11	2.09			0.000			
	DC	WH		38:22	RO	1.65	0.94			1.019			
	DC	WH		38:32		0.91	1.26			1.024			
424-426			0	Peaks			0.00						
13C12-HpCDD				0.88-1.20						0.973-1.027			
436-438	DC	NL		0:00	RO	1.36	2.02			0.000			
				37:38		1.10	175.47	91.96	83.51	1.000	13C12-HpCDD	678	IS7
	DC	WH		38:40	RO	1.89	1.24			1.027			
	DC	WH		39:02	RO	3.68	0.57			1.037			
436-438			1	Peak			175.47						

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				0.903-1.097			
442-444	DC	NL		0:00		0.86	2.62			0.000			
	DC	WL		35:42	RO	1.39	1.64			0.864			
	DC	WL		36:15	RO	1.58	2.17			0.877			
	DC	WL		36:28	RO	2.00	0.66			0.882			
	DC	WL		36:31	RO	2.38	0.74			0.883			
	DC	SN		37:22	RO	0.28	0.57			0.904			
	DC	SN		37:28	RO	0.34	0.45			0.906			
	DC	SN		38:09	RO	0.07	0.30			0.923			
	DC	SN		38:15		0.77	1.88			0.925			
	DC	SN		38:25	RO	0.24	1.02			0.929			
	DC	SN		38:45	RO	0.74	1.97			0.938			
	DC	SN		39:03	RO	0.21	1.21			0.945			
	DC	SN		39:43	RO	1.40	1.59			0.961			
	DC	SN		41:19	RO	2.13	1.64			1.000			
	DC	SN		41:28	RO	0.41	0.64			1.003			
	DC	SN		41:32	RO	0.36	1.15			1.005			
442-444			0	Peaks			0.00						
OCDD						0.76-1.02				0.903-1.097			
458-460	DC	NL		0:00	RO	1.08	1.80			0.000			
458-460			0	Peaks			0.00						
13C12-OCDD						0.76-1.02				0.996-1.004			
470-472	DC	NL		0:00	RO	1.14	1.78			0.000			
				41:20		0.90	196.00	92.84	103.16	1.000	13C12-OCDD	IS8	
	DC	WH		41:35	RO	0.43	2.31			1.006			
470-472			1	Peak			196.00						

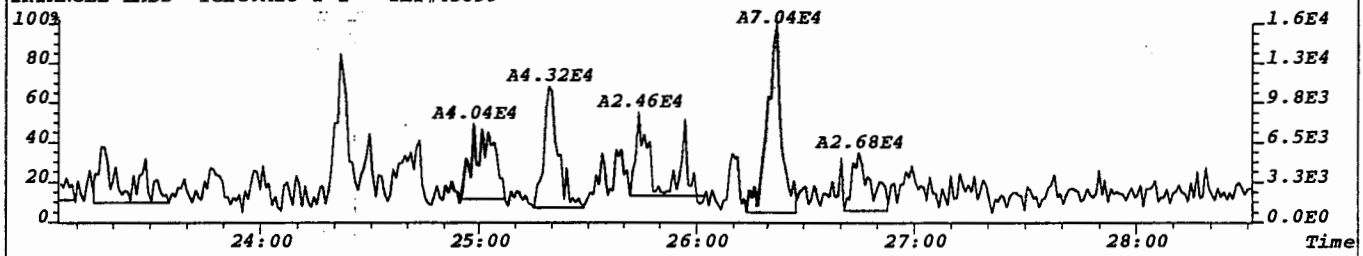
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside 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
		X-Ether Interference

*** End of Report ***

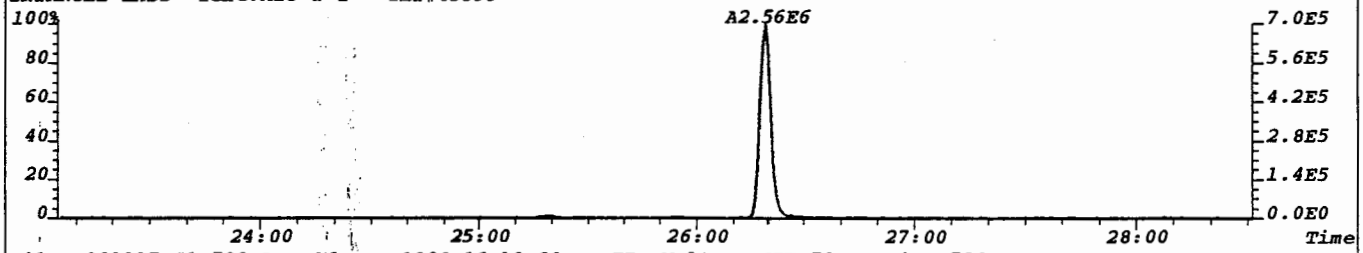
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:1153
303.9016 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.10%,4612.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



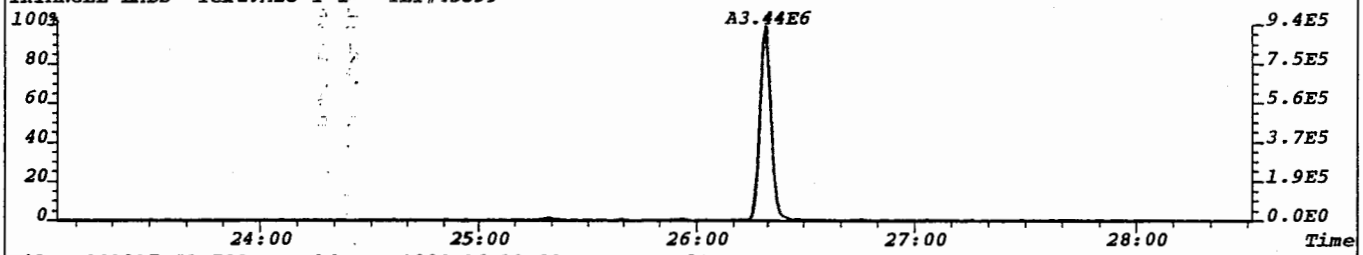
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:802
305.8987 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.10%,3208.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



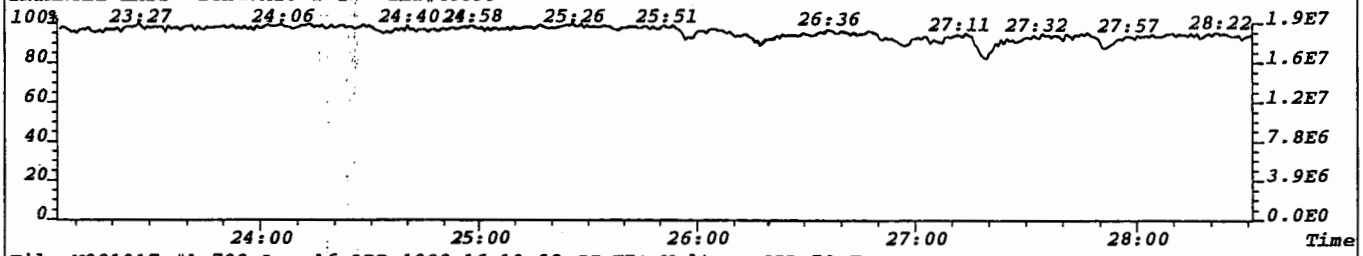
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:647
315.9419 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.10%,2588.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



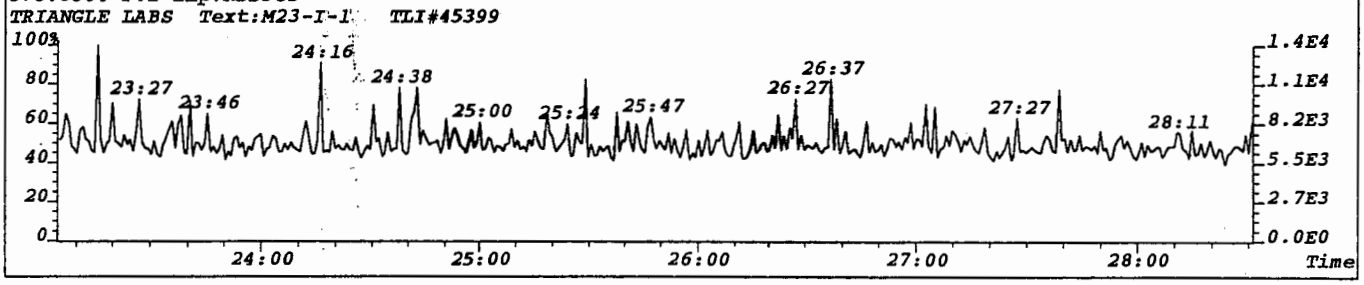
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:738
317.9389 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.10%,2952.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



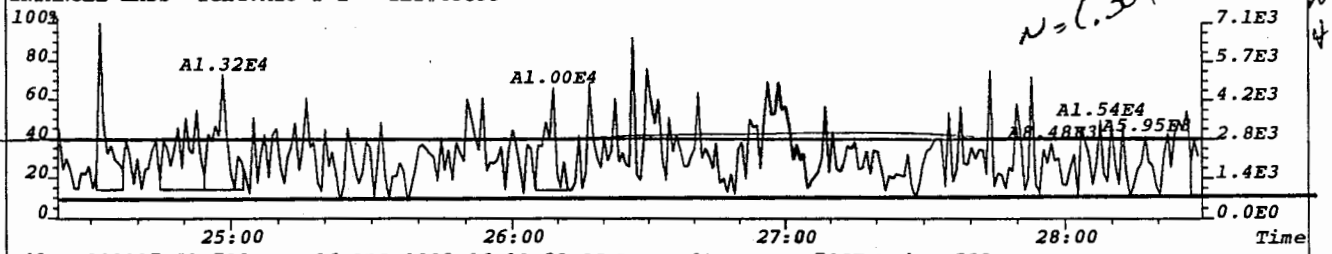
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE
375.8364 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



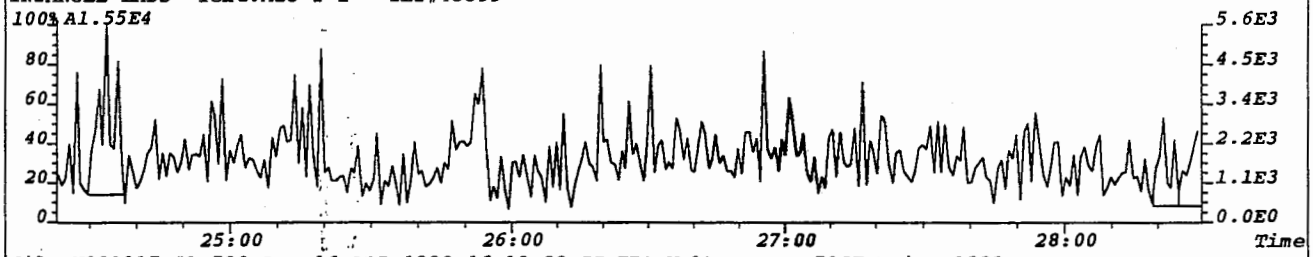
N = (.30)(.71) 2.4 = 1.58

4-20-98

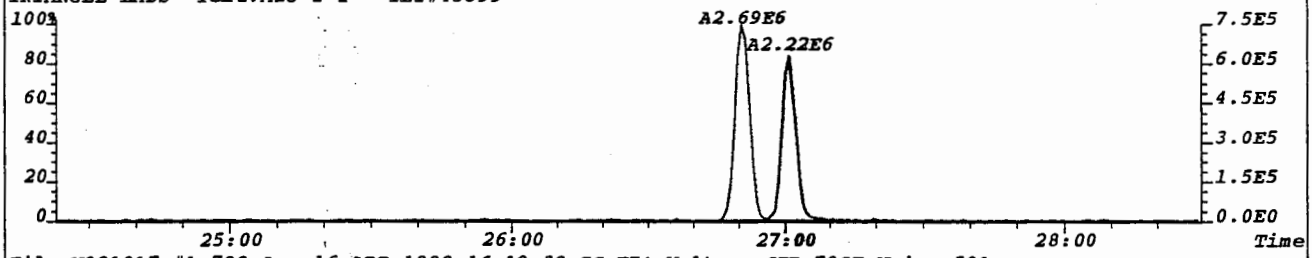
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:629
319.8965 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2516.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



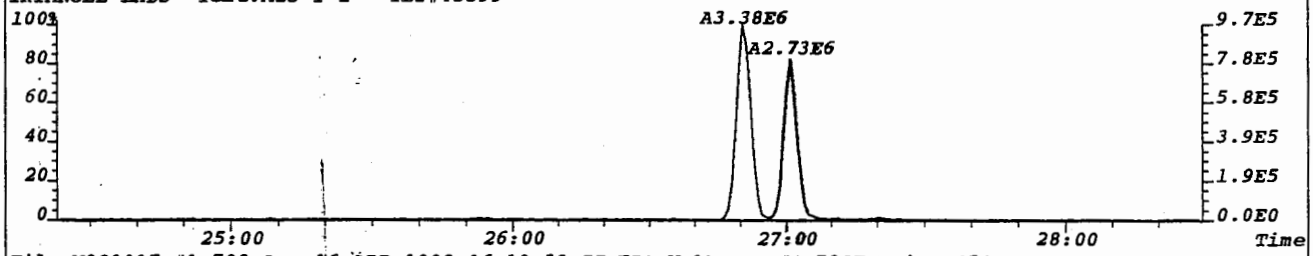
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:522
321.8936 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2088.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



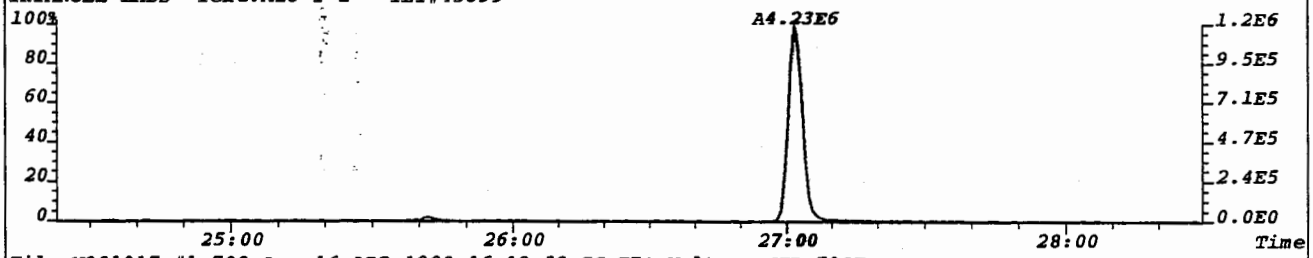
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:1232
331.9368 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4928.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



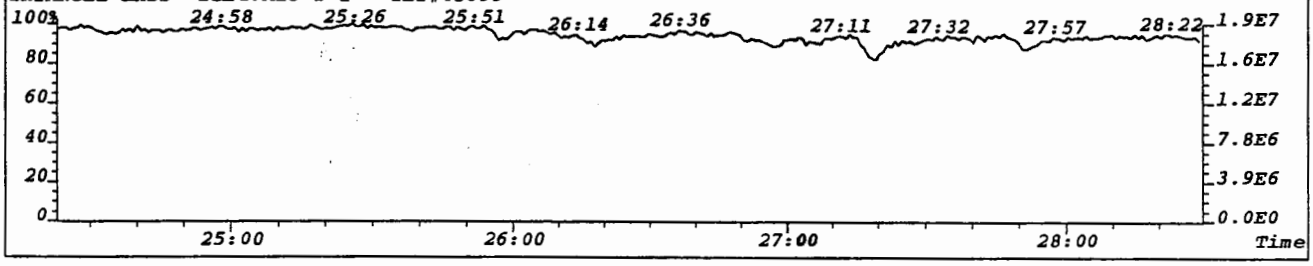
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:591
333.9338 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2364.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



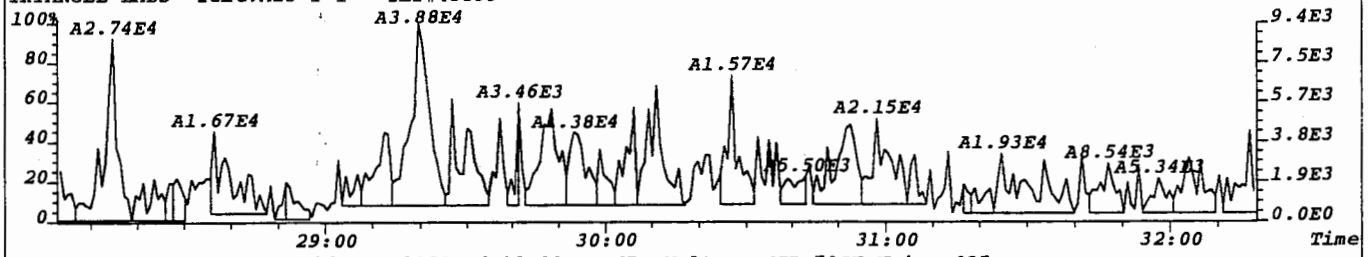
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:454
327.8847 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1816.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



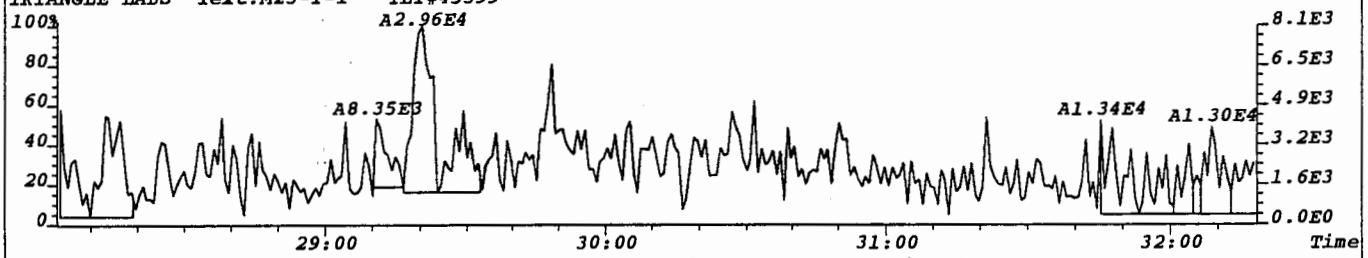
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



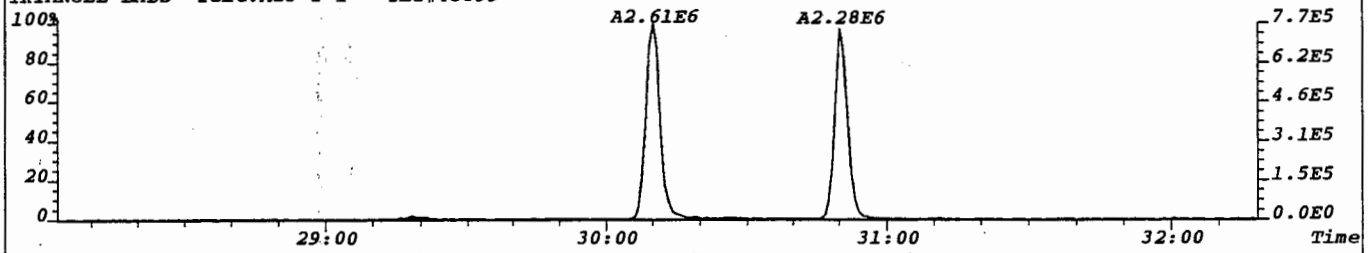
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:450
339.8597 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1800.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



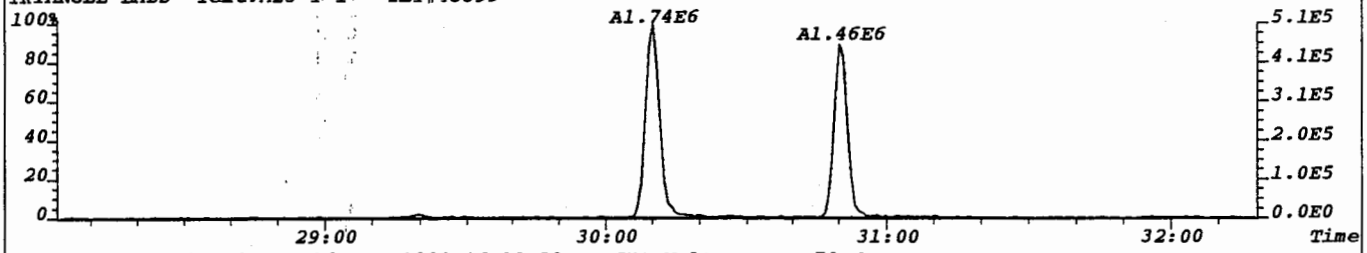
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:625
341.8567 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2500.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



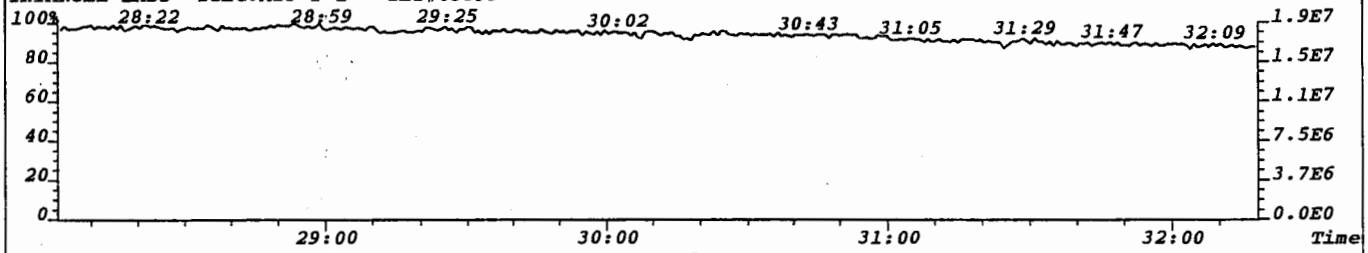
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:442
351.9000 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1768.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



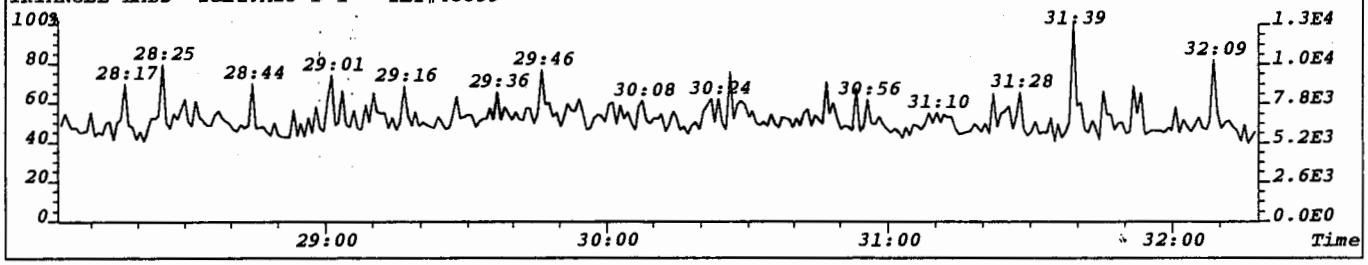
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:494
353.8970 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1976.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



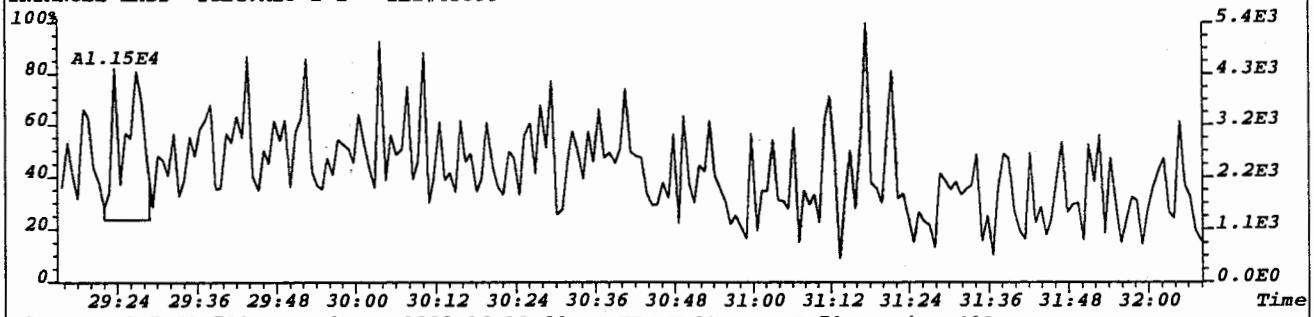
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



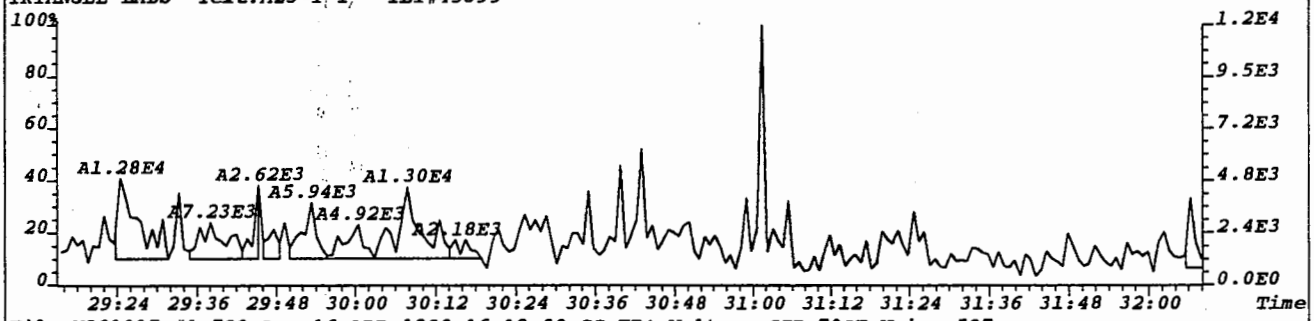
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE
409.7974 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



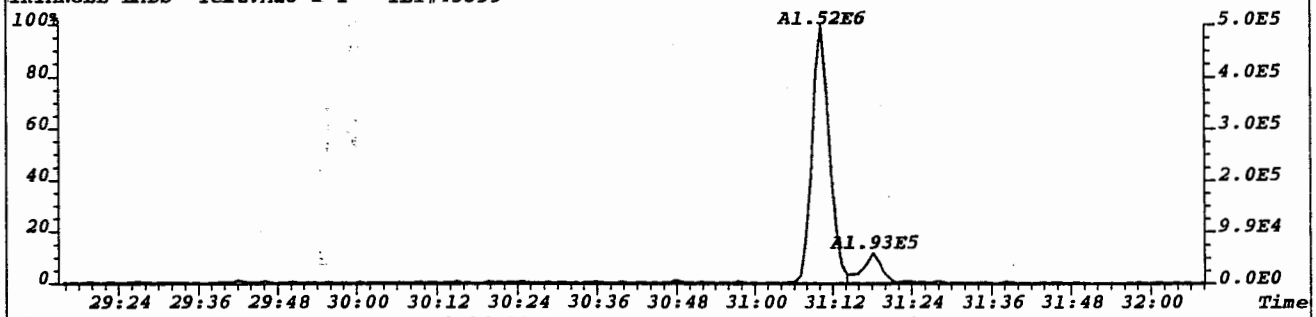
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:617
355.8546 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2468.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



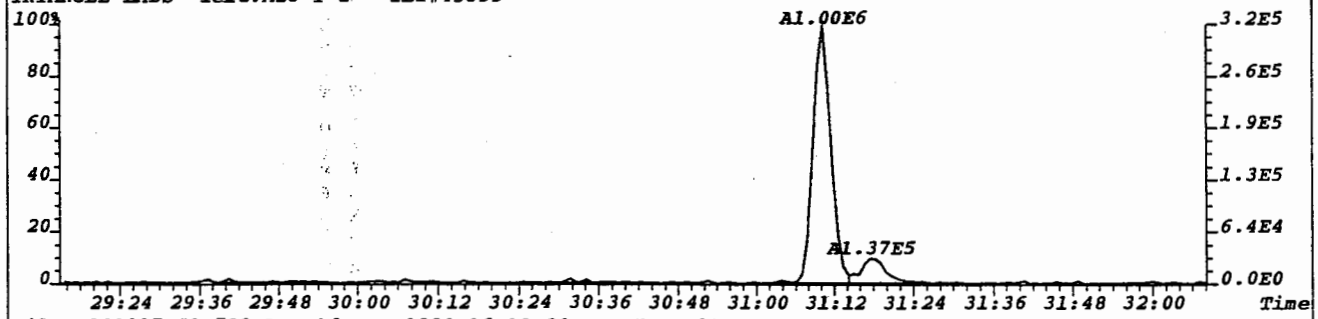
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:489
357.8516 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1956.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



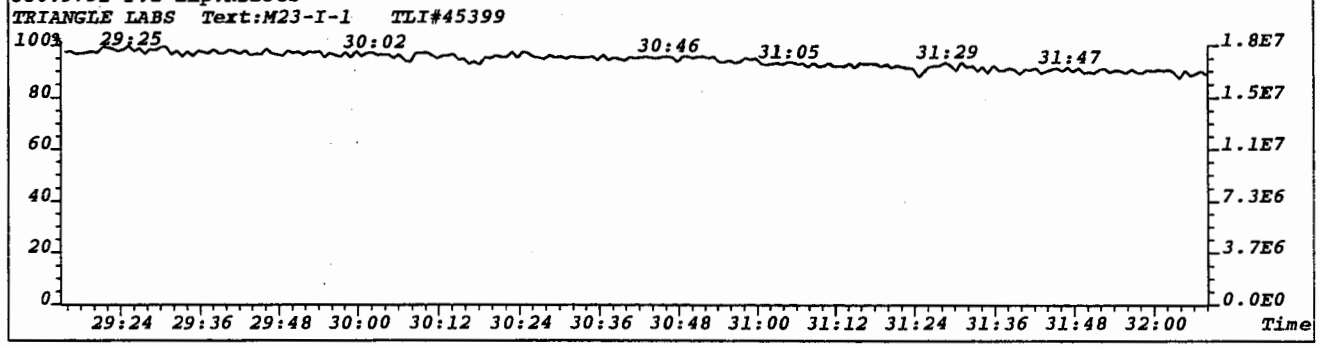
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:597
367.8949 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2388.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



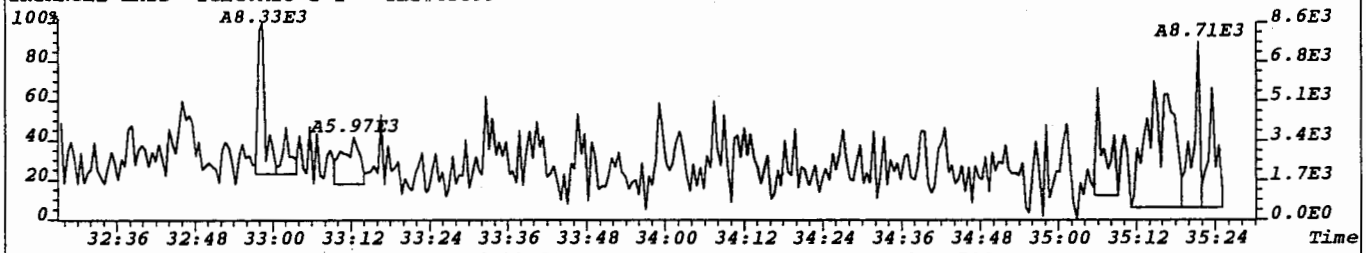
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:501
369.8919 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2004.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



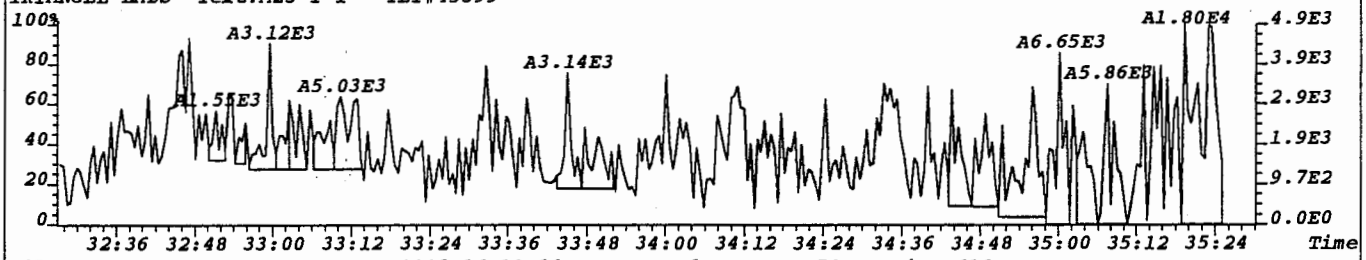
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



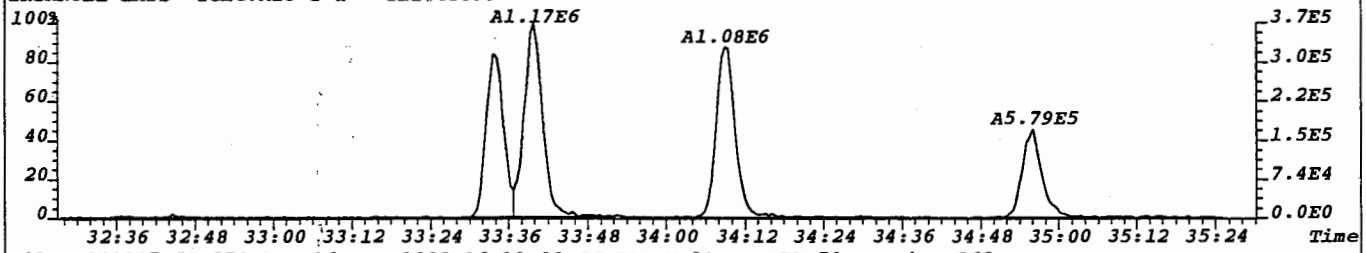
File:W981017 #1-354 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:788
373.8208 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3152.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



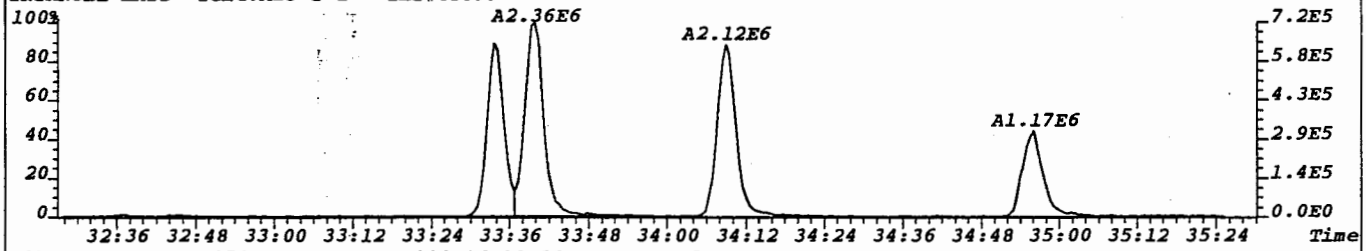
File:W981017 #1-354 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:538
375.8178 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2152.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



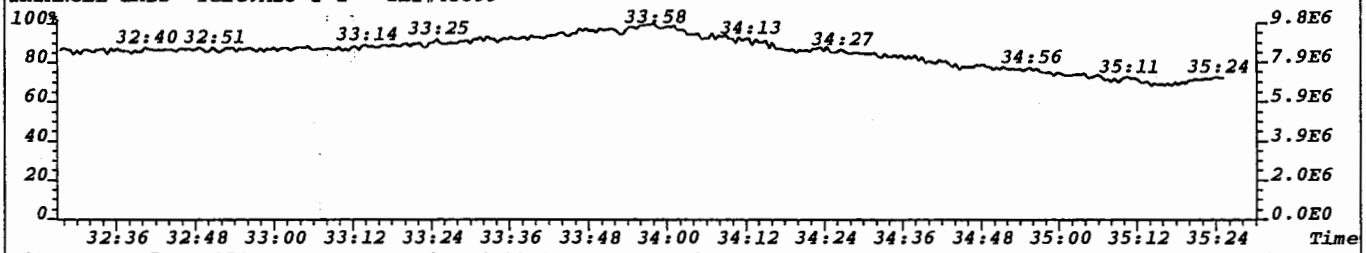
File:W981017 #1-354 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:618
383.8639 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2472.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



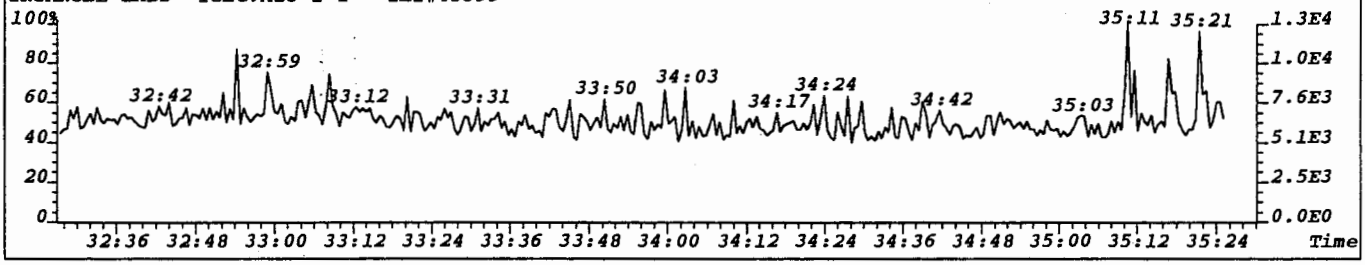
File:W981017 #1-354 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:963
385.8610 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3852.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



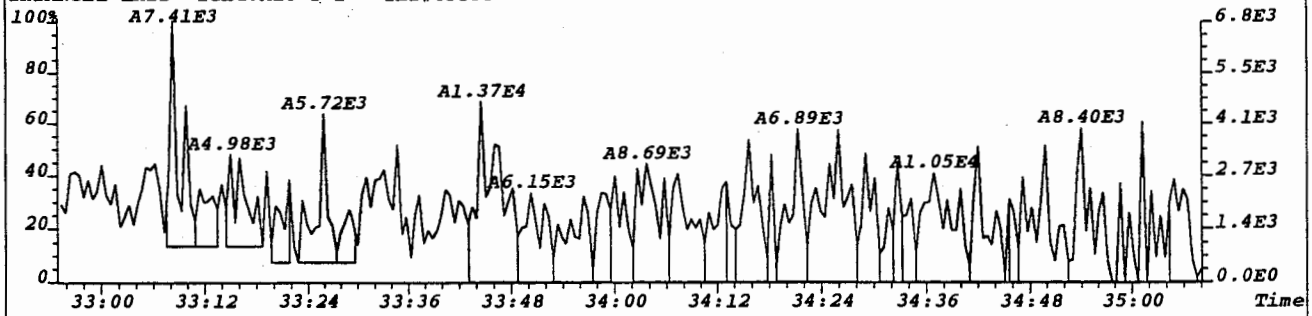
File:W981017 #1-354 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE
392.9760 F:3 Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



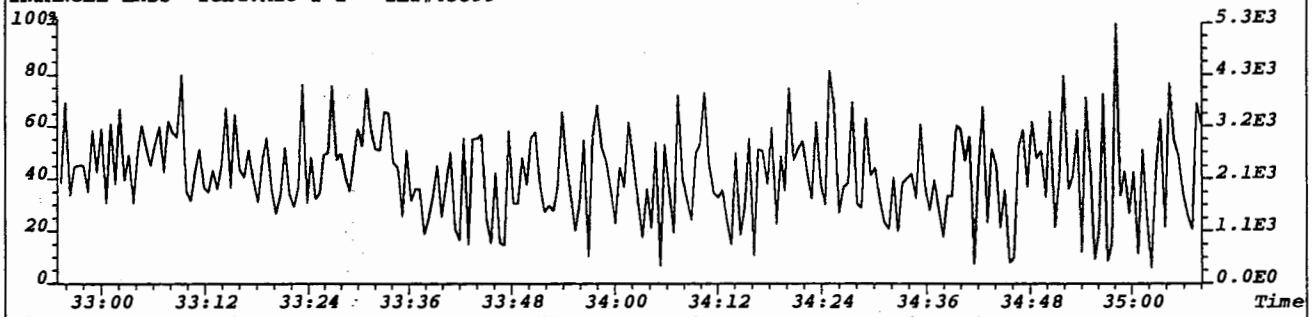
File:W981017 #1-354 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE
445.7555 F:3 Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



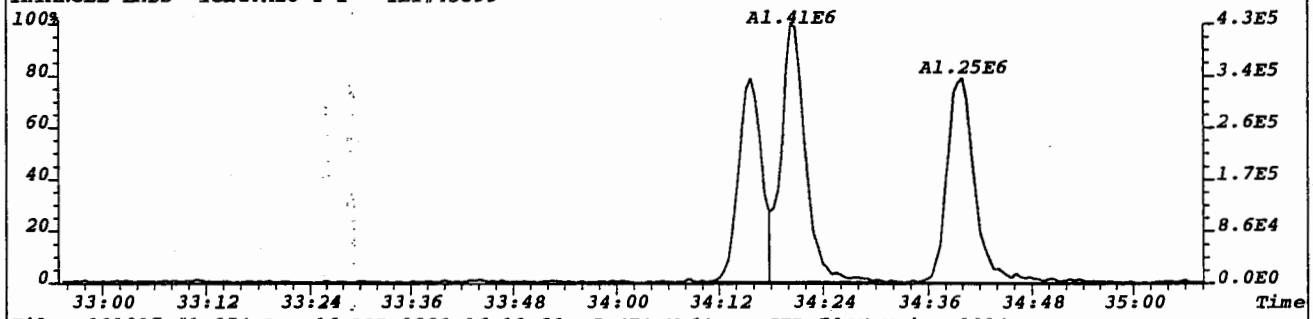
File:W981017 #1-354 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:626
389.8156 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2504.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



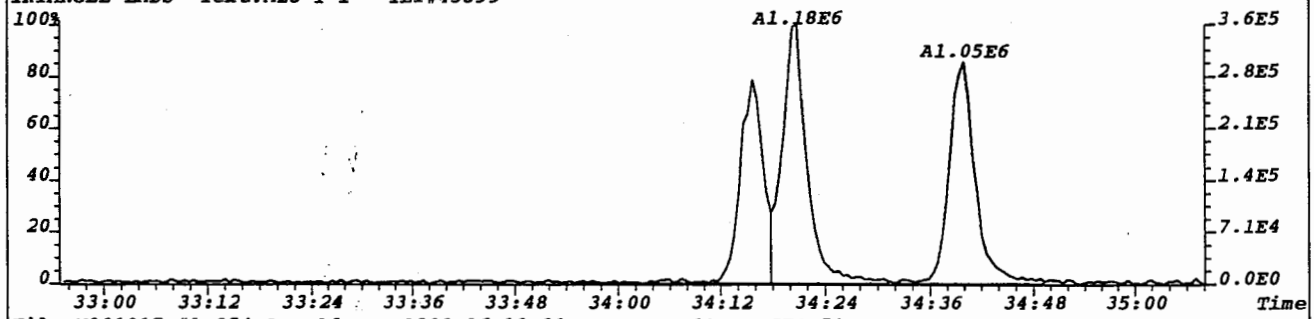
File:W981017 #1-354 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:741
391.8127 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2964.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



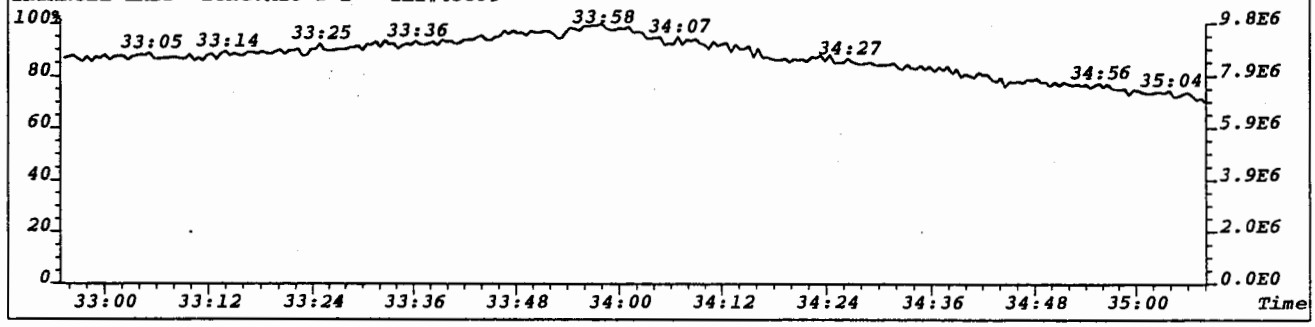
File:W981017 #1-354 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:950
401.8558 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3800.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



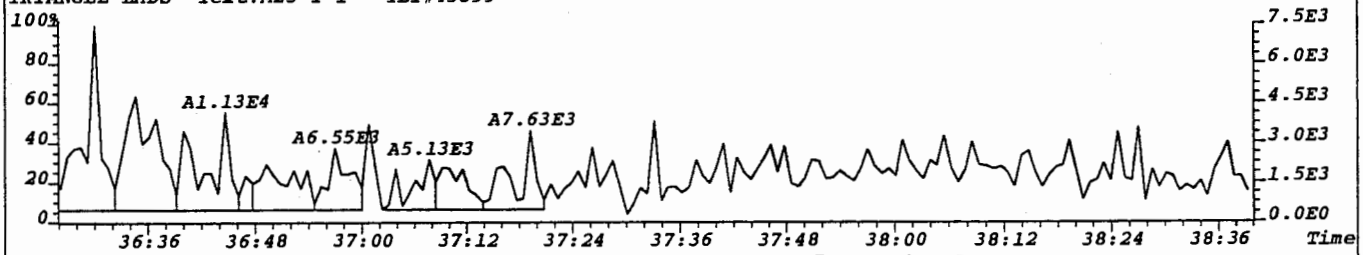
File:W981017 #1-354 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:1014
403.8529 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,4056.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



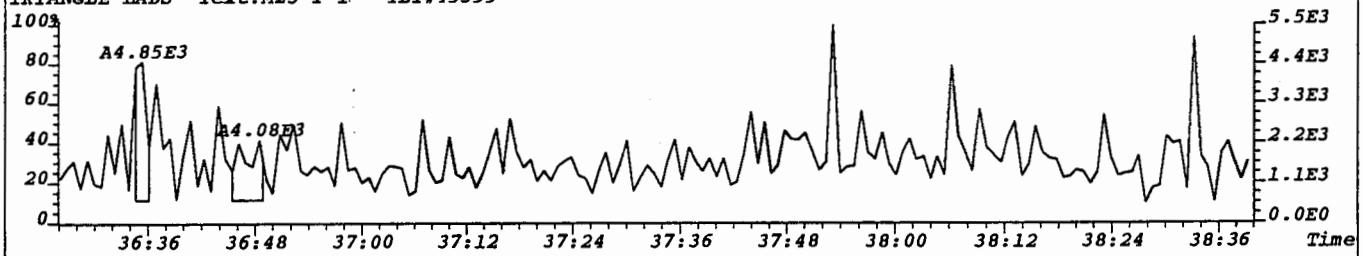
File:W981017 #1-354 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE
392.9760 F:3 Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



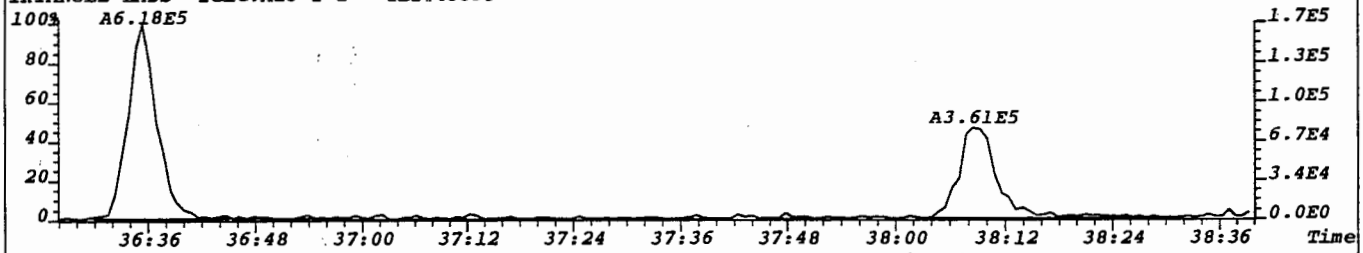
File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:587
407.7818 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2348.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



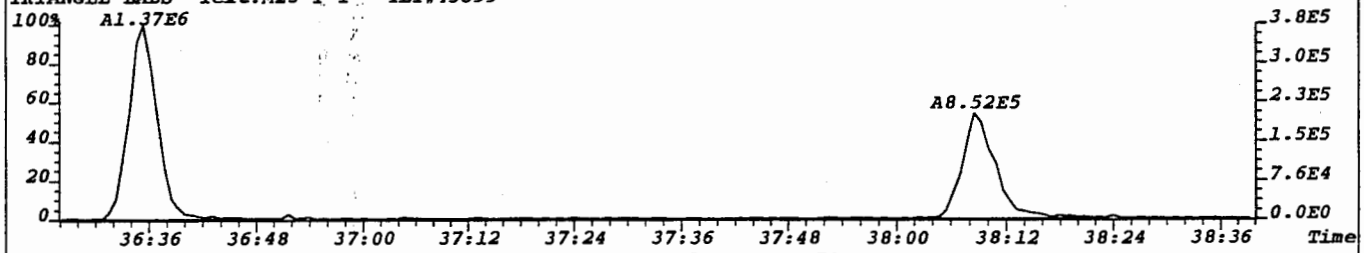
File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:539
409.7789 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2156.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



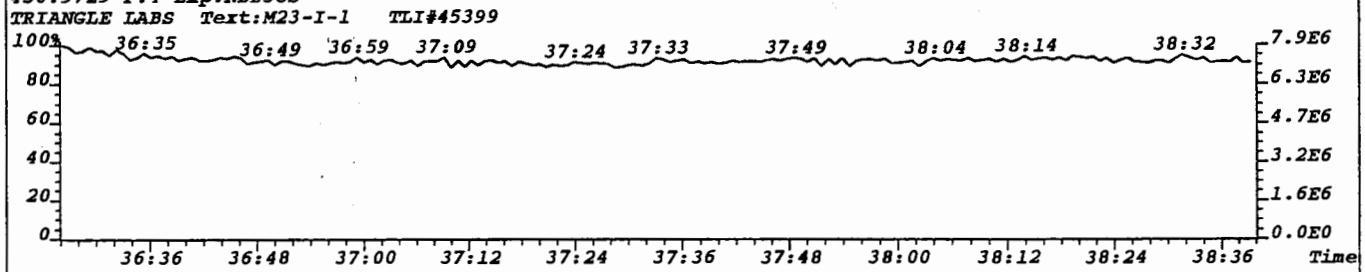
File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:581
417.8253 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2324.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



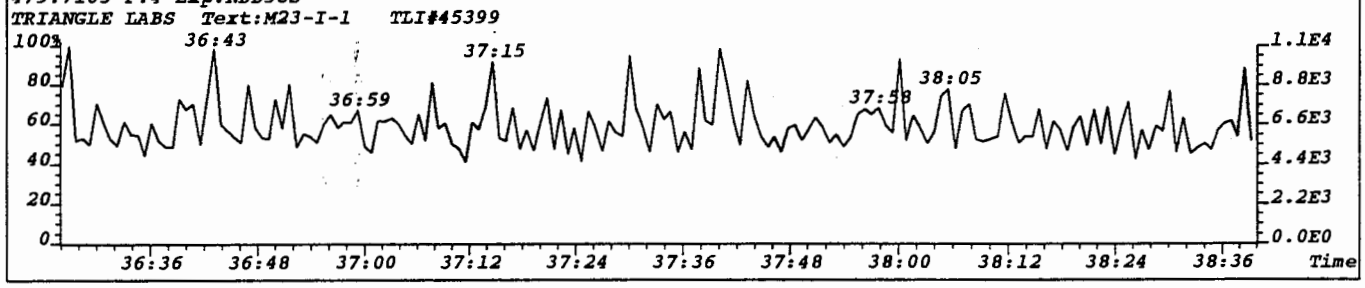
File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:686
419.8220 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2744.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



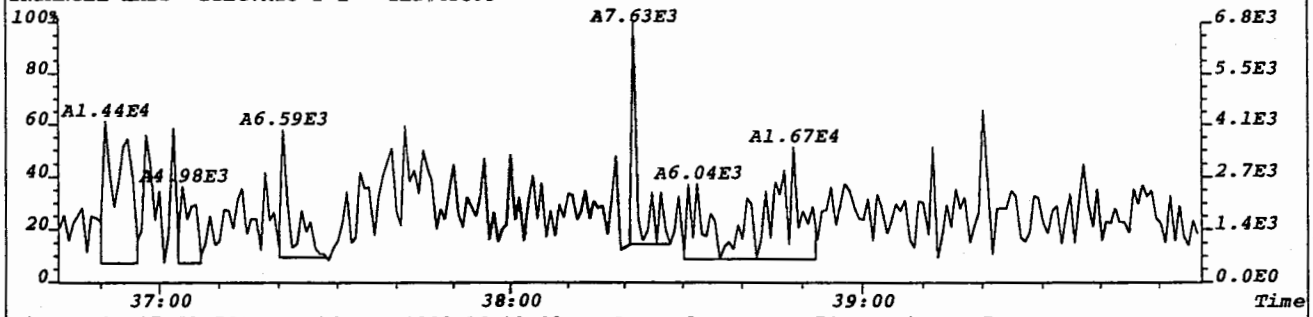
File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



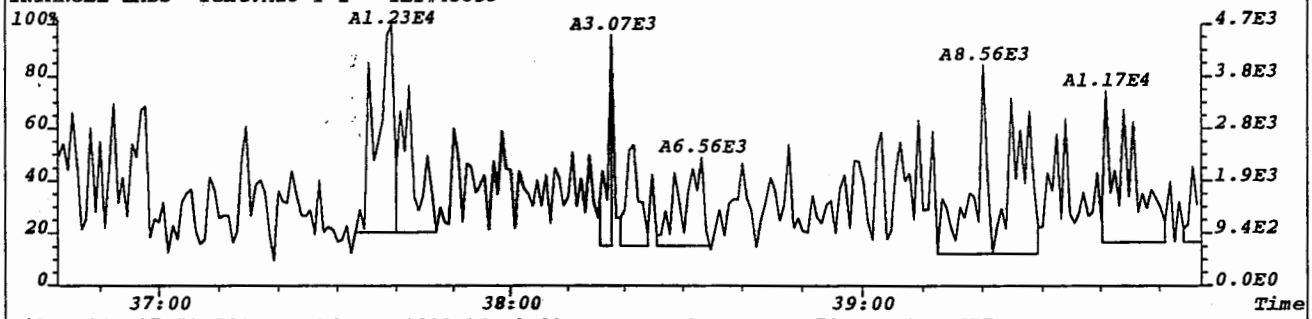
File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE
479.7165 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:549
423.7766 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2196.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



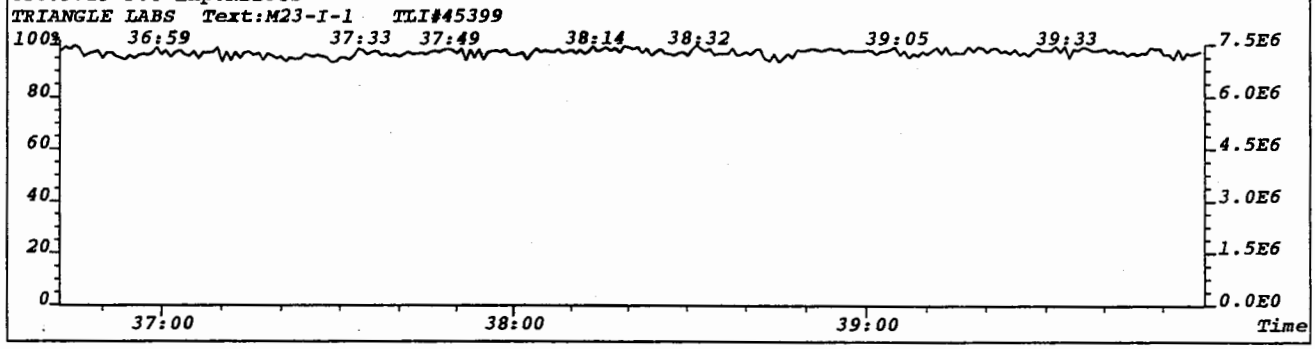
File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:497
425.7737 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1988.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



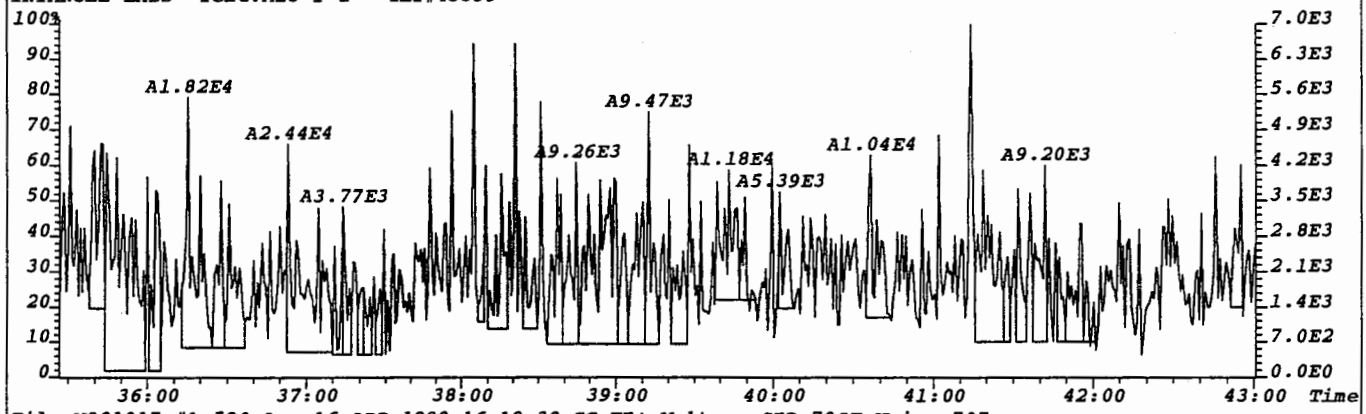
File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:677
435.8169 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2708.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399

File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:493
437.8140 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1972.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399

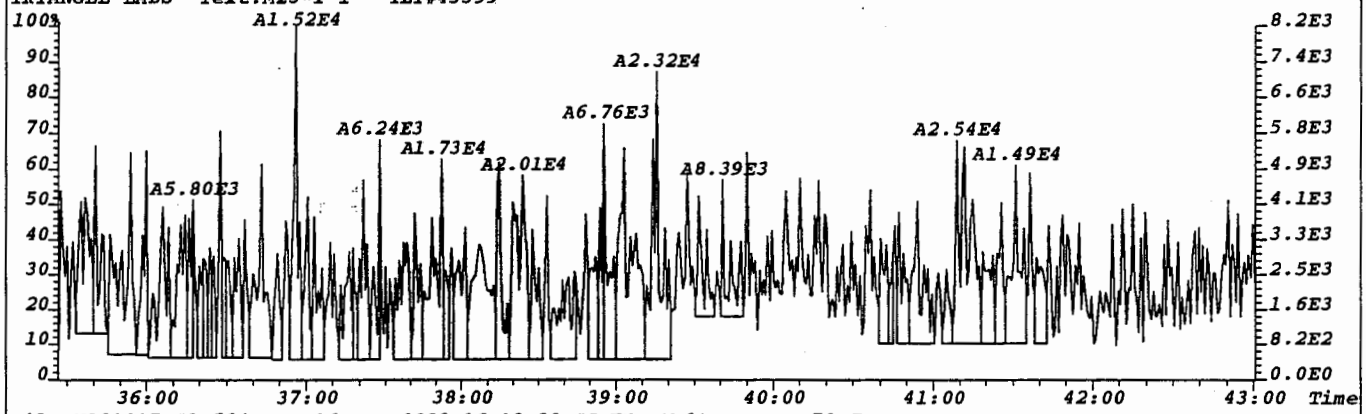
File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



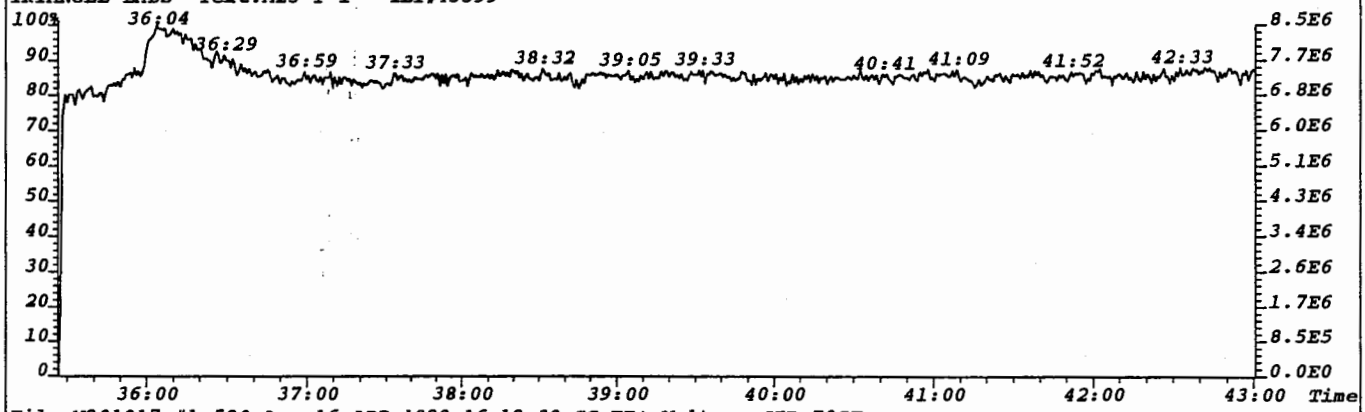
File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:606
441.7428 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2424.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



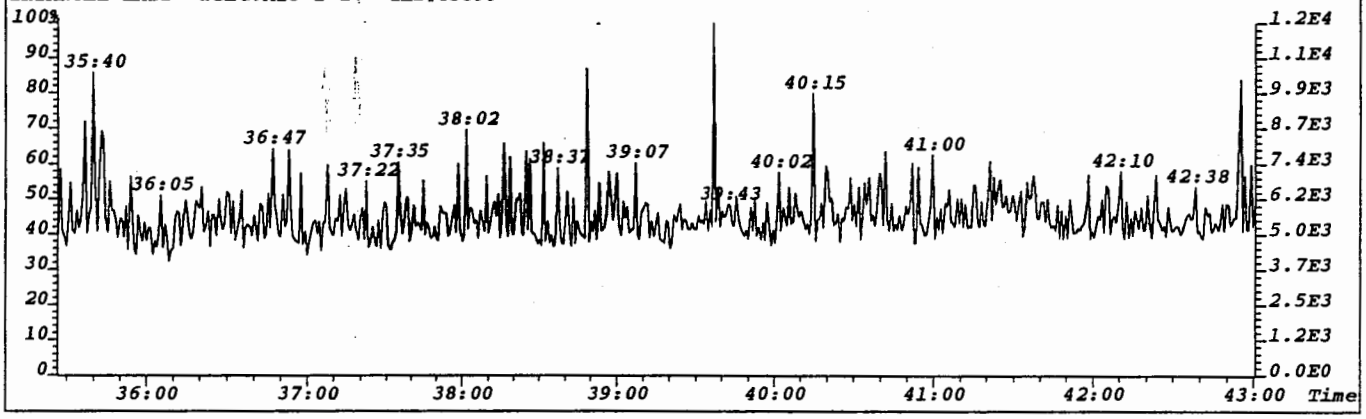
File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:707
443.7399 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2828.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



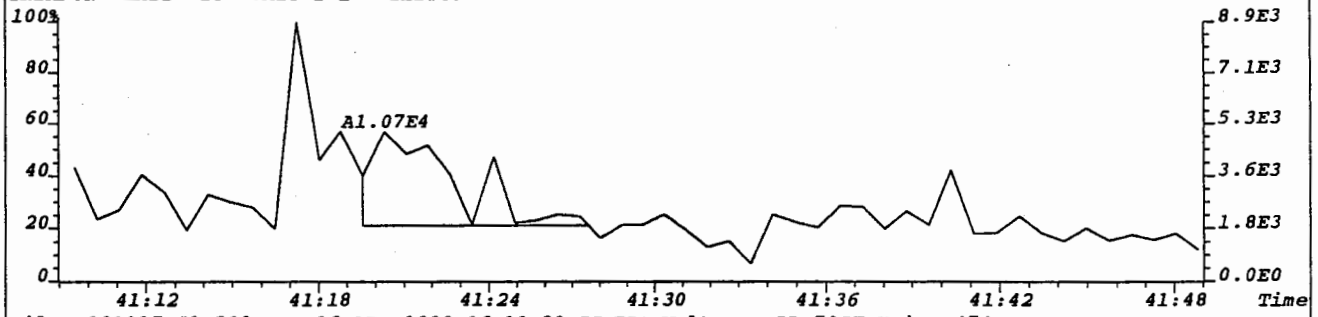
File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



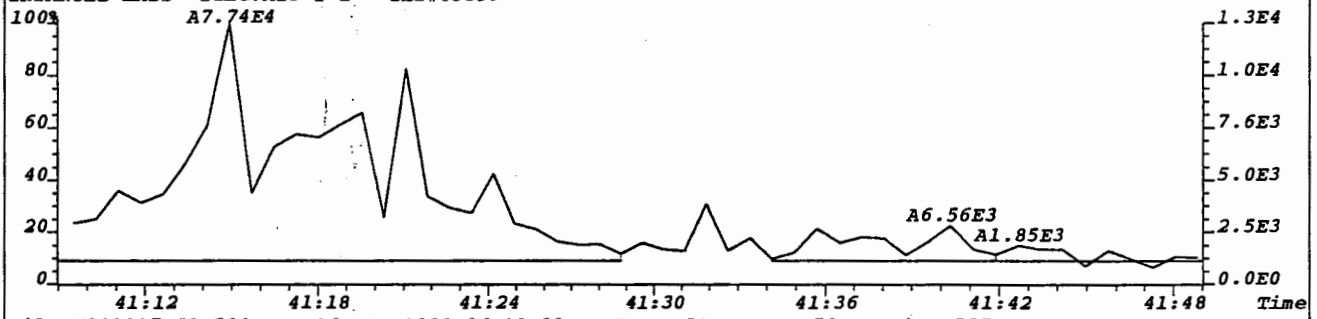
File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE
513.6775 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



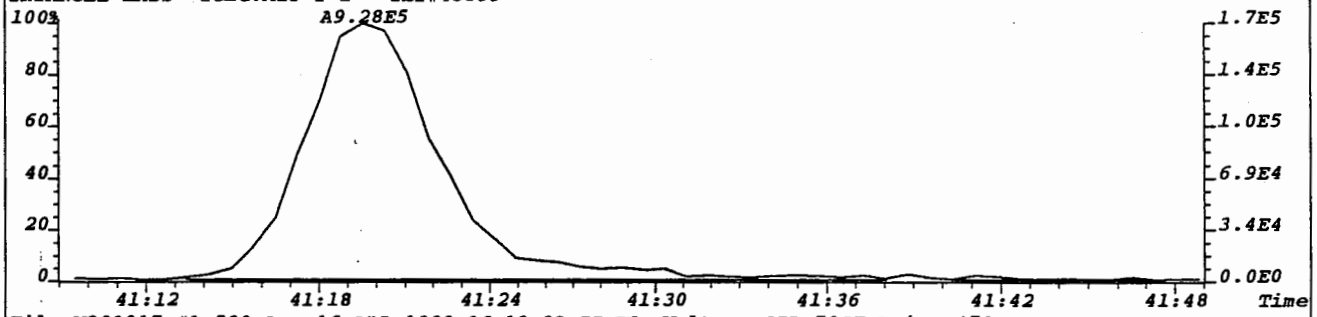
File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:516
457.7377 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2064.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



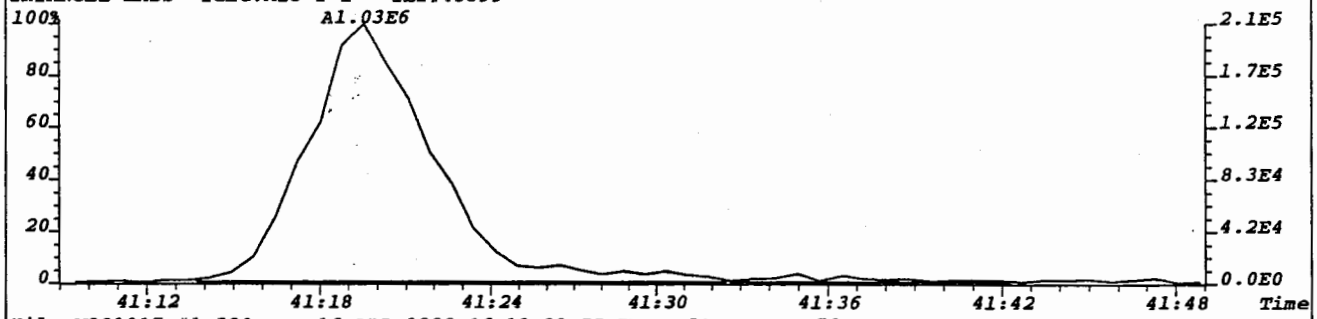
File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:474
459.7348 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1896.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



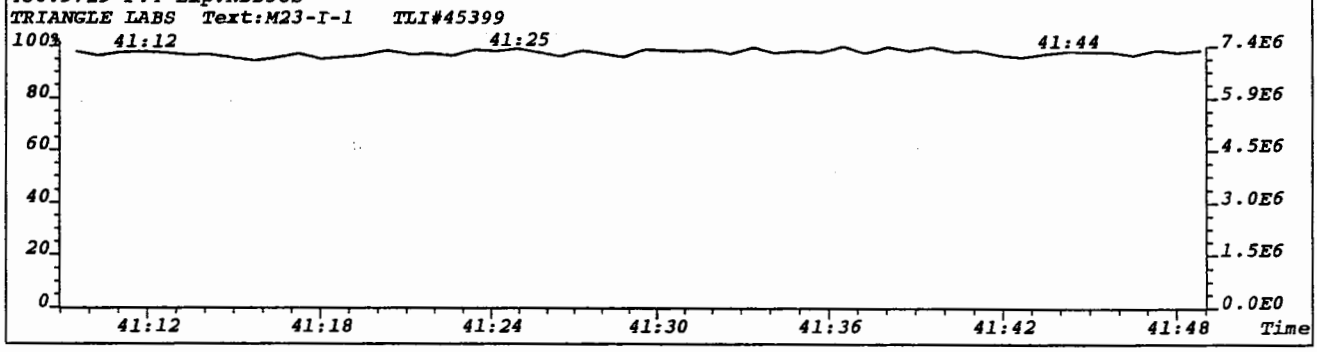
File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:537
469.7779 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2148.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



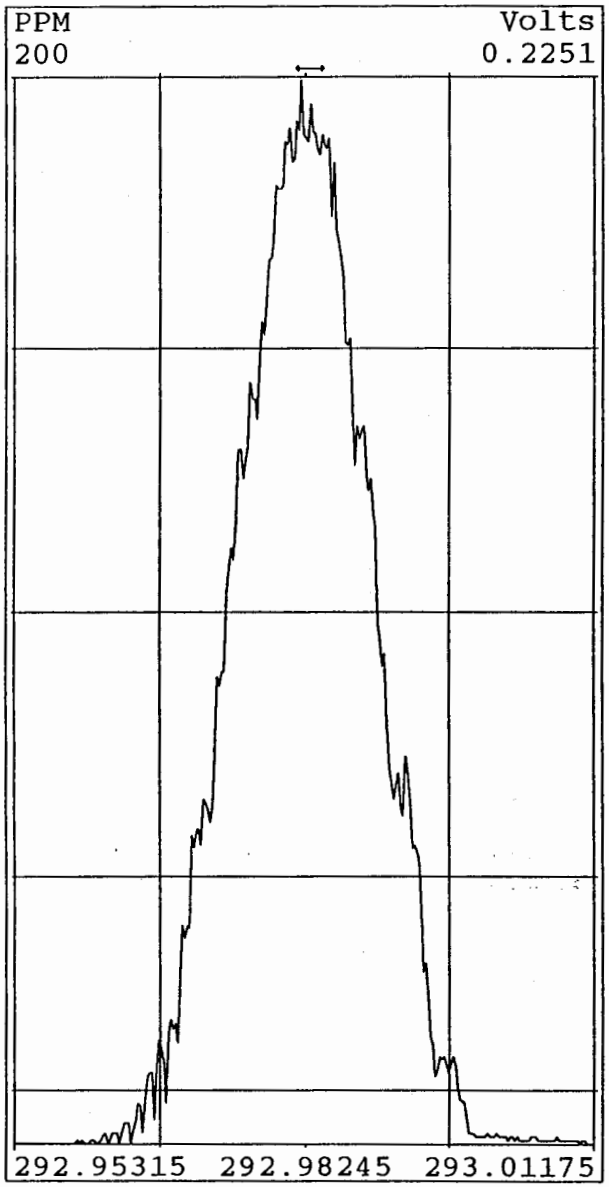
File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE Noise:470
471.7750 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1880.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399

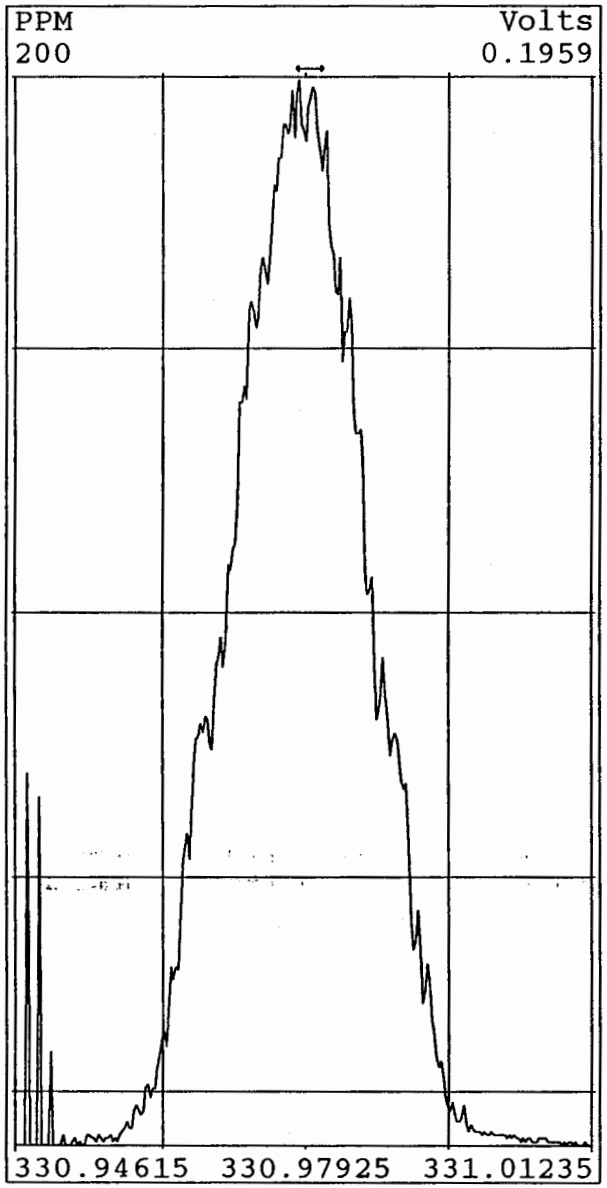


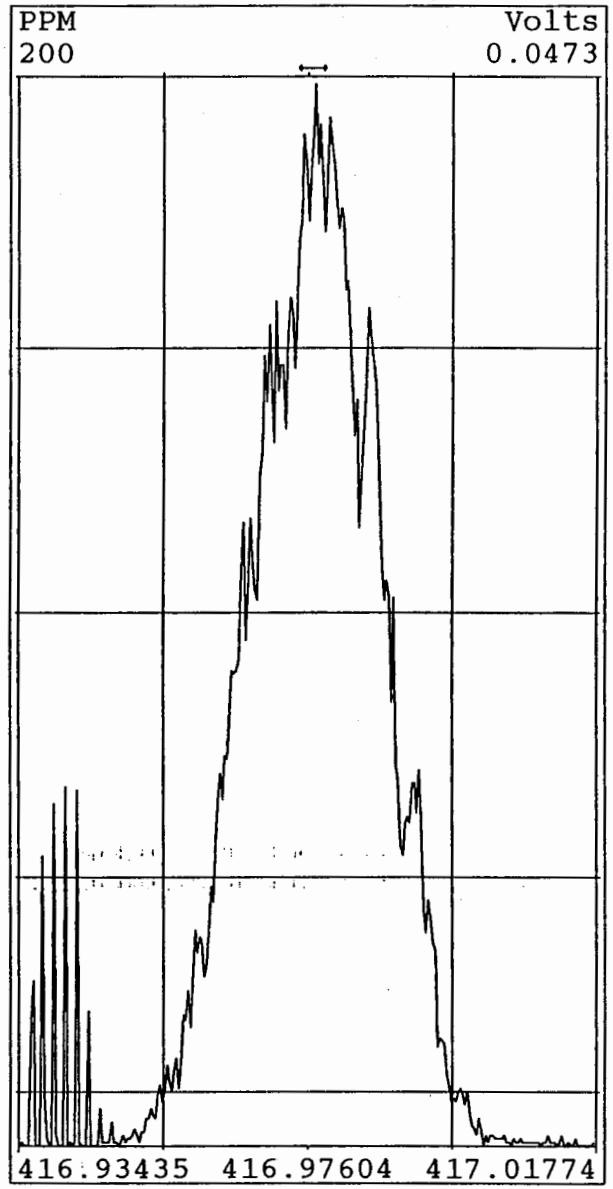
File:W981017 #1-590 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-I-1 TLI#45399



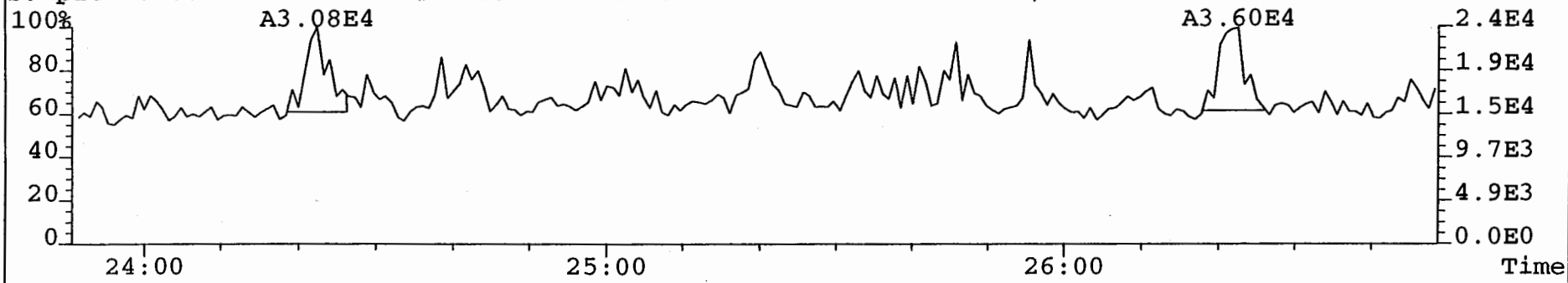
Peak Locate Examination:16-APR-1998:16:17 File:W981017
Experiment:NDB5US Function:2 Reference:PFK



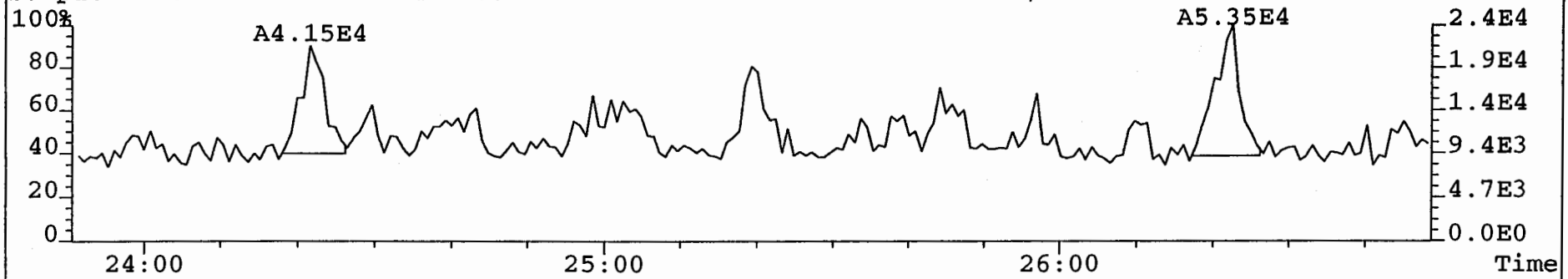




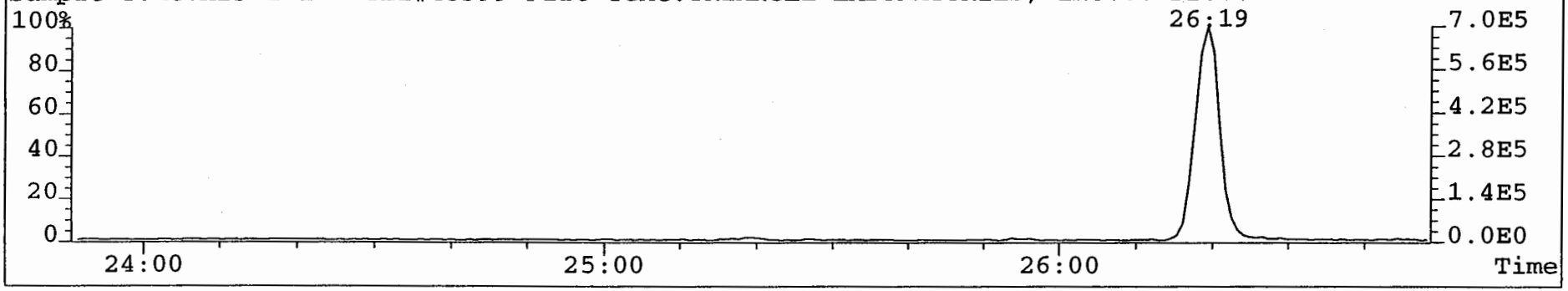
File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE
303.9016 F:2 Exp:NDB5US
Sample Text:M23-I-1 TLI#45399 File Text:TRIANGLE LABORATORIES, INC.:: DB5::



File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE
305.8987 F:2 Exp:NDB5US
Sample Text:M23-I-1 TLI#45399 File Text:TRIANGLE LABORATORIES, INC.:: DB5::



File:W981017 #1-798 Acq:16-APR-1998 16:19:38 GC EI+ Voltage SIR 70SE
315.9419 F:2 Exp:NDB5US
Sample Text:M23-I-1 TLI#45399 File Text:TRIANGLE LABORATORIES, INC.:: DB5::



Pacific Environmental Services

TLI Project: **45399** Method 23 TCDD/TCDF Analysis (DB-225)
Client Sample: **M23-I-1** Analysis File: **P981306**

Client Project:	**r012.002/Lime Kiln**				
Sample Matrix:	**M23**	Date Received:	**04/01/98**	Spike File:	**SPC2NF04**
TLI ID:	**204-92-1A-D**	Date Extracted:	**04/03/98**	ICal:	**PF24098**
		Date Analyzed:	**04/16/98**	ConCal:	**P981302**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U980780**	% Lipid:	**n/a**
GC Column:	**DB-225**	Analyst:	**BJG**	% Solids:	**n/a**

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDF	EMPC		0.007			JB_

Internal Standard	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	3.2	80.4	40%-130%	0.76	22:23	___

Recovery Standard	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.81	21:17	___

Data Reviewer: K 04/20/98

C2NF_PSR v2.02, LARS 6.11.00

Triangle Laboratories, Inc.®
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Initial ....Date...

Data Review By: K 4/20/98 Calculated Noise Area: 0.14

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 P981306B.dbf
04/20/98 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						0.790-1.102			
304-306	DC	NL		0:00	RO	1.00	0.16			0.000			
				17:50		0.66	0.53	0.21	0.32	0.797			J
				18:50	RO	0.56	0.44	0.19	0.34	0.841			J
				18:58	RO	0.64	0.41	0.18	0.28	0.847			J
				19:06	RO	0.52	0.80	0.35	0.67	0.853			J
	DC	SN		19:17	RO	0.52	0.32			0.862			
	DC	SN		19:34	RO	0.37	0.25			0.874			
				19:43	RO	0.59	0.80	0.35	0.59	0.881			J
	DC	SN		19:52	RO	0.31	0.21			0.888			
	DC	SN		20:02	RO	0.16	0.32			0.895			
				20:11	RO	1.33	0.32	0.24	0.18	0.902			J
				20:34	RO	0.64	1.93	0.84	1.32	0.919			
				20:59		0.72	0.81	0.34	0.47	0.937			J
	DC	SN		21:05	RO	0.63	0.11			0.942			
				21:14	RO	0.52	0.60	0.26	0.50	0.949			J
				21:27		0.73	0.71	0.30	0.41	0.958			J
				21:52		0.78	0.71	0.31	0.40	0.977			J
				22:17	RO	0.96	0.44	0.24	0.25	0.996			J
				22:25	RO	0.59	0.46	0.20	0.34	1.001	2378-TCDF	AN	J
				22:39		0.87	0.56	0.26	0.30	1.012			J
	DC	SN		22:57		0.68	0.32			1.025			
				23:05		0.72	0.62	0.26	0.36	1.031			J
	DC	SN		23:49	RO	0.50	0.14			1.064			
304-306				15 Peaks			10.14						
13C12-TCDF				0.65-0.89						0.955-1.045			
316-318	DC	NL		0:00		0.89	0.17			0.000			
	DC	WL		20:58		0.87	0.86			0.937			
	DC	WL		21:14	RO	0.90	1.52			0.949			
				22:23		0.76	255.83	110.67	145.16	1.000	13C12-2378-TCDF	IS0	
	DC	WH		24:25		0.72	2.60			1.091			
316-318				1 Peak			255.83						

---------- Above: TCDF / TCDD Follows ----------

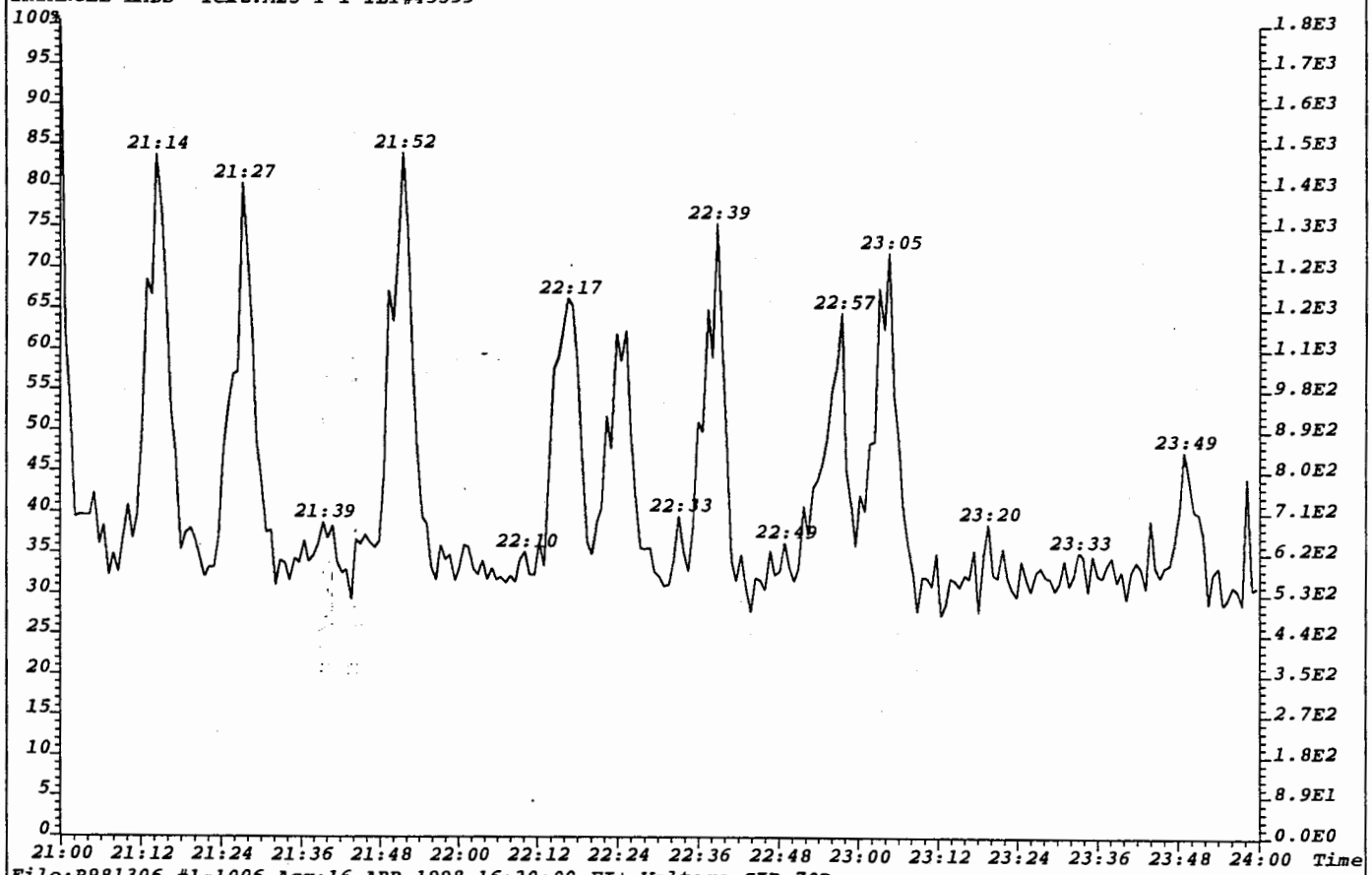
13C12-TCDD				0.65-0.89						0.905-1.095			
332-334	DC	NL		0:00	RO	1.38	0.14			0.000			
				19:53	RO	0.92	0.42	0.22	0.24	0.946			
				21:01		0.80	184.52	82.03	102.49	1.000	13C12-2378-TCDD	IS1	
				21:17		0.81	236.75	105.64	131.11	1.013	13C12-1234-TCDD	RS1	
				22:00		0.78	1.51	0.66	0.85	1.047			
332-334				4 Peaks			423.20						

Compound/
M_Z.... QC.Log Omit Why ..RT. OK Ratio Total.Area... Area.Peak.1.. Area.Peak.2.. Rel.RT Compound.Name.. ID.. Flags.

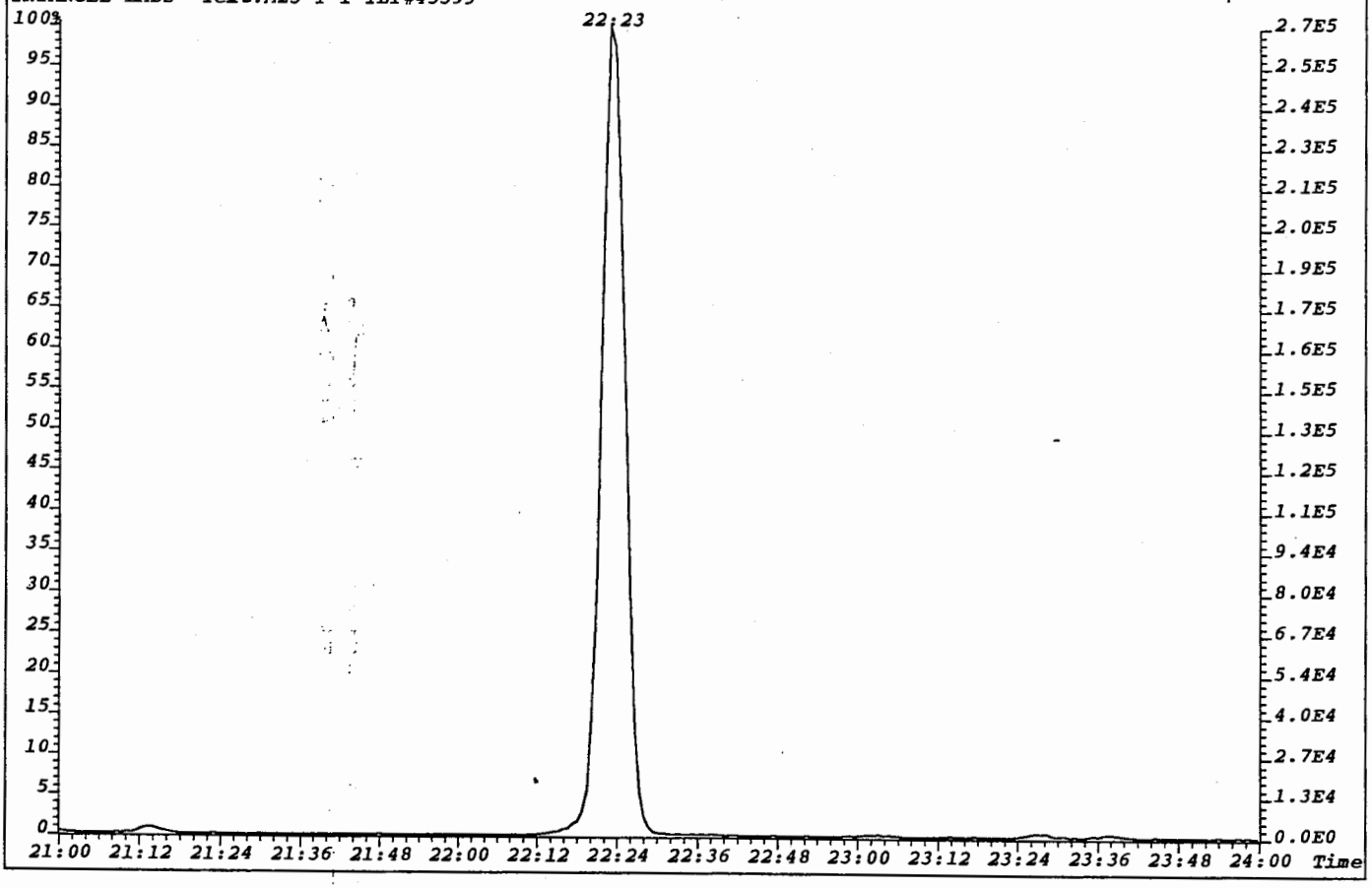
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside 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
		X-Ether Interference

*** End of Report ***

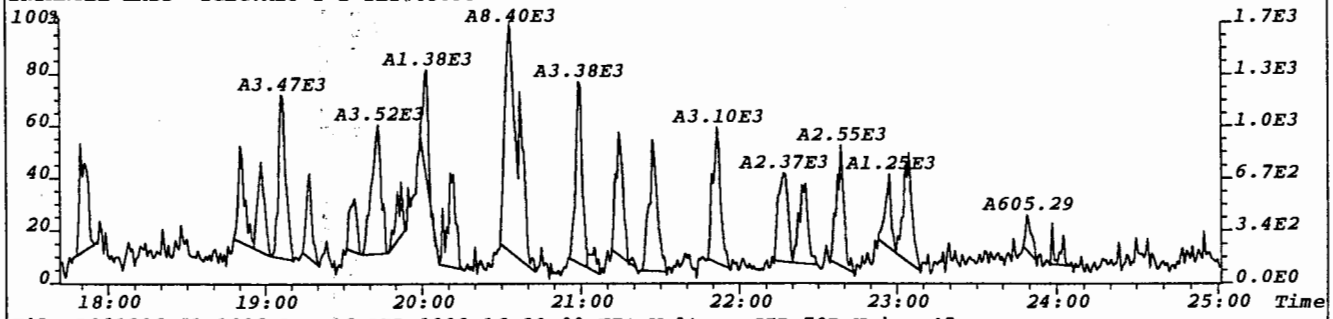
File:P981306 #1-1006 Acq:16-APR-1998 16:30:00 EI+ Voltage SIR 70P
303.9016 Exp:DB225
TRIANGLE LABS Text:M23-I-1 TLI#45399



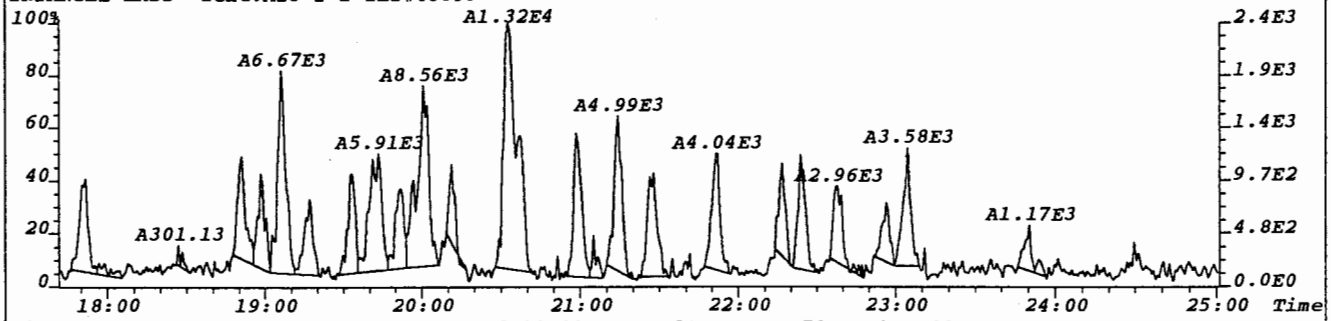
File:P981306 #1-1006 Acq:16-APR-1998 16:30:00 EI+ Voltage SIR 70P
315.9419 Exp:DB225
TRIANGLE LABS Text:M23-I-1 TLI#45399



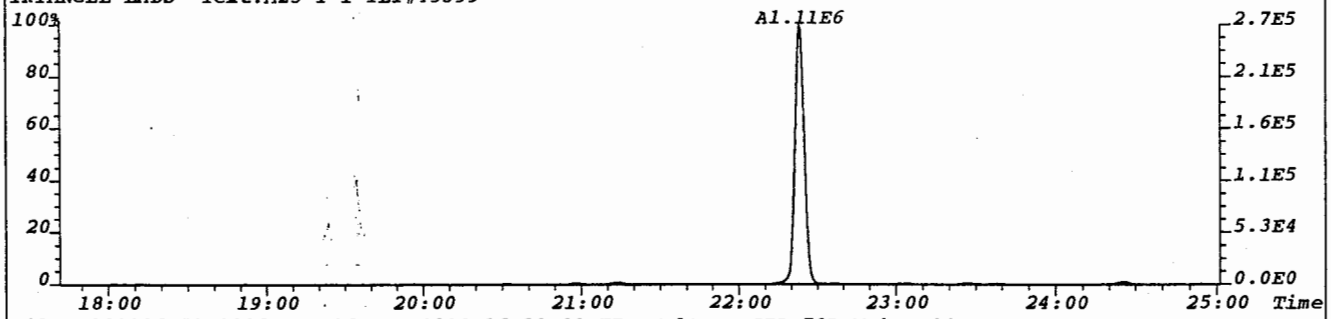
File:P981306 #1-1006 Acq:16-APR-1998 16:30:00 EI+ Voltage SIR 70P Noise:46
303.9016 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,184.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-I-1 TLI#45399



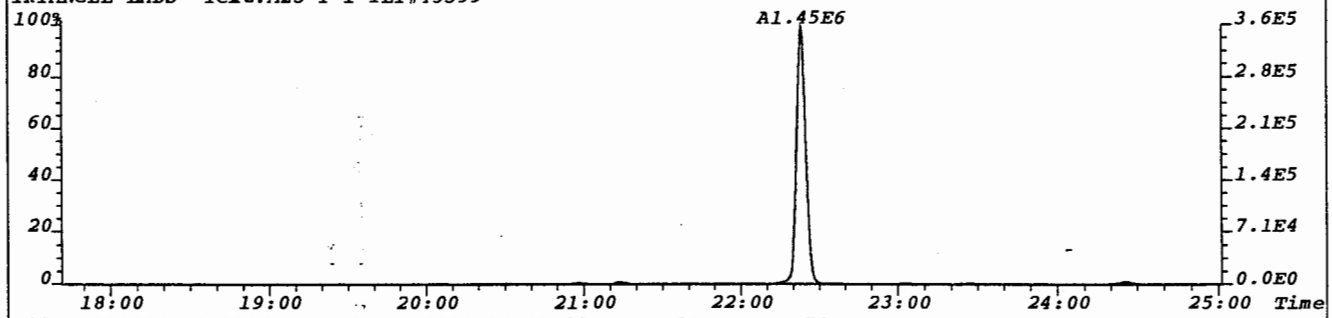
File:P981306 #1-1006 Acq:16-APR-1998 16:30:00 EI+ Voltage SIR 70P Noise:45
305.8987 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,180.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-I-1 TLI#45399



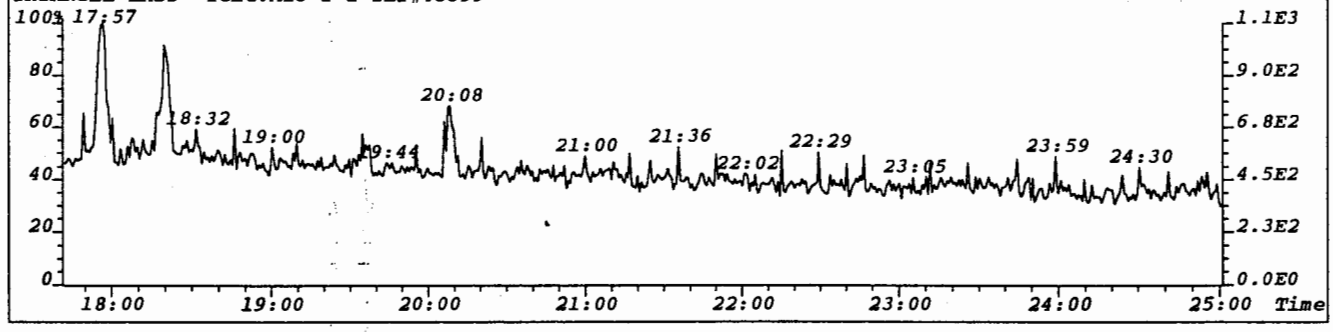
File:P981306 #1-1006 Acq:16-APR-1998 16:30:00 EI+ Voltage SIR 70P Noise:38
315.9419 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,152.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-I-1 TLI#45399



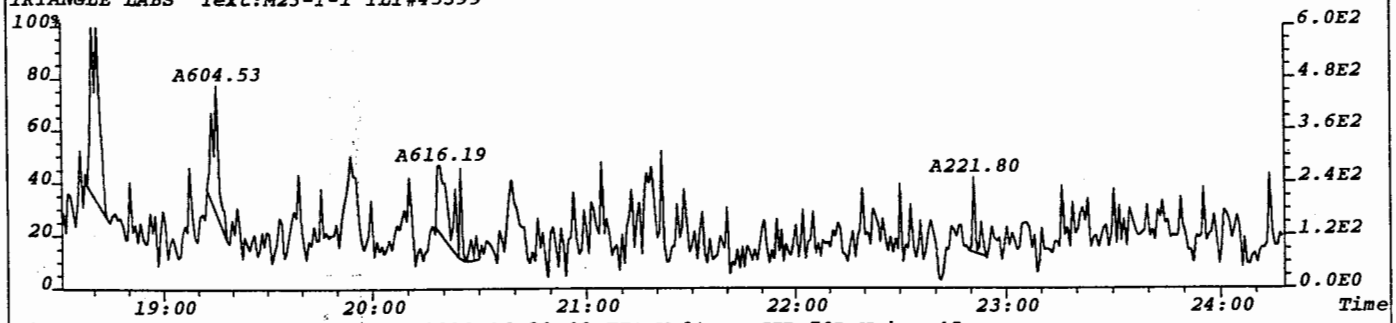
File:P981306 #1-1006 Acq:16-APR-1998 16:30:00 EI+ Voltage SIR 70P Noise:44
317.9389 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,176.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-I-1 TLI#45399



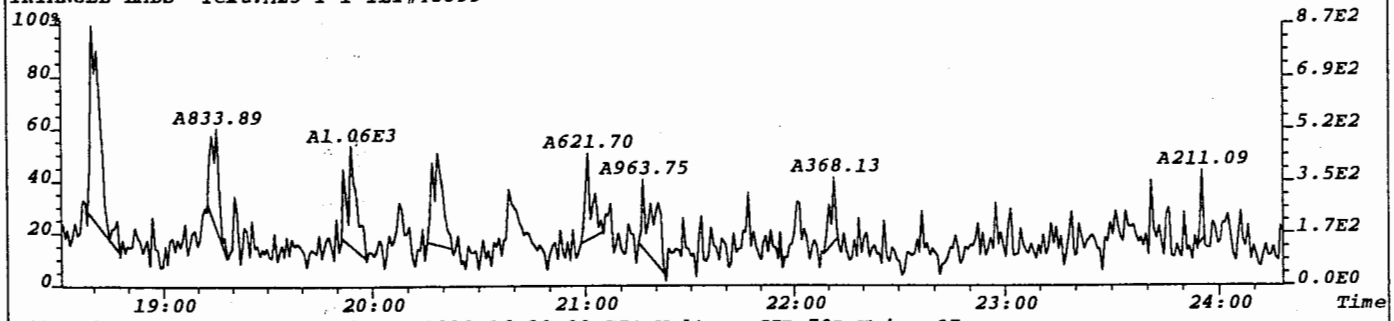
File:P981306 #1-1006 Acq:16-APR-1998 16:30:00 EI+ Voltage SIR 70P
375.8364 Exp:DB225
TRIANGLE LABS Text:M23-I-1 TLI#45399



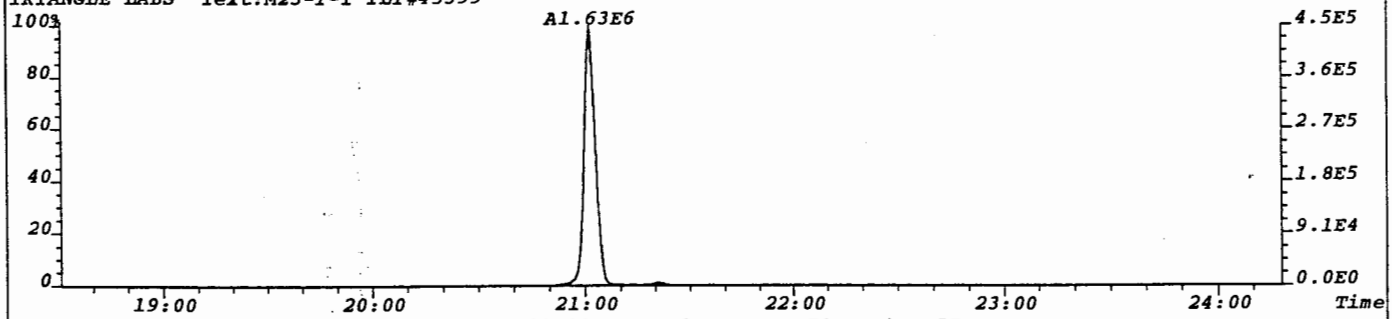
File:P981306 #1-1006 Acq:16-APR-1998 16:30:00 EI+ Voltage SIR 70P Noise:39
319.8965 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,156.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-I-1 TLI#45399



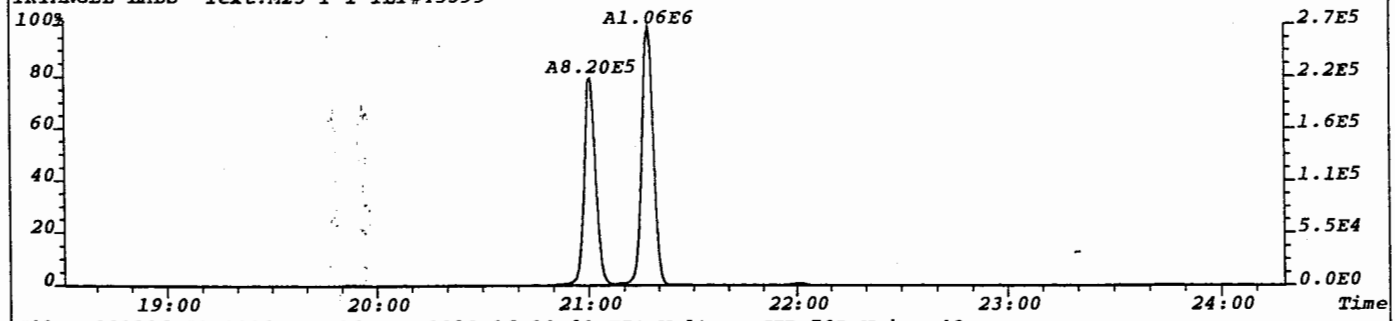
File:P981306 #1-1006 Acq:16-APR-1998 16:30:00 EI+ Voltage SIR 70P Noise:45
321.8936 BSUB(256,30,-3.0) PKD(5,3,1,Q.10%,180.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-I-1 TLI#45399



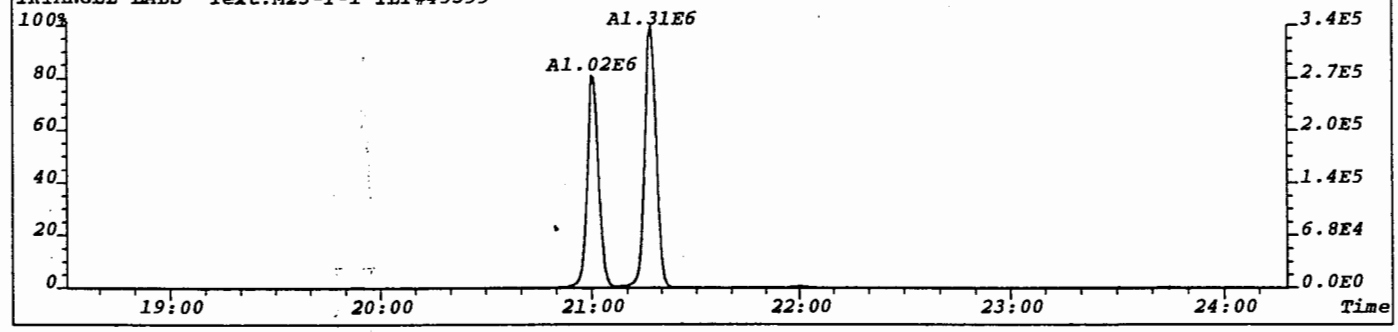
File:P981306 #1-1006 Acq:16-APR-1998 16:30:00 EI+ Voltage SIR 70P Noise:37
327.8847 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,148.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-I-1 TLI#45399



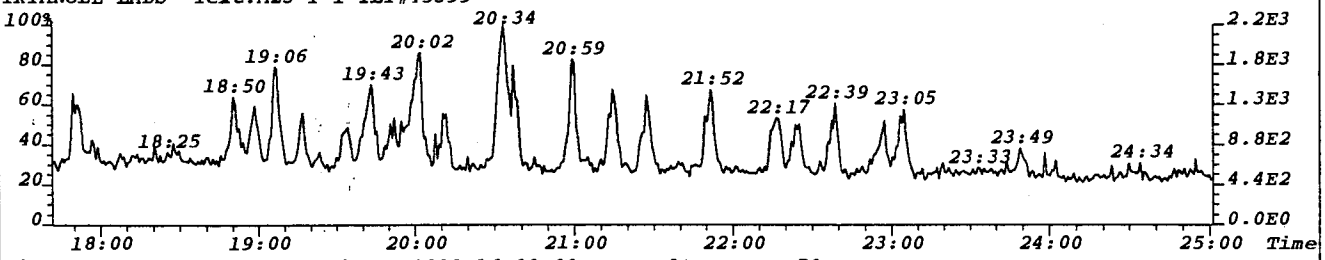
File:P981306 #1-1006 Acq:16-APR-1998 16:30:00 EI+ Voltage SIR 70P Noise:57
331.9368 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,228.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-I-1 TLI#45399



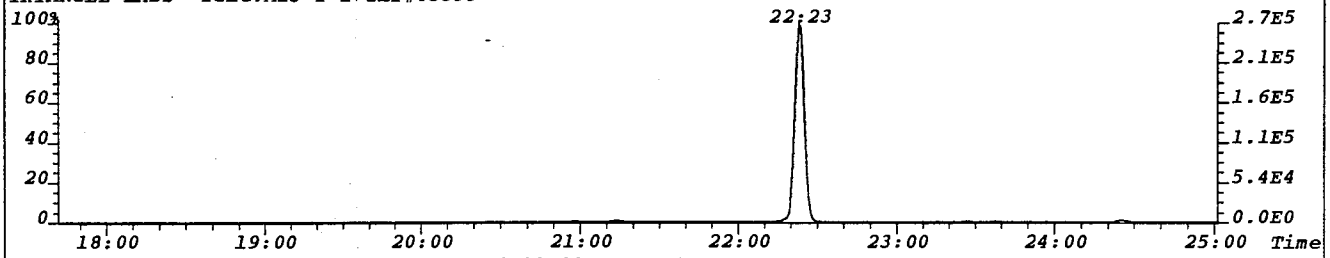
File:P981306 #1-1006 Acq:16-APR-1998 16:30:00 EI+ Voltage SIR 70P Noise:42
333.9338 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,168.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-I-1 TLI#45399



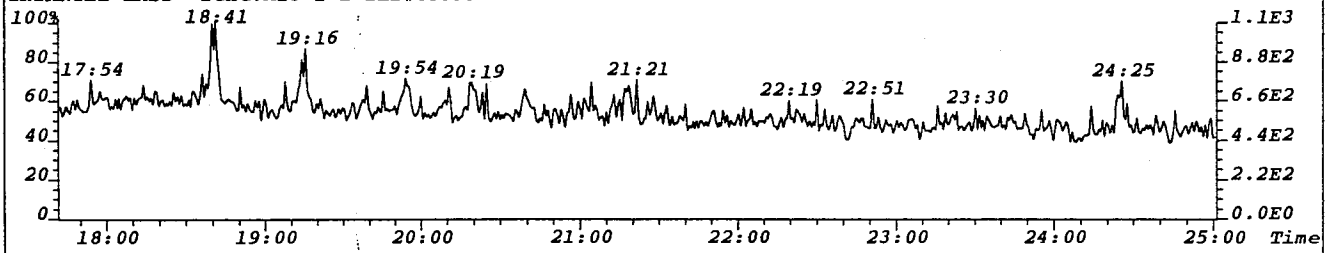
File:P981306 #1-1006 Acq:16-APR-1998 16:30:00 EI+ Voltage SIR 70P
303.9016 Exp:DB225
TRIANGLE LABS Text:M23-I-1 TLI#45399



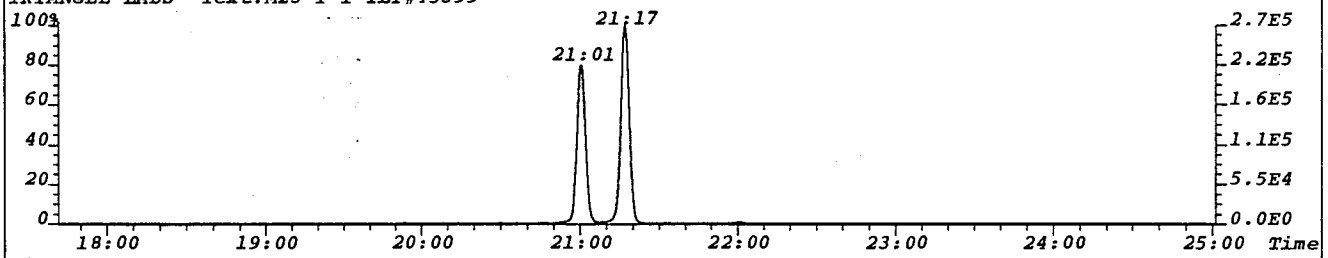
File:P981306 #1-1006 Acq:16-APR-1998 16:30:00 EI+ Voltage SIR 70P
315.9419 Exp:DB225
TRIANGLE LABS Text:M23-I-1 TLI#45399



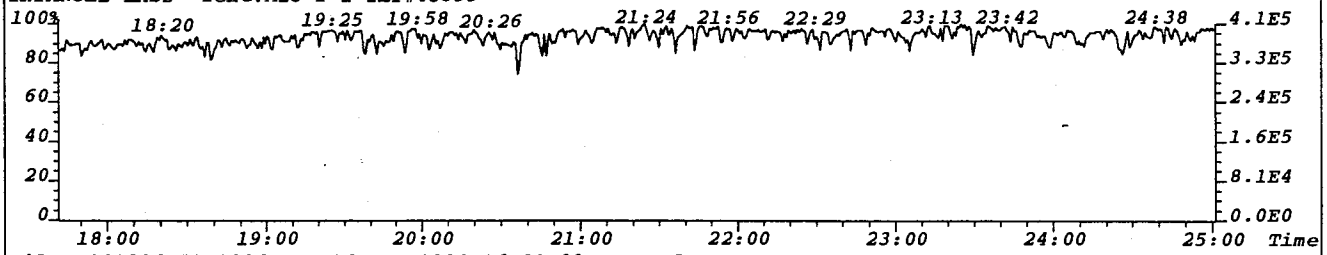
File:P981306 #1-1006 Acq:16-APR-1998 16:30:00 EI+ Voltage SIR 70P
319.8965 Exp:DB225
TRIANGLE LABS Text:M23-I-1 TLI#45399



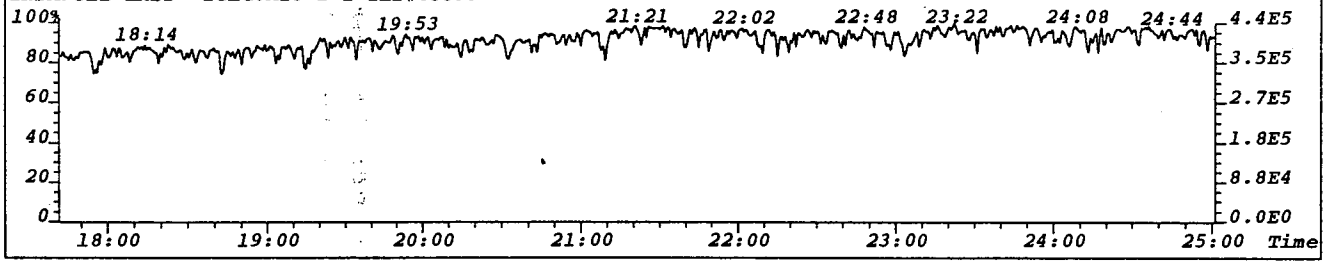
File:P981306 #1-1006 Acq:16-APR-1998 16:30:00 EI+ Voltage SIR 70P
331.9368 Exp:DB225
TRIANGLE LABS Text:M23-I-1 TLI#45399

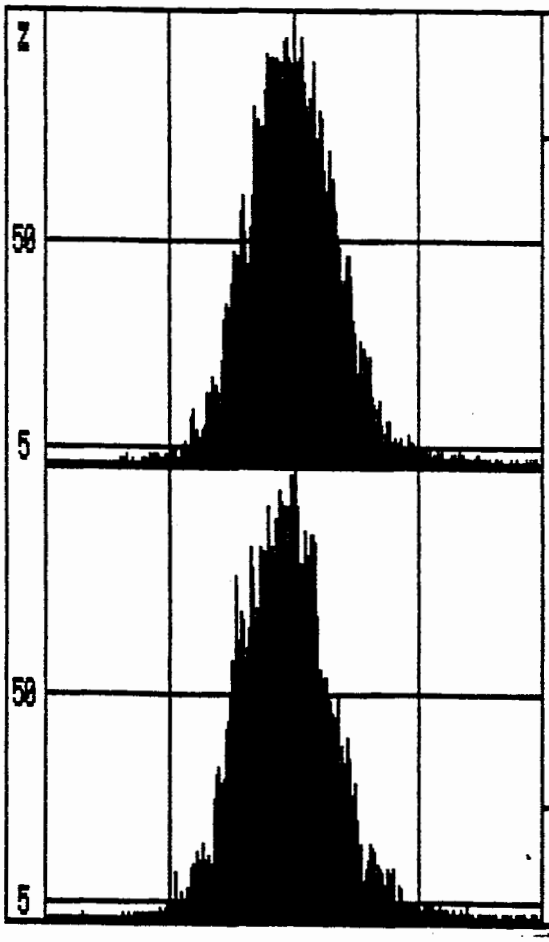


File:P981306 #1-1006 Acq:16-APR-1998 16:30:00 EI+ Voltage SIR 70P
292.9825 Exp:DB225
TRIANGLE LABS Text:M23-I-1 TLI#45399



File:P981306 #1-1006 Acq:16-APR-1998 16:30:00 EI+ Voltage SIR 70P
330.9792 Exp:DB225
TRIANGLE LABS Text:M23-I-1 TLI#45399





Ref. mass 292.9825 Peak top
Height .06 volts Span 200 ppm

System file name	D8225
Data file name	A:P981306
Resolution	10000
Group number	1
Ionization mode	EI+
Switching	VOLTAGE
Ref. masses	292.9825, 380.9761

A	292.9825	J	330.9792
B	303.9016	K	331.9368
C	305.8987	L	333.9338
D	315.9419	M	375.8364
E	317.9389		
F	319.8965		
G	321.8936		
H	327.8847		
I	330.9792		

Channel I 330.9792 Peak top
Height .06 volts Span 200 ppm

Pacific Environmental Services

TLI Project: **45399** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **M23-I-2** Analysis File: **W981018**

Client Project:	**r012.002/Lime Kiln**				
Sample Matrix:	**M23**	Date Received:	**04/01/98**	Spike File:	**SPMIT204**
TLI ID:	**204-92-2A-D**	Date Extracted:	**04/03/98**	ICal:	**WF53178**
		Date Analyzed:	**04/16/98**	ConCal:	**W981012**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U980780**	% Lipid:	**n/a**
GC Column:	**DB-5**	Analyst:	**KAS**	% Solids:	**n/a**

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	ND	0.04				___
1,2,3,7,8-PeCDD	ND	0.07				___
1,2,3,4,7,8-HxCDD	ND	0.09				___
1,2,3,6,7,8-HxCDD	ND	0.08				___
1,2,3,7,8,9-HxCDD	ND	0.08				___
1,2,3,4,6,7,8-HpCDD	ND	0.1				___
1,2,3,4,6,7,8,9-OCDD	EMPC		0.29			___
2,3,7,8-TCDF	1.5			0.75	26:22	___
1,2,3,7,8-PeCDF	0.21			1.55	30:11	___
2,3,4,7,8-PeCDF	0.21			1.60	30:51	___
1,2,3,4,7,8-HxCDF	0.10			1.15	33:34	J__
1,2,3,6,7,8-HxCDF	EMPC		0.05			J__
2,3,4,6,7,8-HxCDF	ND	0.06				___
1,2,3,7,8,9-HxCDF	ND	0.07				___
1,2,3,4,6,7,8-HpCDF	EMPC		0.05			J__
1,2,3,4,7,8,9-HpCDF	ND	0.1				___
1,2,3,4,6,7,8,9-OCDF	ND	0.1				___

Totals	Amt. (ng)	Number	DL	EMPC	Flags
Total TCDD	0.25	2		0.51	___
Total PeCDD	EMPC			0.11	___
Total HxCDD	0.07	1			___
Total HpCDD	ND		0.1		___
Total TCDF	12.1	14			___
Total PeCDF	2.7	11		3.0	___
Total HxCDF	0.33	3		0.37	___
Total HpCDF	EMPC			0.05	___

MIT2_PSR v1.04, LARS 6.11.00

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Pacific Environmental Services

TLI Project: **45399** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **M23-I-2** Analysis File: **W981018**

Internal Standards	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	2.9	73.1	40%-130%	0.77	26:19	___
$^{13}C_{12}$-2,3,7,8-TCDD	3.0	74.0	40%-130%	0.82	27:01	___
$^{13}C_{12}$-1,2,3,7,8-PeCDF	2.6	64.9	40%-130%	1.46	30:10	___
$^{13}C_{12}$-1,2,3,7,8-PeCDD	2.7	68.3	40%-130%	1.55	31:10	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	3.5	87.9	40%-130%	0.50	33:40	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	3.7	93.0	40%-130%	1.24	34:20	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	4.0	100.0	25%-130%	0.45	36:35	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	4.3	107	25%-130%	1.03	37:38	___
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	7.6	95.4	25%-130%	0.91	41:20	___

Surrogate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,4,7,8-PeCDF	3.6	88.8	40%-130%	1.49	30:50	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	3.2	81.0	40%-130%	0.50	33:34	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	3.0	75.6	40%-130%	1.20	34:16	___
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	3.4	85.1	25%-130%	0.47	38:09	___

Other Standard	Amt. (ng)	% Recovery	QC Limits	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	3.4	84.7	40%-130%	27:02	___

Alternate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	3.6	90.3	40%-130%	0.50	34:56	___
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	3.1	78.2	40%-130%	0.51	34:09	___

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.83	26:51	___
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.21	34:39	___

Data Reviewer: WZ/RA 04/20/98

MIT2_PSR v1.04, LARS 6.11.00

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Printed: 13:40 04/20/98

Initial ....Date...

Data Review By: WDH 4/20/98 Calculated Noise Area: 2.89

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 W981018B.dbf
04/20/98 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						0.878-1.072			
304-306	DC	NL		0:00	RO	1.54	3.26			0.000			
				23:16		0.73	151.09	63.75	87.34	0.884			
				23:46		0.69	80.46	32.98	47.48	0.903			
				24:00		0.72	56.38	23.69	32.69	0.912			
				24:22		0.73	541.91	228.97	312.94	0.926			
				24:38		0.74	330.80	140.55	190.25	0.936			
				25:04		0.72	281.82	118.13	163.69	0.953			
				25:20		0.76	263.46	113.70	149.76	0.963			
				25:38		0.76	316.83	136.57	180.26	0.974			
				25:56		0.81	171.61	76.76	94.85	0.985			
				26:10		0.73	120.49	50.92	69.57	0.994			
				26:22		0.75	361.02	154.46	206.56	1.002	2378-TCDF	AN	
				26:45		0.72	147.54	61.68	85.86	1.016			
				26:58		0.70	72.73	30.01	42.72	1.025			
				27:13		0.72	15.19	6.38	8.81	1.034			
304-306			14	Peaks			2,911.33						
13C12-TCDF				0.65-0.89						0.962-1.038			
316-318	DC	NL		0:00		0.89	2.72			0.000			
	DC	WL		23:57		0.80	3.33			0.910			
	DC	WL		24:22	RO	1.28	1.95			0.926			
	DC	WL		24:37		0.77	3.03			0.935			
	DC	WL		25:18	RO	0.55	6.57			0.961			
				26:19		0.77	799.72	347.96	451.76	1.000	13C12-2378-TCDF	ISO	
	DC	SN		26:44	RO	1.22	5.20			1.016			
	DC	WH		27:36		0.87	2.84			1.049			
316-318			1	Peak			799.72						

---------- Above: TCDF / TCDD Follows ----------

TCDD				0.65-0.89						0.903-1.042			
320-322	DC	NL		0:00	RO	1.24	1.77			0.000			
				24:34	RO	0.93	30.92	16.29	17.47	0.909			
				24:56		0.88	18.31	8.57	9.74	0.923			
	DC	SN		25:03	RO	1.33	1.35			0.927			
	DC	SN		25:15		0.89	3.67			0.935			
				25:52		0.75	28.95	12.44	16.51	0.957			
D	D	SN		26:08	RO	0.93	14.04			0.967			
	DC	SN		26:31	RO	0.48	4.32			0.981			
	DC	SN		26:48	RO	0.32	2.37			0.992			
				26:56	RO	1.49	10.87	9.17	6.14	0.997			J
D	D	SN		27:02		0.88	7.74			1.001	2378-TCDD	AN	
	DC	SN		27:11	RO	1.52	2.53			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.
				27:22	RO	0.90	8.28	4.22	4.68	1.013			J
	DC	SN		27:59		0.74	3.59			1.036			
	DC	SN		28:06	RO	1.50	1.13			1.040			
320-322				5 Peaks			97.33						
37Cl-TCDD										0.926-1.074			
328	DC	NL		0:00			1.08			0.000			
	DC	WL		24:20			0.87			0.901			
	DC	WL		24:26			0.59			0.904			
	DC	WL		24:38			0.88			0.912			
	DC	WL		24:38			0.66			0.912			
	DC	WL		24:46			0.74			0.917			
	DC	WL		24:52			0.34			0.920			
	DC	WL		24:56			0.50			0.923			
	DC	WL		24:58			0.94			0.924			
	DC	SN		25:05			0.79			0.928			
	DC	SN		25:17			0.59			0.936			
	DC	SN		25:18			0.64			0.936			
	DC	SN		25:25			0.58			0.941			
	DC	SN		25:25			0.91			0.941			
	DC	SN		25:32			0.36			0.945			
				25:42			15.73	15.73		0.951			
	DC	SN		25:51			1.19			0.957			
	DC	SN		26:01			0.49			0.963			
	DC	SN		26:02			0.32			0.964			
	DC	SN		26:19			0.52			0.974			
	DC	SN		26:24			0.61			0.977			
	DC	SN		26:31			1.09			0.981			
				26:50			3.70	3.70		0.993			
				27:02			529.61	529.61		1.001	37Cl-TCDD		CLS
				27:25			11.92	11.92		1.015			
	DC	SN		27:47			1.01			1.028			
	DC	SN		27:55			3.02			1.033			
	DC	SN		28:09			0.45			1.042			
	DC	SN		28:25			1.60			1.052			
328				4 Peaks			560.96						
13C12-TCDD						0.65-0.89				0.926-1.074			
332-334	DC	NL		0:00	RO	1.67	2.87			0.000			
				26:51		0.83	787.29	356.19	431.10	0.994	13C12-1234-TCDD		RS1
				27:01		0.82	609.11	274.01	335.10	1.000	13C12-2378-TCDD		IS1
				27:20	RO	1.21	10.46	7.14	5.91	1.012			
	DC	SN		27:49	RO	1.54	2.51			1.030			
	DC	SN		28:10	RO	6.84	0.90			1.043			
	DC	SN		28:16	RO	3.34	1.65			1.046			
332-334				3 Peaks			1,406.86						

---------- Above: TCDD / PeCDF Follows ----------

PeCDF						1.32-1.78				0.930-1.060			
340-342	DC	NL		0:00	RO	0.95	1.79			0.000			
	DC	SN		28:06	RO	0.98	1.73			0.931			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
				28:14		1.47	50.80	30.22	20.58	0.936			
				29:12		1.41	29.77	17.40	12.37	0.968			
				29:20		1.58	124.46	76.15	48.31	0.972			
				29:30	RO	1.31	25.85	15.71	12.00	0.978			
				29:44		1.35	12.32	7.07	5.25	0.986			J
				29:48		1.59	17.62	10.83	6.79	0.988			
				29:55		1.40	23.33	13.61	9.72	0.992			
	A			30:06		1.56	10.68	6.51	4.17	0.998			J
	M			30:11		1.55	29.60	18.00	11.60	1.001	12378-PeCDF	AN	
				30:20		1.33	19.46	11.11	8.35	1.006			
				30:27		1.61	29.56	18.25	11.31	1.009			
				30:51		1.60	29.33	18.05	11.28	1.023	23478-PeCDF	AN	
				30:59	RO	2.13	16.78	14.02	6.58	1.027			
340-342			13	Peaks			419.56						
13C12-PeCDF				1.32-1.78						0.867-1.133			
352-354	DC	NL		0:00	RO	0.90	1.56			0.000			
	DC	SN		28:19	RO	0.60	1.53			0.939			
	DC	SN		28:37	RO	2.23	3.06			0.949			
	DC	SN		28:49	RO	0.89	0.39			0.955			
	DC	SN		28:59	RO	1.86	2.17			0.961			
				30:10		1.46	535.25	317.49	217.76	1.000	13C12-PeCDF 123	IS2	
	DC	SN		30:25	RO	0.98	4.61			1.008			
	DC	SN		30:36	RO	1.21	1.60			1.014			
				30:50		1.49	457.87	274.15	183.72	1.022	13C12-PeCDF 234	SUR1	
352-354			2	Peaks			993.12						

---------- Above: PeCDF / PeCDD Follows ----------

PeCDD				1.32-1.78						0.939-1.020			
356-358	DC	NL		0:00	RO	1.17	1.99			0.000			
				29:27	RO	1.15	11.37	6.91	6.02	0.945			
	DC	SN		29:42	RO	0.76	1.07			0.953			
	DC	SN		30:08	RO	0.96	5.00			0.967			
	DC	SN		30:16	RO	2.52	2.55			0.971			
	DC	SN		30:27		1.71	6.88			0.977			
	DC	SN		31:01	RO	5.13	0.79			0.995			
356-358			1	Peak			11.37						
13C12-PeCDD				1.32-1.78						0.872-1.128			
368-370	DC	NL		0:00		1.58	2.04			0.000			
	DC	SN		30:16	RO	0.65	1.37			0.971			
				31:10		1.55	311.17	189.04	122.13	1.000	13C12-PeCDD 123	IS3	
				31:18		1.70	38.07	23.96	14.11	1.004			
	DC	SN		31:28	RO	0.83	2.45			1.010			
	DC	SN		31:34	RO	1.93	2.35			1.013			
	DC	SN		31:57	RO	0.95	1.35			1.025			
	DC	SN		32:03		1.52	3.18			1.028			
368-370			2	Peaks			349.24						

---------- Above: PeCDD / HxCDF Follows ----------

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
HxCDF				1.05-1.43						0.964-1.045			
374-376		DC	NL	0:00		1.41	2.39			0.000			
	K			32:37		1.33	6.60	3.77	2.83	0.969			J
				32:46		1.08	21.28	11.06	10.22	0.973			
		DC	SN	32:56	RO	1.02	2.93			0.978			
		DC	SN	33:03		1.23	3.14			0.982			
				33:34		1.15	12.67	6.77	5.90	0.997	123478-HxCDF	AN	J
	K			33:40	RO	0.86	6.49	3.59	4.16	1.000	123678-HxCDF	AN	J
		DC	SN	33:47	RO	0.35	0.69			1.003			
		DC	SN	33:57	RO	1.50	2.82			1.008			
		DC	SN	34:09		1.40	4.41			1.014	234678-HxCDF	AN	
		DC	WH	35:21	RO	1.74	2.42			1.050			
374-376				4 Peaks			47.04						
13C12-HxCDF				0.43-0.59						0.881-1.119			
384-386		DC	NL	0:00	RO	0.85	2.67			0.000			
		DC	SN	32:44	RO	0.79	3.61			0.972			
				33:34		0.50	359.29	119.97	239.32	0.997	13C12-HxCDF 478	SUR2	
				33:40		0.50	430.85	144.02	286.83	1.000	13C12-HxCDF 678	IS4	
				34:09		0.51	363.76	122.43	241.33	1.014	13C12-HxCDF 234	ALT2	
				34:56		0.50	317.95	106.34	211.61	1.038	13C12-HxCDF 789	ALT1	
		DC	SN	35:09	RO	0.38	3.55			1.044			
384-386				4 Peaks			1,471.85						

---------- Above: HxCDF / HxCDD Follows ----------

HxCDD				1.05-1.43						0.958-1.013			
390-392		DC	NL	0:00	RO	0.85	2.11			0.000			
	K			33:32		1.08	5.92	3.07	2.85	0.977			J
		DC	SN	34:39	RO	5.23	0.87			1.009	123789-HxCDD	AN	
		DC	WH	34:51		1.05	0.82			1.015			
		DC	WH	34:56	RO	0.67	0.92			1.017			
		DC	WH	35:03	RO	0.94	0.61			1.021			
390-392				1 Peak			5.92						
13C12-HxCDD				1.05-1.43						0.971-1.029			
402-404		DC	NL	0:00		1.15	2.49			0.000			
				34:16		1.20	243.57	132.81	110.76	0.998	13C12-HxCDD 478	SUR3	
				34:20		1.24	346.26	191.90	154.36	1.000	13C12-HxCDD 678	IS5	
				34:39		1.21	381.59	208.61	172.98	1.009	13C12-HxCDD 789	RS2	
		DC	SN	34:52	RO	0.29	1.32			1.016			
		DC	SN	34:57	RO	0.59	2.85			1.018			
402-404				3 Peaks			971.42						

---------- Above: HxCDD / HpCDF Follows ----------

HpCDF				0.88-1.20						0.996-1.048			
408-410		DC	NL	0:00	RO	1.30	1.92			0.000			
	K			36:36	RO	1.30	5.63	3.58	2.76	1.000	1234678-HpCDF	AN	J
		DC	SN	37:02	RO	0.71	1.61			1.012			
408-410				1 Peak			5.63						

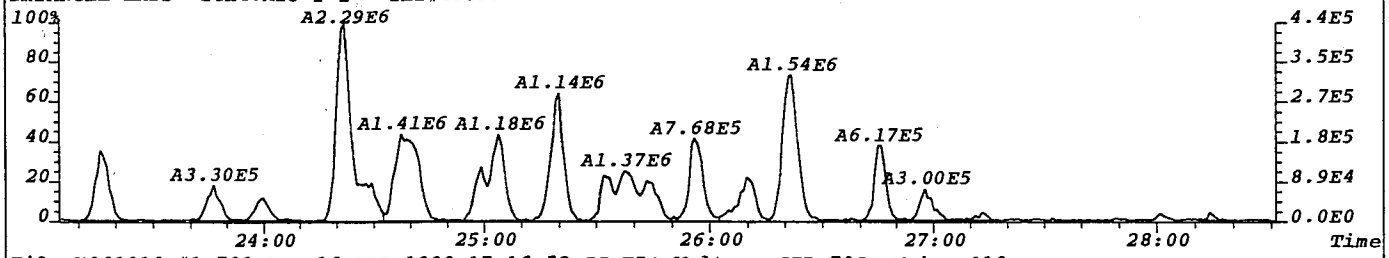
```
Compound/
M_Z.... QC.Log Omit Why ..RT. OK Ratio Total.Area... Area.Peak.1.. Area.Peak.2.. Rel.RT Compound.Name.. ID.. Flags.

13C12-HpCDF                    0.37-0.51                                    0.945-1.109
418-420          DC  NL   0:00 RO  1.12          1.74                            0.000
                         36:35     0.45        284.92         88.09        196.83  1.000 13C12-HpCDF 678 IS6
                         38:09     0.47        177.28         56.99        120.29  1.043 13C12-HpCDF 789 SUR4
418-420                2 Peaks                   462.20

                 --------------------- Above: HpCDF / HpCDD Follows --------------------

HpCDD                          0.88-1.20                                    0.976-1.004
424-426          DC  NL   0:00     0.99          2.19                            0.000
                 DC  SN  36:53 RO  1.64          2.73                            0.980
                 DC  SN  37:13 RO 10.74          0.39                            0.989
                 DC  SN  37:34 RO  0.33          0.82                            0.998
                 DC  SN  37:39     0.93          2.95                            1.000 1234678-HpCDD   AN
                 DC  WH  38:52 RO  0.70          1.47                            1.033
424-426                0 Peaks                    0.00

13C12-HpCDD                    0.88-1.20                                    0.973-1.027
436-438          DC  NL   0:00     1.15          2.34                            0.000
                 DC  SN  37:25     1.10          1.09                            0.994
                         37:38     1.03        268.06        136.33        131.73  1.000 13C12-HpCDD 678 IS7
                 DC  SN  37:57 RO  0.41          0.98                            1.008
                 DC  SN  38:00 RO  0.67          1.51                            1.010
                 DC  WH  39:38 RO  2.19          1.06                            1.053
436-438                1 Peak                   268.06

                 --------------------- Above: HpCDD / Octa-CDD and CDF Follows ----------

OCDF                           0.76-1.02                                    0.903-1.097
442-444          DC  NL   0:00     0.90          2.26                            0.000
                 DC  SN  37:50 RO  0.70          1.64                            0.915
                 DC  SN  41:19     0.92          3.48                            1.000
                 DC  SN  41:26 RO  1.22          1.40                            1.002
                 DC  SN  41:33 RO  1.52          3.14                            1.005 OCDF            AN
442-444                0 Peaks                    0.00

OCDD                           0.76-1.02                                    0.903-1.097
458-460          DC  NL   0:00     0.98          1.84                            0.000
                         41:19 RO  0.56         12.66          5.96         10.59  1.000 OCDD            AN
458-460                1 Peak                    12.66

13C12-OCDD                     0.76-1.02                                    0.996-1.004
470-472          DC  NL   0:00 RO  1.24          1.47                            0.000
                         41:20     0.91        299.27        142.28        156.99  1.000 13C12-OCDD      IS8
                 DC  WH  41:42 RO  0.16          0.66                            1.009
470-472                1 Peak                   299.27
```

Compound/
M_Z.... QC.Log Omit Why ..RT. OK Ratio Total.Area... Area.Peak.1.. Area.Peak.2.. Rel.RT Compound.Name.. ID.. Flags.

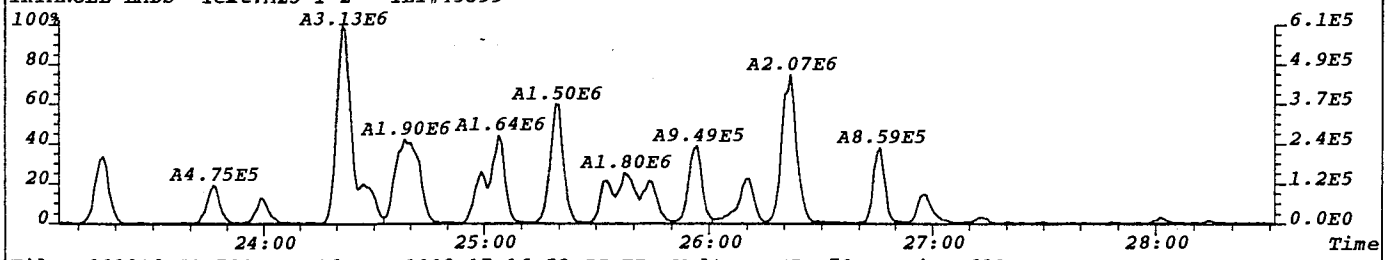
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside 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
		X-Ether Interference

*** End of Report ***

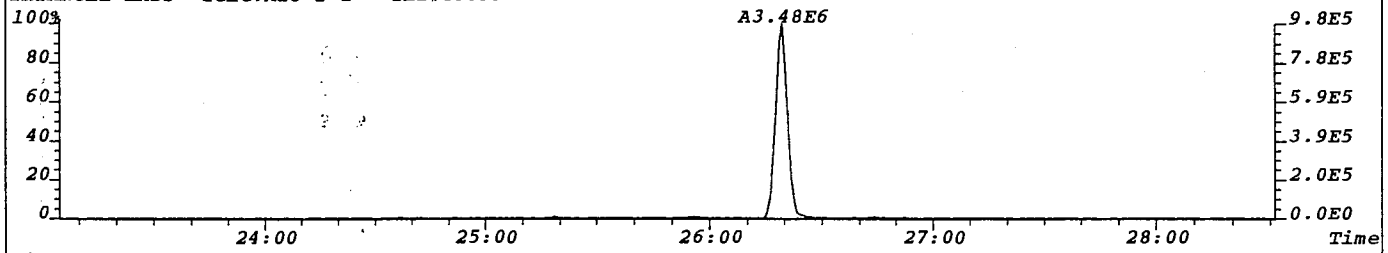
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:1417
303.9016 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.10%,5668.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



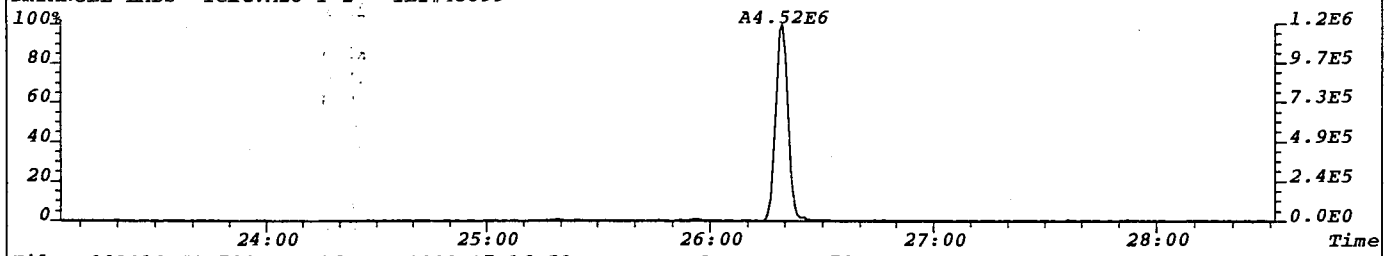
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:918
305.8987 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.10%,3672.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



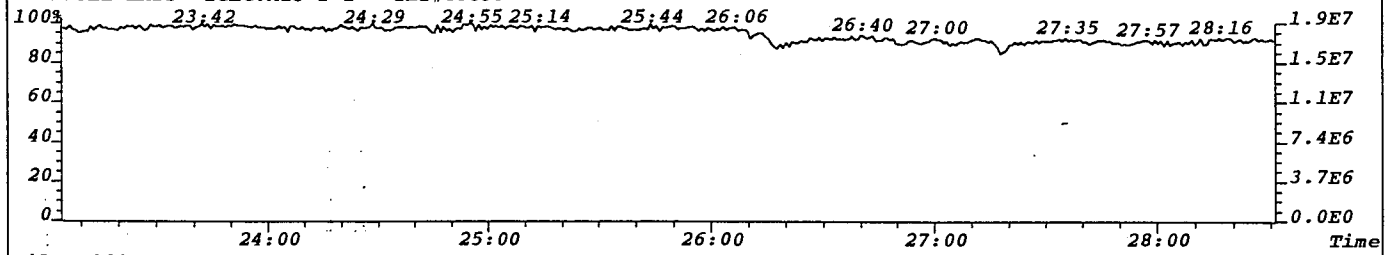
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:639
315.9419 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.10%,2556.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



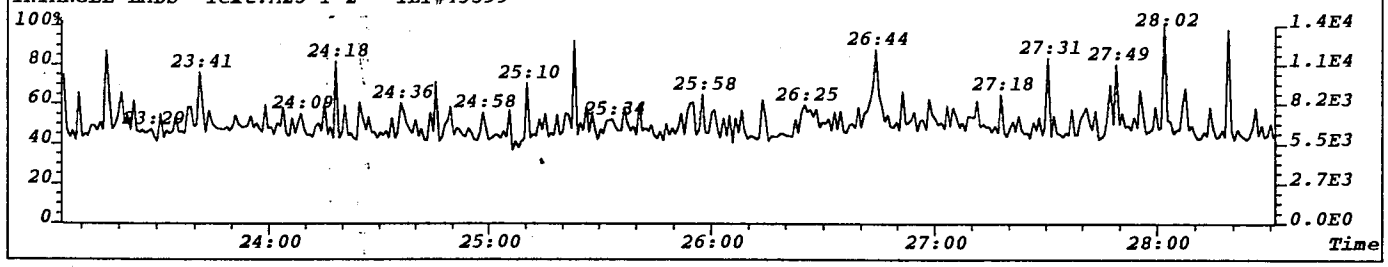
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:722
317.9389 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.10%,2888.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399

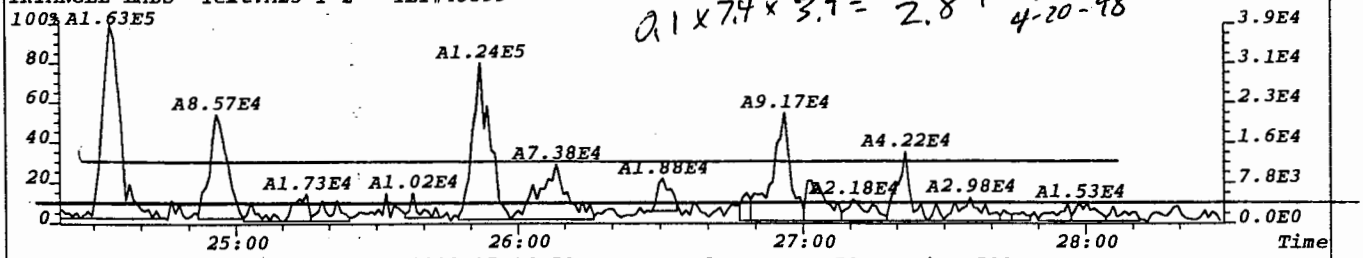


File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
375.8364 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399

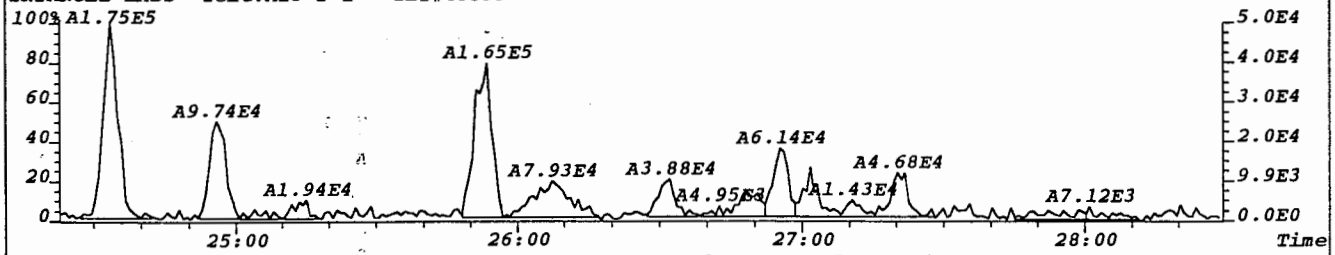


File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:622
319.8965 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2488.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399

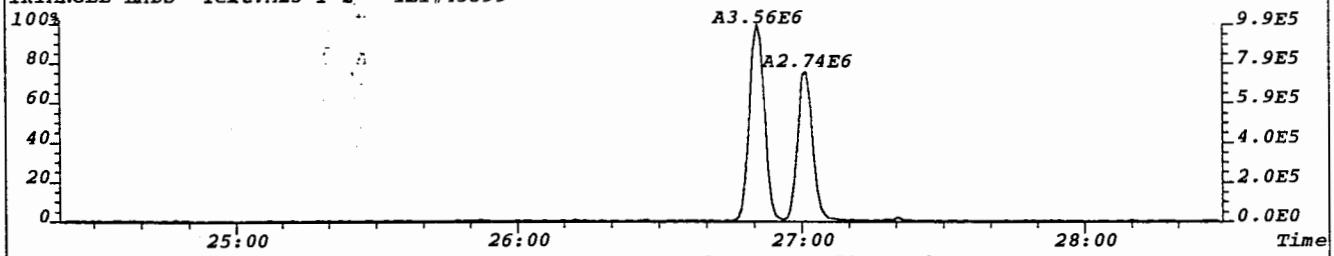
0.1 x 7.4 x 3.9 = 2.89 AND 4-20-98



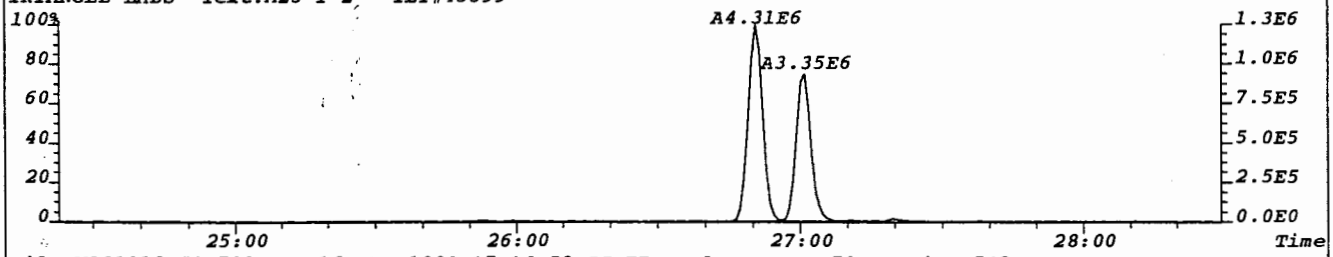
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:502
321.8936 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2008.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



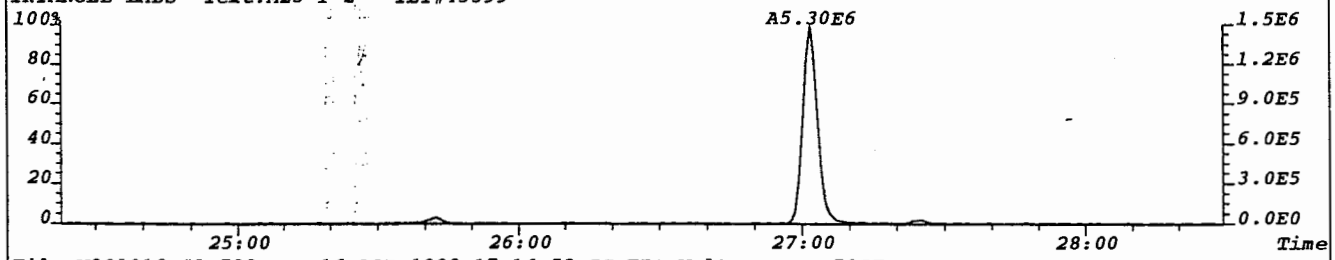
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:1356
331.9368 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,5424.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



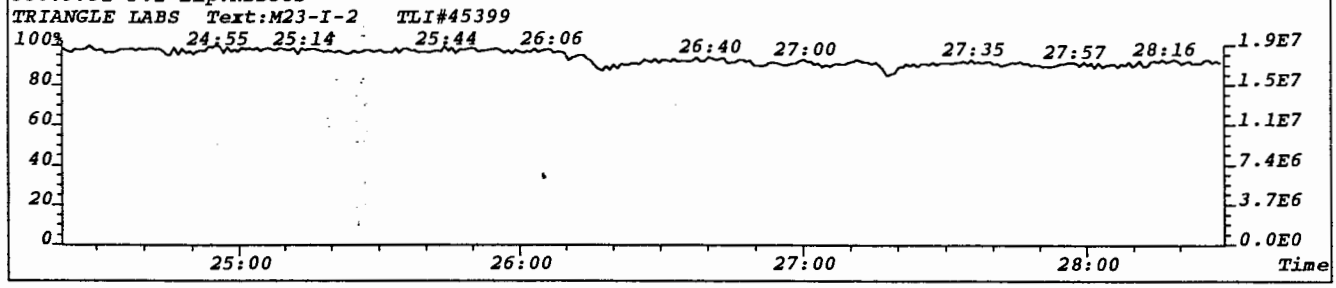
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:809
333.9338 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3236.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



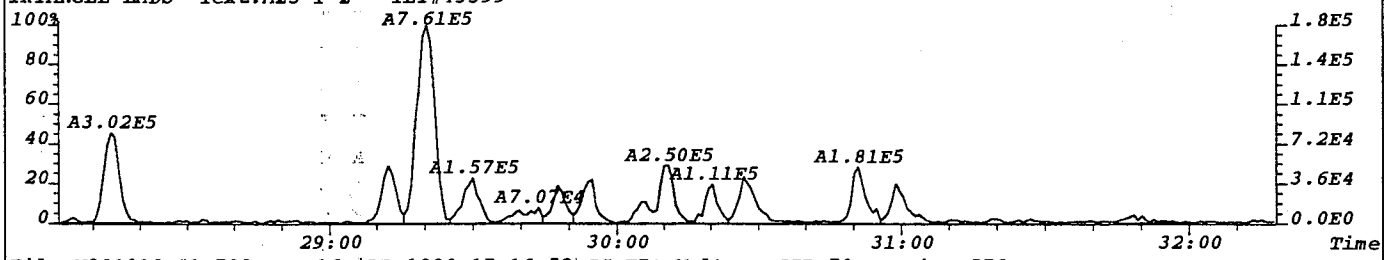
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:542
327.8847 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2168.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



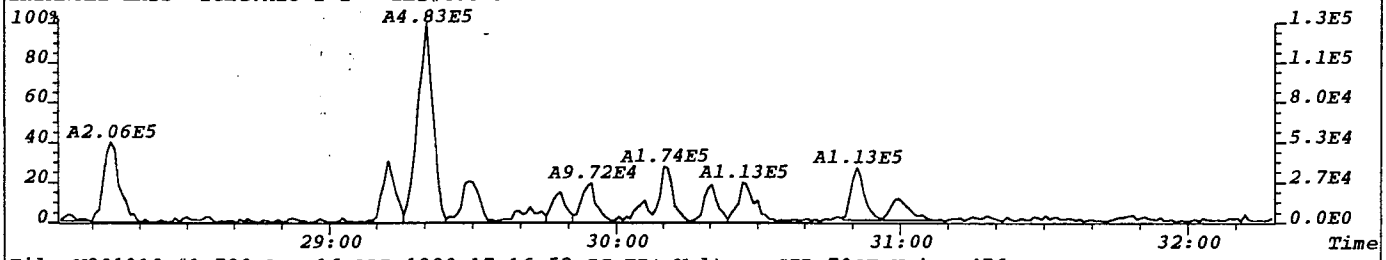
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



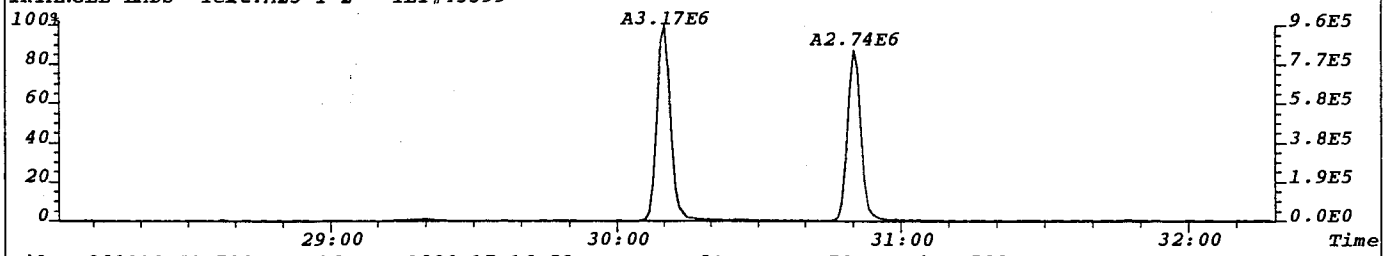
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:545
339.8597 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2180.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



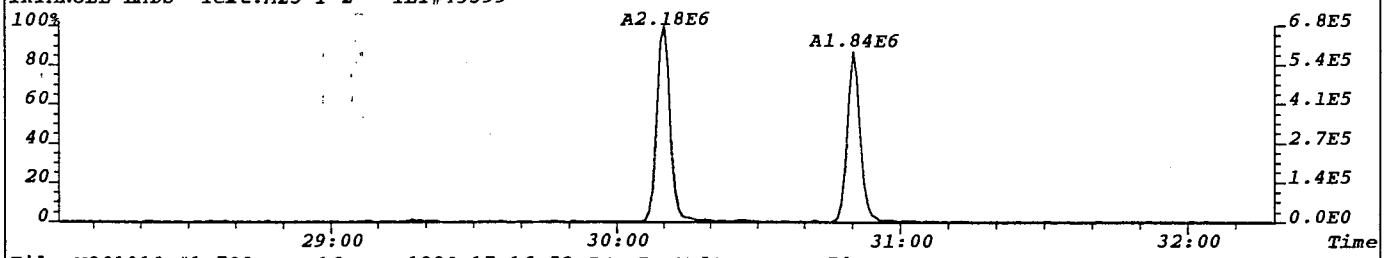
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:573
341.8567 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2292.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



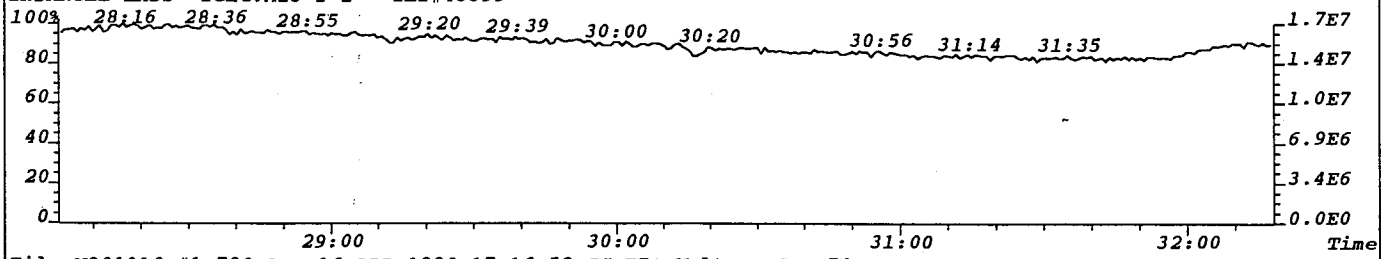
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:476
351.9000 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1904.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



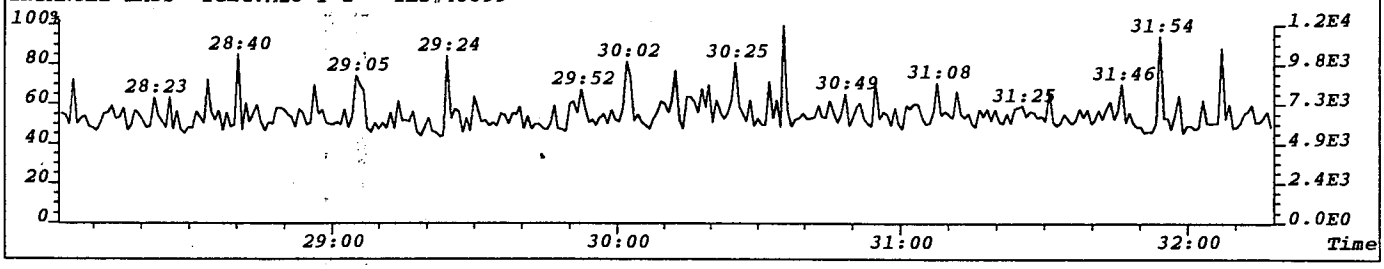
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:523
353.8970 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2092.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



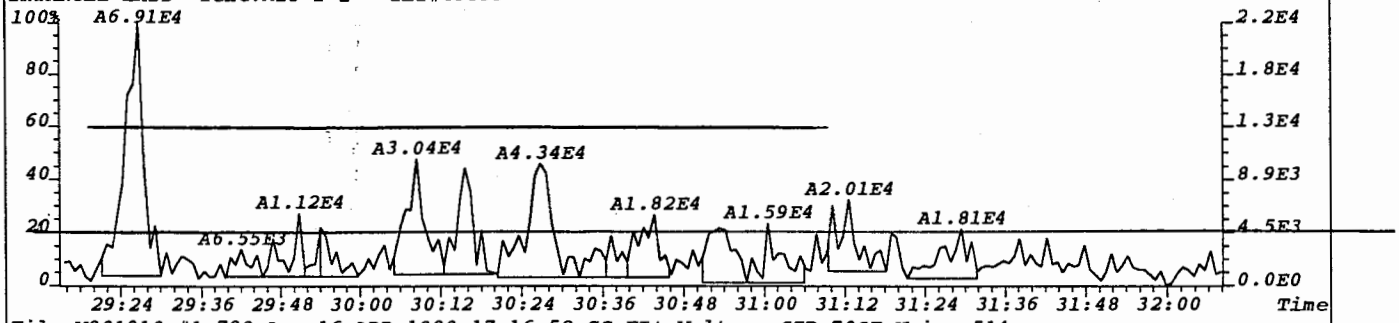
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



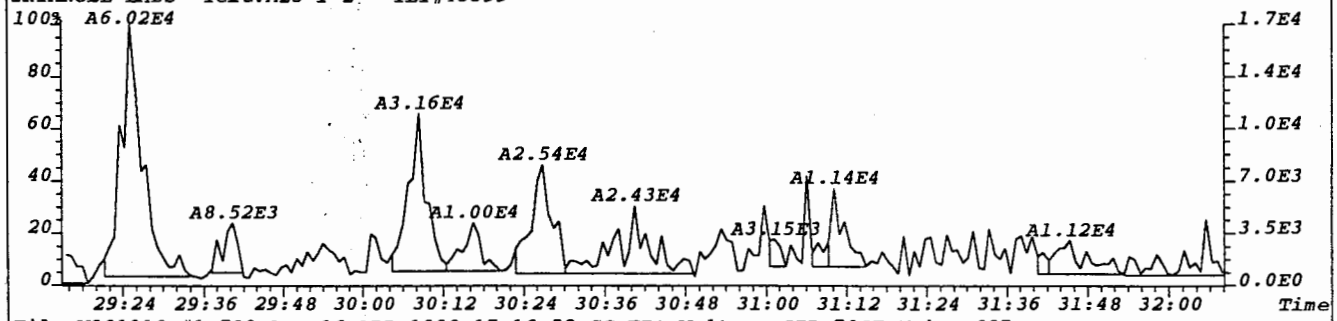
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
409.7974 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



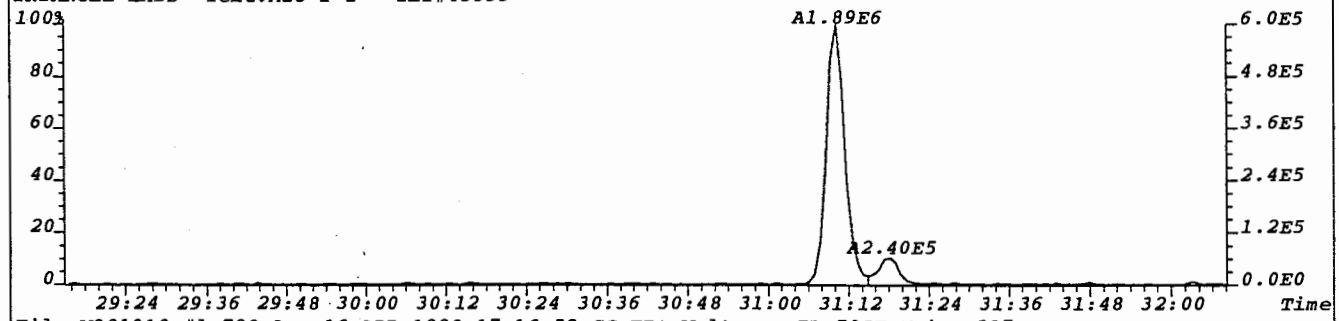
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:605
355.8546 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2420.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



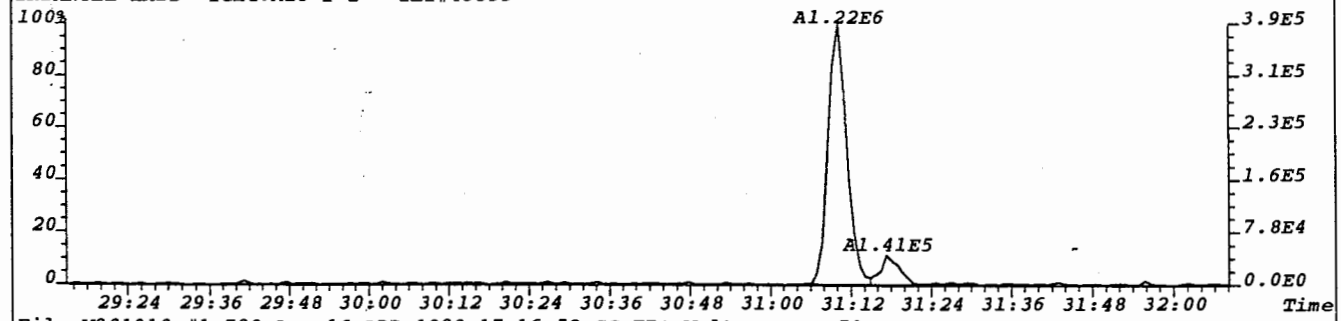
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:514
357.8516 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2056.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



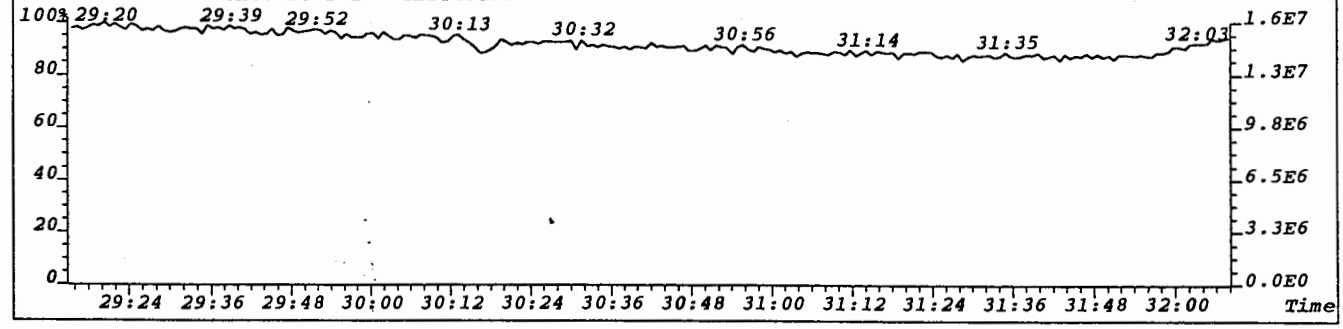
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:627
367.8949 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2508.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



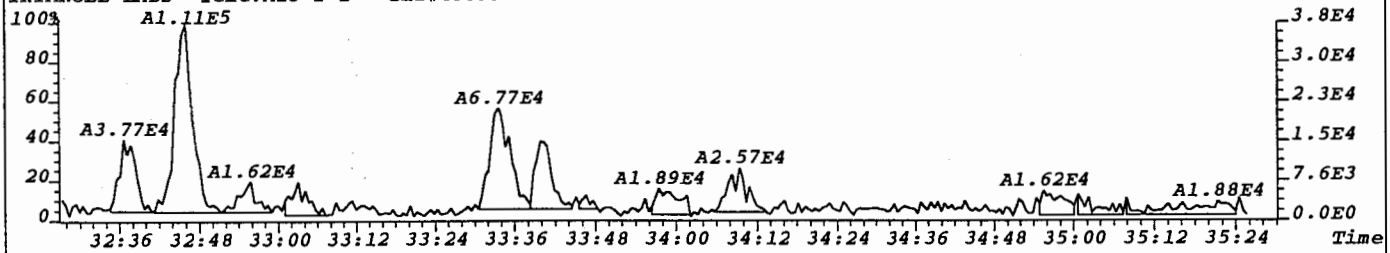
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:397
369.8919 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1588.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



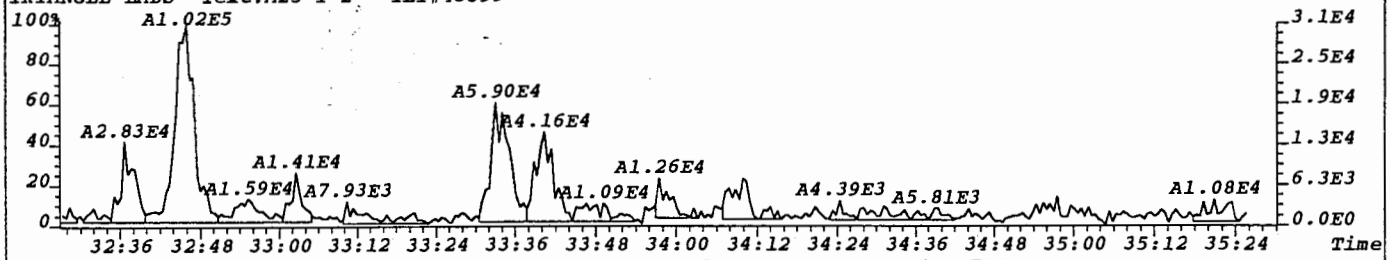
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



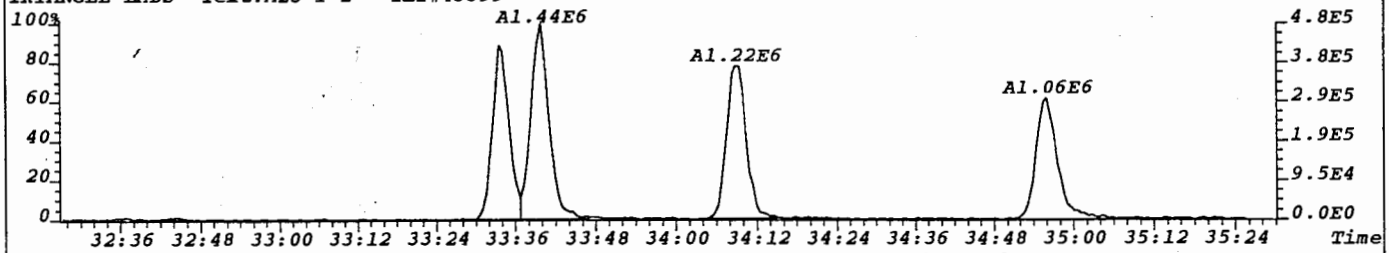
File:W981018 #1-355 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:700
373.8208 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2800.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



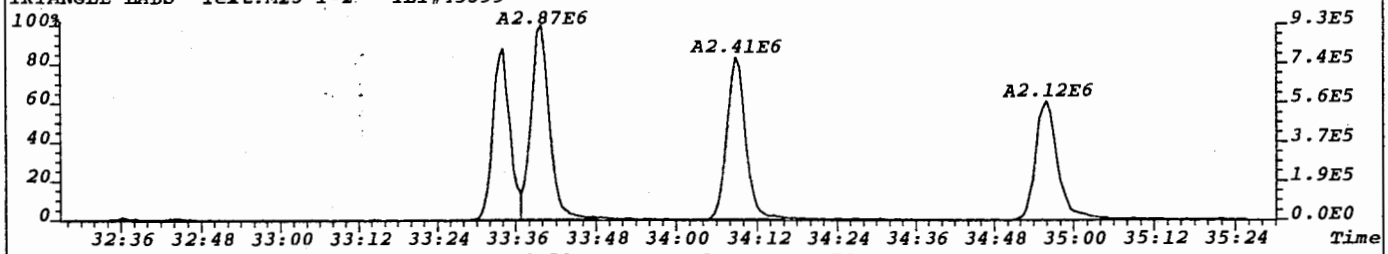
File:W981018 #1-355 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:493
375.8178 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1972.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



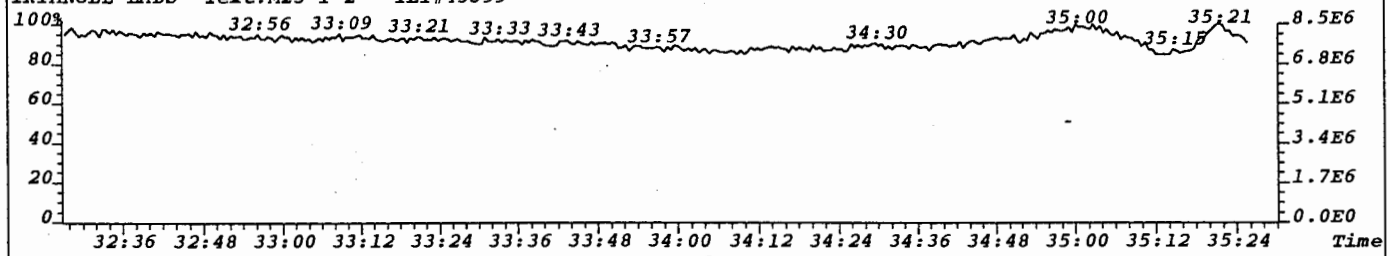
File:W981018 #1-355 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:749
383.8639 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2996.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



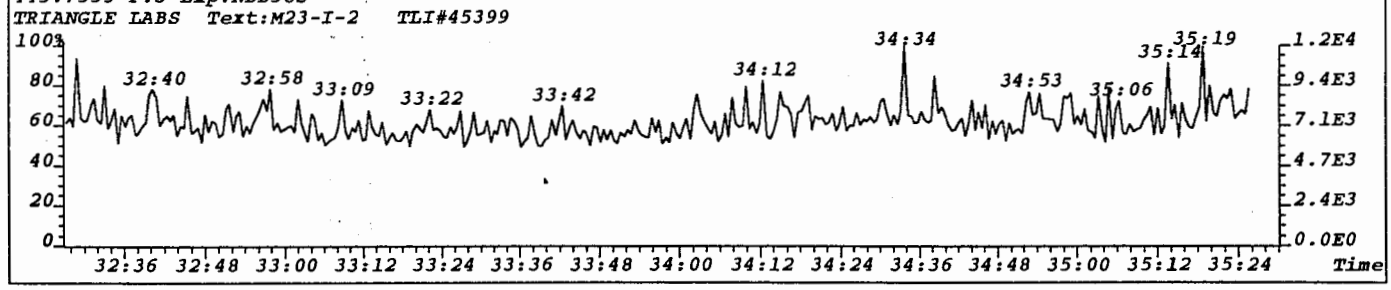
File:W981018 #1-355 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:886
385.8610 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,3544.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



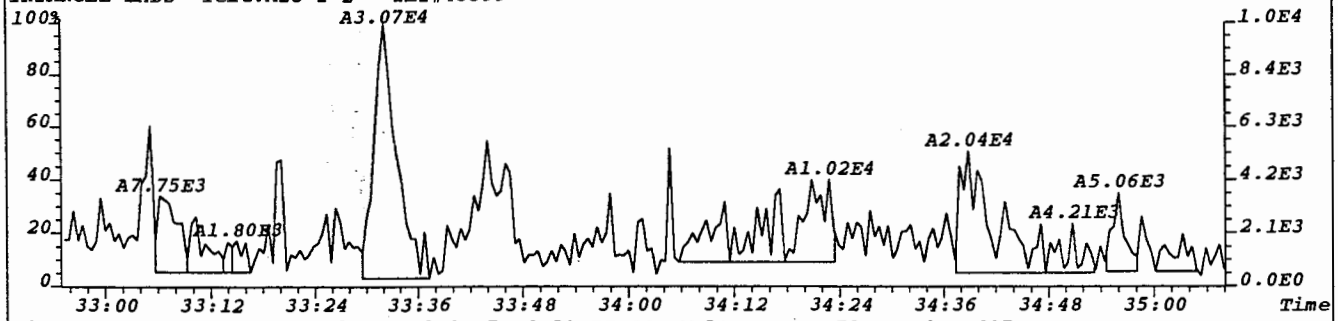
File:W981018 #1-355 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
392.9760 F:3 Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



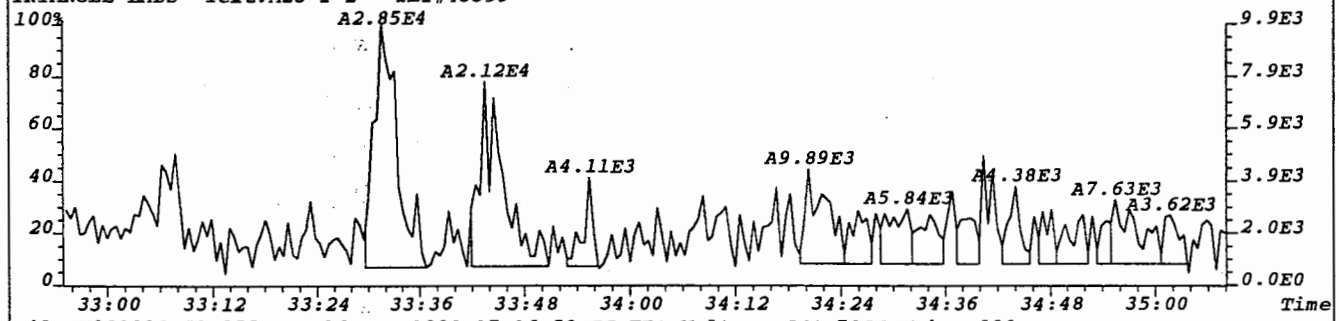
File:W981018 #1-355 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
445.7555 F:3 Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



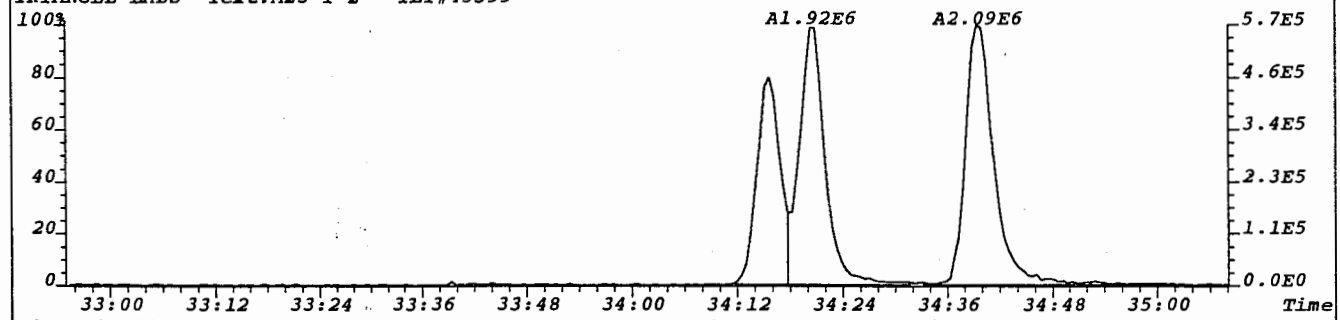
File:W981018 #1-355 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:584
389.8156 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2336.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



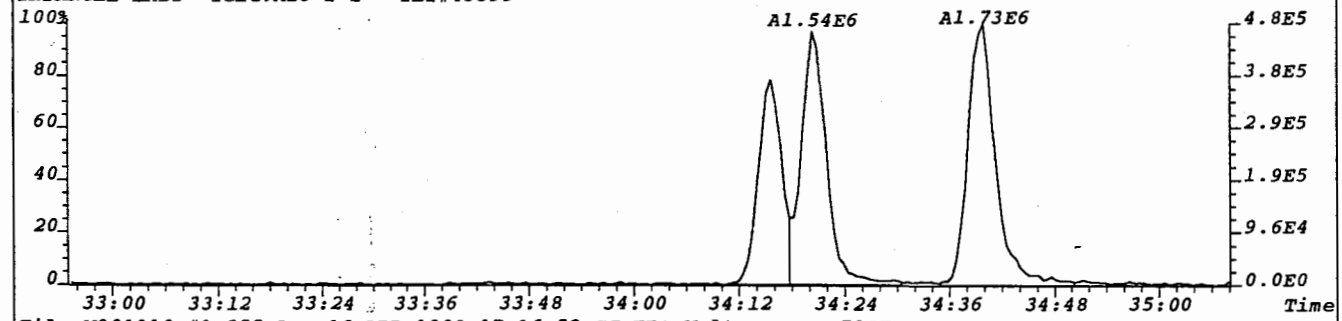
File:W981018 #1-355 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:687
391.8127 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2748.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



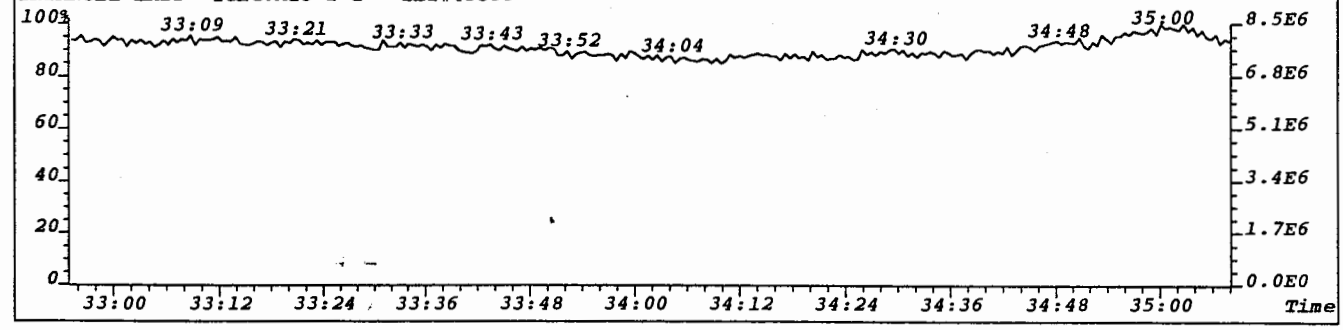
File:W981018 #1-355 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:666
401.8558 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2664.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



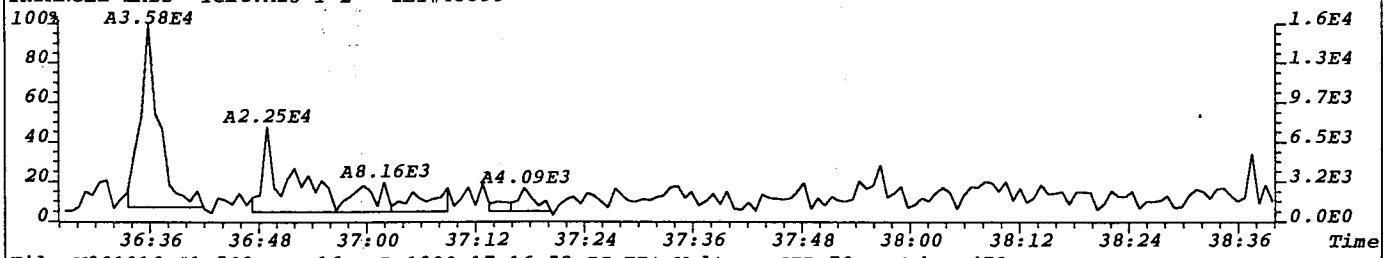
File:W981018 #1-355 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:581
403.8529 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2324.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



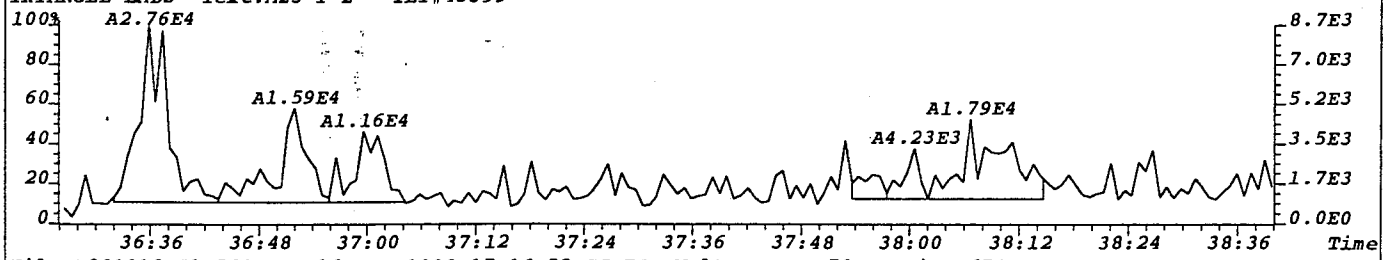
File:W981018 #1-355 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
392.9760 F:3 Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



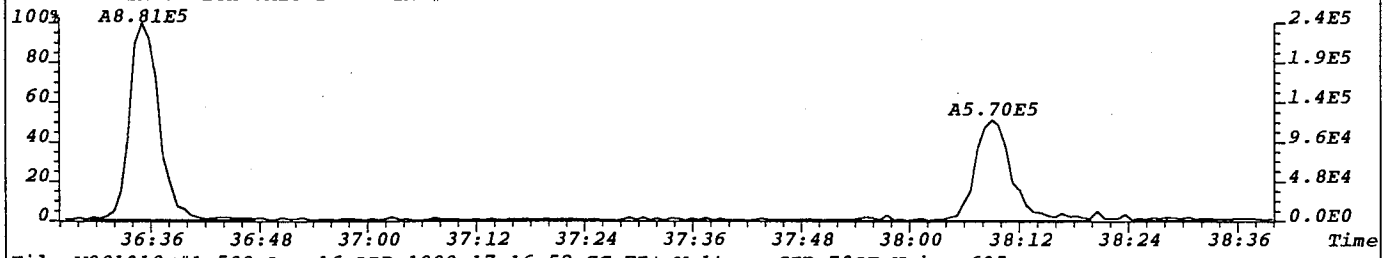
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:609
407.7818 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2436.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



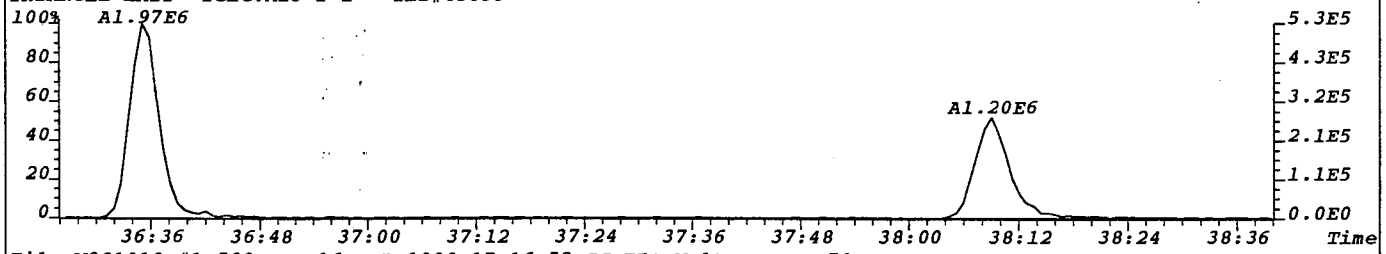
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:472
409.7789 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1888.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



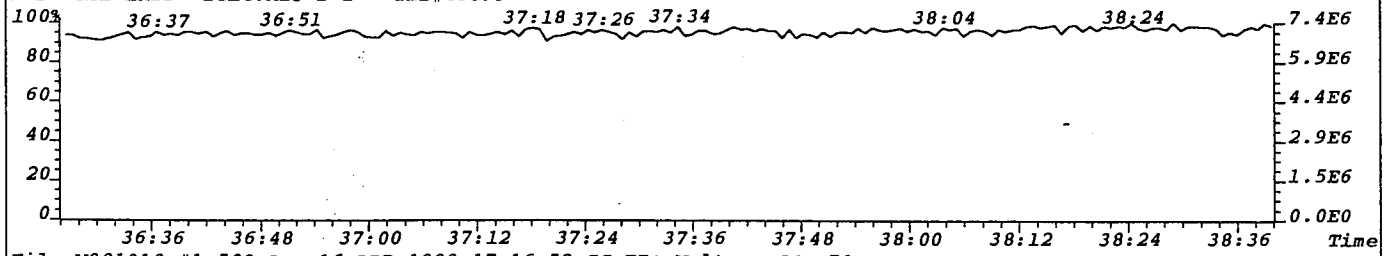
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:674
417.8253 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2696.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



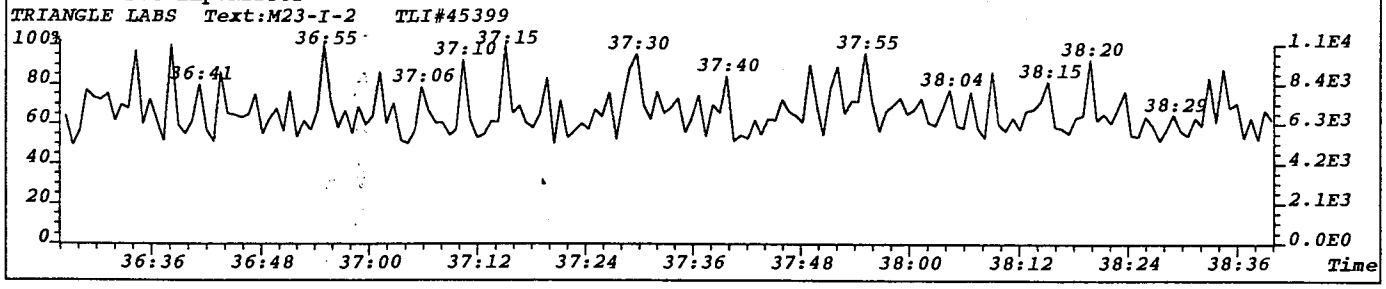
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:605
419.8220 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2420.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



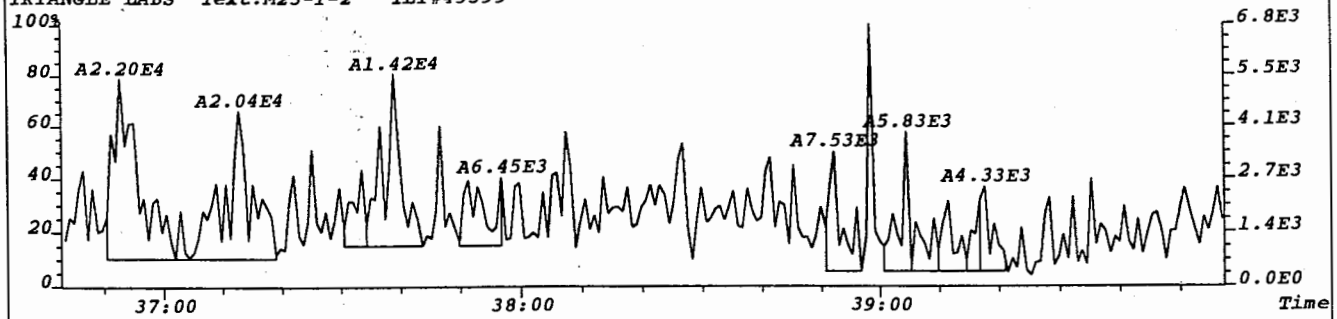
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



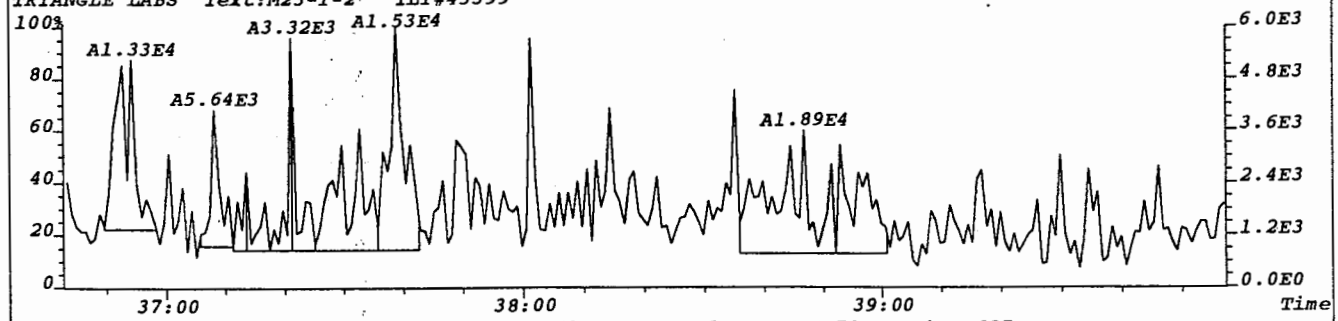
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
479.7165 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



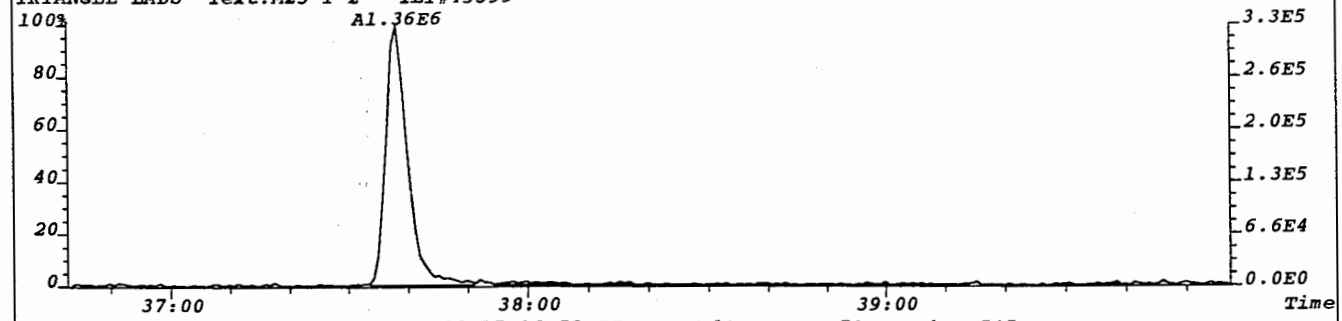
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:543
423.7766 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2172.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



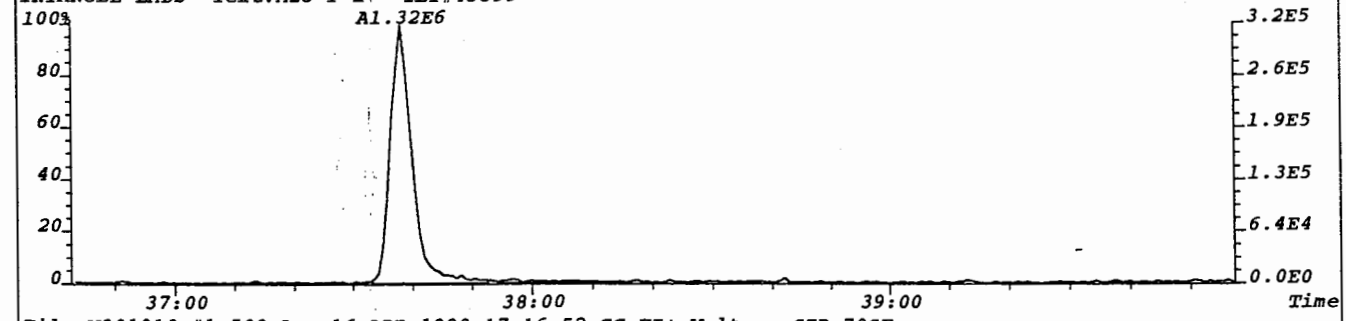
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:549
425.7737 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2196.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



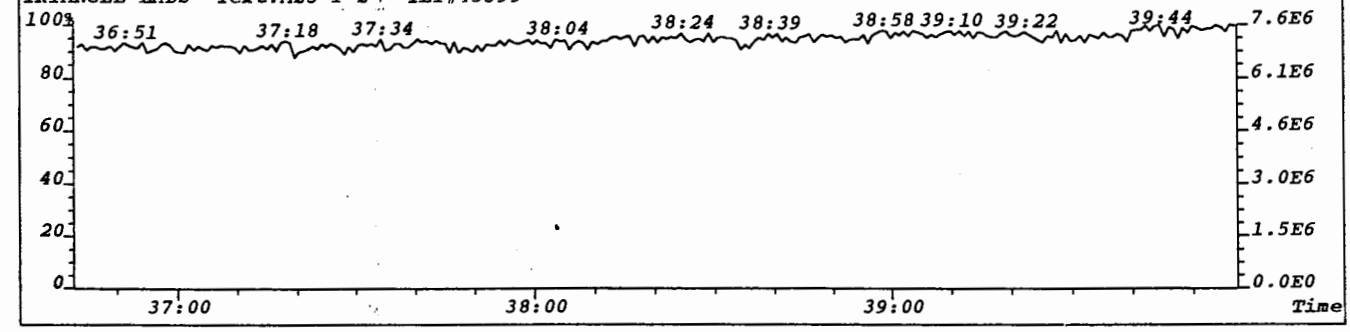
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:627
435.8169 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2508.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



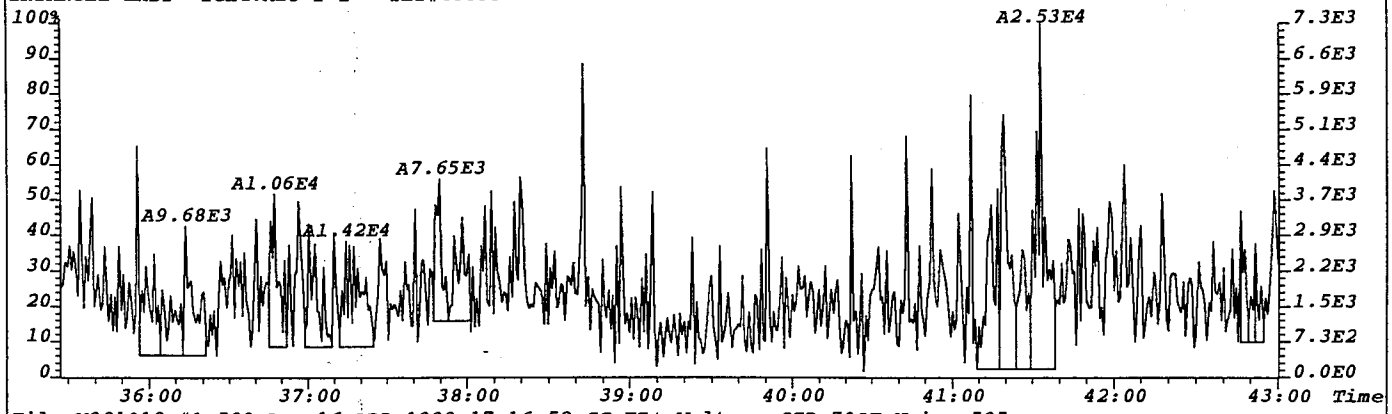
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:545
437.8140 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2180.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



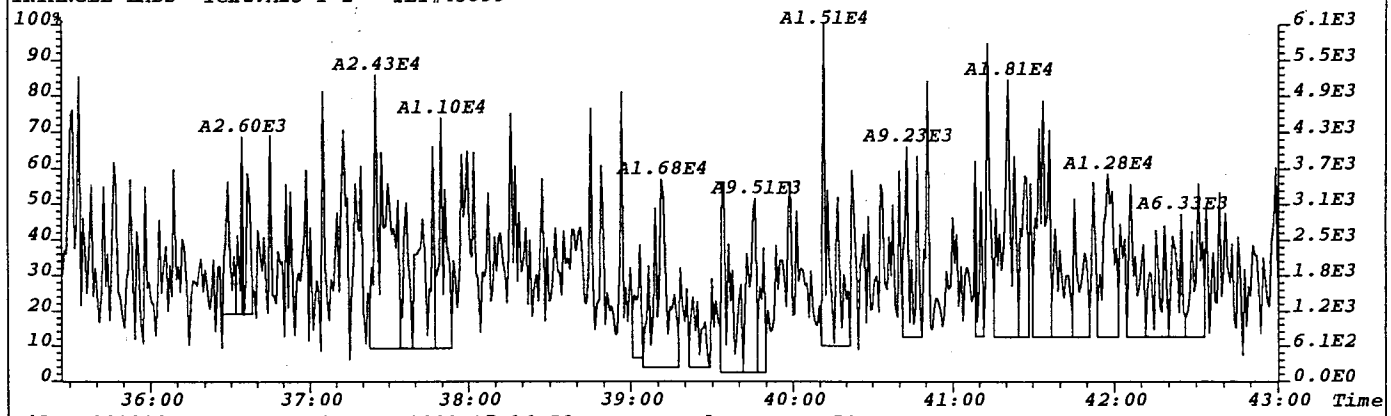
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



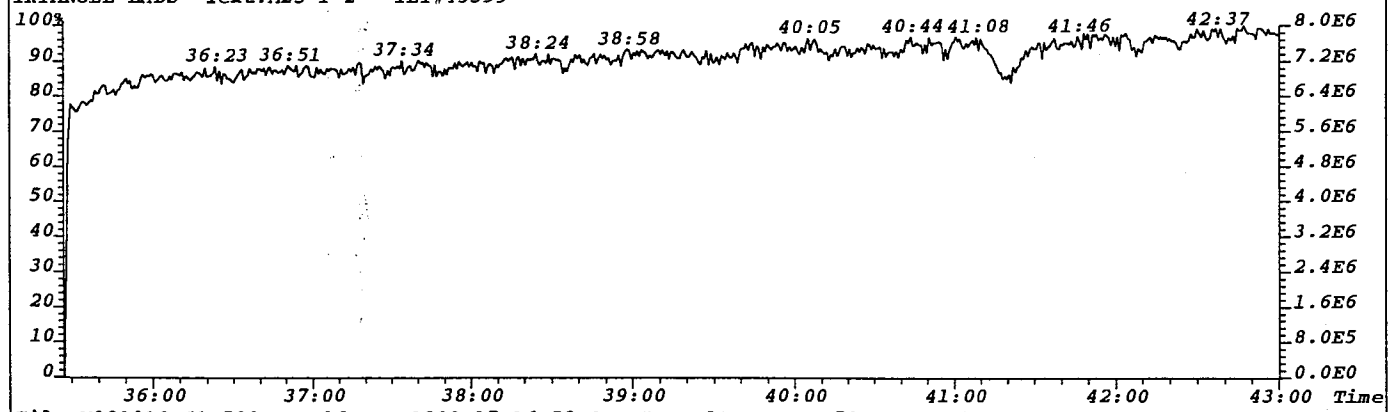
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:536
441.7428 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2144.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



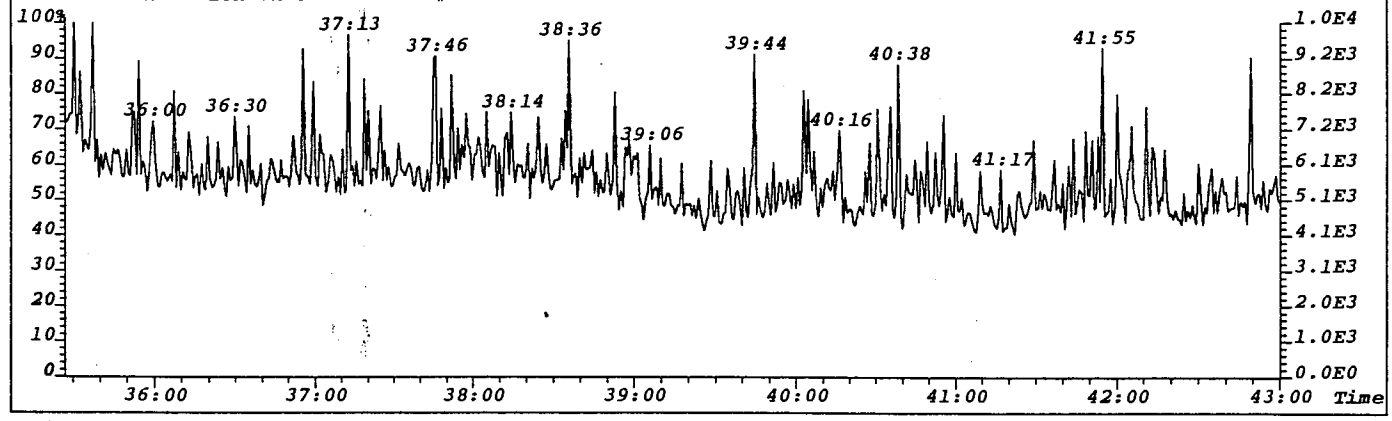
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:595
443.7399 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,2380.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



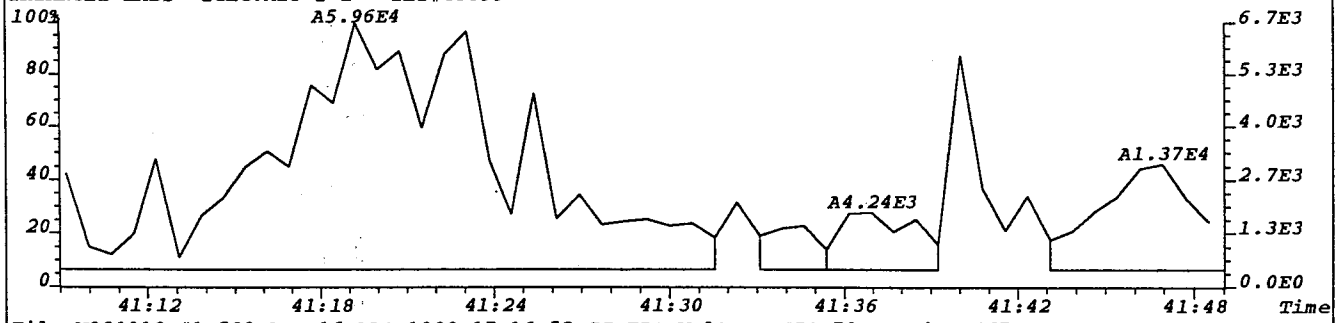
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



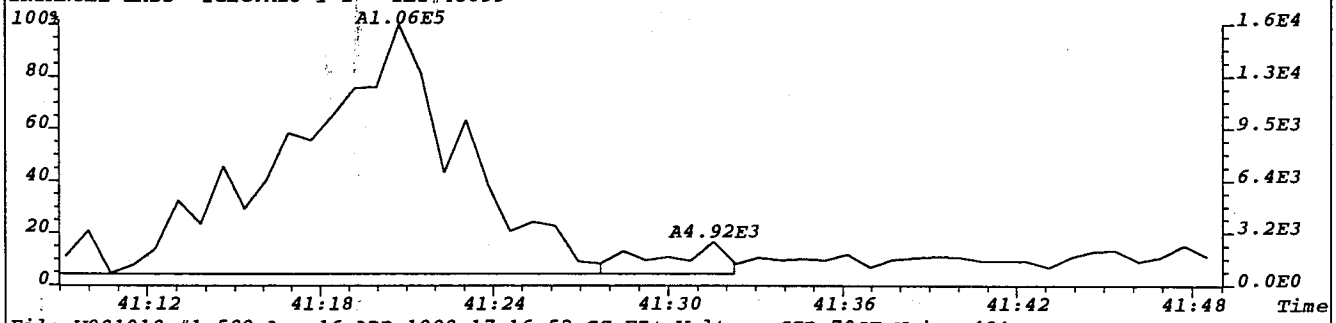
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
513.6775 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



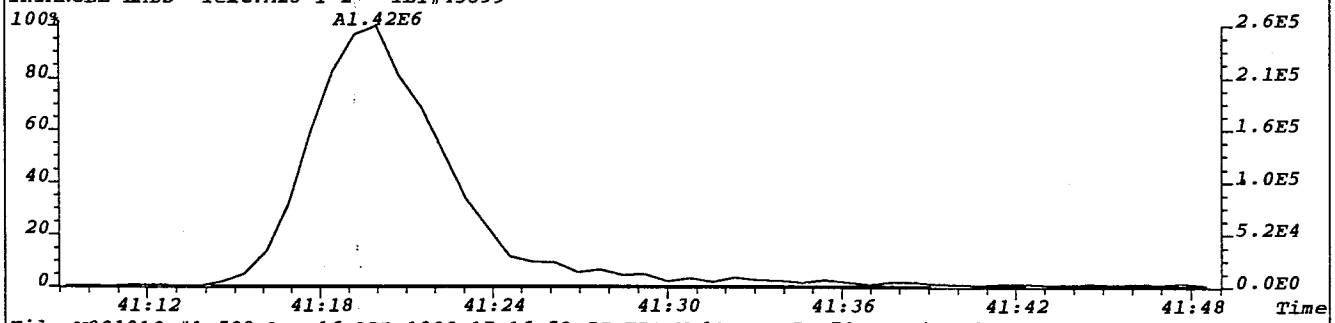
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:457
457.7377 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1828.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



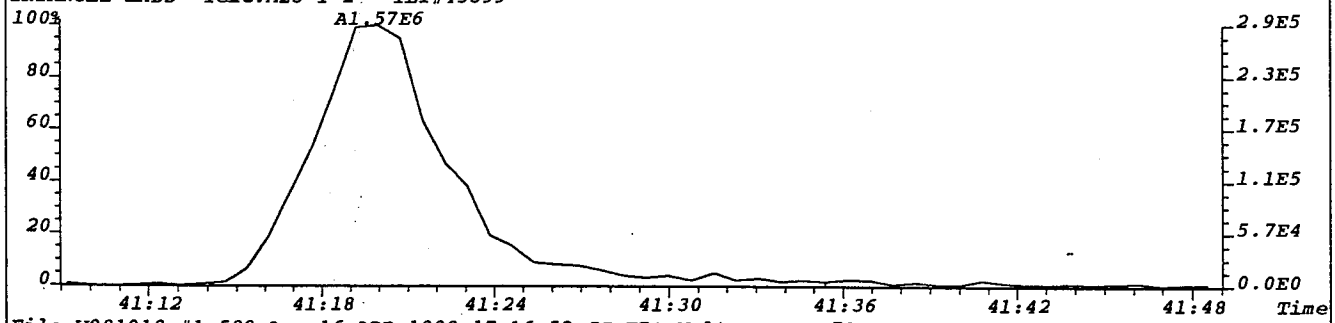
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:467
459.7348 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1868.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



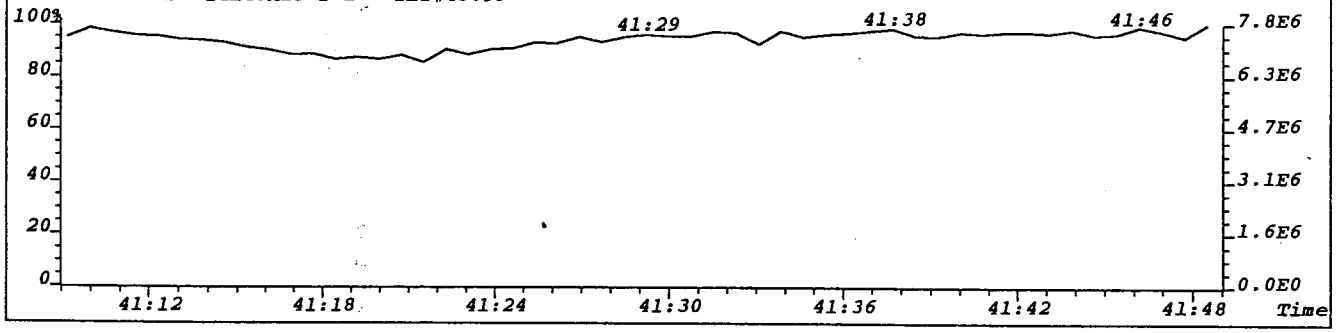
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:484
469.7779 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1936.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



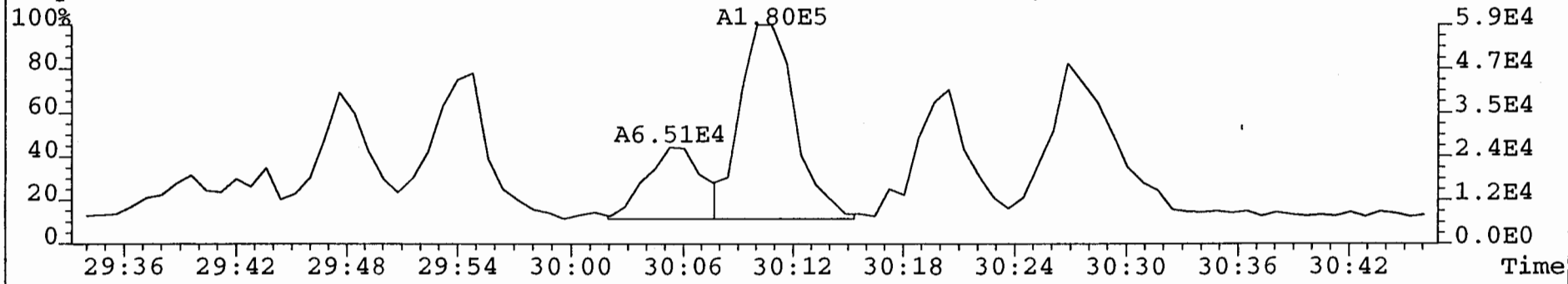
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE Noise:390
471.7750 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.10%,1560.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



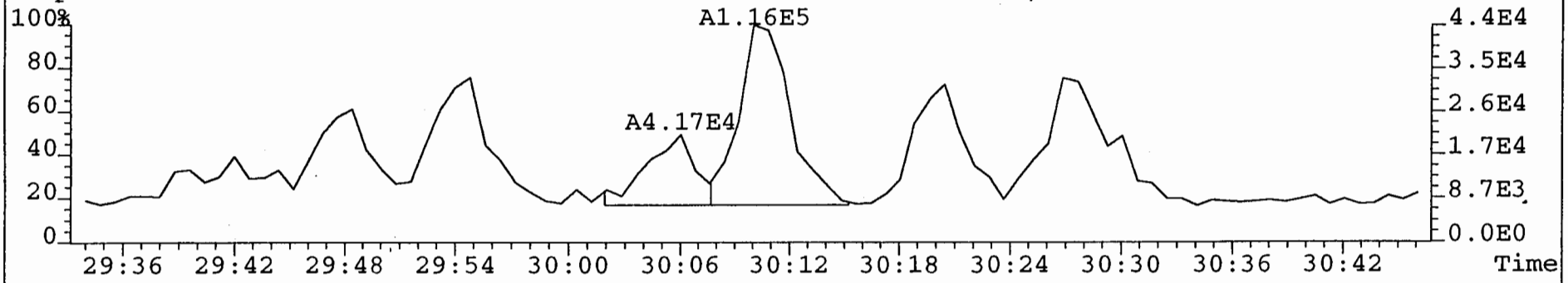
File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-I-2 TLI#45399



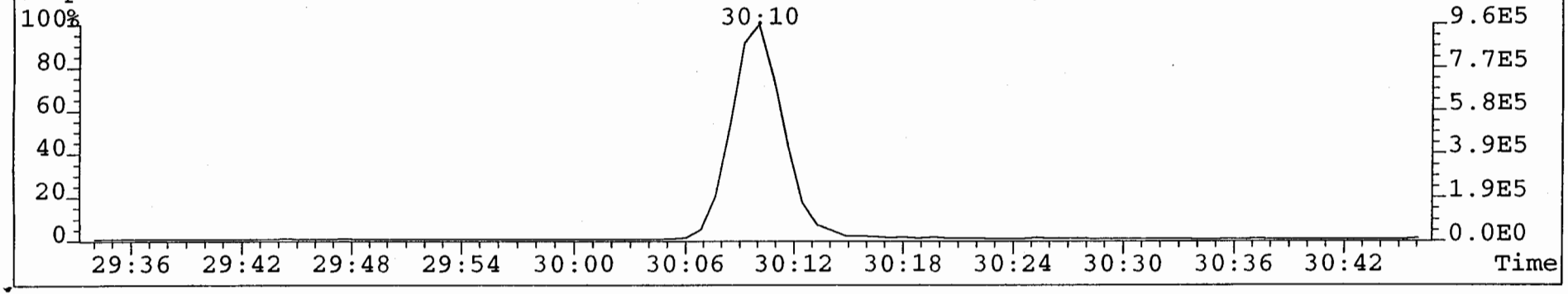
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
339.8597 F:2 Exp:NDB5US
Sample Text:M23-I-2 TLI#45399 File Text:TRIANGLE LABORATORIES, INC.:: DB5::



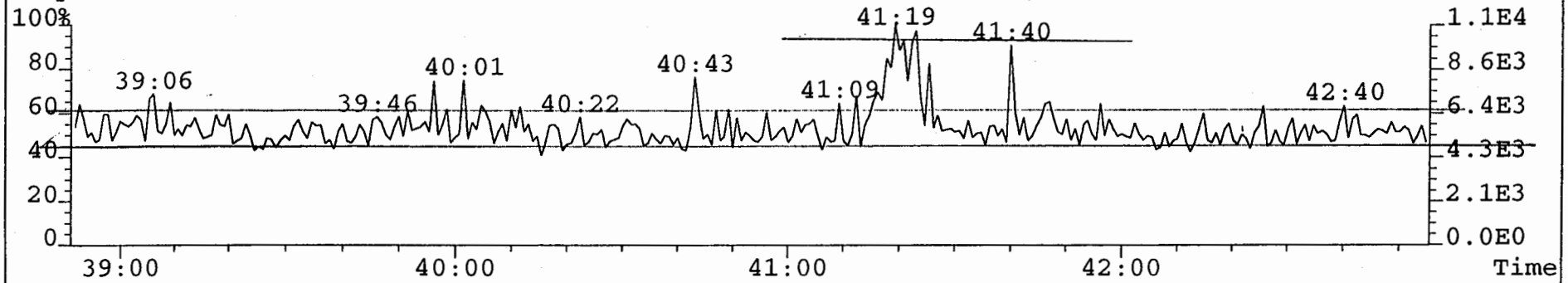
File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
341.8567 F:2 Exp:NDB5US
Sample Text:M23-I-2 TLI#45399 File Text:TRIANGLE LABORATORIES, INC.:: DB5::



File:W981018 #1-798 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
351.9000 F:2 Exp:NDB5US
Sample Text:M23-I-2 TLI#45399 File Text:TRIANGLE LABORATORIES, INC.:: DB5::



File:W981018 #1-589 Acq:16-APR-1998 17:16:52 GC EI+ Voltage SIR 70SE
457.7377 F:4 Exp:NDB5US
Sample Text:M23-I-2 TLI#45399 File Text:TRIANGLE LABORATORIES, INC.:: DB5::



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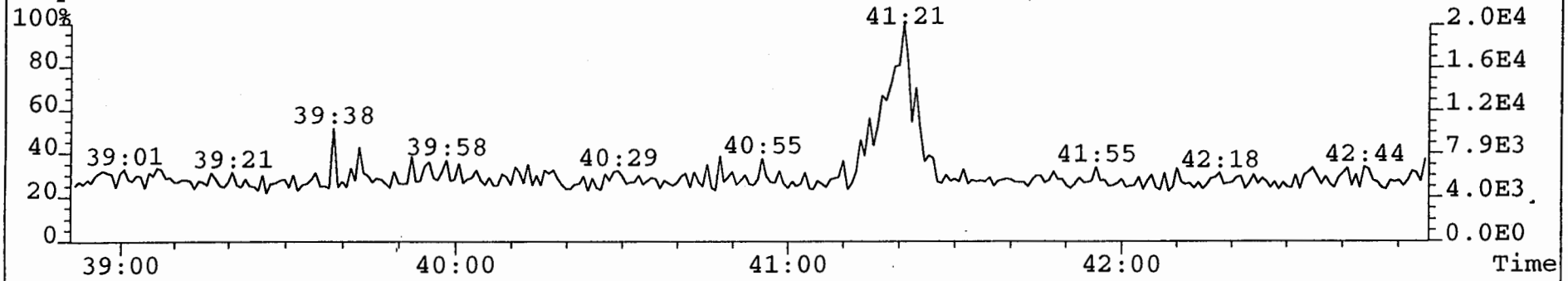
459.7348 F:4 Exp:NDB5US
Sample Text:M23-I-2 TLI#45399 File Text:TRIANGLE LABORATORIES, INC.:: DB5::



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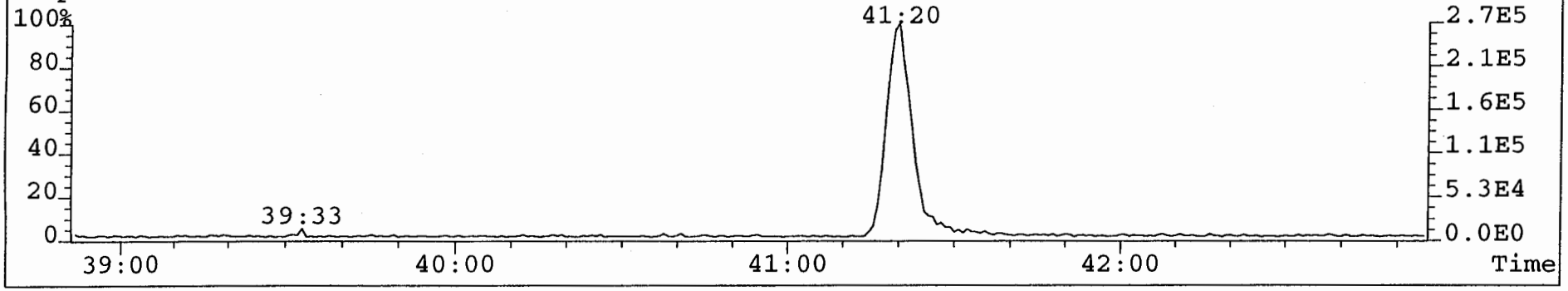
469.7779 F:4 Exp:NDB5US
Sample Text:M23-I-2 TLI#45399 File Text:TRIANGLE LABORATORIES, INC.:: DB5::



Pacific Environmental Services

TLI Project: **45399** Method 23 TCDD/TCDF Analysis (DB-225)
Client Sample: **M23-I-2** Analysis File: **P981307**

Client Project:	**r012.002/Lime Kiln**				
Sample Matrix:	**M23**	Date Received:	**04/01/98**	Spike File:	**SPC2NF04**
TLI ID:	**204-92-2A-D**	Date Extracted:	**04/03/98**	ICal:	**PF24098**
		Date Analyzed:	**04/16/98**	ConCal:	**P981302**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U980780**	% Lipid:	**n/a**
GC Column:	**DB-225**	Analyst:	**ML**	% Solids:	**n/a**

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDF	0.51			0.78	22:25	—

Internal Standard	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	2.9	73.5	40%-130%	0.78	22:24	—

Recovery Standard	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.80	21:18	—

Data Reviewer: KW 04/20/98

C2NF_PSR v2.02, LARS 6.11.00

Triangle Laboratories, Inc.®
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Printed: 21:21 04/20/98

Initial ....Date...

Data Review By: K 4/20/98 Calculated Noise Area: 0.14

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 P981307B.dbf
04/20/98 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						0.790-1.102			
304-306	DC	NL		0:00	RO	1.00	0.14			0.000			
				17:52		0.77	48.60	21.19	27.41	0.798			
	DC	SN		18:08	RO	1.07	0.25			0.810			
	DC	SN		18:18	RO	0.18	0.05			0.817			
	DC	SN		18:28	RO	0.61	0.39			0.824			
				18:51		0.76	103.15	44.43	58.72	0.842			
				18:59		0.75	44.53	19.06	25.47	0.847			
				19:07		0.76	56.64	24.51	32.13	0.853			
				19:18		0.78	42.31	18.56	23.75	0.862			
				19:34		0.72	27.92	11.67	16.25	0.874			
				19:43		0.77	45.46	19.72	25.74	0.880			
				19:52		0.75	19.04	8.17	10.87	0.887			
				20:02	RO	0.58	87.63	38.12	65.42	0.894			
				20:12	RO	0.48	16.44	7.15	14.84	0.902			
				20:33		0.77	67.70	29.41	38.29	0.917			
				20:38		0.76	46.58	20.15	26.43	0.921			
	DC	SN		20:46	RO	5.00	0.05			0.927			
				21:00		0.76	62.96	27.18	35.78	0.938			
				21:06	RO	0.58	5.65	2.46	4.23	0.942			
				21:15		0.73	56.37	23.75	32.62	0.949			
				21:28		0.75	46.36	19.94	26.42	0.958			
				21:42		0.78	3.62	1.59	2.03	0.969			
				21:52		0.75	33.87	14.49	19.38	0.976			
	DC	SN		22:04	RO	1.00	0.19			0.985			
				22:17		0.75	32.31	13.81	18.50	0.995			
				22:25		0.78	46.03	20.11	25.92	1.001	2378-TCDF	AN	
				22:39		0.73	29.88	12.56	17.32	1.011			
				22:57		0.77	24.14	10.49	13.65	1.025			
				23:05		0.76	62.23	26.82	35.41	1.031			
				23:15	RO	0.63	0.46	0.20	0.32	1.038			J
	DC	SN		23:32	RO	1.00	0.07			1.051			
				23:50		0.75	21.52	9.23	12.29	1.064			
	DC	SN		24:05		0.69	0.22			1.075			
				24:32		0.73	3.15	1.33	1.82	1.095			
304-306				26 Peaks			1,034.55						
13C12-TCDF				0.65-0.89						0.955-1.045			
316-318	DC	NL		0:00	RO	1.11	0.16			0.000			
	DC	WL		20:59		0.67	1.00			0.937			
	DC	WL		21:14		0.69	1.40			0.948			
				22:24		0.78	367.86	161.58	206.28	1.000	13C12-2378-TCDF	ISO	
				23:04	RO	1.15	0.48	0.31	0.27	1.030			
	DC	WH		23:28	RO	3.76	0.44			1.048			

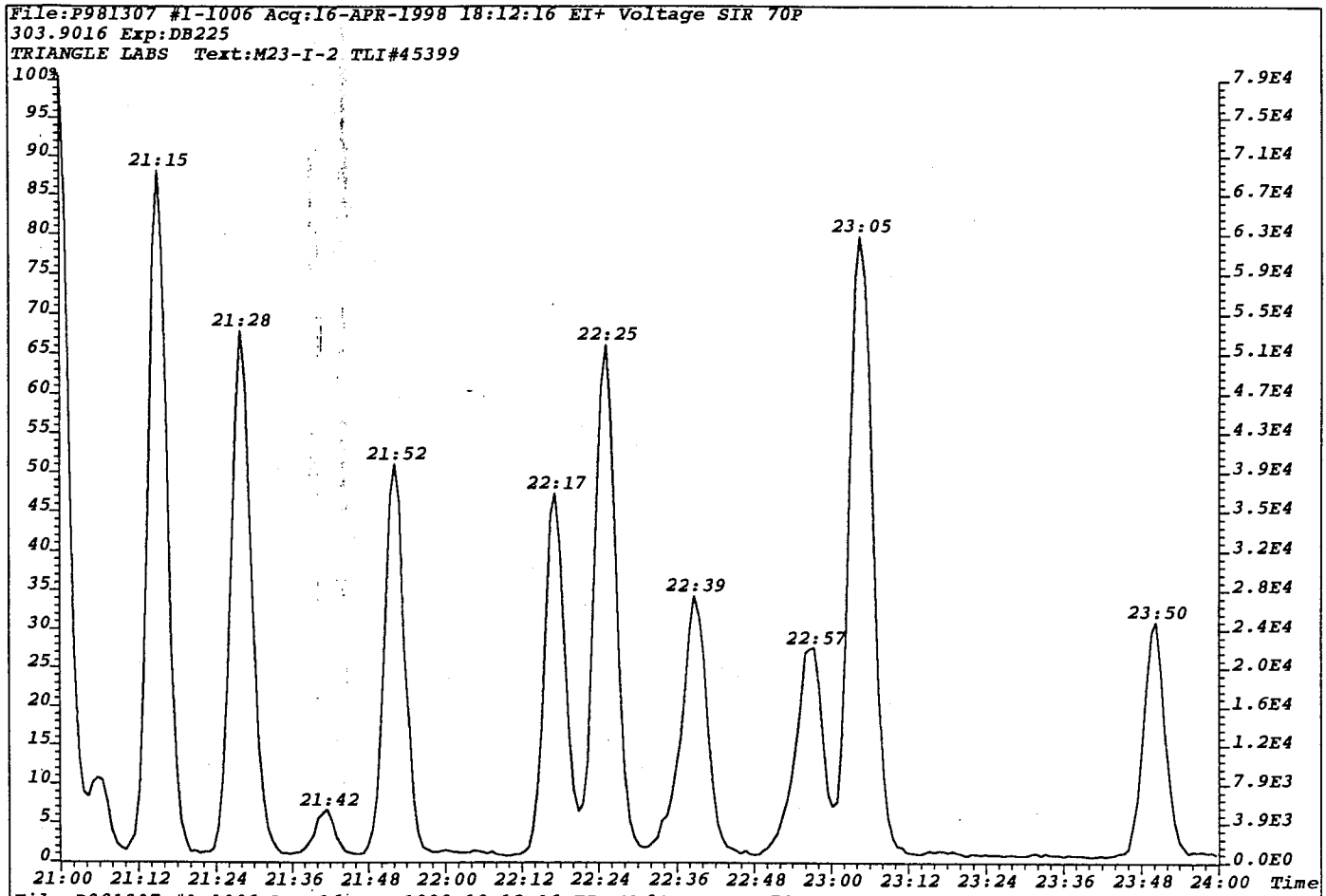
Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
	DC	WH		24:26	RO	1.03	4.96			1.091			
316-318				2 Peaks			368.34						

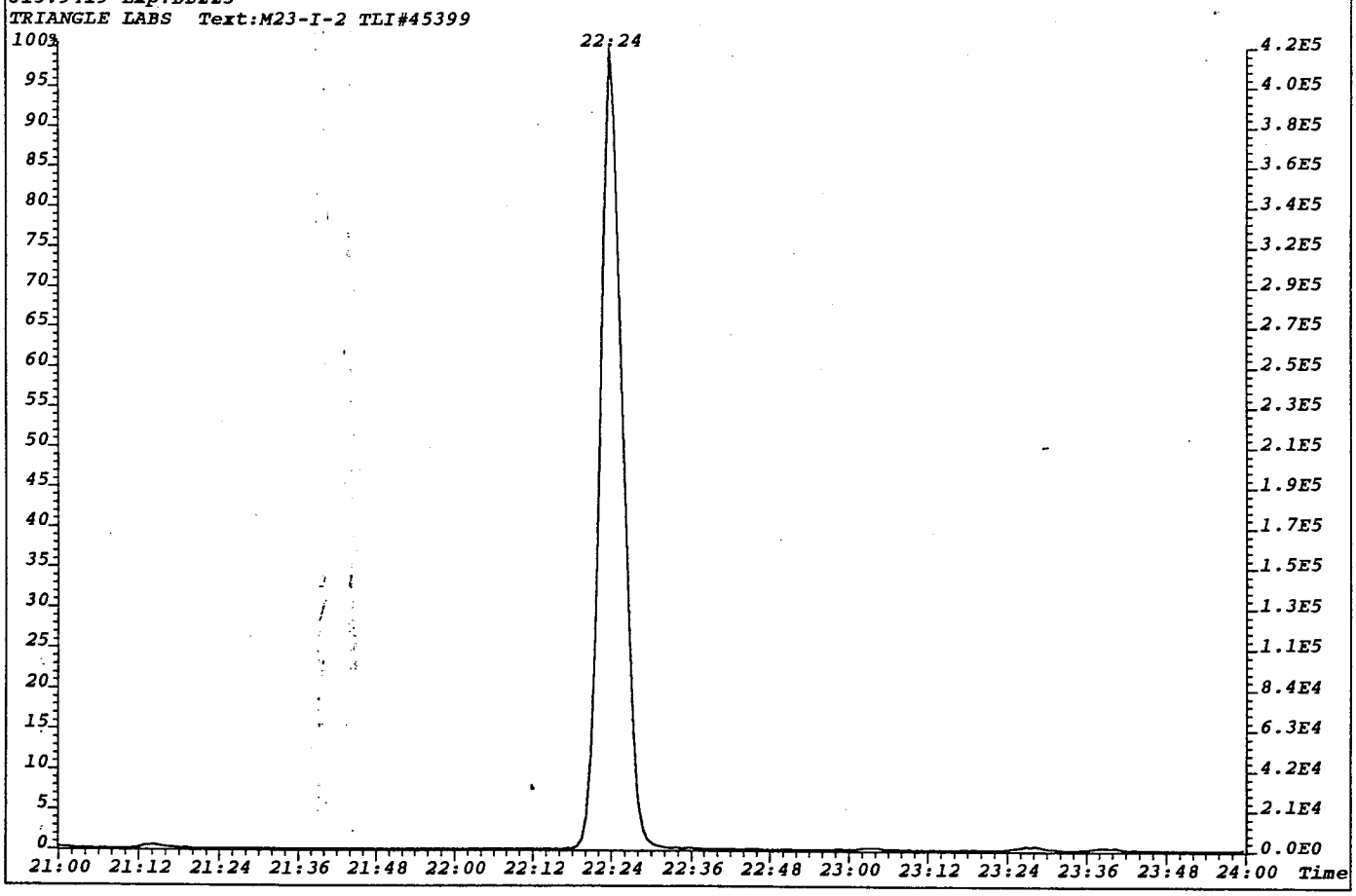
---------- Above: TCDF / TCDD Follows ----------

13C12-TCDD				0.65-0.89						0.905-1.095		
332-334	DC	NL		0:00	RO	1.25	0.14			0.000		
				21:01		0.78	274.67	119.98	154.69	1.000	13C12-2378-TCDD	IS1
				21:18		0.80	372.60	165.60	207.00	1.013	13C12-1234-TCDD	RS1
				22:02		0.87	2.28	1.06	1.22	1.048		
332-334				3 Peaks			649.55					

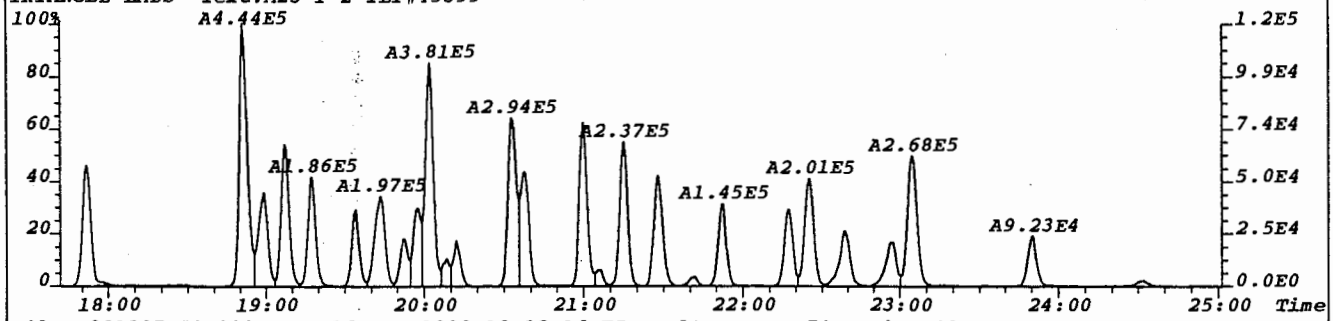
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside 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
		X-Ether Interference

*** End of Report ***

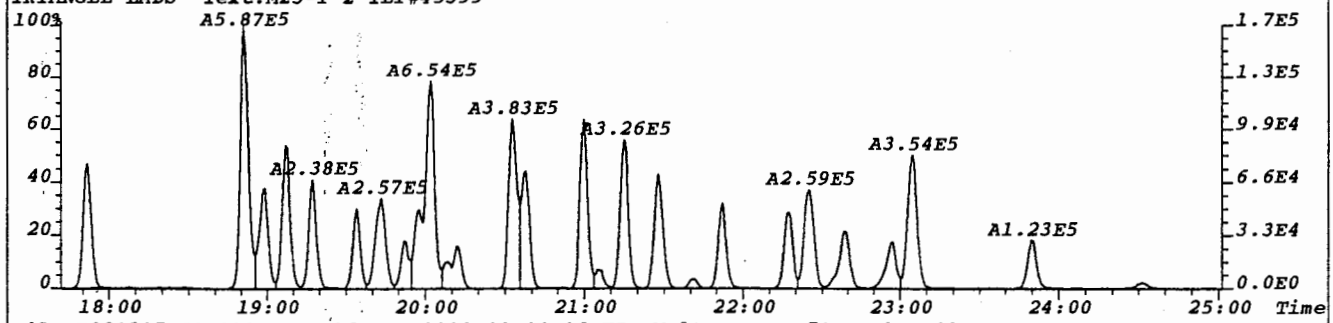

File:P981307 #1-1006 Acq:16-APR-1998 18:12:16 EI+ Voltage SIR 70P
303.9016 Exp:DB225
TRIANGLE LABS Text:M23-I-2 TLI#45399
21:15
21:28
21:42
21:52
22:17
22:25
22:39
22:57
23:05
23:50
Time


File:P981307 #1-1006 Acq:16-APR-1998 18:12:16 EI+ Voltage SIR 70P
315.9419 Exp:DB225
TRIANGLE LABS Text:M23-I-2 TLI#45399
22:24
Time

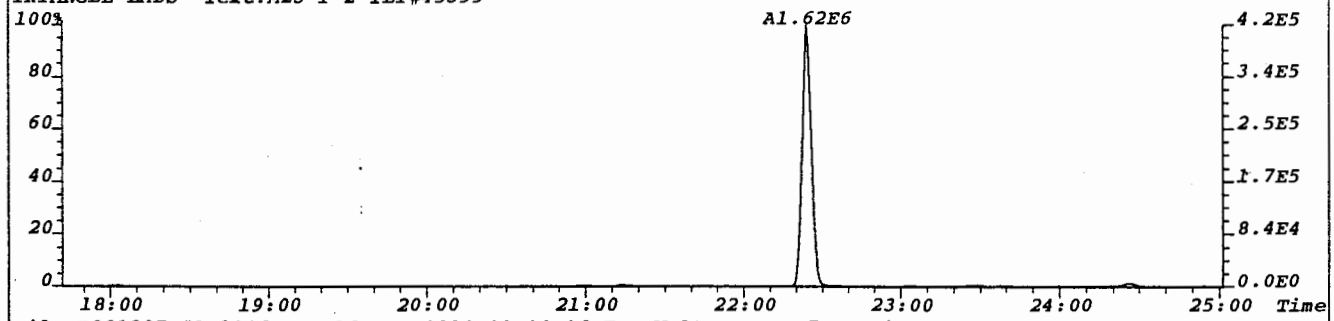
File:P981307 #1-1006 Acq:16-APR-1998 18:12:16 EI+ Voltage SIR 70P Noise:40
303.9016 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,160.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-I-2 TLI#45399



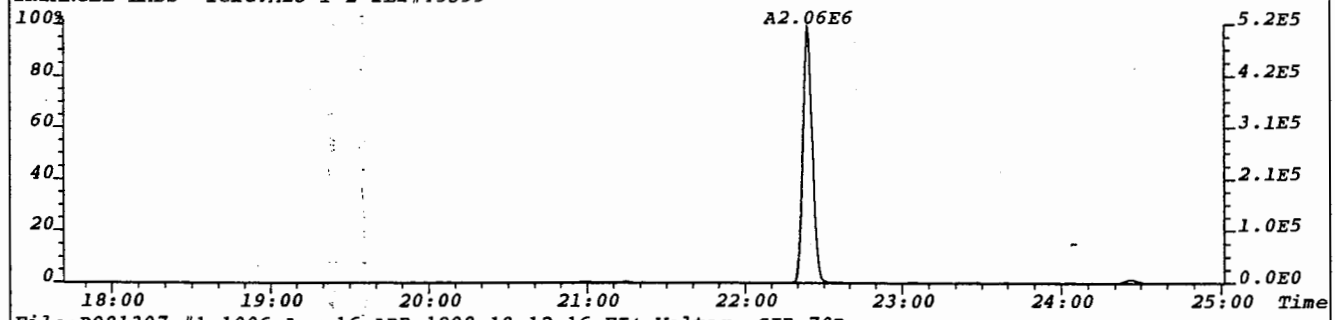
File:P981307 #1-1006 Acq:16-APR-1998 18:12:16 EI+ Voltage SIR 70P Noise:42
305.8987 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,168.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-I-2 TLI#45399



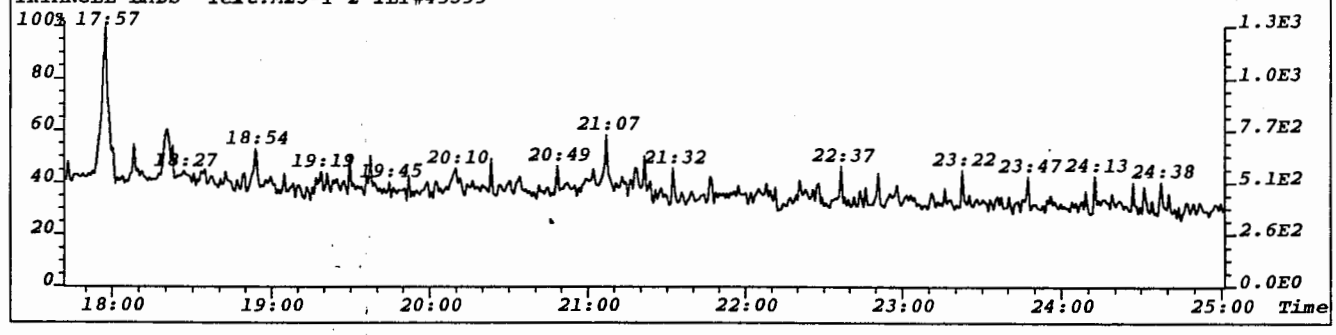
File:P981307 #1-1006 Acq:16-APR-1998 18:12:16 EI+ Voltage SIR 70P Noise:48
315.9419 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,192.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-I-2 TLI#45399



File:P981307 #1-1006 Acq:16-APR-1998 18:12:16 EI+ Voltage SIR 70P Noise:43
317.9389 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,172.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-I-2 TLI#45399



File:P981307 #1-1006 Acq:16-APR-1998 18:12:16 EI+ Voltage SIR 70P
375.8364 Exp:DB225
TRIANGLE LABS Text:M23-I-2 TLI#45399



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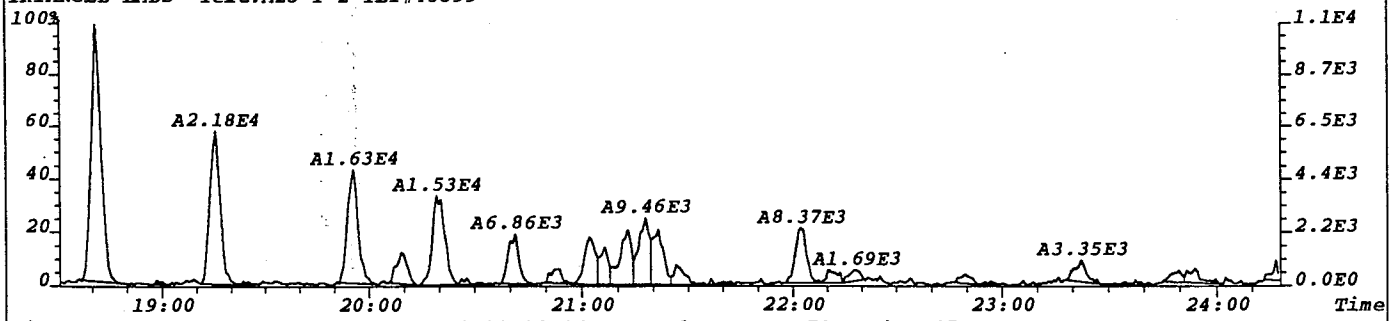
319.8965 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,148.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-I-2 TLI#45399



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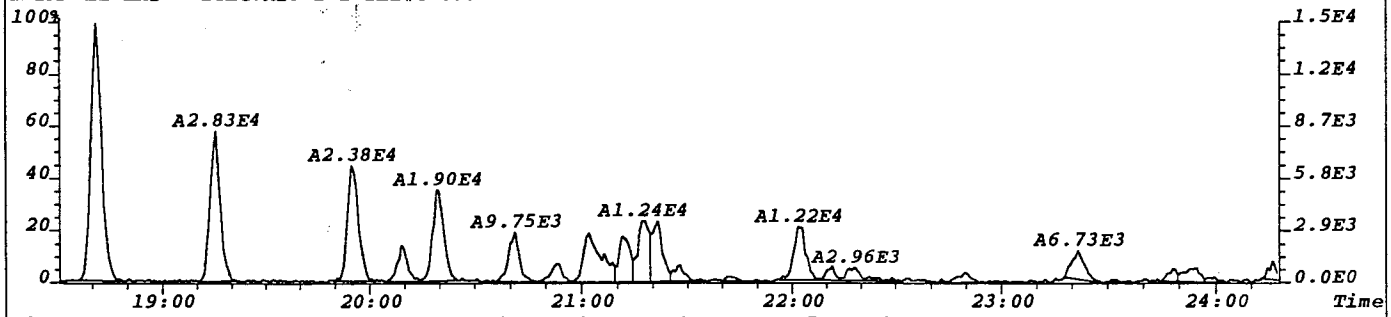
321.8936 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,148.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-I-2 TLI#45399



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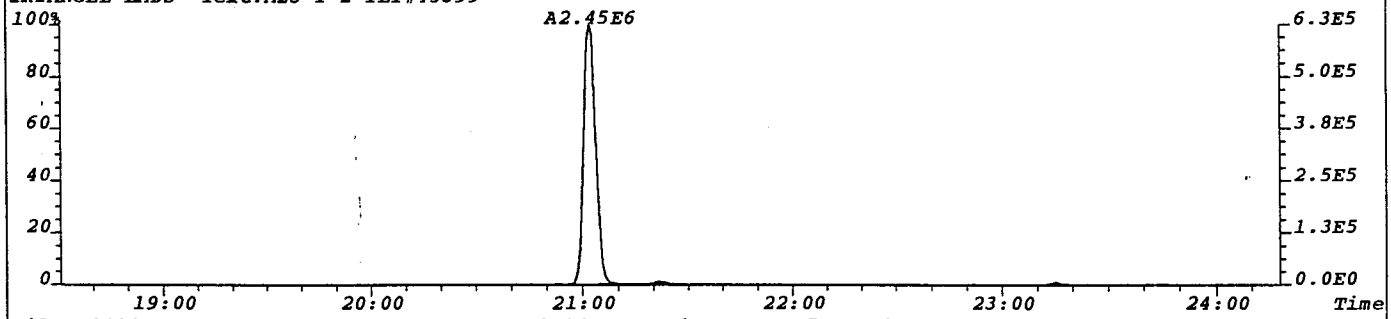
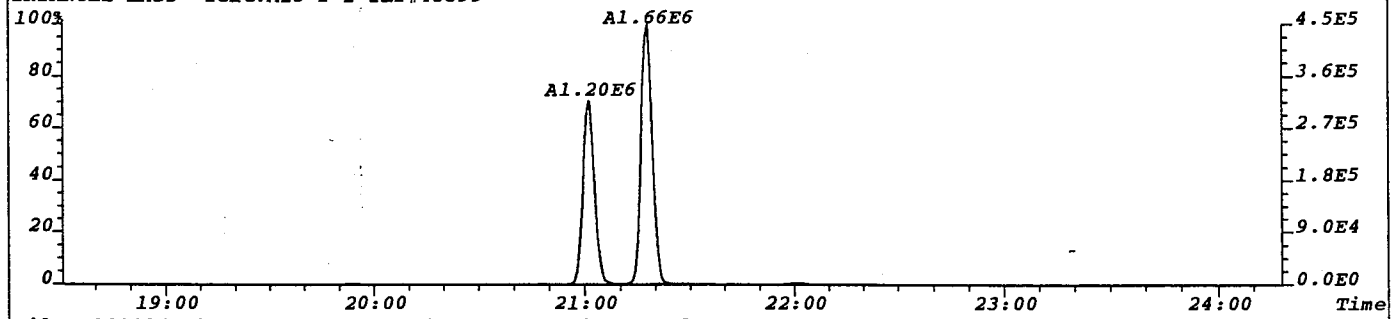
327.8847 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,148.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-I-2 TLI#45399



File:P981307 #1-1006 Acq:16-APR-1998 18:12:16 EI+ Voltage SIR 70P Noise:48
331.9368 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,192.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-I-2 TLI#45399



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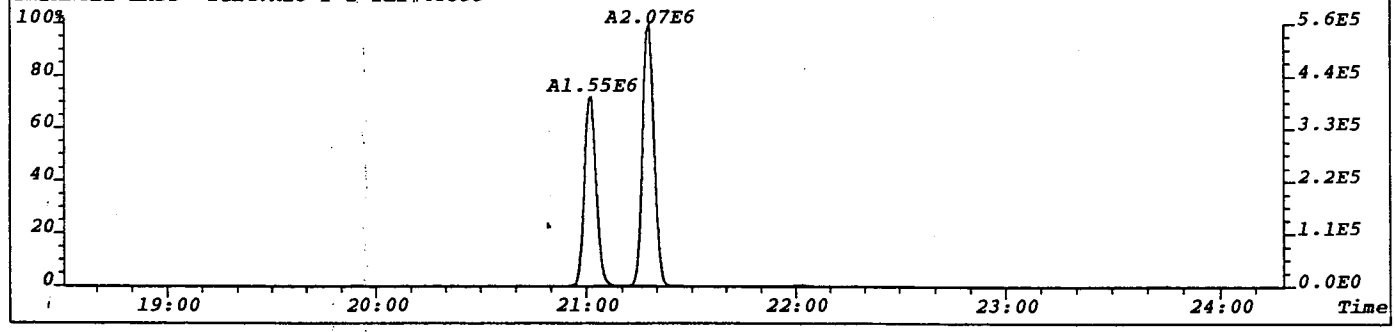
333.9338 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,152.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-I-2 TLI#45399



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303.9016 Exp:DB225
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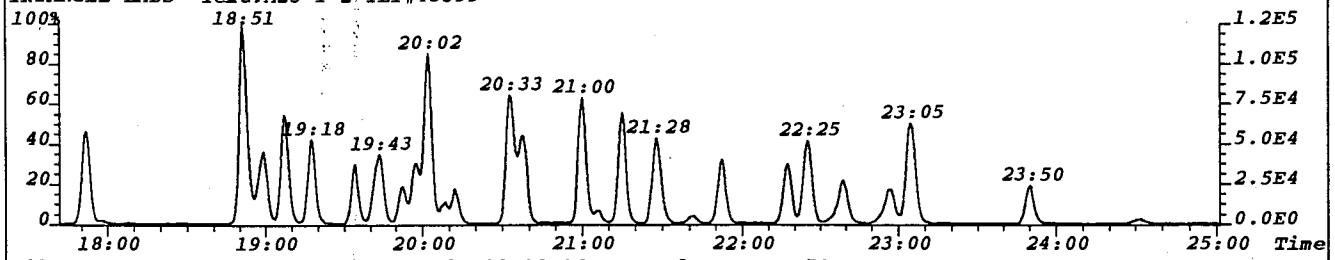

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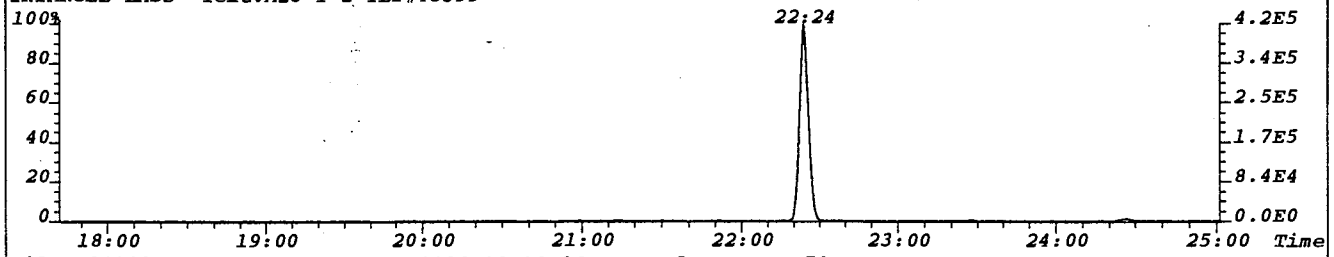
315.9419 Exp:DB225
TRIANGLE LABS Text:M23-I-2 TLI#45399



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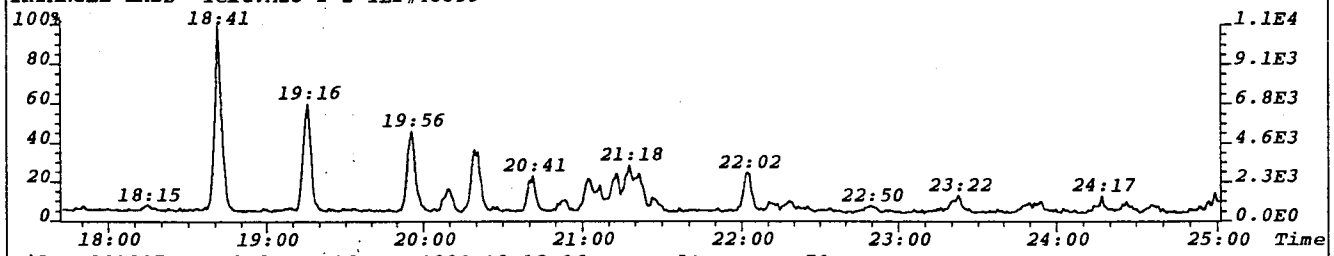

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331.9368 Exp:DB225
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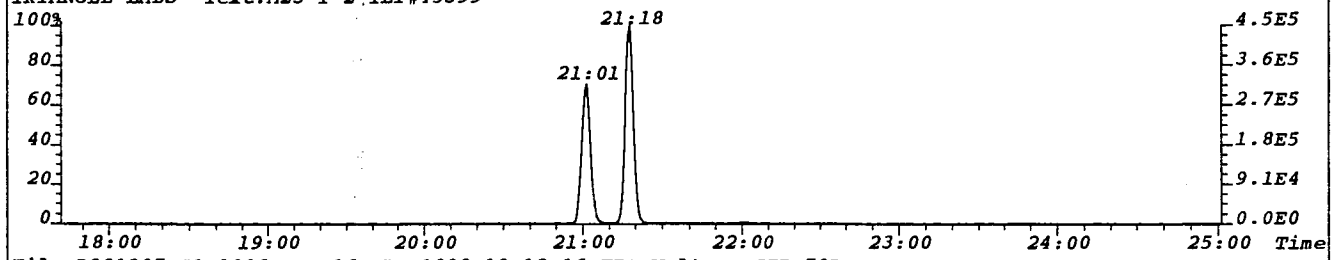
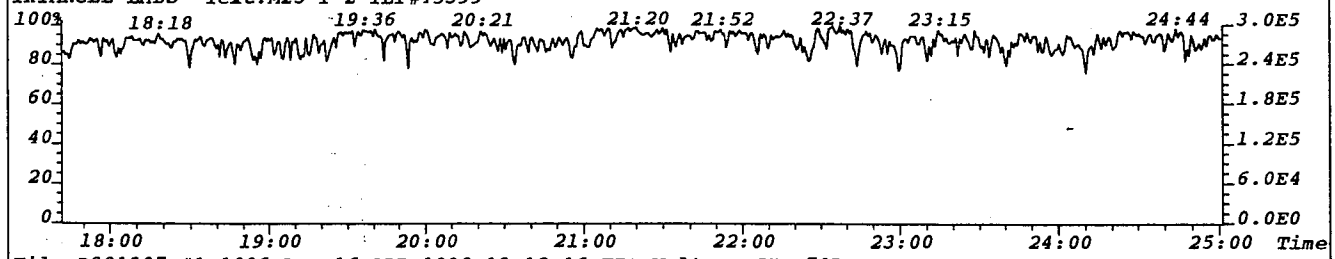
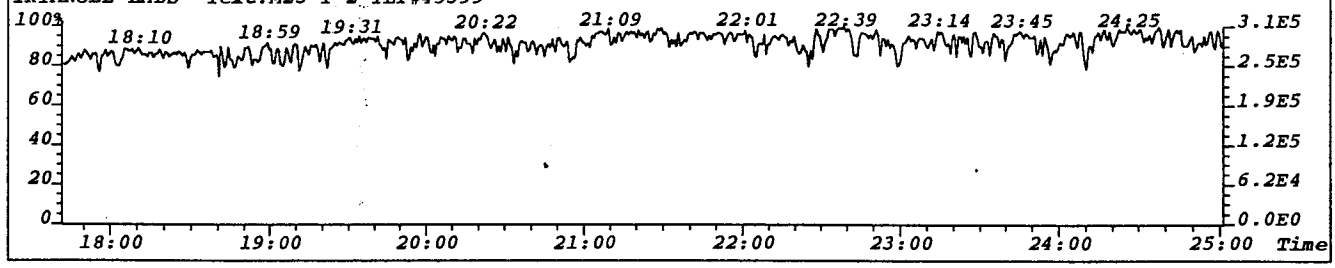
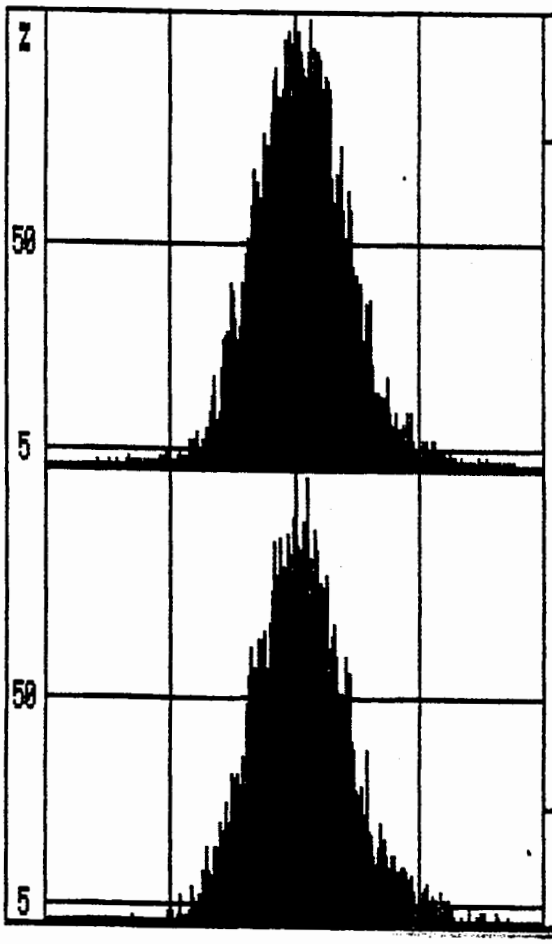


File:P981307 #1-1006 Acq:16-APR-1998 18:12:16 EI+ Voltage SIR 70P
292.9825 Exp:DB225
TRIANGLE LABS Text:M23-I-2 TLI#45399



File:P981307 #1-1006 Acq:16-APR-1998 18:12:16 EI+ Voltage SIR 70P
330.9792 Exp:DB225
TRIANGLE LABS Text:M23-I-2 TLI#45399





Ref. mass 292.9825 Peak top
Height .05 volts Span 200 ppm

System file name	D8225
Data file name	A:P981307
Resolution	10000
Group number	1
Ionization mode	EI+
Switching	VOLTAGE
Ref. masses	292.9825, 380.9761

A	292.9825	J	330.9792
B	303.9016	K	331.9368
C	305.8987	L	333.9338
D	315.9419	M	375.8364
E	317.9389		
F	319.8965		
G	321.8936		
H	327.8847		
I	330.9792		

Channel I 330.9792 Peak top
Height .04 volts Span 200 ppm

Pages 131 through 187 from the Triangle Laboratories, Inc. analytical report have been excluded by PES since these pages present results for samples collected at another lime kiln facility during the same mobilization.

Pacific Environmental Services

TLI Project: **45399** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **M23-O-1** Analysis File: **T981959**

Client Project:	r012.002/Lime Kiln				
Sample Matrix:	M23	Date Received:	04/01/98	Spike File:	SPMIT204
TLI ID:	204-92-5A-D	Date Extracted:	04/03/98	ICal:	TF51308
		Date Analyzed:	04/18/98	ConCal:	T981946
Sample Size:	1.000	Dilution Factor:	n/a	% Moisture:	n/a
Dry Weight:	n/a	Blank File:	U980780	% Lipid:	n/a
GC Column:	DB-5	Analyst:	HLM	% Solids:	n/a

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDD	ND	0.01				___
1,2,3,7,8-PeCDD	ND	0.02				___
1,2,3,4,7,8-HxCDD	ND	0.02				___
1,2,3,6,7,8-HxCDD	ND	0.02				___
1,2,3,7,8,9-HxCDD	ND	0.02				___
1,2,3,4,6,7,8-HpCDD	ND	0.03				___
1,2,3,4,6,7,8,9-OCDD	ND	0.05				___
2,3,7,8-TCDF	EMPC		0.02			B__
1,2,3,7,8-PeCDF	ND	0.01				___
2,3,4,7,8-PeCDF	ND	0.01				___
1,2,3,4,7,8-HxCDF	ND	0.01				___
1,2,3,6,7,8-HxCDF	ND	0.01				___
2,3,4,6,7,8-HxCDF	ND	0.01				___
1,2,3,7,8,9-HxCDF	ND	0.01				___
1,2,3,4,6,7,8-HpCDF	ND	0.02				___
1,2,3,4,7,8,9-HpCDF	ND	0.02				___
1,2,3,4,6,7,8,9-OCDF	ND	0.04				___

Totals	Amt. (ng)	Number	DL	EMPC	Flags
Total TCDD	0.03	1			___
Total PeCDD	ND		0.02		___
Total HxCDD	ND		0.02		___
Total HpCDD	ND		0.03		___
Total TCDF	EMPC			0.02	___
Total PeCDF	EMPC			0.01	___
Total HxCDF	ND		0.01		___
Total HpCDF	ND		0.02		___

MIT2_PSR v1.04, LARS 6.11.00

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Printed: 21:24 04/20/98

Pacific Environmental Services

TLI Project: **45399** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **M23-O-1** Analysis File: **T981959**

Internal Standards	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	0.92	22.9	40%-130%	0.75	25:23	V___
$^{13}C_{12}$-2,3,7,8-TCDD	0.89	22.3	40%-130%	0.77	26:07	V___
$^{13}C_{12}$-1,2,3,7,8-PeCDF	1.0	25.6	40%-130%	1.42	29:23	V___
$^{13}C_{12}$-1,2,3,7,8-PeCDD	1.3	31.3	40%-130%	1.50	30:26	V___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	1.4	35.4	40%-130%	0.49	32:57	V___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	1.5	36.3	40%-130%	1.20	33:38	V___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	1.3	33.7	25%-130%	0.43	35:47	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	1.5	38.7	25%-130%	1.03	36:49	___
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	2.0	25.1	25%-130%	0.85	40:21	___

Surrogate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,4,7,8-PeCDF	4.3	107	40%-130%	1.41	30:05	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	3.7	91.3	40%-130%	0.49	32:51	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	4.0	99.4	40%-130%	1.21	33:33	___
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	3.4	84.8	25%-130%	0.42	37:18	___

Other Standard	Amt. (ng)	% Recovery	QC Limits	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	3.7	92.6	40%-130%	26:08	___

Alternate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	1.5	38.5	40%-130%	0.49	34:11	V___
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	1.6	39.2	40%-130%	0.49	33:26	V___

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.81	25:56	___
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.21	33:56	___

Data Reviewer: GM 04/20/98

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Printed: 21:24 04/20/98

Initial ....Date...

Data Review By: GM 4/21/98 Calculated Noise Area: 0.22

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 T981959B.dbf
04/20/98 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				0.868-1.077			
304-306		DC	NL	0:00		0.75	0.49			0.000			
	D	D	SN	24:20		0.67	0.85			0.959			
	AN			25:24	RO	0.59	1.13	0.49	0.83	1.001	2378-TCDF	AN	
304-306			1	Peak			1.13						
13C12-TCDF						0.65-0.89				0.961-1.039			
316-318		DC	NL	0:00	RO	1.17	0.32			0.000			
		DC	WL	24:20		0.66	2.81			0.959			
				24:57		0.69	1.10	0.45	0.65	0.983			
				25:23		0.75	167.91	72.03	95.88	1.000	13C12-2378-TCDF	ISO	
316-318			2	Peaks			169.01						

---------- Above: TCDF / TCDD Follows ----------

TCDD						0.65-0.89				0.896-1.045			
320-322		DC	NL	0:00	RO	1.00	0.21			0.000			
				23:32		0.71	1.16	0.48	0.68	0.901			J
		DC	SN	23:41	RO	0.50	0.09			0.907			
		DC	SN	23:56	RO	0.96	0.42			0.916			
320-322			1	Peak			1.16						
37Cl-TCDD										0.924-1.076			
328		DC	NL	0:00			0.12			0.000			
				24:44			0.94	0.94		0.947			
		DC	SN	24:52			0.21			0.952			
				26:08			121.33	121.33		1.001	37Cl-TCDD	CLS	
		DC	SN	26:32			0.26			1.016			
		DC	SN	26:36			0.23			1.019			
				26:44			0.31	0.31		1.024			
				27:26			0.28	0.28		1.050			
328			4	Peaks			122.86						
13C12-TCDD						0.65-0.89				0.924-1.076			
332-334		DC	NL	0:00	RO	2.02	0.78			0.000			
				25:56		0.81	493.80	221.27	272.53	0.993	13C12-1234-TCDD	RS1	
				26:07		0.77	125.94	54.85	71.09	1.000	13C12-2378-TCDD	IS1	
332-334			2	Peaks			619.74						

---------- Above: TCDD / PeCDF Follows ----------

PeCDF						1.32-1.78				0.926-1.063			
340-342		DC	NL	0:00	RO	0.71	0.16			0.000			
		DC	SN	27:13	RO	0.21	0.21			0.926			

```
Compound/
M_Z.... QC.Log Omit Why ..RT. OK Ratio Total.Area... Area.Peak.1.. Area.Peak.2.. Rel.RT Compound.Name.. ID.. Flags.

        K              27:24 RO  0.81          0.41          0.25          0.31  0.933                       J
340-342              1 Peak                    0.41

13C12-PeCDF                     1.32-1.78                                   0.864-1.136
352-354         DC  NL   0:00 RO  0.89          0.13                              0.000
                        28:31     1.45          4.76          2.82          1.94  0.971
                DC  SN  29:00 RO  2.00          0.23                              0.987
                        29:23     1.42        156.28         91.79         64.49  1.000 13C12-PeCDF 123 IS2
                        29:40     1.54          1.78          1.08          0.70  1.010
                        30:05     1.41        168.59         98.75         69.84  1.024 13C12-PeCDF 234 SUR1
                        31:04     1.45          0.71          0.42          0.29  1.057
352-354              5 Peaks                  332.12

                ---------------------- Above: PeCDF / PeCDD Follows ---------------------

PeCDD                           1.32-1.78                                   0.936-1.021
356-358         DC  NL   0:00 RO  1.00          0.16                              0.000
                DC  SN  28:37 RO  0.67          0.16                              0.940
                DC  SN  29:50 RO  0.80          0.13                              0.980
356-358              0 Peaks                    0.00

13C12-PeCDD                     1.32-1.78                                   0.869-1.131
368-370         DC  NL   0:00 RO  1.00          0.16                              0.000
                DC  SN  29:20 RO  0.79          0.31                              0.964
                DC  SN  29:29     1.38          0.31                              0.969
                        30:26     1.50        105.91         63.62         42.29  1.000 13C12-PeCDD 123 IS3
                        30:34     1.51         12.03          7.23          4.80  1.004
                DC  SN  30:43 RO  3.21          0.36                              1.009
                DC  SN  31:12     1.43          0.17                              1.025
368-370              2 Peaks                  117.94

                ---------------------- Above: PeCDD / HxCDF Follows ---------------------

HxCDF                           1.05-1.43                                   0.963-1.045
374-376         DC  NL   0:00     1.10          0.21                              0.000
                DC  SN  32:03     1.38          0.38                              0.973
                DC  SN  32:12 RO  0.60          0.05                              0.977
                DC  SN  32:16 RO  1.60          0.11                              0.979
                DC  SN  32:22 RO  0.67          0.04                              0.982
                DC  SN  33:26     1.14          0.15                              1.015 234678-HxCDF    AN
                DC  SN  33:32 RO  1.67          0.07                              1.018
374-376              0 Peaks                    0.00

13C12-HxCDF                     0.43-0.59                                   0.879-1.121
384-386         DC  NL   0:00 RO  1.13          0.12                              0.000
                        31:52     0.45          1.71          0.53          1.18  0.967
                        32:01     0.45          2.25          0.70          1.55  0.972
                        32:51     0.49        146.92         48.51         98.41  0.997 13C12-HxCDF 478 SUR2
                        32:57     0.49        167.31         55.04        112.27  1.000 13C12-HxCDF 678 IS4
                        33:11 RO  0.64          1.13          0.48          0.75  1.007
                        33:26     0.49        174.61         57.51        117.10  1.015 13C12-HxCDF 234 ALT2
                DC  SN  33:44 RO  0.42          0.80                              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	SN		34:02		0.46	0.19			1.033			
				34:11		0.49	132.88	43.99	88.89	1.037	13C12-HxCDF	789	ALT1
	DC	SN		34:41	RO	0.94	0.24			1.053			
384-386			7	Peaks			626.81						
---------- Above: HxCDF / HxCDD Follows ----------													
HxCDD						1.05-1.43				0.958-1.013			
390-392	DC	NL		0:00	RO	0.75	0.16			0.000			
	DC	SN		32:49		1.36	0.26			0.976			
390-392			0	Peaks			0.00						
13C12-HxCDD						1.05-1.43				0.970-1.030			
402-404	DC	NL		0:00	RO	0.93	0.25			0.000			
				33:02		1.05	0.76	0.39	0.37	0.982			
				33:33		1.21	109.34	59.96	49.38	0.998	13C12-HxCDD	478	SUR3
				33:38		1.20	131.53	71.76	59.77	1.000	13C12-HxCDD	678	IS5
				33:56		1.21	359.76	197.13	162.63	1.009	13C12-HxCDD	789	RS2
	DC	SN		34:23	RO	0.39	0.33			1.022			
				34:25		1.20	0.88	0.48	0.40	1.023			
402-404			5	Peaks			602.27						
---------- Above: HxCDD / HpCDF Follows ----------													
HpCDF						0.88-1.20				0.996-1.047			
408-410	DC	NL		0:00		1.13	0.17			0.000			
	DC	SN		35:47	RO	3.00	0.18			1.000	1234678-HpCDF		AN
	DC	SN		35:54	RO	1.40	0.10			1.003			
408-410			0	Peaks			0.00						
13C12-HpCDF						0.37-0.51				0.944-1.112			
418-420	DC	NL		0:00	RO	0.92	0.17			0.000			
				35:47		0.43	89.68	27.02	62.66	1.000	13C12-HpCDF	678	IS6
	DC	SN		36:04	RO	0.32	0.62			1.008			
	DC	SN		36:11		0.48	0.34			1.011			
				37:18		0.42	54.97	16.38	38.59	1.042	13C12-HpCDF	789	SUR4
	DC	SN		37:42	RO	0.62	0.30			1.054			
	DC	SN		37:45	RO	0.72	0.26			1.055			
418-420			2	Peaks			144.65						
---------- Above: HpCDF / HpCDD Follows ----------													
HpCDD						0.88-1.20				0.976-1.005			
424-426	DC	NL		0:00		1.00	0.16			0.000			
424-426			0	Peaks			0.00						
13C12-HpCDD						0.88-1.20				0.973-1.027			
436-438	DC	NL		0:00		1.00	0.18			0.000			
				36:05		1.00	0.66	0.33	0.33	0.980			
				36:49		1.03	84.73	42.99	41.74	1.000	13C12-HpCDD	678	IS7
	DC	SN		37:13	RO	3.00	0.24			1.011			
	DC	SN		37:20		0.90	0.19			1.014			

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				85.39						

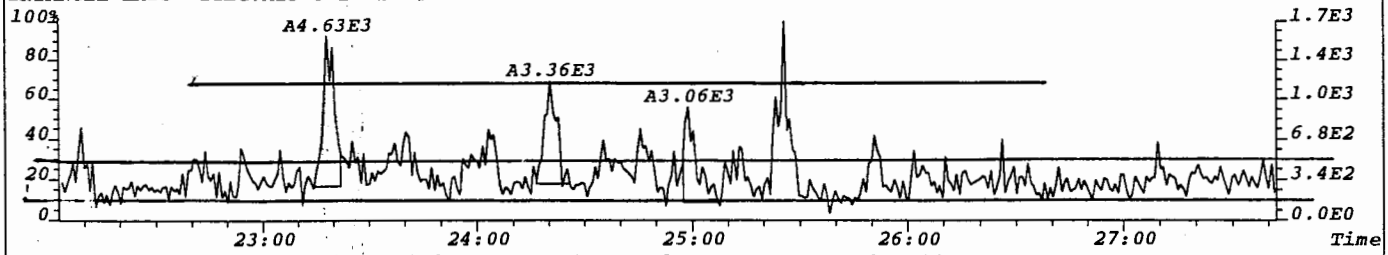
---------- Above: HpCDD / Octa-CDD and CDF Follows ----------

OCDF						0.76-1.02				0.901-1.099			
442-444	DC	NL		0:00		1.00	0.18			0.000			
	DC	SN		41:26	RO	0.58	0.15			1.027			
	DC	SN		41:57	RO	9.00	0.02			1.040			
442-444			0 Peaks				0.00						
OCDD						0.76-1.02				0.901-1.099			
458-460	DC	NL		0:00		1.00	0.14			0.000			
458-460			0 Peaks				0.00						
13C12-OCDD						0.76-1.02				0.996-1.004			
470-472	DC	NL		0:00		1.00	0.16			0.000			
				40:21		0.85	73.77	33.99	39.78	1.000	13C12-OCDD		IS8
470-472			1 Peak				73.77						

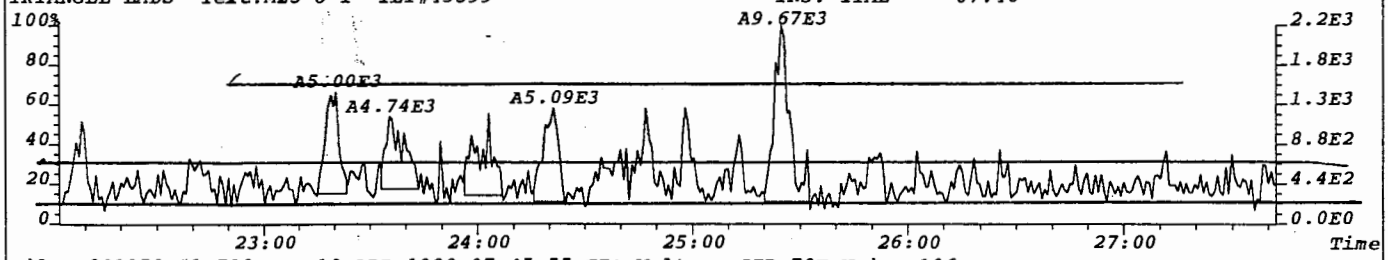
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside 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
		X-Ether Interference

*** End of Report ***

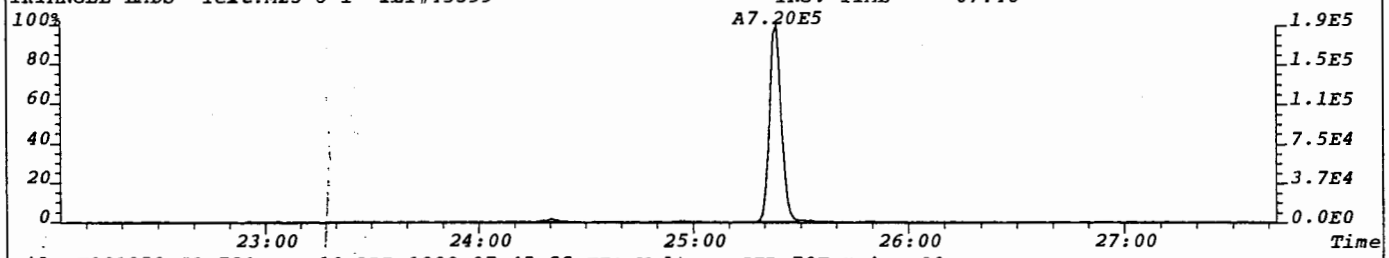
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:106
303.9016 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,424.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



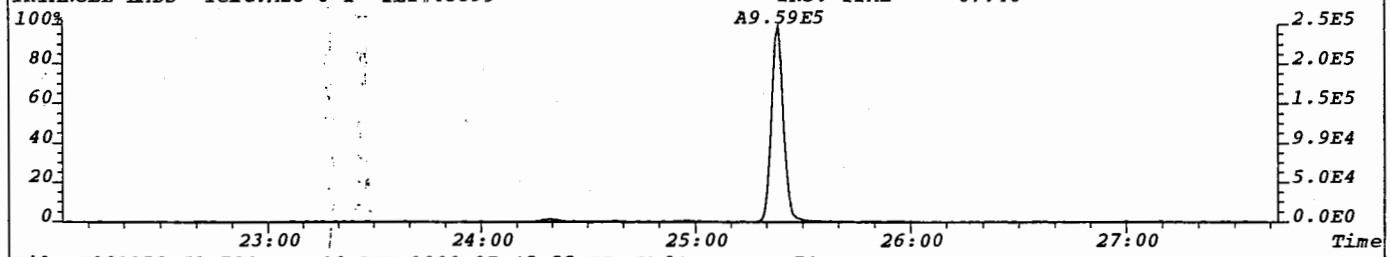
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:141
305.8987 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,564.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



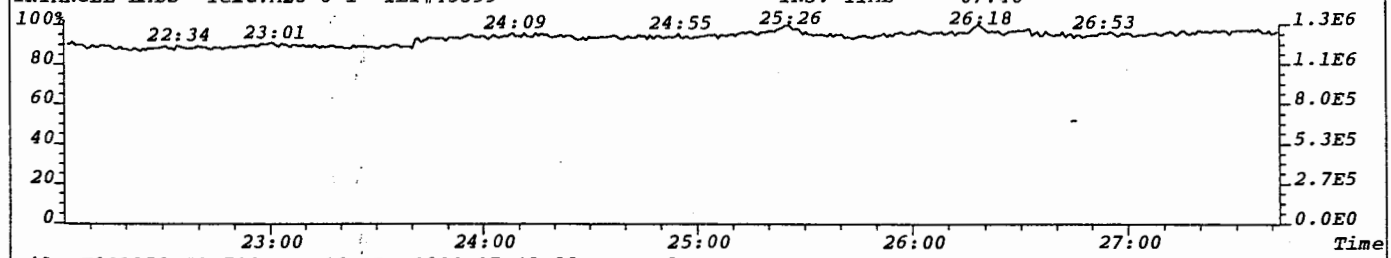
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:106
315.9419 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,424.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



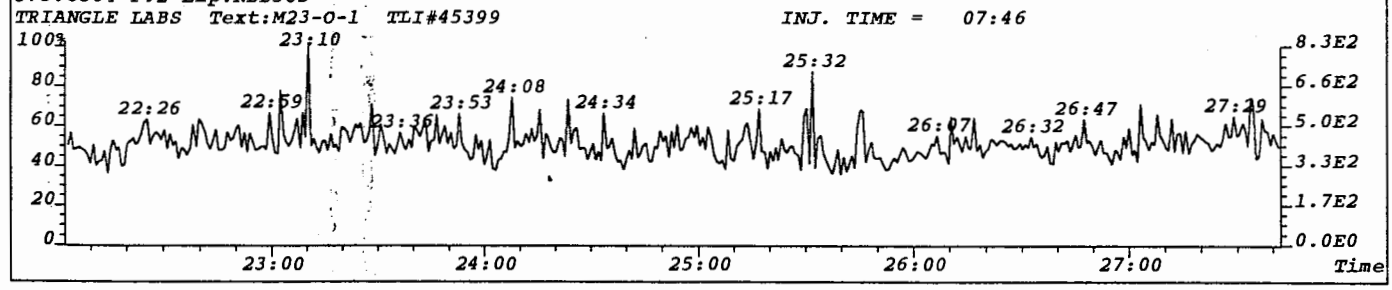
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:90
317.9389 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,360.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



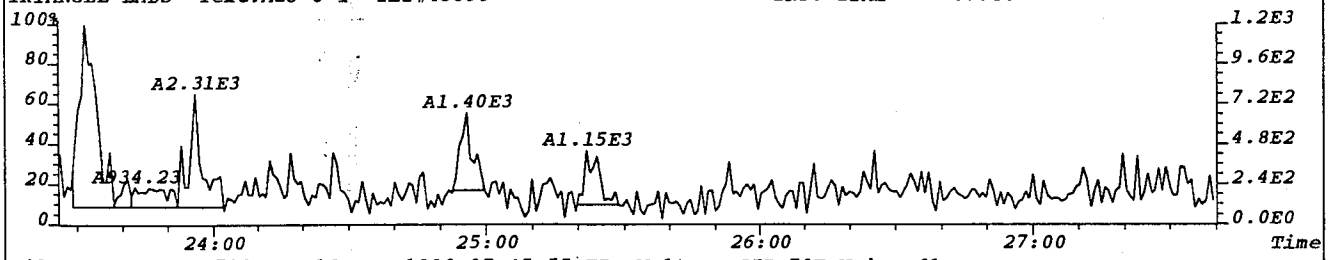
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



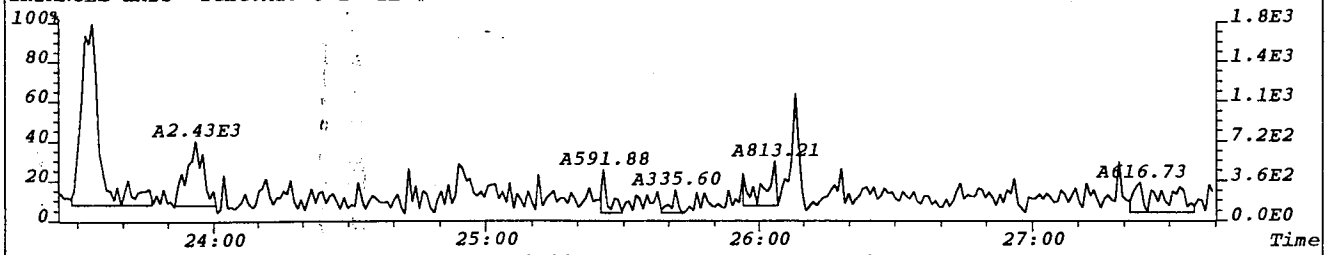
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
375.8364 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



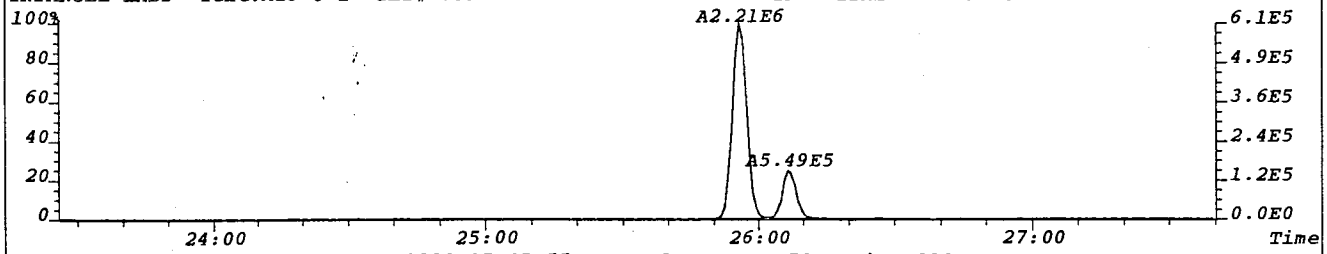
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:58
319.8965 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,232.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



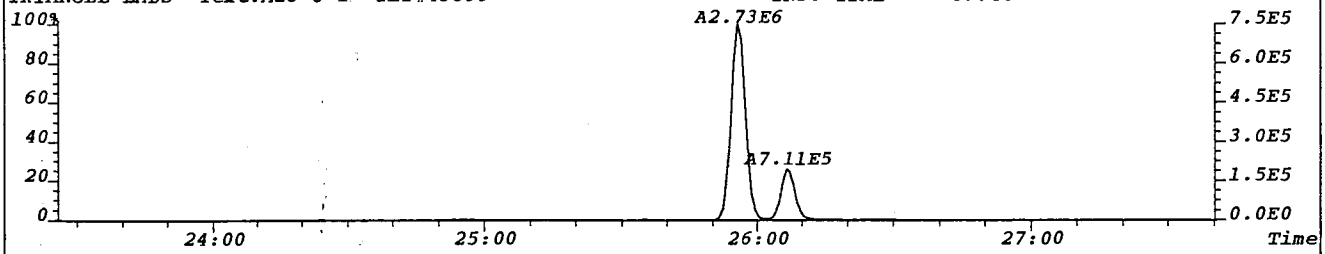
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:61
321.8936 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,244.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



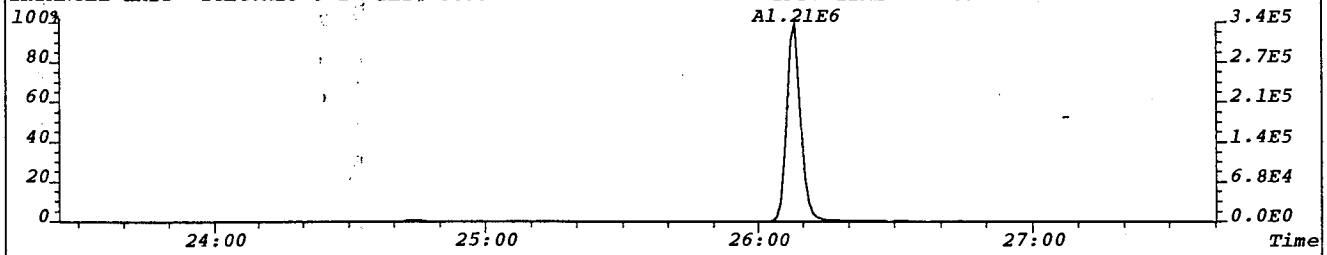
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:443
331.9368 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,1772.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



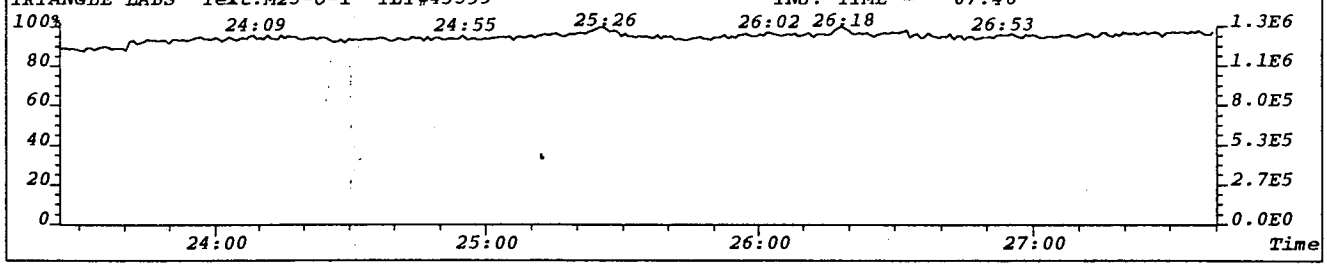
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:220
333.9338 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,880.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



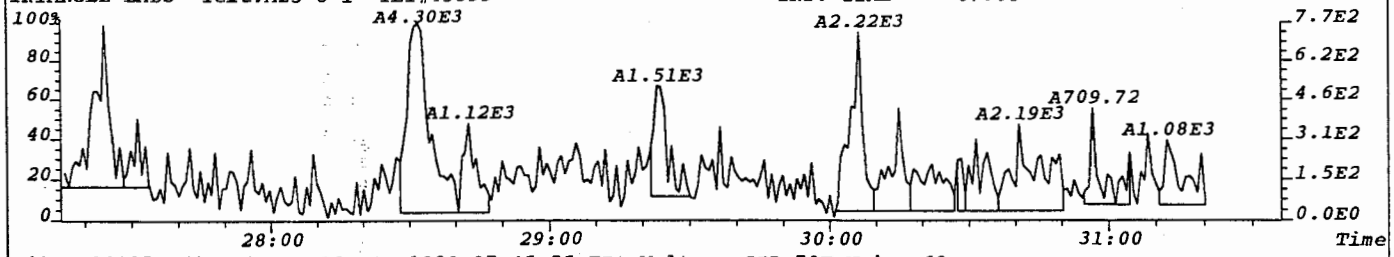
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:58
327.8847 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,232.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



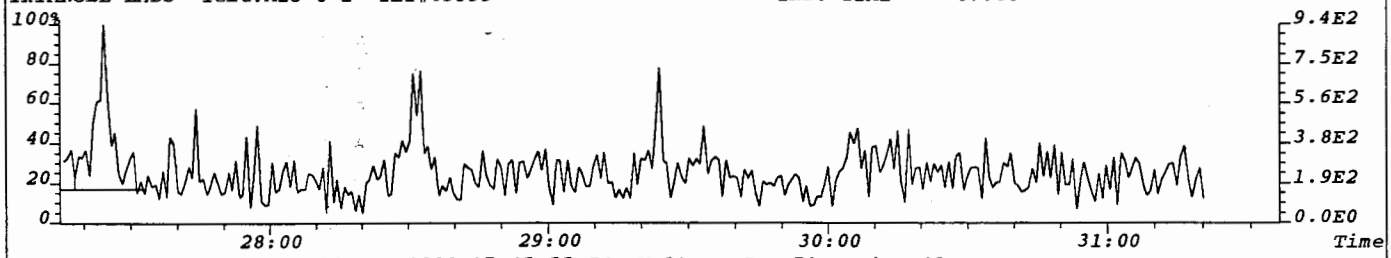
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



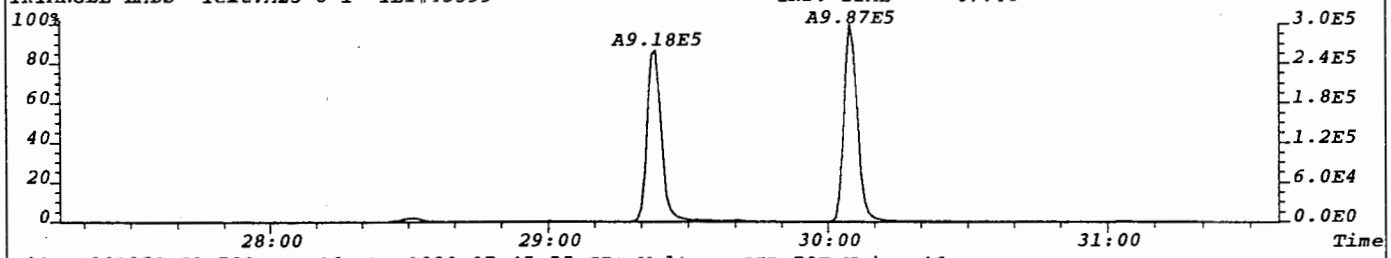
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:50
339.8597 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,200.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



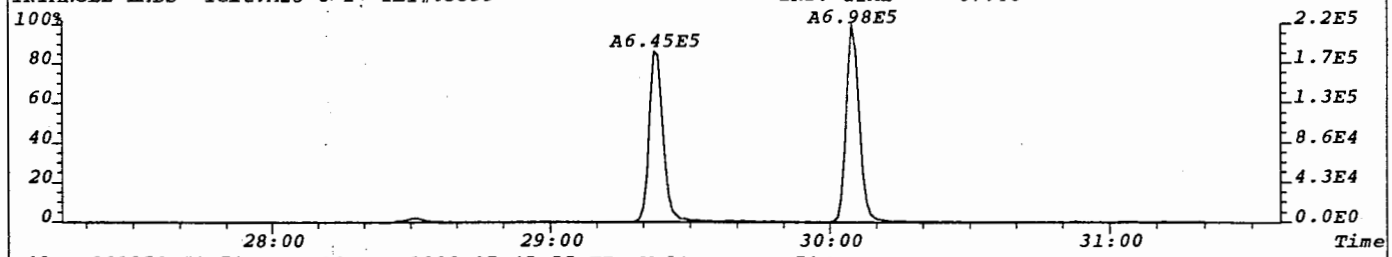
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:69
341.8567 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,276.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



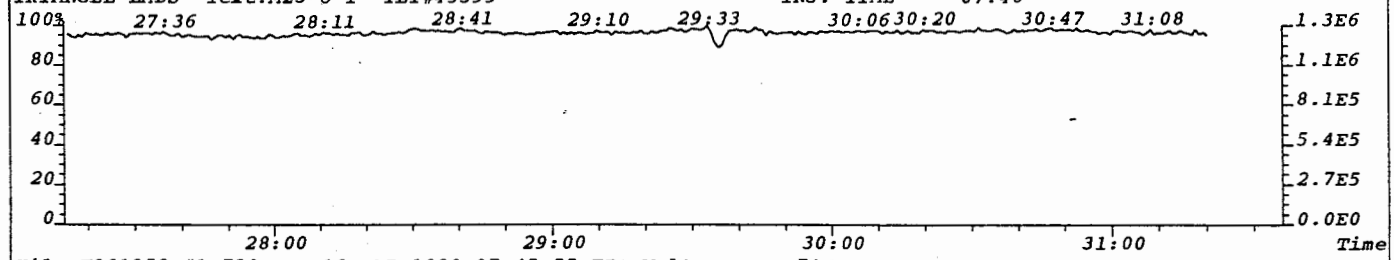
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:42
351.9000 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,168.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



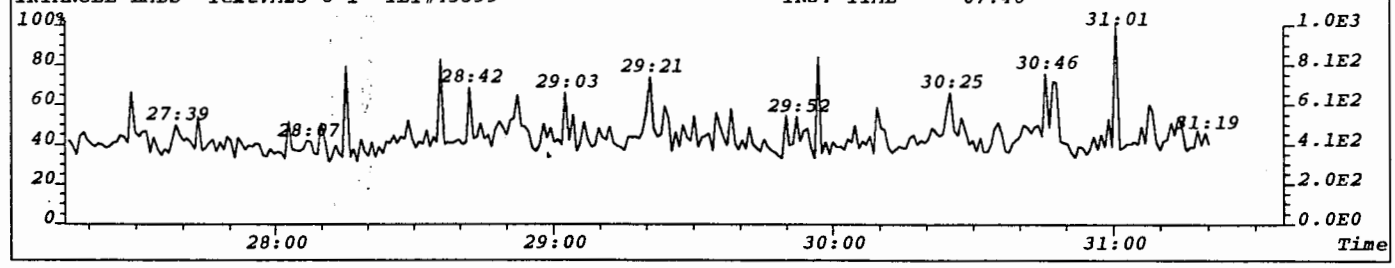
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:46
353.8970 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,184.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



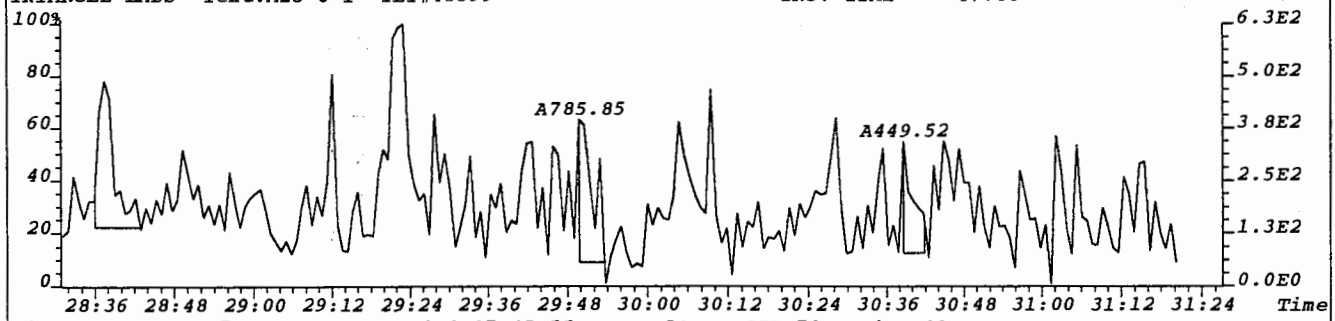
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



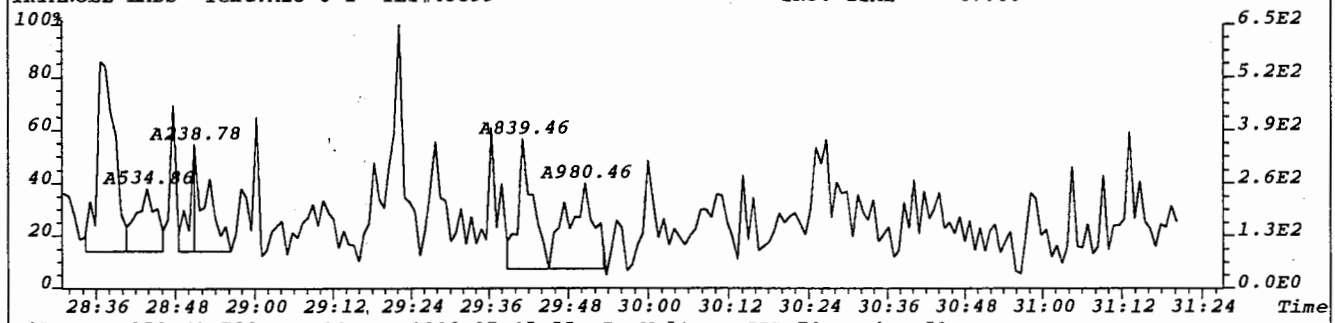
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
409.7974 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



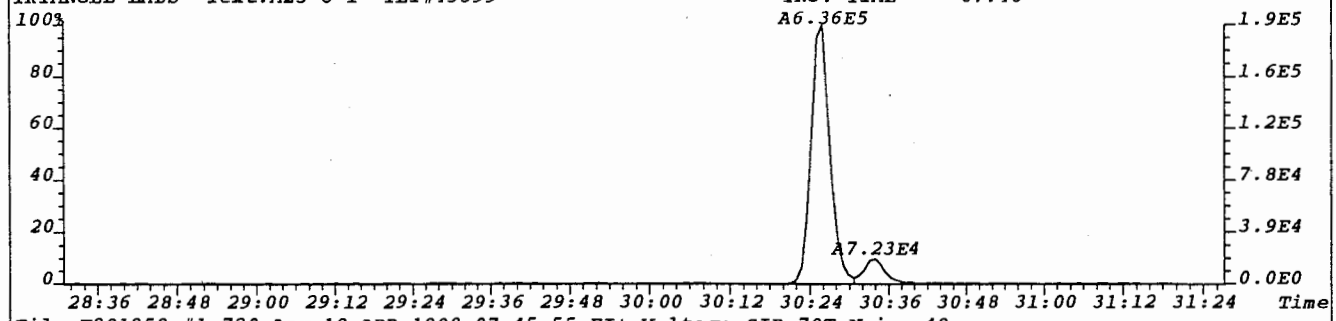
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:50
355.8546 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,200.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



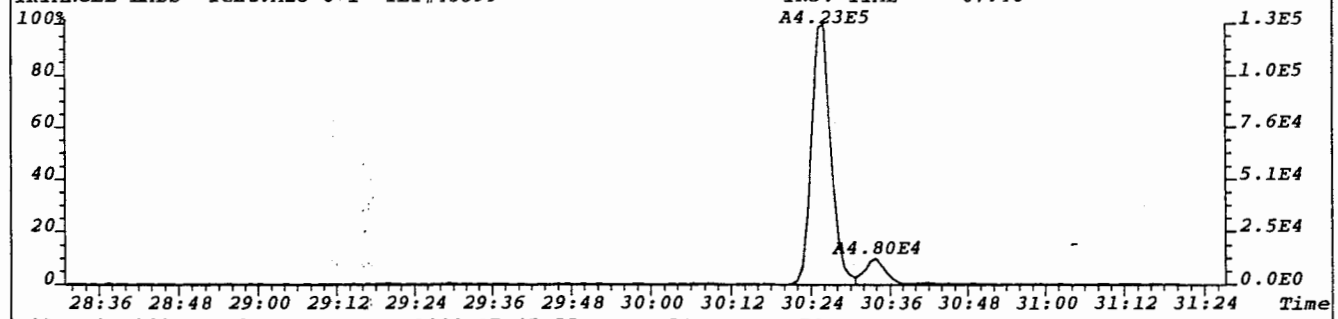
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:49
357.8516 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,196.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



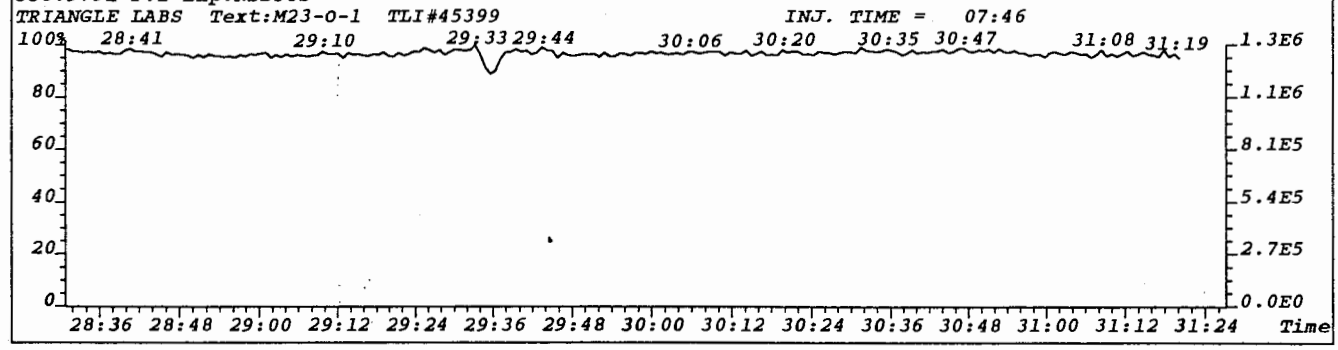
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:51
367.8949 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,204.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



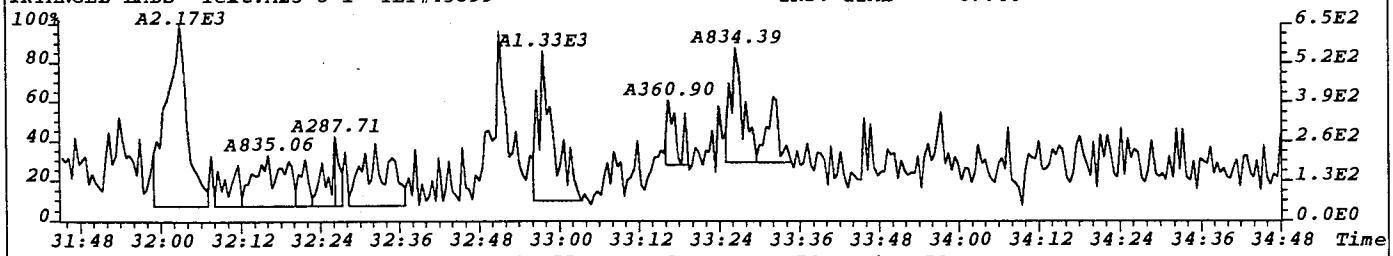
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:49
369.8919 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,196.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



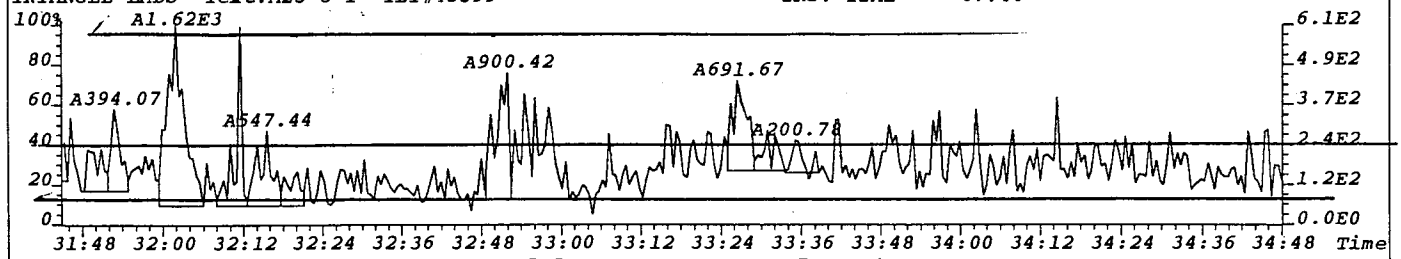
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



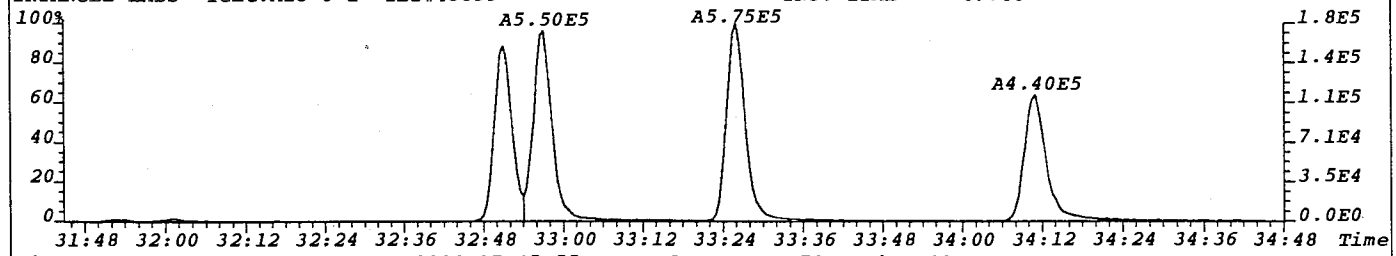
File:T981959 #1-425 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:56
373.8208 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,224.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-0-1 TLI#45399 INJ. TIME = 07:46



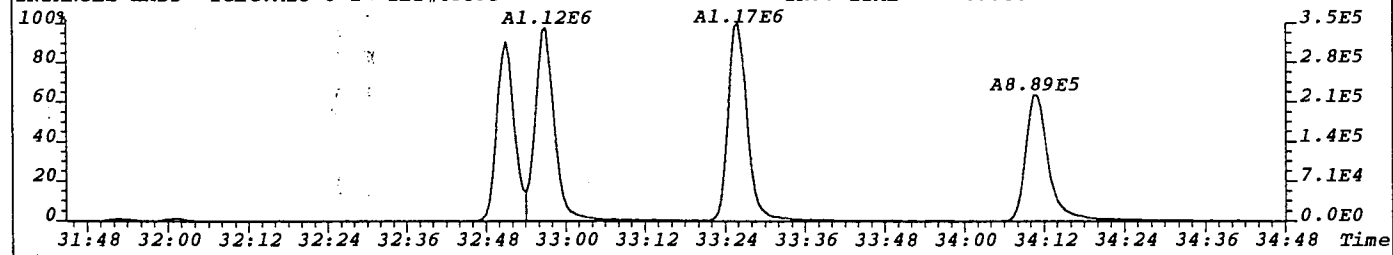
File:T981959 #1-425 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:52
375.8178 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,208.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-0-1 TLI#45399 INJ. TIME = 07:46



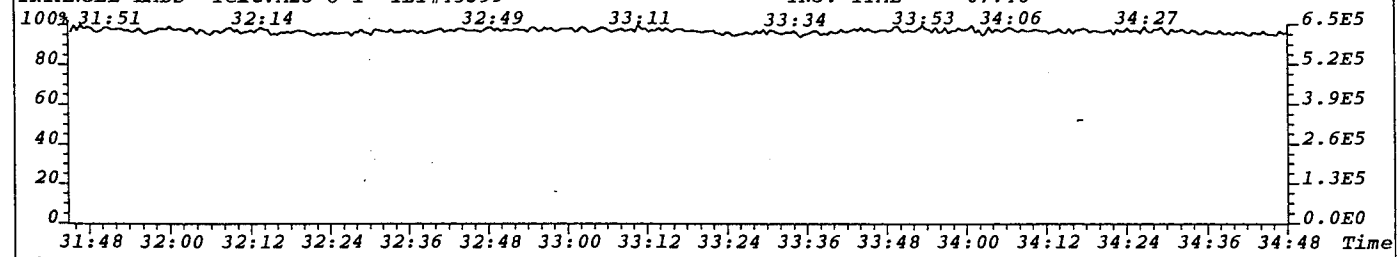
File:T981959 #1-425 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:44
383.8639 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,176.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-0-1 TLI#45399 INJ. TIME = 07:46



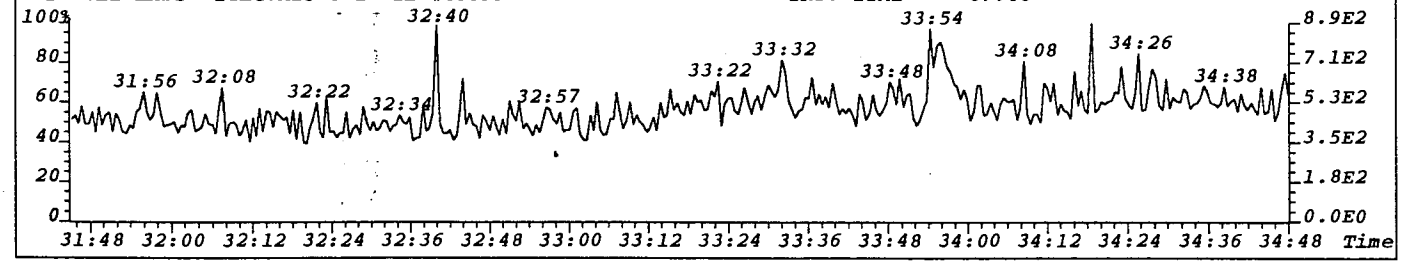
File:T981959 #1-425 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:41
385.8610 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,164.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-0-1 TLI#45399 INJ. TIME = 07:46



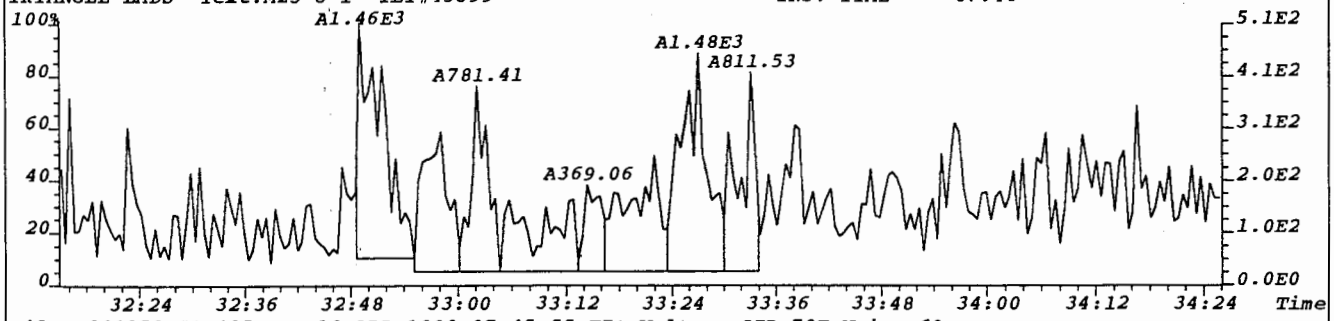
File:T981959 #1-425 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
392.9760 F:3 Exp:NDB5US
TRIANGLE LABS Text:M23-0-1 TLI#45399 INJ. TIME = 07:46



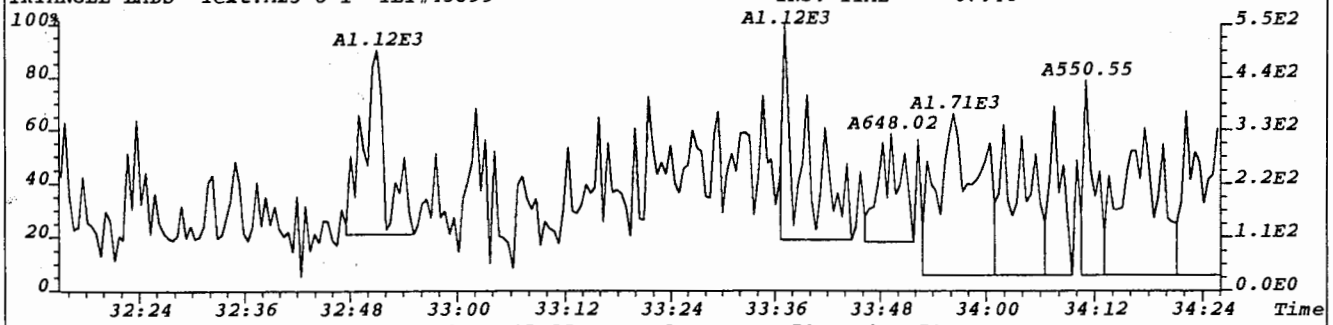
File:T981959 #1-425 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
445.7555 F:3 Exp:NDB5US
TRIANGLE LABS Text:M23-0-1 TLI#45399 INJ. TIME = 07:46



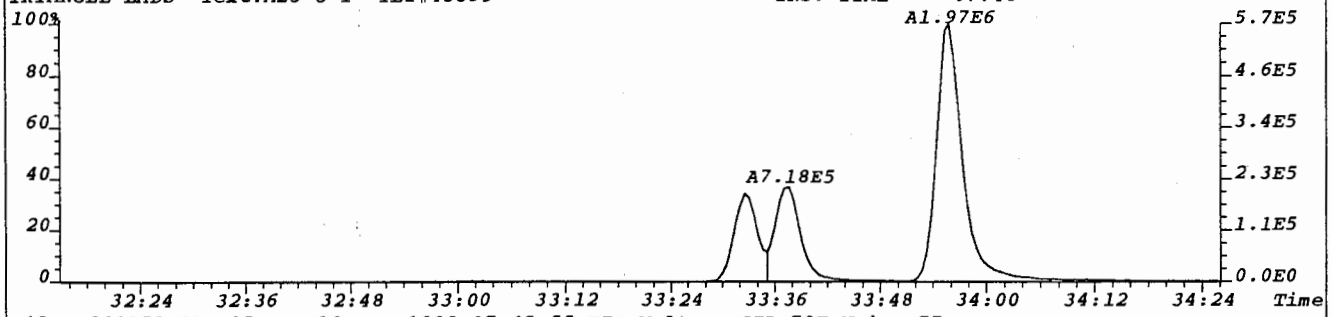
File:T981959 #1-425 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:45
389.8156 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,180.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-0-1 TLI#45399 INJ. TIME = 07:46



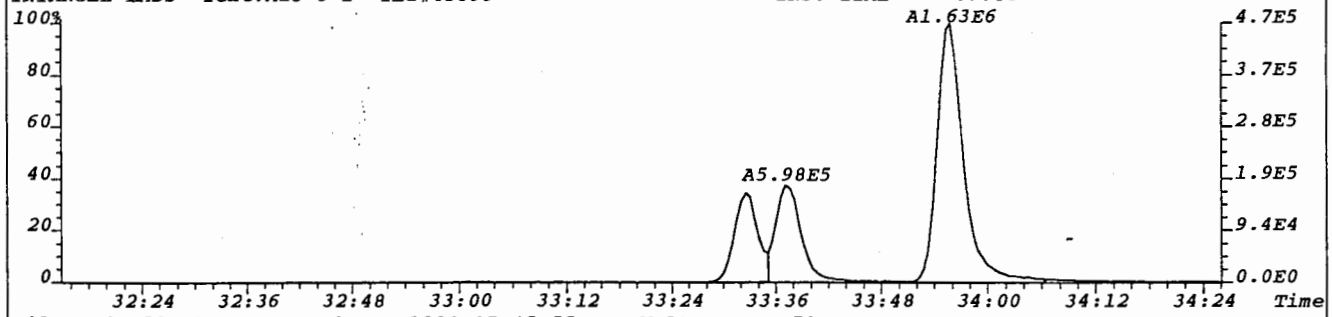
File:T981959 #1-425 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:60
391.8127 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,240.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-0-1 TLI#45399 INJ. TIME = 07:46



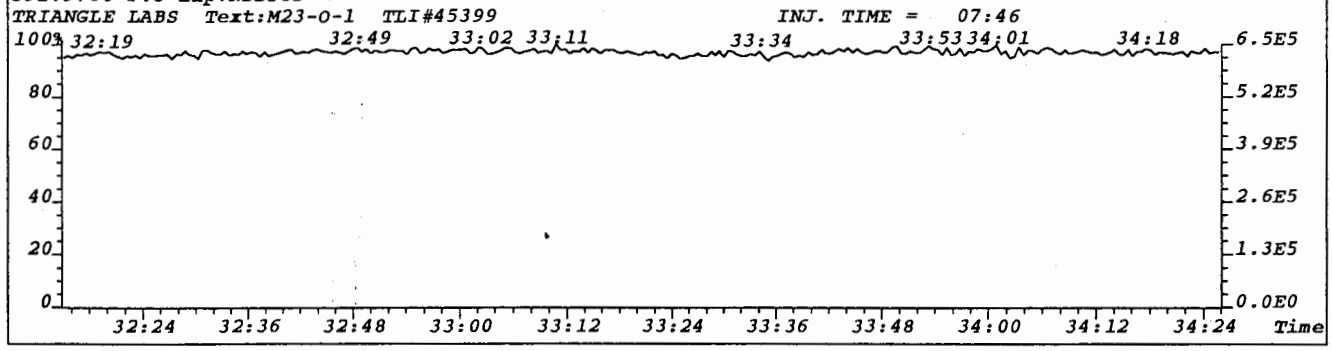
File:T981959 #1-425 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:71
401.8558 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,284.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-0-1 TLI#45399 INJ. TIME = 07:46



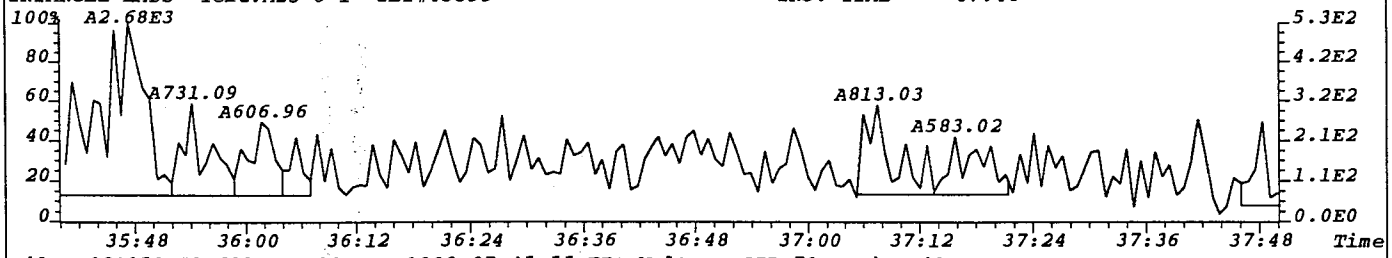
File:T981959 #1-425 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:77
403.8529 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,308.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-0-1 TLI#45399 INJ. TIME = 07:46



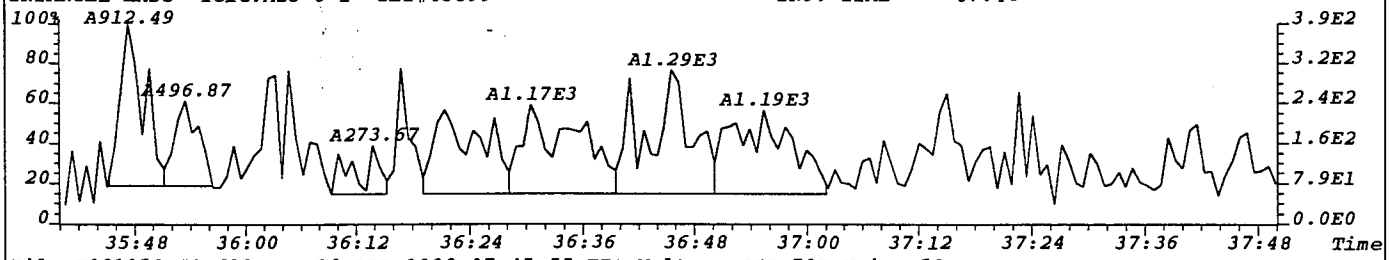
File:T981959 #1-425 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
392.9760 F:3 Exp:NDB5US
TRIANGLE LABS Text:M23-0-1 TLI#45399 INJ. TIME = 07:46



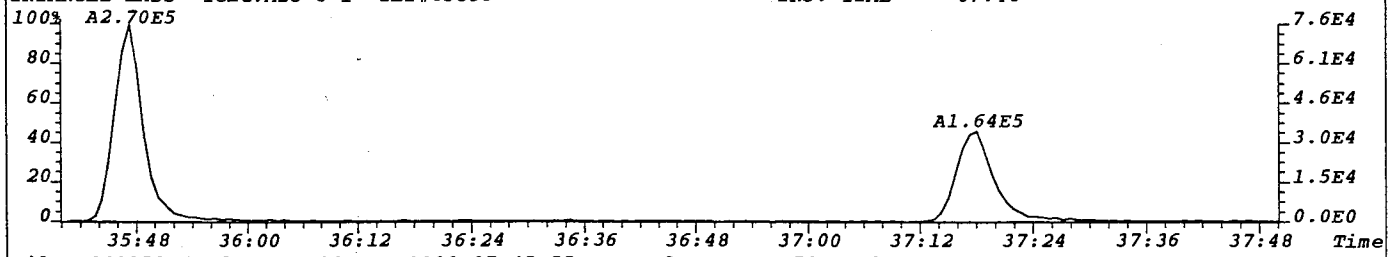
File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:47
407.7818 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,188.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



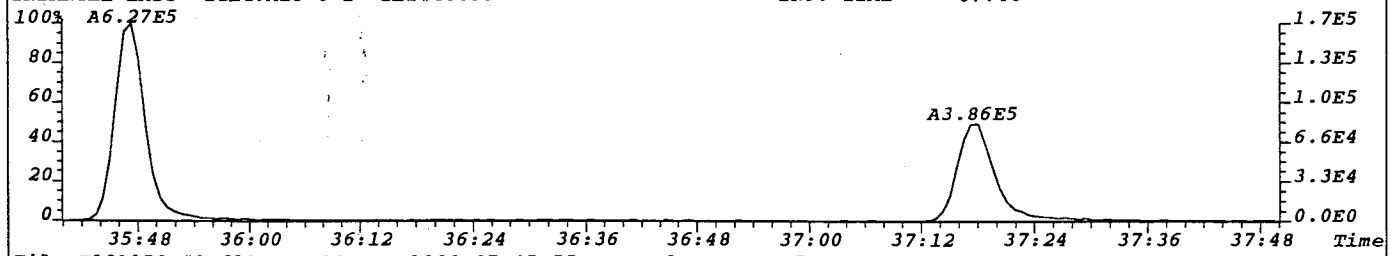
File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:42
409.7789 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,168.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



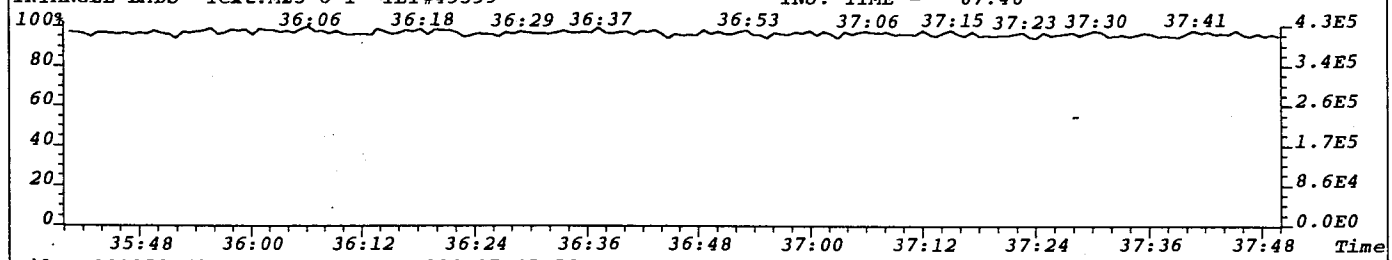
File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:53
417.8253 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,212.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



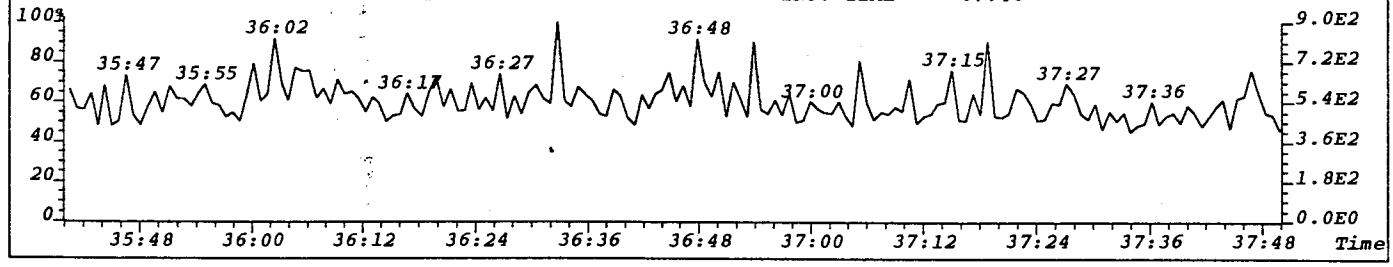
File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:58
419.8220 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,232.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



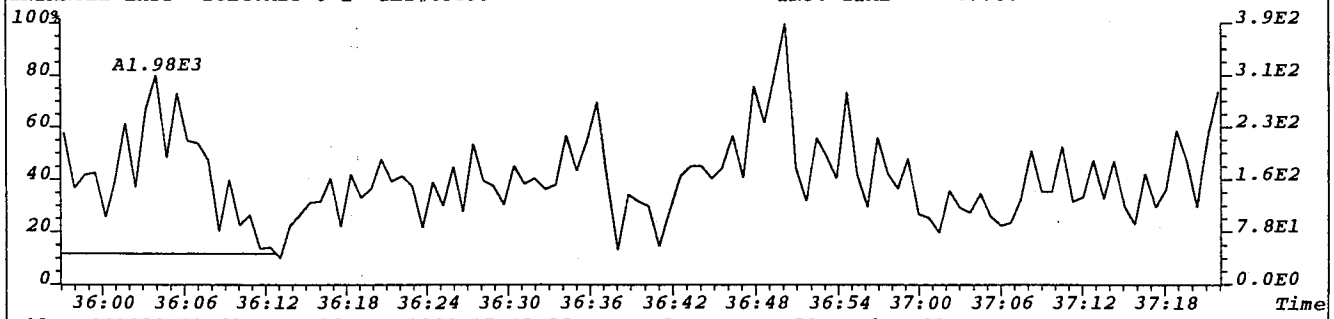
File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



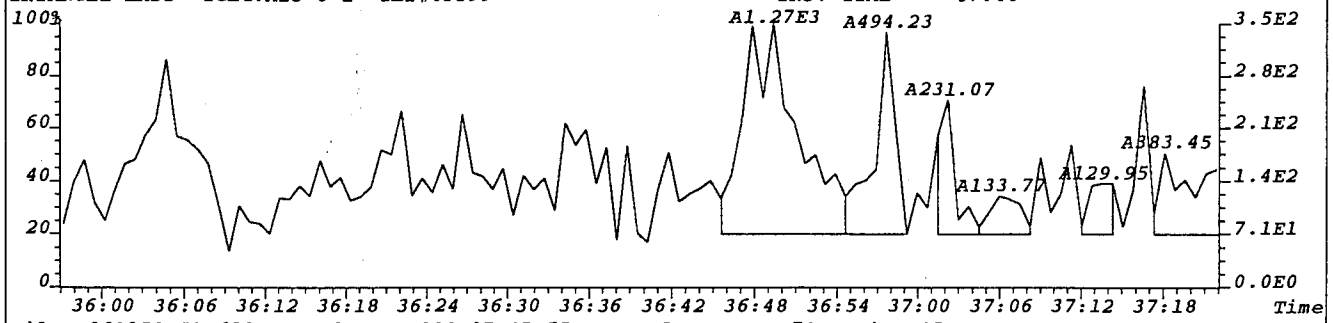
File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
479.7165 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



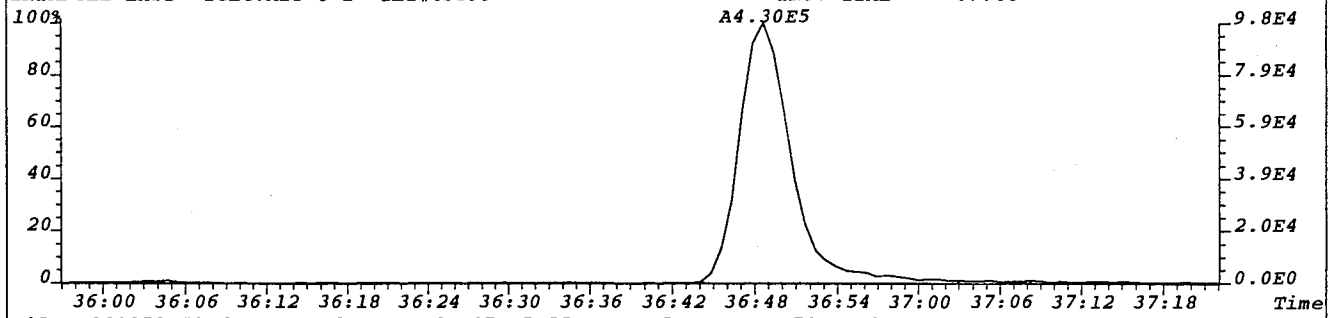
File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:40
423.7766 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,160.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-0-1 TLI#45399 INJ. TIME = 07:46



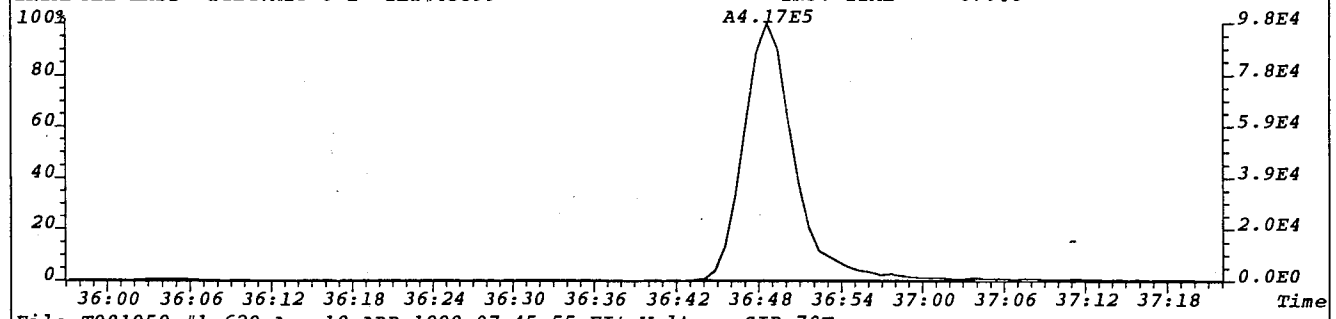
File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:39
425.7737 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,156.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-0-1 TLI#45399 INJ. TIME = 07:46



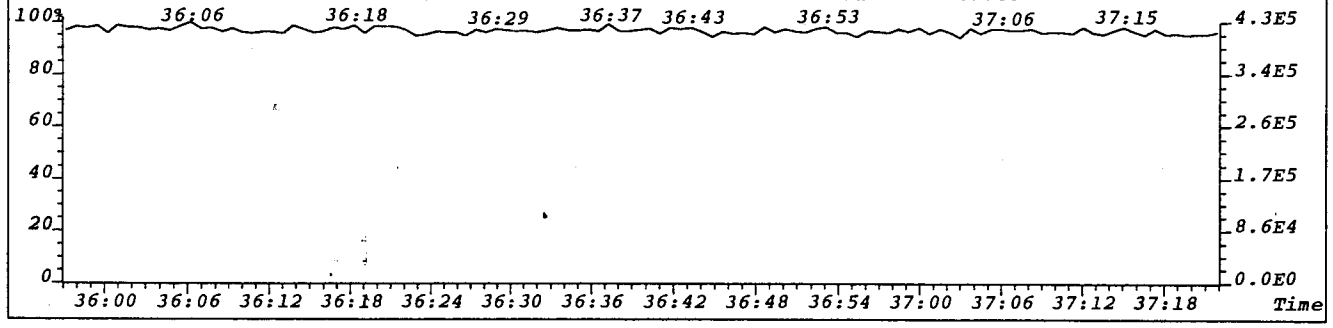
File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:45
435.8169 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,180.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-0-1 TLI#45399 INJ. TIME = 07:46



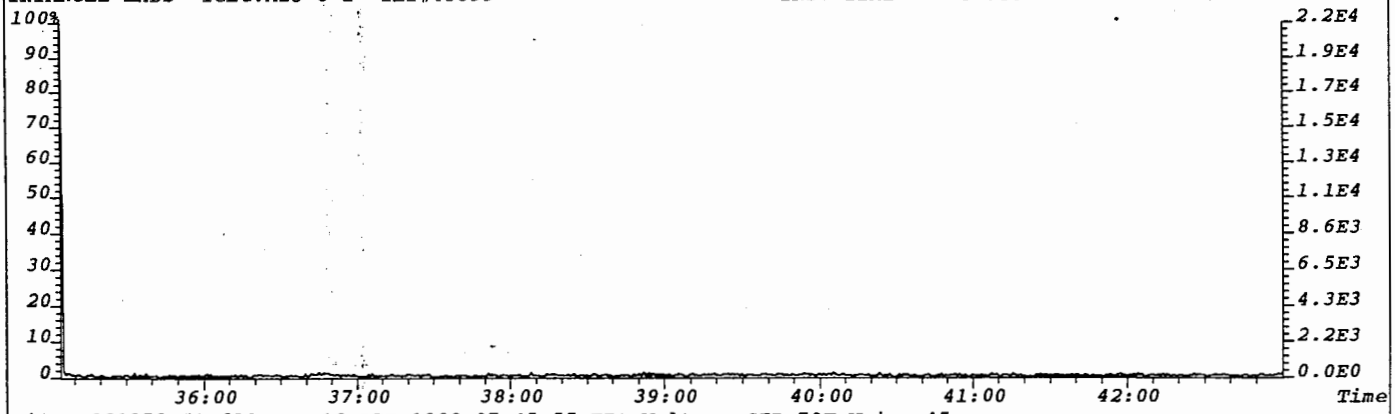
File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:47
437.8140 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,188.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-0-1 TLI#45399 INJ. TIME = 07:46



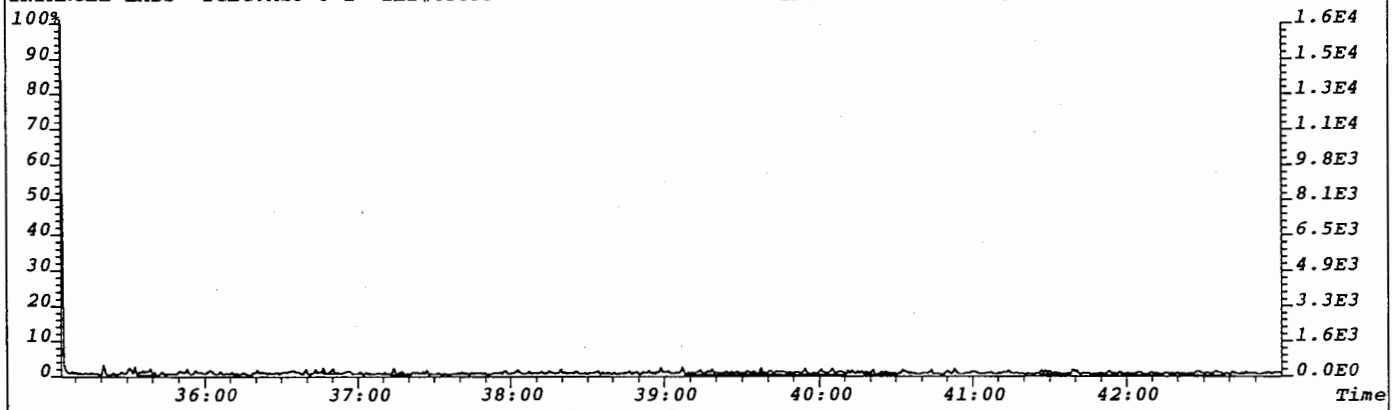
File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-0-1 TLI#45399 INJ. TIME = 07:46



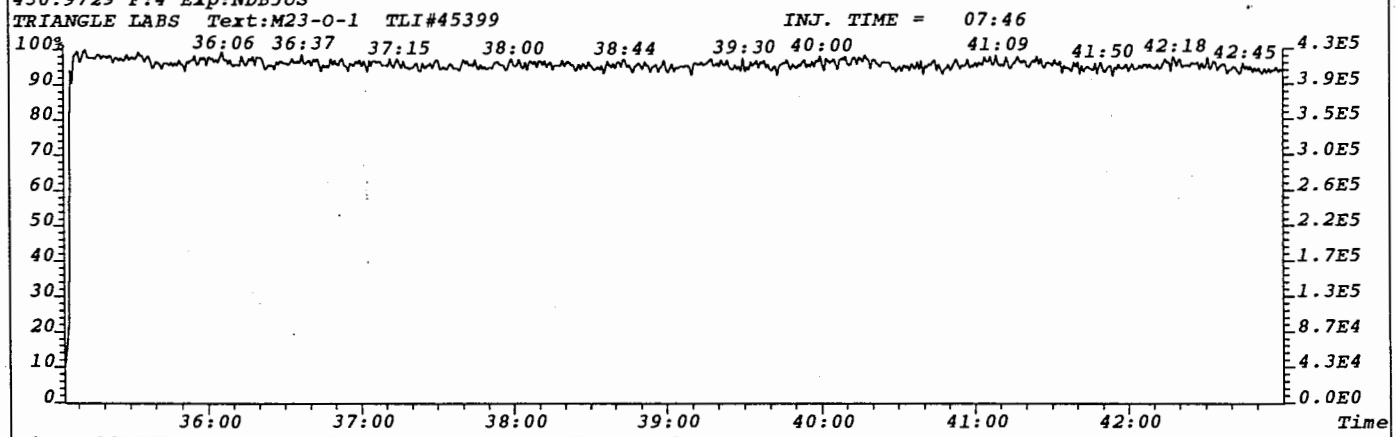
File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:43
441.7428 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,172.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



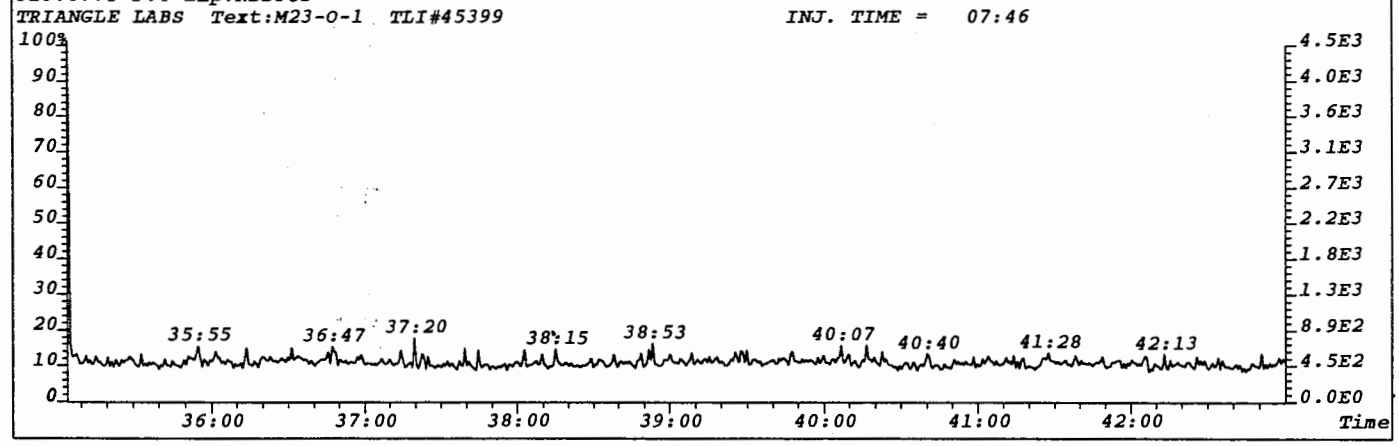
File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:45
443.7399 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,180.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



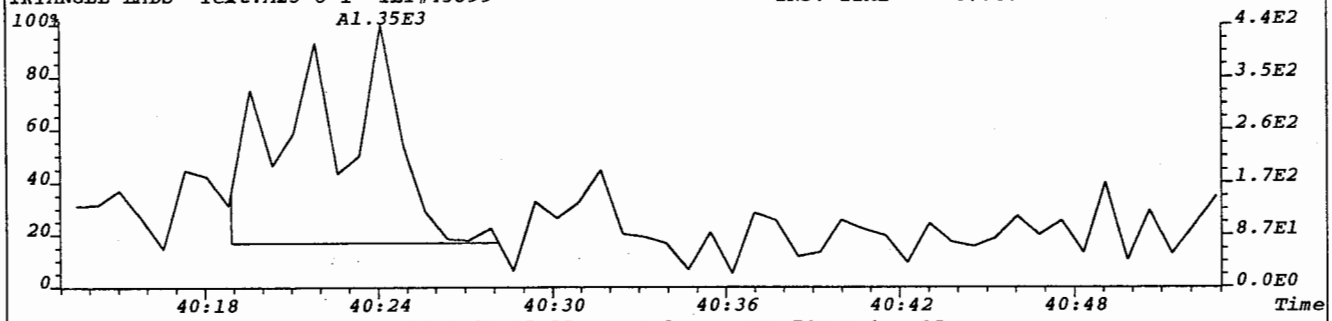
File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



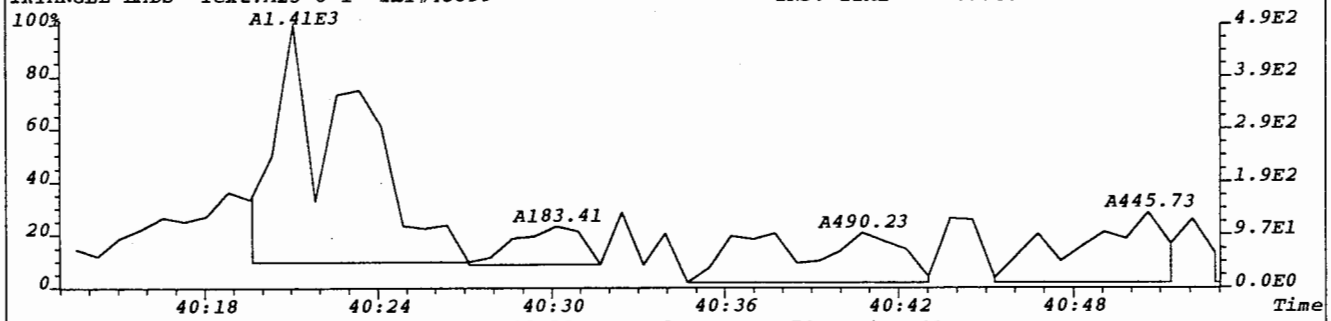
File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
513.6775 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



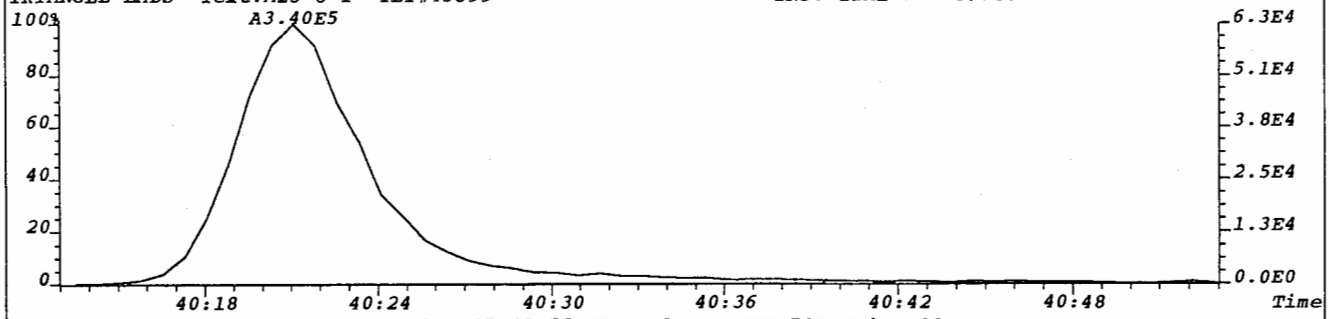
File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:37
457.7377 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,148.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



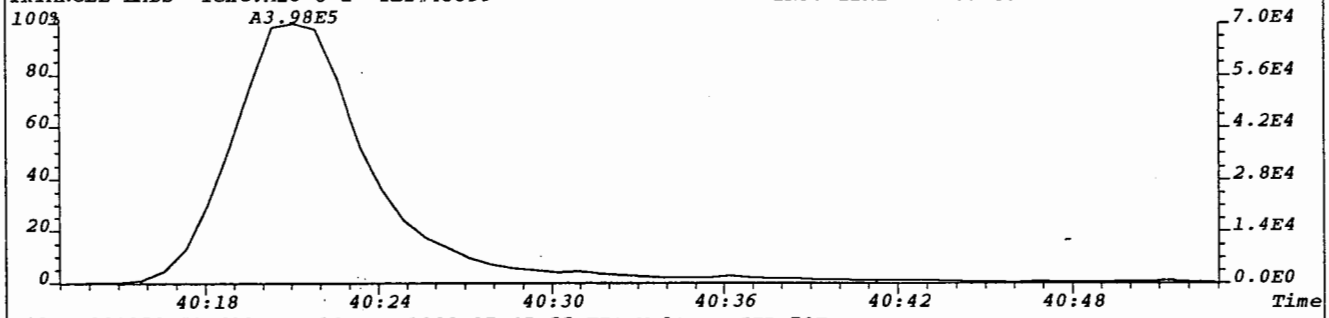
File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:35
459.7348 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,140.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



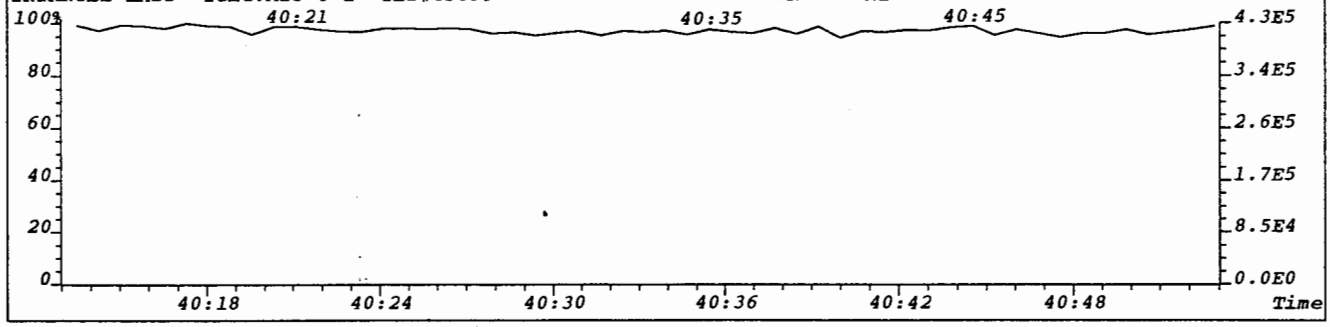
File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:41
469.7779 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,164.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46

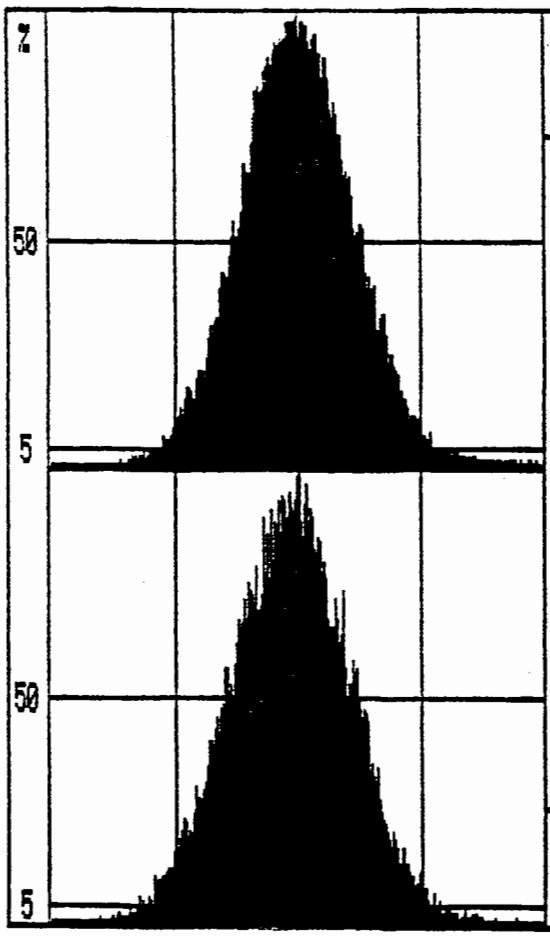


File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T Noise:38
471.7750 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,152.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46



File:T981959 #1-629 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-O-1 TLI#45399 INJ. TIME = 07:46





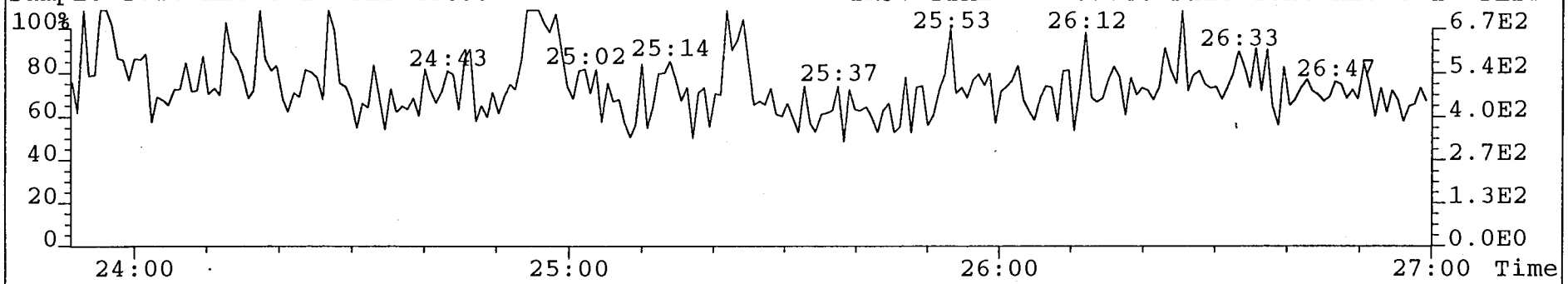
Channel I 330.9792 Peak top
Height .70 volts Span 200 ppm

System file name	NOBSUS
Data file name	A:T981948
Resolution	10000
Group number	2
Ionization mode	EI+
Switching	VOLTAGE
Ref. masses	292.9825, 416.9760

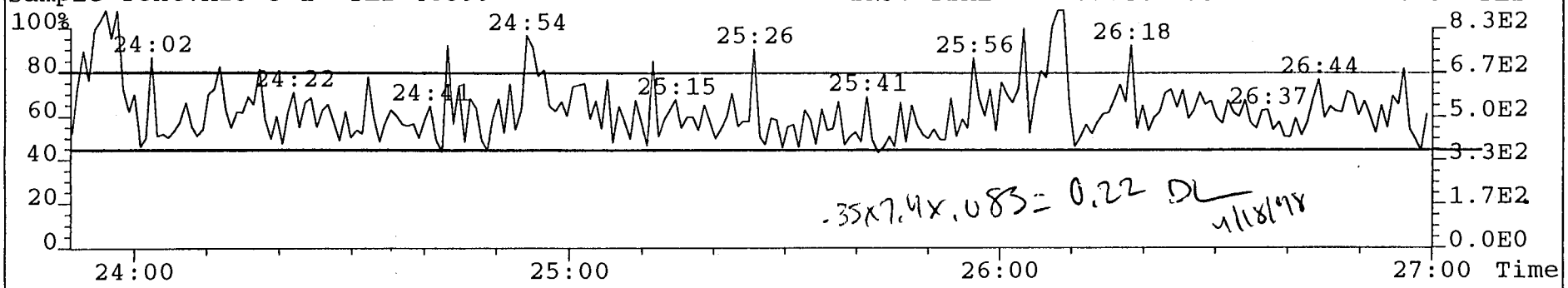
A	293	J	331	S	368
B	304	K	332	T	370
C	306	L	334	U	376
D	316	M	340	V	410
E	318	N	342		
F	320	O	352		
G	322	P	354		
H	328	Q	356		
I	331	R	358		

Ref. mass 416.9760 Peak top
Height .17 volts Span 200 ppm

File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
319.8965 F:2 Exp:NDB5US
Sample Text:M23-O-1 TLI#45399 INJ. TIME = 07:46 File Text:M23-O-1 TLI#»

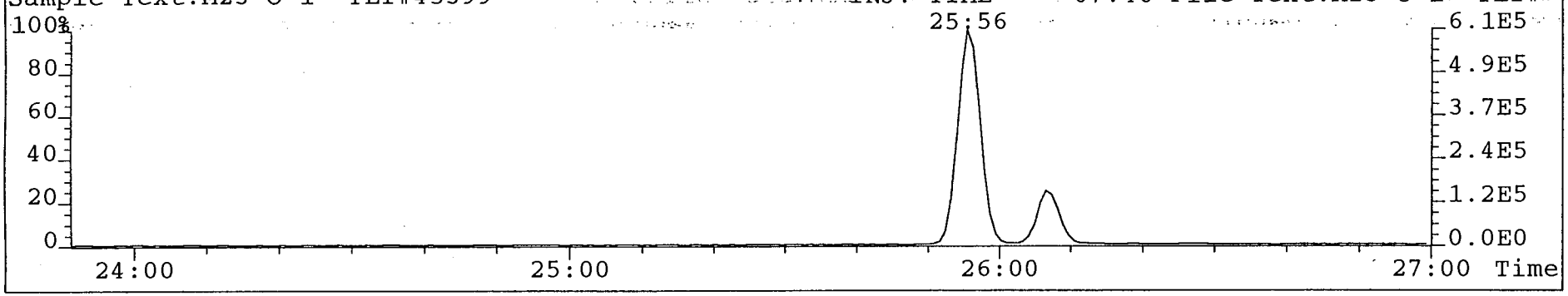


File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
321.8936 F:2 Exp:NDB5US
Sample Text:M23-O-1 TLI#45399 INJ. TIME = 07:46 File Text:M23-O-1 TLI#»

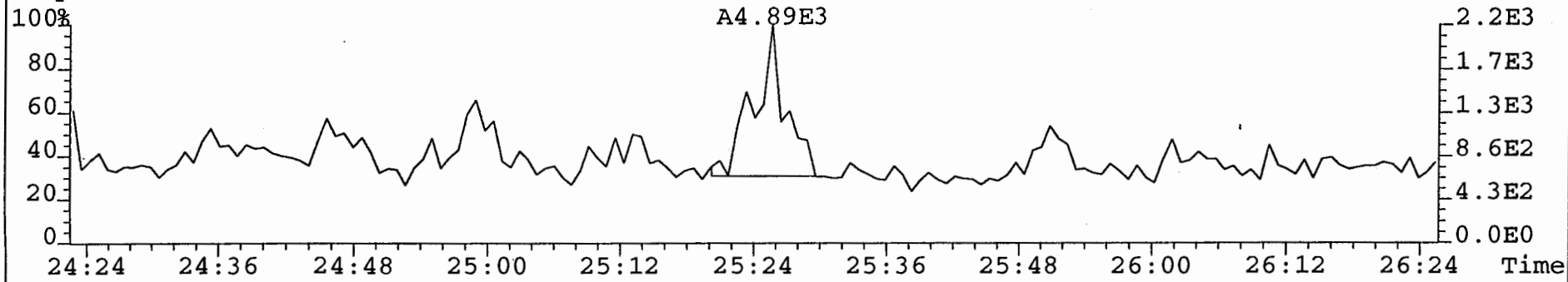


.35x7.4x.083 = 0.22 DL
4/18/98

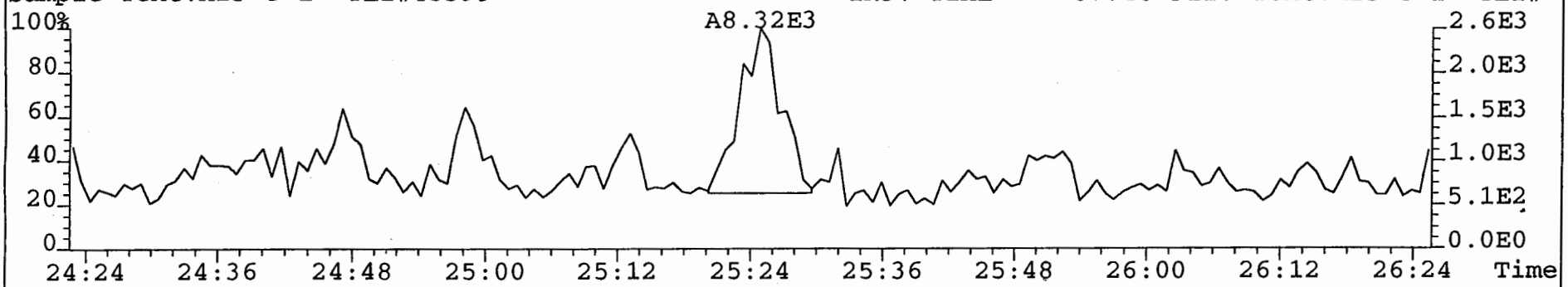
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
331.9368 F:2 Exp:NDB5US
Sample Text:M23-O-1 TLI#45399 INJ. TIME = 07:46 File Text:M23-O-1 TLI#»



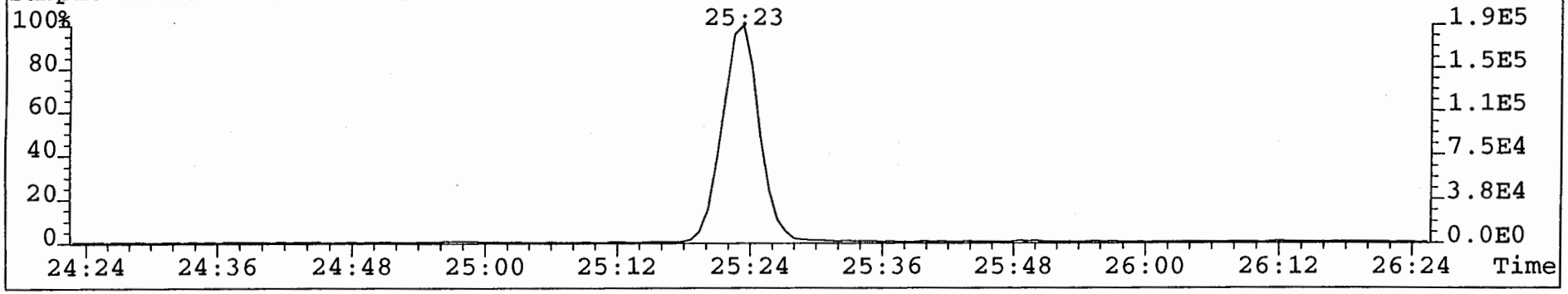
File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
303.9016 F:2 Exp:NDB5US
Sample Text:M23-O-1 TLI#45399 INJ. TIME = 07:46 File Text:M23-O-1 TLI#»

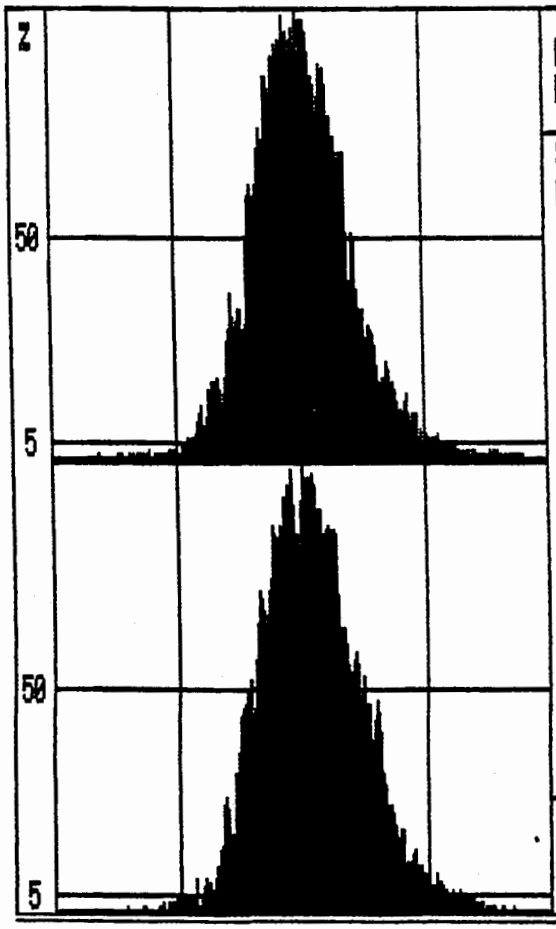


File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
305.8987 F:2 Exp:NDB5US
Sample Text:M23-O-1 TLI#45399 INJ. TIME = 07:46 File Text:M23-O-1 TLI#»



File:T981959 #1-720 Acq:18-APR-1998 07:45:55 EI+ Voltage SIR 70T
315.9419 F:2 Exp:NDB5US
Sample Text:M23-O-1 TLI#45399 INJ. TIME = 07:46 File Text:M23-O-1 TLI#»





Ref. mass 292.9825 Peak top
Height .18 volts Span 200 ppm

System file name	D8225
Data file name	A:P981309
Resolution	10000
Group number	1
Ionization mode	EI+
Switching	VOLTAGE
Ref. masses	292.9825, 380.9761

A	292.9825	J	330.9792
B	303.9016	K	331.9368
C	305.8987	L	333.9338
D	315.9419	M	375.8364
E	317.9389		
F	319.8965		
G	321.8936		
H	327.8847		
I	330.9792		

Channel I 330.9792 Peak top
Height .21 volts Span 200 ppm

Pacific Environmental Services

TLI Project: **45399** Method 23 TCDD/TCDF Analysis (DB-225)
Client Sample: **M23-O-1** Analysis File: **P981310**

Client Project:	**r012.002/Lime Kiln**				
Sample Matrix:	**M23**	Date Received:	**04/01/98**	Spike File:	**SPC2NF04**
TLI ID:	**204-92-5A-D**	Date Extracted:	**04/03/98**	ICal:	**PF24098**
		Date Analyzed:	**04/16/98**	ConCal:	**P981302**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U980780**	% Lipid:	**n/a**
GC Column:	**DB-225**	Analyst:	**ML**	% 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	0.86	21.4	40%-130%	0.76	22:24	V___

Recovery Standard	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.80	21:18	___

Data Reviewer: K~ 04/20/98

C2NF_PSR v2.02, LARS 6.11.00

Triangle Laboratories, Inc.®
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Printed: 21:28 04/20/98

Initial ....Date...

Data Review By: K- 4/20/98 Calculated Noise Area: 0.13

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 P981310B.dbf
04/20/98 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				0.790-1.102			
304-306	DC	NL		0:00	RO	1.00	0.14			0.000			
	DC	SN		19:07		0.78	0.16			0.853			
	DC	SN		20:02	RO	0.60	0.21			0.894			
	DC	SN		21:01	RO	0.64	0.21			0.938			
	DC	SN		21:16	RO	0.56	0.11			0.949			
304-306				0 Peaks			0.00						
13C12-TCDF						0.65-0.89				0.955-1.045			
316-318	DC	NL		0:00	RO	1.00	0.16			0.000			
	DC	WL		20:59	RO	1.06	0.30			0.937			
	DC	WL		21:14		0.83	0.99			0.948			
	DC	SN		21:31	RO	1.00	0.05			0.961			
				22:24		0.76	96.68	41.87	54.81	1.000	13C12-2378-TCDF	IS0	
	DC	SN		23:07	RO	1.07	0.25			1.032			
	DC	WH		23:45		0.67	0.05			1.060			
	DC	WH		24:05	RO	1.33	0.05			1.075			
	DC	WH		24:26	RO	0.93	1.86			1.091			
	DC	WH		24:50		0.75	0.07			1.109			
316-318				1 Peak			96.68						

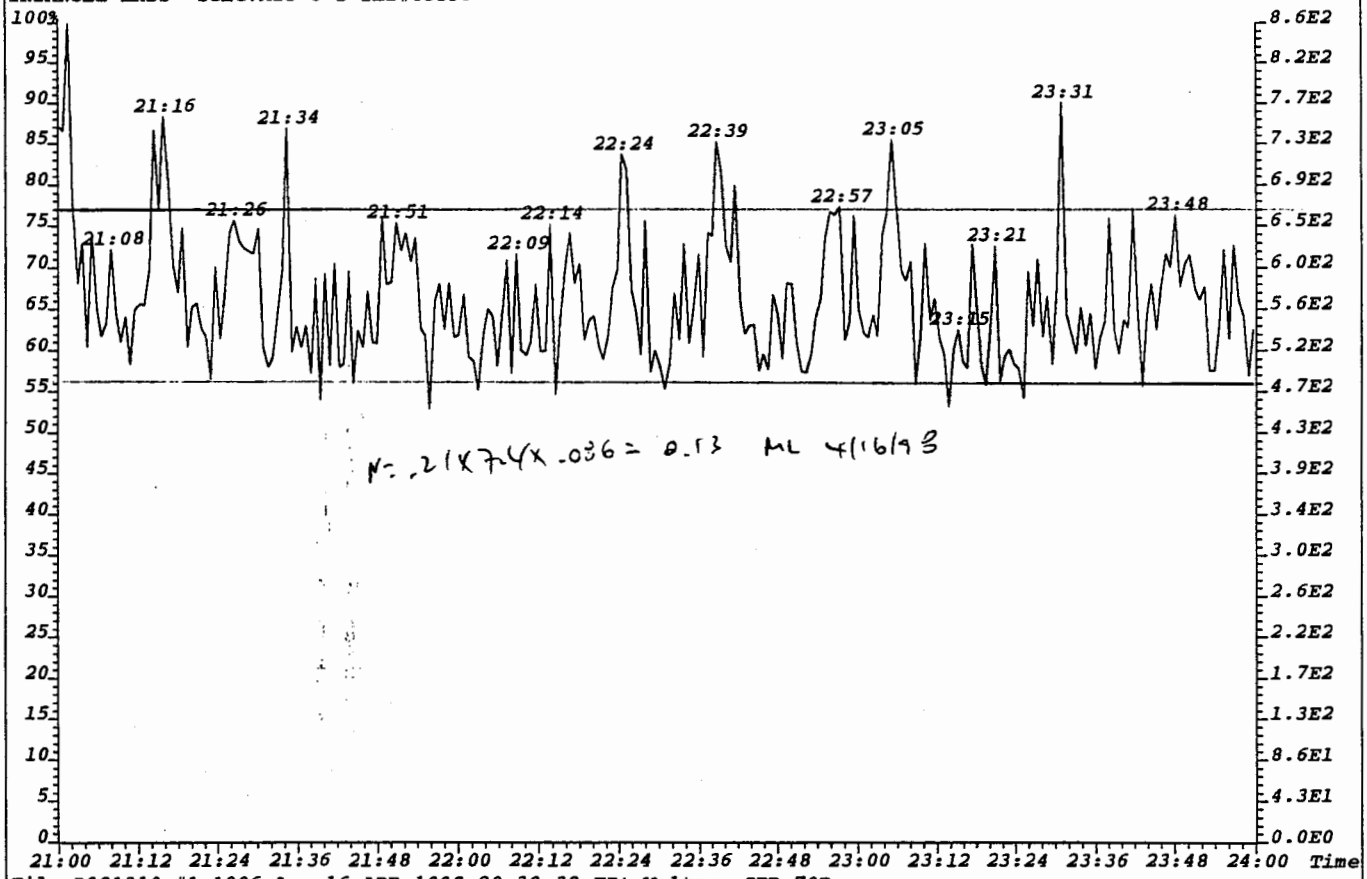
---------- Above: TCDF / TCDD Follows ----------

13C12-TCDD						0.65-0.89				0.905-1.095			
332-334	DC	NL		0:00	RO	1.25	0.14			0.000			
				21:01		0.81	74.07	33.25	40.82	1.000	13C12-2378-TCDD	IS1	
				21:18		0.80	336.38	149.33	187.05	1.013	13C12-1234-TCDD	RS1	
				22:02	RO	0.64	0.53	0.23	0.36	1.048			
332-334				3 Peaks			410.98						

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
		X-Ether Interference

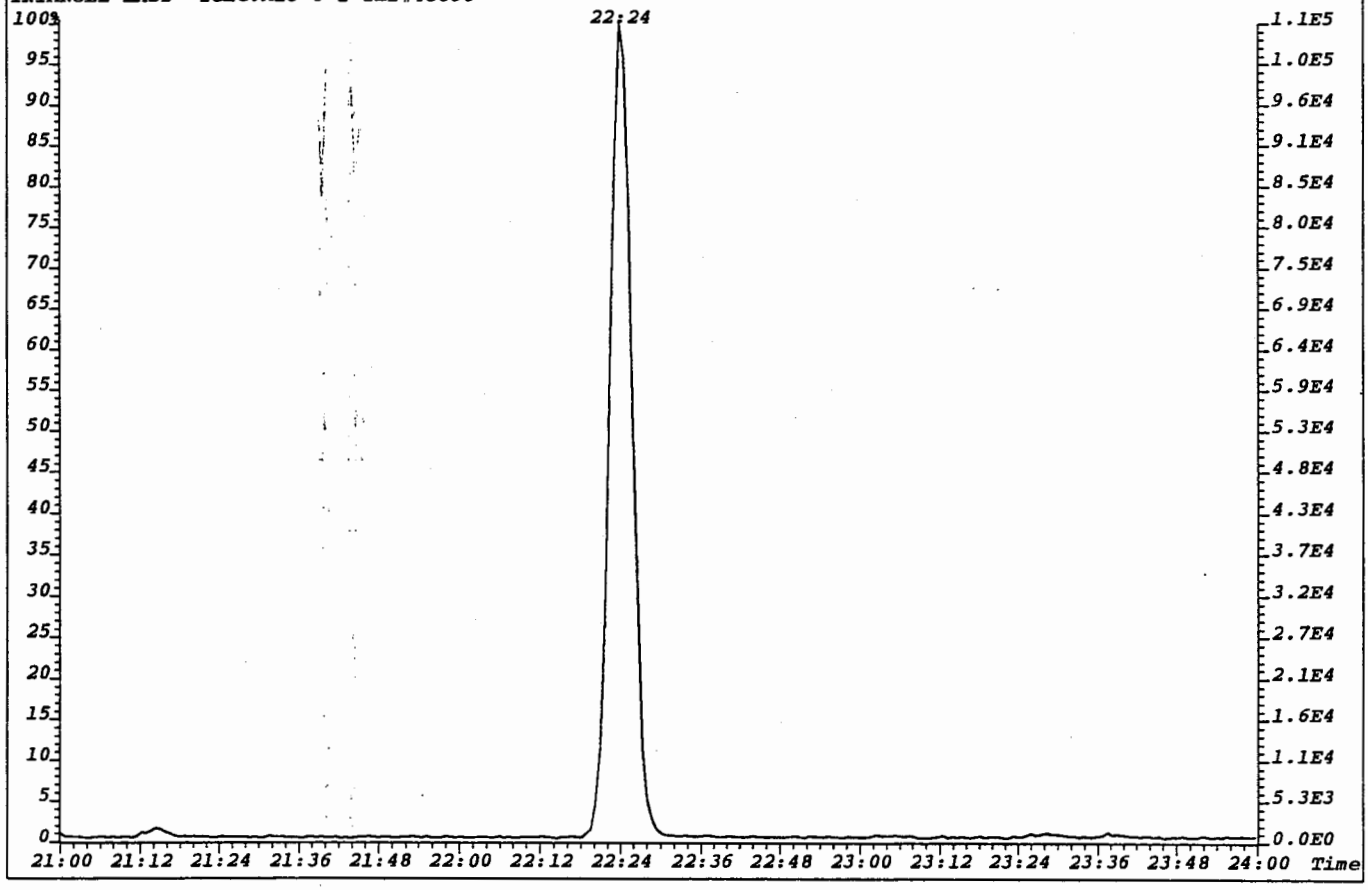
*** End of Report ***

File:P981310 #1-1006 Acq:16-APR-1998 20:38:38 EI+ Voltage SIR 70P
303.9016 Exp:DB225
TRIANGLE LABS Text:M23-0-1 TLI#45399

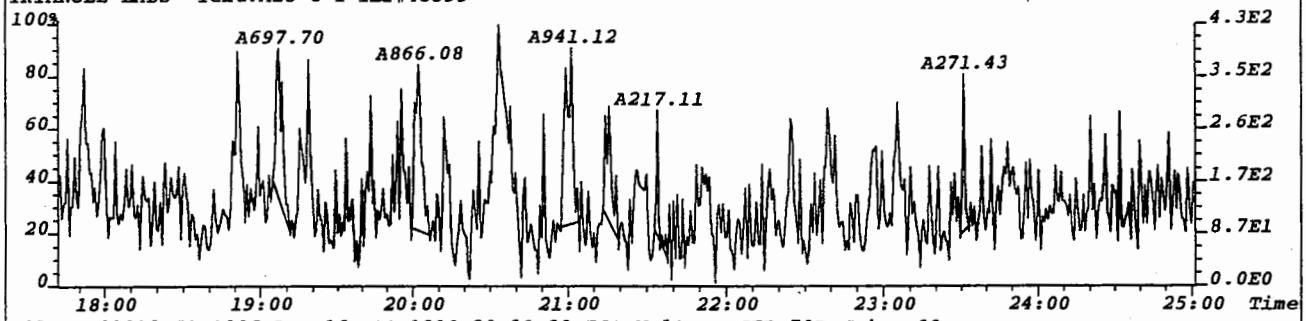


N= .21X74X.036 = 0.13 ML 4/16/98

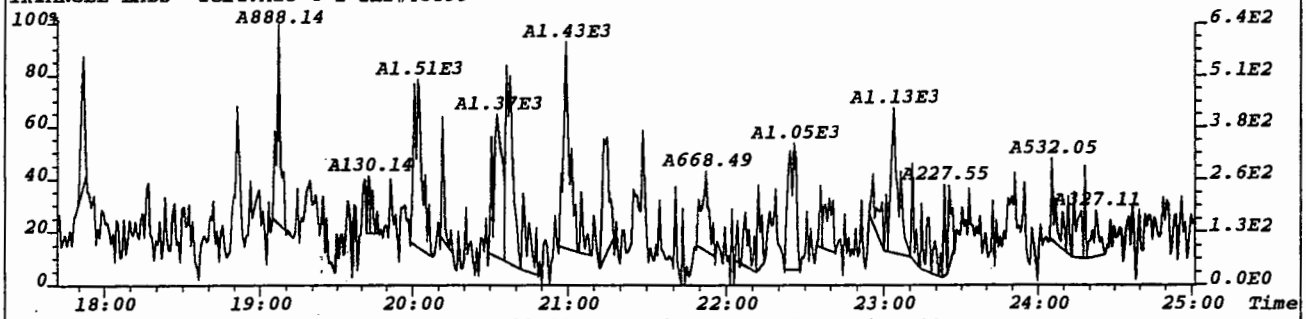
File:P981310 #1-1006 Acq:16-APR-1998 20:38:38 EI+ Voltage SIR 70P
315.9419 Exp:DB225
TRIANGLE LABS Text:M23-0-1 TLI#45399



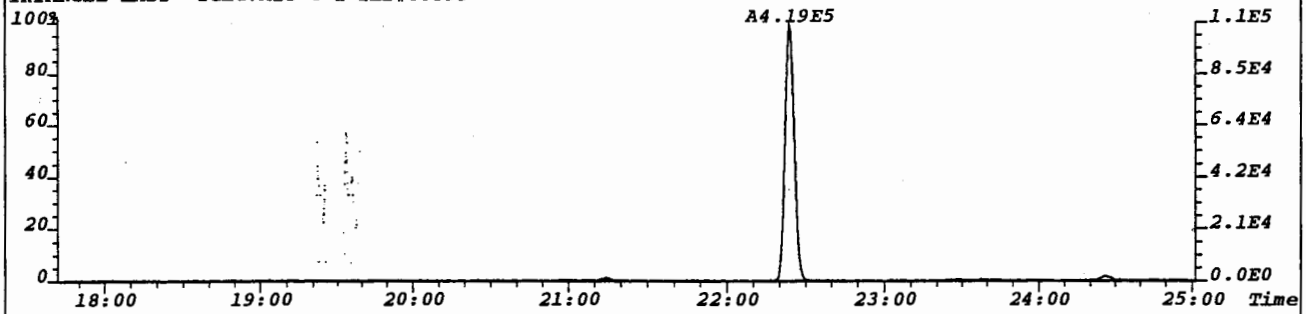
File:P981310 #1-1006 Acq:16-APR-1998 20:38:38 EI+ Voltage SIR 70P Noise:38
303.9016 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,152.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-O-1 TLI#45399



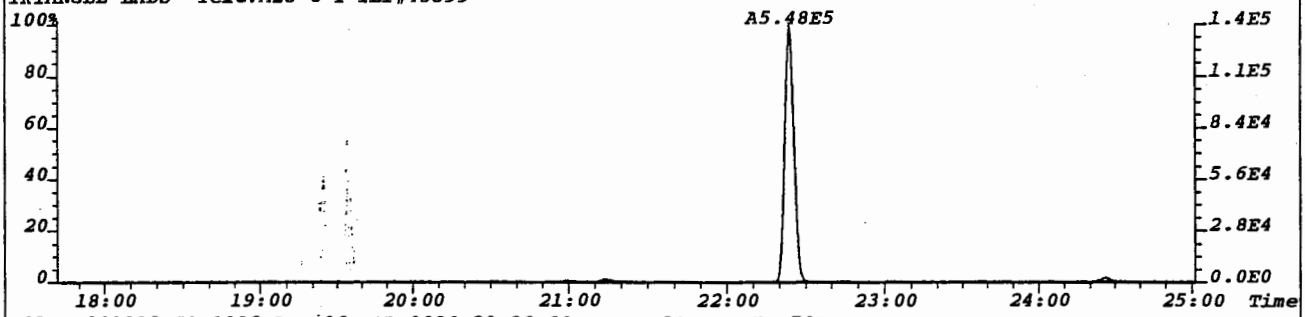
File:P981310 #1-1006 Acq:16-APR-1998 20:38:38 EI+ Voltage SIR 70P Noise:39
305.8987 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,156.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-O-1 TLI#45399



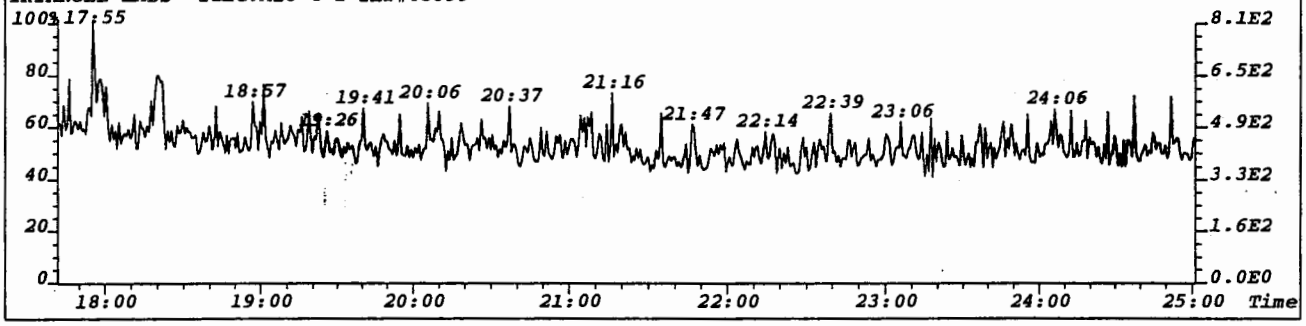
File:P981310 #1-1006 Acq:16-APR-1998 20:38:38 EI+ Voltage SIR 70P Noise:43
315.9419 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,172.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-O-1 TLI#45399



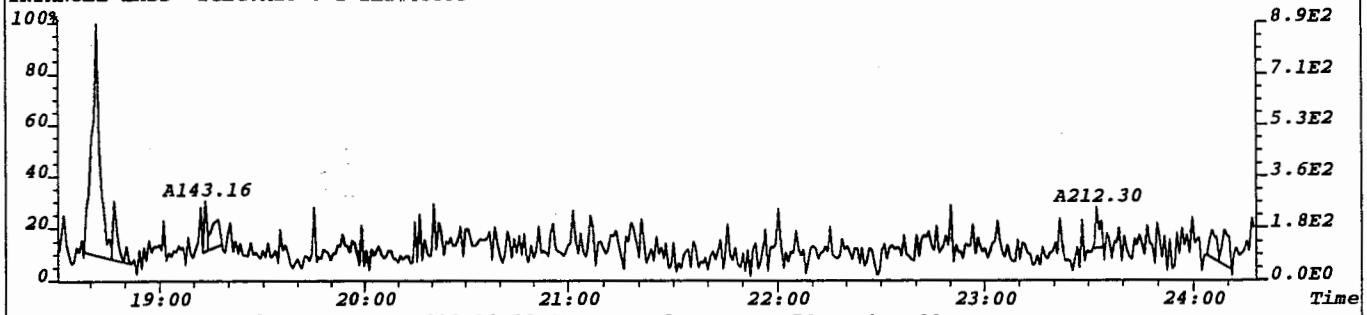
File:P981310 #1-1006 Acq:16-APR-1998 20:38:38 EI+ Voltage SIR 70P Noise:44
317.9389 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,176.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-O-1 TLI#45399



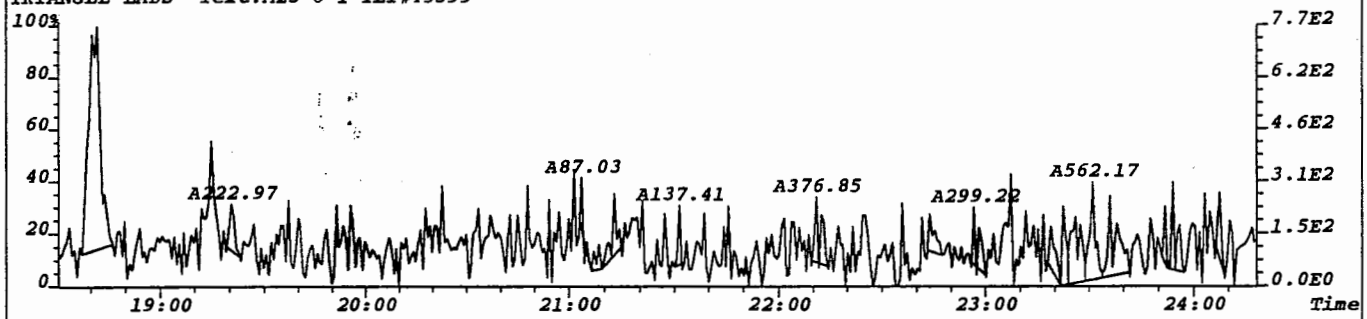
File:P981310 #1-1006 Acq:16-APR-1998 20:38:38 EI+ Voltage SIR 70P
375.8364 Exp:DB225
TRIANGLE LABS Text:M23-O-1 TLI#45399



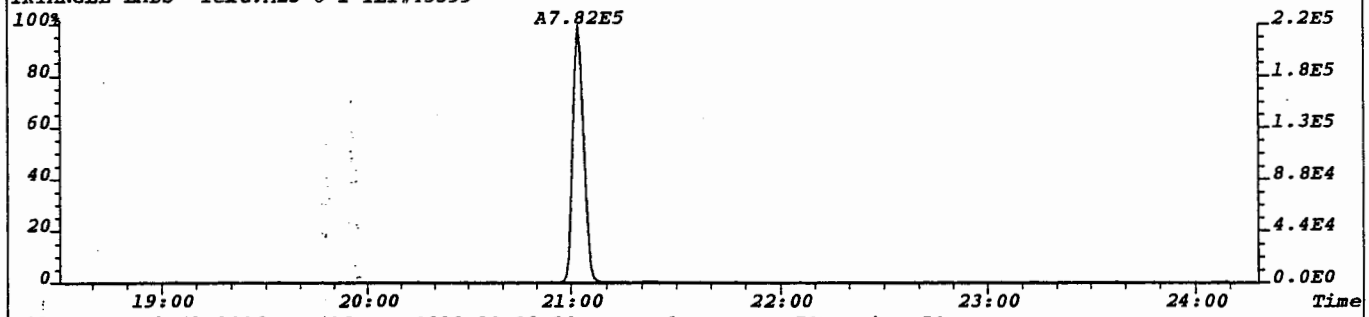
File:P981310 #1-1006 Acq:16-APR-1998 20:38:38 EI+ Voltage SIR 70P Noise:35
319.8965 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,140.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-O-1 TLI#45399



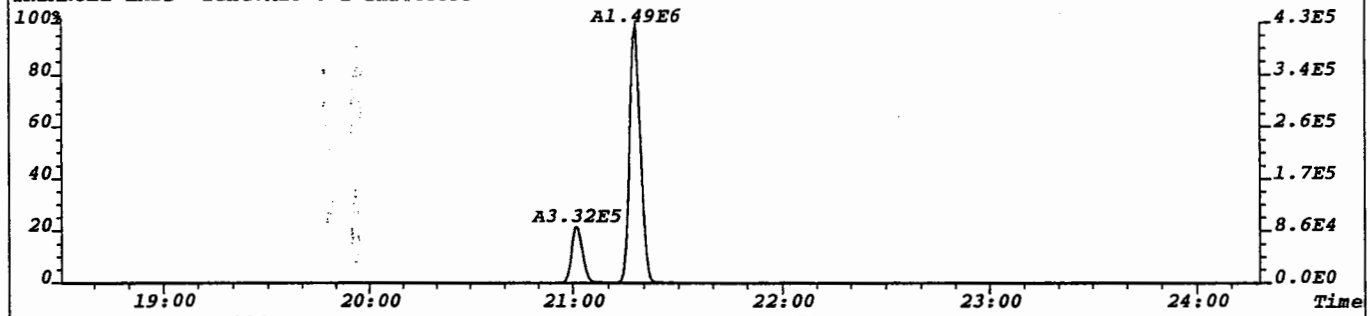
File:P981310 #1-1006 Acq:16-APR-1998 20:38:38 EI+ Voltage SIR 70P Noise:38
321.8936 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,152.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-O-1 TLI#45399



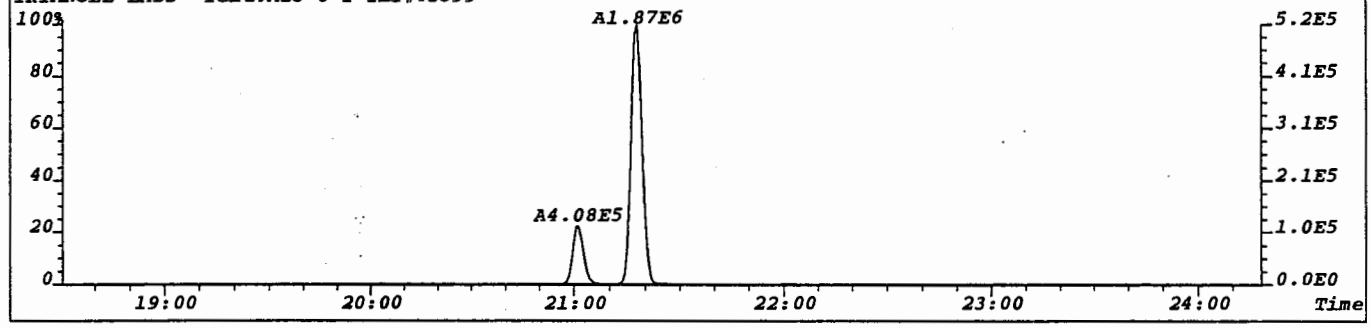
File:P981310 #1-1006 Acq:16-APR-1998 20:38:38 EI+ Voltage SIR 70P Noise:42
327.8847 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,168.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-O-1 TLI#45399



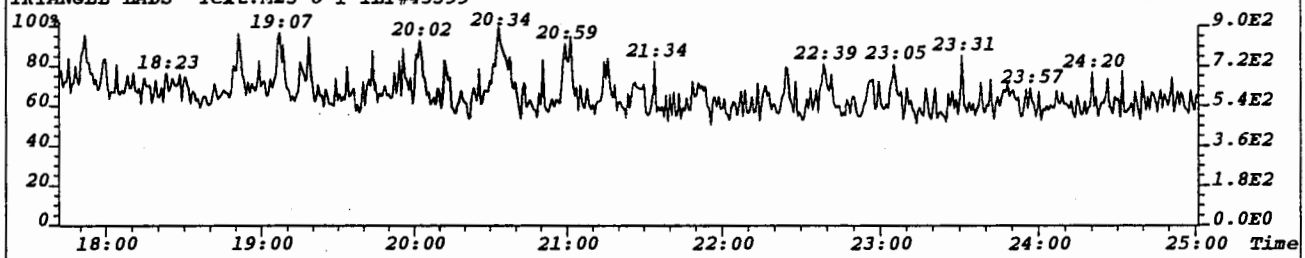
File:P981310 #1-1006 Acq:16-APR-1998 20:38:38 EI+ Voltage SIR 70P Noise:50
331.9368 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,200.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-O-1 TLI#45399



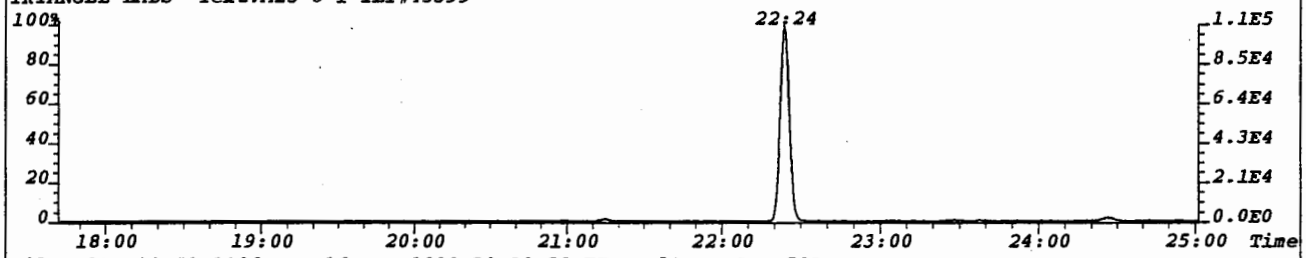
File:P981310 #1-1006 Acq:16-APR-1998 20:38:38 EI+ Voltage SIR 70P Noise:38
333.9338 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,152.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-O-1 TLI#45399



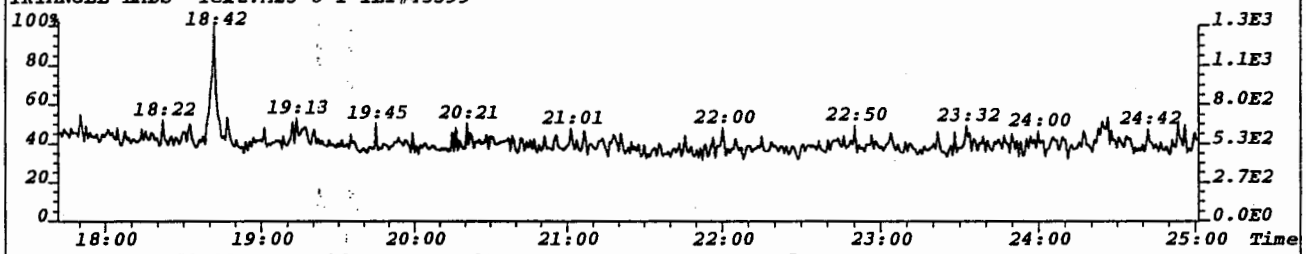
File:P981310 #1-1006 Acq:16-APR-1998 20:38:38 EI+ Voltage SIR 70P
303.9016 Exp:DB225
TRIANGLE LABS Text:M23-O-1 TLI#45399



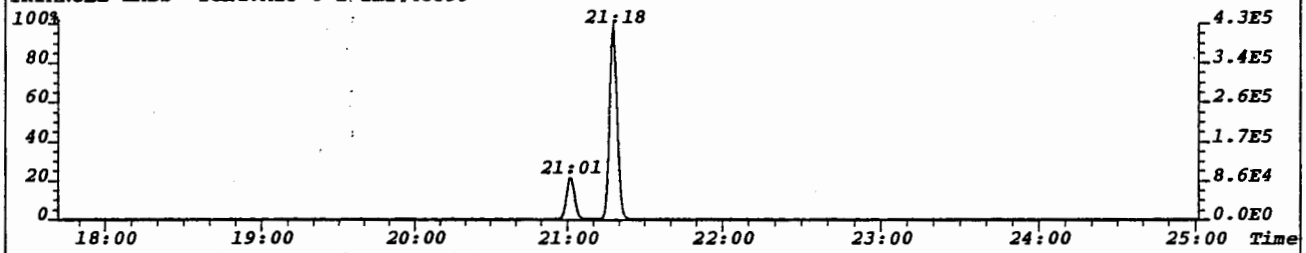
File:P981310 #1-1006 Acq:16-APR-1998 20:38:38 EI+ Voltage SIR 70P
315.9419 Exp:DB225
TRIANGLE LABS Text:M23-O-1 TLI#45399



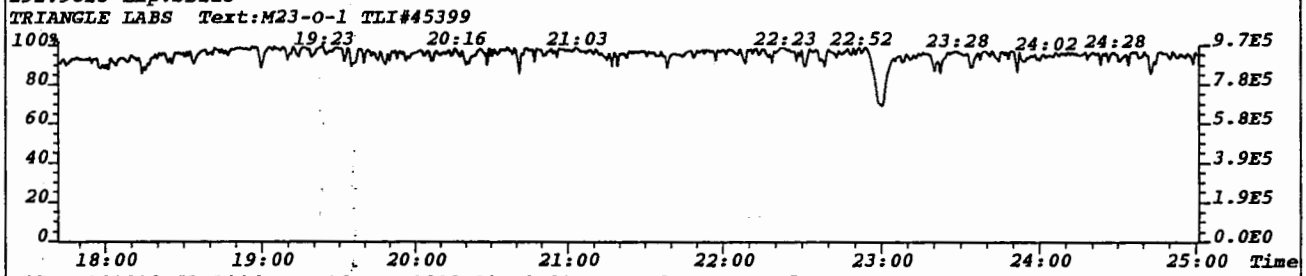
File:P981310 #1-1006 Acq:16-APR-1998 20:38:38 EI+ Voltage SIR 70P
319.8965 Exp:DB225
TRIANGLE LABS Text:M23-O-1 TLI#45399



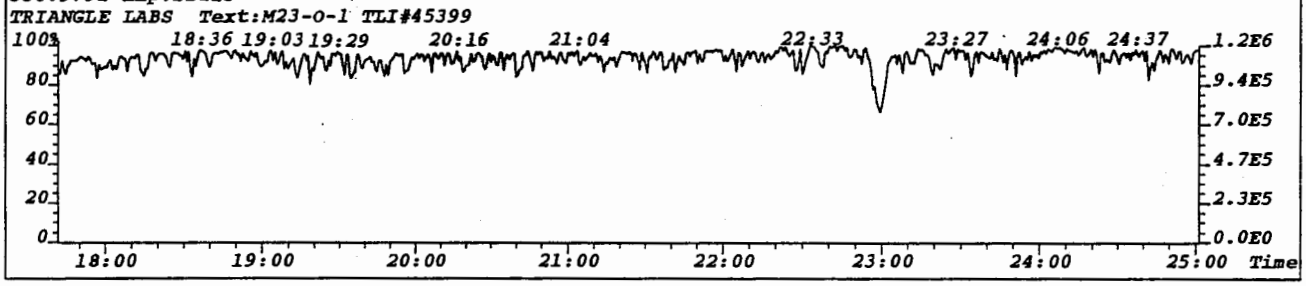
File:P981310 #1-1006 Acq:16-APR-1998 20:38:38 EI+ Voltage SIR 70P
331.9368 Exp:DB225
TRIANGLE LABS Text:M23-O-1 TLI#45399

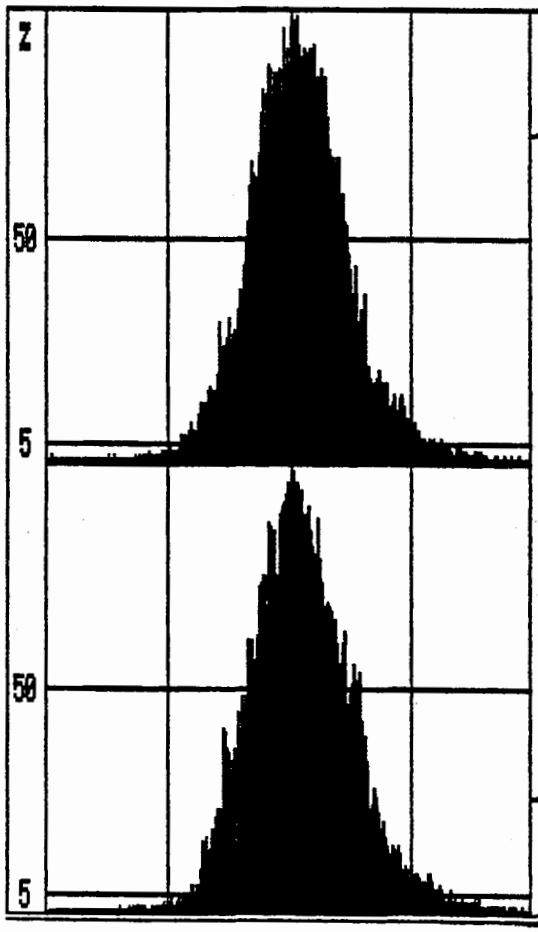


File:P981310 #1-1006 Acq:16-APR-1998 20:38:38 EI+ Voltage SIR 70P
292.9825 Exp:DB225
TRIANGLE LABS Text:M23-O-1 TLI#45399



File:P981310 #1-1006 Acq:16-APR-1998 20:38:38 EI+ Voltage SIR 70P
330.9792 Exp:DB225
TRIANGLE LABS Text:M23-O-1 TLI#45399





Ref. mass 292.9825 Peak top
Height .15 volts Span 200 ppm

System file name	DB225
Data file name	A:P981310
Resolution	10000
Group number	1
Ionization mode	EI+
Switching	VOLTAGE
Ref. masses	292.9825, 380.9761

A	292.9825	J	330.9792
B	303.9016	K	331.9368
C	305.8987	L	333.9338
D	315.9419	M	375.8364
E	317.9389		
F	319.8965		
G	321.8936		
H	327.8847		
I	330.9792		

Channel I 330.9792 Peak top
Height .19 volts Span 200 ppm

Pacific Environmental Services

TLI Project: **45399** — Method 23 PCDD/PCDF Analysis (a)

Client Sample: **M23-O-2** — Analysis File: **T981960**

Client Project:	**r012.002/Lime Kiln**				
Sample Matrix:	**M23**	Date Received:	**04/01/98**	Spike File:	**SPMIT204**
TLI ID:	**204-92-6A-D**	Date Extracted:	**04/03/98**	ICal:	**TF51308**
		Date Analyzed:	**04/18/98**	ConCal:	**T981946**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U980780**	% Lipid:	**n/a**
GC Column:	**DB-5**	Analyst:	**HLM**	% 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	0.009				___
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	0.01			1.04	36:49	J__
1,2,3,4,6,7,8,9-OCDD	EMPC		0.03			JB_
2,3,7,8-TCDF	0.03			0.76	25:25	B__
1,2,3,7,8-PeCDF	ND	0.006				___
2,3,4,7,8-PeCDF	ND	0.006				___
1,2,3,4,7,8-HxCDF	ND	0.008				___
1,2,3,6,7,8-HxCDF	ND	0.007				___
2,3,4,6,7,8-HxCDF	ND	0.009				___
1,2,3,7,8,9-HxCDF	ND	0.01				___
1,2,3,4,6,7,8-HpCDF	EMPC		0.01			J__
1,2,3,4,7,8,9-HpCDF	ND	0.02				___
1,2,3,4,6,7,8,9-OCDF	ND	0.03				___

Totals	Amt. (ng)	Number	DL	EMPC	Flags
Total TCDD	0.08	2		0.11	___
Total PeCDD	0.03	2			___
Total HxCDD	ND		0.01		___
Total HpCDD	0.01	1			___
Total TCDF	0.25	9		0.28	___
Total PeCDF	0.02	1		0.04	___
Total HxCDF	EMPC			0.007	___
Total HpCDF	EMPC			0.01	___

MIT2_PSR v1.04, LARS 6.11.00

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Printed: 15:40 04/20/98

Pacific Environmental Services

TLI Project: **45399**
Client Sample: **M23-O-2**

Method 23 PCDD/PCDF Analysis (a)
Analysis File: **T981960**

Internal Standards	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	2.3	57.4	40%-130%	0.74	25:23	___
$^{13}C_{12}$-2,3,7,8-TCDD	2.2	54.3	40%-130%	0.80	26:07	___
$^{13}C_{12}$-1,2,3,7,8-PeCDF	2.2	54.4	40%-130%	1.41	29:23	___
$^{13}C_{12}$-1,2,3,7,8-PeCDD	2.5	62.6	40%-130%	1.49	30:26	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	3.0	74.0	40%-130%	0.51	32:58	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	2.9	71.9	40%-130%	1.21	33:38	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	2.7	67.7	25%-130%	0.44	35:47	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	3.1	77.0	25%-130%	1.05	36:49	___
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	3.8	47.7	25%-130%	0.87	40:21	___

Surrogate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,4,7,8-PeCDF	4.0	98.8	40%-130%	1.41	30:06	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	3.6	91.0	40%-130%	0.50	32:52	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	3.8	95.9	40%-130%	1.22	33:33	___
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	3.3	82.2	25%-130%	0.42	37:18	___

Other Standard	Amt. (ng)	% Recovery	QC Limits	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	3.5	87.1	40%-130%	26:08	___

Alternate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	2.7	66.8	40%-130%	0.50	34:11	___
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	2.9	73.2	40%-130%	0.51	33:26	___

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.82	25:56	___
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.21	33:56	___

Data Reviewer: WDA 04/20/98

MIT2_PSR v1.04, LARS 6.11.00

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Printed: 15:40 04/20/98

Initial ....Date...

Data Review By: WSH 4/20/98 Calculated Noise Area: 0.25

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 T981960B.dbf
04/20/98 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				0.868-1.077			
304-306	DC	NL		0:00		0.72	0.31			0.000			
				22:09		0.79	2.33	1.03	1.30	0.873			J
				22:41	RO	0.55	1.06	0.46	0.83	0.894			J
				22:56	RO	0.97	1.31	0.72	0.74	0.903			J
				23:20		0.87	6.59	3.07	3.52	0.919			J
				23:40		0.84	4.32	1.97	2.35	0.932			J
				24:05		0.78	3.68	1.61	2.07	0.949			J
				24:21		0.86	3.48	1.61	1.87	0.959			J
	M			24:46		0.68	4.25	1.72	2.53	0.976			J
				24:59		0.88	2.25	1.05	1.20	0.984			J
				25:14		0.75	1.33	0.57	0.76	0.994			J
				25:25		0.76	4.68	2.02	2.66	1.001	2378-TCDF	AN	
				25:51	RO	0.90	1.84	0.94	1.04	1.018			J
				26:05	RO	0.95	0.99	0.53	0.56	1.028			J
304-306			13	Peaks			38.11						
13C12-TCDF						0.65-0.89				0.961-1.039			
316-318	DC	NL		0:00	RO	1.18	0.30			0.000			
	DC	WL		24:20		0.74	5.87			0.959			
				24:58		0.79	2.42	1.07	1.35	0.984			
				25:23		0.74	439.62	186.97	252.65	1.000	13C12-2378-TCDF	ISO	
				25:50	RO	0.50	1.82	0.79	1.57	1.018			
316-318			3	Peaks			443.86						

---------- Above: TCDF / TCDD Follows ----------

TCDD						0.65-0.89				0.896-1.045			
320-322	DC	NL		0:00	RO	1.00	0.19			0.000			
				23:32		0.81	6.56	2.94	3.62	0.901			
				23:56	RO	0.90	2.39	1.22	1.35	0.916			J
	DC	SN		24:14	RO	0.55	0.25			0.928			
				24:57		0.72	1.72	0.72	1.00	0.955			J
	DC	SN		25:39	RO	3.71	0.12			0.982			
	DC	SN		25:51	RO	0.44	0.09			0.990			
				26:03	RO	1.51	0.76	0.65	0.43	0.997			J
	DC	SN		26:08	RO	0.30	0.21			1.001	2378-TCDD	AN	
320-322			4	Peaks			11.43						
37Cl-TCDD										0.924-1.076			
328	DC	NL		0:00			0.12			0.000			
				24:45			2.41	2.41		0.948			
				26:08			291.40	291.40		1.001	37Cl-TCDD	CLS	
				26:31			0.71	0.71		1.015			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
328			3 Peaks				294.52						
13C12-TCDD				0.65-0.89						0.924-1.076			
332-334	DC	NL		0:00	RO	2.55	0.74			0.000			
				25:56		0.82	516.66	232.44	284.22	0.993	13C12-1234-TCDD	RS1	
				26:07		0.80	321.70	143.11	178.59	1.000	13C12-2378-TCDD	IS1	
				26:27	RO	0.63	4.37	1.90	3.00	1.013			
332-334			3 Peaks				842.73						
---------- Above: TCDD / PeCDF Follows ----------													
PeCDF				1.32-1.78						0.926-1.063			
340-342	DC	NL		0:00	RO	0.77	0.16			0.000			
D	D	SN		27:13	RO	0.44	3.45			0.926			
				27:24	RO	0.68	2.02	1.23	1.80	0.933			J
	DC	SN		27:44		1.57	0.18			0.944			
	DC	SN		27:52	RO	0.33	0.13			0.948			
	DC	SN		28:23	RO	0.84	0.35			0.966			
				28:32		1.76	1.71	1.09	0.62	0.971			J
	DC	SN		28:42		1.53	0.43			0.977			
	DC	SN		29:02		1.67	0.40			0.988			
	DC	SN		29:06	RO	2.60	0.38			0.990			
	DC	SN		29:41	RO	1.19	0.51			1.010			
	DC	SN		29:57	RO	2.38	0.20			1.019			
D	D	SN		30:06	RO	1.03	0.56			1.024	23478-PeCDF	AN	
	DC	SN		30:13		1.48	0.62			1.028			
	DC	SN		31:02	RO	0.44	0.13			1.056			
340-342			2 Peaks				3.73						
13C12-PeCDF				1.32-1.78						0.864-1.136			
352-354	DC	NL		0:00	RO	0.89	0.13			0.000			
				28:32		1.40	8.85	5.17	3.68	0.971			
				29:00	RO	1.30	0.71	0.43	0.33	0.987			
				29:23		1.41	347.08	203.19	143.89	1.000	13C12-PeCDF 123	IS2	
				29:40	RO	1.25	3.18	1.93	1.55	1.010			
				30:06		1.41	344.32	201.19	143.13	1.024	13C12-PeCDF 234	SUR1	
				31:03	RO	0.79	0.79	0.48	0.61	1.057			
352-354			6 Peaks				704.93						
---------- Above: PeCDF / PeCDD Follows ----------													
PeCDD				1.32-1.78						0.936-1.021			
356-358	DC	NL		0:00	RO	0.64	0.15			0.000			
				28:40		1.52	1.11	0.67	0.44	0.942			J
				29:22		1.50	1.15	0.69	0.46	0.965			J
	DC	WH		31:11	RO	3.75	0.10			1.025			
356-358			2 Peaks				2.26						
13C12-PeCDD				1.32-1.78						0.869-1.131			
368-370	DC	NL		0:00	RO	1.13	0.15			0.000			
				29:21	RO	1.00	0.53	0.32	0.32	0.964			
	DC	SN		29:31		1.67	0.56			0.970			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
				30:26		1.49	221.46	132.69	88.77	1.000	13C12-PeCDD 123	IS3	
				30:34		1.58	26.36	16.14	10.22	1.004			
	DC	SN		30:56	RO	2.14	0.18			1.016			
368-370				3 Peaks			248.35						

---------- Above: PeCDD / HxCDF Follows ----------

HxCDF				1.05-1.43					0.963-1.045				
374-376	DC	NL		0:00	RO	0.92	0.43			0.000			
K				32:03	RO	1.60	0.56	0.40	0.25	0.972			J
	DC	SN		32:52	RO	1.50	0.58			0.997	123478-HxCDF	AN	
374-376				1 Peak			0.56						
13C12-HxCDF				0.43-0.59					0.879-1.121				
384-386	DC	NL		0:00	RO	1.07	0.23			0.000			
				31:53		0.53	3.03	1.05	1.98	0.967			
				32:01		0.50	3.73	1.25	2.48	0.971			
				32:52		0.50	256.24	85.69	170.55	0.997	13C12-HxCDF 478	SUR2	
				32:58		0.51	292.55	98.79	193.76	1.000	13C12-HxCDF 678	IS4	
	DC	SN		33:14	RO	0.29	0.86			1.008			
				33:26		0.51	272.53	91.64	180.89	1.014	13C12-HxCDF 234	ALT2	
				33:41	RO	1.19	0.82	0.64	0.54	1.022			
	DC	SN		33:47		0.43	0.67			1.025			
	DC	SN		33:50	RO	0.71	0.57			1.026			
				34:11		0.50	193.06	64.24	128.82	1.037	13C12-HxCDF 789	ALT1	
				34:27		0.46	2.14	0.67	1.47	1.045			
				34:33		0.59	2.05	0.76	1.29	1.048			
384-386				9 Peaks			1,026.15						

---------- Above: HxCDF / HxCDD Follows ----------

HxCDD				1.05-1.43					0.958-1.013				
390-392	DC	NL		0:00		1.19	0.46			0.000			
	DC	SN		32:51	RO	1.50	0.63			0.977			
	DC	SN		32:58	RO	2.22	0.20			0.980			
D	D	SN		33:27	RO	1.00	0.58			0.995			
	DC	SN		33:34	RO	0.32	0.13			0.998	123478-HxCDD	AN	
	DC	SN		33:44	RO	3.86	0.16			1.003			
390-392				0 Peaks			0.00						
13C12-HxCDD				1.05-1.43					0.970-1.030				
402-404	DC	NL		0:00	RO	0.69	0.43			0.000			
				33:03	RO	1.56	1.28	0.89	0.57	0.983			
	DC	SN		33:08	RO	1.00	0.16			0.985			
	DC	SN		33:12		1.22	0.20			0.987			
				33:18	RO	0.71	0.58	0.32	0.45	0.990			
				33:33		1.22	174.69	96.10	78.59	0.998	13C12-HxCDD 478	SUR3	
				33:38		1.21	218.00	119.36	98.64	1.000	13C12-HxCDD 678	IS5	
				33:56		1.21	300.78	164.85	135.93	1.009	13C12-HxCDD 789	RS2	
				34:24	RO	1.56	1.37	0.95	0.61	1.023			
402-404				6 Peaks			696.70						

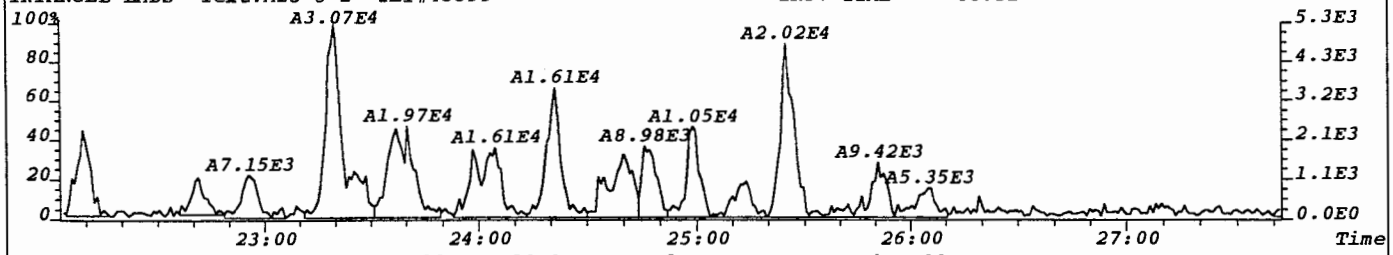
```
Compound/
M_Z.... QC.Log Omit Why ..RT. OK Ratio Total.Area... Area.Peak.1.. Area.Peak.2.. Rel.RT Compound.Name.. ID.. Flags.

                    ---------------------- Above: HxCDD / HpCDF Follows ---------------------

HpCDF                              0.88-1.20                                      0.996-1.047
408-410          DC  NL   0:00 RO  1.36          0.29                                 0.000
        M                35:50 RO  1.37          0.61          0.41          0.30  1.001 1234678-HpCDF   AN   J
                 DC  SN  36:01 RO  0.29          0.08                                 1.007
408-410                1 Peak                    0.61

13C12-HpCDF                        0.37-0.51                                      0.944-1.112
418-420          DC  NL   0:00 RO  1.07          0.20                                 0.000
                         35:47     0.44        150.68         45.80        104.88  1.000 13C12-HpCDF 678 IS6
                         37:18     0.42         89.59         26.59         63.00  1.042 13C12-HpCDF 789 SUR4
                 DC  SN  37:38 RO  1.27          0.16                                 1.052
418-420                2 Peaks                  240.27

                    ---------------------- Above: HpCDF / HpCDD Follows ---------------------

HpCDD                              0.88-1.20                                      0.976-1.005
424-426          DC  NL   0:00 RO  1.30          0.20                                 0.000
        K                36:49     1.04          0.47          0.24          0.23  1.000 1234678-HpCDD   AN   J
424-426                1 Peak                    0.47

13C12-HpCDD                        0.88-1.20                                      0.973-1.027
436-438          DC  NL   0:00     0.94          0.31                                 0.000
                         36:05 RO  0.84          0.94          0.48          0.57  0.980
                 DC  SN  36:18 RO  2.67          0.06                                 0.986
                         36:49     1.05        140.81         72.02         68.79  1.000 13C12-HpCDD 678 IS7
436-438                2 Peaks                  141.75

                    ---------------------- Above: HpCDD / Octa-CDD and CDF Follows ----------

OCDF                               0.76-1.02                                      0.901-1.099
442-444          DC  NL   0:00     1.00          0.24                                 0.000
442-444                0 Peaks                   0.00

OCDD                               0.76-1.02                                      0.901-1.099
458-460          DC  NL   0:00 RO  1.27          0.21                                 0.000
        K                40:23 RO  0.61          0.42          0.20          0.33  1.001 OCDD            AN   J
458-460                1 Peak                    0.42

13C12-OCDD                         0.76-1.02                                      0.996-1.004
470-472          DC  NL   0:00 RO  1.08          0.23                                 0.000
                         40:21     0.87        117.42         54.50         62.92  1.000 13C12-OCDD      IS8
                 DC  WH  40:42 RO  0.63          0.89                                 1.009
                 DC  WH  40:52 RO  0.63          0.25                                 1.013
470-472                1 Peak                  117.42
```

Compound/
M_Z.... QC.Log Omit Why ..RT. OK Ratio Total.Area... Area.Peak.1.. Area.Peak.2.. Rel.RT Compound.Name.. ID.. Flags.

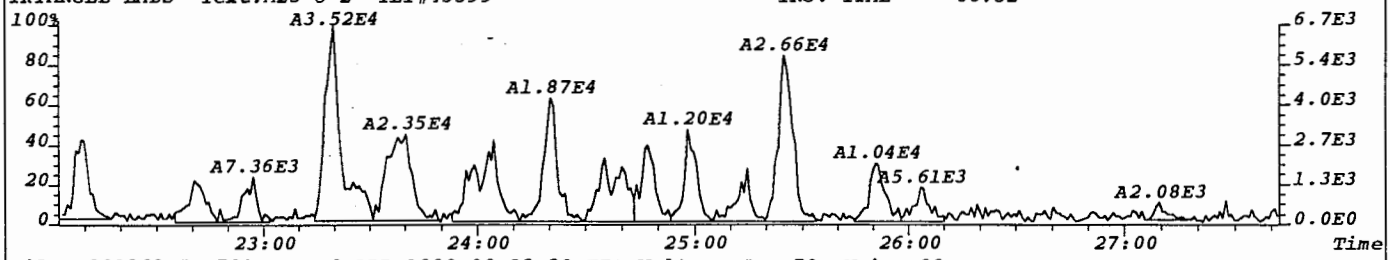
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside 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
		X-Ether Interference

*** End of Report ***

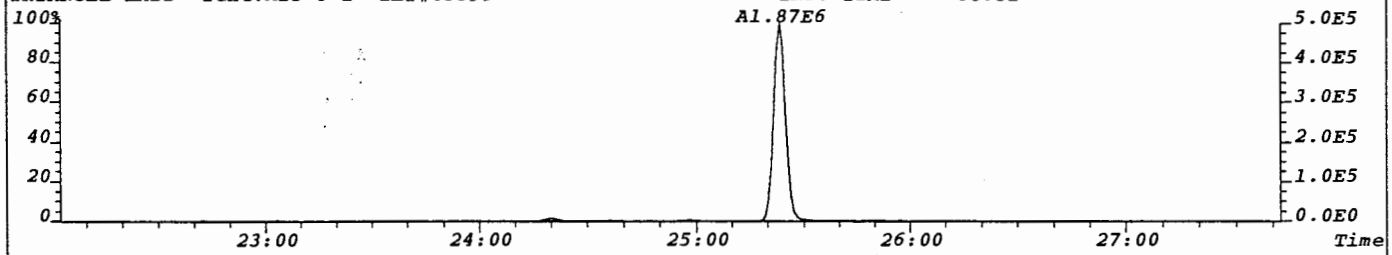
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:64
303.9016 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,256.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



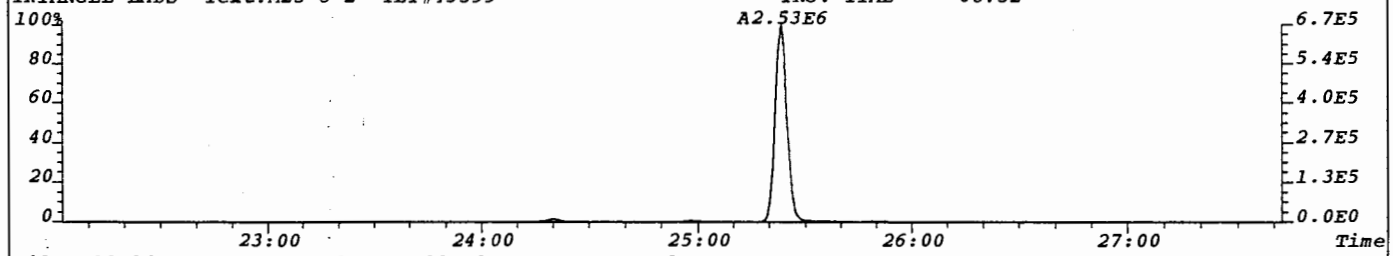
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:88
305.8987 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,352.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



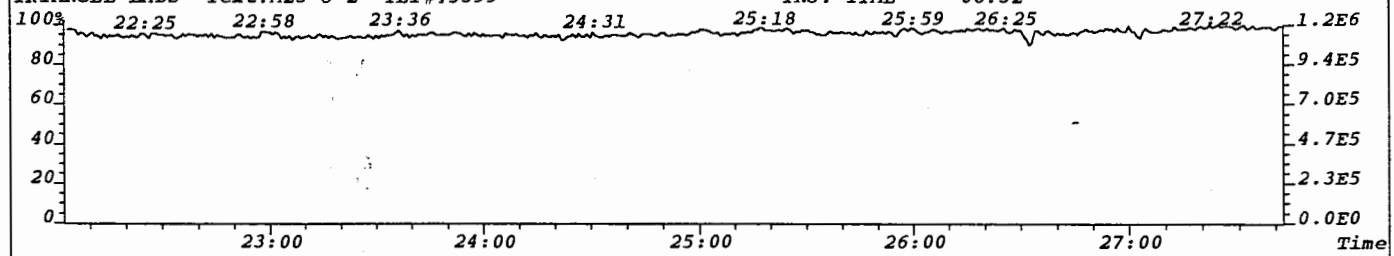
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:99
315.9419 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,396.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



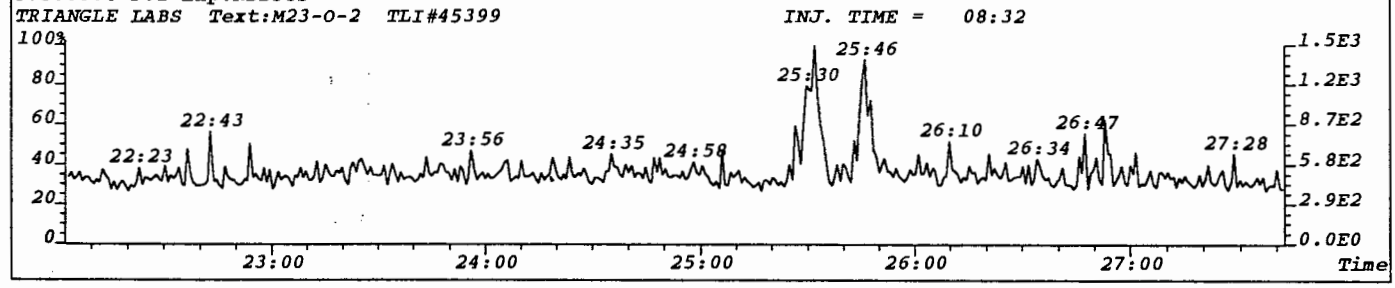
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:85
317.9389 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,340.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



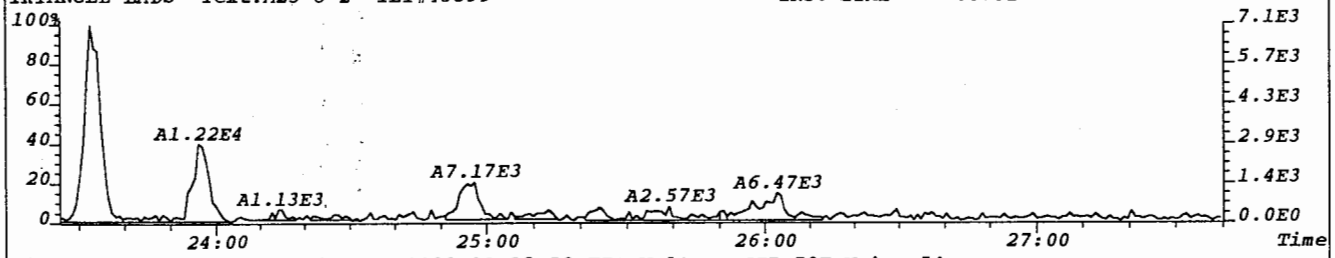
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



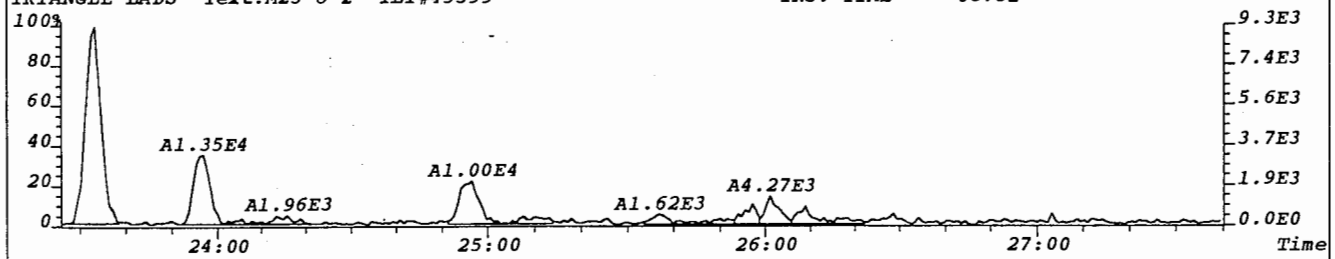
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
375.8364 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



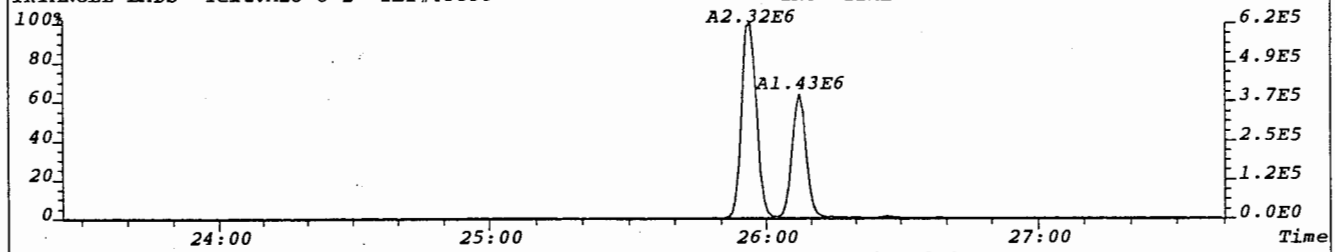
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:56
319.8965 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,224.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



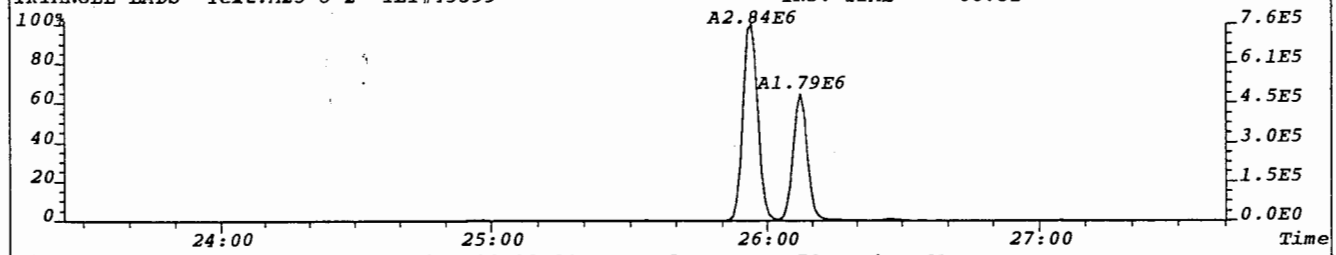
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:54
321.8936 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,216.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



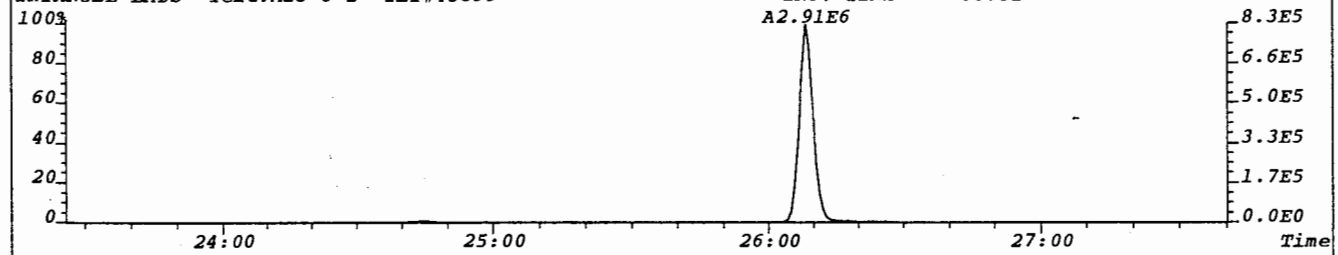
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:535
331.9368 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,2140.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



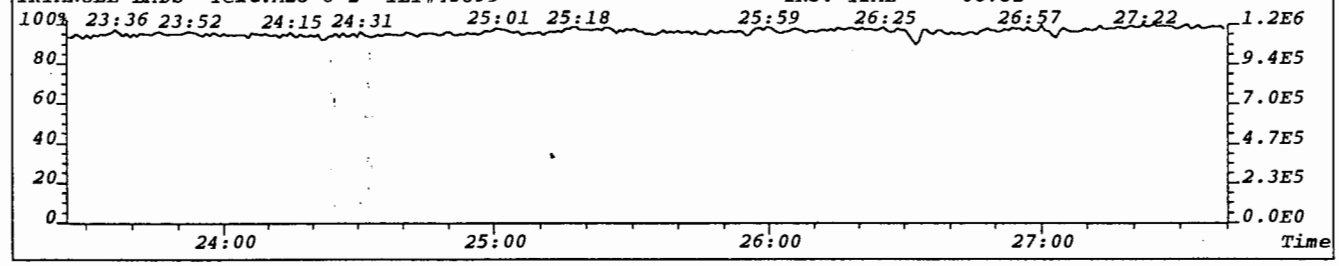
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:208
333.9338 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,832.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



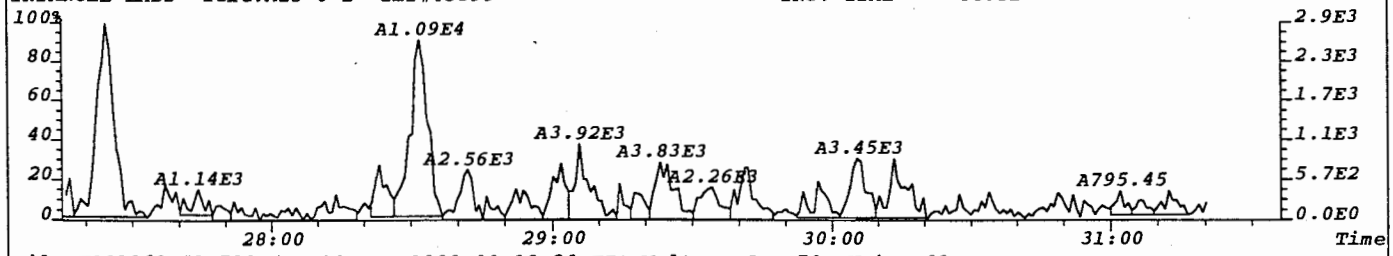
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:61
327.8847 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,244.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



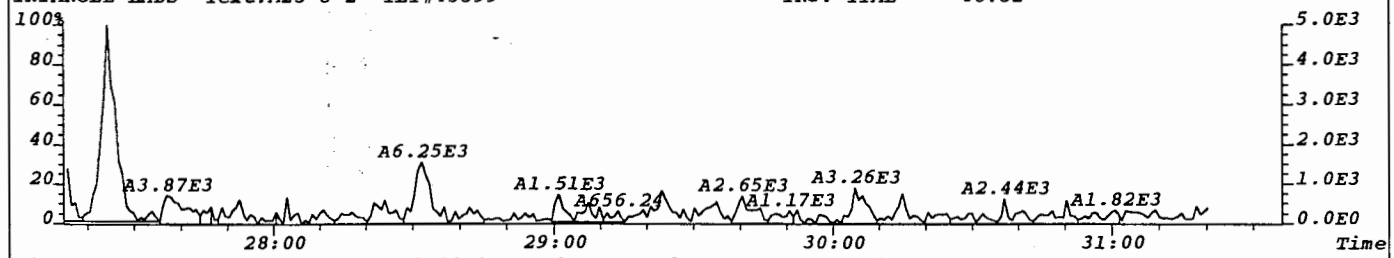
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



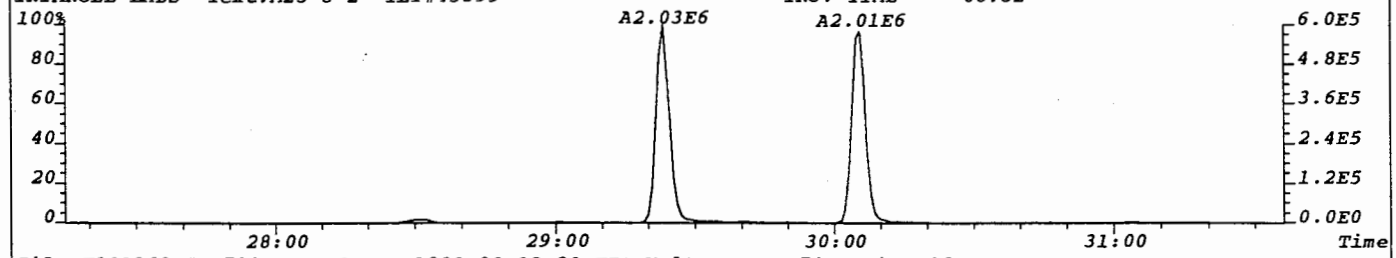
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:51
339.8597 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,204.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



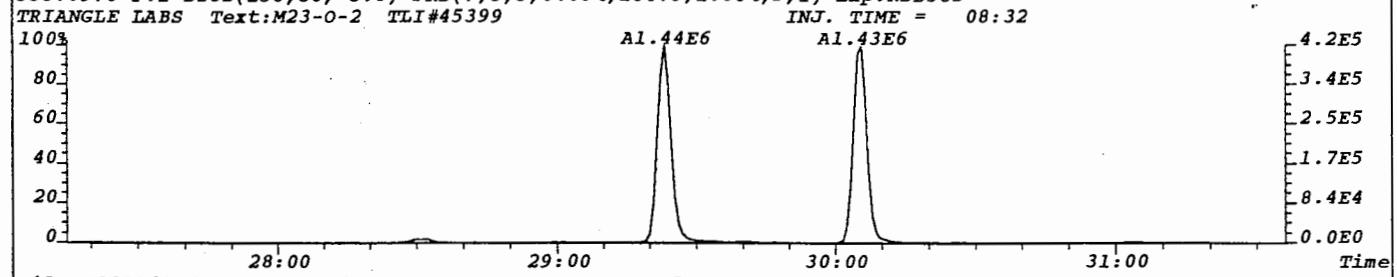
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:63
341.8567 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,252.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



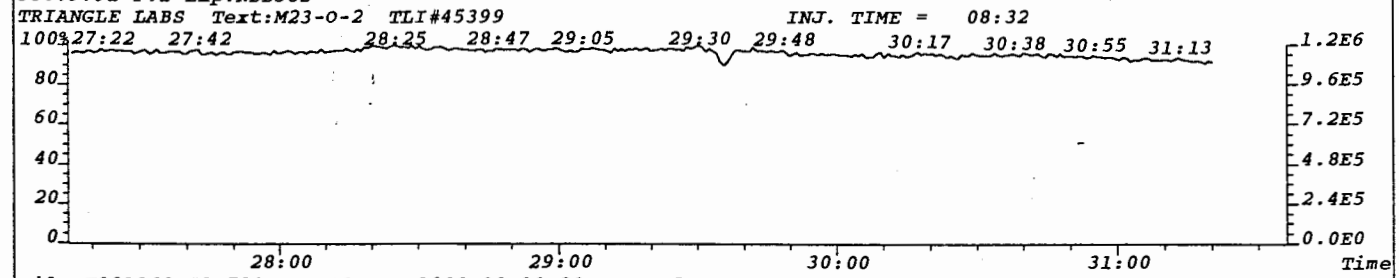
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:38
351.9000 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,152.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



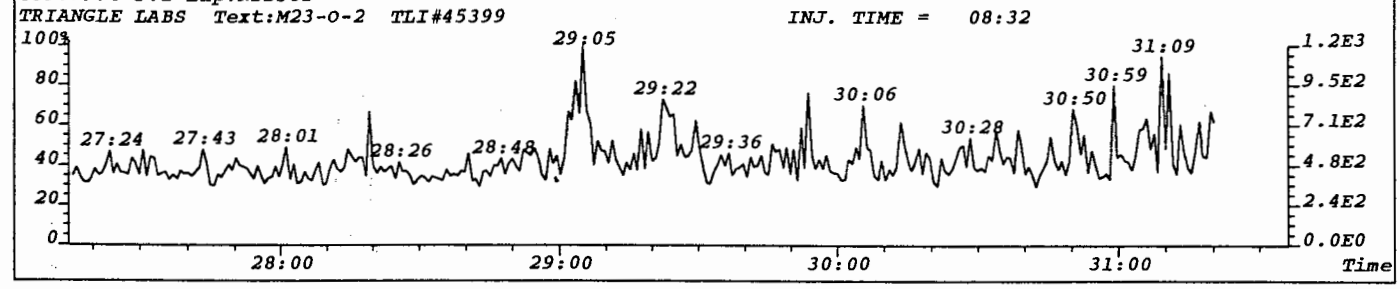
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:46
353.8970 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,184.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



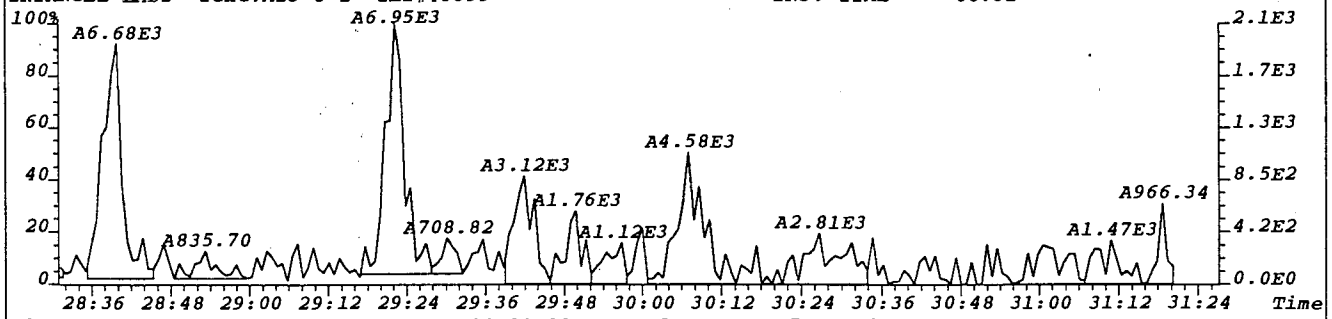
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



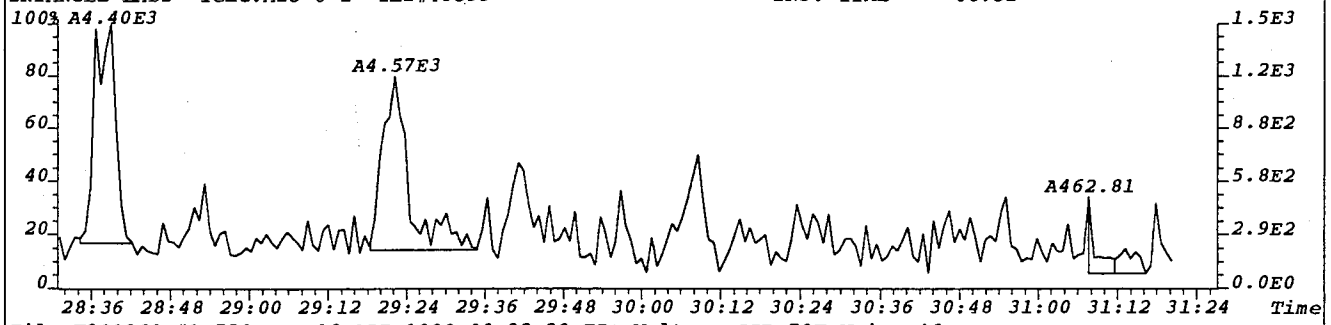
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
409.7974 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



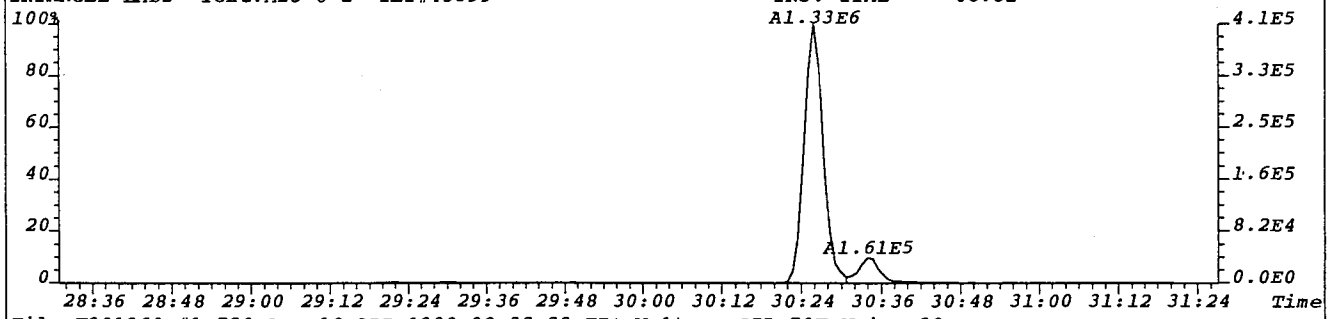
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:47
355.8546 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,188.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



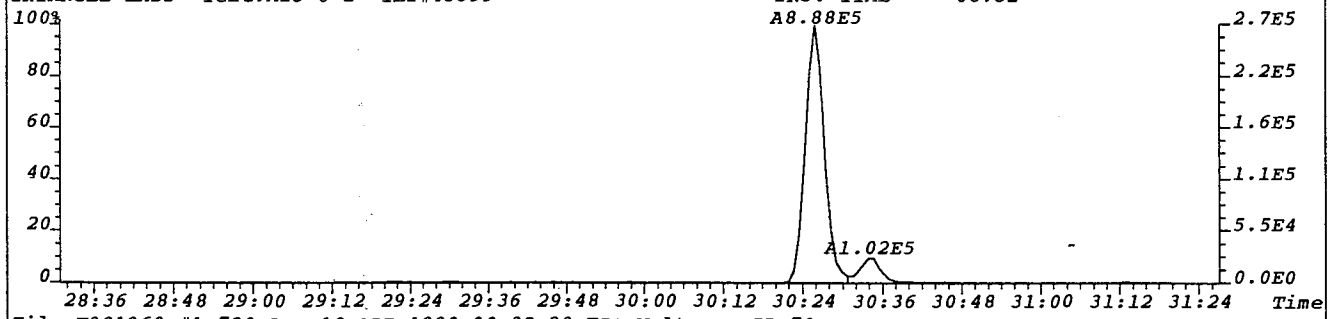
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:72
357.8516 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,288.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



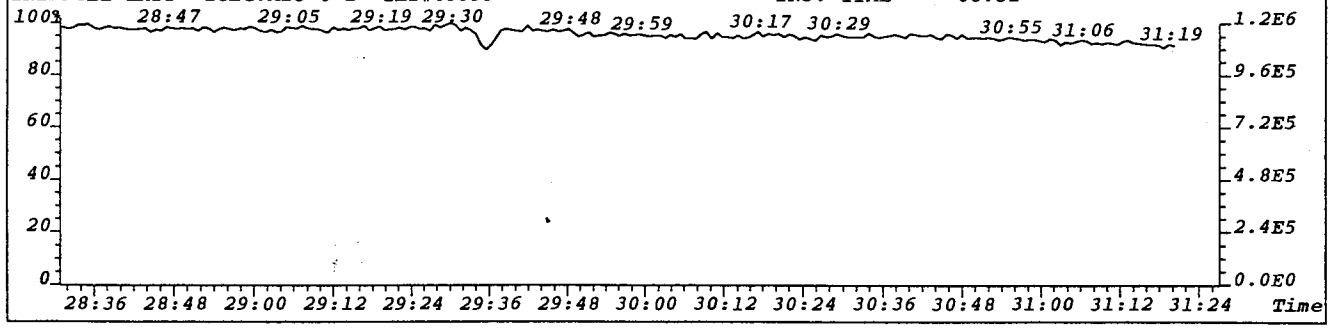
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:46
367.8949 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,184.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



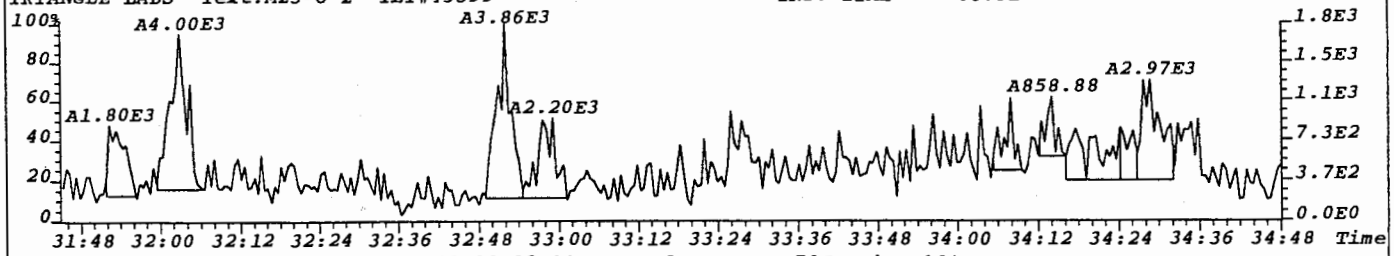
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:38
369.8919 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,152.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



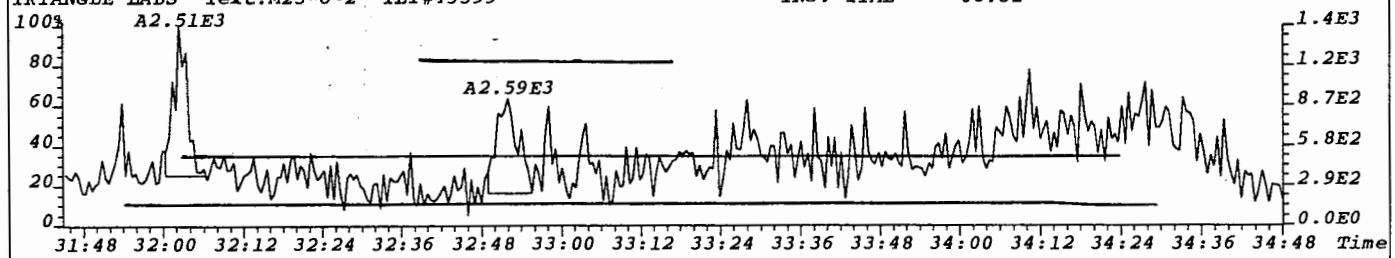
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



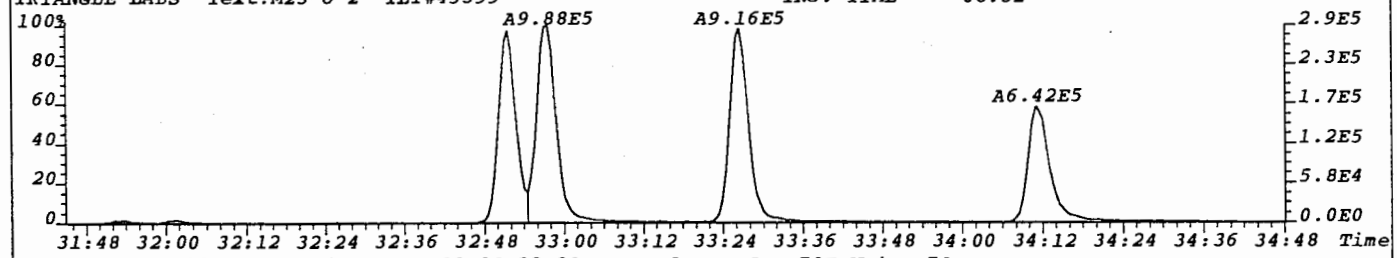
File:T981960 #1-425 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:120
373.8208 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,480.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



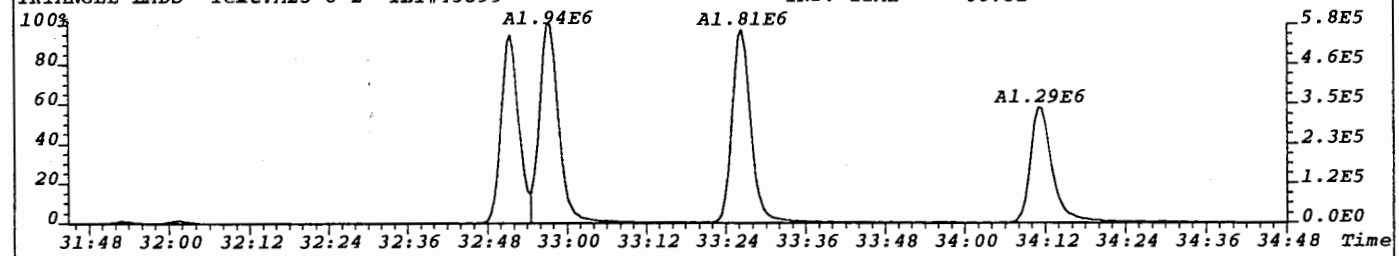
File:T981960 #1-425 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:131
375.8178 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,524.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



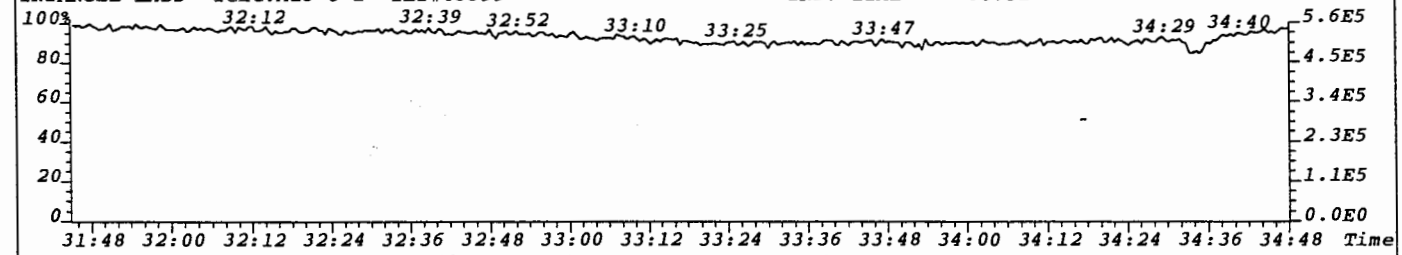
File:T981960 #1-425 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:78
383.8639 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,312.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



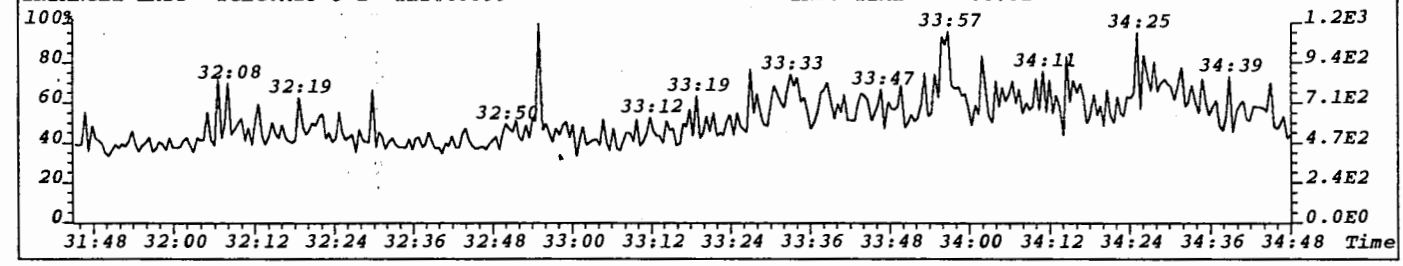
File:T981960 #1-425 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:73
385.8610 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,292.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



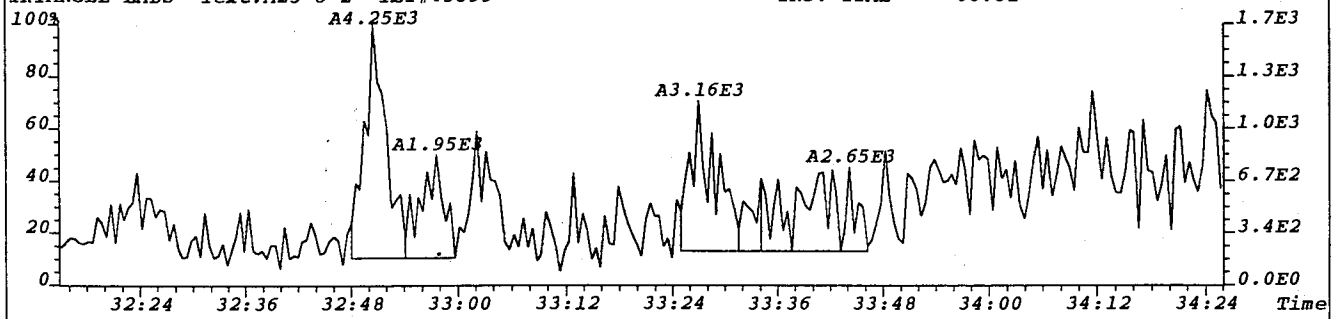
File:T981960 #1-425 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
392.9760 F:3 Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



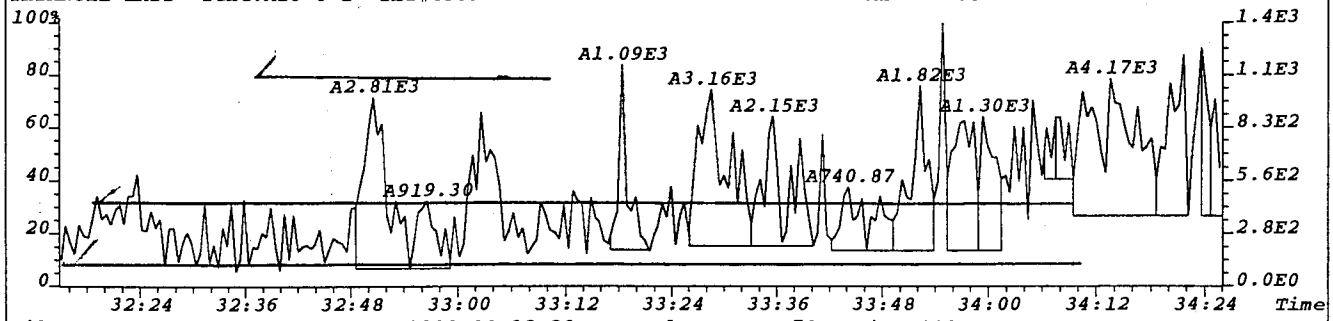
File:T981960 #1-425 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
445.7555 F:3 Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



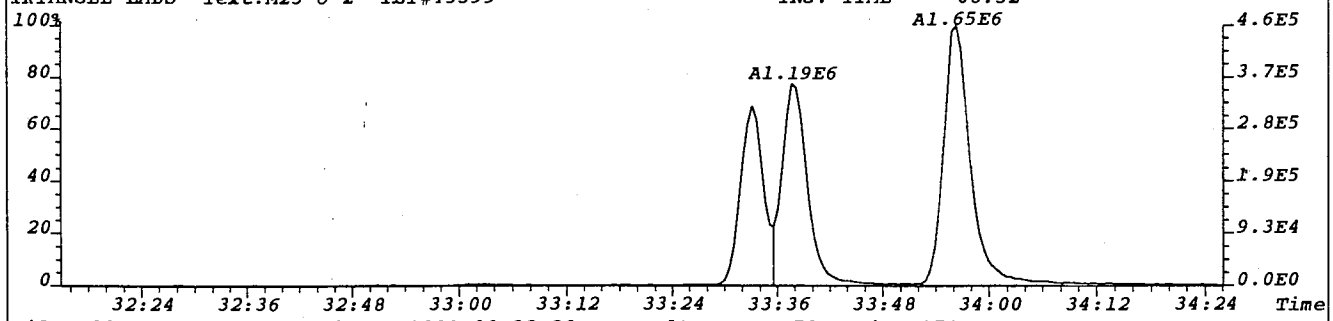
File:T981960 #1-425 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:124
389.8156 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,496.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



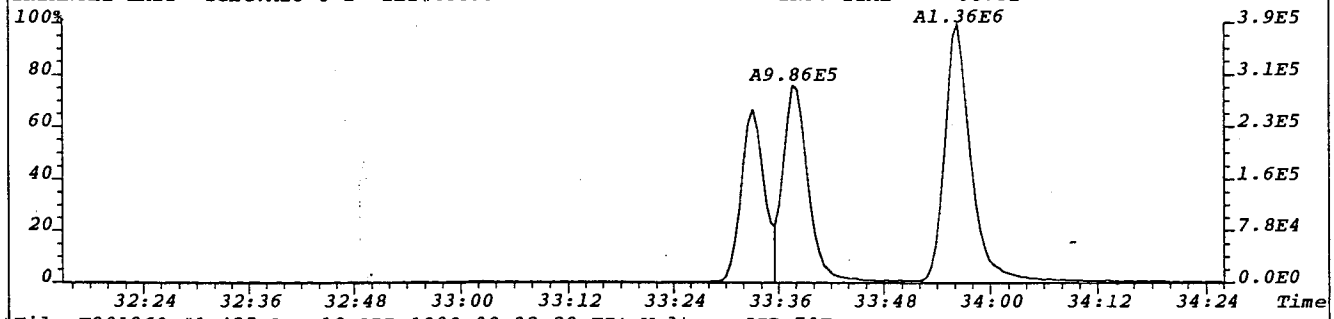
File:T981960 #1-425 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:106
391.8127 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,424.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



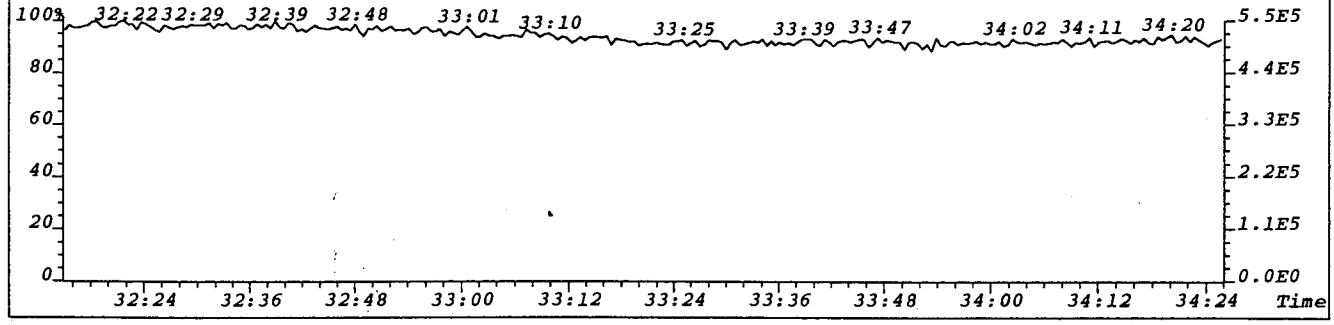
File:T981960 #1-425 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:119
401.8558 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,476.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



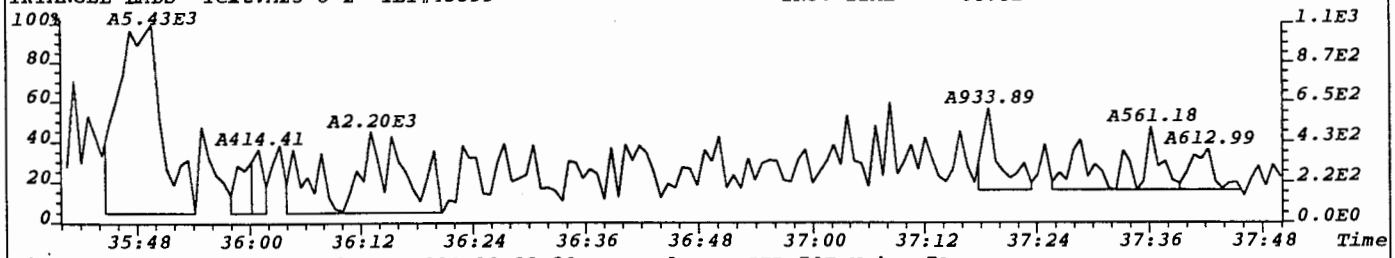
File:T981960 #1-425 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:174
403.8529 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,696.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



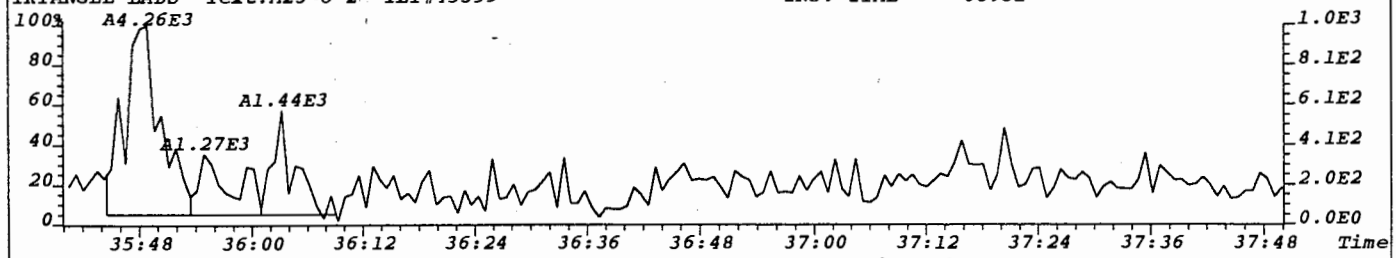
File:T981960 #1-425 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
392.9760 F:3 Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



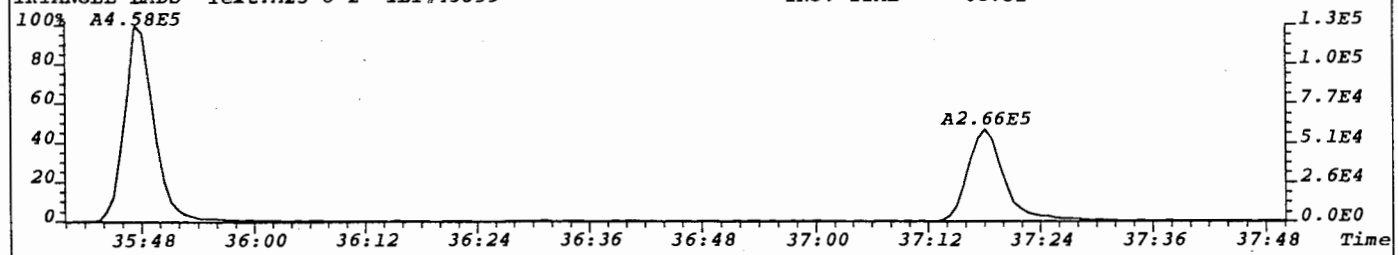
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:95
407.7818 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,380.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



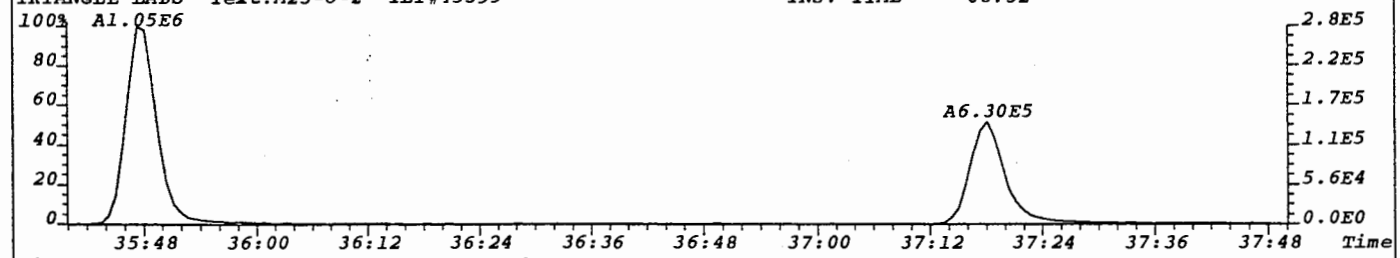
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:71
409.7789 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,284.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



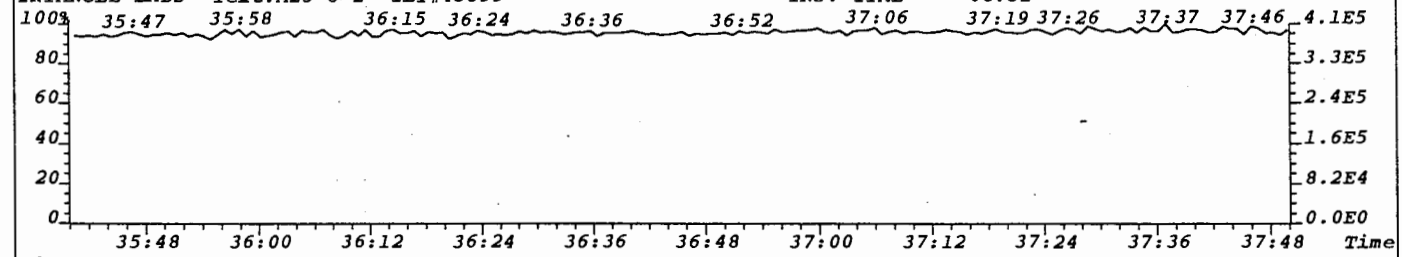
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:76
417.8253 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,304.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



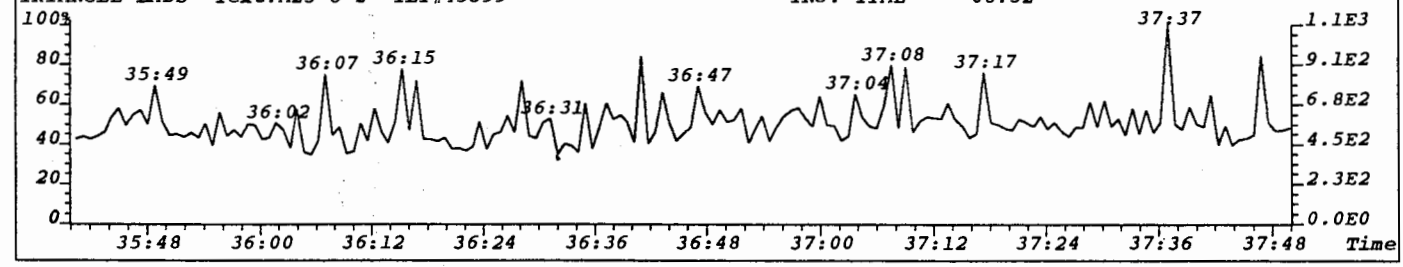
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:69
419.8220 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,276.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



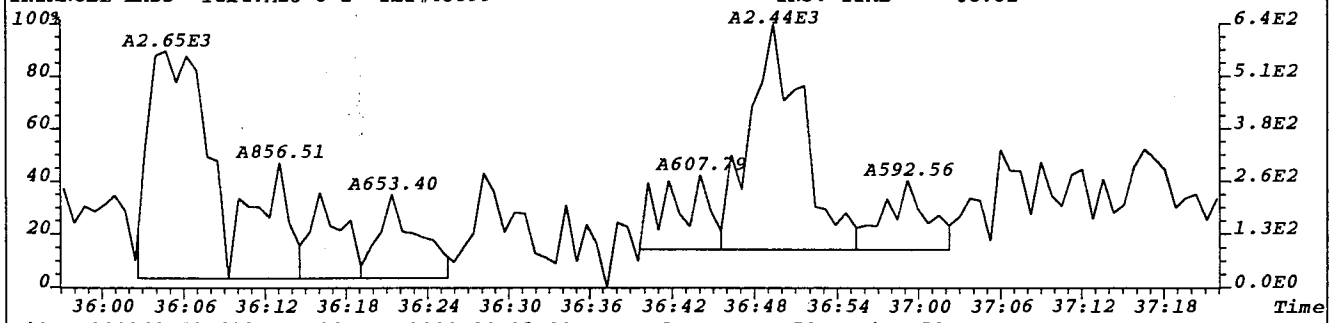
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



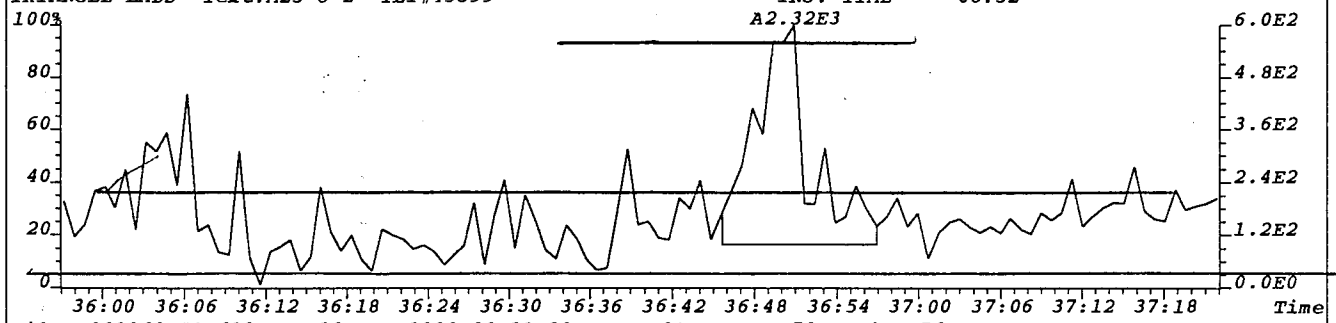
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
479.7165 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



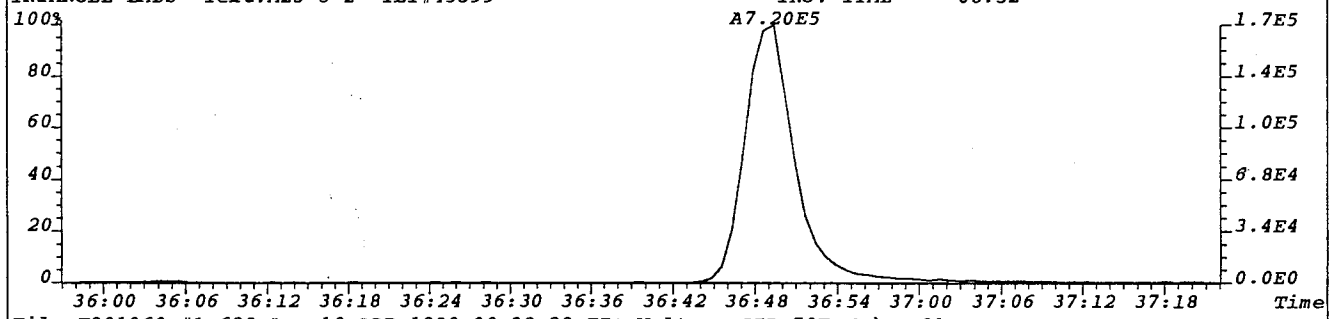
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:64
423.7766 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,256.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



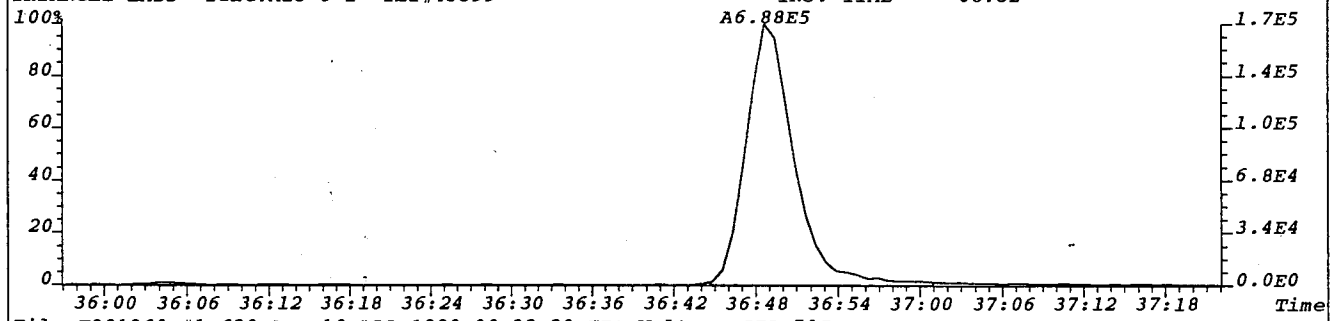
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:52
425.7737 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,208.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



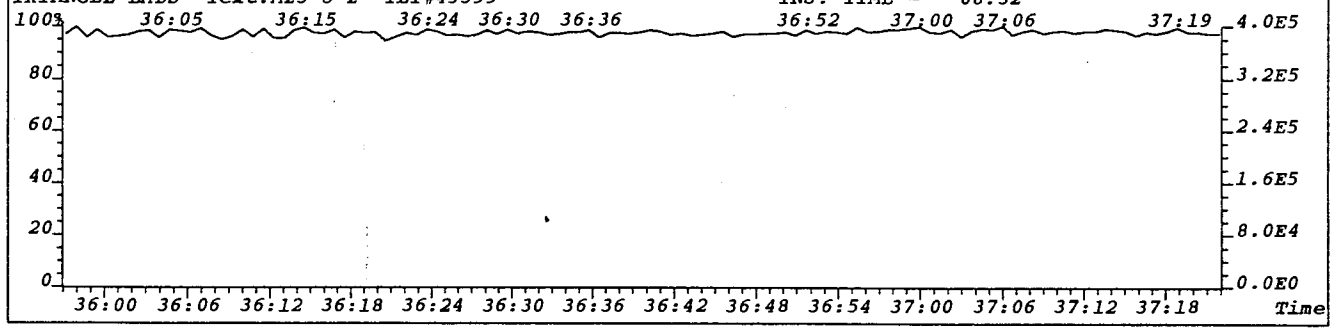
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:76
435.8169 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,304.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



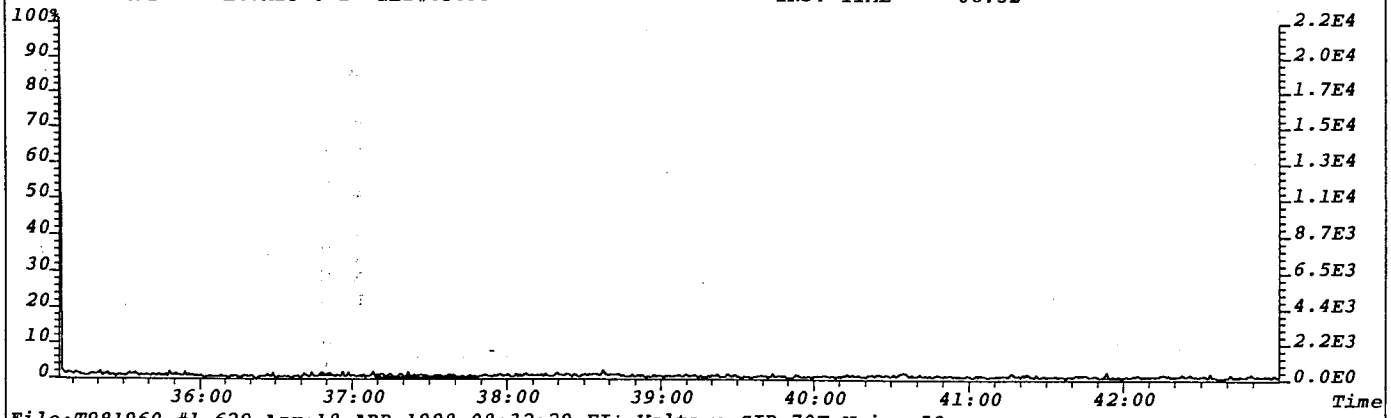
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:81
437.8140 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,324.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



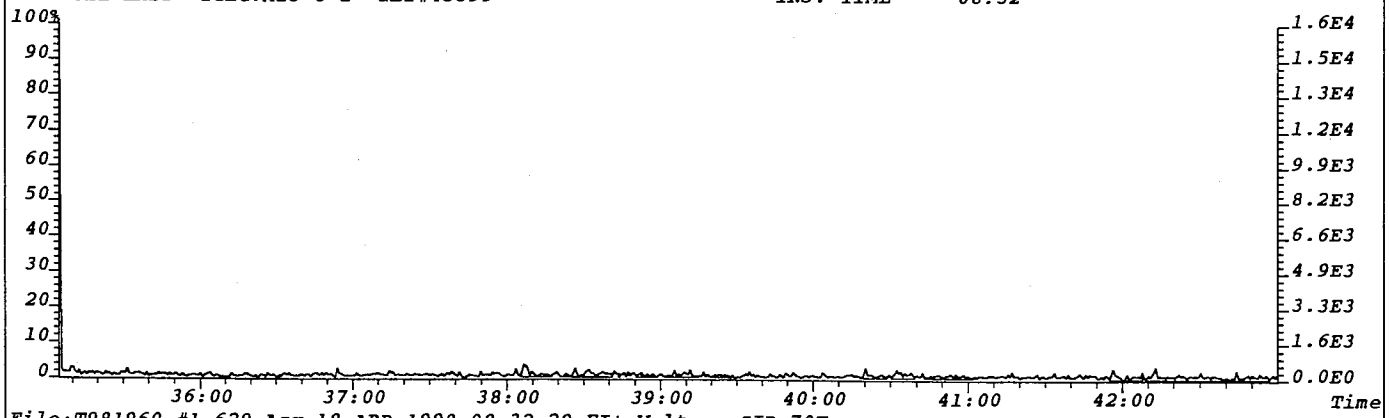
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



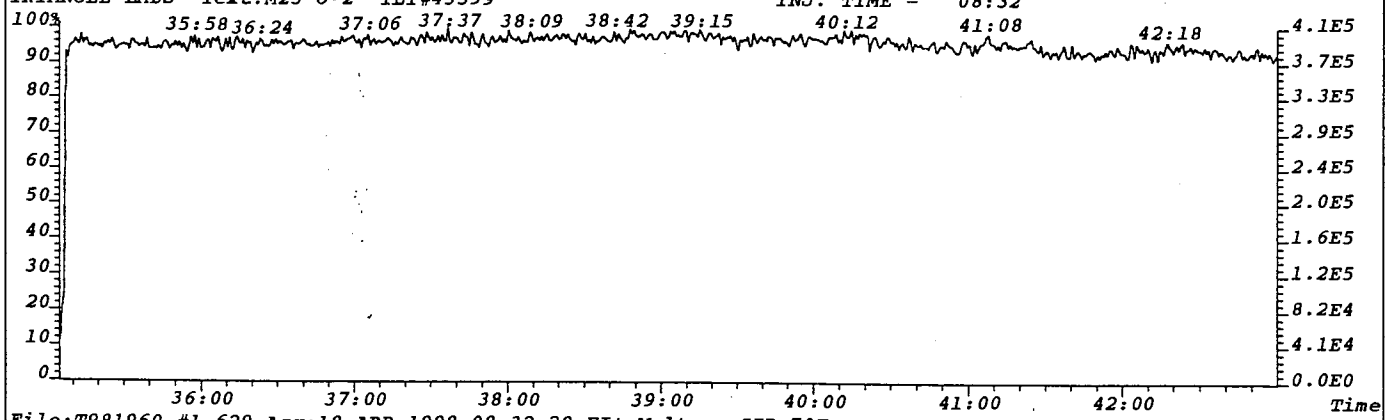
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:60
441.7428 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,240.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



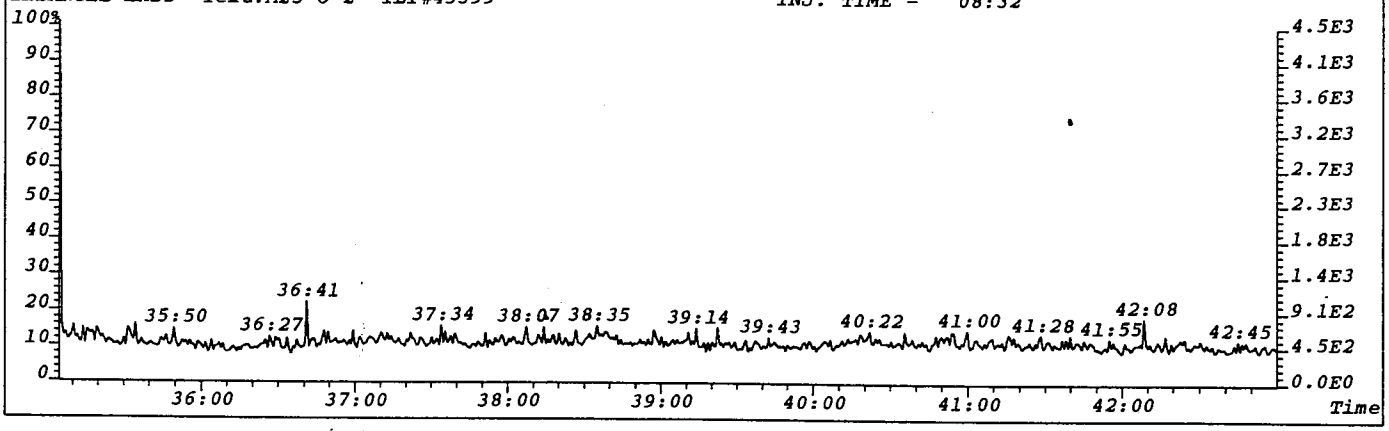
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:59
443.7399 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,236.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



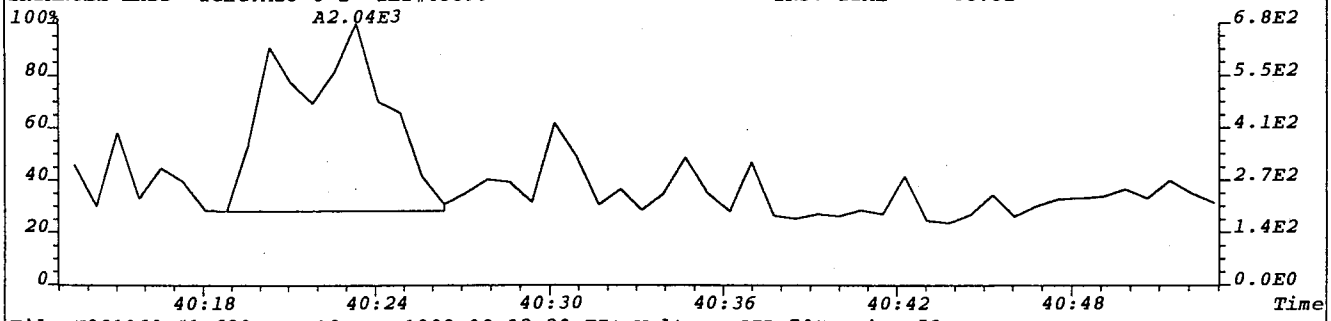
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



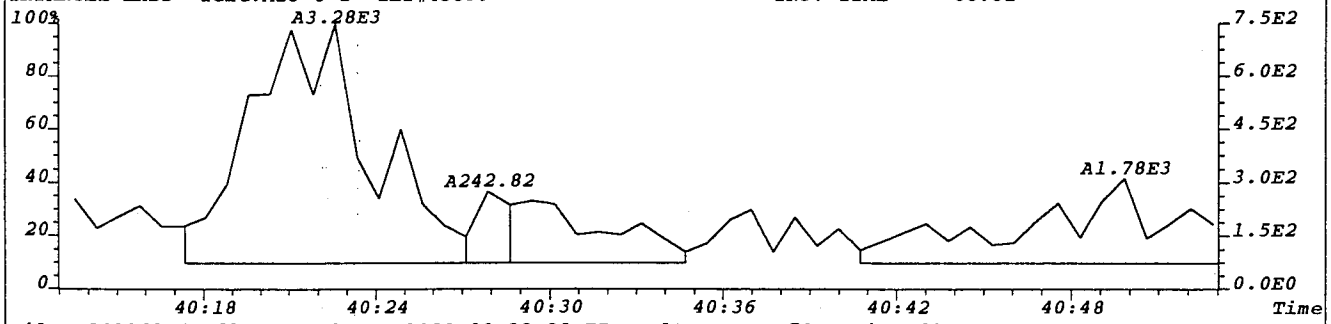
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
513.6775 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



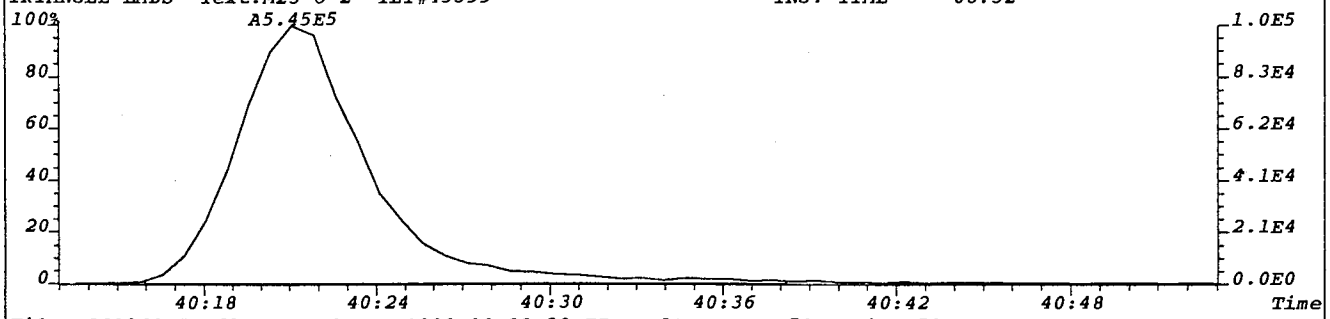
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:68
457.7377 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,272.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



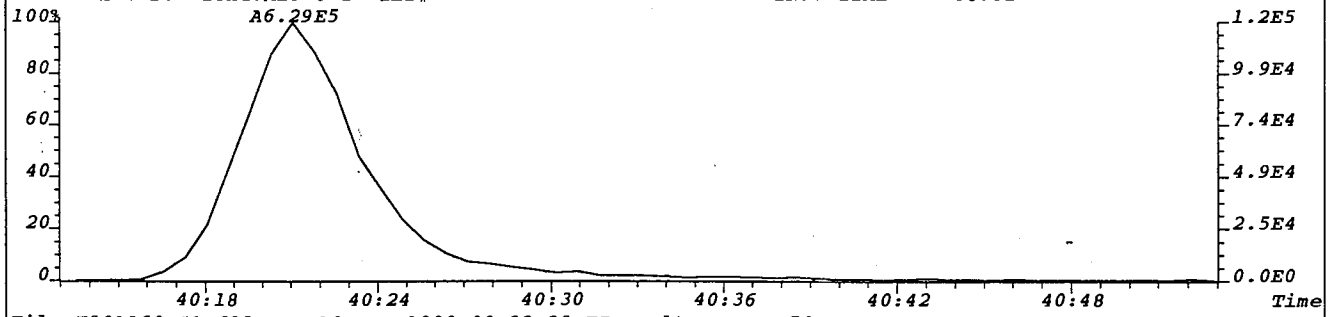
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:53
459.7348 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,212.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



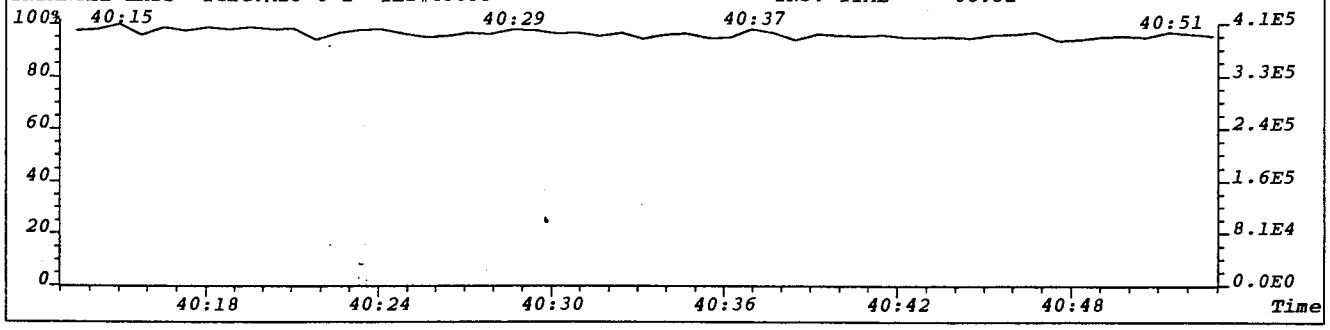
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:64
469.7779 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,256.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32

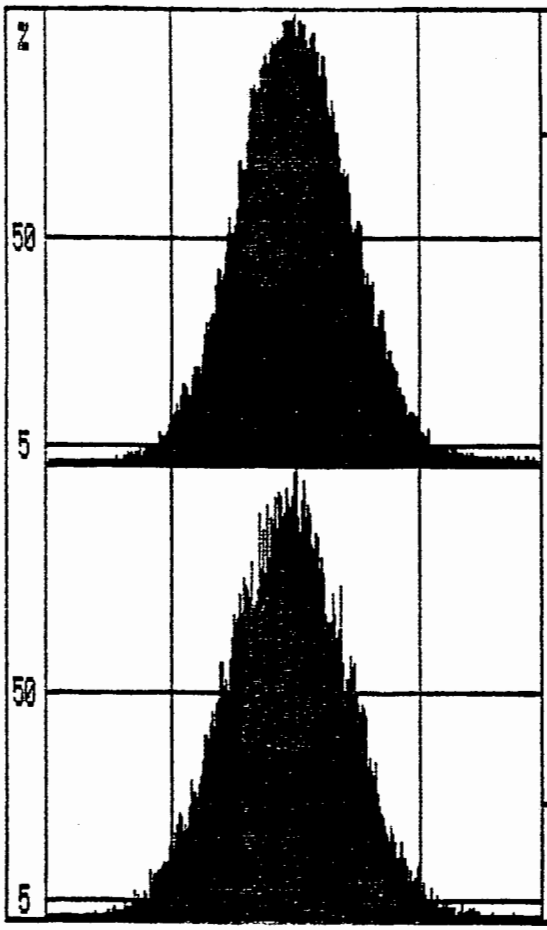


File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T Noise:58
471.7750 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,232.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32



File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:M23-O-2 TLI#45399 INJ. TIME = 08:32





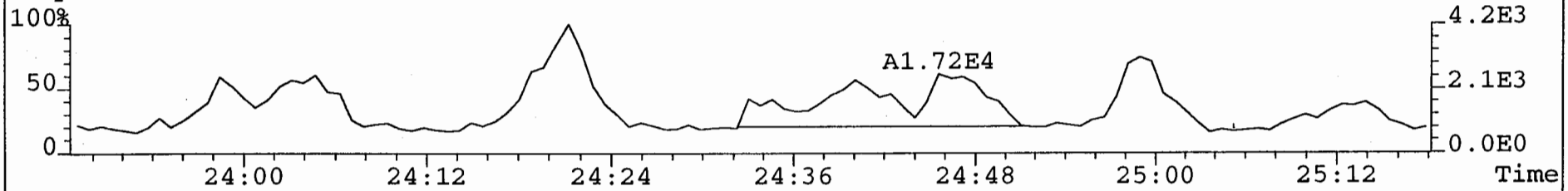
Channel I 330.9792 Peak top
Height .70 volts Span 200 ppm

System file name	NDB5US
Data file name	A:T981948
Resolution	10000
Group number	2
Ionization mode	EI+
Switching	VOLTAGE
Ref. masses	292.9825, 416.9760

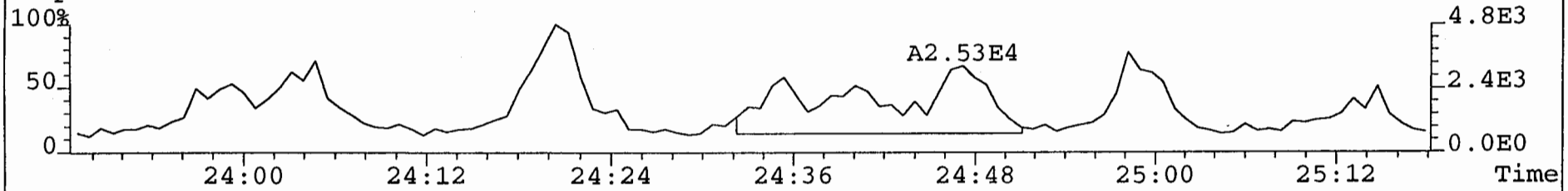
A	293	J	331	S	368
B	304	K	332	T	370
C	306	L	334	U	376
D	316	M	340	V	410
E	318	N	342		
F	320	O	352		
G	322	P	354		
H	328	Q	356		
I	331	R	358		

Ref. mass 416.9760 Peak top
Height .17 volts Span 200 ppm

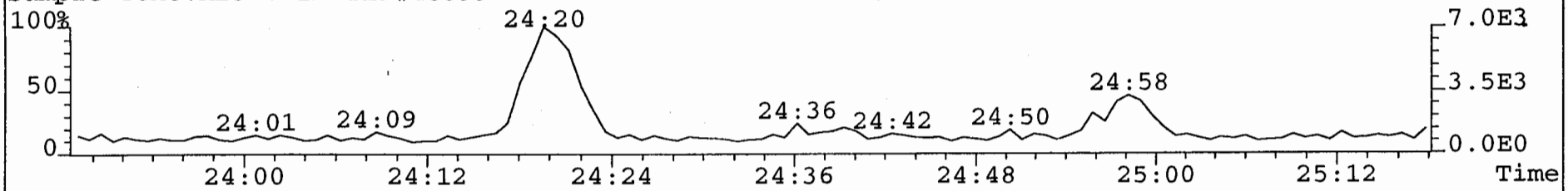
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
303.9016 F:2 Exp:NDB5US
Sample Text:M23-O-2 TLI#45399 INJ. TIME = 08:32 File Text:M23-O-2 TLI#»



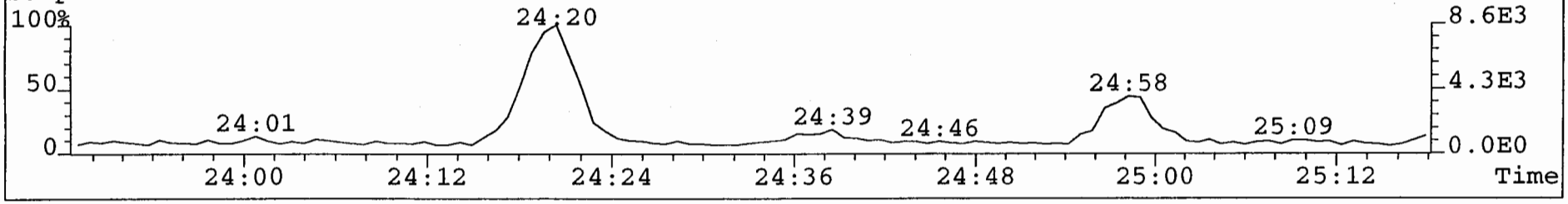
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
305.8987 F:2 Exp:NDB5US
Sample Text:M23-O-2 TLI#45399 INJ. TIME = 08:32 File Text:M23-O-2 TLI#»



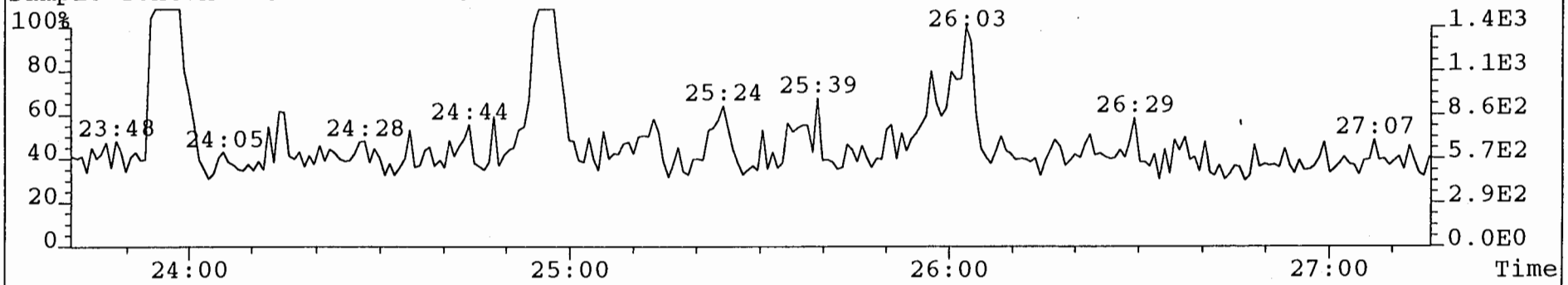
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
315.9419 F:2 Exp:NDB5US
Sample Text:M23-O-2 TLI#45399 INJ. TIME = 08:32 File Text:M23-O-2 TLI#»



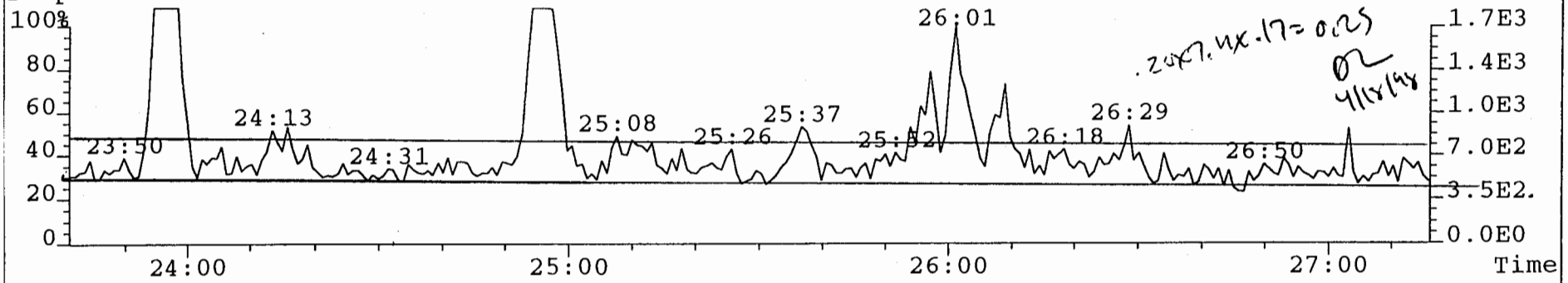
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
317.9389 F:2 Exp:NDB5US
Sample Text:M23-O-2 TLI#45399 INJ. TIME = 08:32 File Text:M23-O-2 TLI#»



File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
319.8965 F:2 Exp:NDB5US
Sample Text:M23-O-2 TLI#45399 INJ. TIME = 08:32 File Text:M23-O-2 TLI#»

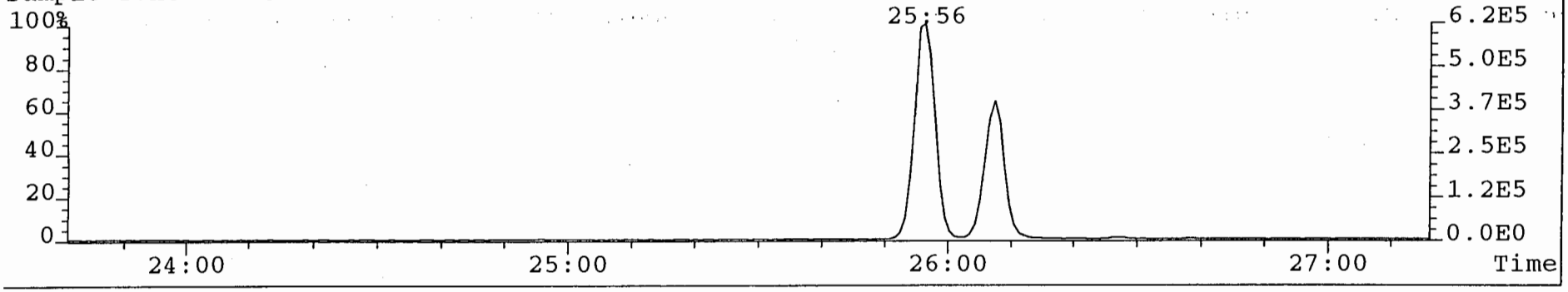


File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
321.8936 F:2 Exp:NDB5US
Sample Text:M23-O-2 TLI#45399 INJ. TIME = 08:32 File Text:M23-O-2 TLI#»

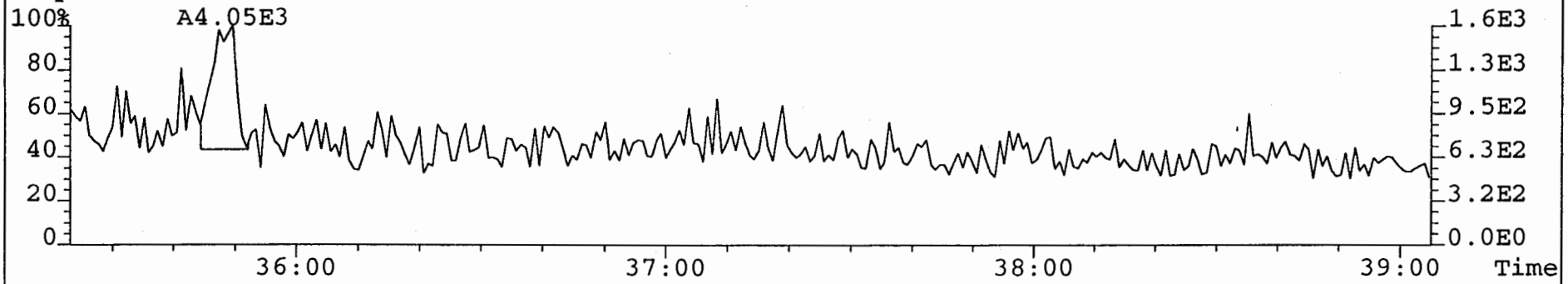


.20x7.4x.17= 0.25
OL
4/18/98

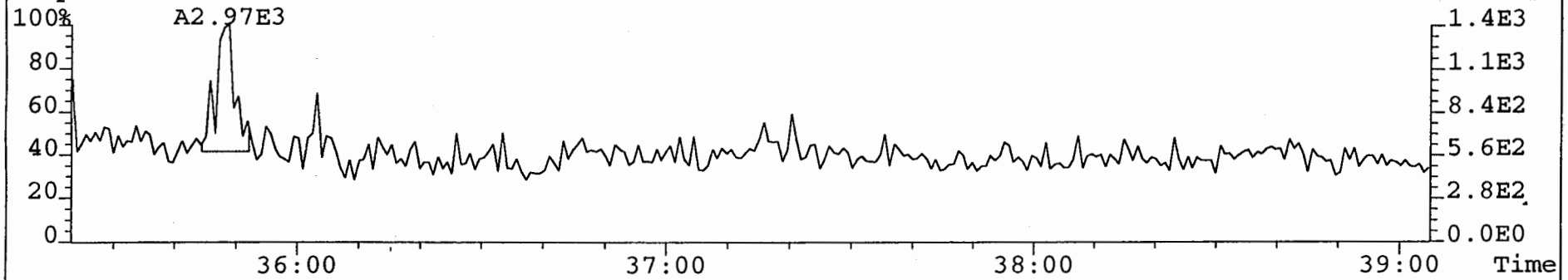
File:T981960 #1-720 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
331.9368 F:2 Exp:NDB5US
Sample Text:M23-O-2 TLI#45399 INJ. TIME = 08:32 File Text:M23-O-2 TLI#»



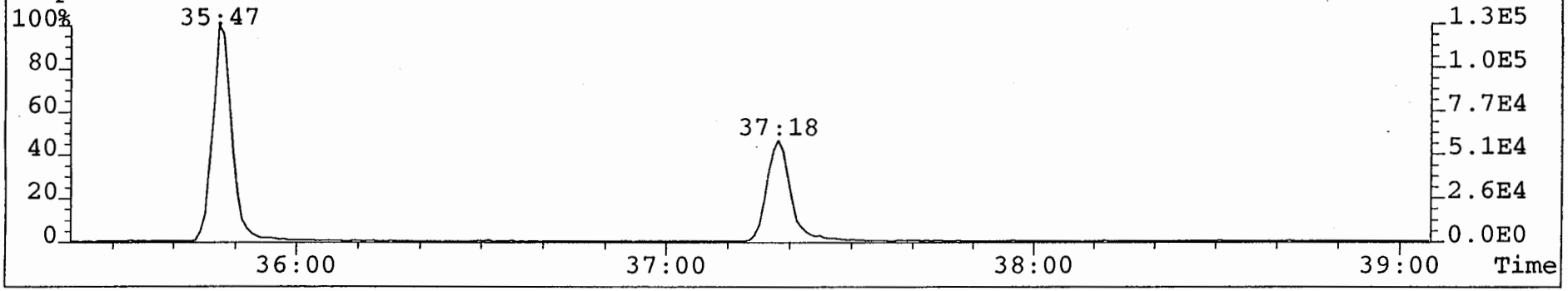
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
407.7818 F:4 Exp:NDB5US
Sample Text:M23-O-2 TLI#45399 INJ. TIME = 08:32 File Text:M23-O-2 TLI#»



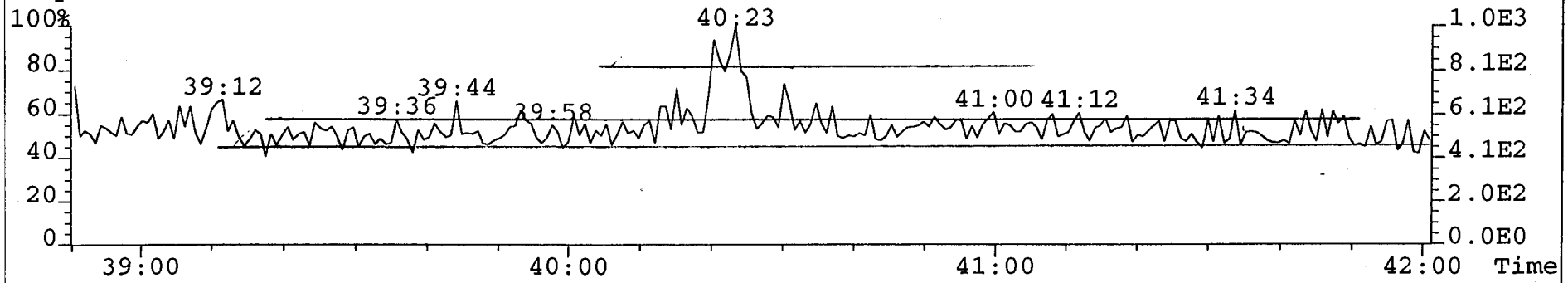
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
409.7789 F:4 Exp:NDB5US
Sample Text:M23-O-2 TLI#45399 INJ. TIME = 08:32 File Text:M23-O-2 TLI#»



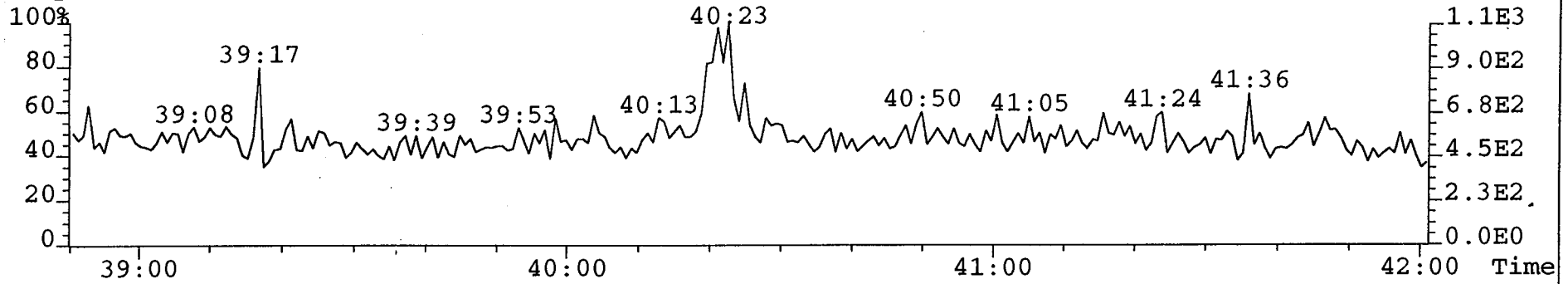
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
417.8253 F:4 Exp:NDB5US
Sample Text:M23-O-2 TLI#45399 INJ. TIME = 08:32 File Text:M23-O-2 TLI#»



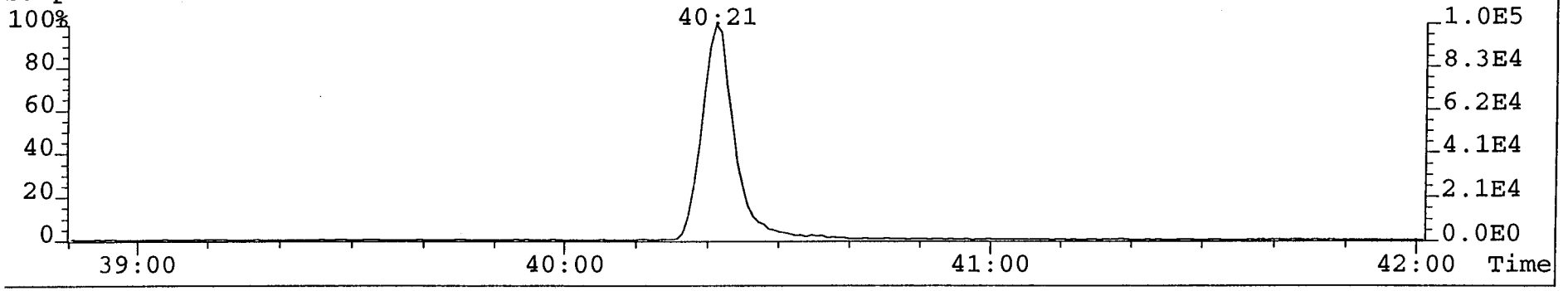
File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
457.7377 F:4 Exp:NDB5US
Sample Text:M23-O-2 TLI#45399 INJ. TIME = 08:32 File Text:M23-O-2 TLI#»



File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
459.7348 F:4 Exp:NDB5US
Sample Text:M23-O-2 TLI#45399 INJ. TIME = 08:32 File Text:M23-O-2 TLI#»



File:T981960 #1-629 Acq:18-APR-1998 08:32:29 EI+ Voltage SIR 70T
469.7779 F:4 Exp:NDB5US
Sample Text:M23-O-2 TLI#45399 INJ. TIME = 08:32 File Text:M23-O-2 TLI#»



Pacific Environmental Services

TLI Project: **45399** Method 23 TCDD/TCDF Analysis (DB-225)
Client Sample: **M23-O-2** Analysis File: **P981311**

Client Project:	**r012.002/Lime Kiln**				
Sample Matrix:	**M23**	Date Received:	**04/01/98**	Spike File:	**SPC2NF04**
TLI ID:	**204-92-6A-D**	Date Extracted:	**04/03/98**	ICal:	**PF24098**
		Date Analyzed:	**04/16/98**	ConCal:	**P981302**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U980780**	% Lipid:	**n/a**
GC Column:	**DB-225**	Analyst:	**ML**	% Solids:	**n/a**

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDF	0.01			0.67	22:25	JB_

Internal Standard	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	2.2	54.0	40%-130%	0.79	22:24	___

Recovery Standard	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.79	21:18	___

Data Reviewer: _____ 04/20/98

C2NF_PSR v2.02, LARS 6.11.00

Triangle Laboratories, Inc.®
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Printed: 21:28 04/20/98

Initial ....Date...

Data Review By: K 4/20/98 Calculated Noise Area: 0.15

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 P981311B.dbf

04/20/98 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						0.790-1.102			
304-306	DC	NL		0:00	RO	0.90	0.18			0.000			
				17:52	RO	0.93	0.74	0.39	0.42	0.798			J
				18:51		0.69	0.81	0.33	0.48	0.842			J
	DC	SN		19:00	RO	0.19	0.11			0.848			
				19:06		0.70	0.78	0.32	0.46	0.853			J
	DC	SN		19:18	RO	0.55	0.39			0.862			
	DC	SN		19:33		0.74	0.33			0.873			
				19:43	RO	0.59	0.55	0.24	0.41	0.880			J
	DC	SN		19:52	RO	1.50	0.11			0.887			
				20:02		0.86	0.95	0.44	0.51	0.894			J
				20:33		0.71	1.66	0.69	0.97	0.917			
				21:00	RO	0.58	0.60	0.26	0.45	0.938			J
				21:14	RO	0.48	0.57	0.25	0.52	0.948			J
	DC	SN		21:27		0.82	0.40			0.958			
				21:52	RO	0.92	0.44	0.23	0.25	0.976			J
	DC	SN		22:18	RO	1.07	0.27			0.996			
				22:25		0.67	0.70	0.28	0.42	1.001	2378-TCDF	AN	J
				23:06		0.66	0.48	0.19	0.29	1.031			J
304-306			11	Peaks			8.28						
13C12-TCDF				0.65-0.89						0.955-1.045			
316-318	DC	NL		0:00	RO	1.00	0.18			0.000			
	DC	WL		20:59		0.84	0.81			0.937			
	DC	WL		21:14		0.83	2.38			0.948			
				22:24		0.79	229.80	101.27	128.53	1.000	13C12-2378-TCDF	IS0	
				23:04		0.81	0.49	0.22	0.27	1.030			
	DC	WH		23:27	RO	2.28	0.32			1.047			
	DC	WH		24:25		0.73	3.71			1.090			
316-318			2	Peaks			230.29						

---------- Above: TCDF / TCDD Follows ----------

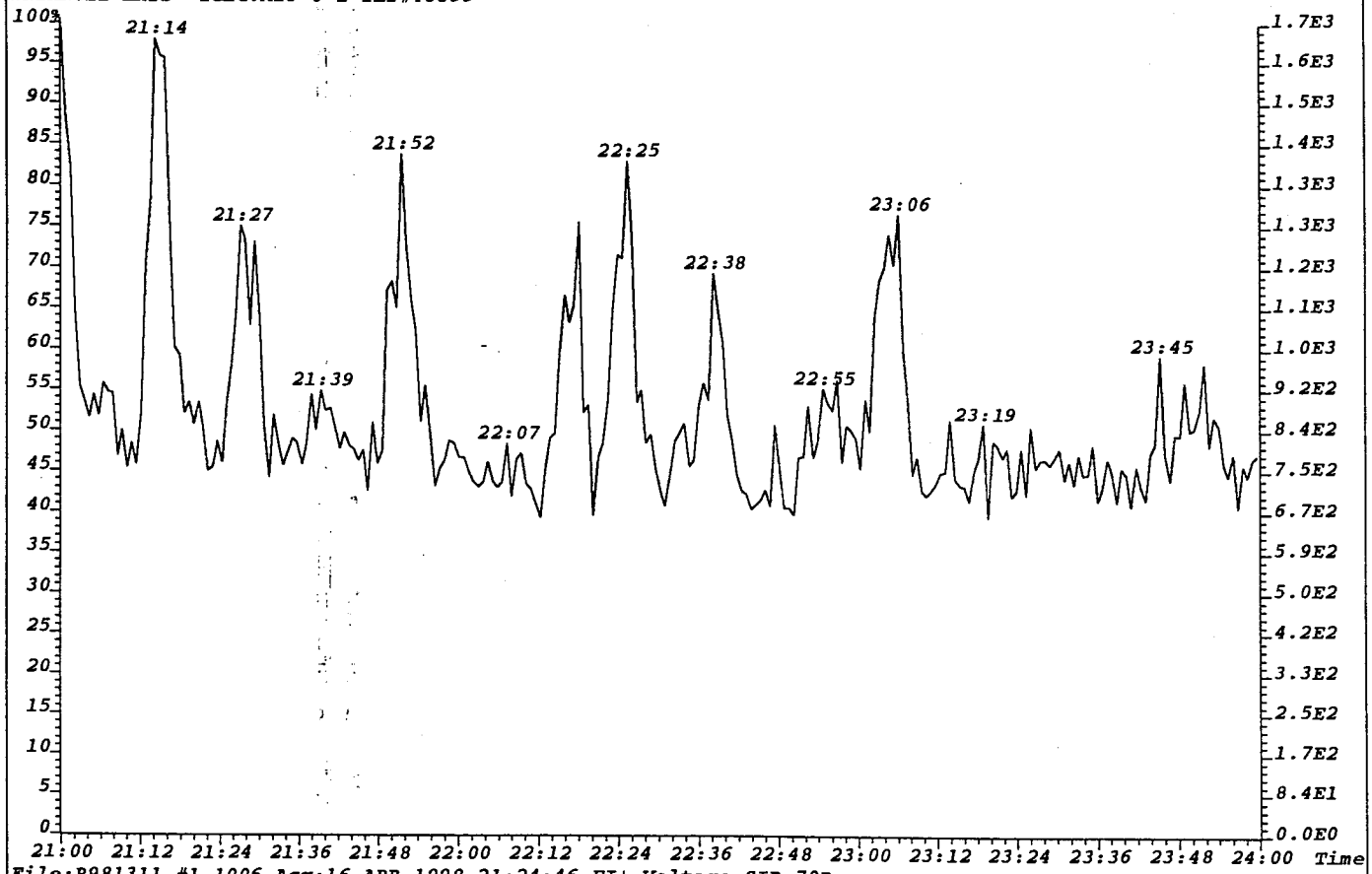
13C12-TCDD				0.65-0.89						0.905-1.095			
332-334	DC	NL		0:00	RO	1.11	0.16			0.000			
				19:53	RO	0.97	0.55	0.30	0.31	0.946			
				21:01		0.75	169.88	72.68	97.20	1.000	13C12-2378-TCDD	IS1	
				21:18		0.79	316.91	139.63	177.28	1.013	13C12-1234-TCDD	RS1	
				22:01		0.75	1.38	0.59	0.79	1.048			
332-334			4	Peaks			488.72						

Compound/
M_Z.... QC.Log Omit Why ..RT. OK Ratio Total.Area... Area.Peak.1.. Area.Peak.2.. Rel.RT Compound.Name.. ID.. Flags.

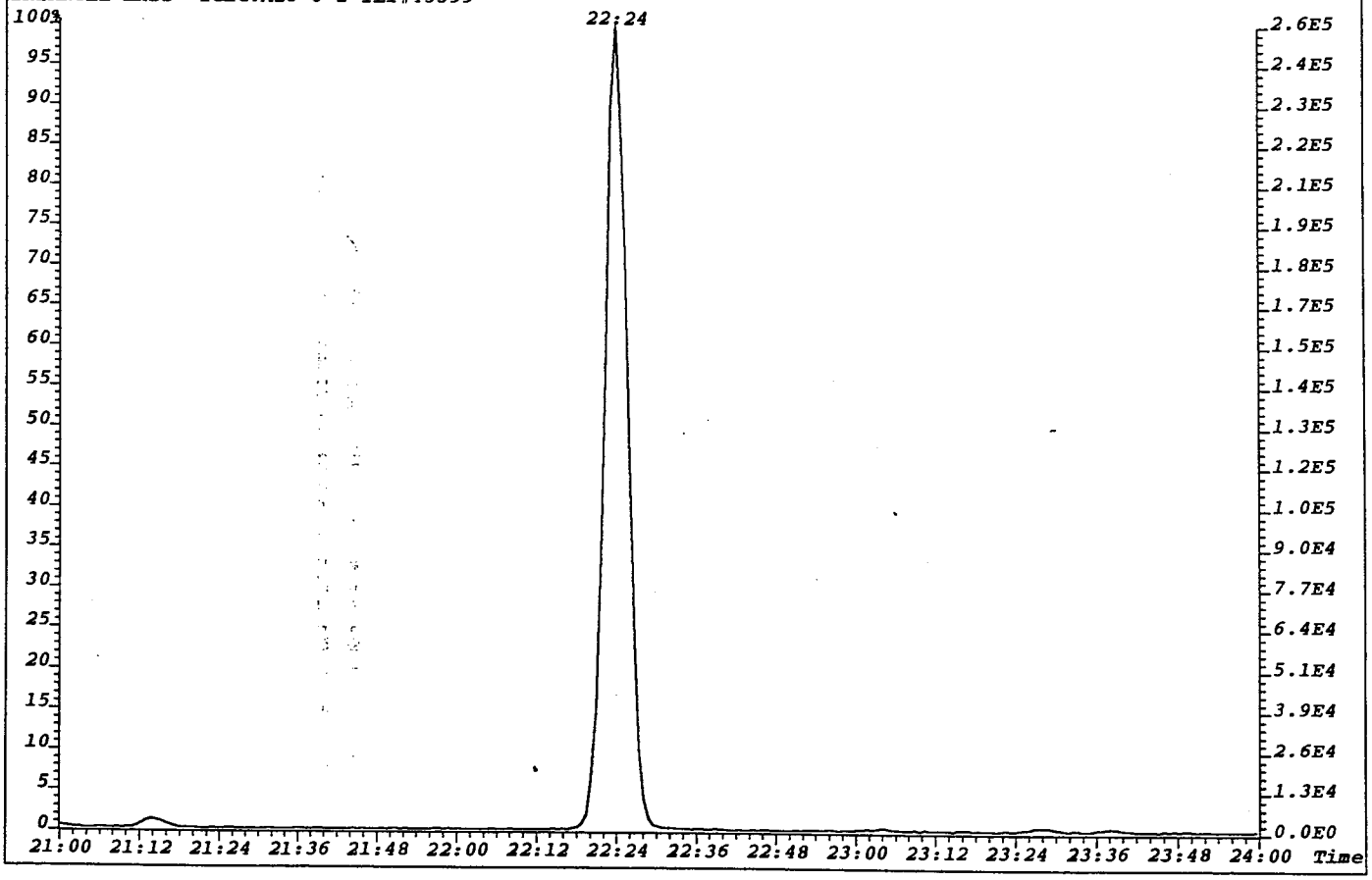
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside 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
		X-Ether Interference

*** End of Report ***

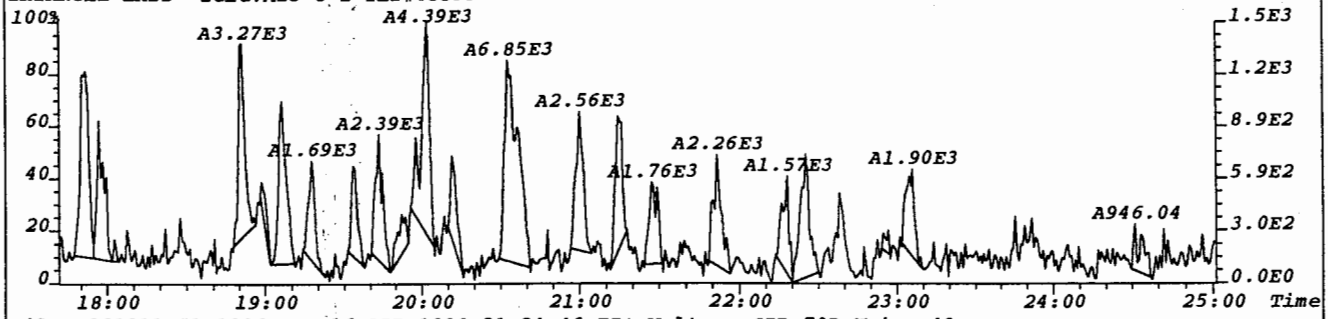
File:P981311 #1-1006 Acq:16-APR-1998 21:24:46 EI+ Voltage SIR 70P
303.9016 Exp:DB225
TRIANGLE LABS Text:M23-O-2 TLI#45399



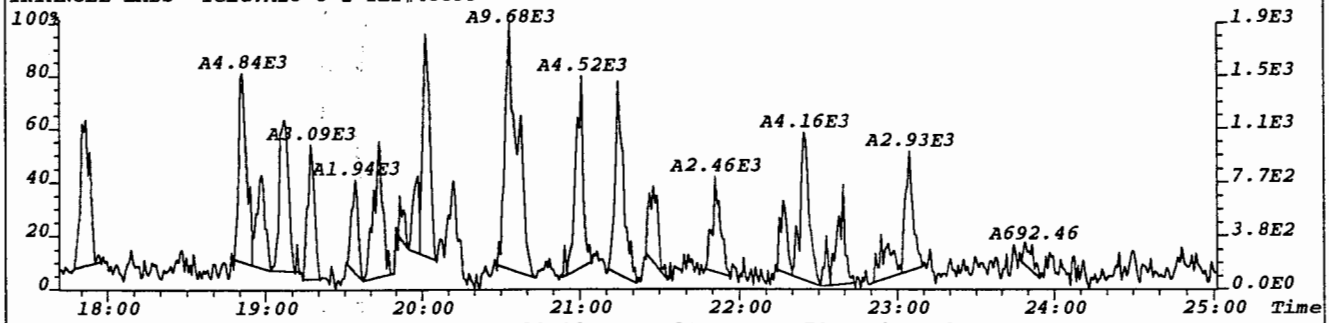
File:P981311 #1-1006 Acq:16-APR-1998 21:24:46 EI+ Voltage SIR 70P
315.9419 Exp:DB225
TRIANGLE LABS Text:M23-O-2 TLI#45399



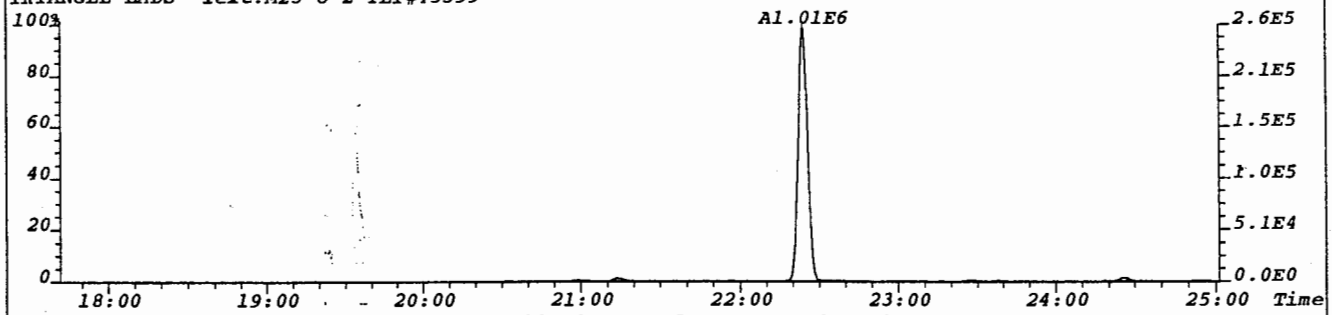
File:P981311 #1-1006 Acq:16-APR-1998 21:24:46 EI+ Voltage SIR 70P Noise:45
303.9016 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,180.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-O-2 TLI#45399



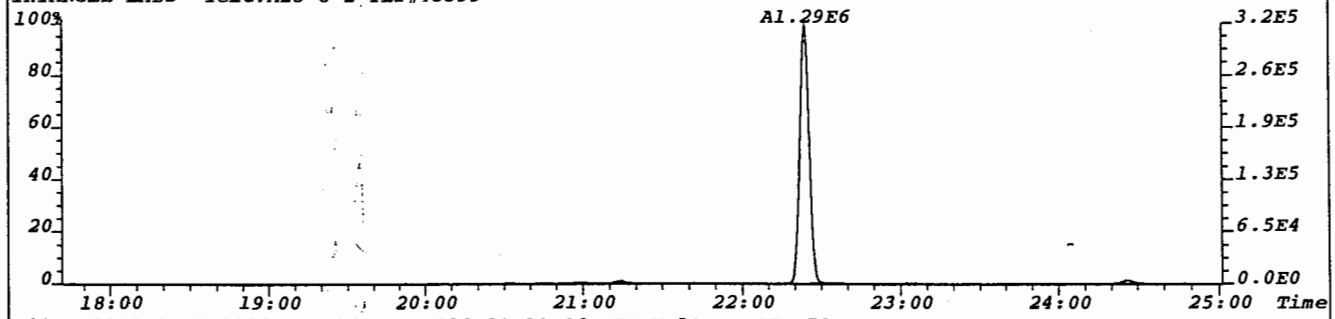
File:P981311 #1-1006 Acq:16-APR-1998 21:24:46 EI+ Voltage SIR 70P Noise:49
305.8987 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,196.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-O-2 TLI#45399



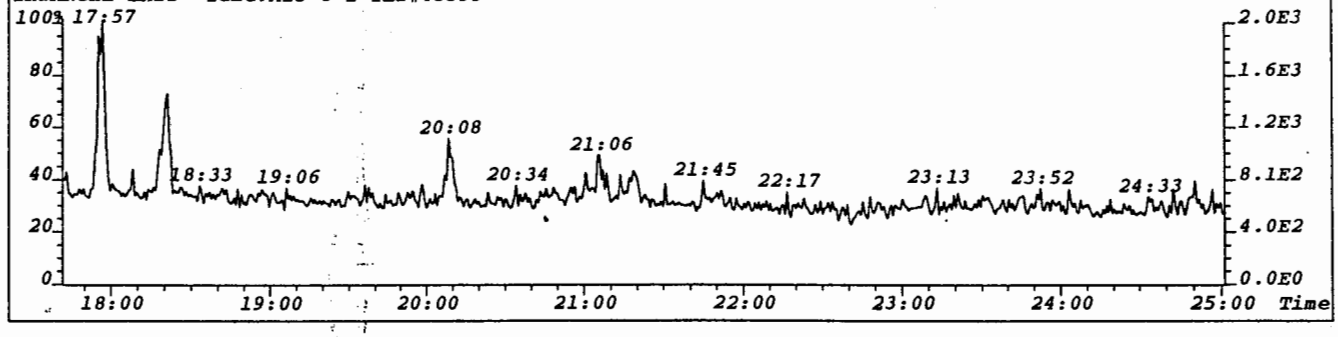
File:P981311 #1-1006 Acq:16-APR-1998 21:24:46 EI+ Voltage SIR 70P Noise:48
315.9419 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,192.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-O-2 TLI#45399



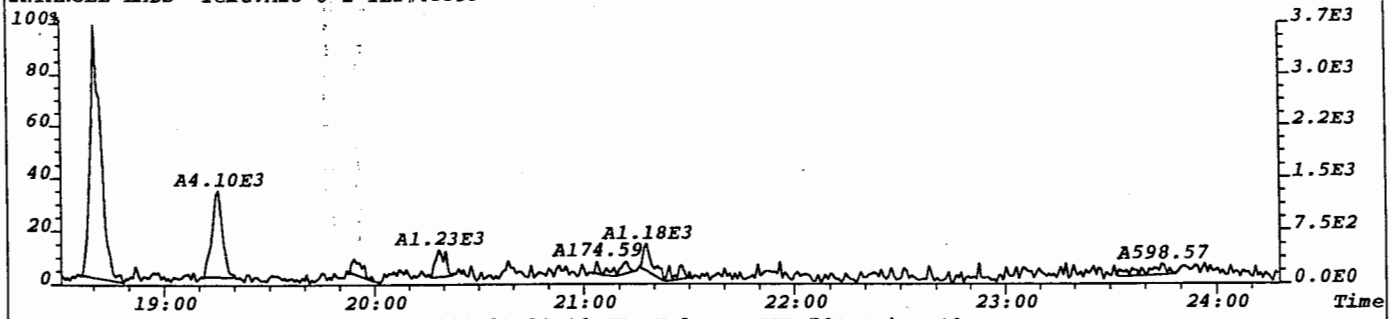
File:P981311 #1-1006 Acq:16-APR-1998 21:24:46 EI+ Voltage SIR 70P Noise:51
317.9389 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,204.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-O-2 TLI#45399



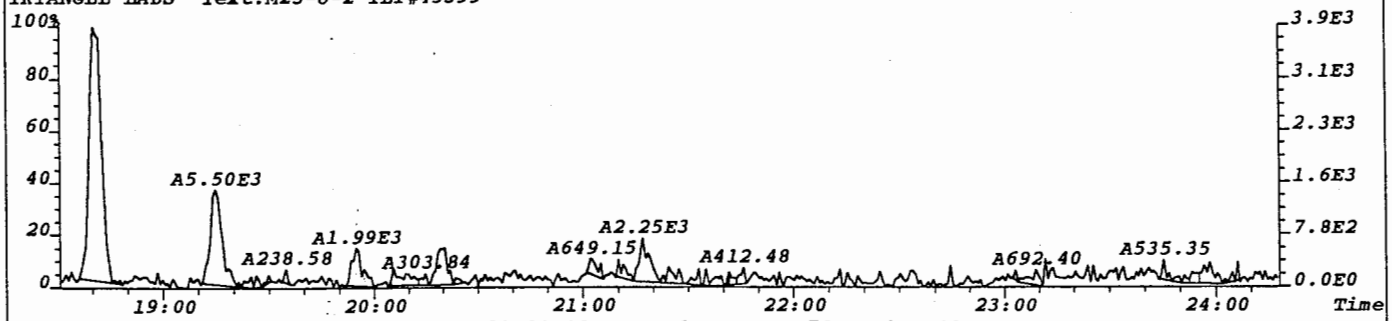
File:P981311 #1-1006 Acq:16-APR-1998 21:24:46 EI+ Voltage SIR 70P
375.8364 Exp:DB225
TRIANGLE LABS Text:M23-O-2 TLI#45399



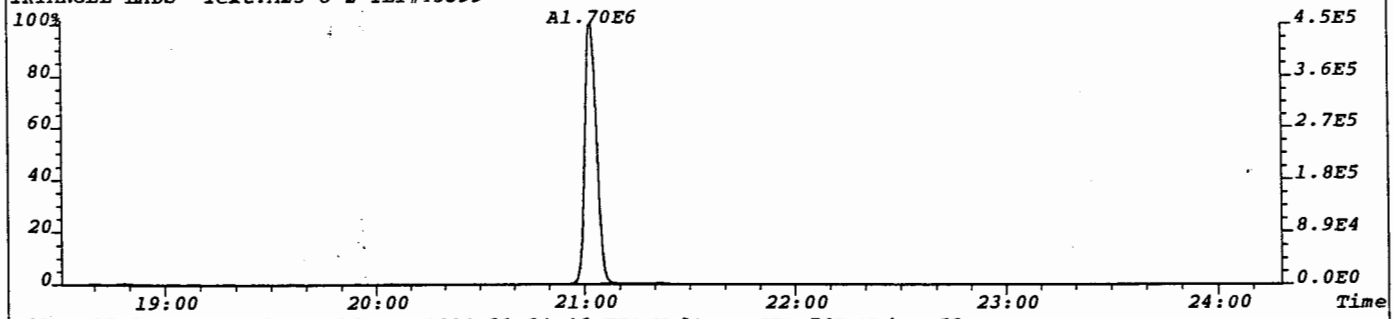
File:P981311 #1-1006 Acq:16-APR-1998 21:24:46 EI+ Voltage SIR 70P Noise:43
319.8965 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,172.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-O-2 TLI#45399



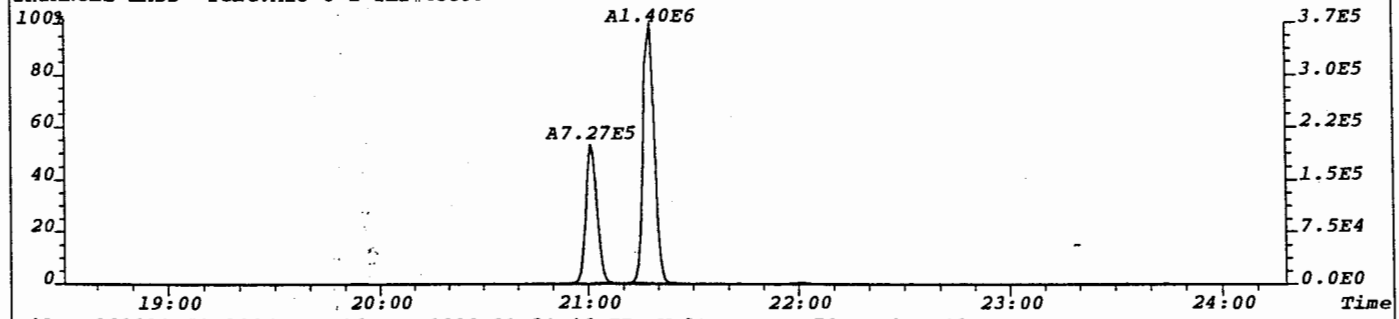
File:P981311 #1-1006 Acq:16-APR-1998 21:24:46 EI+ Voltage SIR 70P Noise:40
321.8936 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,160.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-O-2 TLI#45399



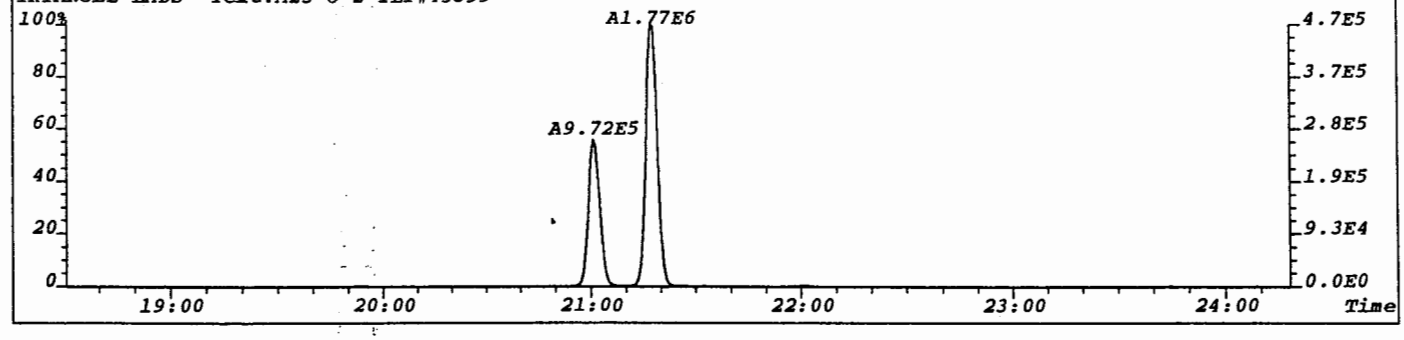
File:P981311 #1-1006 Acq:16-APR-1998 21:24:46 EI+ Voltage SIR 70P Noise:40
327.8847 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,160.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-O-2 TLI#45399



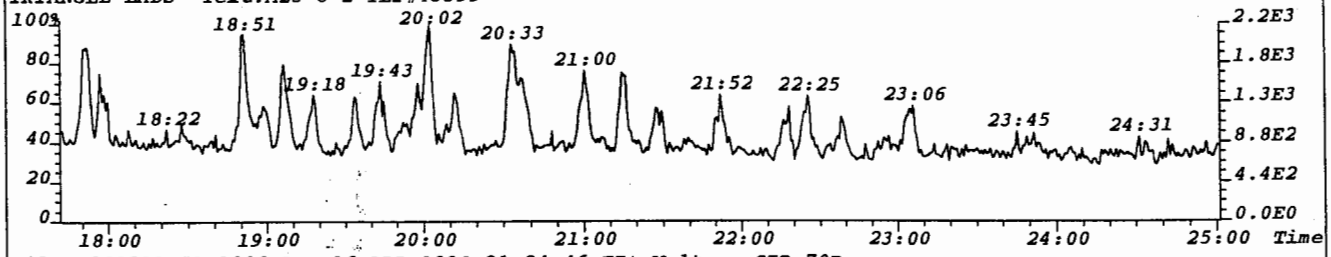
File:P981311 #1-1006 Acq:16-APR-1998 21:24:46 EI+ Voltage SIR 70P Noise:52
331.9368 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,208.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-O-2 TLI#45399



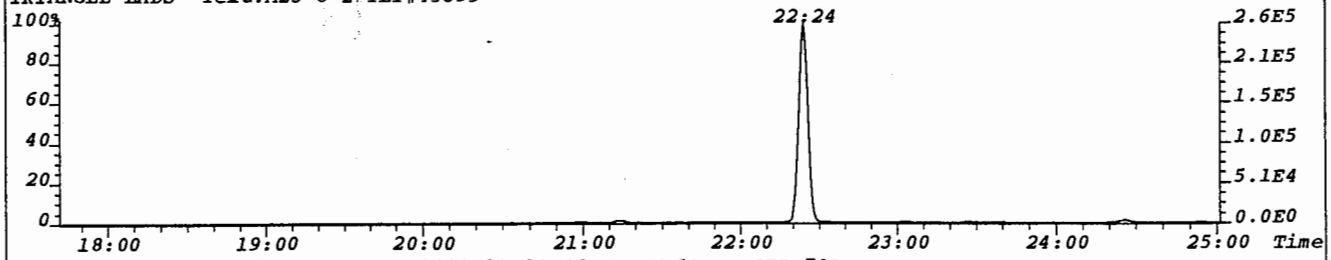
File:P981311 #1-1006 Acq:16-APR-1998 21:24:46 EI+ Voltage SIR 70P Noise:43
333.9338 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,172.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-O-2 TLI#45399



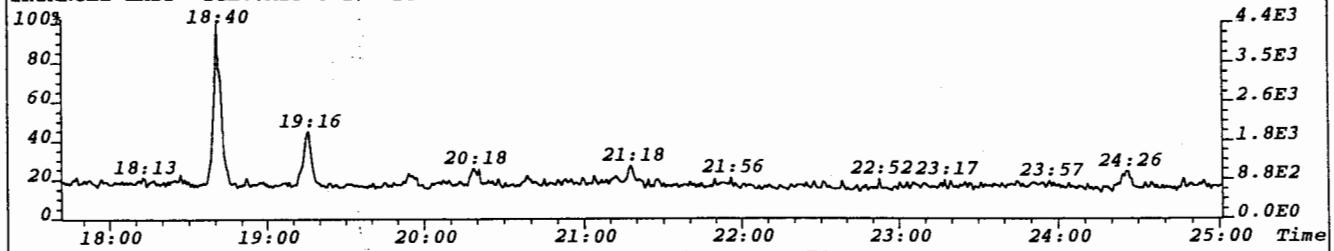
File:P981311 #1-1006 Acq:16-APR-1998 21:24:46 EI+ Voltage SIR 70P
303.9016 Exp:DB225
TRIANGLE LABS Text:M23-O-2 TLI#45399



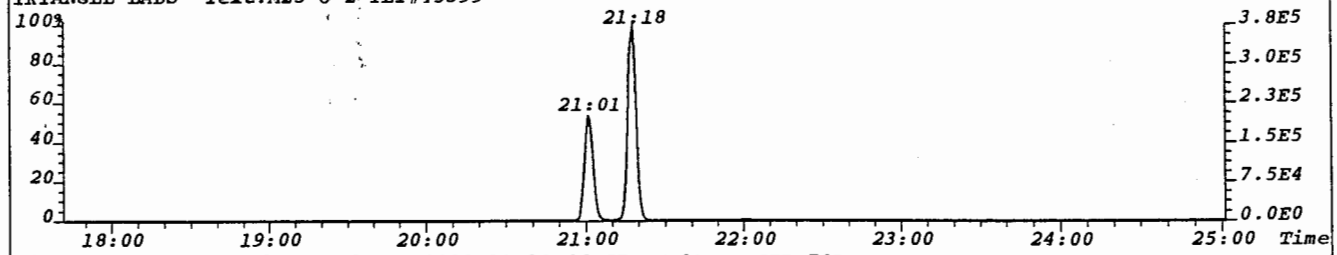
File:P981311 #1-1006 Acq:16-APR-1998 21:24:46 EI+ Voltage SIR 70P
315.9419 Exp:DB225
TRIANGLE LABS Text:M23-O-2 TLI#45399



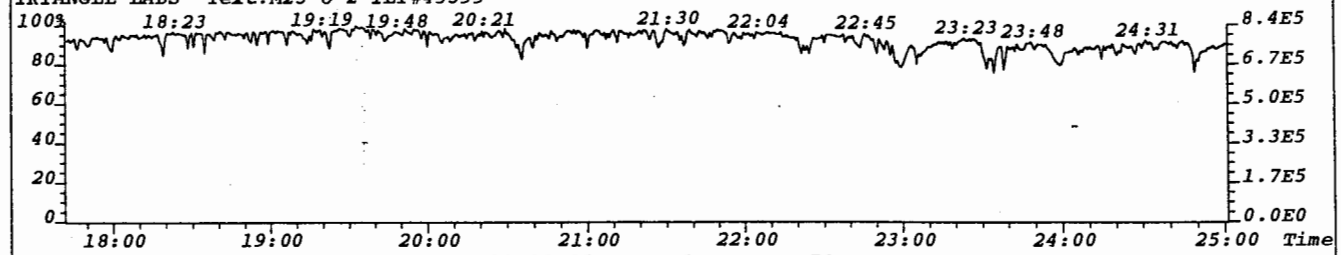
File:P981311 #1-1006 Acq:16-APR-1998 21:24:46 EI+ Voltage SIR 70P
319.8965 Exp:DB225
TRIANGLE LABS Text:M23-O-2 TLI#45399



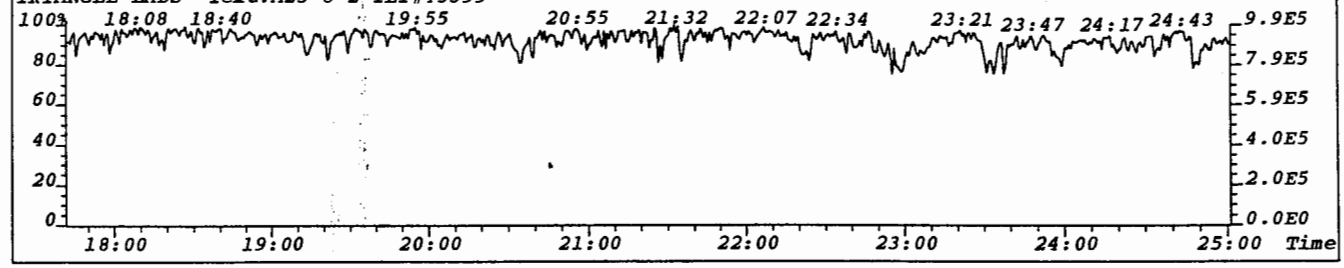
File:P981311 #1-1006 Acq:16-APR-1998 21:24:46 EI+ Voltage SIR 70P
331.9368 Exp:DB225
TRIANGLE LABS Text:M23-O-2 TLI#45399

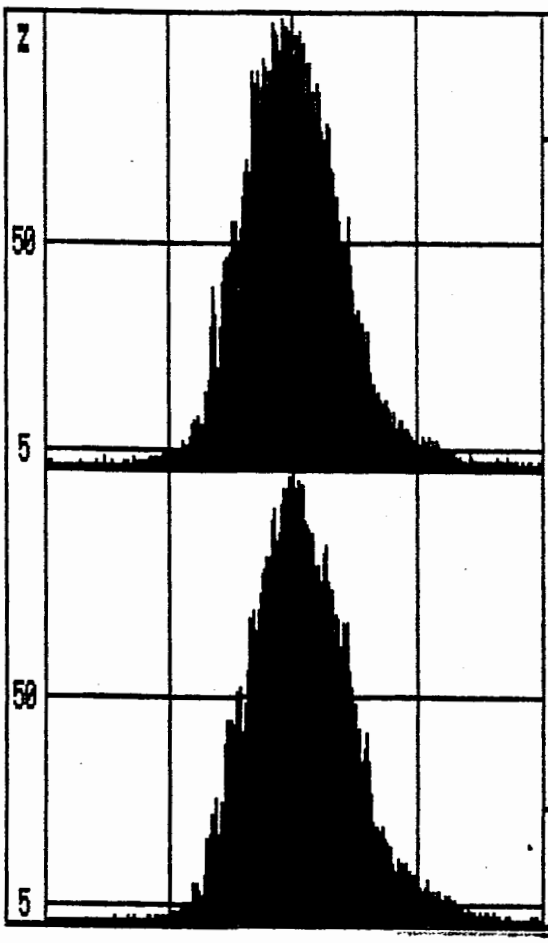


File:P981311 #1-1006 Acq:16-APR-1998 21:24:46 EI+ Voltage SIR 70P
292.9825 Exp:DB225
TRIANGLE LABS Text:M23-O-2 TLI#45399



File:P981311 #1-1006 Acq:16-APR-1998 21:24:46 EI+ Voltage SIR 70P
330.9792 Exp:DB225
TRIANGLE LABS Text:M23-O-2 TLI#45399





Ref. mass 292.9825 Peak top
Height .13 volts Span 200 ppm

System file name	DB225
Data file name	A:P981311
Resolution	10000
Group number	1
Ionization mode	EI+
Switching	VOLTAGE
Ref. masses	292.9825, 300.9761

A	292.9825	J	330.9792
B	303.9016	K	331.9368
C	305.8987	L	333.9338
D	315.9419	M	375.8364
E	317.9389		
F	319.8965		
G	321.8936		
H	327.8847		
I	330.9792		

Channel I 330.9792 Peak top
Height .17 volts Span 200 ppm

Pages 245 through 297 from the Triangle Laboratories, Inc. analytical report have been excluded by PES since these pages present results for samples collected at another lime kiln facility during the same mobilization.

Pacific Environmental Services

TLI Project: **45399** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **M23-FB-1** Analysis File: **S982307**

Client Project:	**r012.002/Lime Kiln**				
Sample Matrix:	**M23**	Date Received:	**04/01/98**	Spike File:	**SPMIT204**
TLI ID:	**204-92-9A-D**	Date Extracted:	**04/03/98**	ICal:	**SF51078**
		Date Analyzed:	**04/18/98**	ConCal:	**S982303**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U980780**	% Lipid:	**n/a**
GC Column:	**DB-5**	Analyst:	**DL**	% 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	0.005				—
1,2,3,4,7,8-HxCDD	ND	0.005				—
1,2,3,6,7,8-HxCDD	ND	0.005				—
1,2,3,7,8,9-HxCDD	ND	0.004				—
1,2,3,4,6,7,8-HpCDD	ND	0.005				—
1,2,3,4,6,7,8,9-OCDD	ND	0.006				—
2,3,7,8-TCDF	ND	0.002				—
1,2,3,7,8-PeCDF	ND	0.004				—
2,3,4,7,8-PeCDF	ND	0.004				—
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	0.004				—
1,2,3,7,8,9-HxCDF	ND	0.004				—
1,2,3,4,6,7,8-HpCDF	ND	0.004				—
1,2,3,4,7,8,9-HpCDF	ND	0.005				—
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		0.005		—
Total HxCDD	ND		0.005		—
Total HpCDD	ND		0.005		—
Total TCDF	ND		0.002		—
Total PeCDF	ND		0.004		—
Total HxCDF	ND		0.004		—
Total HpCDF	ND		0.005		—

MIT2_PSR v1.04, LARS 6.11.00

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Printed: 20:27 04/20/98

Pacific Environmental Services

TLI Project: **45399** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **M23-FB-1** Analysis File: **S982307**

Internal Standards	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	3.0	74.4	40%-130%	0.72	25:15	___
$^{13}C_{12}$-2,3,7,8-TCDD	2.5	63.1	40%-130%	0.80	25:58	___
$^{13}C_{12}$-1,2,3,7,8-PeCDF	2.8	70.1	40%-130%	1.52	29:11	___
$^{13}C_{12}$-1,2,3,7,8-PeCDD	3.3	83.6	40%-130%	1.48	30:13	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	2.9	72.8	40%-130%	0.50	32:45	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	3.7	91.7	40%-130%	1.21	33:27	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	3.2	80.5	25%-130%	0.41	35:46	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	4.2	106	25%-130%	1.02	36:51	___
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	9.5	119	25%-130%	0.86	40:45	___

Surrogate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,4,7,8-PeCDF	4.2	106	40%-130%	1.54	29:53	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	3.6	90.4	40%-130%	0.50	32:39	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	3.7	92.9	40%-130%	1.21	33:22	___
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	4.4	110	25%-130%	0.42	37:23	___

Other Standard	Amt. (ng)	% Recovery	QC Limits		RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	3.7	93.5	40%-130%		25:59	___

Alternate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	3.4	84.9	40%-130%	0.50	34:04	___
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	3.5	87.4	40%-130%	0.50	33:16	___

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.81	25:47	___
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.21	33:47	___

Data Reviewer: _____ 04/20/98

MIT2_PSR v1.04, LARS 6.11.00

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Printed: 20:27 04/20/98

Initial ....Date...

Data Review By: K- 4/20/90 Calculated Noise Area: 0.15

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 S982307B.dbf
04/20/98 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						0.873-1.075			
304-306	DC	NL		0:00	RO	1.11	0.16			0.000			
	DC	SN		24:42	RO	1.27	0.19			0.978			
	DC	WH		27:24	RO	1.60	0.18			1.085			
304-306			0	Peaks			0.00						
13C12-TCDF				0.65-0.89						0.960-1.040			
316-318	DC	NL		0:00	RO	0.59	0.23			0.000			
	DC	WL		24:13		0.69	9.05			0.959			
				24:51		0.76	2.97	1.28	1.69	0.984			
				25:15		0.72	547.80	229.40	318.40	1.000	13C12-2378-TCDF	IS0	
				25:41		0.73	1.87	0.79	1.08	1.017			
316-318			3	Peaks			552.64						

---------- Above: TCDF / TCDD Follows ----------

TCDD				0.65-0.89						0.899-1.046			
320-322	DC	NL		0:00	RO	1.00	0.14			0.000			
	DC	SN		25:15	RO	3.10	0.18			0.972			
	DC	SN		25:26	RO	1.00	0.14			0.979			
	DC	SN		25:59	RO	0.41	0.37			1.001	2378-TCDD	AN	
	DC	SN		26:16	RO	1.17	0.11			1.012			
	DC	SN		26:27	RO	1.75	0.07			1.019			
320-322			0	Peaks			0.00						
37Cl-TCDD										0.923-1.077			
328	DC	NL		0:00			0.13			0.000			
				24:37			1.67	1.67		0.948			
				25:59			316.86	316.86		1.001	37Cl-TCDD	CLS	
				26:39			0.37	0.37		1.026			
328			3	Peaks			318.90						
13C12-TCDD				0.65-0.89						0.923-1.077			
332-334	DC	NL		0:00	RO	2.36	0.19			0.000			
				24:49	RO	1.11	1.54	0.97	0.87	0.956			
				25:47		0.81	513.06	229.03	284.03	0.993	13C12-1234-TCDD	RS1	
				25:58		0.80	357.14	158.88	198.26	1.000	13C12-2378-TCDD	IS1	
				26:17	RO	0.93	4.73	2.47	2.67	1.012			
332-334			4	Peaks			876.47						

---------- Above: TCDD / PeCDF Follows ----------

PeCDF				1.32-1.78						0.928-1.063			
340-342	DC	NL		0:00	RO	1.00	0.13			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		27:09	RO	0.44	0.13			0.930			
	DC	SN		29:53	RO	1.00	0.10			1.024	23478-PeCDF	AN	
	DC	SN		30:03	RO	1.18	0.21			1.030			
	DC	SN		30:09		1.33	0.14			1.033			
340-342			0	Peaks			0.00						
13C12-PeCDF				1.32-1.78						0.863-1.137			
352-354	DC	NL		0:00	RO	1.00	0.15			0.000			
				28:19		1.45	12.41	7.34	5.07	0.970			
				28:48		1.66	0.85	0.53	0.32	0.987			
				29:11		1.52	387.08	233.77	153.31	1.000	13C12-PeCDF 123	IS2	
				29:19	RO	1.30	2.01	1.22	0.94	1.005			
				29:28		1.35	2.58	1.48	1.10	1.010			
				29:53		1.54	397.87	241.02	156.85	1.024	13C12-PeCDF 234	SUR1	
	DC	SN		30:14	RO	3.13	0.38			1.036			
				30:51		1.68	1.10	0.69	0.41	1.057			
352-354			7	Peaks			803.90						

---------- Above: PeCDF / PeCDD Follows ----------

PeCDD				1.32-1.78						0.937-1.022			
356-358	DC	NL		0:00	RO	0.90	0.15			0.000			
	DC	SN		29:32	RO	2.73	0.28			0.977			
	DC	SN		30:13	RO	1.83	0.15			1.000	12378-PeCDD	AN	
	DC	SN		30:47		1.67	0.24			1.019			
	DC	WH		31:04		1.63	0.21			1.028			
	DC	WH		31:11	RO	3.00	0.10			1.032			
356-358			0	Peaks			0.00						
13C12-PeCDD				1.32-1.78						0.868-1.132			
368-370	DC	NL		0:00		1.50	0.15			0.000			
				29:09		1.42	0.58	0.34	0.24	0.965			
				29:16		1.59	0.70	0.43	0.27	0.969			
				30:13		1.48	256.04	152.79	103.25	1.000	13C12-PeCDD 123	IS3	
				30:21		1.47	21.10	12.57	8.53	1.004			
368-370			4	Peaks			278.42						

---------- Above: PeCDD / HxCDF Follows ----------

HxCDF				1.05-1.43						0.963-1.048			
374-376	DC	NL		0:00		1.33	0.21			0.000			
	DC	SN		31:50	RO	2.00	0.20			0.972			
	DC	SN		31:58	RO	5.00	0.02			0.976			
	DC	SN		32:11		1.20	0.11			0.983			
	DC	SN		32:40	RO	0.62	0.14			0.997	123478-HxCDF	AN	
374-376			0	Peaks			0.00						
13C12-HxCDF				0.43-0.59						0.878-1.122			
384-386	DC	NL		0:00	RO	0.80	0.30			0.000			
				31:41		0.44	3.76	1.15	2.61	0.967			
				31:48		0.50	5.57	1.86	3.71	0.971			
				32:39		0.50	321.34	107.51	213.83	0.997	13C12-HxCDF 478	SUR2	

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
				32:45		0.50	349.73	116.36	233.37	1.000	13C12-HxCDF 678	IS4	
				33:04		0.48	0.62	0.20	0.42	1.010			
				33:16		0.50	415.42	138.46	276.96	1.016	13C12-HxCDF 234	ALT2	
				33:26		0.51	0.98	0.33	0.65	1.021			
				34:04		0.50	324.41	108.00	216.41	1.040	13C12-HxCDF 789	ALT1	
384-386				8 Peaks			1,421.83						

---------- Above: HxCDF / HxCDD Follows ----------

HxCDD						1.05-1.43				0.958-1.014			
390-392	DC	NL		0:00		1.13	0.17			0.000			
	DC	SN		32:40	RO	2.30	0.22			0.977			
	DC	SN		32:45	RO	5.00	0.11			0.979			
	DC	SN		32:50	RO	1.50	0.13			0.982			
	DC	SN		33:16	RO	3.00	0.18			0.995			
	DC	SN		33:24		1.17	0.13			0.999	123478-HxCDD	AN	
	DC	SN		33:33	RO	0.67	0.07			1.003			
	DC	SN		33:41	RO	0.60	0.05			1.007			
	DC	SN		33:51	RO	1.50	0.04			1.012	123789-HxCDD	AN	
	DC	SN		33:54	RO	0.17	0.04			1.013			
390-392				0 Peaks			0.00						
13C12-HxCDD						1.05-1.43				0.970-1.030			
402-404	DC	NL		0:00		1.30	0.23			0.000			
				32:52		1.24	1.50	0.83	0.67	0.983			
				33:22		1.21	272.54	149.14	123.40	0.998	13C12-HxCDD 478	SUR3	
				33:27		1.21	319.20	175.05	144.15	1.000	13C12-HxCDD 678	IS5	
				33:47		1.21	376.77	205.99	170.78	1.010	13C12-HxCDD 789	RS2	
				34:04		1.32	0.51	0.29	0.22	1.018			
				34:13		1.24	0.56	0.31	0.25	1.023			
402-404				6 Peaks			971.08						

---------- Above: HxCDD / HpCDF Follows ----------

HpCDF						0.88-1.20				0.997-1.051			
408-410	DC	NL		0:00		1.00	0.24			0.000			
D	d	SN		35:45	RO	0.84	1.20			1.000			
	DC	SN		36:10		1.10	0.21			1.011			
408-410				0 Peaks			0.00						
13C12-HpCDF						0.37-0.51				0.944-1.112			
418-420	DC	NL		0:00	RO	0.79	0.27			0.000			
				35:46		0.41	256.84	74.52	182.32	1.000	13C12-HpCDF 678	IS6	
				37:23		0.42	226.13	66.79	159.34	1.045	13C12-HpCDF 789	SUR4	
418-420				2 Peaks			482.97						

---------- Above: HpCDF / HpCDD Follows ----------

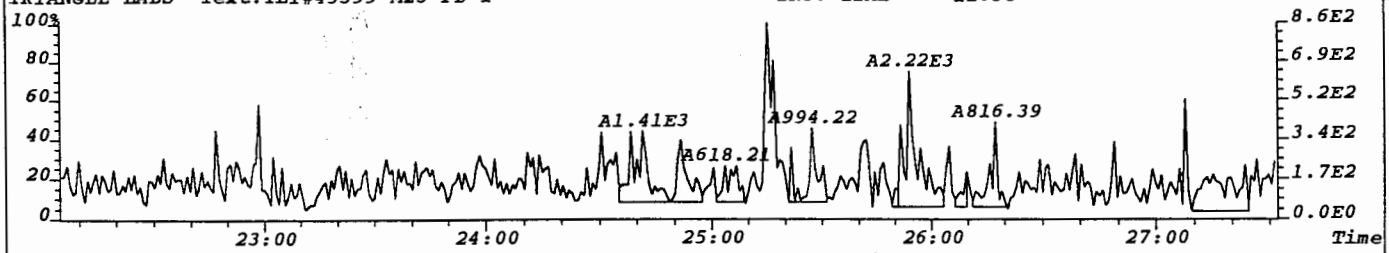
HpCDD						0.88-1.20				0.976-1.005			
424-426	DC	NL		0:00	RO	1.25	0.16			0.000			
	DC	SN		36:53	RO	0.42	0.16			1.001	1234678-HpCDD	AN	
	DC	SN		37:01		0.88	0.15			1.005			

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	37:08		1.00	0.16			1.008			
	DC		WH	37:17	RO	2.67	0.06			1.012			
424-426		0	Peaks				0.00						
13C12-HpCDD				0.88-1.20						0.973-1.027			
436-438	DC	NL		0:00		1.06	0.33			0.000			
				36:51		1.02	294.43	148.47	145.96	1.000	13C12-HpCDD	678	IS7
	DC	SN		37:08	RO	1.67	0.37			1.008			
436-438		1	Peak				294.43						
---------- Above: HpCDD / Octa-CDD and CDF Follows ----------													
OCDF				0.76-1.02						0.902-1.098			
442-444	DC	NL		0:00		0.90	0.19			0.000			
	DC	WL		36:38	RO	0.41	0.19			0.899			
	DC	SN		36:46	RO	0.38	0.06			0.902			
	DC	SN		37:53	RO	0.38	0.11			0.930			
	DC	SN		40:10	RO	0.29	0.08			0.986			
	DC	SN		40:34	RO	0.23	0.06			0.996			
	DC	SN		40:37	RO	0.67	0.08			0.997			
	DC	SN		40:55	RO	0.29	0.23			1.004			
	DC	SN		42:29	RO	0.70	0.15			1.043			
	DC	SN		42:42		1.00	0.20			1.048			
442-444		0	Peaks				0.00						
OCDD				0.76-1.02						0.902-1.098			
458-460	DC	NL		0:00		1.00	0.16			0.000			
D	d	SN		40:48	RO	1.24	0.47			1.001			
458-460		0	Peaks				0.00						
13C12-OCDD				0.76-1.02						0.996-1.004			
470-472	DC	NL		0:00		1.00	0.14			0.000			
				40:45		0.86	449.78	207.59	242.19	1.000	13C12-OCDD		IS8
	DC	WH		41:17	RO	0.53	0.64			1.013			
470-472		1	Peak				449.78						

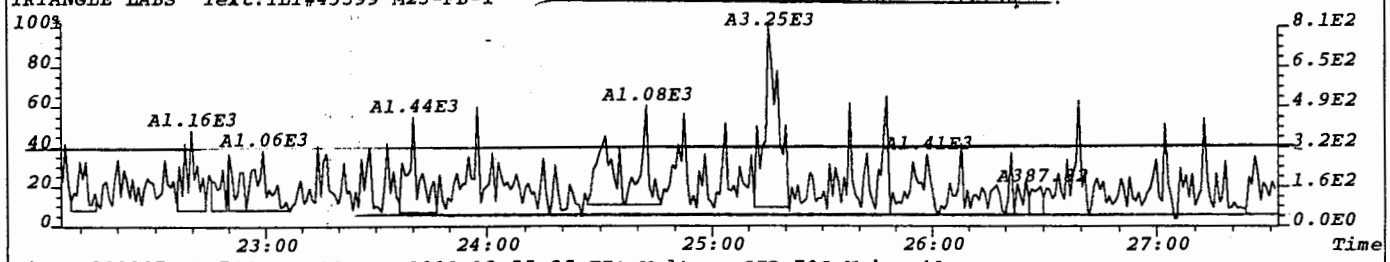
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside 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
		X-Ether Interference

*** End of Report ***

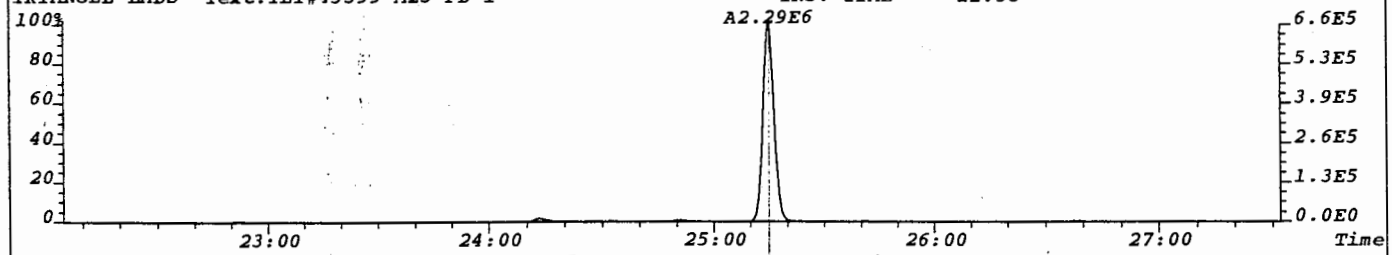
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:49
303.9016 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,196.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



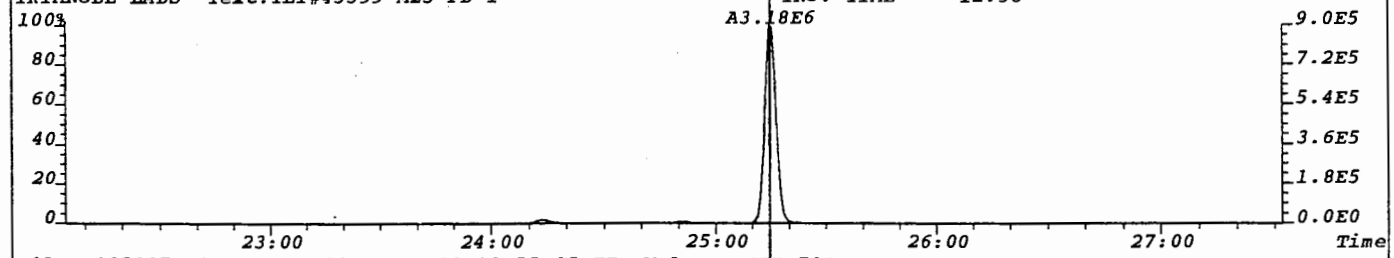
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:46
305.8987 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,184.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



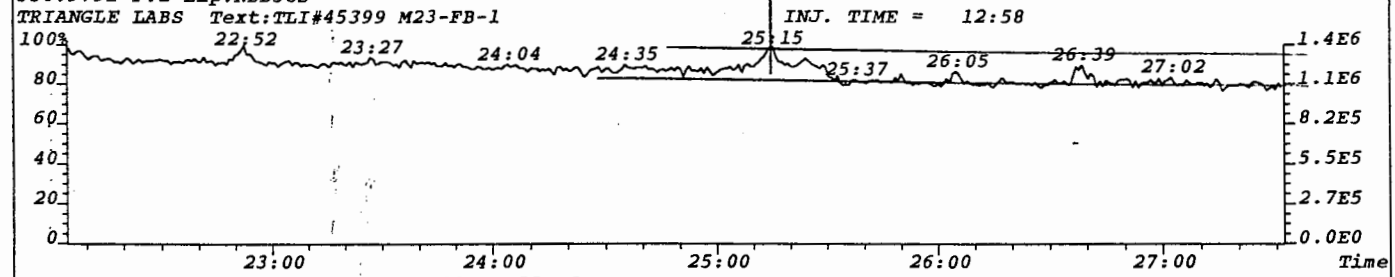
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:48
315.9419 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,192.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



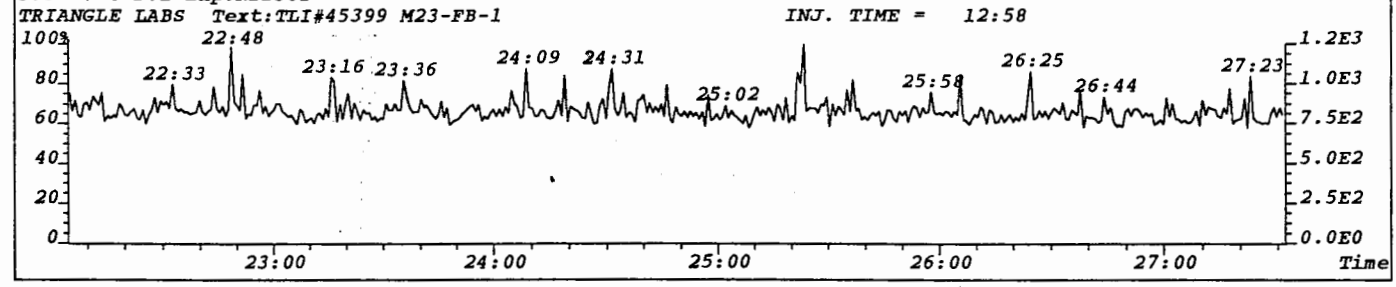
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:86
317.9389 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,344.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



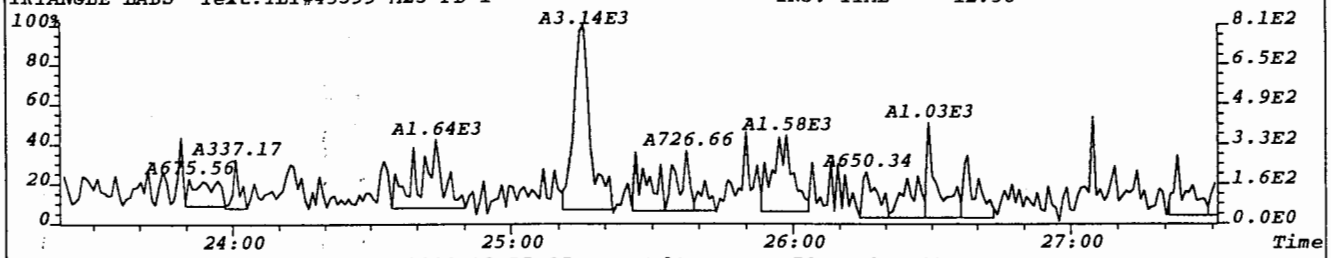
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S
375.8364 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58

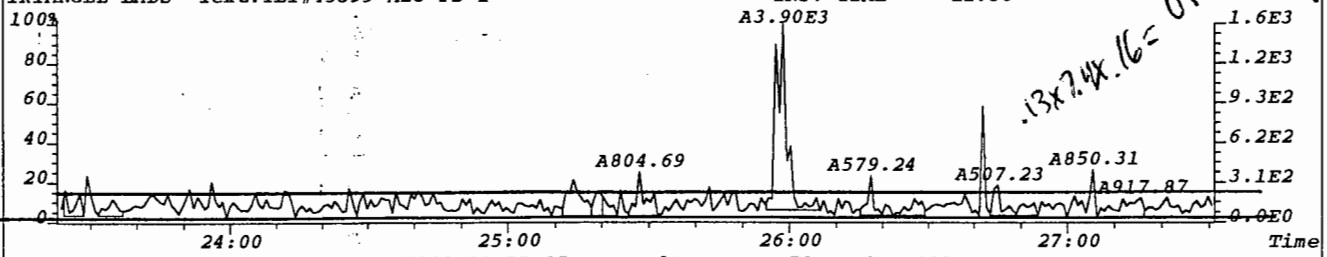


File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:41
319.8965 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,164.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58

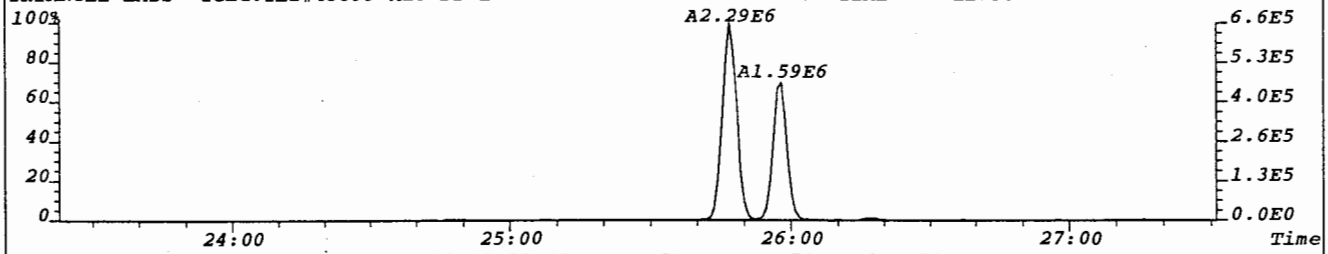


File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:41
321.8936 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,164.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58

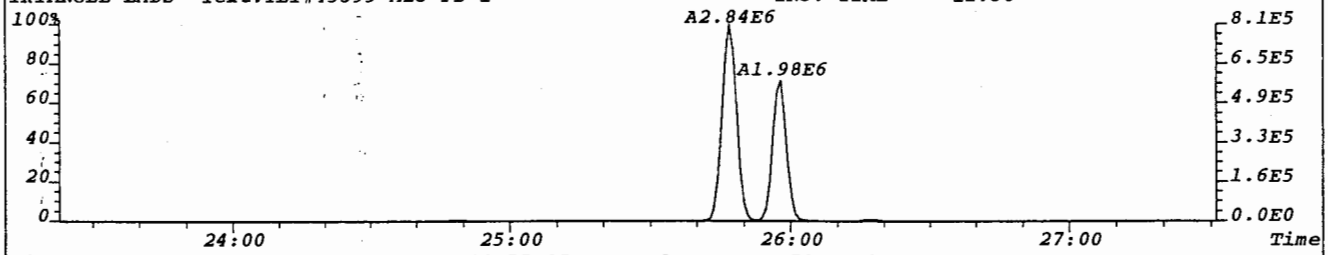
.13x7.4x.16= 0.15 DL 4/18/98



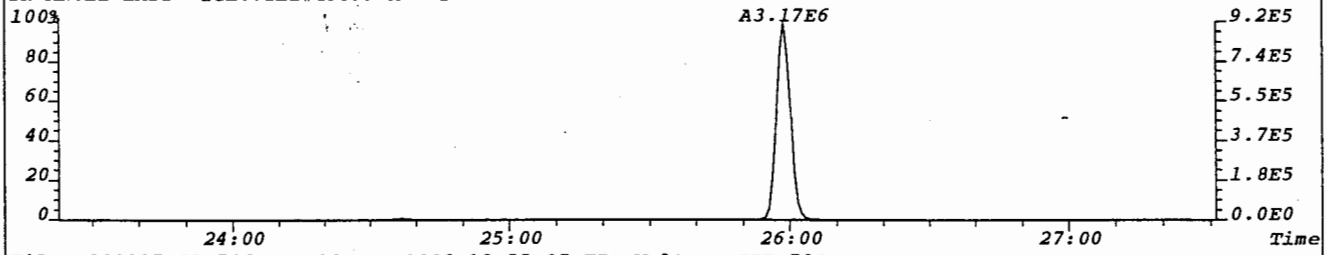
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:129
331.9368 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,516.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



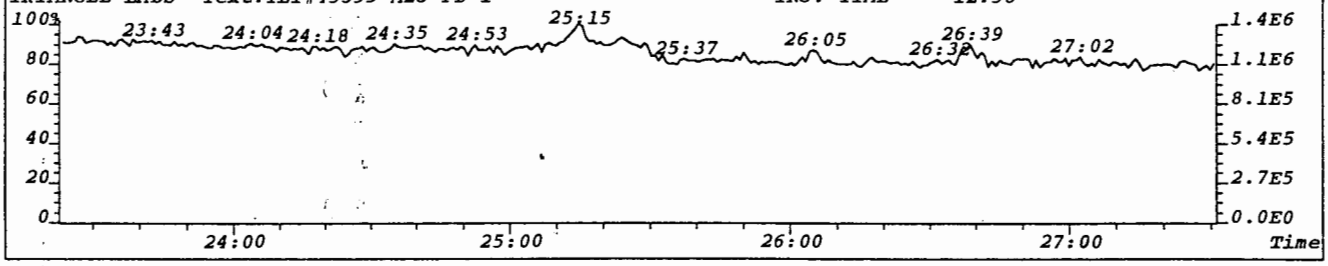
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:54
333.9338 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,216.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



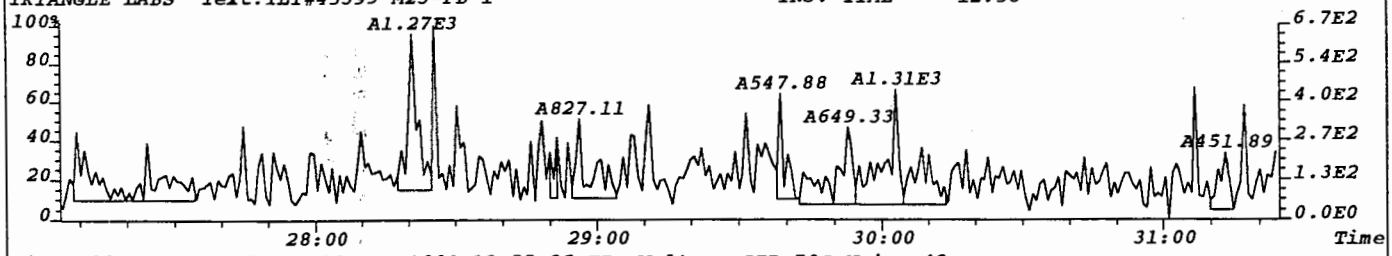
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:67
327.8847 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,268.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



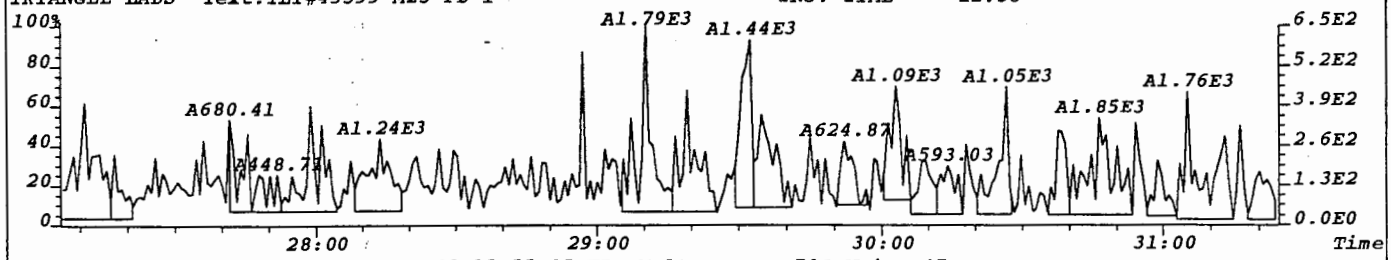
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



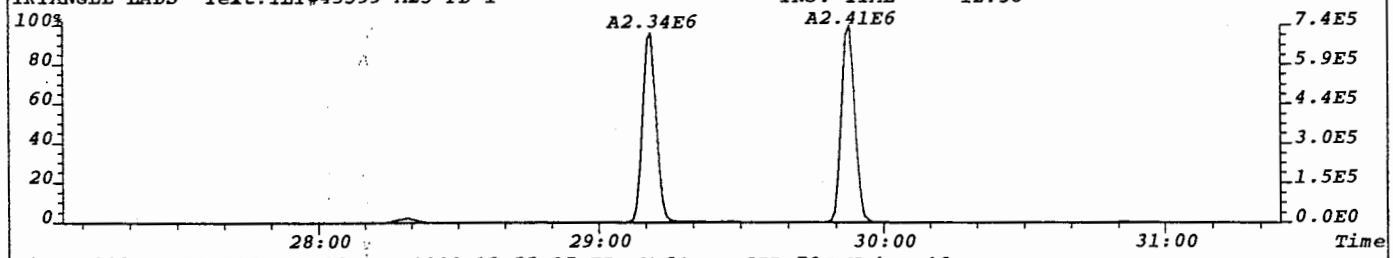
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:41
339.8597 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,164.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



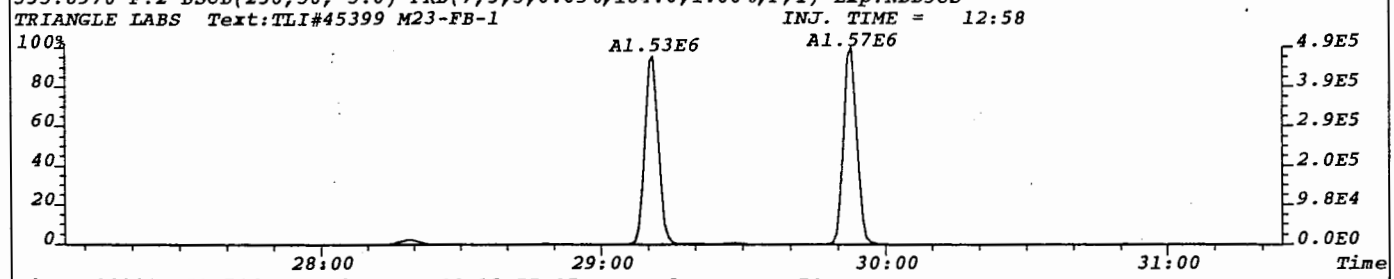
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:42
341.8567 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,168.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



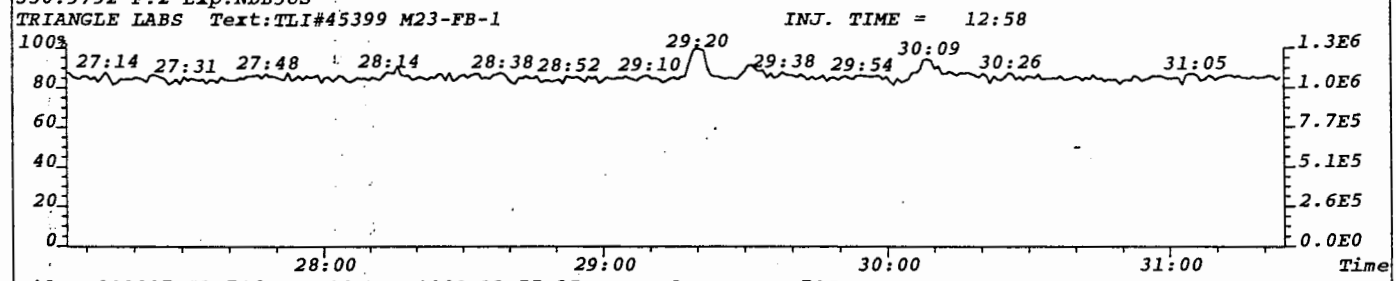
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:47
351.9000 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,188.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



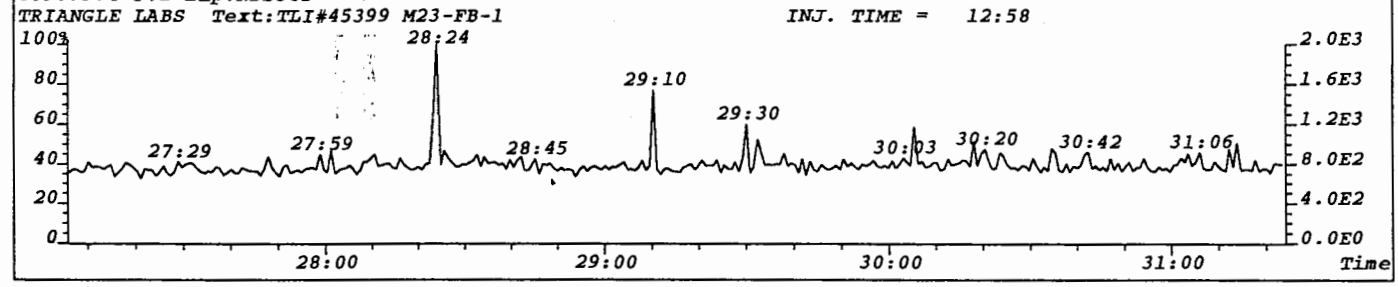
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:46
353.8970 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,184.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



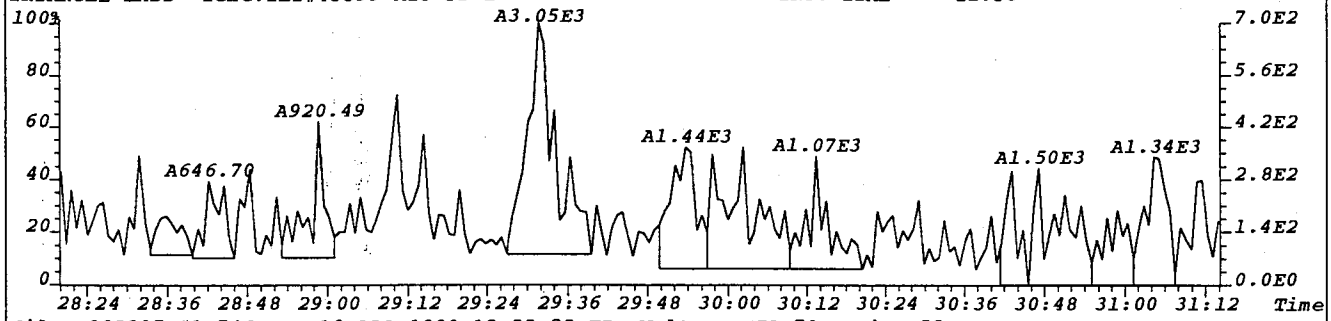
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



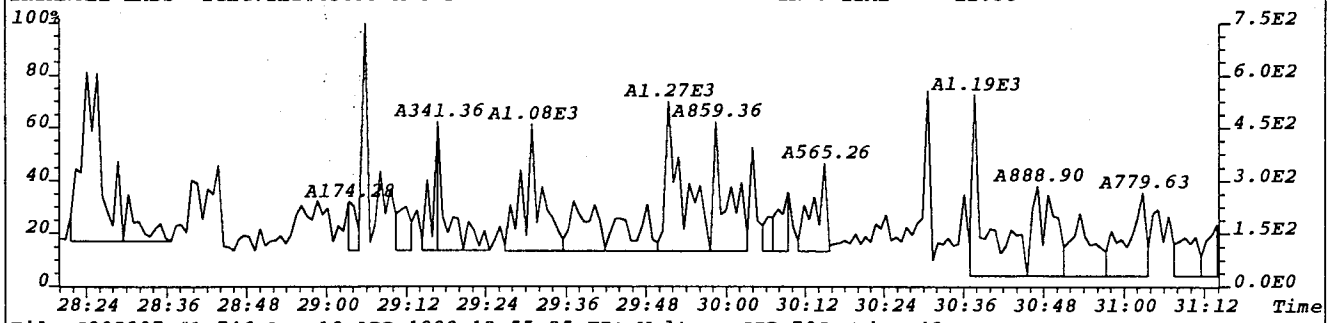
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S
409.7974 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



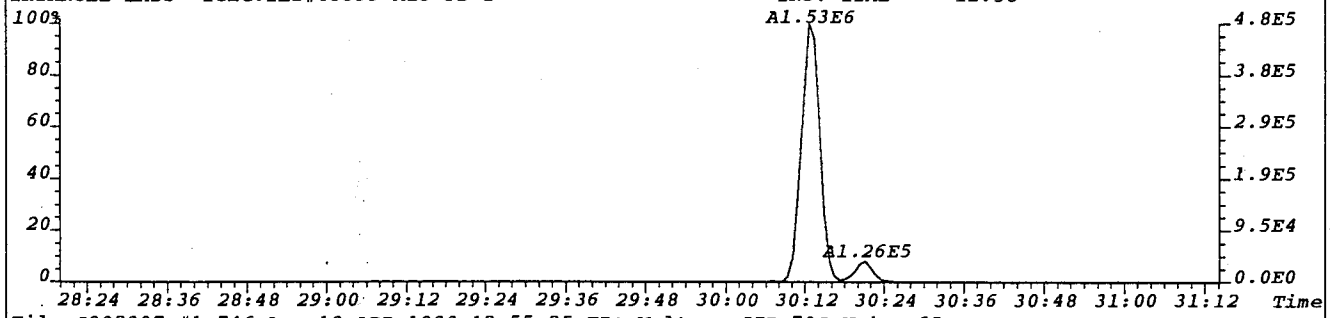
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:44
355.8546 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,176.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



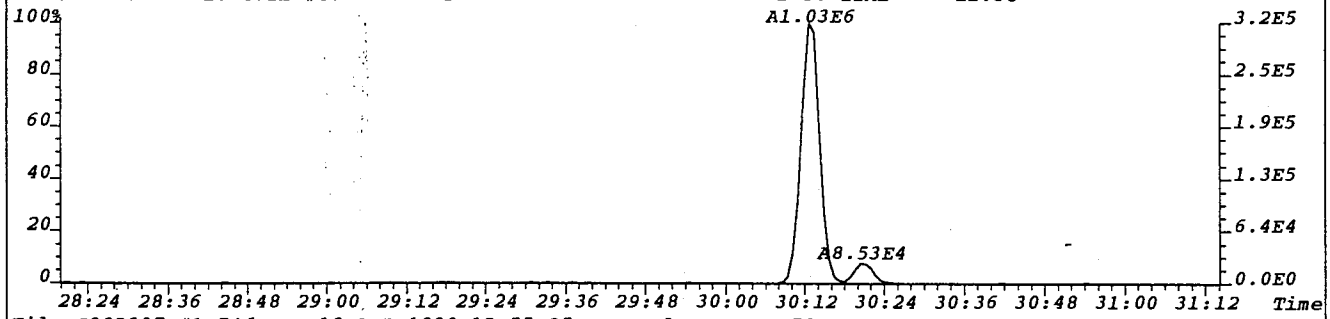
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:52
357.8516 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,208.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



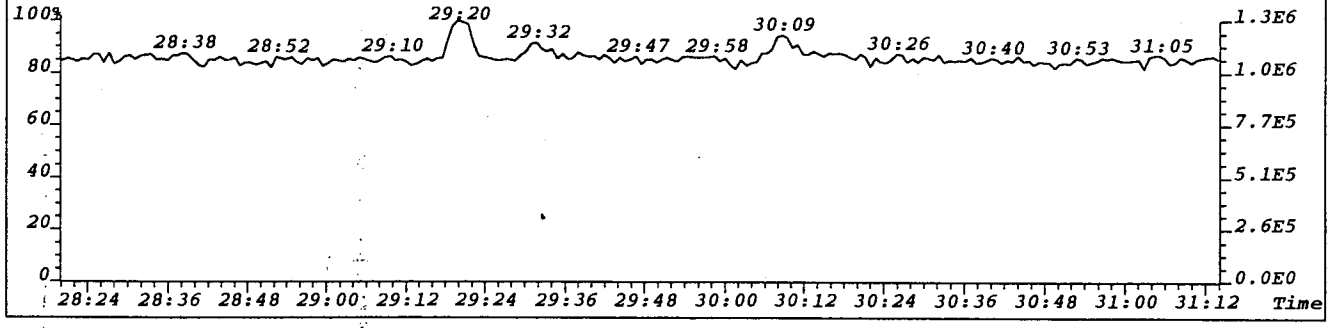
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:43
367.8949 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,172.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



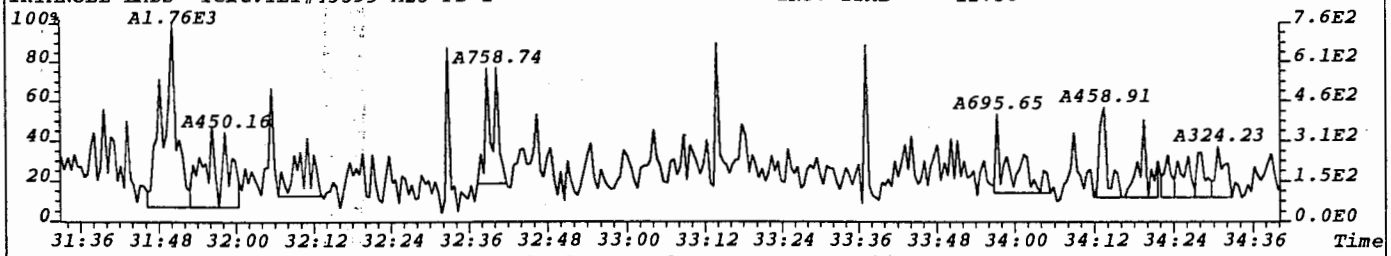
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:32
369.8919 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,128.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



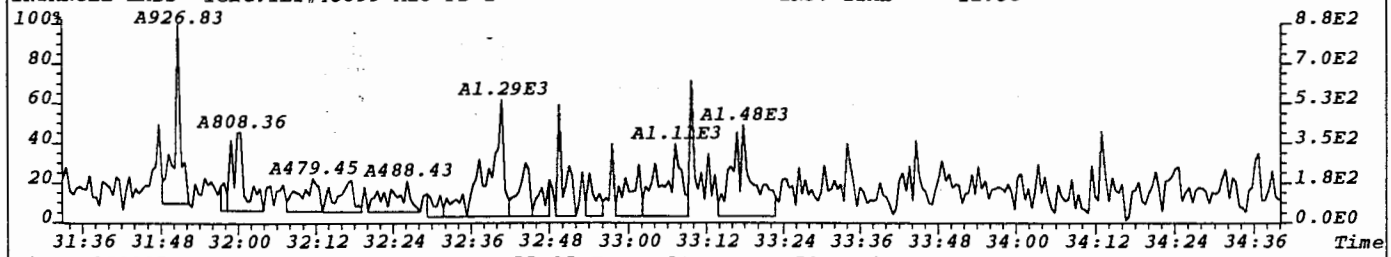
File:S982307 #1-746 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



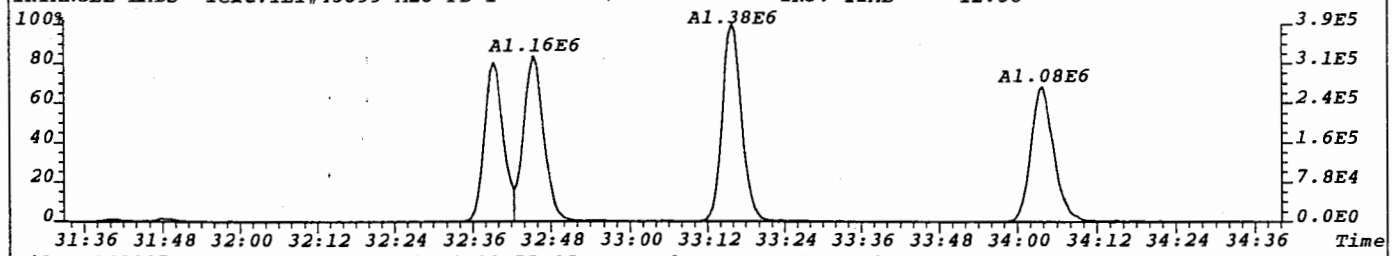
File:S982307 #1-465 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:59
373.8208 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,236.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



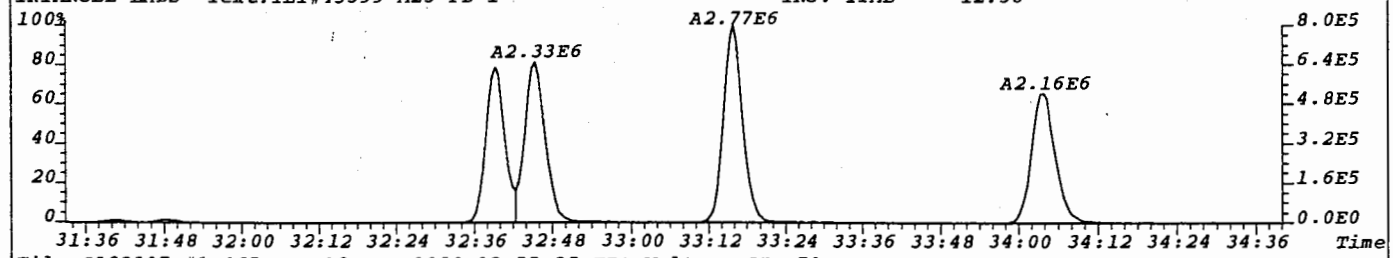
File:S982307 #1-465 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:45
375.8178 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,180.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



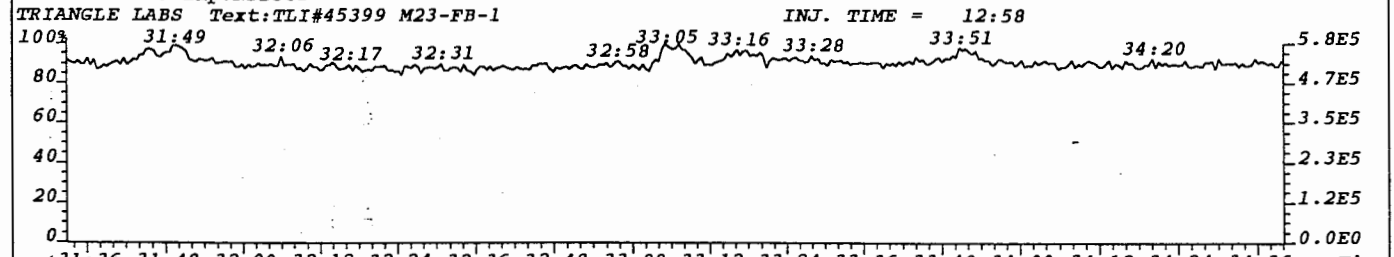
File:S982307 #1-465 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:82
383.8639 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,328.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



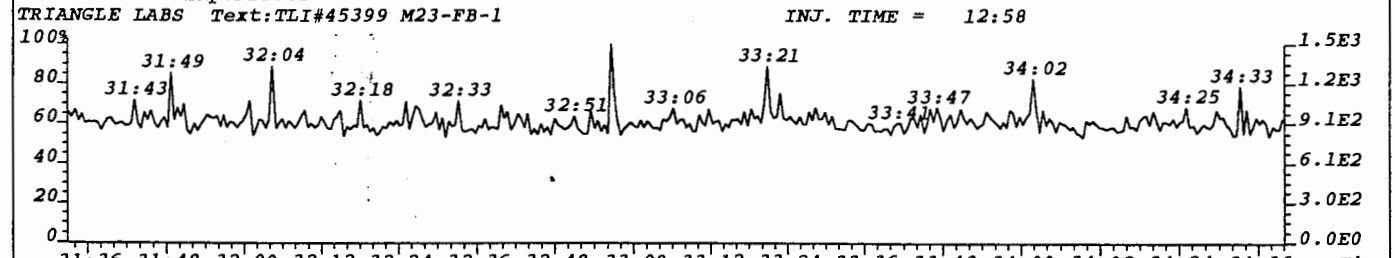
File:S982307 #1-465 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:101
385.8610 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,404.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



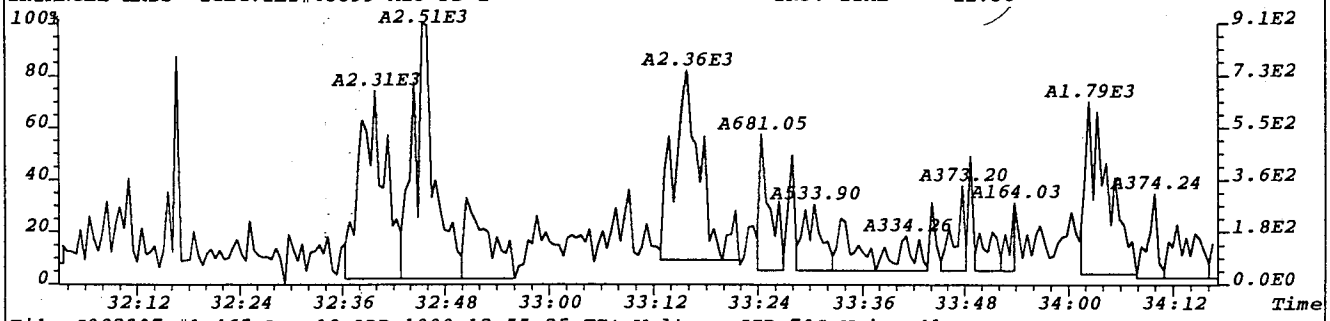
File:S982307 #1-465 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S
392.9760 F:3 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



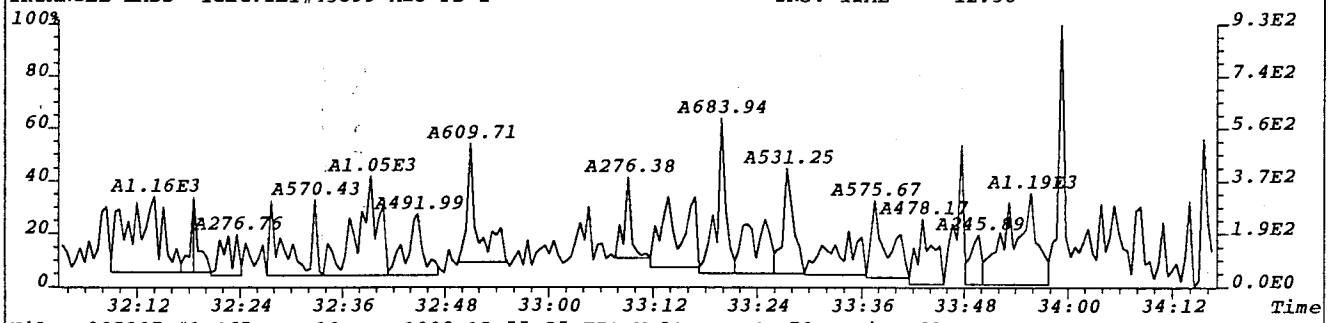
File:S982307 #1-465 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S
445.7555 F:3 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



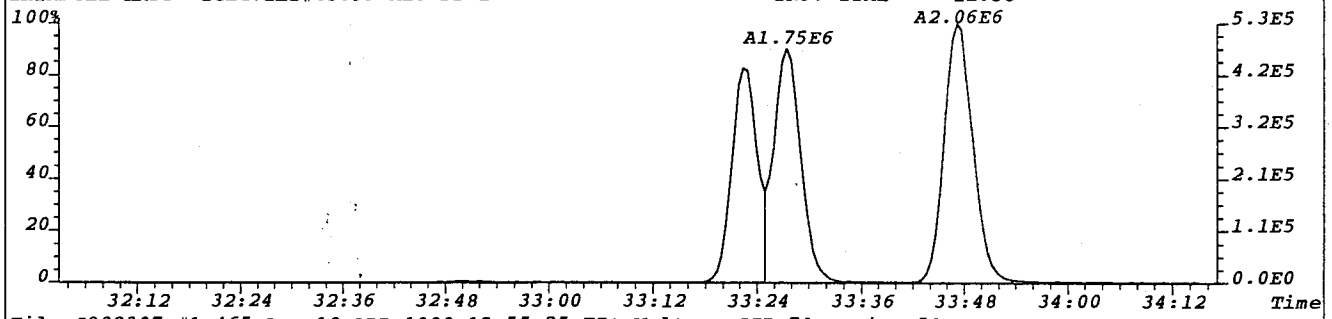
File:S982307 #1-465 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:43
389.8156 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,172.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



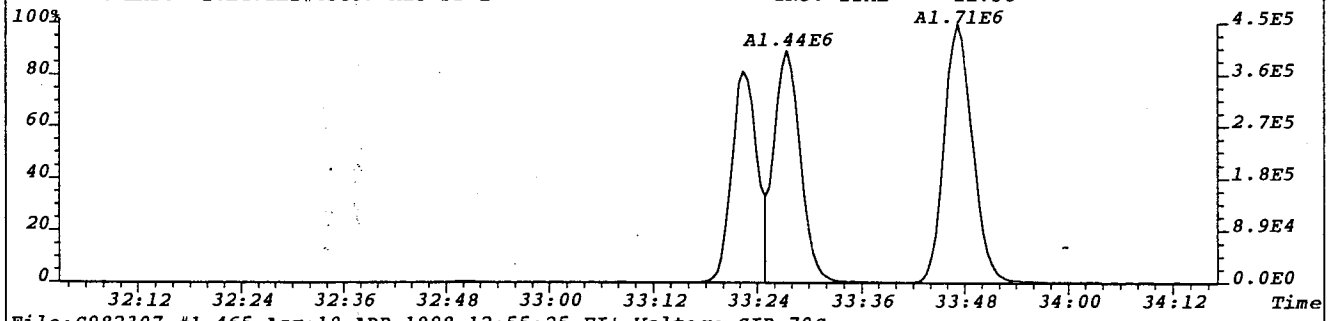
File:S982307 #1-465 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:41
391.8127 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,164.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



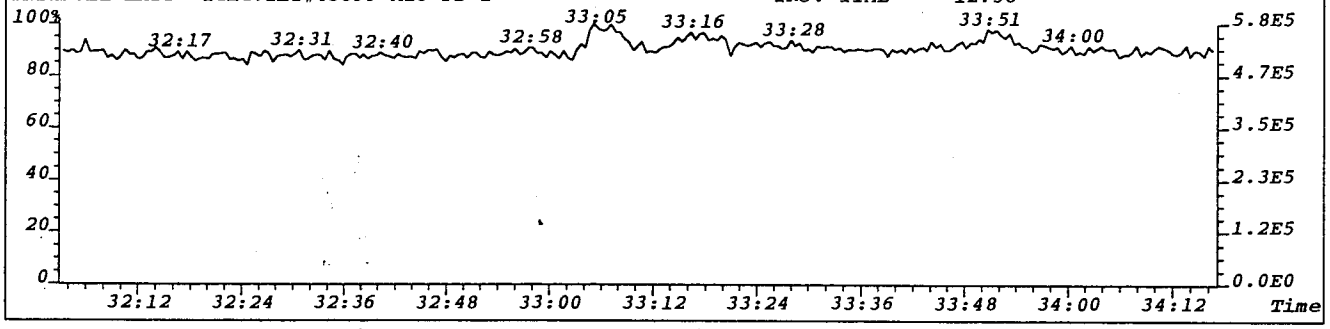
File:S982307 #1-465 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:63
401.8558 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,252.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



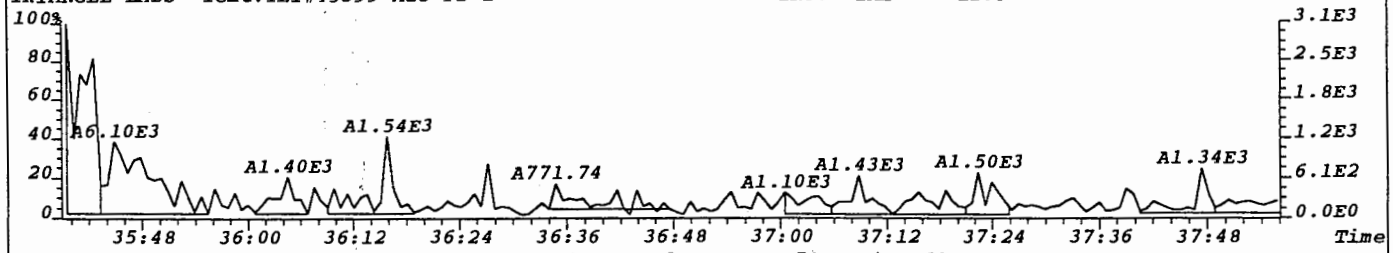
File:S982307 #1-465 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:50
403.8529 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,200.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



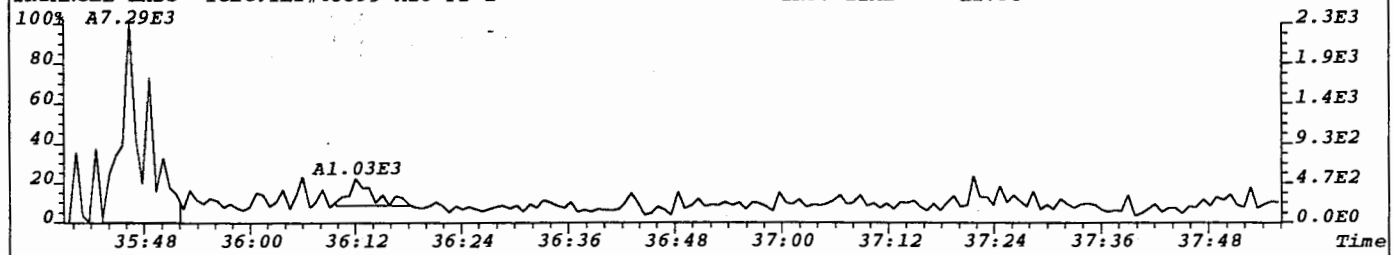
File:S982307 #1-465 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S
392.9760 F:3 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



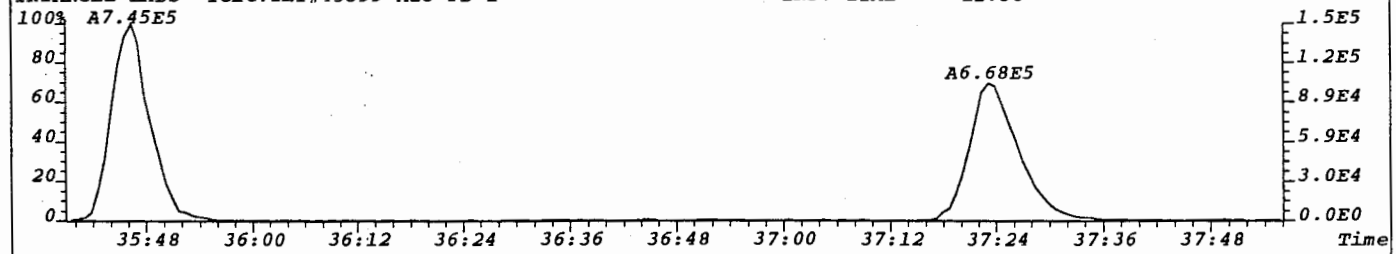
File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:61
407.7818 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,244.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



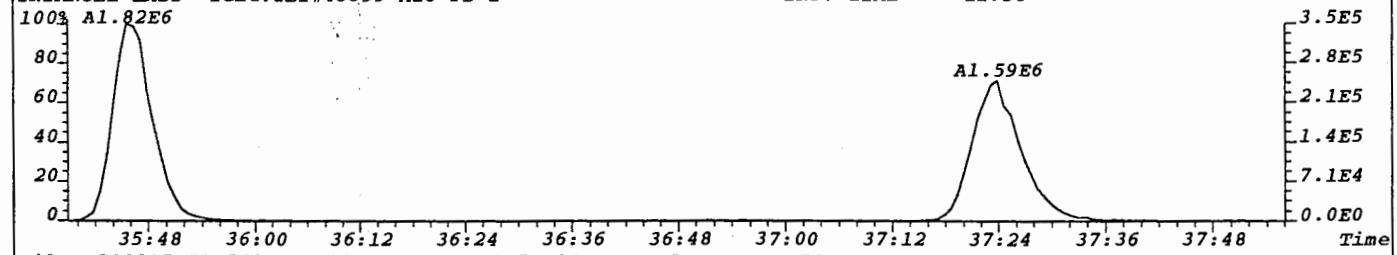
File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:62
409.7789 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,248.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



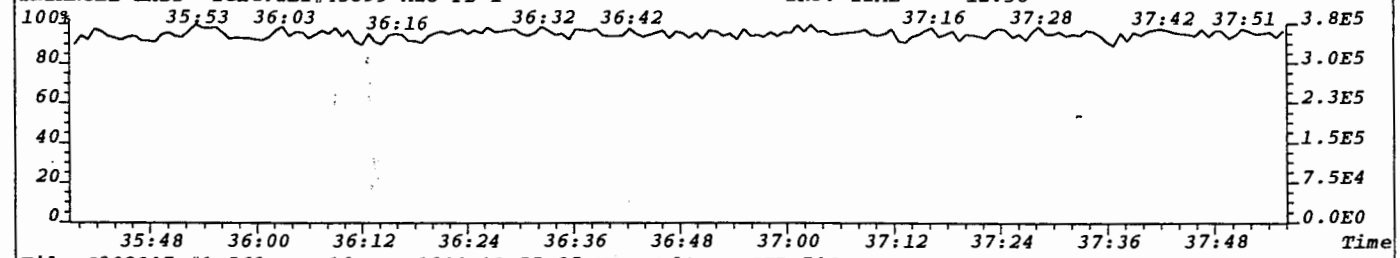
File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:77
417.8253 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,308.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



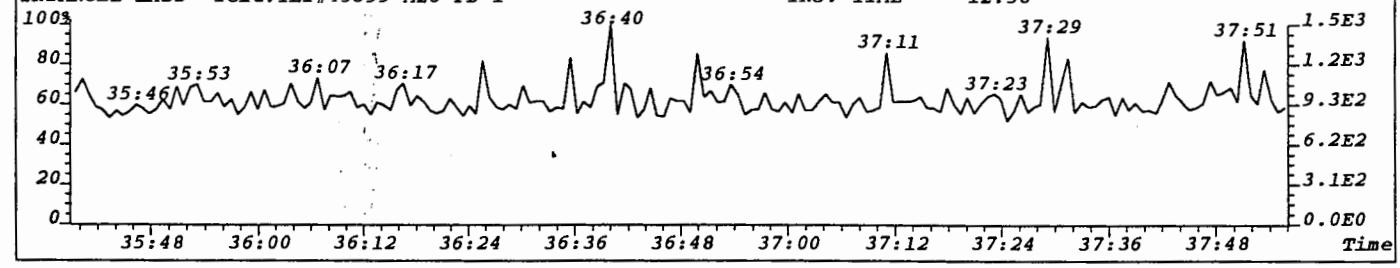
File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:95
419.8220 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,380.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



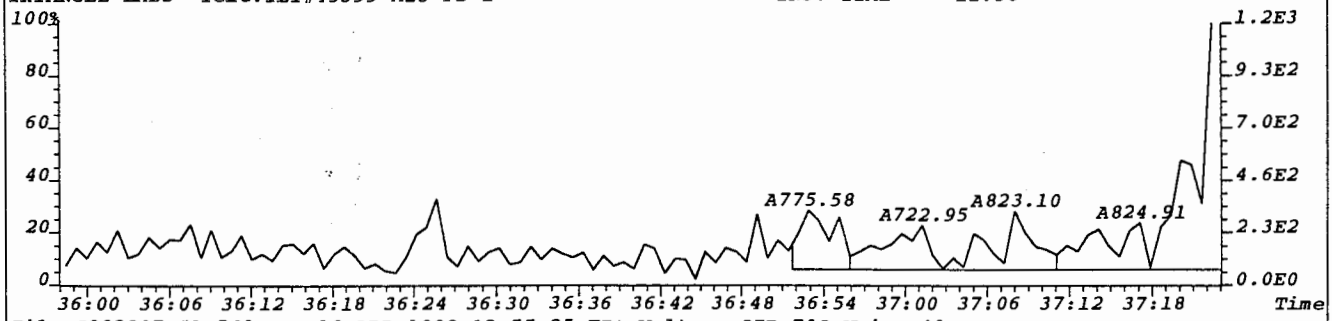
File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



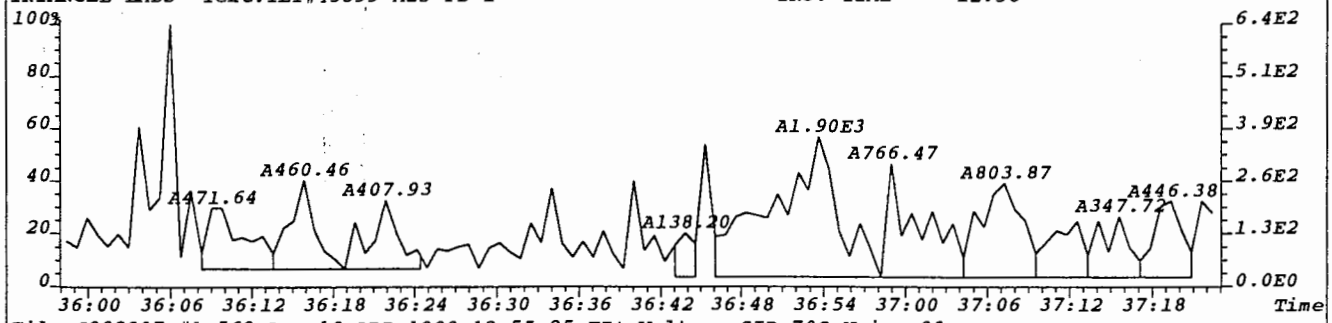
File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S
479.7165 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



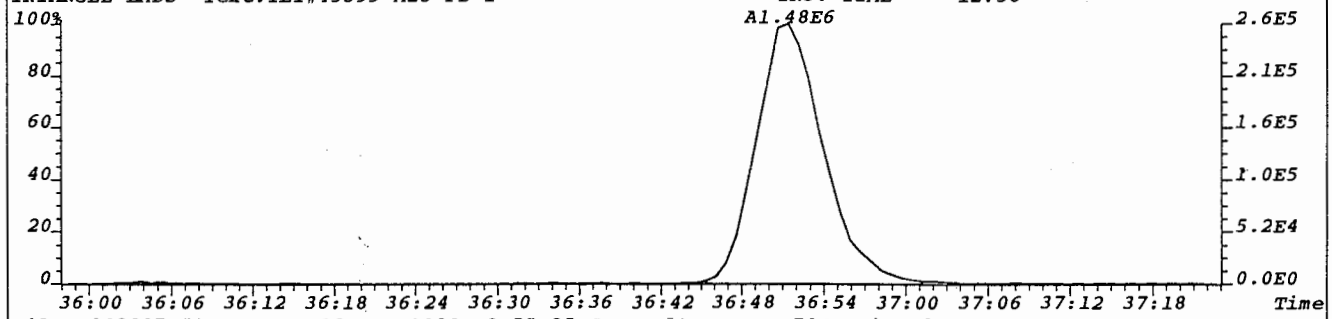
File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:50
423.7766 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,200.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



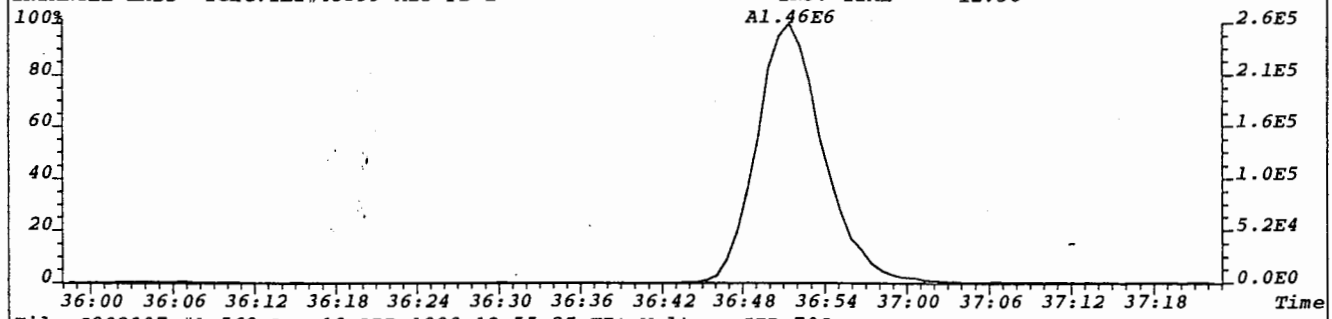
File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:40
425.7737 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,160.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



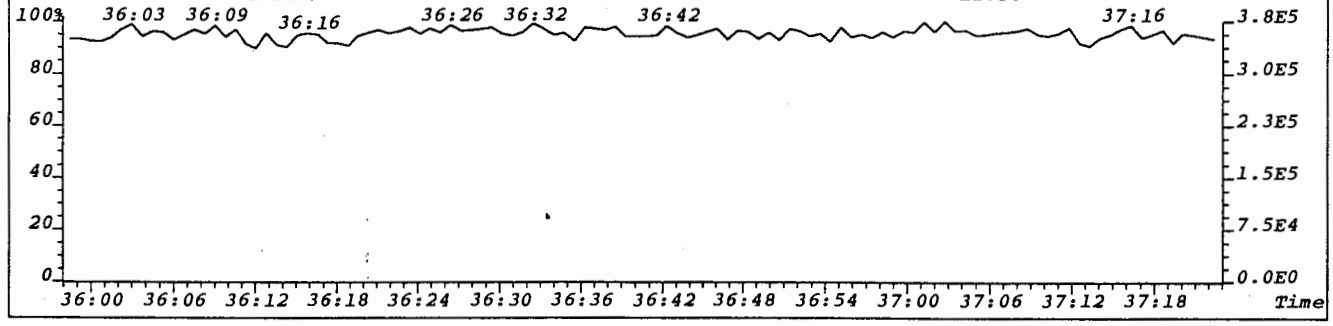
File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:83
435.8169 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,332.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



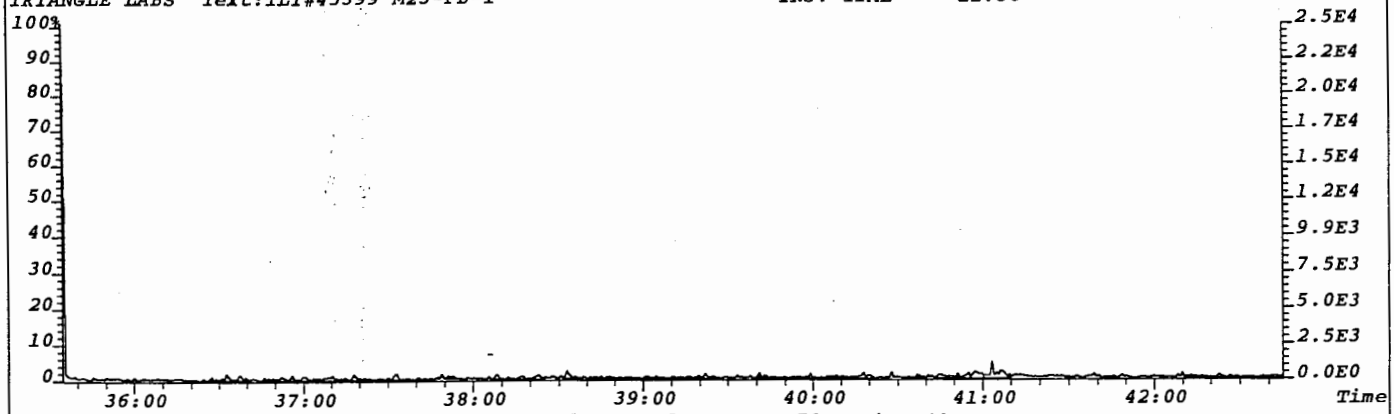
File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:81
437.8140 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,324.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



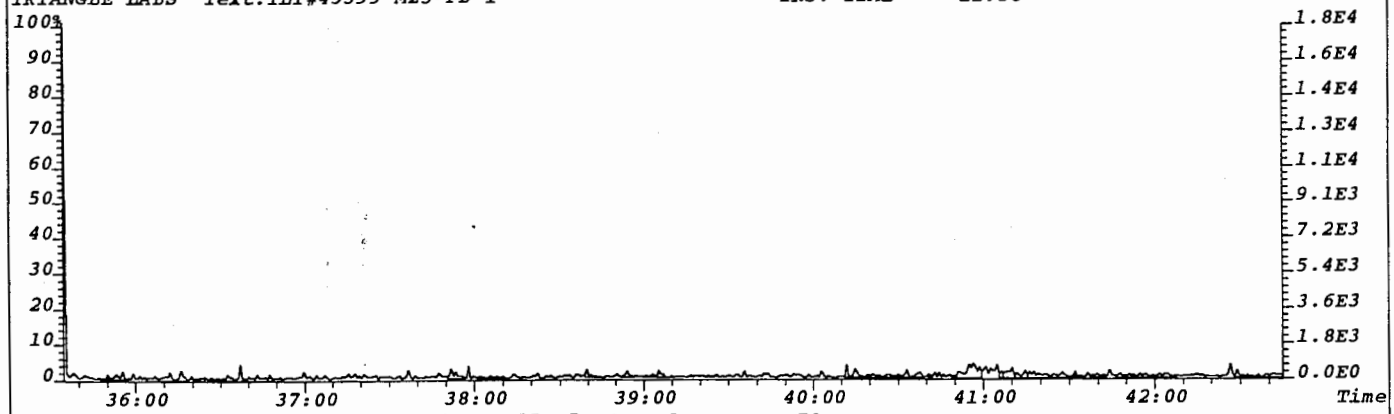
File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



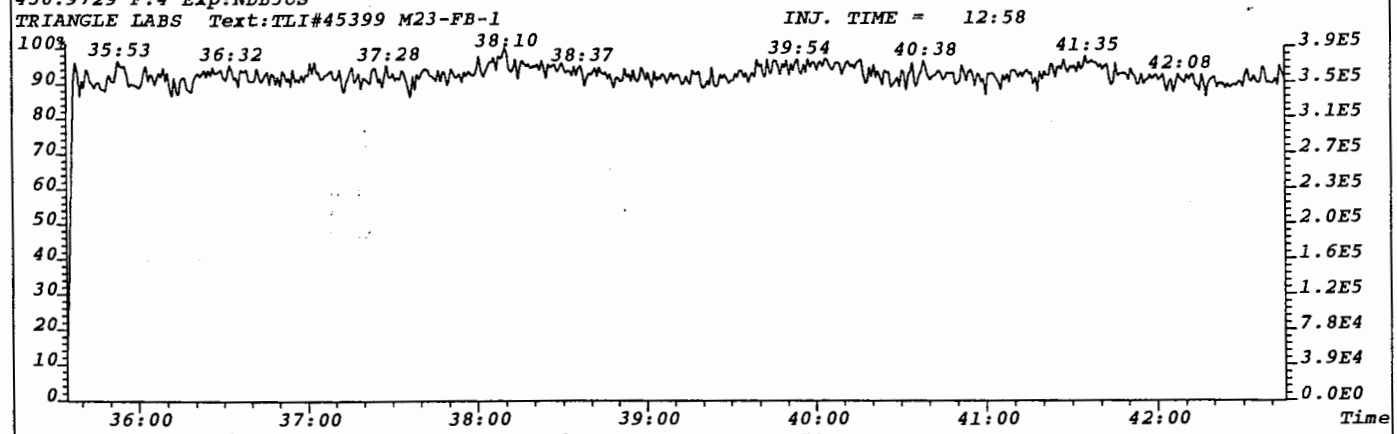
File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:47
441.7428 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,188.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



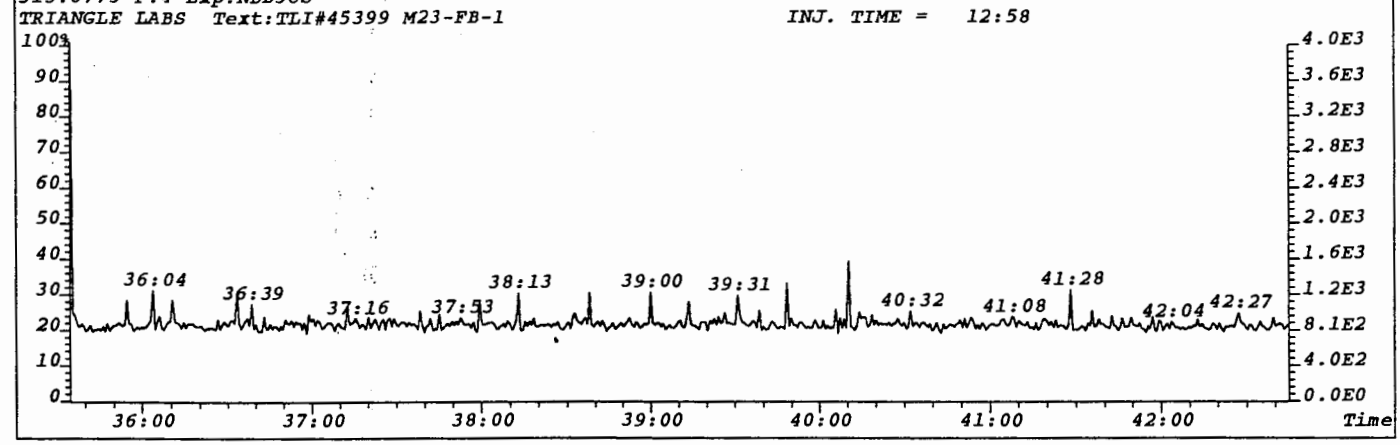
File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:49
443.7399 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,196.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



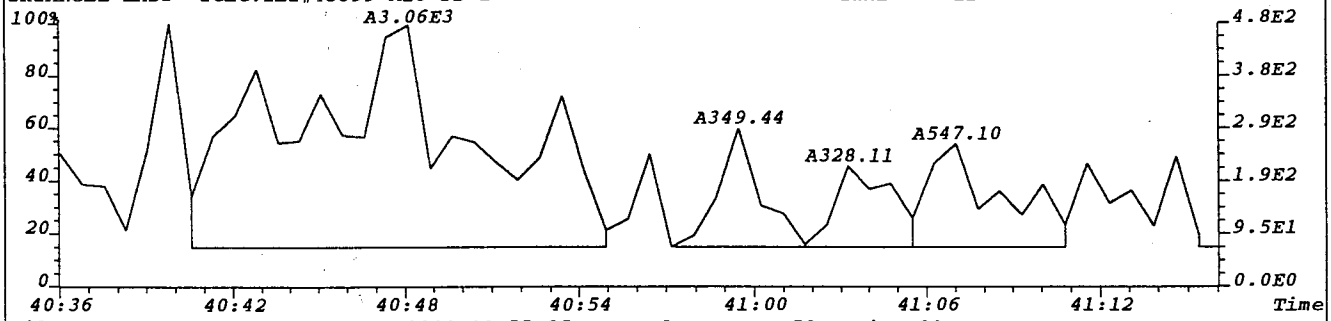
File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S
513.6775 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58

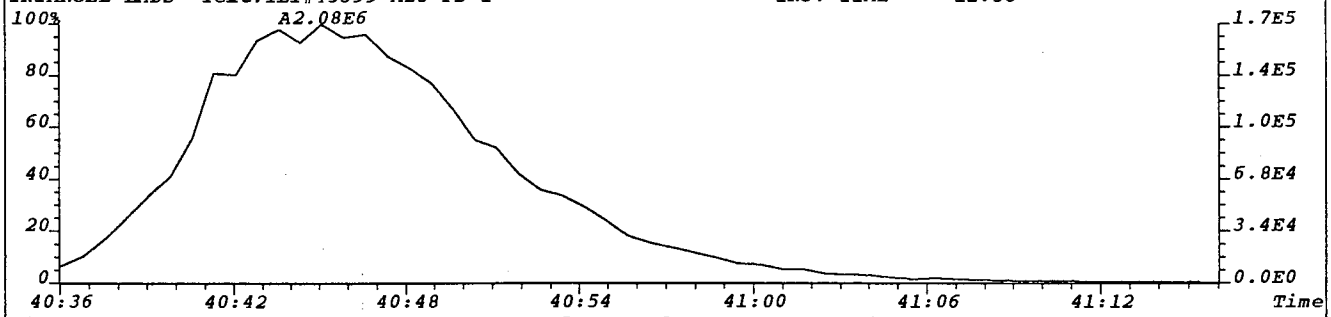


File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:40
457.7377 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,160.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58

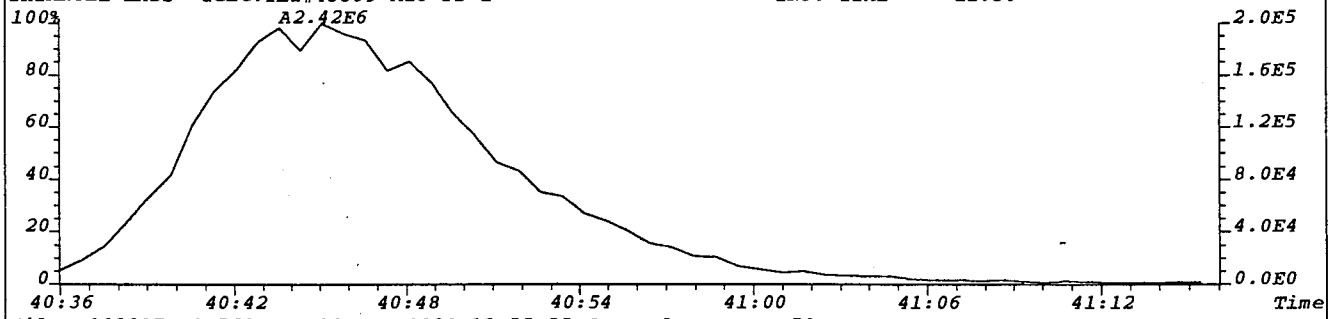


File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:39
459.7348 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,156.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58

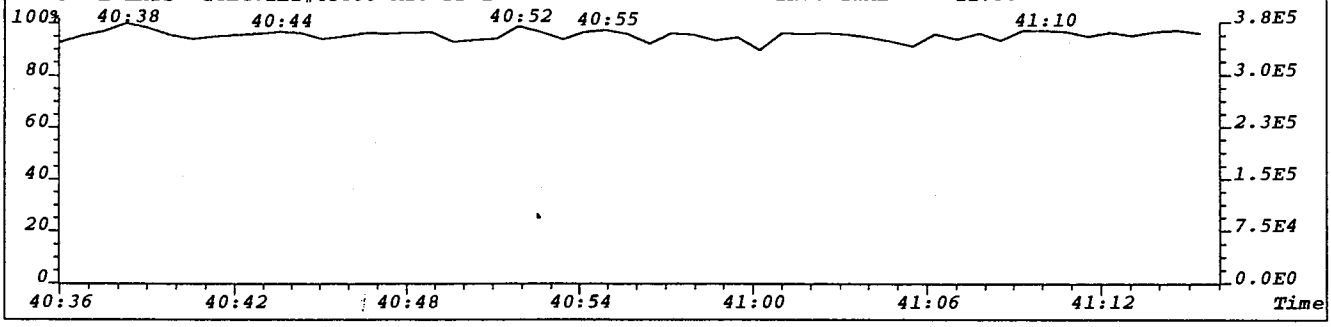
File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:34
469.7779 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,136.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58

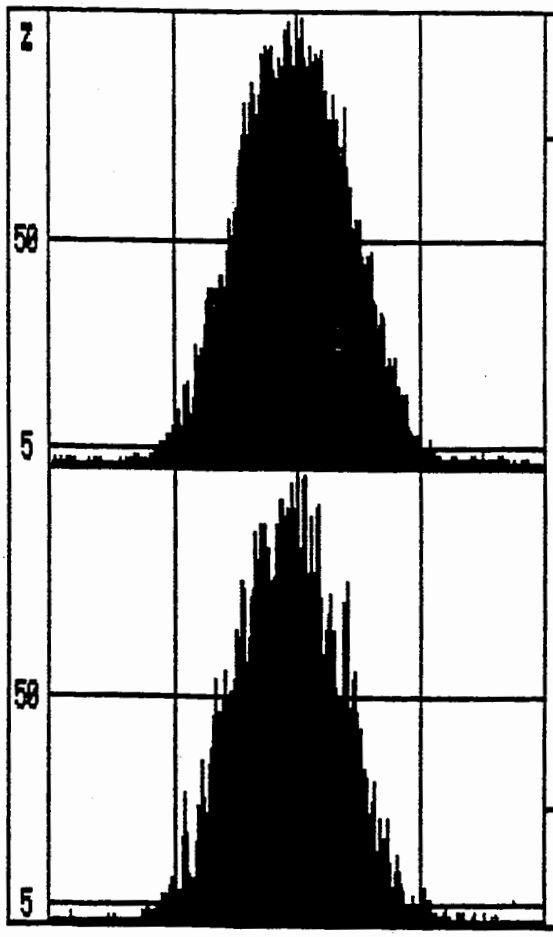


File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S Noise:35
471.7750 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,140.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58



File:S982307 #1-569 Acq:18-APR-1998 12:55:25 EI+ Voltage SIR 70S
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-1 INJ. TIME = 12:58





Channel I 330.9792 Peak top
Height .33 volts Span 200 ppm

System file name	MOBSUS
Data file name	A:S982304
Resolution	10000
Group number	2
Ionization mode	EI+
Switching	VOLTAGE
Ref. masses	292.9825, 416.9760

A	293	J	331	S	368
B	304	K	332	T	370
C	306	L	334	U	376
D	316	M	340	V	410
E	318	N	342		
F	320	O	352		
G	322	P	354		
H	328	Q	356		
I	331	R	358		

Ref. mass 416.9760 Peak top
Height .08 volts Span 200 ppm

Pacific Environmental Services

TLI Project: **45399** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **M23-FB-2** Analysis File: **S982308**

Client Project:	**r012.002/Lime Kiln**				
Sample Matrix:	**M23**	Date Received:	**04/01/98**	Spike File:	**SPMIT204**
TLI ID:	**204-92-10A-D**	Date Extracted:	**04/03/98**	ICal:	**SF51078**
		Date Analyzed:	**04/18/98**	ConCal:	**S982303**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U980780**	% Lipid:	**n/a**
GC Column:	**DB-5**	Analyst:	**DL**	% 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	0.006				___
1,2,3,6,7,8-HxCDD	ND	0.006				___
1,2,3,7,8,9-HxCDD	ND	0.006				___
1,2,3,4,6,7,8-HpCDD	ND	0.006				___
1,2,3,4,6,7,8,9-OCDD	ND	0.009				___
2,3,7,8-TCDF	0.005			0.65	25:16	JB_
1,2,3,7,8-PeCDF	ND	0.004				___
2,3,4,7,8-PeCDF	ND	0.004				___
1,2,3,4,7,8-HxCDF	ND	0.004				___
1,2,3,6,7,8-HxCDF	ND	0.004				___
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	0.006				___

Totals	Amt. (ng)	Number	DL	EMPC	Flags
Total TCDD	ND		0.004		___
Total PeCDD	ND		0.005		___
Total HxCDD	ND		0.006		___
Total HpCDD	ND		0.006		___
Total TCDF	0.005	1			___
Total PeCDF	ND		0.004		___
Total HxCDF	ND		0.004		___
Total HpCDF	ND		0.005		___

MIT2_PSR v1.04, LARS 6.11.00

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Printed: 20:27 04/20/98

Pacific Environmental Services

TLI Project: **45399** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **M23-FB-2** Analysis File: **S982308**

Internal Standards	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	2.8	70.4	40%-130%	0.72	25:15	___
$^{13}C_{12}$-2,3,7,8-TCDD	2.6	66.2	40%-130%	0.79	25:57	___
$^{13}C_{12}$-1,2,3,7,8-PeCDF	2.9	72.1	40%-130%	1.50	29:10	___
$^{13}C_{12}$-1,2,3,7,8-PeCDD	3.8	95.3	40%-130%	1.45	30:13	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	3.9	96.7	40%-130%	0.52	32:45	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	4.2	104	40%-130%	1.20	33:27	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	4.1	102	25%-130%	0.42	35:46	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	5.3	133	25%-130%	0.98	36:51	___
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	9.1	114	25%-130%	0.84	40:44	___

Surrogate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,4,7,8-PeCDF	4.3	107	40%-130%	1.51	29:52	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	3.4	84.6	40%-130%	0.48	32:39	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	3.4	85.0	40%-130%	1.21	33:22	___
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	3.3	82.6	25%-130%	0.41	37:23	___

Other Standard	Amt. (ng)	% Recovery	QC Limits		RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	3.7	92.1	40%-130%		25:58	___

Alternate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	3.4	85.6	40%-130%	0.50	34:03	___
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	3.5	87.6	40%-130%	0.50	33:15	___

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.80	25:47	___
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.20	33:47	___

Data Reviewer: _____ 04/20/98

MIT2_PSR v1.04, LARS 6.11.00

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Printed: 20:27 04/20/98

Initial ....Date...

Data Review By: K 4/20/98 Calculated Noise Area: 0.16

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 S982308B.dbf
04/20/98 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					0.873-1.075			
304-306	DC	NL		0:00	RO	1.27	0.19			0.000			
				25:16		0.65	0.84	0.33	0.51	1.001	2378-TCDF	AN	J
304-306			1	Peak			0.84						
13C12-TCDF					0.65-0.89					0.960-1.040			
316-318	DC	NL		0:00	RO	1.00	0.21			0.000			
	DC	WL		24:12		0.79	12.96			0.958			
				24:31		0.73	1.47	0.62	0.85	0.971			
				24:50		0.75	3.35	1.44	1.91	0.983			
				25:15		0.72	484.83	202.35	282.48	1.000	13C12-2378-TCDF	IS0	
				25:40	RO	0.93	1.43	0.75	0.81	1.017			
316-318			4	Peaks			491.08						

---------- Above: TCDF / TCDD Follows ----------

TCDD					0.65-0.89					0.899-1.046			
320-322	DC	NL		0:00	RO	0.90	0.18			0.000			
	DC	SN		23:44	RO	2.00	0.11			0.915			
	DC	SN		23:51	RO	1.29	0.12			0.919			
	DC	SN		25:14	RO	5.75	0.07			0.972			
	DC	SN		25:19	RO	2.50	0.04			0.976			
	DC	SN		25:59	RO	0.35	0.21			1.001	2378-TCDD	AN	
	DC	SN		26:06	RO	1.75	0.14			1.006			
	DC	SN		26:54	RO	4.50	0.04			1.037			
	DC	WH		27:30		0.88	0.32			1.060			
320-322			0	Peaks			0.00						
37Cl-TCDD										0.923-1.077			
328	DC	NL		0:00			0.12			0.000			
				24:37			1.45	1.45		0.949			
				25:58			306.20	306.20		1.001	37Cl-TCDD	CLS	
				26:17			0.21	0.21		1.013			
				26:37			0.35	0.35		1.026			
328			4	Peaks			308.21						
13C12-TCDD					0.65-0.89					0.923-1.077			
332-334	DC	NL		0:00	RO	1.92	0.21			0.000			
				24:47		0.88	2.29	1.07	1.22	0.955			
				25:47		0.80	480.06	213.44	266.62	0.994	13C12-1234-TCDD	RS1	
				25:57		0.79	350.28	155.00	195.28	1.000	13C12-2378-TCDD	IS1	
				26:17		0.70	5.21	2.15	3.06	1.013			
332-334			4	Peaks			837.84						

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: TCDD / PeCDF Follows ----------													
PeCDF				1.32-1.78						0.928-1.063			
340-342	DC	NL		0:00	RO	0.78	0.12			0.000			
	DC	SN		28:19	RO	1.17	0.35			0.971			
	DC	SN		28:39	RO	0.73	0.13			0.982			
	DC	SN		28:48		1.36	0.26			0.987			
	DC	SN		29:11	RO	3.21	0.36			1.001	12378-PeCDF	AN	
	DC	SN		29:35	RO	0.64	0.15			1.014			
	DC	SN		29:48	RO	0.67	0.10			1.022			
	DC	SN		29:52	RO	3.17	0.15			1.024	23478-PeCDF	AN	
	DC	SN		30:02	RO	0.39	0.23			1.030			
	DC	SN		30:12	RO	0.33	0.08			1.035			
	DC	SN		30:26	RO	0.56	0.08			1.043			
	DC	SN		30:33	RO	0.92	0.18			1.047			
	DC	SN		30:59	RO	0.88	0.12			1.062			
340-342			0	Peaks			0.00						
13C12-PeCDF				1.32-1.78						0.863-1.137			
352-354	DC	NL		0:00	RO	0.89	0.13			0.000			
				28:19		1.62	22.49	13.89	8.60	0.971			
				28:48	RO	1.00	0.89	0.54	0.54	0.987			
				29:10		1.50	372.42	223.57	148.85	1.000	13C12-PeCDF 123	IS2	
				29:27		1.55	3.72	2.26	1.46	1.010			
				29:52		1.51	386.14	232.37	153.77	1.024	13C12-PeCDF 234	SUR1	
				30:51	RO	1.15	1.25	0.76	0.66	1.058			
352-354			6	Peaks			786.91						
---------- Above: PeCDF / PeCDD Follows ----------													
PeCDD				1.32-1.78						0.937-1.022			
356-358	DC	NL		0:00		1.50	0.15			0.000			
	DC	SN		28:25	RO	0.18	0.07			0.940			
	DC	SN		28:31	RO	0.83	0.08			0.944			
	DC	SN		28:40	RO	1.20	0.20			0.949			
	DC	SN		28:53	RO	0.73	0.13			0.956			
	DC	SN		29:09		1.67	0.32			0.965			
	DC	SN		29:22	RO	2.33	0.23			0.972			
	DC	SN		29:36	RO	2.33	0.08			0.980			
	DC	SN		30:28	RO	1.06	0.30			1.008			
	DC	WH		30:54	RO	1.22	0.18			1.023			
	DC	WH		31:00		1.71	0.19			1.026			
356-358			0	Peaks			0.00						
13C12-PeCDD				1.32-1.78						0.868-1.132			
368-370	DC	NL		0:00	RO	1.14	0.13			0.000			
				29:08	RO	0.78	0.63	0.38	0.49	0.964			
				29:17	RO	1.28	0.97	0.59	0.46	0.969			
				30:13		1.45	273.08	161.56	111.52	1.000	13C12-PeCDD 123	IS3	
				30:20		1.45	23.29	13.79	9.50	1.004			
	DC	SN		30:42	RO	1.00	0.31			1.016			
368-370			4	Peaks			297.97						

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						0.963-1.048			
374-376	DC	NL		0:00		1.06	0.33			0.000			
	DC	SN		31:48		1.33	0.35			0.971			
	DC	SN		32:45		1.14	0.30			1.000	123678-HxCDF	AN	
D	d	SN		33:18		1.18	0.48			1.017	234678-HxCDF	AN	
	DC	SN		33:51	RO	0.53	0.16			1.034			
	DC	WH		34:27	RO	0.58	0.20			1.052			
374-376			0	Peaks			0.00						
13C12-HxCDF				0.43-0.59						0.878-1.122			
384-386	DC	NL		0:00	RO	0.94	0.26			0.000			
				31:40		0.46	5.52	1.75	3.77	0.967			
				31:48		0.51	8.65	2.94	5.71	0.971			
				32:39		0.48	303.01	98.09	204.92	0.997	13C12-HxCDF 478	SUR2	
				32:45		0.52	352.38	120.39	231.99	1.000	13C12-HxCDF 678	IS4	
	DC	SN		33:06	RO	0.75	0.36			1.011			
				33:15		0.50	316.21	105.28	210.93	1.015	13C12-HxCDF 234	ALT2	
				33:25		0.55	1.01	0.36	0.65	1.020			
				34:03		0.50	248.00	82.59	165.41	1.040	13C12-HxCDF 789	ALT1	
				34:20	RO	0.96	0.41	0.26	0.27	1.048			
				34:23		0.50	0.66	0.22	0.44	1.050			
	DC	SN		34:27		0.45	0.45			1.052			
	DC	SN		34:34	RO	0.28	0.24			1.055			
384-386			9	Peaks			1,235.85						
---------- Above: HxCDF / HxCDD Follows ----------													
HxCDD				1.05-1.43						0.958-1.014			
390-392	DC	NL		0:00		1.13	0.34			0.000			
	DC	SN		32:19	RO	0.18	0.04			0.966			
	DC	SN		32:25	RO	0.83	0.09			0.969			
	DC	SN		32:28	RO	0.75	0.05			0.971			
	DC	SN		32:32		1.20	0.11			0.973			
	DC	SN		32:39	RO	1.71	0.38			0.976			
	DC	SN		32:46	RO	6.20	0.11			0.980			
	DC	SN		32:51	RO	4.00	0.04			0.982			
	DC	SN		32:55	RO	1.00	0.11			0.984			
	DC	SN		33:05	RO	0.44	0.07			0.989			
	DC	SN		33:06	RO	1.50	0.09			0.990			
	DC	SN		33:39	RO	0.50	0.13			1.006			
390-392			0	Peaks			0.00						
13C12-HxCDD				1.05-1.43						0.970-1.030			
402-404	DC	NL		0:00	RO	0.61	0.34			0.000			
				32:49	RO	1.46	2.11	1.37	0.94	0.981			
	DC	SN		33:05	RO	0.69	0.36			0.989			
				33:22		1.21	214.22	117.48	96.74	0.998	13C12-HxCDD 478	SUR3	
				33:27		1.20	274.38	149.68	124.70	1.000	13C12-HxCDD 678	IS5	
				33:47		1.20	285.94	156.10	129.84	1.010	13C12-HxCDD 789	RS2	
				33:59	RO	2.57	0.52	0.59	0.23	1.016			

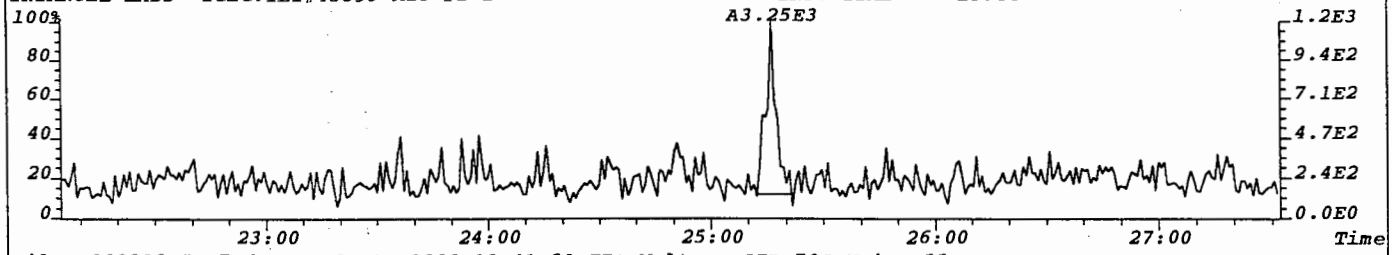
Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
	DC	SN		34:12	RO	0.74	0.36			1.022			
	DC	SN		34:17		1.07	0.29			1.025			
402-404				5 Peaks			777.17						
---------- Above: HxCDD / HpCDF Follows ----------													
HpCDF				0.88-1.20						0.997-1.051			
408-410	DC	NL		0:00	RO	1.25	0.33			0.000			
	DC	SN		35:55	RO	4.50	0.20			1.004			
	DC	WH		37:38	RO	2.71	0.14			1.052			
408-410				0 Peaks			0.00						
13C12-HpCDF				0.37-0.51						0.944-1.112			
418-420	DC	NL		0:00	RO	1.44	0.23			0.000			
				35:46		0.42	246.67	72.85	173.82	1.000	13C12-HpCDF	678	IS6
	DC	SN		36:01	RO	0.69	0.37			1.007			
	DC	SN		36:10	RO	1.20	0.22			1.011			
	DC	SN		36:21	RO	1.25	0.17			1.016			
				37:23		0.41	163.17	47.48	115.69	1.045	13C12-HpCDF	789	SUR4
418-420				2 Peaks			409.84						
---------- Above: HpCDF / HpCDD Follows ----------													
HpCDD				0.88-1.20						0.976-1.005			
424-426	DC	NL		0:00		1.09	0.23			0.000			
	DC	SN		36:04		1.00	0.26			0.979			
	DC	SN		36:11	RO	0.40	0.08			0.982			
	DC	WH		37:19	RO	2.36	0.22			1.013			
424-426				0 Peaks			0.00						
13C12-HpCDD				0.88-1.20						0.973-1.027			
436-438	DC	NL		0:00		1.12	0.36			0.000			
				36:04		1.08	2.93	1.52	1.41	0.979			
				36:51		0.98	281.68	139.70	141.98	1.000	13C12-HpCDD	678	IS7
436-438				2 Peaks			284.61						
---------- Above: HpCDD / Octa-CDD and CDF Follows ----------													
OCDF				0.76-1.02						0.902-1.098			
442-444	DC	NL		0:00	RO	1.20	0.19			0.000			
	DC	WL		35:43	RO	0.75	0.19			0.877			
	DC	WL		35:49	RO	0.35	0.17			0.879			
	DC	WL		36:13	RO	1.33	0.11			0.889			
	DC	WL		36:16	RO	0.71	0.11			0.890			
	DC	WL		36:21		0.80	0.27			0.892			
	DC	WL		36:41	RO	3.50	0.04			0.901			
	DC	SN		36:49		0.92	0.25			0.904			
	DC	SN		36:52	RO	2.50	0.08			0.905			
	DC	SN		38:12	RO	6.00	0.08			0.938			
	DC	SN		38:16	RO	2.50	0.04			0.939			
	DC	SN		38:32	RO	4.25	0.08			0.946			
	DC	SN		41:21	RO	1.13	0.15			1.015			

Compound/ M_Z....	QC.Log	Omit	Why	..RT.	OK	Ratio	Total.Area...	Area.Peak.1..	Area.Peak.2..	Rel.RT	Compound.Name..	ID..	Flags.
442-444			0 Peaks				0.00						
OCDD				0.76-1.02						0.902-1.098			
458-460	DC	NL		0:00	RO	1.11	0.17			0.000			
	DC	SN		40:53	RO	0.58	0.15			1.004			
458-460			0 Peaks				0.00						
13C12-OCDD				0.76-1.02						0.996-1.004			
470-472	DC	NL		0:00	RO	1.30	0.19			0.000			
				40:44		0.84	326.16	149.34	176.82	1.000	13C12-OCDD		IS8
470-472			1 Peak				326.16						

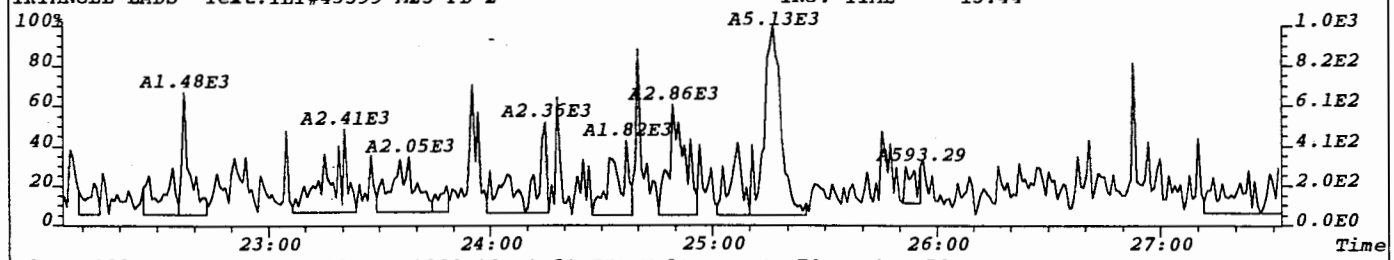
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside 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
		X-Ether Interference

*** End of Report ***

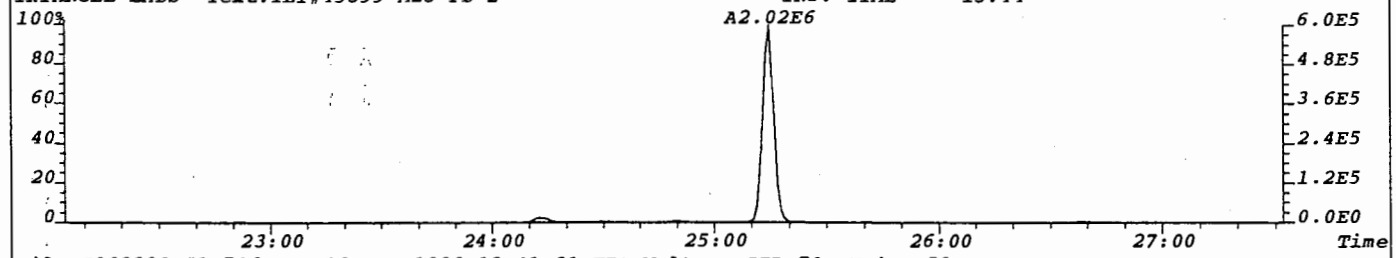
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:69
303.9016 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,276.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



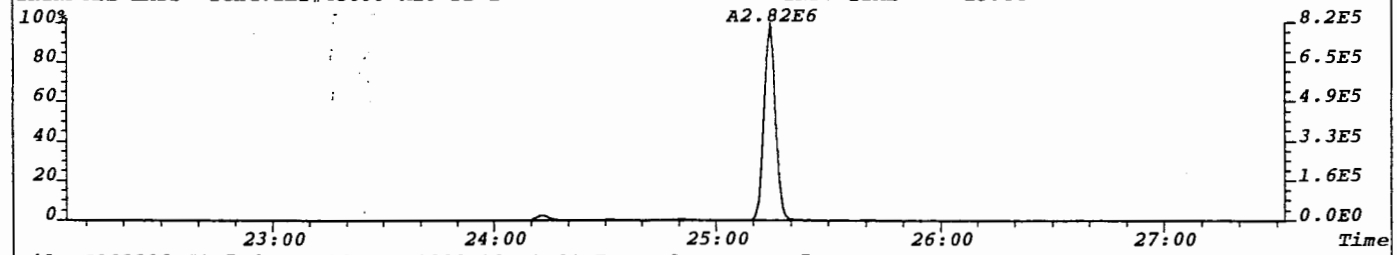
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:55
305.8987 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,220.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



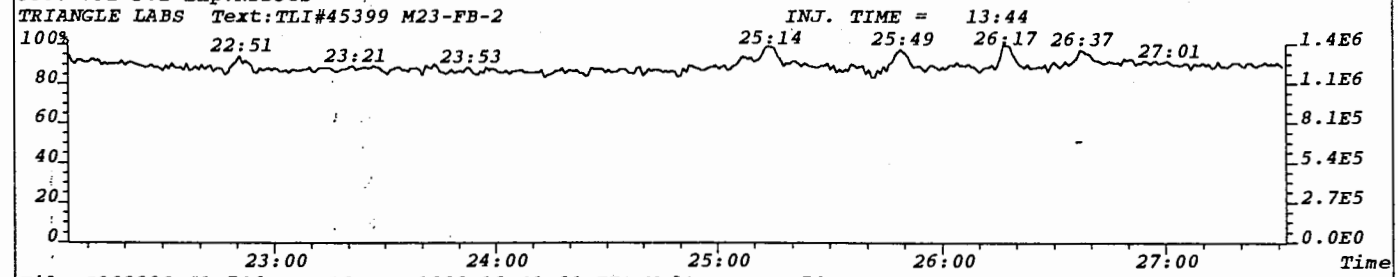
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:58
315.9419 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,232.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



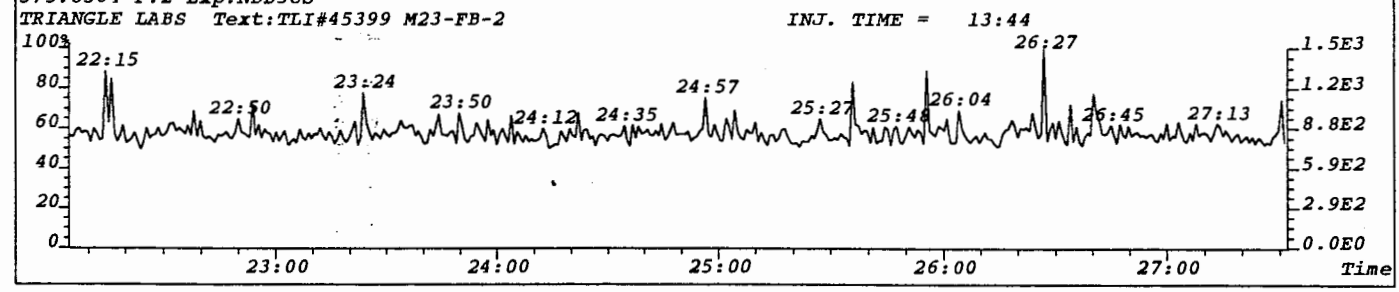
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:59
317.9389 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,236.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



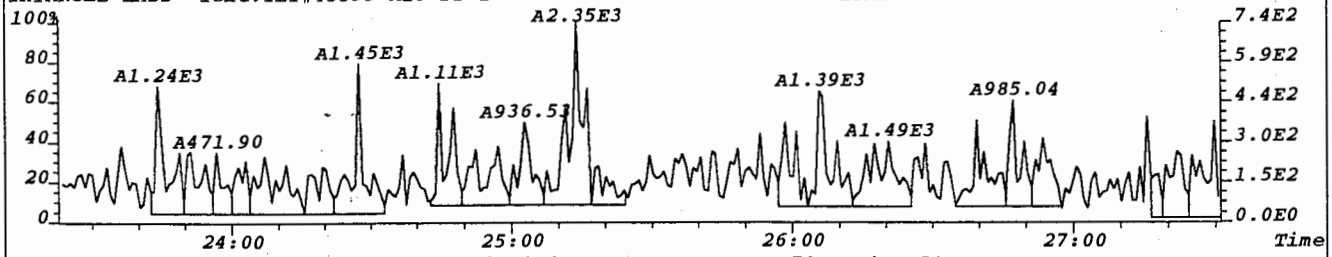
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



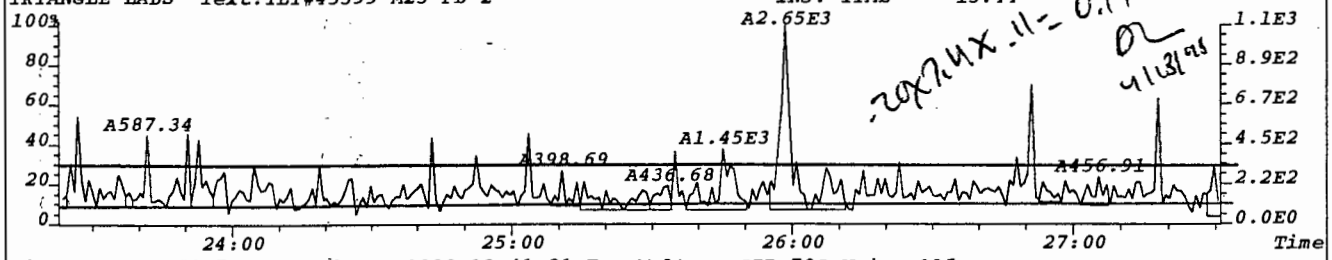
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S
375.8364 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:45
319.8965 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,180.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44

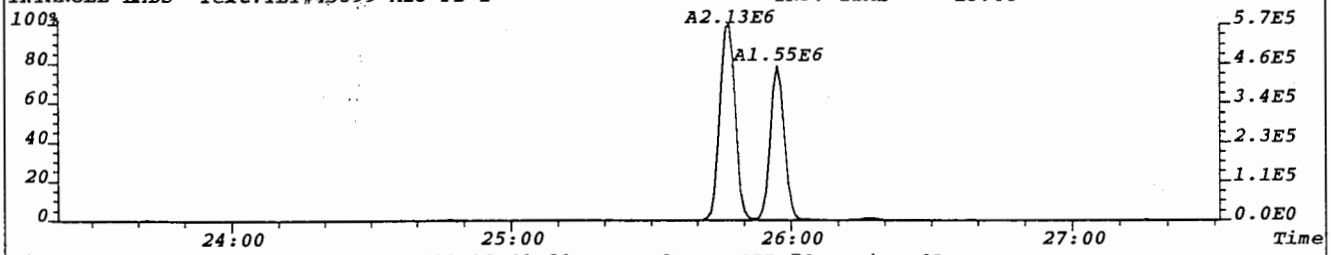


File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:51
321.8936 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,204.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44

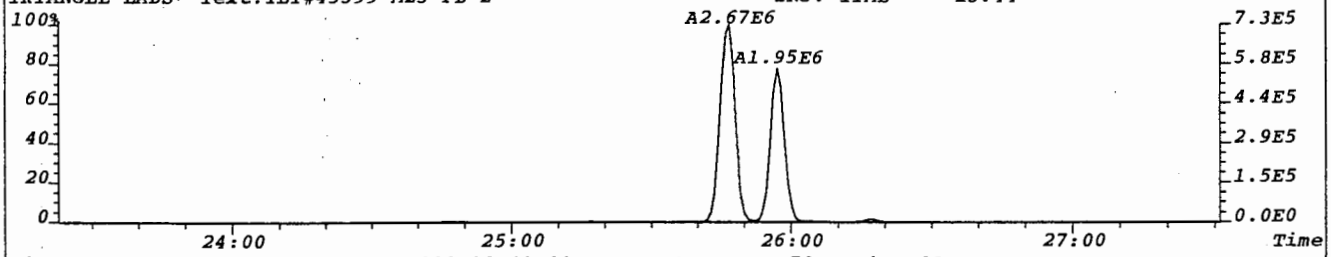


.20X2.4X.11= 0.16
OK
4/23/98

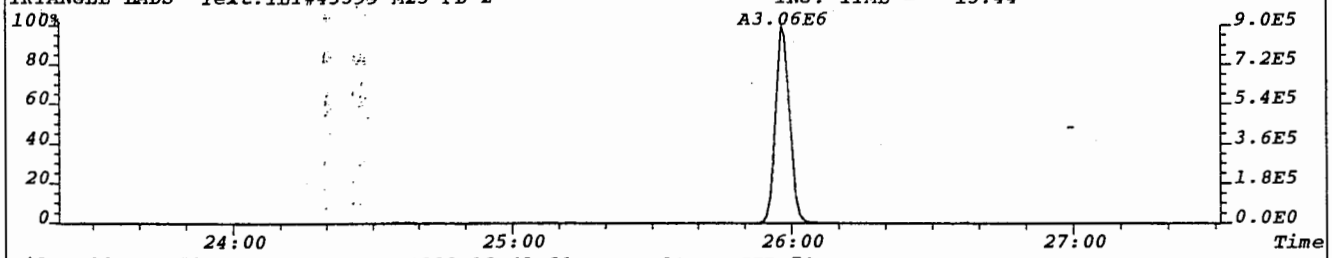
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:115
331.9368 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,460.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



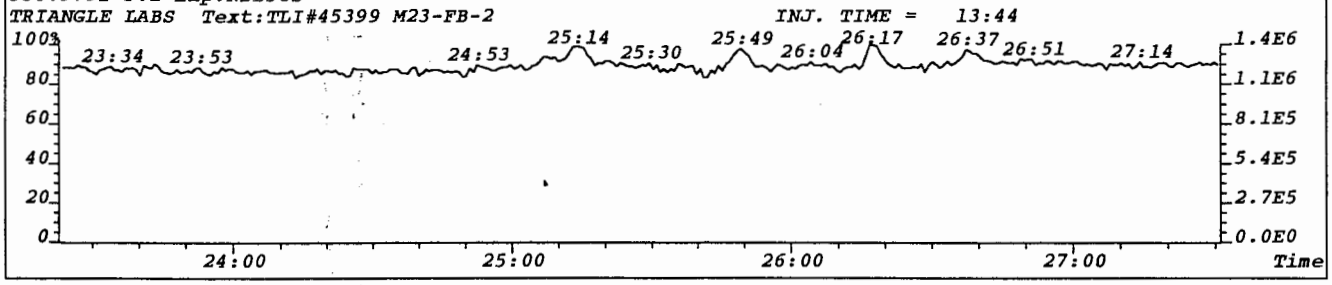
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:62
333.9338 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,248.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



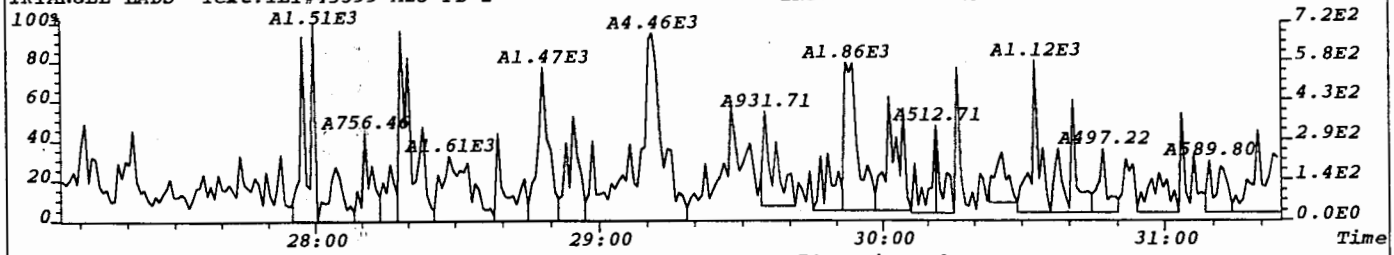
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:58
327.8847 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,232.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



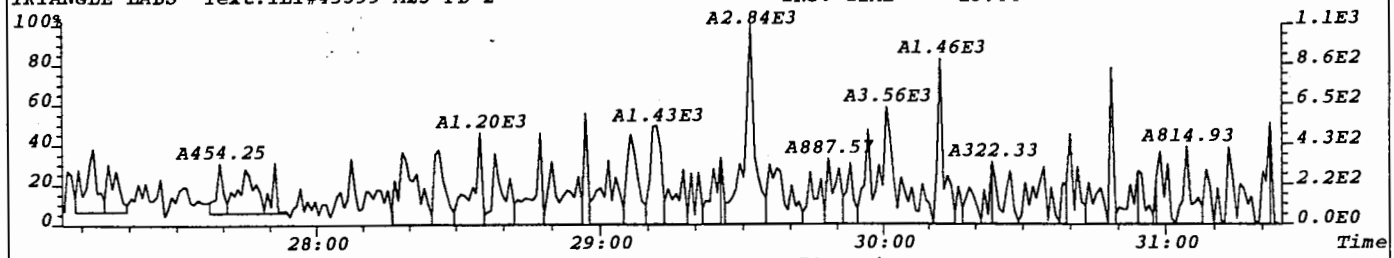
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



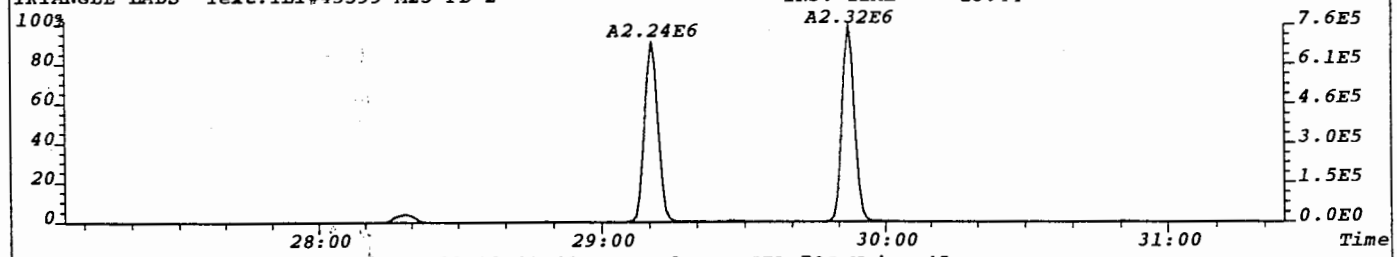
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:35
339.8597 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,140.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



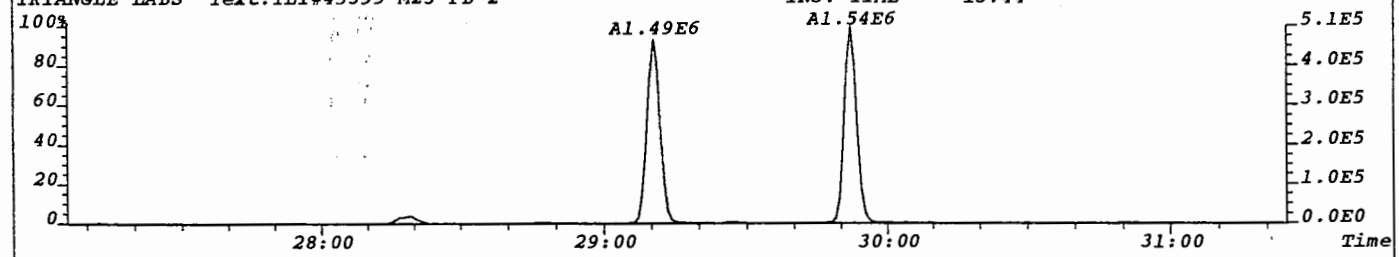
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:46
341.8567 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,184.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



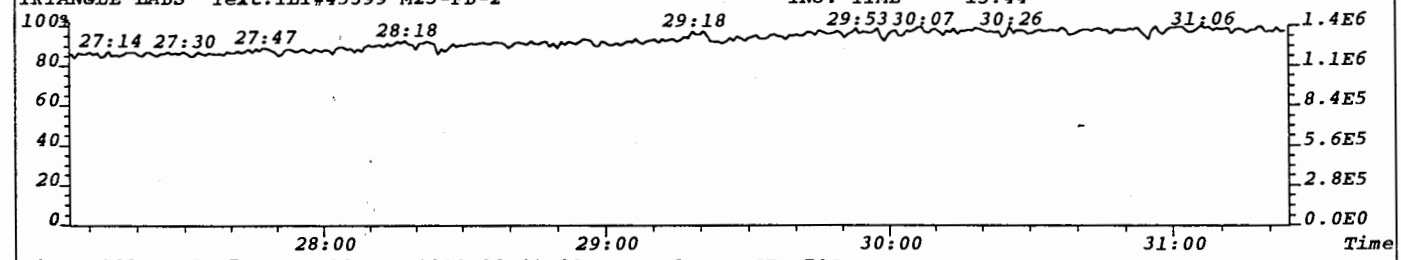
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:41
351.9000 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,164.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



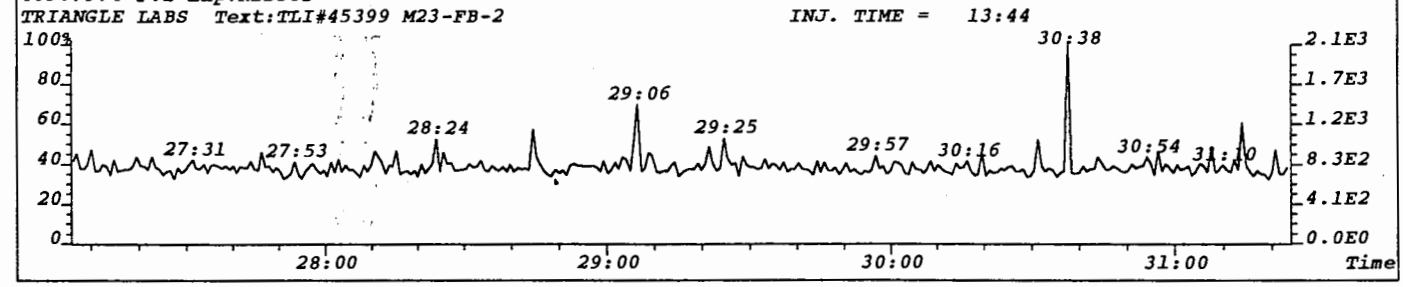
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:45
353.8970 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,180.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



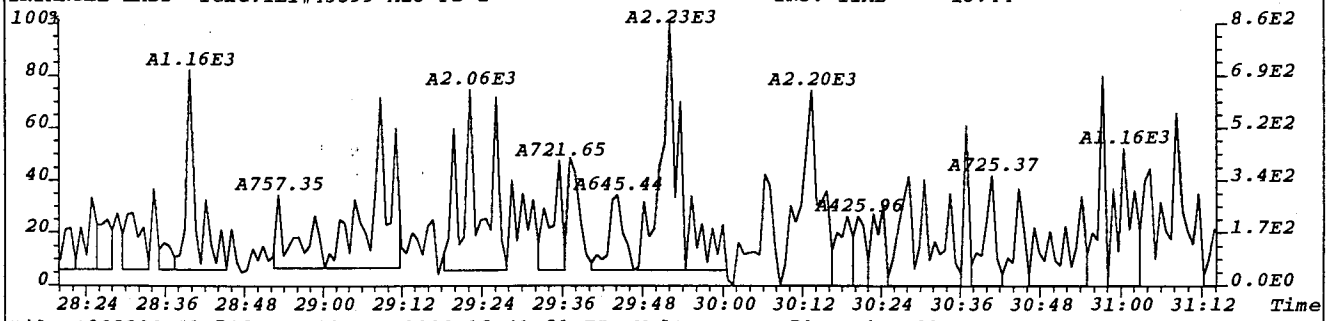
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



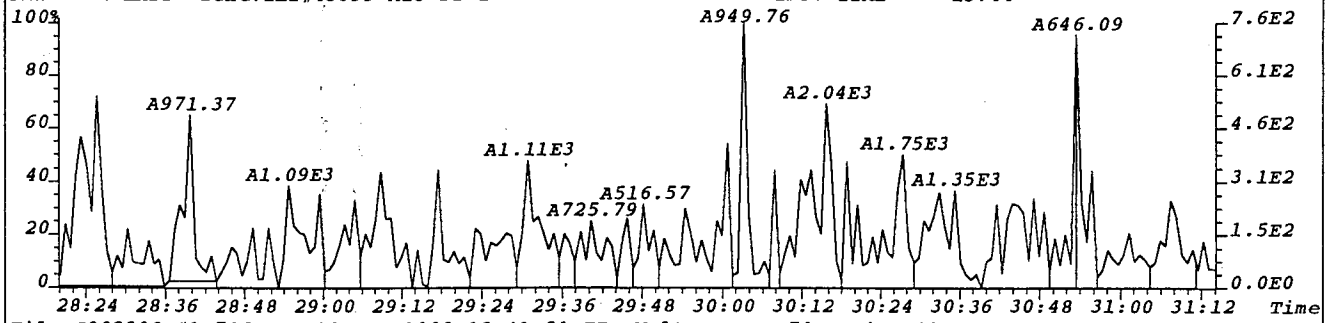
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S
409.7974 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



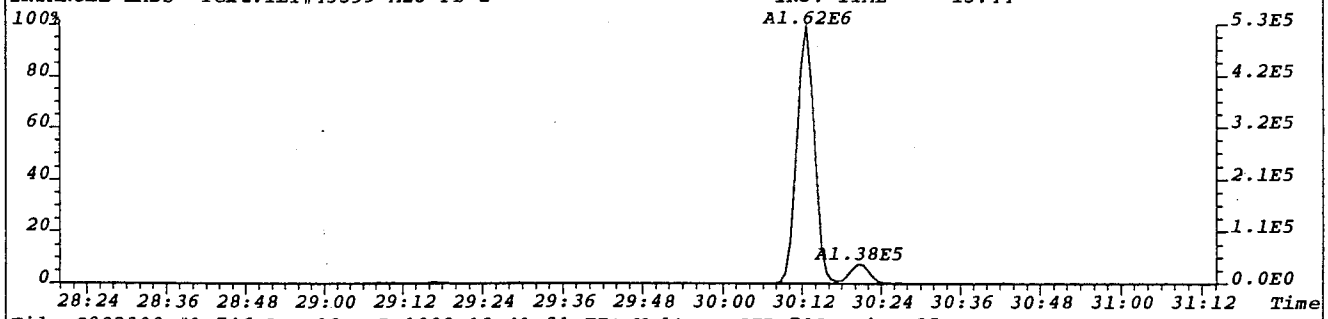
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:43
355.8546 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,172.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



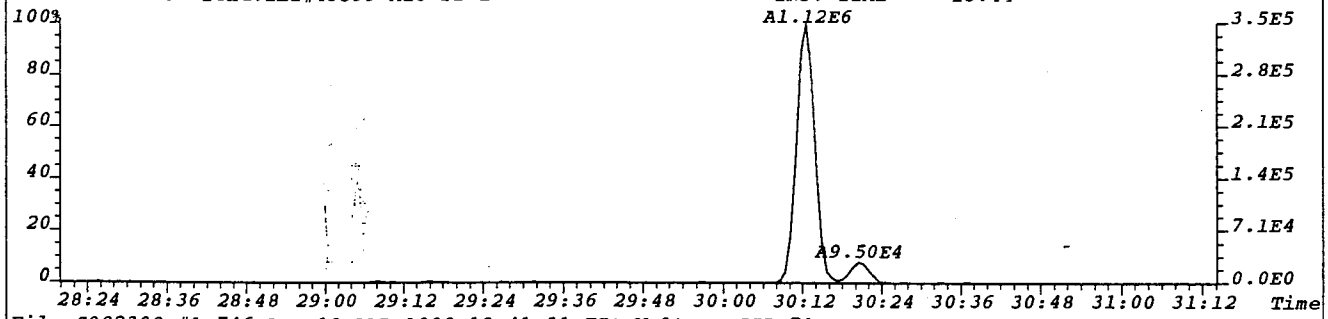
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:31
357.8516 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,124.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



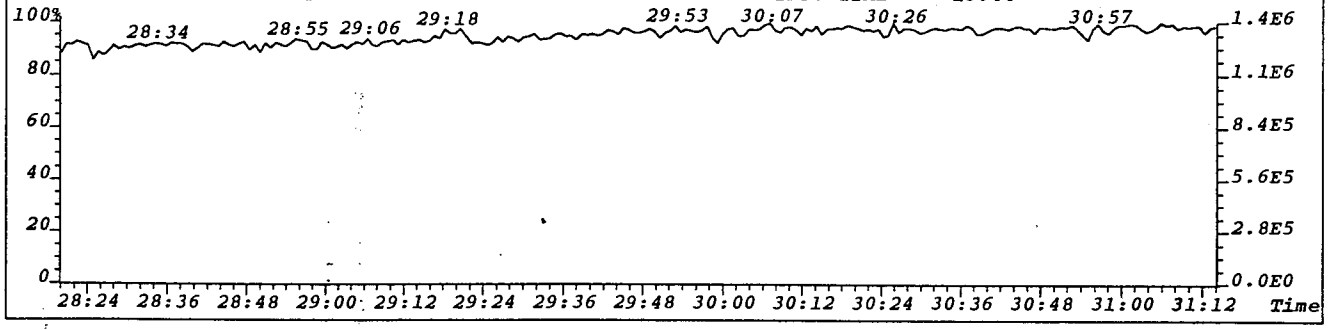
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:40
367.8949 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,160.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



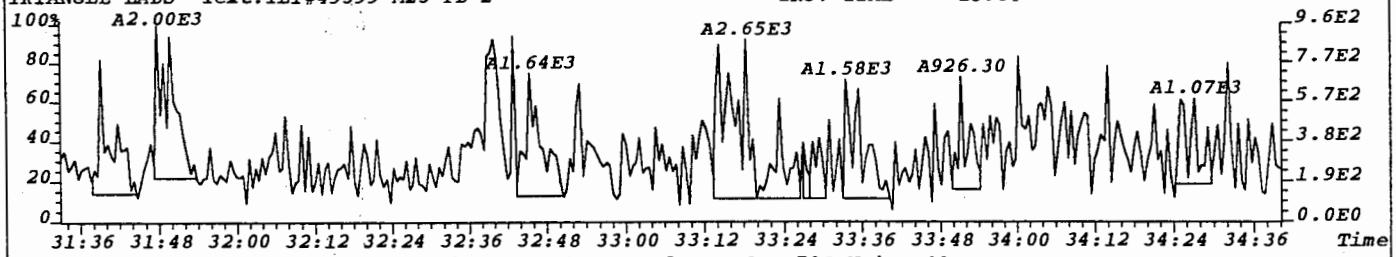
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:35
369.8919 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,140.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



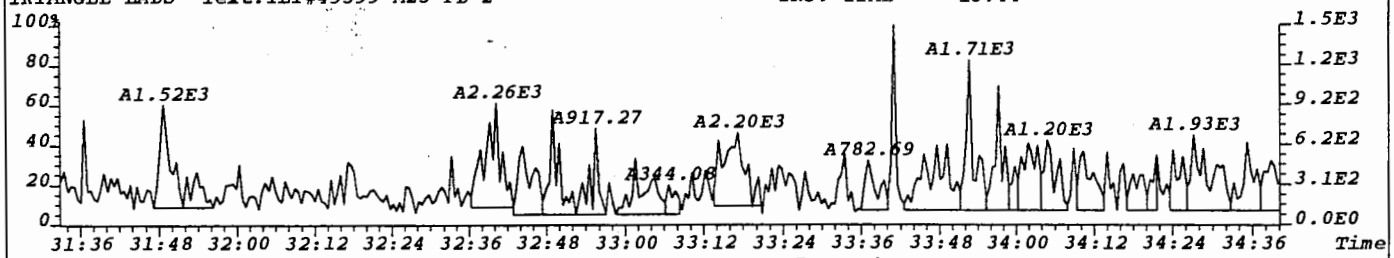
File:S982308 #1-746 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



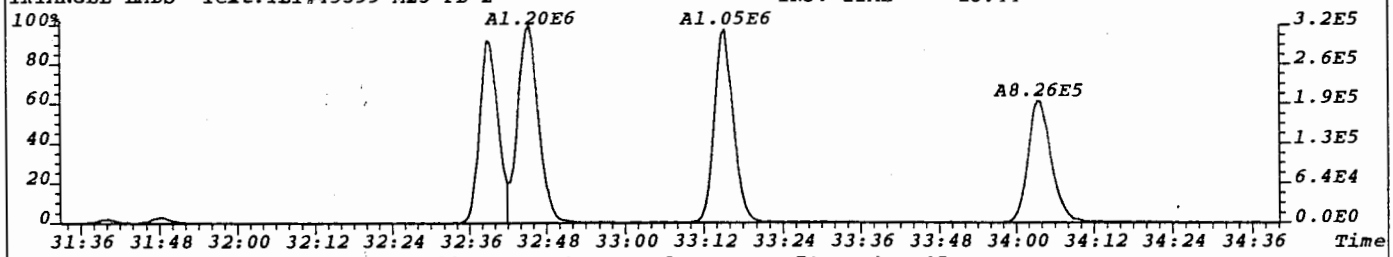
File:S982308 #1-465 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:85
373.8208 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,340.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



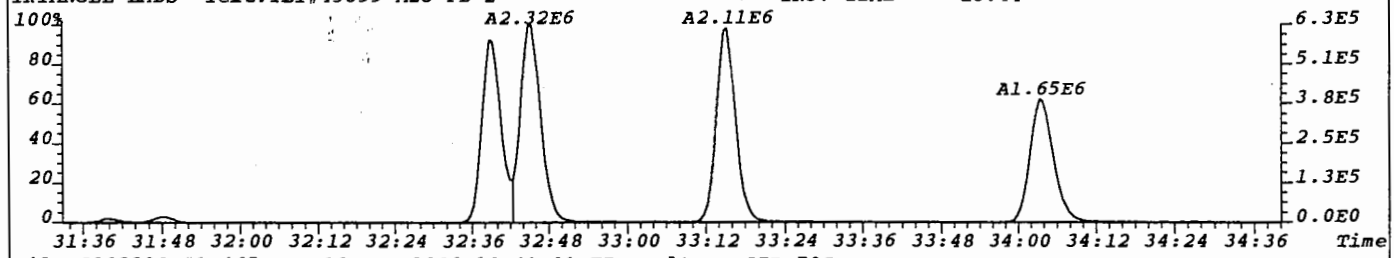
File:S982308 #1-465 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:80
375.8178 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,320.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



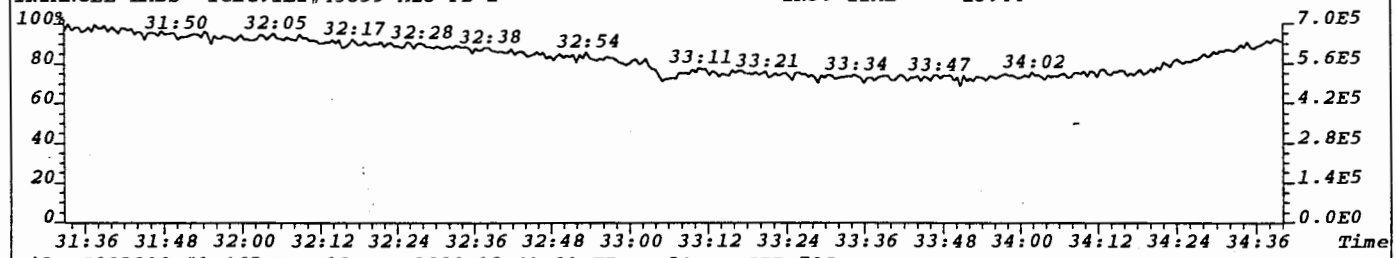
File:S982308 #1-465 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:81
383.8639 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,324.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



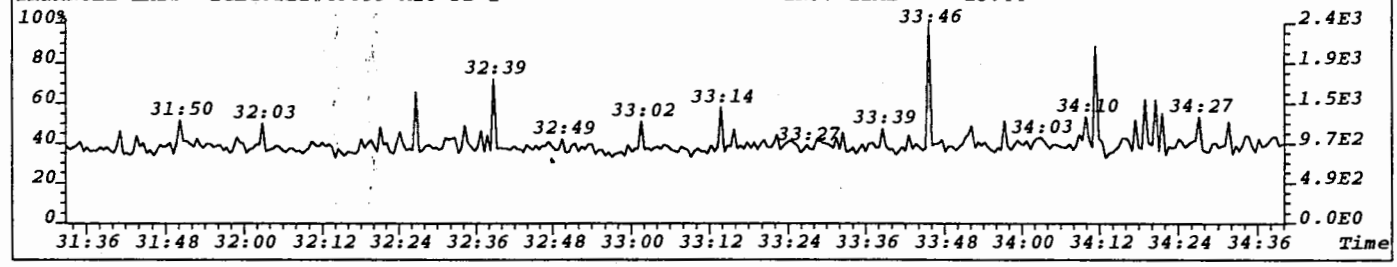
File:S982308 #1-465 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:85
385.8610 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,340.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



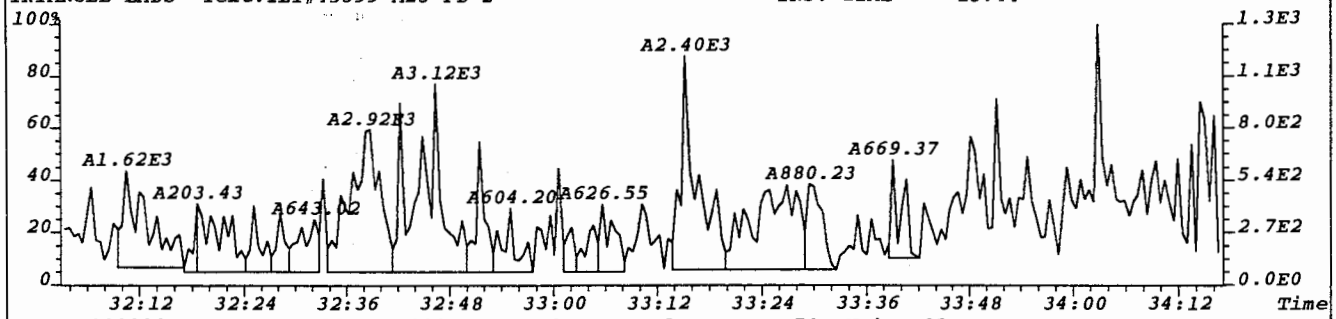
File:S982308 #1-465 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S
392.9760 F:3 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



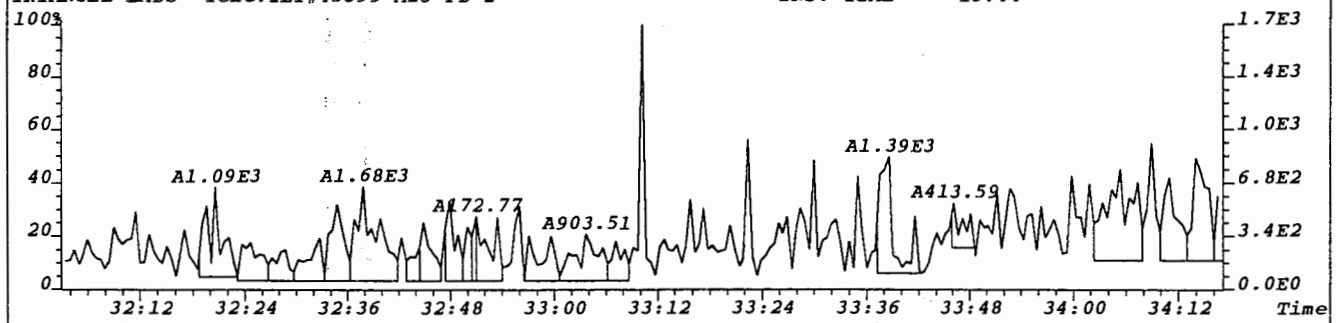
File:S982308 #1-465 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S
445.7555 F:3 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



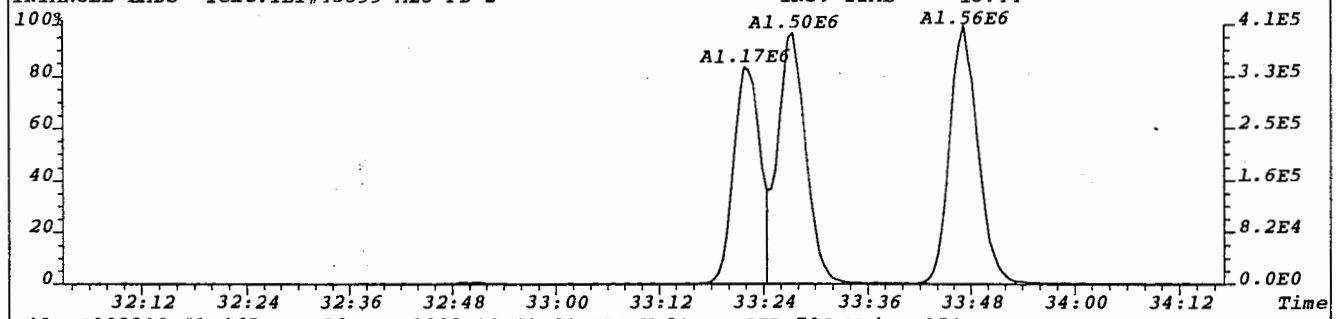
File:S982308 #1-465 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:91
389.8156 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,364.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



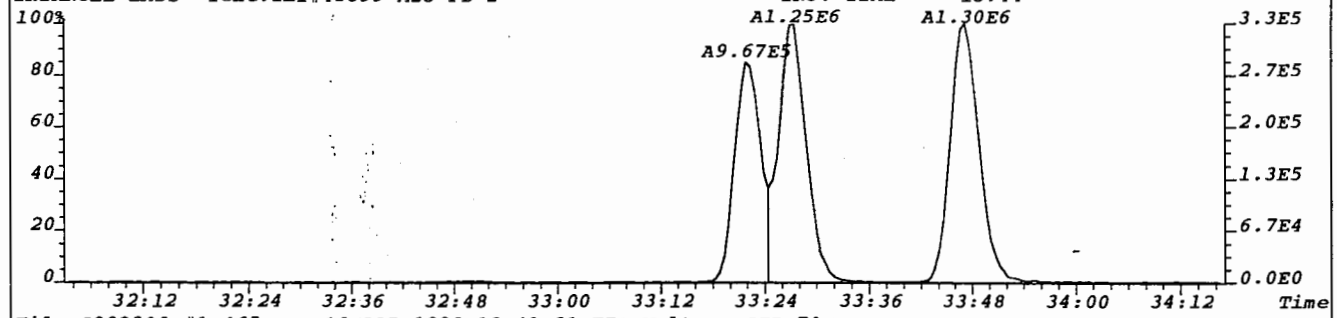
File:S982308 #1-465 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:82
391.8127 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,328.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



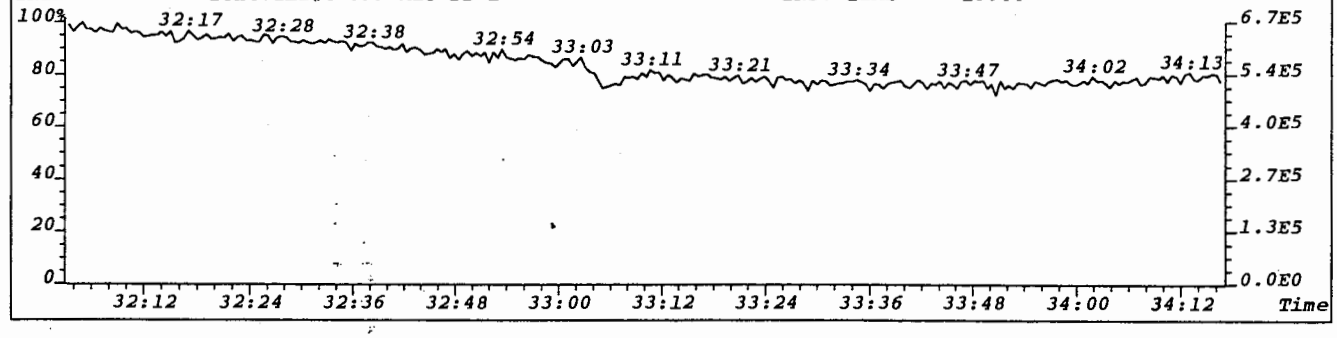
File:S982308 #1-465 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:93
401.8558 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,372.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



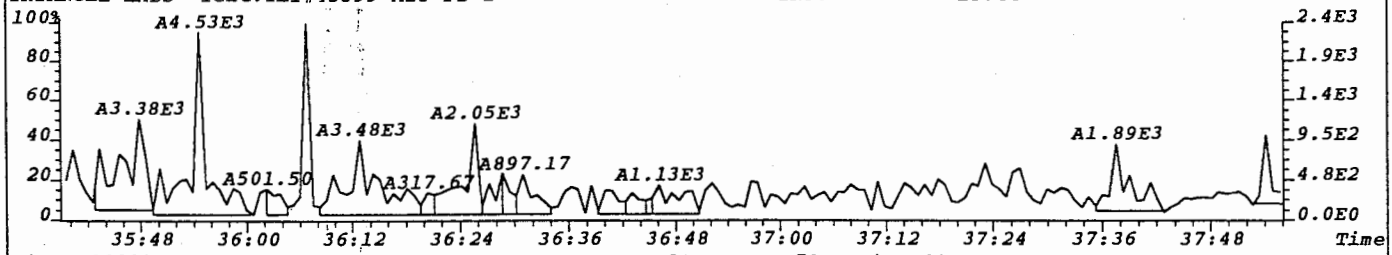
File:S982308 #1-465 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:154
403.8529 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,616.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



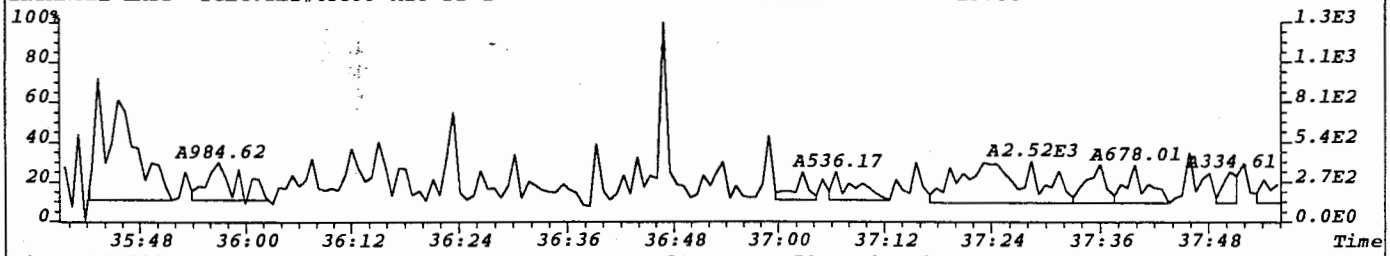
File:S982308 #1-465 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S
392.9760 F:3 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



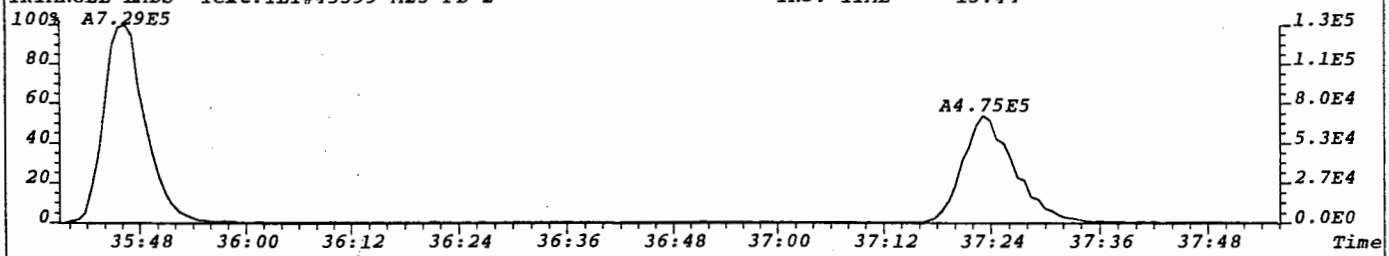
File:S982308 #1-569 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:100
407.7818 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,400.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



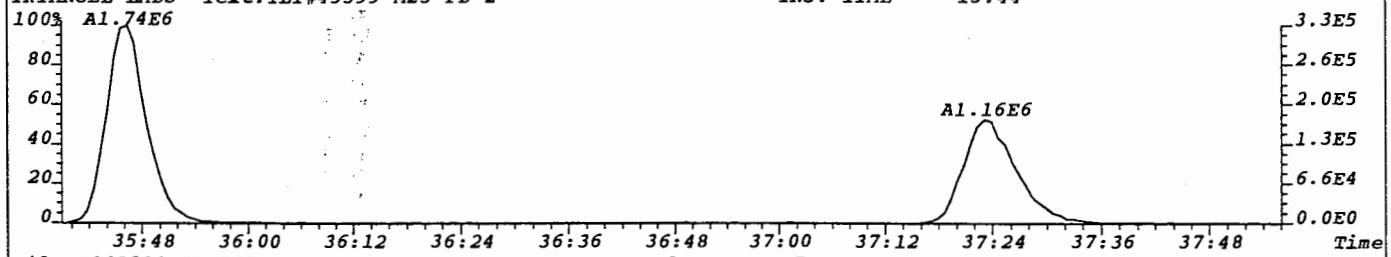
File:S982308 #1-569 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:81
409.7789 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,324.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



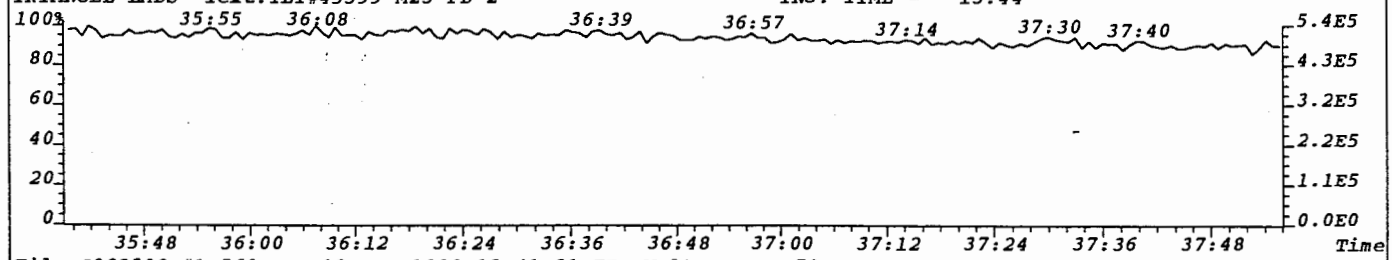
File:S982308 #1-569 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:114
417.8253 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,456.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



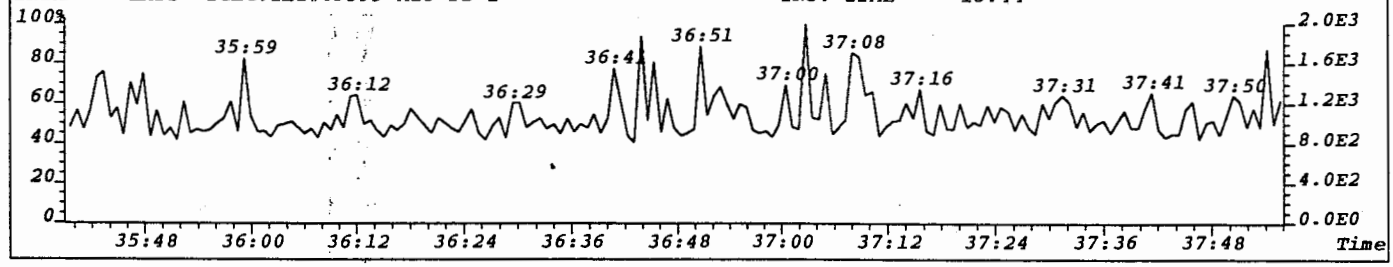
File:S982308 #1-569 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:82
419.8220 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,328.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



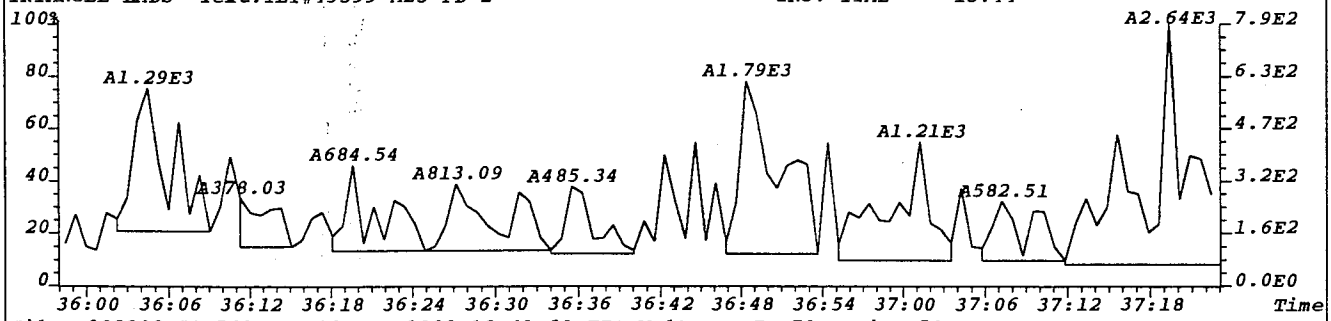
File:S982308 #1-569 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



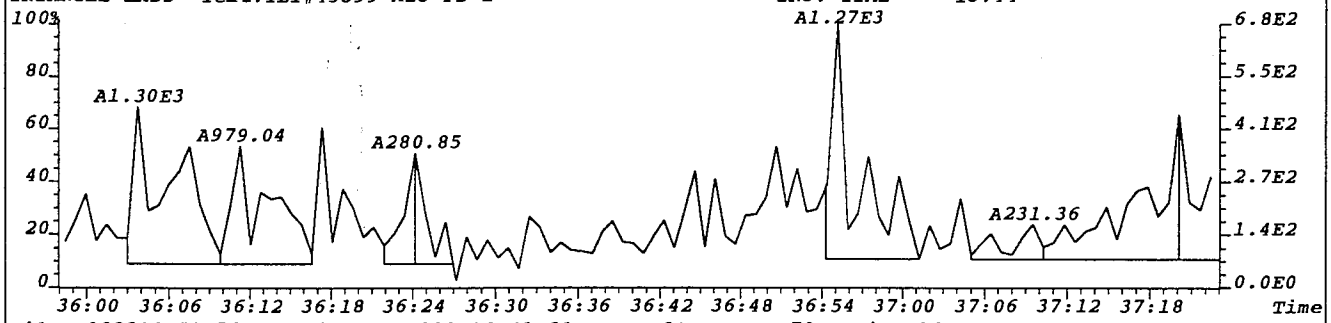
File:S982308 #1-569 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S
479.7165 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



File:S982308 #1-569 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:62
423.7766 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,248.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



File:S982308 #1-569 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:54
425.7737 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,216.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



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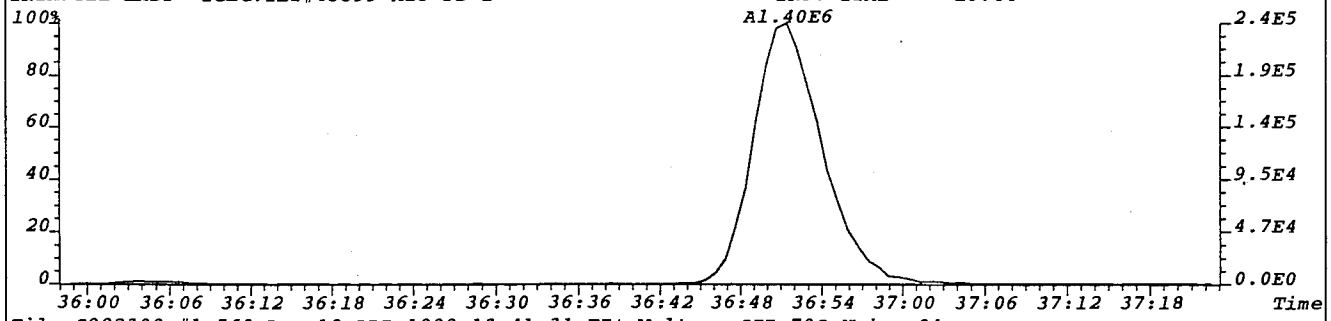
435.8169 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,384.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



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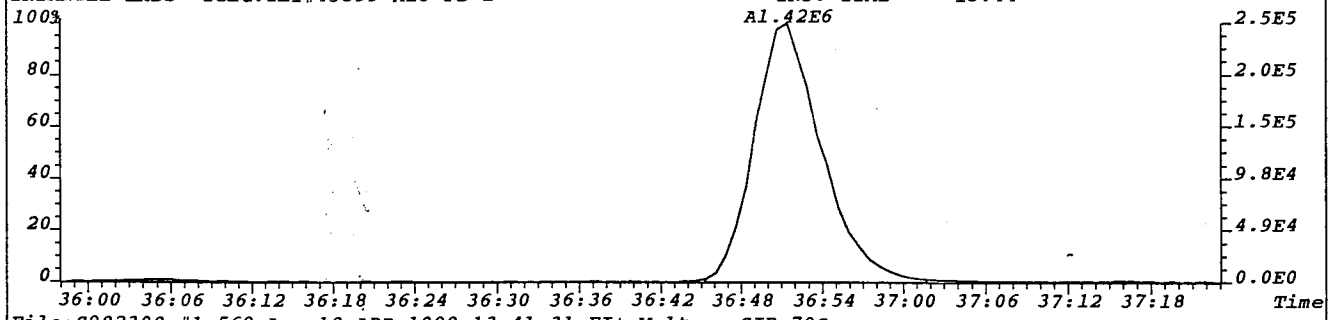
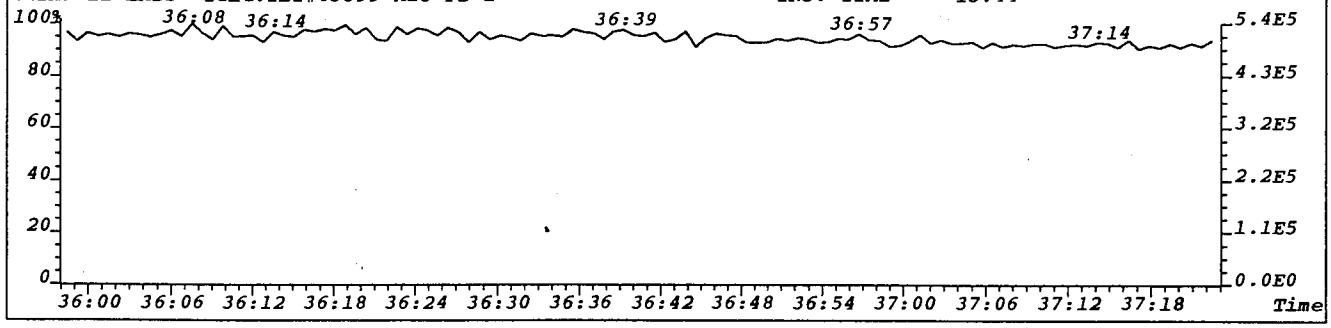
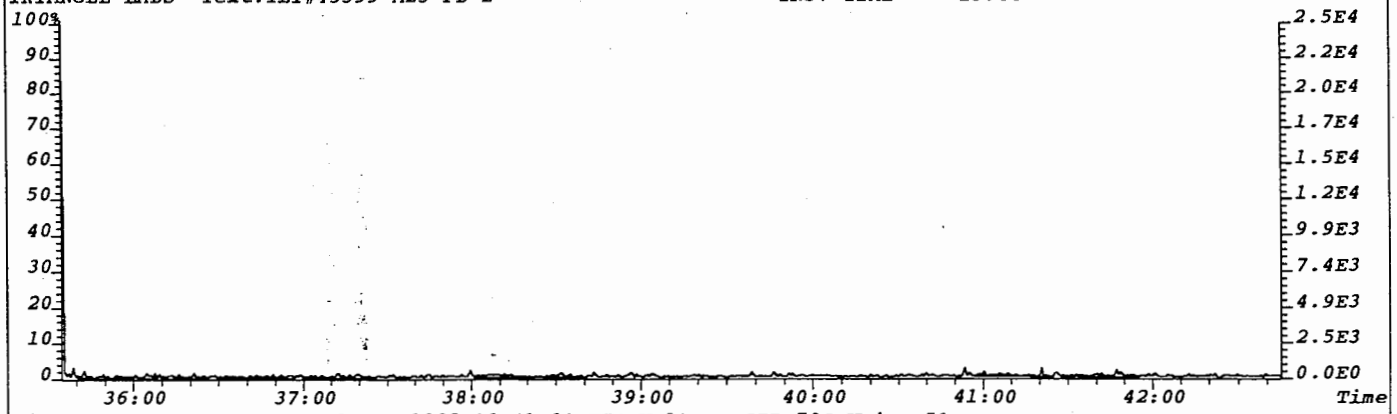
437.8140 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,336.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



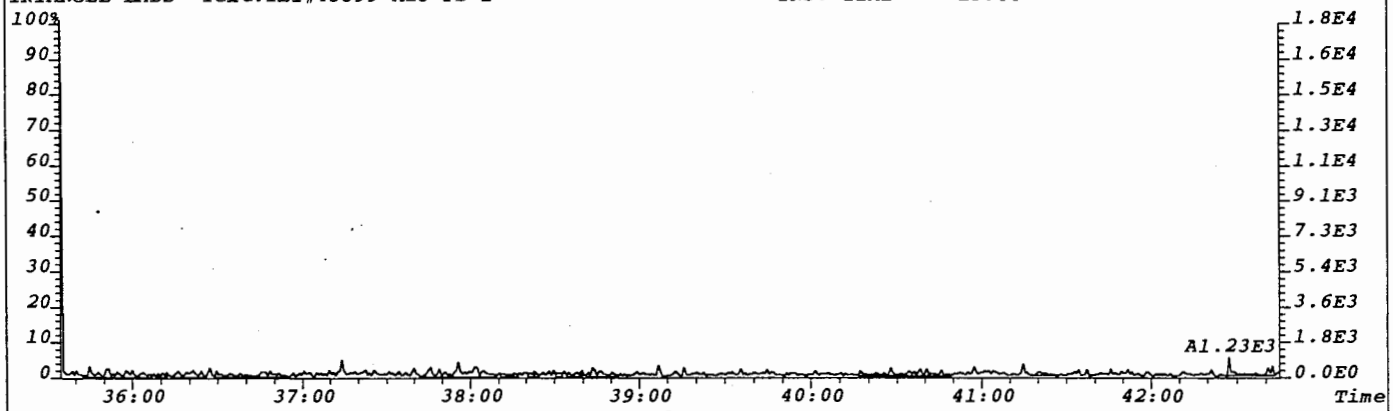
File:S982308 #1-569 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



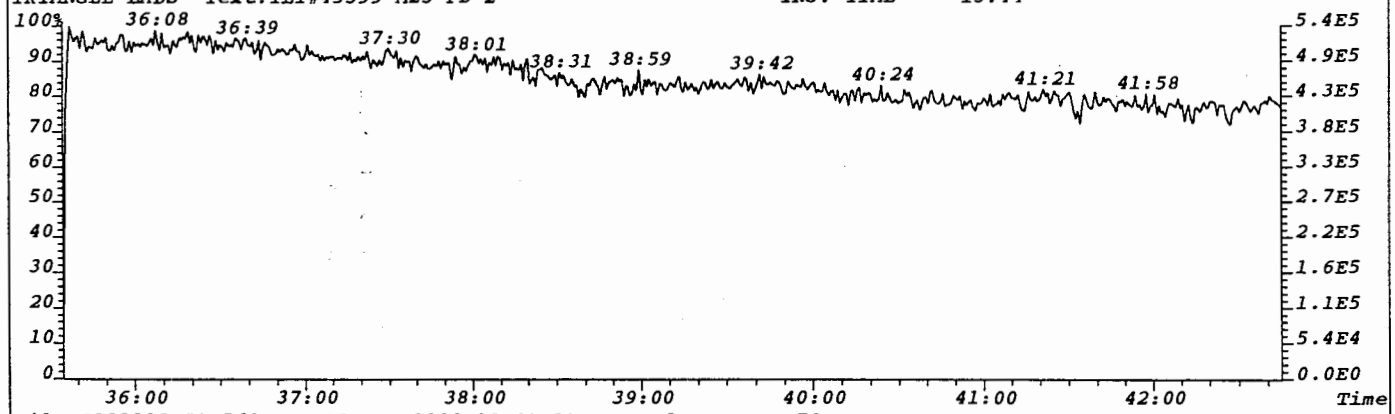
File:S982308 #1-569 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:61
441.7428 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,244.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



File:S982308 #1-569 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:51
443.7399 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,204.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



File:S982308 #1-569 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



File:S982308 #1-569 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S
513.6775 F:4 Exp:NDB5US
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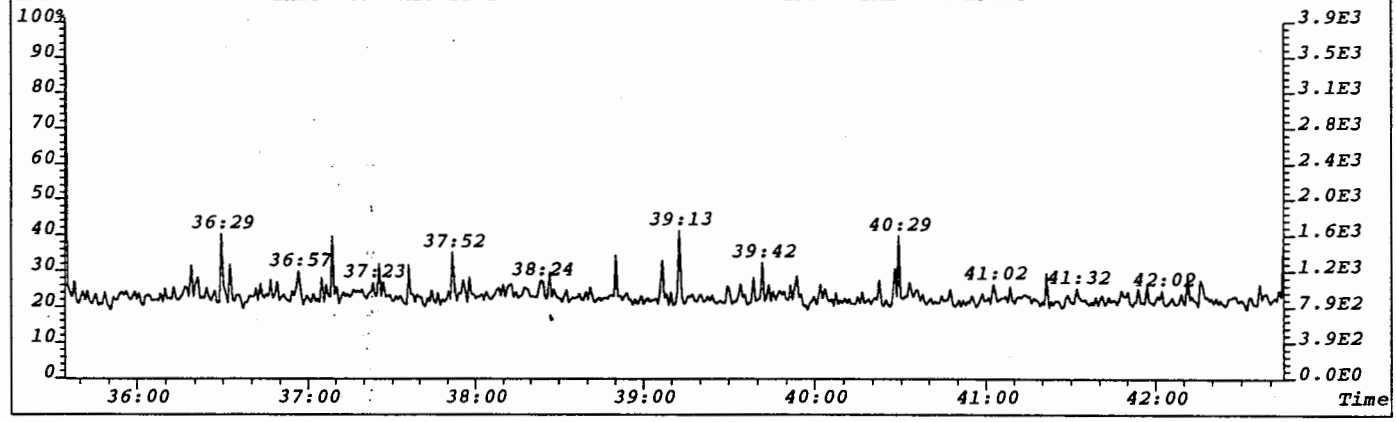

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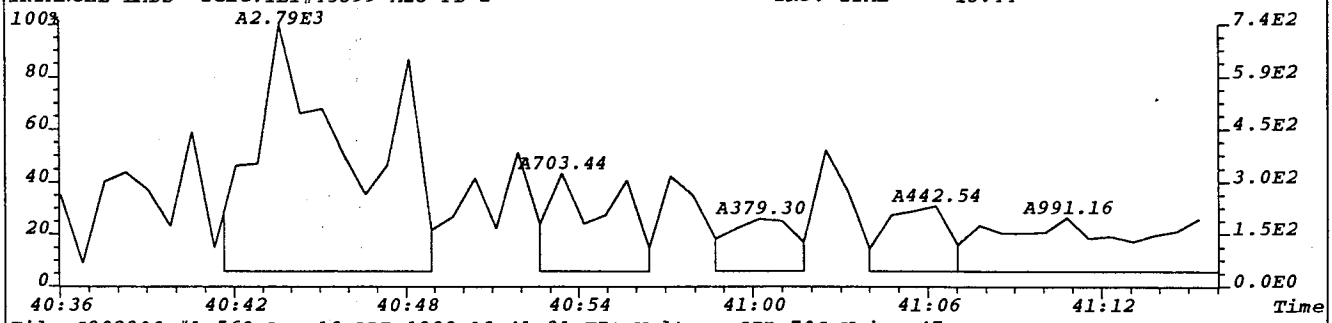
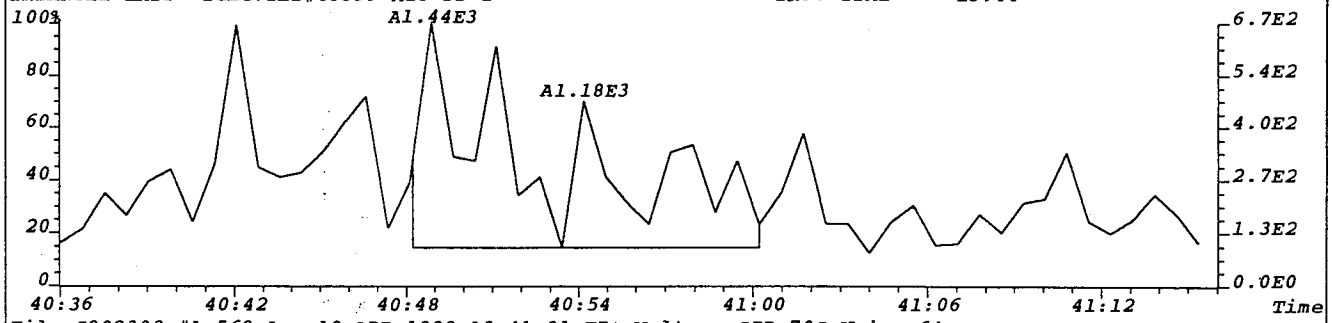
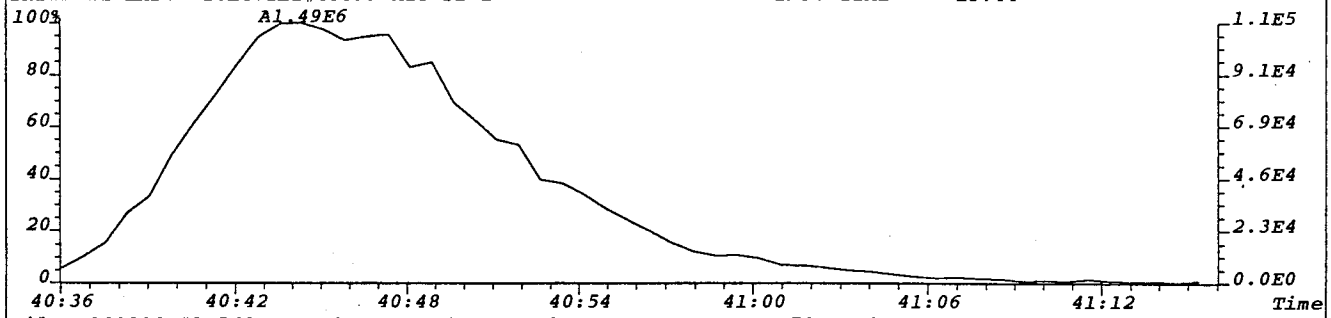
457.7377 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,204.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



File:S982308 #1-569 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:47
459.7348 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,188.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



File:S982308 #1-569 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S Noise:64
469.7779 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,256.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44



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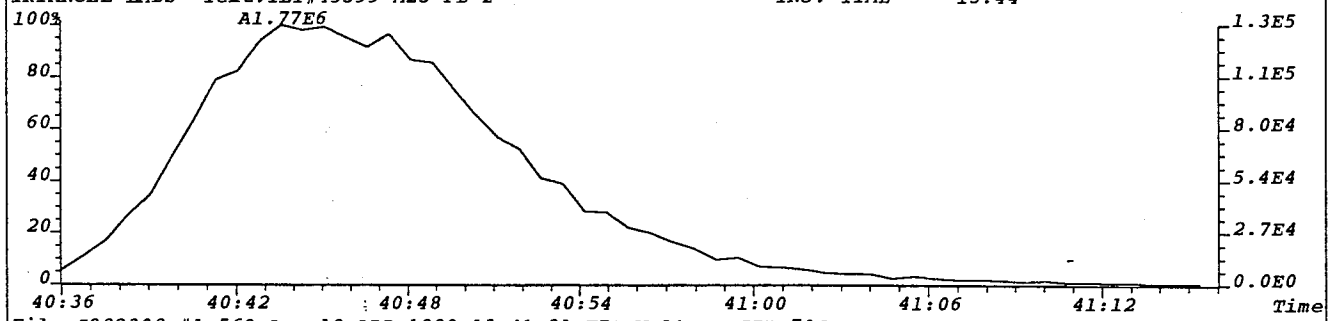
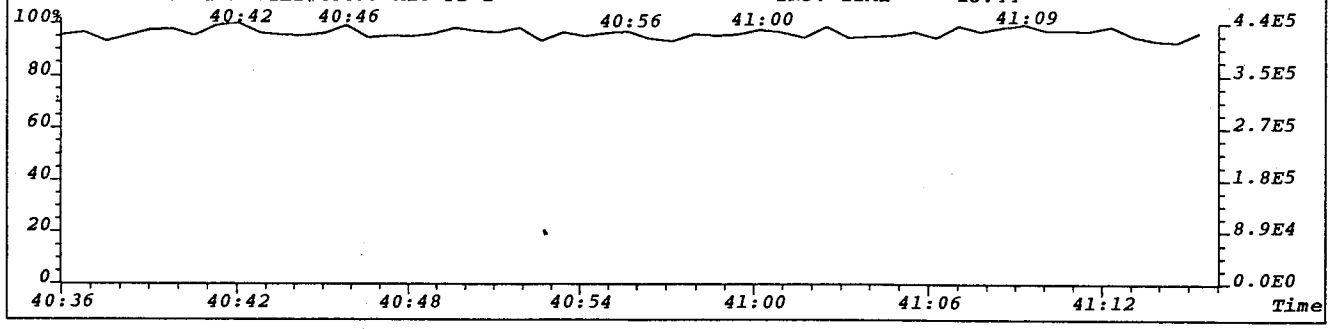
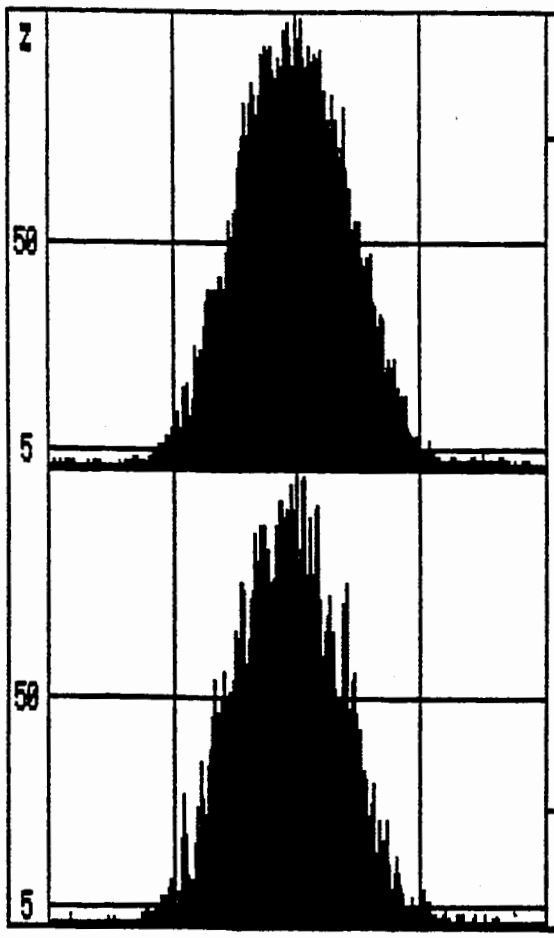


File:S982308 #1-569 Acq:18-APR-1998 13:41:31 EI+ Voltage SIR 70S
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-FB-2 INJ. TIME = 13:44





Channel I 330.9792 Peak top
Height .33 volts Span 200 ppm

System file name	ND85US
Data file name	A:S982304
Resolution	10000
Group number	2
Ionization mode	EI+
Switching	VOLTAGE
Ref. masses	292.9825, 416.9760

A	293	J	331	S	368
B	304	K	332	T	370
C	306	L	334	U	376
D	316	M	340	Y	410
E	318	N	342		
F	320	O	352		
G	322	P	354		
H	328	Q	356		
I	331	R	358		

Ref. mass 416.9760 Peak top
Height .08 volts Span 200 ppm

Pacific Environmental Services

TLI Project: **45399** Method 23 TCDD/TCDF Analysis (DB-225)
Client Sample: **M23-FB-2** Analysis File: **P981319**

Client Project:	**r012.002/Lime Kiln**				
Sample Matrix:	**M23**	Date Received:	**04/01/98**	Spike File:	**SPC2NF04**
TLI ID:	**204-92-10A-D**	Date Extracted:	**04/03/98**	ICal:	**PF24098**
		Date Analyzed:	**04/17/98**	ConCal:	**P981314**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U980780**	% Lipid:	**n/a**
GC Column:	**DB-225**	Analyst:	**KB**	% Solids:	**n/a**

Analytes	Amt. (ng)	DL	EMPC	Ratio	RT	Flags
2,3,7,8-TCDF	ND	0.005				—

Internal Standard	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	2.9	73.7	40%-130%	0.78	22:22	—

Recovery Standard	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.83	21:16	—

Data Reviewer: K 04/20/98

C2NF_PSR v2.02, LARS 6.11.00

Triangle Laboratories, Inc.®
801 Capitola Drive • Durham, North Carolina 27713
Phone: (919) 544-5729 • Fax: (919) 544-5491

Printed: 21:29 04/20/98

Initial ....Date...

Data Review By: K 4/20/98 Calculated Noise Area: 0.10

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 P981319B.dbf
04/20/98 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				0.789-1.101			
304-306	DC	NL		0:00		0.69	0.22			0.000			
304-306			0 Peaks				0.00						
13C12-TCDF						0.65-0.89				0.955-1.045			
316-318	DC	NL		0:00		0.73	0.19			0.000			
	DC	WL		20:31	RO	1.00	0.27			0.917			
	DC	WL		20:57	RO	0.62	1.08			0.937			
	DC	WL		21:13		0.83	5.34			0.949			
				22:22		0.78	188.67	82.73	105.94	1.000	13C12-2378-TCDF	IS0	
	DC	SN		23:02	RO	2.55	0.19			1.030			
	DC	WH		23:26	RO	4.29	0.12			1.048			
	DC	WH		23:38	RO	1.92	0.23			1.057			
	DC	WH		24:25	RO	0.57	1.95			1.092			
316-318			1 Peak				188.67						

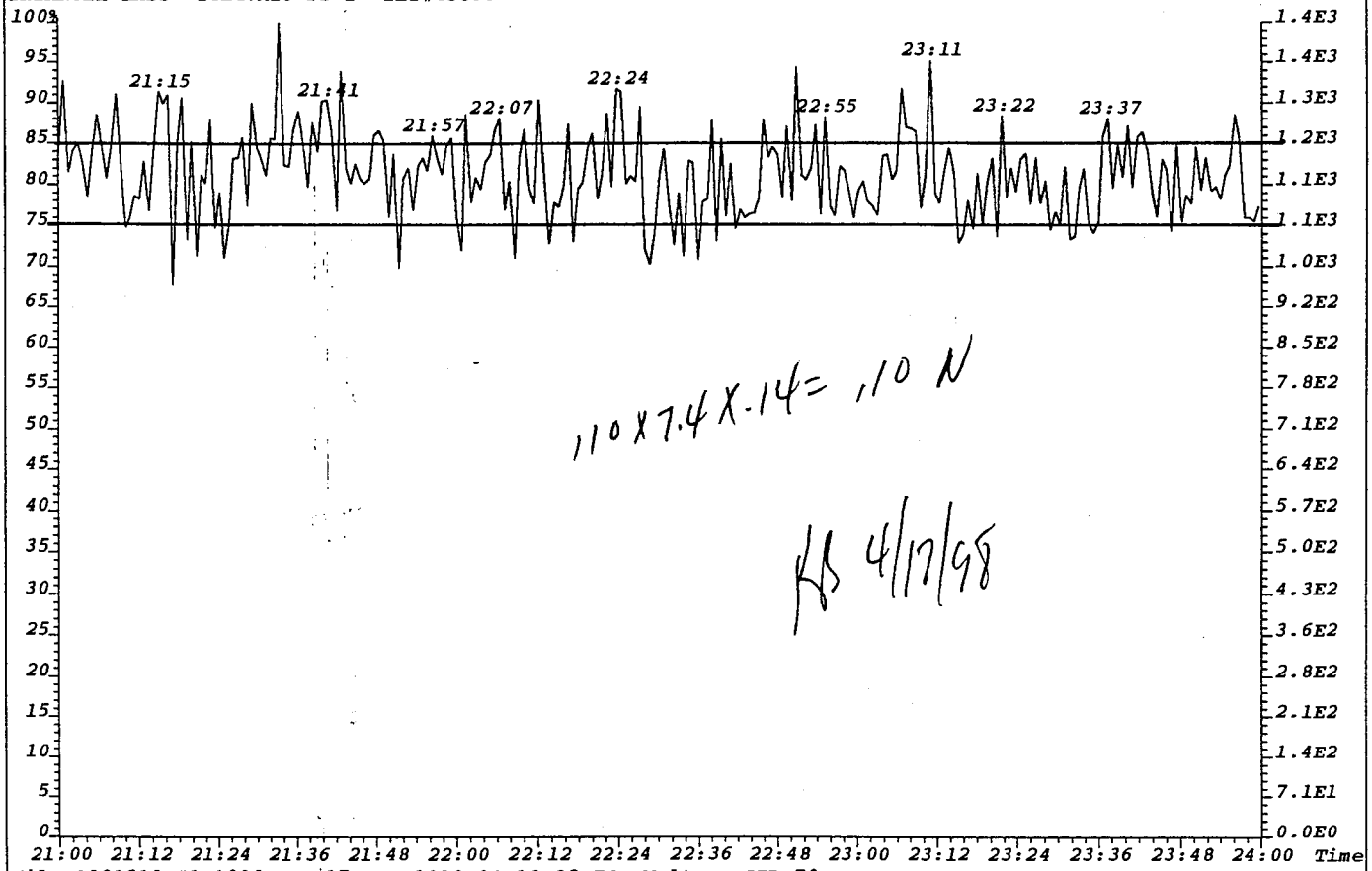
---------- Above: TCDF / TCDD Follows ----------

13C12-TCDD						0.65-0.89				0.905-1.095			
332-334	DC	NL		0:00	RO	1.44	0.16			0.000			
	DC	SN		19:53	RO	0.31	0.11			0.947			
				21:00		0.82	135.18	60.97	74.21	1.000	13C12-2378-TCDD	IS1	
				21:16		0.83	190.53	86.43	104.10	1.013	13C12-1234-TCDD	RS1	
				22:00	RO	1.04	0.97	0.57	0.55	1.048			
332-334			3 Peaks				326.68						

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
		X-Ether Interference

*** End of Report ***

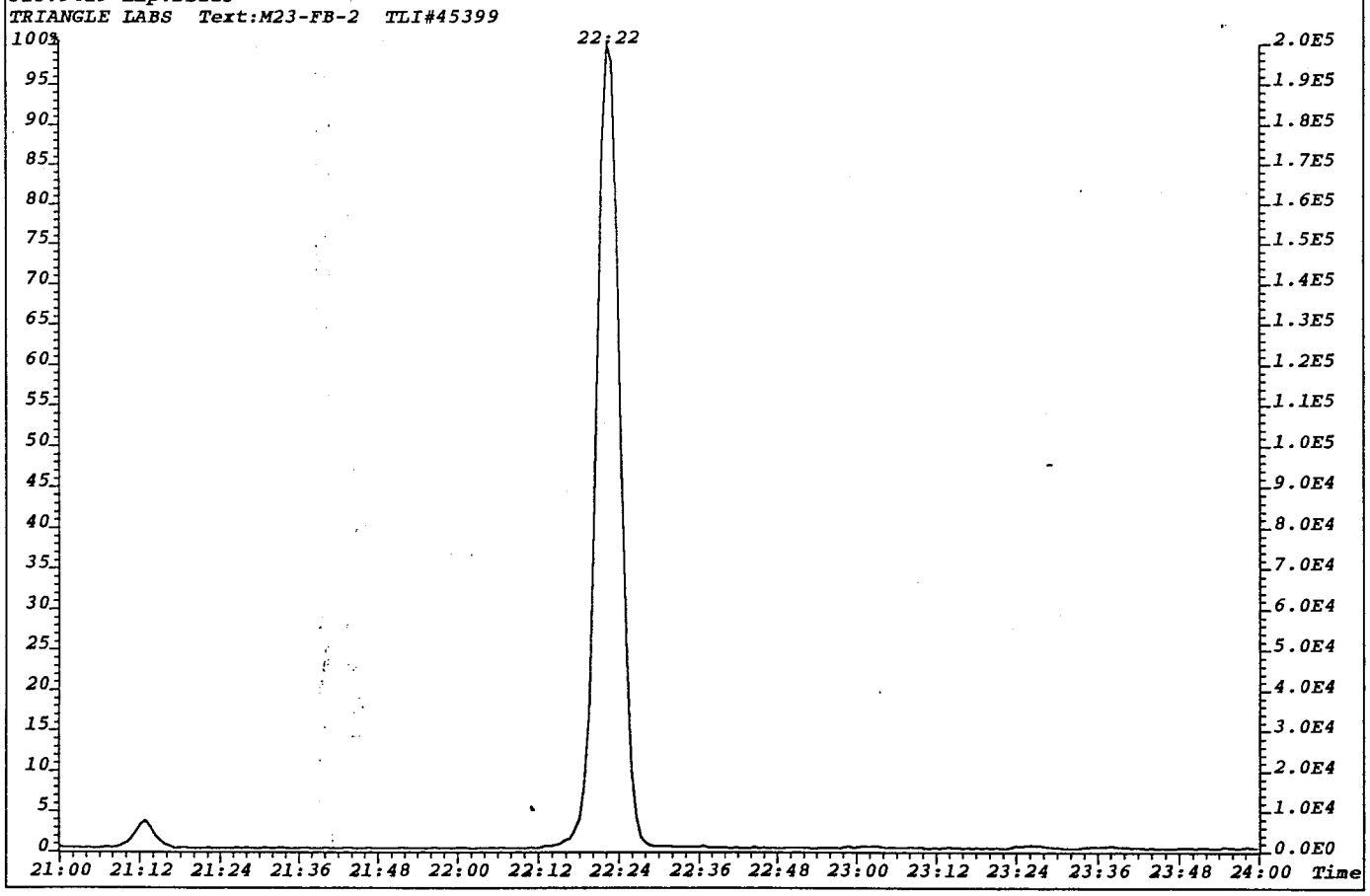
File:P981319 #1-1006 Acq:17-APR-1998 04:18:22 EI+ Voltage SIR 70P
303.9016 Exp:DB225
TRIANGLE LABS Text:M23-FB-2 TLI#45399



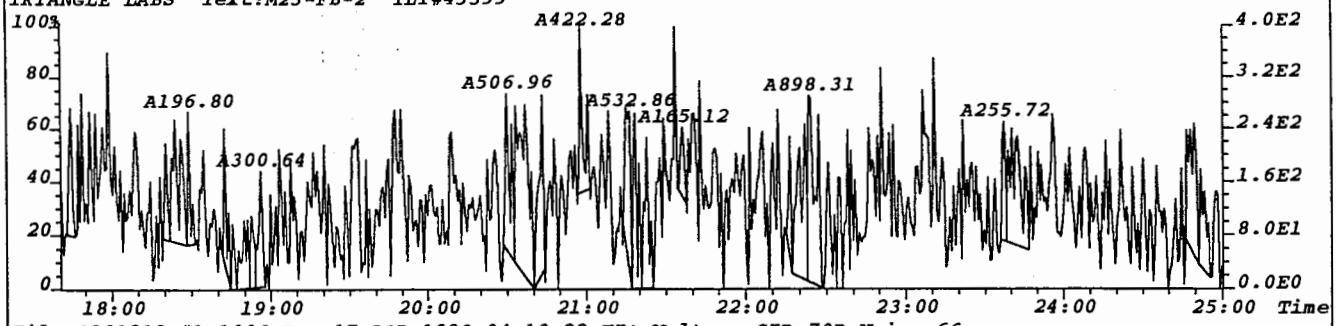
.110 X 7.4 X .14 = .10 N

KB 4/17/98

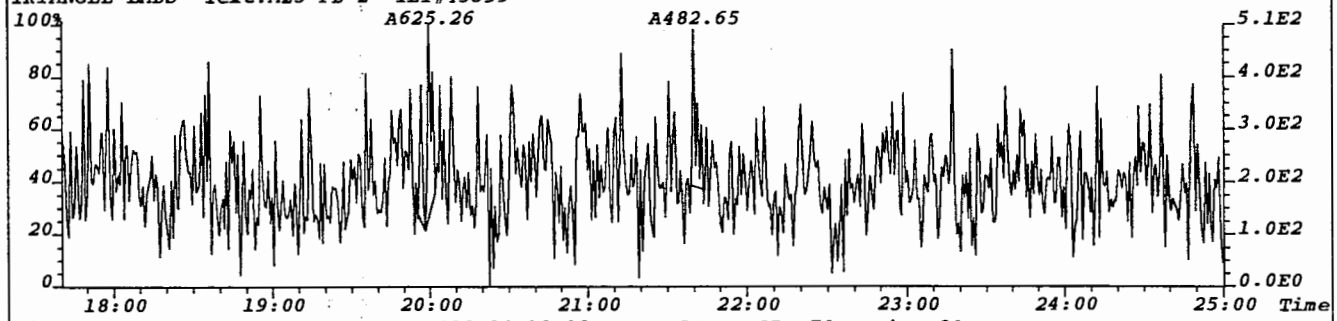
File:P981319 #1-1006 Acq:17-APR-1998 04:18:22 EI+ Voltage SIR 70P
315.9419 Exp:DB225
TRIANGLE LABS Text:M23-FB-2 TLI#45399



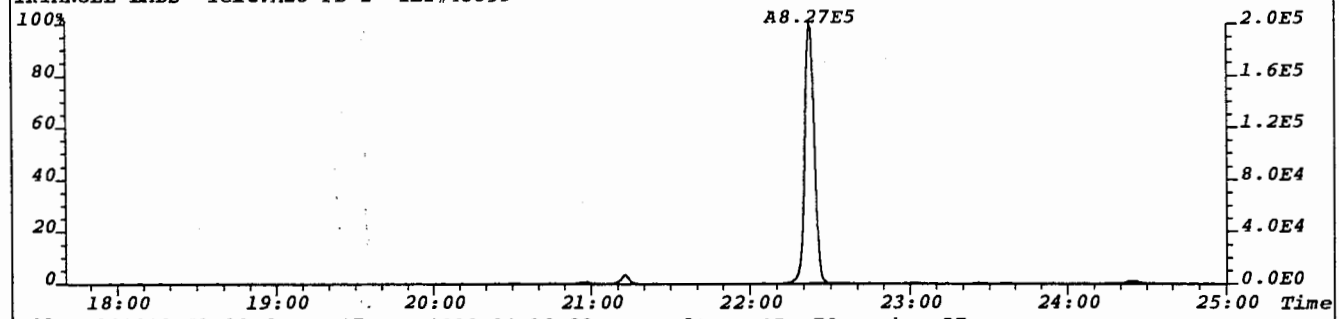
File:P981319 #1-1006 Acq:17-APR-1998 04:18:22 EI+ Voltage SIR 70P Noise:44
303.9016 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,176.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-FB-2 TLI#45399



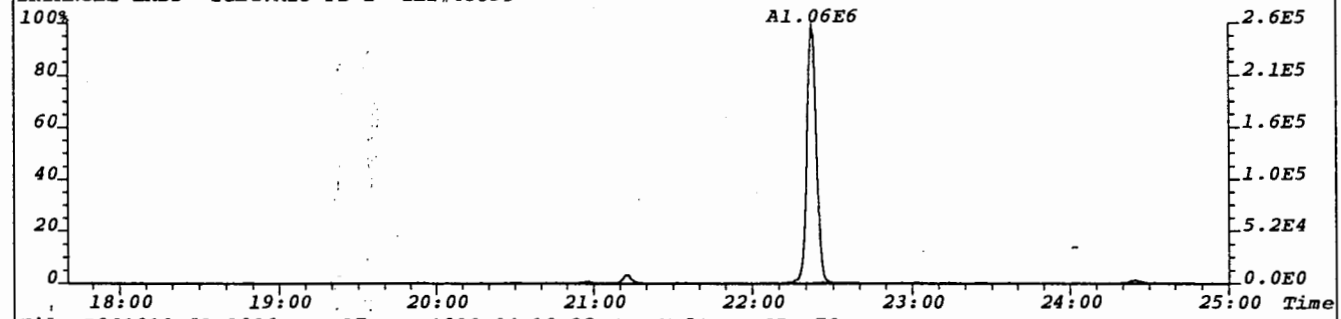
File:P981319 #1-1006 Acq:17-APR-1998 04:18:22 EI+ Voltage SIR 70P Noise:66
305.8987 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,264.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-FB-2 TLI#45399



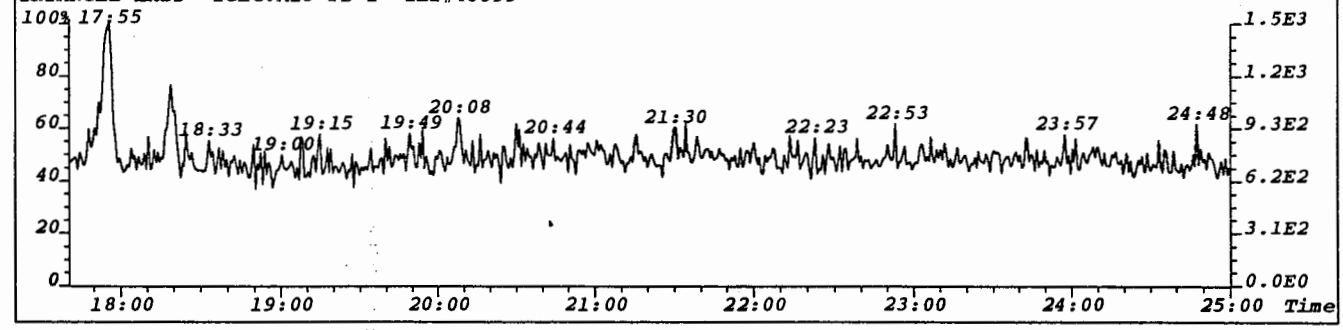
File:P981319 #1-1006 Acq:17-APR-1998 04:18:22 EI+ Voltage SIR 70P Noise:38
315.9419 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,152.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-FB-2 TLI#45399



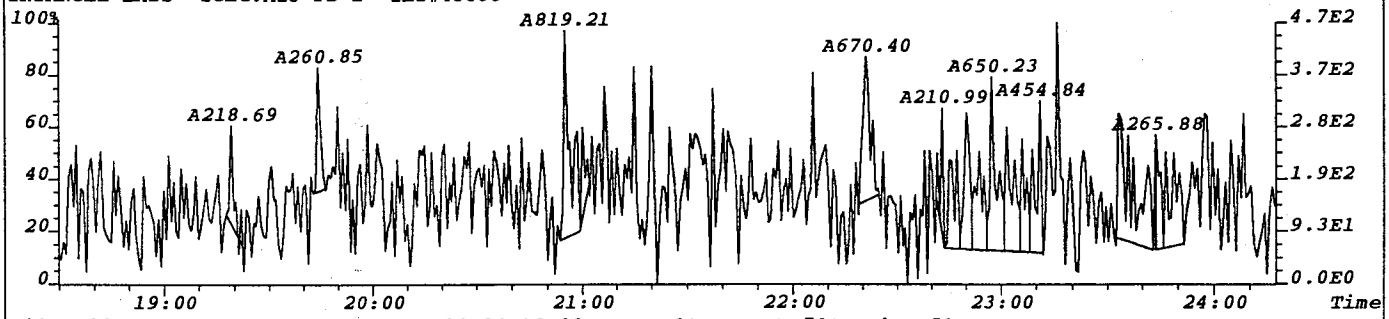
File:P981319 #1-1006 Acq:17-APR-1998 04:18:22 EI+ Voltage SIR 70P Noise:57
317.9389 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,228.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-FB-2 TLI#45399



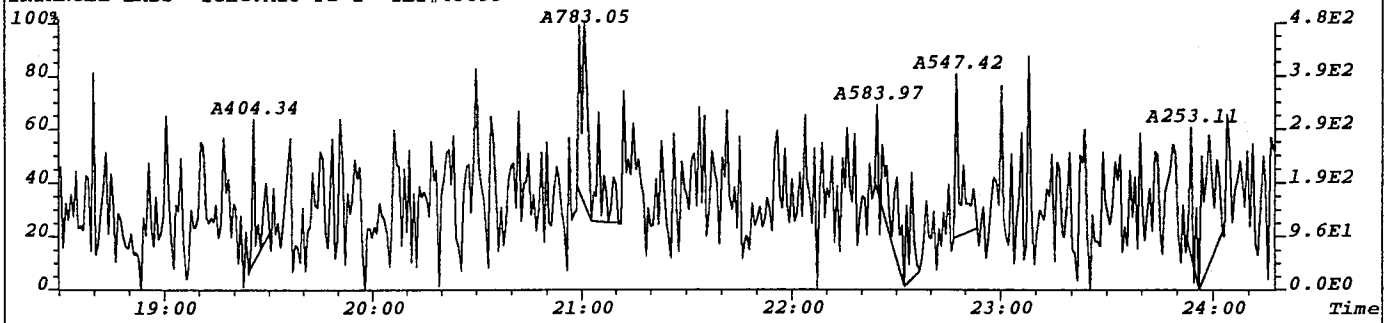
File:P981319 #1-1006 Acq:17-APR-1998 04:18:22 EI+ Voltage SIR 70P
375.8364 Exp:DB225
TRIANGLE LABS Text:M23-FB-2 TLI#45399



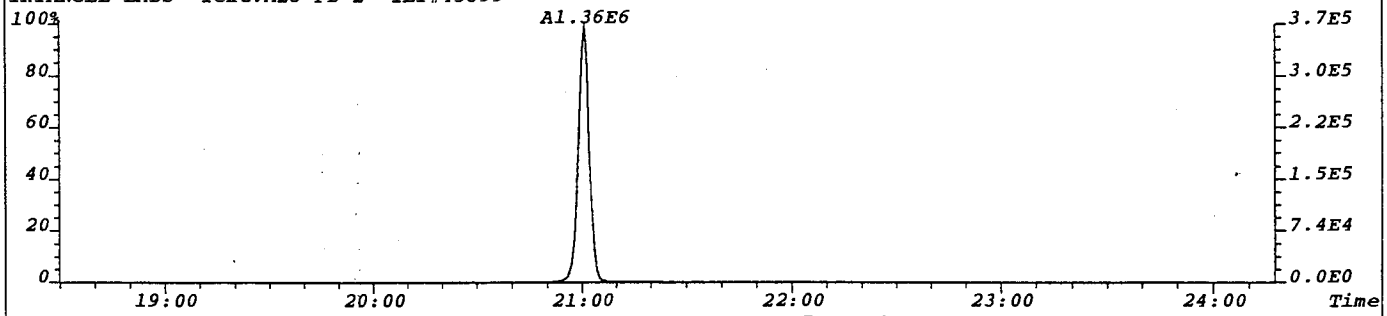
File:P981319 #1-1006 Acq:17-APR-1998 04:18:22 EI+ Voltage SIR 70P Noise:52
319.8965 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,208.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-FB-2 TLI#45399



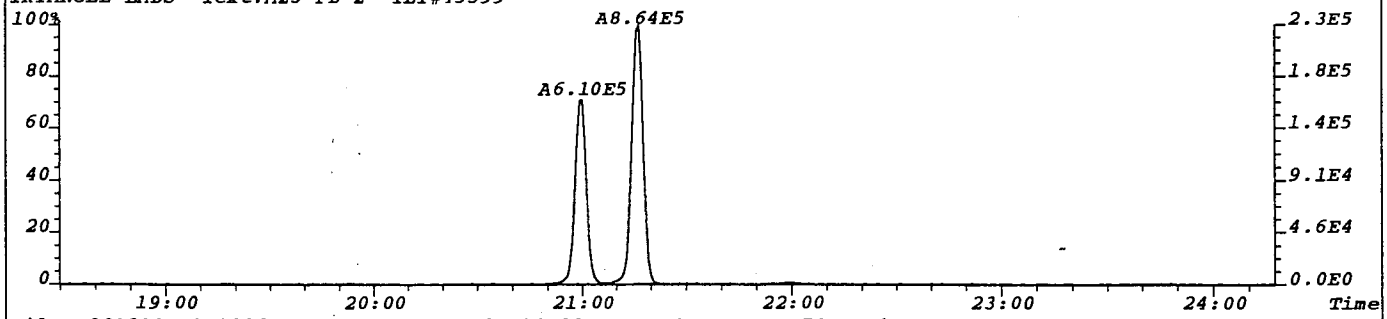
File:P981319 #1-1006 Acq:17-APR-1998 04:18:22 EI+ Voltage SIR 70P Noise:51
321.8936 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,204.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-FB-2 TLI#45399



File:P981319 #1-1006 Acq:17-APR-1998 04:18:22 EI+ Voltage SIR 70P Noise:61
327.8847 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,244.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-FB-2 TLI#45399



File:P981319 #1-1006 Acq:17-APR-1998 04:18:22 EI+ Voltage SIR 70P Noise:64
331.9368 BSUB(256,30,-3.0) PKD(5,3,1,0.10%,256.0,0.00%,F,F) Exp:DB225
TRIANGLE LABS Text:M23-FB-2 TLI#45399



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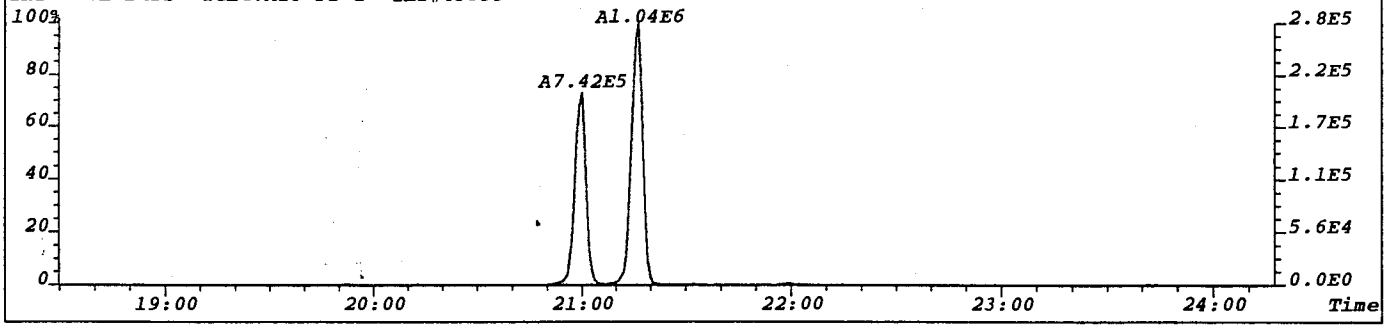
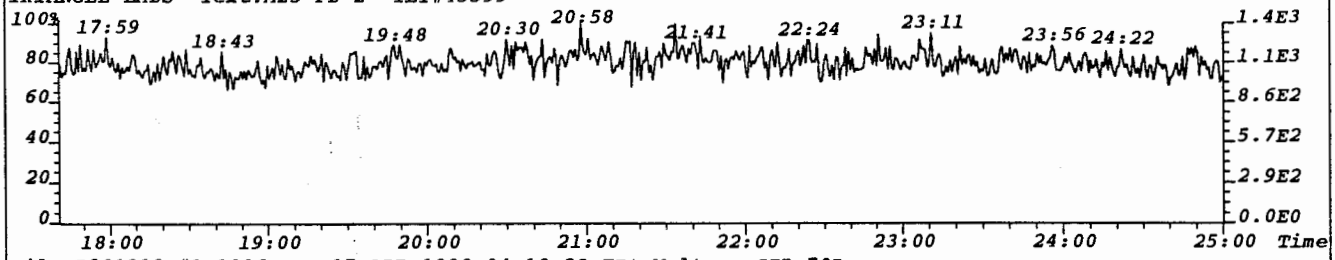
TRIANGLE LABS Text:M23-FB-2 TLI#45399



File:P981319 #1-1006 Acq:17-APR-1998 04:18:22 EI+ Voltage SIR 70P
303.9016 Exp:DB225
TRIANGLE LABS Text:M23-FB-2 TLI#45399



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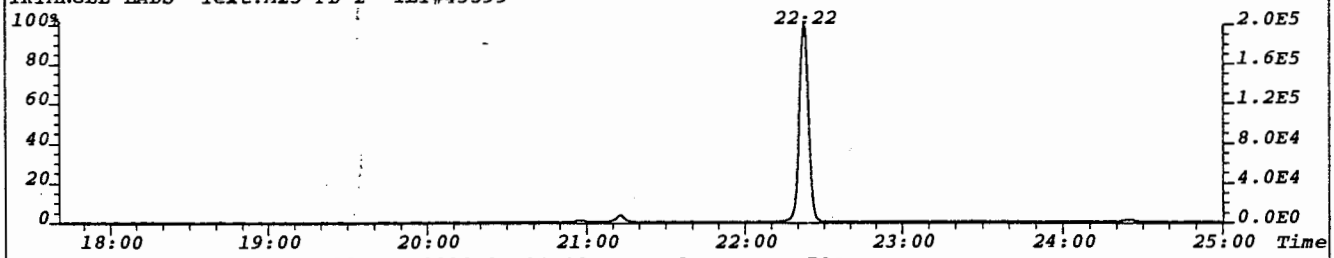

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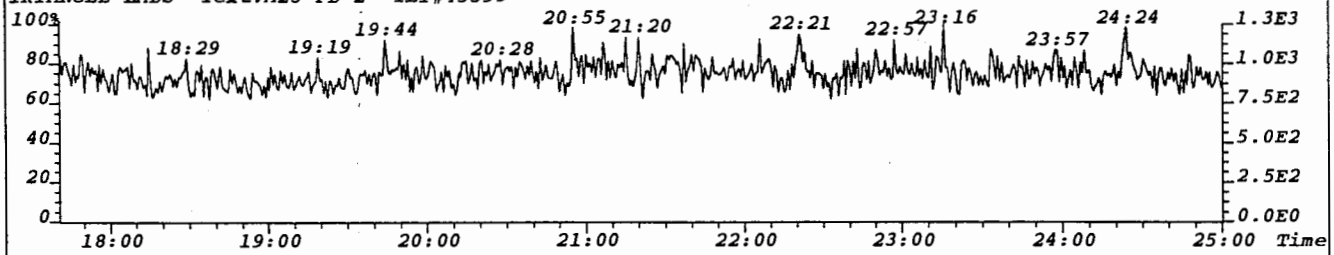

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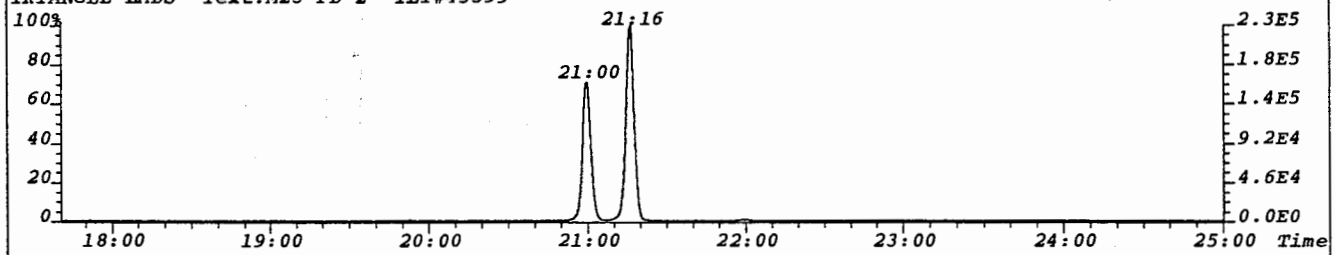

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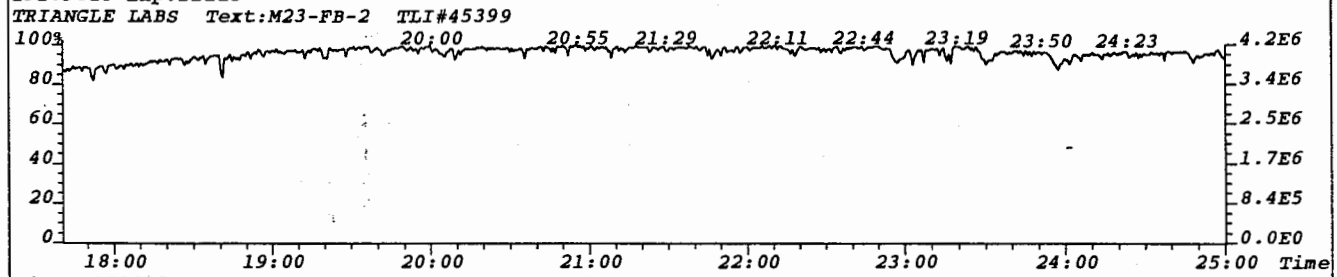
TRIANGLE LABS Text:M23-FB-2 TLI#45399



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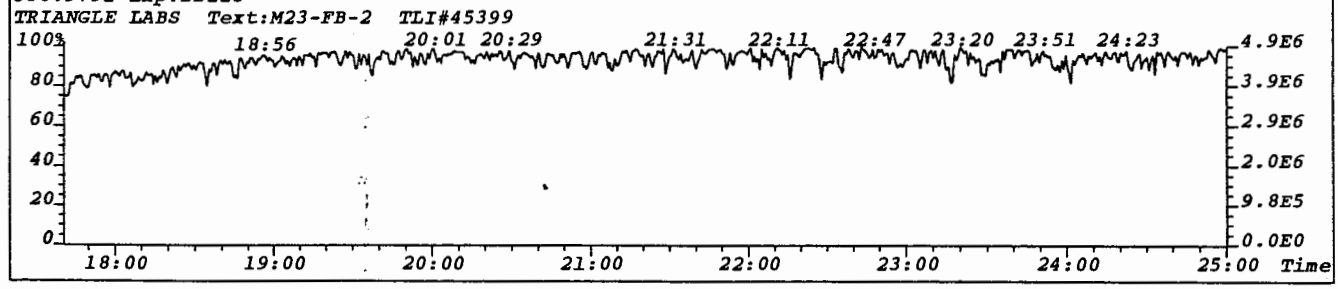
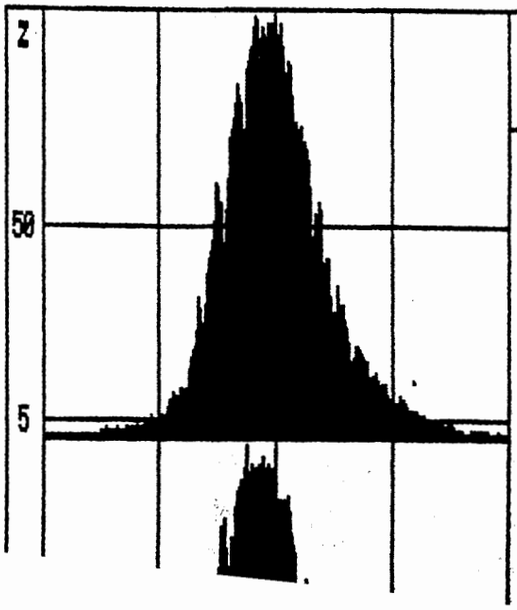
TRIANGLE LABS Text:M23-FB-2 TLI#45399





Ref. mass 292.9825 Peak top
Height .51 volts Span 200 ppm

System file name	D8225
Data file name	A:P981319
Resolution	10000
Group number	1
Ionization mode	EI+
Switching	VOLTAGE
Ref. masses	292.9825, 380.9761

A	292.9825	J	330.9792
B	303.9016	K	331.9368
C	305.8987	L	333.9338
D	315.9419	M	375.8364
E	317.9389		
F	319.9965		

Pages 340 through 357 from the Triangle Laboratories, Inc. analytical report have been excluded by PES since these pages present results for samples collected at another lime kiln facility during the same mobilization.

Pacific Environmental Services

TLI Project: **45399** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **M23-RB-1-4** Analysis File: **S982310**

Client Project:	**r012.002/Lime Kiln**				
Sample Matrix:	**M23**	Date Received:	**04/01/98**	Spike File:	**SPMIT204**
TLI ID:	**204-92-12A-D**	Date Extracted:	**04/03/98**	ICal:	**SF51078**
		Date Analyzed:	**04/18/98**	ConCal:	**S982303**
Sample Size:	**1.000**	Dilution Factor:	**n/a**	% Moisture:	**n/a**
Dry Weight:	**n/a**	Blank File:	**U980780**	% Lipid:	**n/a**
GC Column:	**DB-5**	Analyst:	**DL**	% 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	0.004				—
1,2,3,6,7,8-HxCDD	ND	0.004				—
1,2,3,7,8,9-HxCDD	ND	0.004				—
1,2,3,4,6,7,8-HpCDD	ND	0.004				—
1,2,3,4,6,7,8,9-OCDD	ND	0.005				—
2,3,7,8-TCDF	ND	0.002				—
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	0.003				—
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		0.004		—
Total HpCDD	ND		0.004		—
Total TCDF	ND		0.002		—
Total PeCDF	ND		0.003		—
Total HxCDF	ND		0.003		—
Total HpCDF	ND		0.004		—

MIT2_PSR v1.04, LARS 6.11.00

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Printed: 20:28 04/20/98

Pacific Environmental Services

TLI Project: **45399** Method 23 PCDD/PCDF Analysis (a)
Client Sample: **M23-RB-1-4** Analysis File: **S982310**

Internal Standards	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,7,8-TCDF	2.6	66.0	40%-130%	0.71	25:14	___
$^{13}C_{12}$-2,3,7,8-TCDD	2.4	59.9	40%-130%	0.80	25:57	___
$^{13}C_{12}$-1,2,3,7,8-PeCDF	2.5	62.5	40%-130%	1.57	29:10	___
$^{13}C_{12}$-1,2,3,7,8-PeCDD	3.0	76.1	40%-130%	1.48	30:13	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDF	3.3	81.6	40%-130%	0.50	32:44	___
$^{13}C_{12}$-1,2,3,6,7,8-HxCDD	3.9	97.6	40%-130%	1.21	33:27	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDF	3.3	82.8	25%-130%	0.42	35:44	___
$^{13}C_{12}$-1,2,3,4,6,7,8-HpCDD	4.0	101	25%-130%	1.01	36:52	___
$^{13}C_{12}$-1,2,3,4,6,7,8,9-OCDD	9.2	115	25%-130%	0.85	40:42	___

Surrogate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-2,3,4,7,8-PeCDF	4.0	101	40%-130%	1.53	29:52	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDF	3.3	82.5	40%-130%	0.50	32:38	___
$^{13}C_{12}$-1,2,3,4,7,8-HxCDD	3.3	82.5	40%-130%	1.20	33:22	___
$^{13}C_{12}$-1,2,3,4,7,8,9-HpCDF	3.8	95.2	25%-130%	0.43	37:22	___

Other Standard	Amt. (ng)	% Recovery	QC Limits	RT	Flags
$^{37}Cl_4$-2,3,7,8-TCDD	3.4	83.8	40%-130%	25:58	___

Alternate Standards (Type A)	Amt. (ng)	% Recovery	QC Limits	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,7,8,9-HxCDF	3.5	87.7	40%-130%	0.51	34:03	___
$^{13}C_{12}$-2,3,4,6,7,8-HxCDF	3.6	89.1	40%-130%	0.50	33:15	___

Recovery Standards	Ratio	RT	Flags
$^{13}C_{12}$-1,2,3,4-TCDD	0.79	25:46	___
$^{13}C_{12}$-1,2,3,7,8,9-HxCDD	1.19	33:47	___

Data Reviewer: KU 04/20/98

MIT2_PSR v1.04, LARS 6.11.00

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Printed: 20:28 04/20/98

Initial ....Date...

Data Review By: K 4/20/98 Calculated Noise Area: 0.10

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 S982310B.dbf
04/20/98 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						0.873-1.075			
304-306	DC	NL		0:00	RO	1.23	0.23			0.000			
304-306			0 Peaks				0.00						
13C12-TCDF				0.65-0.89						0.960-1.040			
316-318	DC	NL		0:00	RO	1.00	0.28			0.000			
	DC	WL		23:15	RO	1.46	0.42			0.921			
	DC	WL		24:12		0.71	12.07			0.959			
				24:31		0.88	1.05	0.49	0.56	0.972			
				24:50		0.71	3.00	1.25	1.75	0.984			
				25:14		0.71	434.08	180.06	254.02	1.000	13C12-2378-TCDF	IS0	
				25:40		0.86	1.90	0.88	1.02	1.017			
316-318			4 Peaks				440.03						

---------- Above: TCDF / TCDD Follows ----------

TCDD				0.65-0.89						0.899-1.046			
320-322	DC	NL		0:00	RO	0.90	0.18			0.000			
	DC	SN		23:26	RO	4.00	0.04			0.903			
	DC	SN		23:34	RO	0.43	0.07			0.908			
	DC	SN		23:43		0.67	0.10			0.914			
	DC	SN		23:53	RO	0.40	0.05			0.920			
	DC	SN		24:12		0.83	0.11			0.933			
	DC	SN		24:26	RO	0.18	0.07			0.942			
D	d	SN		24:46	RO	1.00	0.39			0.954			
	DC	SN		25:30	RO	1.20	0.09			0.983			
	DC	SN		25:44	RO	3.75	0.07			0.992			
	DC	SN		25:59	RO	0.37	0.16			1.001	2378-TCDD	AN	
320-322			0 Peaks				0.00						
37Cl-TCDD										0.923-1.077			
328	DC	NL		0:00			0.13			0.000			
				24:35			1.40	1.40		0.947			
	DC	SN		25:07			0.12			0.968			
				25:58			240.64	240.64		1.001	37Cl-TCDD	CLS	
				26:10			0.28	0.28		1.008			
				27:27			0.16	0.16		1.058			
328			4 Peaks				242.48						
13C12-TCDD				0.65-0.89						0.923-1.077			
332-334	DC	NL		0:00	RO	1.27	0.27			0.000			
				24:46	RO	0.94	1.54	0.82	0.87	0.954			
				25:46		0.79	458.13	202.61	255.52	0.993	13C12-1234-TCDD	RS1	
				25:57		0.80	302.52	134.10	168.42	1.000	13C12-2378-TCDD	IS1	

```
Compound/
M_Z.... QC.Log Omit Why ..RT. OK Ratio Total.Area... Area.Peak.1.. Area.Peak.2.. Rel.RT Compound.Name.. ID.. Flags.

                        26:17     0.89          4.44          2.09          2.35  1.013
332-334               4 Peaks                   766.63

              ---------------------- Above: TCDD / PeCDF Follows --------------------

PeCDF                          1.32-1.78                                   0.928-1.063
340-342         DC  NL   0:00 RO  1.00          0.13                            0.000
                DC  SN  29:20     1.75          0.11                            1.006
                DC  SN  29:30 RO  0.17          0.12                            1.011
                DC  SN  29:39 RO  0.50          0.05                            1.017
                DC  SN  29:45 RO  0.60          0.10                            1.020
                DC  SN  29:54 RO  0.73          0.13                            1.025 23478-PeCDF     AN
                DC  SN  30:08 RO  0.38          0.05                            1.033
340-342               0 Peaks                     0.00

13C12-PeCDF                    1.32-1.78                                   0.863-1.137
352-354         DC  NL   0:00 RO  1.11          0.16                            0.000
                        28:19     1.51         18.55         11.15          7.40  0.971
                        28:47 RO  1.80          0.89          0.63          0.35  0.987
                        29:10     1.57        308.06        188.06        120.00  1.000 13C12-PeCDF 123 IS2
                        29:20 RO  0.89          1.28          0.78          0.88  1.006
                        29:27     1.34          2.78          1.59          1.19  1.010
                        29:52     1.53        301.10        182.19        118.91  1.024 13C12-PeCDF 234 SUR1
                        30:14 RO  1.09          0.41          0.25          0.23  1.037
                        30:49 RO  1.00          0.92          0.56          0.56  1.057
352-354               8 Peaks                   633.99

              --------------------- Above: PeCDF / PeCDD Follows --------------------

PeCDD                          1.32-1.78                                   0.937-1.022
356-358         DC  NL   0:00 RO  1.00          0.13                            0.000
                DC  SN  29:37 RO  2.00          0.13                            0.980
                DC  SN  29:49 RO  1.22          0.18                            0.987
356-358               0 Peaks                     0.00

13C12-PeCDD                    1.32-1.78                                   0.868-1.132
368-370         DC  NL   0:00 RO  0.89          0.13                            0.000
                        29:07 RO  1.00          0.48          0.29          0.29  0.964
                        29:17 RO  2.74          0.59          0.63          0.23  0.969
                        30:13     1.48        208.19        124.24         83.95  1.000 13C12-PeCDD 123 IS3
                        30:20     1.44         17.71         10.45          7.26  1.004
                DC  SN  30:45 RO  2.11          0.23                            1.018
368-370               4 Peaks                   226.97

              ---------------------- Above: PeCDD / HxCDF Follows --------------------

HxCDF                          1.05-1.43                                   0.963-1.048
374-376         DC  NL   0:00 RO  0.90          0.16                            0.000
                DC  SN  31:50 RO  2.00          0.16                            0.973
                DC  SN  32:15 RO  0.67          0.04                            0.985
                DC  SN  32:20 RO  0.33          0.02                            0.988
                DC  SN  33:02 RO  1.50          0.04                            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		33:05		1.38	0.19			1.011			
	DC	WH		34:34	RO	0.40	0.04			1.056			
	DC	WH		34:38	RO	3.50	0.04			1.058			
374-376			0	Peaks			0.00						
13C12-HxCDF				0.43-0.59						0.878-1.122			
384-386	DC	NL		0:00	RO	0.87	0.23			0.000			
				31:40	RO	0.60	3.47	1.37	2.30	0.967			
				31:47		0.54	6.79	2.39	4.40	0.971			
				32:38		0.50	254.40	84.46	169.94	0.997	13C12-HxCDF 478		SUR2
				32:44		0.50	303.42	101.46	201.96	1.000	13C12-HxCDF 678		IS4
	DC	SN		32:58	RO	0.23	0.18			1.007			
	DC	SN		33:01	RO	0.27	0.09			1.009			
	DC	SN		33:03	RO	0.18	0.18			1.010			
				33:15		0.50	327.85	109.60	218.25	1.016	13C12-HxCDF 234		ALT2
				33:29	RO	0.42	0.56	0.19	0.45	1.023			
	DC	SN		33:32	RO	0.69	0.20			1.024			
				34:03		0.51	259.19	87.04	172.15	1.040	13C12-HxCDF 789		ALT1
				34:22	RO	0.67	0.32	0.14	0.21	1.050			
384-386			8	Peaks			1,156.00						

---------- Above: HxCDF / HxCDD Follows ----------

HxCDD				1.05-1.43						0.958-1.014			
390-392	DC	NL		0:00		1.29	0.16			0.000			
	DC	SN		32:26	RO	3.00	0.04			0.970			
	DC	SN		32:34	RO	1.00	0.07			0.974			
D	d	SN		32:38	RO	1.00	0.25			0.976			
	DC	SN		32:43	RO	2.13	0.18			0.978			
	DC	SN		32:49		1.20	0.22			0.981			
	DC	SN		32:58	RO	0.60	0.05			0.986			
	DC	SN		33:03	RO	0.70	0.13			0.988			
	DC	SN		33:09	RO	0.75	0.05			0.991			
	DC	SN		33:17	RO	2.44	0.20			0.995			
390-392			0	Peaks			0.00						
13C12-HxCDD				1.05-1.43						0.970-1.030			
402-404	DC	NL		0:00	RO	1.56	0.20			0.000			
				32:50	RO	1.46	1.57	1.02	0.70	0.982			
				33:22		1.20	199.35	108.74	90.61	0.998	13C12-HxCDD 478		SUR3
				33:27		1.21	262.94	143.85	119.09	1.000	13C12-HxCDD 678		IS5
				33:47		1.19	291.63	158.76	132.87	1.010	13C12-HxCDD 789		RS2
				34:01		1.39	0.86	0.50	0.36	1.017			
				34:13	RO	1.94	0.38	0.33	0.17	1.023			
402-404			6	Peaks			756.73						

---------- Above: HxCDD / HpCDF Follows ----------

HpCDF				0.88-1.20						0.997-1.051			
408-410	DC	NL		0:00	RO	0.81	0.26			0.000			
	DC	SN		35:50	RO	2.75	0.08			1.003			
D	d	SN		35:55		0.90	0.40			1.005			

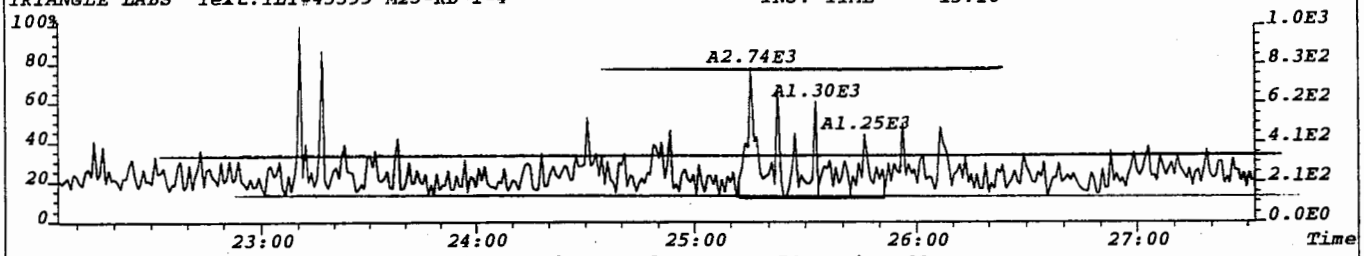
```
Compound/
M_Z.... QC.Log Omit Why ..RT. OK Ratio Total.Area.... Area.Peak.1.. Area.Peak.2.. Rel.RT Compound.Name.. ID.. Flags.

408-410                0 Peaks                  0.00

13C12-HpCDF                     0.37-0.51                                    0.944-1.112
418-420          DC  NL   0:00 RO  0.93          0.22                              0.000
                         35:44     0.42        204.45         60.09        144.36  1.000 13C12-HpCDF 678 IS6
                         36:07 RO  0.95          0.32          0.21          0.22  1.011
                         37:22     0.43        155.83         46.84        108.99  1.046 13C12-HpCDF 789 SUR4
418-420                3 Peaks                  360.60

                 ---------------------- Above: HpCDF / HpCDD Follows ---------------------

HpCDD                           0.88-1.20                                    0.976-1.005
424-426          DC  NL   0:00 RO  1.25          0.16                              0.000
                 DC  SN  36:13 RO  4.50          0.04                              0.982
                 DC  SN  37:02 RO  0.67          0.08                              1.005
424-426                0 Peaks                    0.00

13C12-HpCDD                     0.88-1.20                                    0.973-1.027
436-438          DC  NL   0:00     1.14          0.30                              0.000
                         36:04     0.94          2.41          1.17          1.24  0.978
                         36:52     1.01        217.46        109.39        108.07  1.000 13C12-HpCDD 678 IS7
436-438                2 Peaks                  219.87

                 ---------------------- Above: HpCDD / Octa-CDD and CDF Follows ----------

OCDF                            0.76-1.02                                    0.902-1.098
442-444          DC  NL   0:00     1.00          0.16                              0.000
                 DC  WL  36:37 RO  0.75          0.19                              0.900
                 DC  SN  37:50 RO  0.75          0.13                              0.930
                 DC  SN  37:55 RO  3.50          0.04                              0.932
                 DC  SN  38:01 RO  1.67          0.17                              0.934
                 DC  SN  38:38 RO  0.40          0.04                              0.949
                 DC  SN  38:43 RO  2.00          0.09                              0.951
                 DC  SN  38:50 RO  0.19          0.06                              0.954
                 DC  SN  39:08 RO  0.71          0.11                              0.962
                 DC  SN  39:15 RO  0.10          0.02                              0.964
                 DC  SN  39:18 RO  0.31          0.08                              0.966
442-444                0 Peaks                    0.00

OCDD                            0.76-1.02                                    0.902-1.098
458-460          DC  NL   0:00     1.00          0.16                              0.000
                 DC  SN  40:41 RO  6.50          0.04                              1.000 OCDD            AN
                 DC  SN  40:54 RO  0.75          0.06                              1.005
                 DC  SN  40:54 RO  0.43          0.06                              1.005
                 DC  SN  41:06 RO  0.50          0.08                              1.010
                 DC  SN  41:12 RO  0.50          0.02                              1.012
458-460                0 Peaks                    0.00

13C12-OCDD                      0.76-1.02                                    0.996-1.004
470-472          DC  NL   0:00 RO  1.13          0.15                              0.000
                         40:42     0.85        337.69        154.89        182.80  1.000 13C12-OCDD      IS8
470-472                1 Peak                   337.69
```

Compound/
M_Z.... QC.Log Omit Why ..RT. OK Ratio Total.Area... Area.Peak.1.. Area.Peak.2.. Rel.RT Compound.Name.. ID.. Flags.

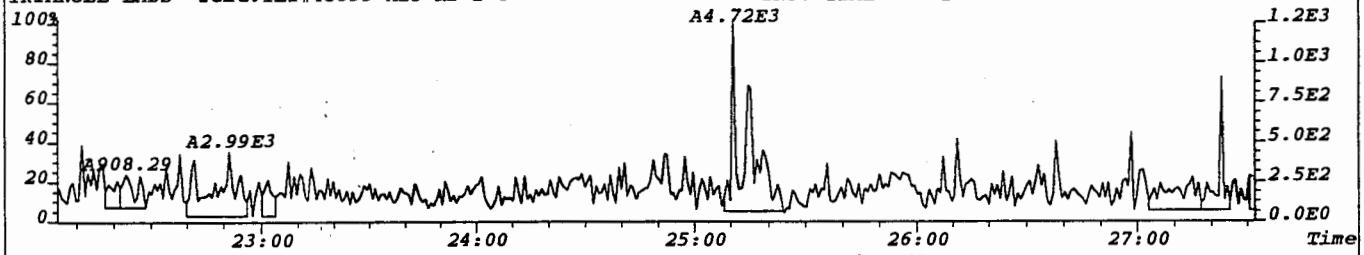
Column Description.....	"Why" Code Description.....	QC Log Desc.....
M_Z -Nominal Ion Mass(es)	WL-Below Retention Time Window	A-Peak Added
..RT. -Retention Time (mm:ss)	WH-Above Retention Time Window	K-Peak Kept
Rat.1 -Ratio of M/M+2 Ions	SN-Below Signal to Noise Level	D-Peak Deleted
OK -RO=Ratio Outside 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
		X-Ether Interference

*** End of Report ***

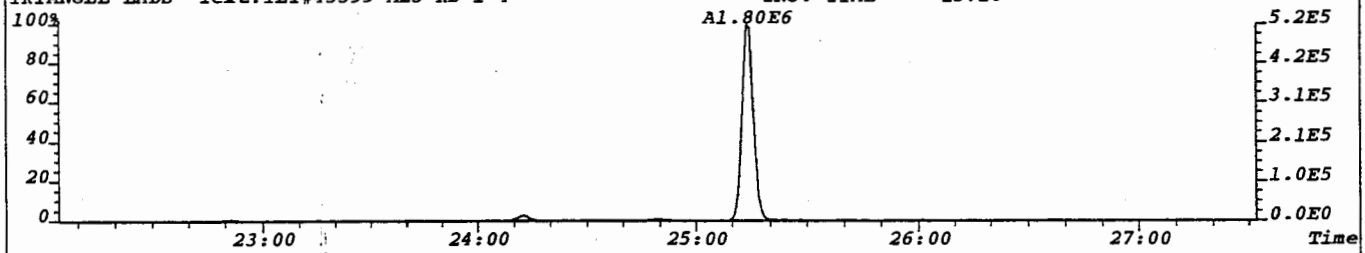
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:78
303.9016 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,312.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



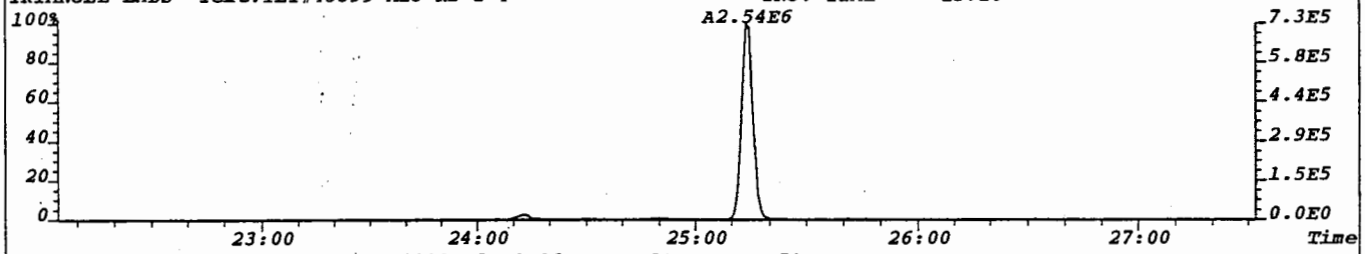
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:63
305.8987 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,252.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



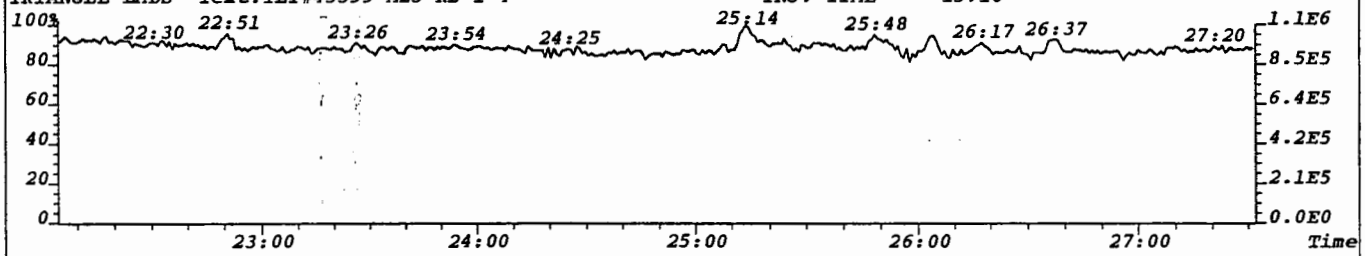
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:81
315.9419 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,324.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



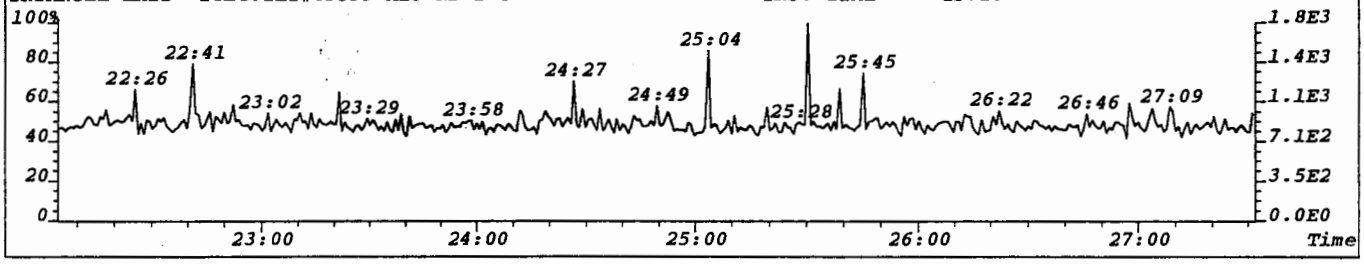
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:78
317.9389 F:2 BSUB(256,30,-3.0) PKD(9,5,5,0.05%,312.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



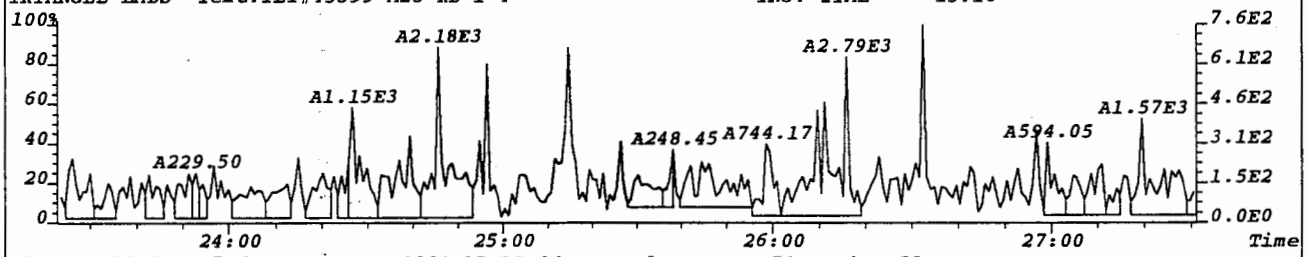
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



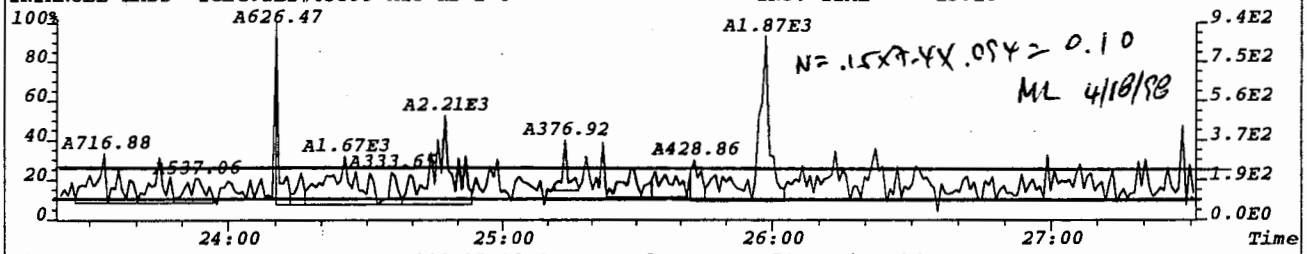
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S
375.8364 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:43
319.8965 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,172.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16

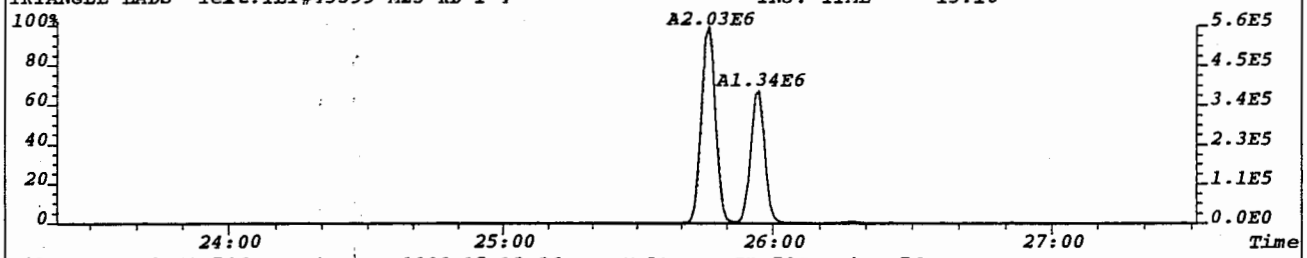


File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:52
321.8936 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,208.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16

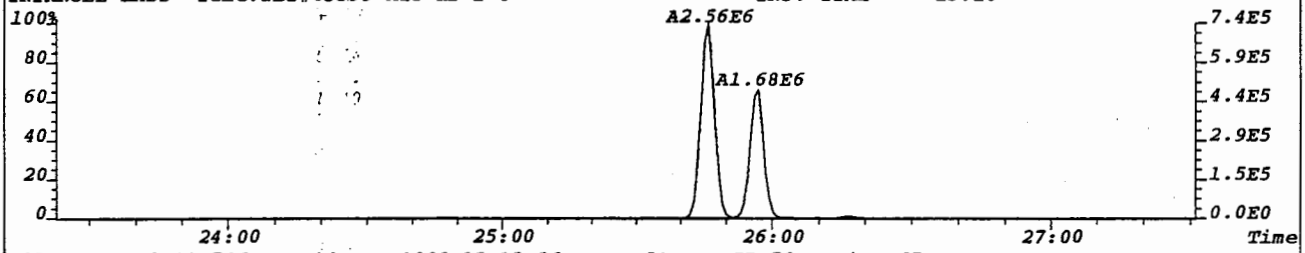


N= .15x7.4x .054 = 0.10
ML 4/18/98

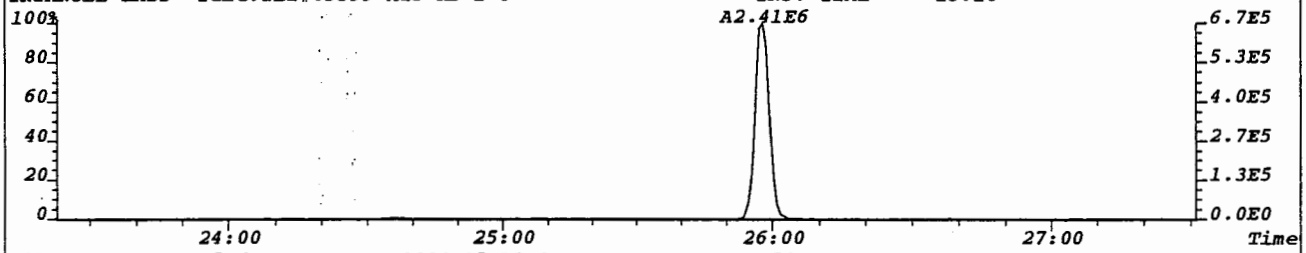
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:96
331.9368 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,384.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



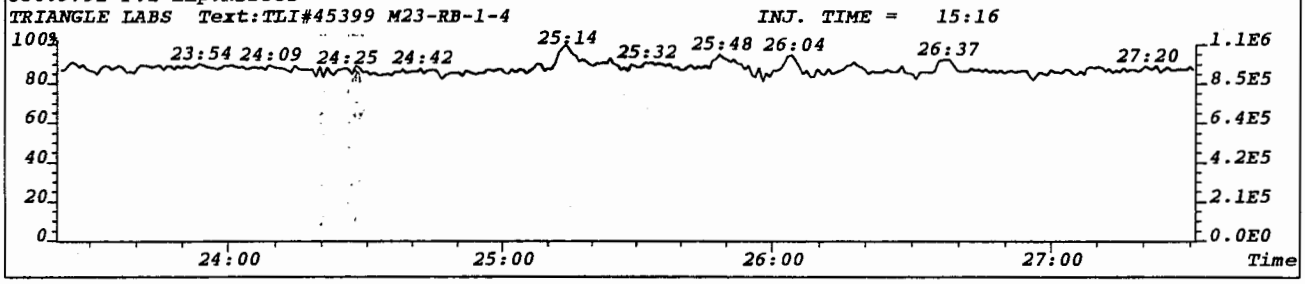
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:76
333.9338 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,304.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



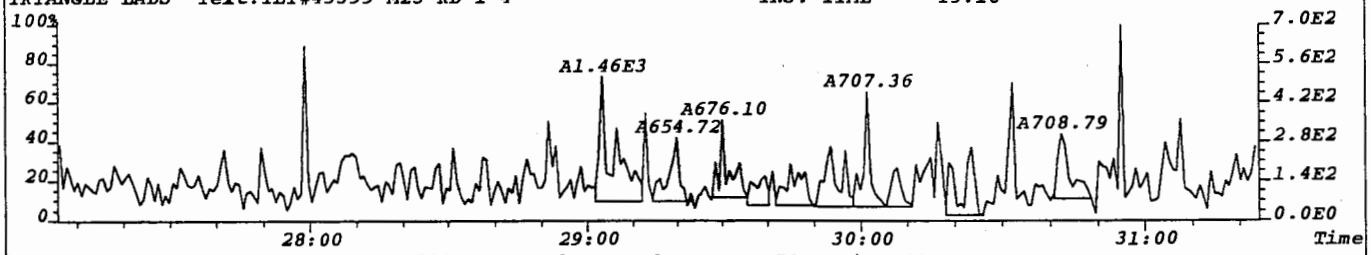
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:67
327.8847 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,268.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



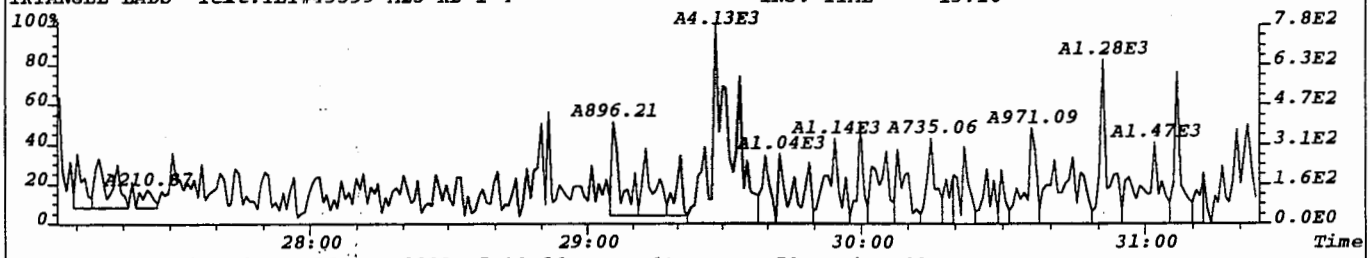
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



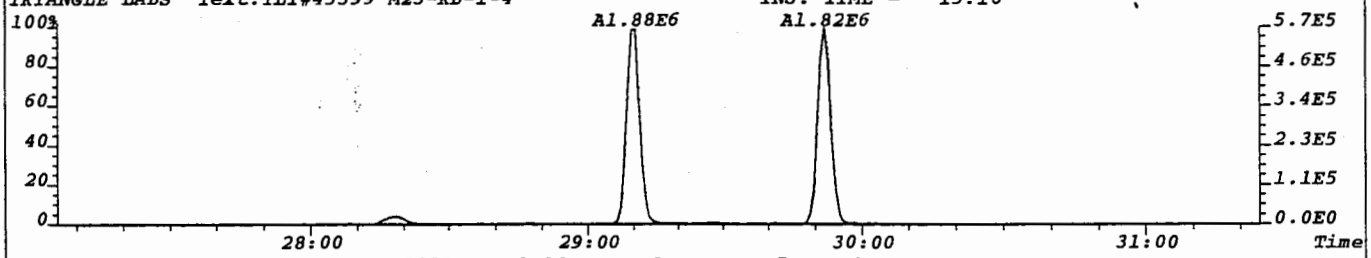
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:39
339.8597 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,156.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



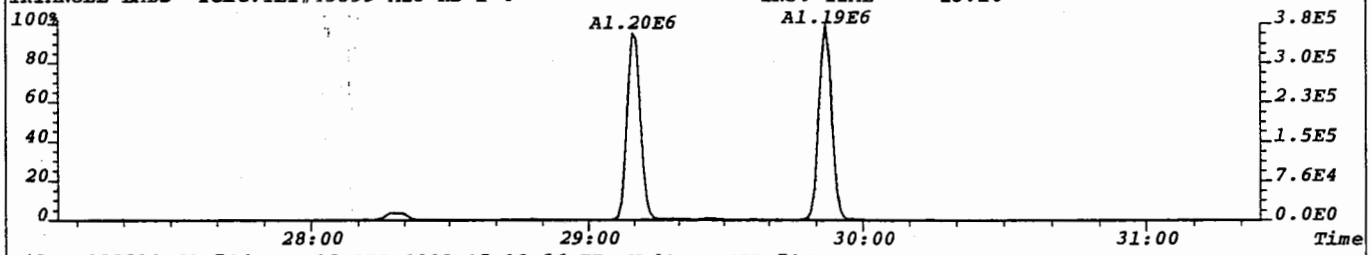
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:41
341.8567 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,164.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



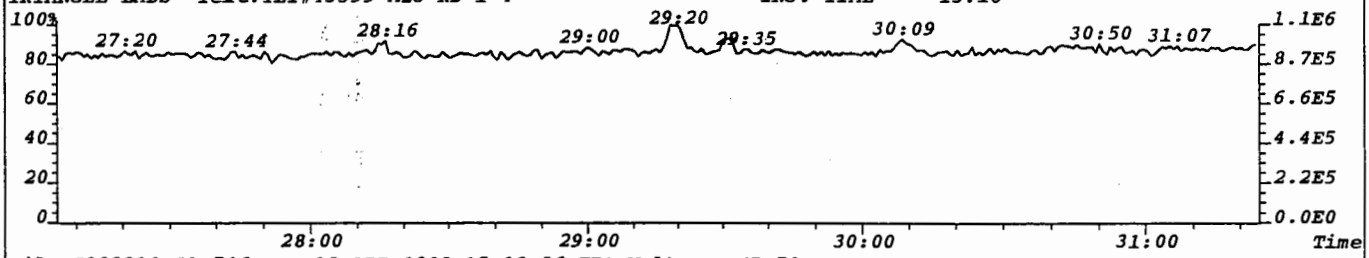
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:49
351.9000 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,196.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



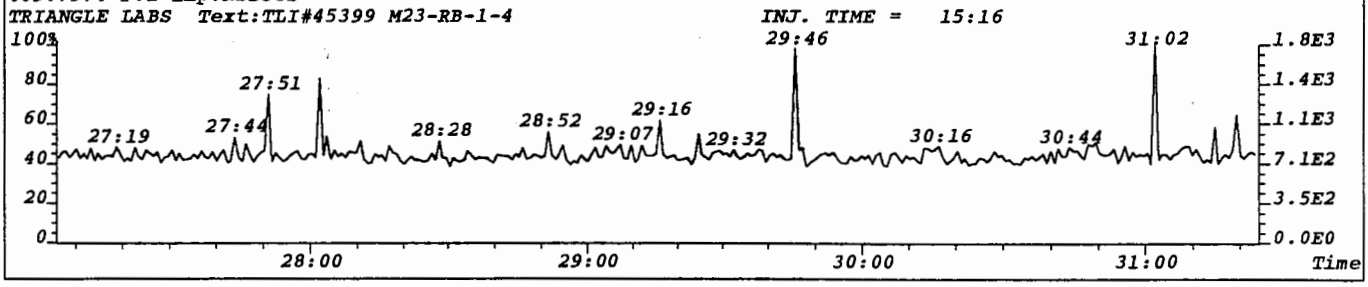
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:44
353.8970 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,176.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



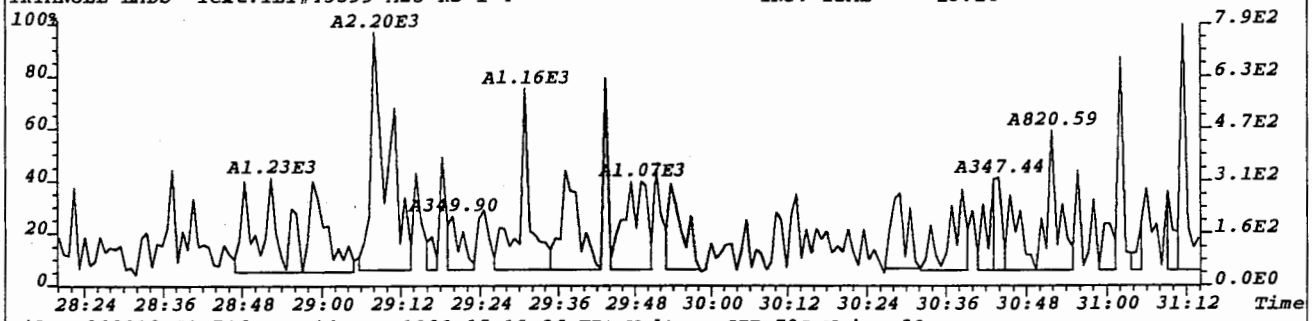
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



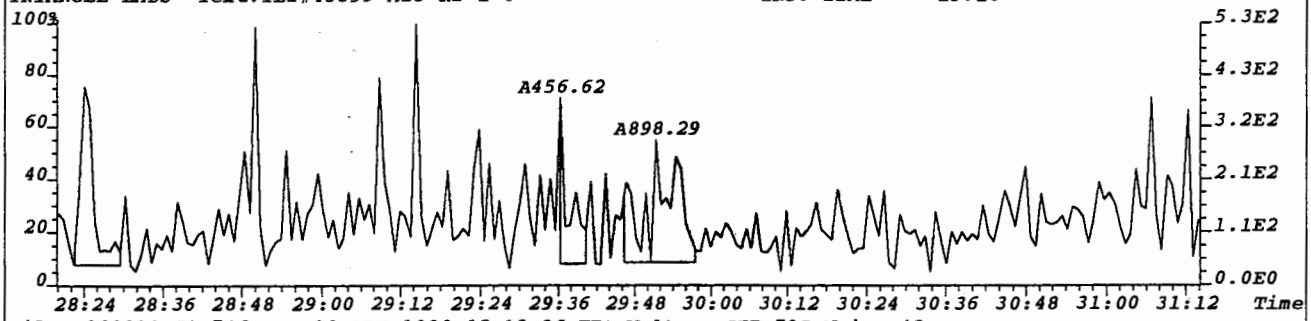
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S
409.7974 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



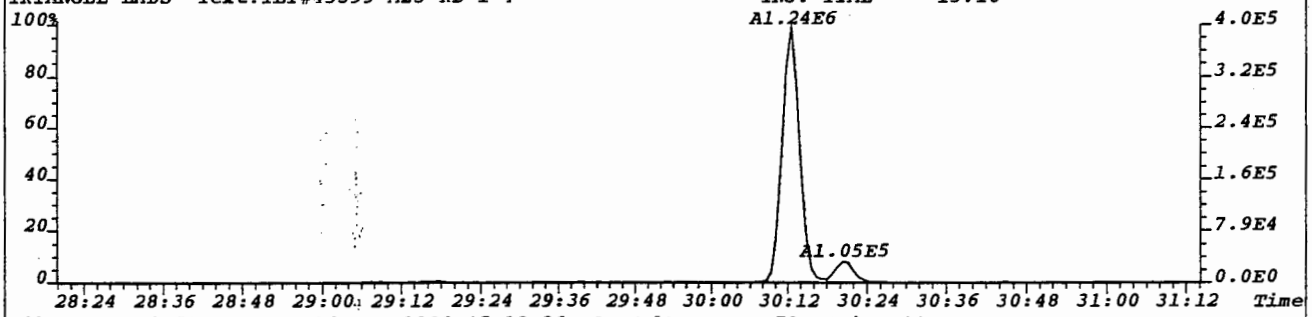
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:38
355.8546 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,152.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



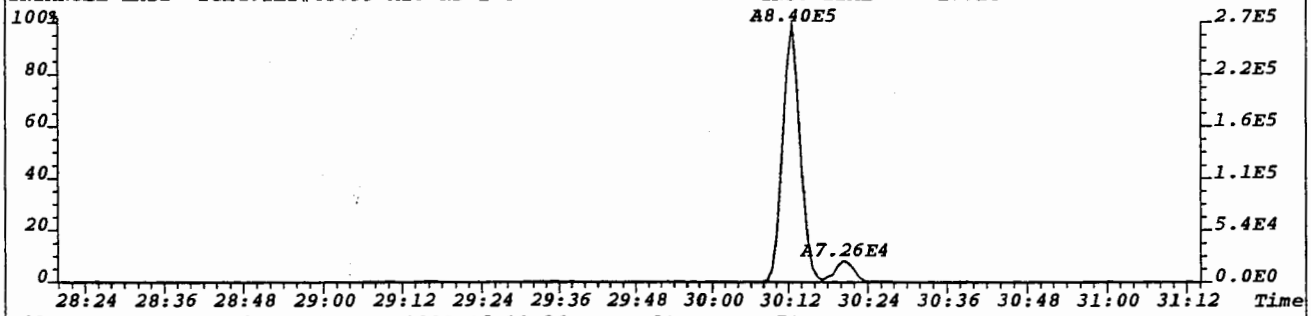
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:39
357.8516 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,156.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



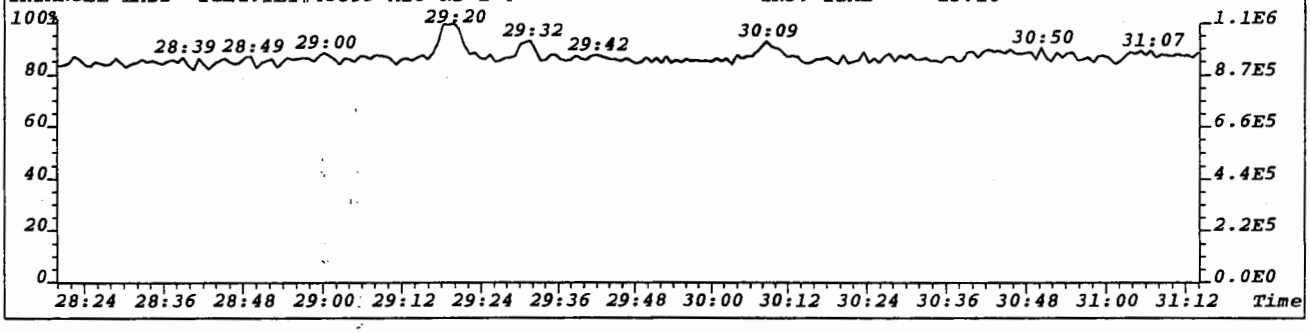
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:42
367.8949 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,168.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



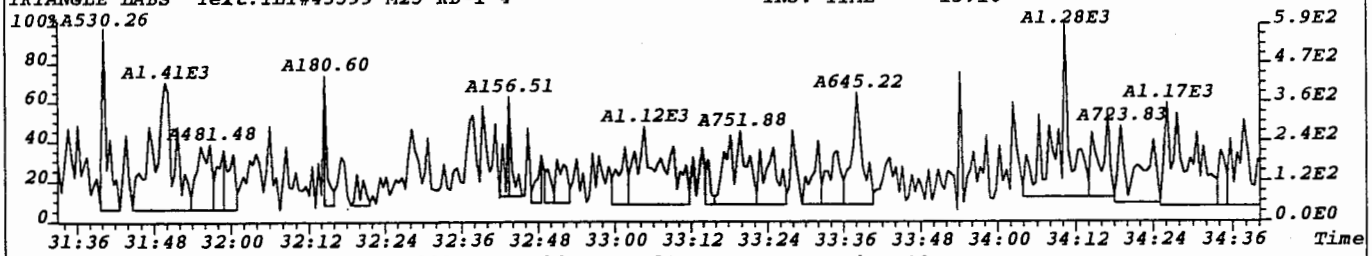
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:44
369.8919 F:2 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,176.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



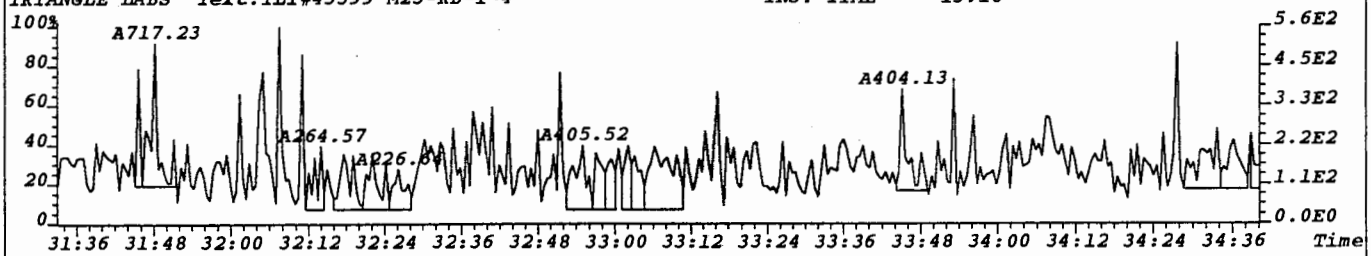
File:S982310 #1-746 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S
330.9792 F:2 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



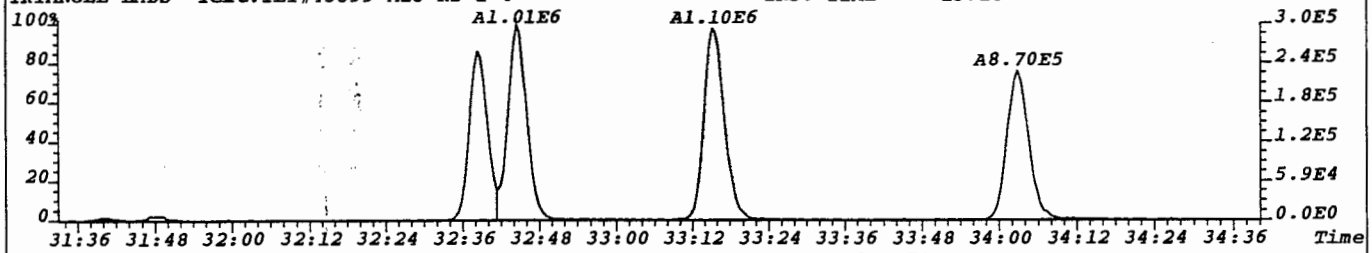
File:S982310 #1-465 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:44
373.8208 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,176.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



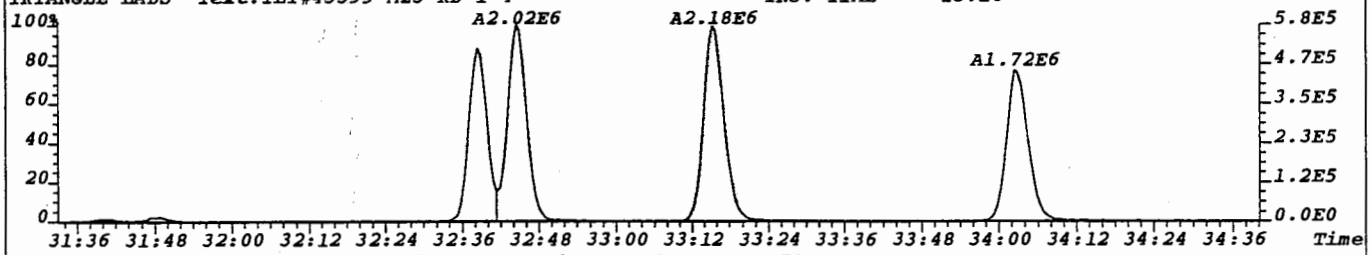
File:S982310 #1-465 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:48
375.8178 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,192.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



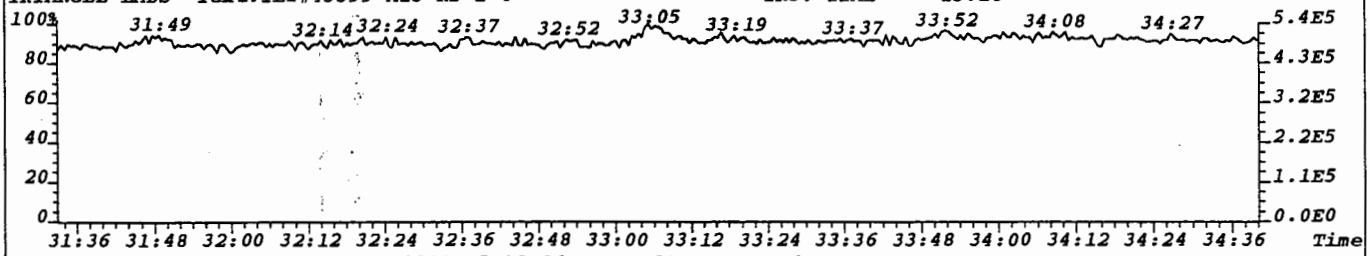
File:S982310 #1-465 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:66
383.8639 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,264.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



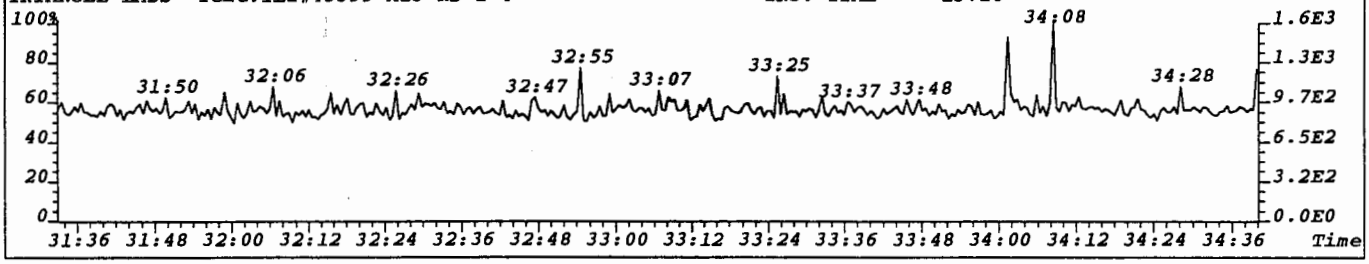
File:S982310 #1-465 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:74
385.8610 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,296.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



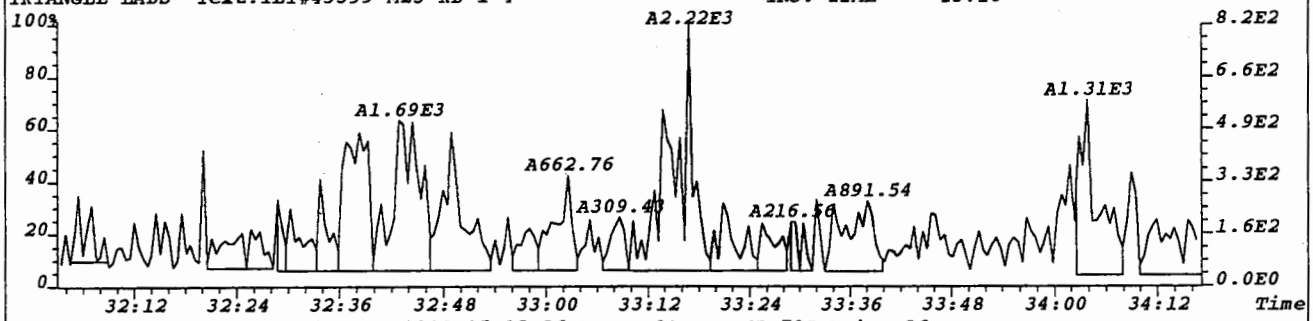
File:S982310 #1-465 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S
392.9760 F:3 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



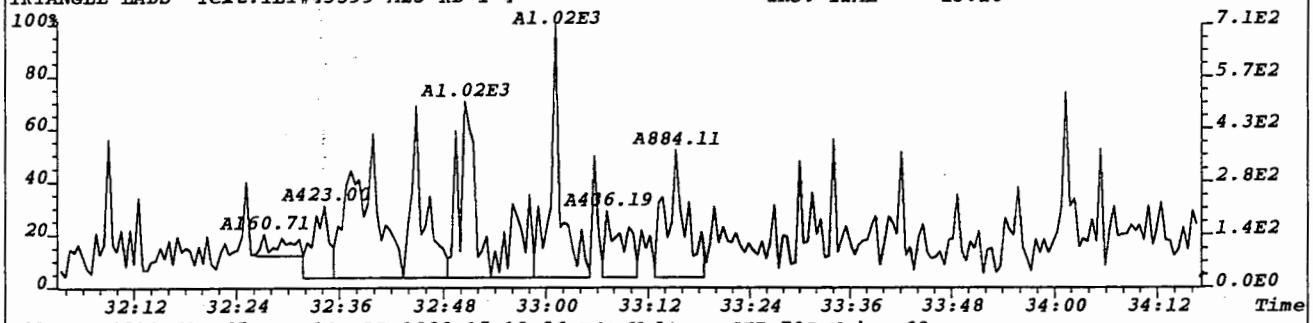
File:S982310 #1-465 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S
445.7555 F:3 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



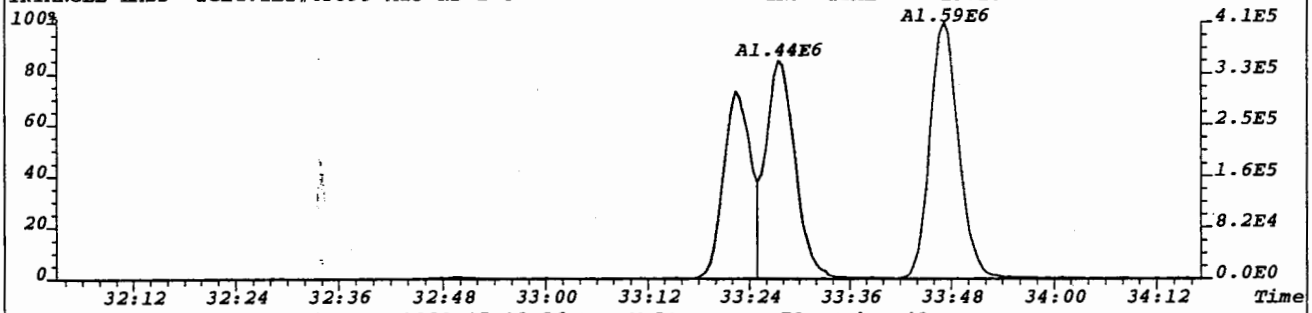
File:S982310 #1-465 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:44
389.8156 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,176.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



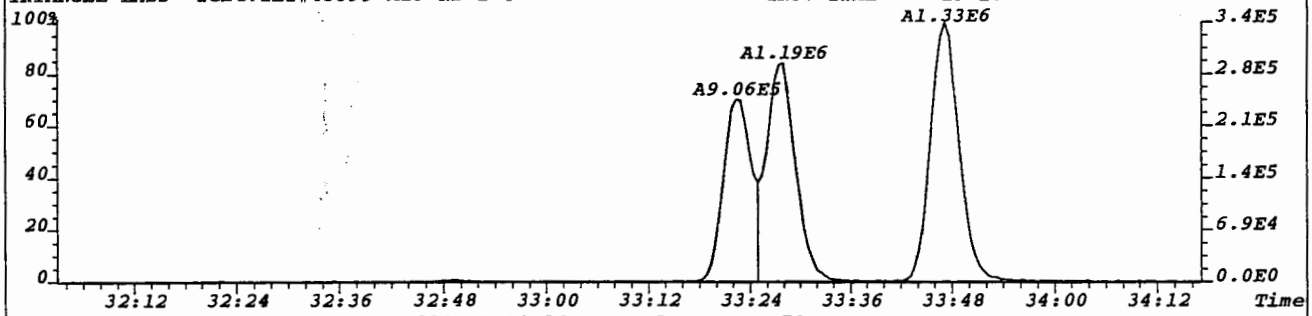
File:S982310 #1-465 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:36
391.8127 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,144.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



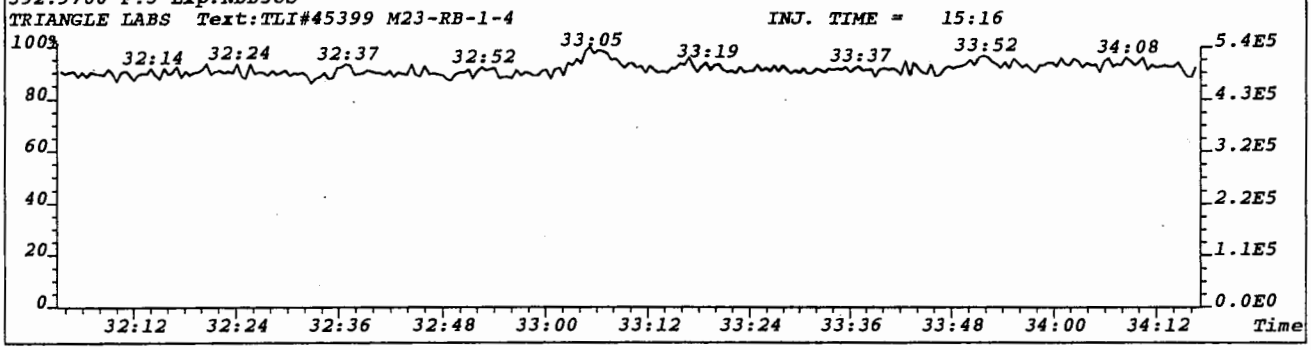
File:S982310 #1-465 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:68
401.8558 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,272.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



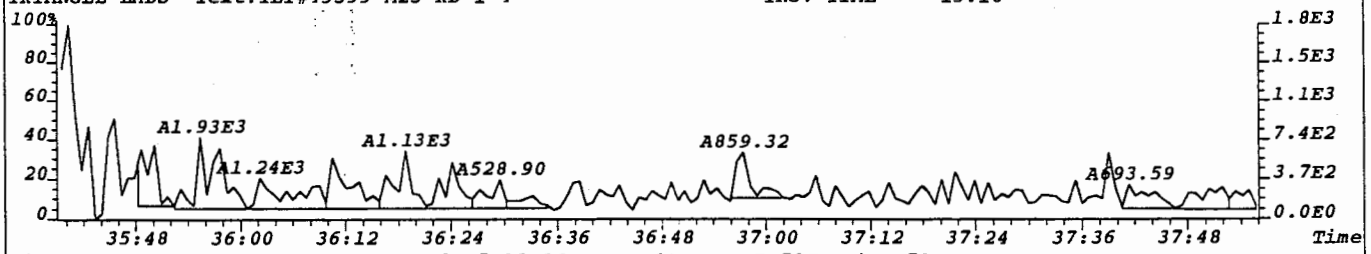
File:S982310 #1-465 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:43
403.8529 F:3 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,172.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



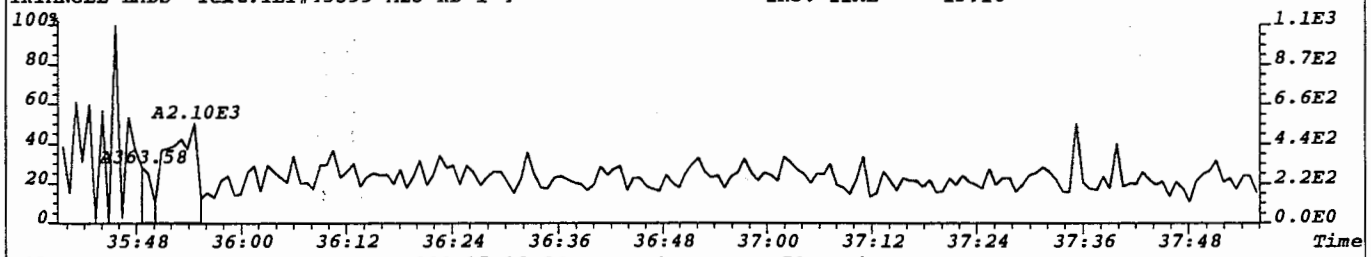
File:S982310 #1-465 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S
392.9760 F:3 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



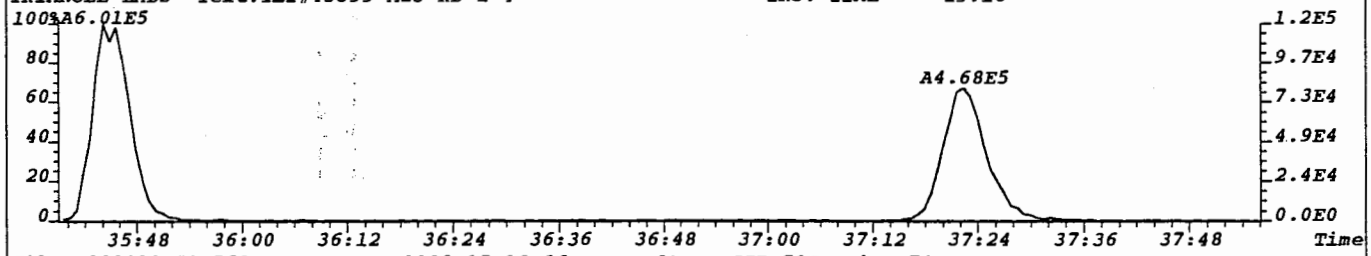
File:S982310 #1-569 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:64
407.7818 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,256.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



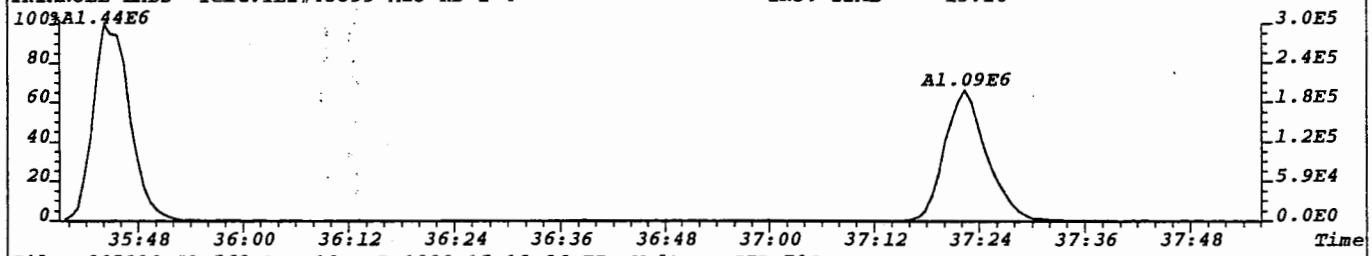
File:S982310 #1-569 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:79
409.7789 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,316.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



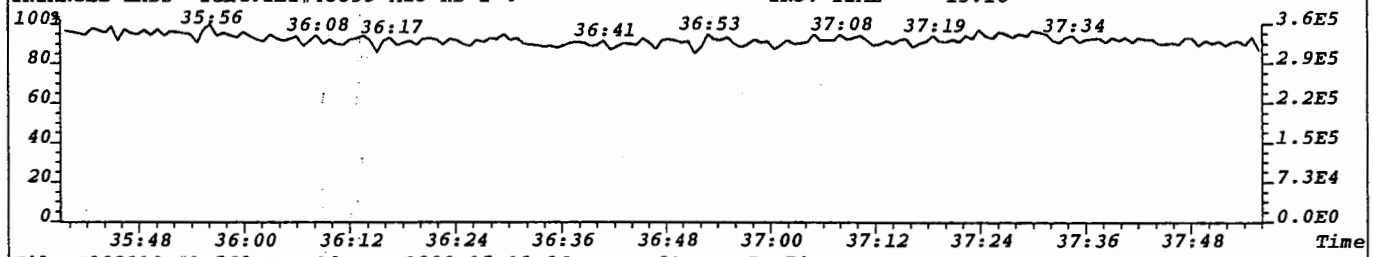
File:S982310 #1-569 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:69
417.8253 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,276.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



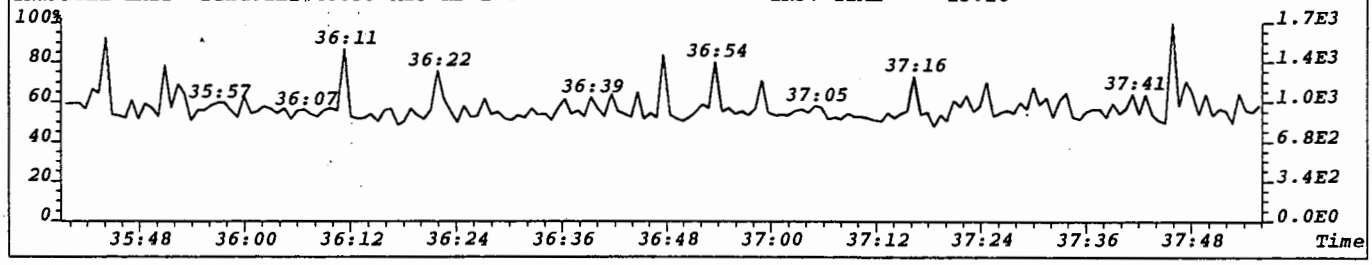
File:S982310 #1-569 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:74
419.8220 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,296.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



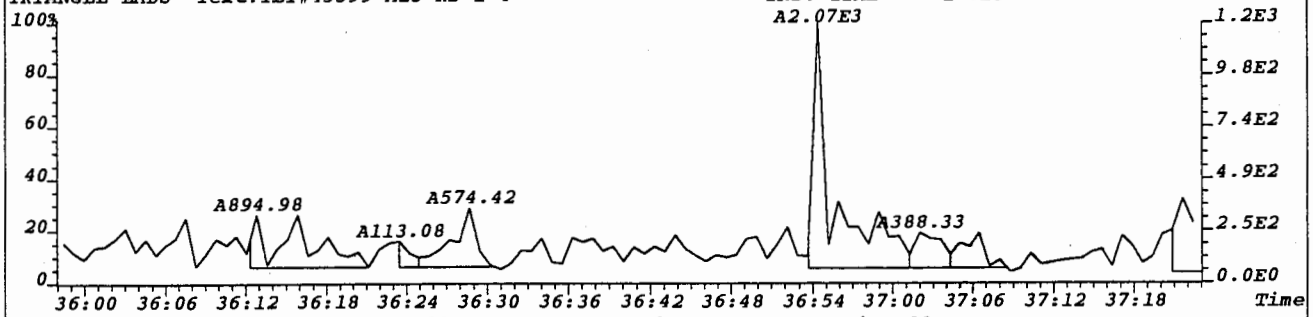
File:S982310 #1-569 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



File:S982310 #1-569 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S
479.7165 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



File:S982310 #1-569 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:51
423.7766 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,204.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



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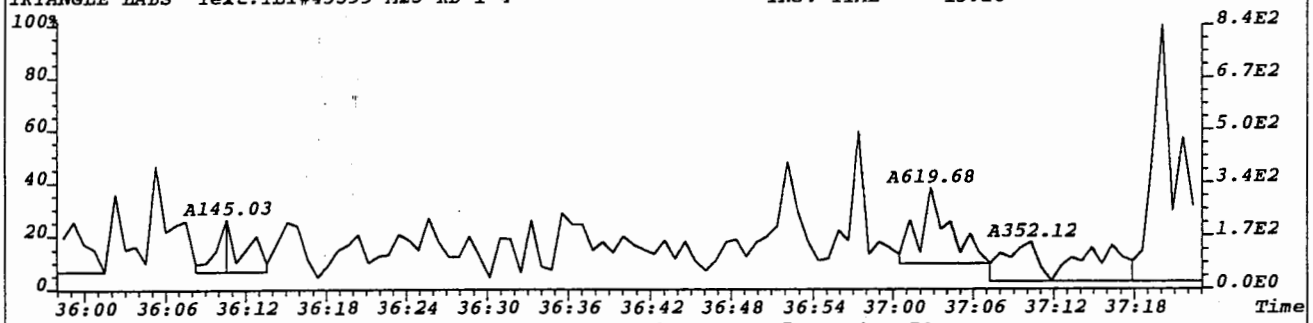
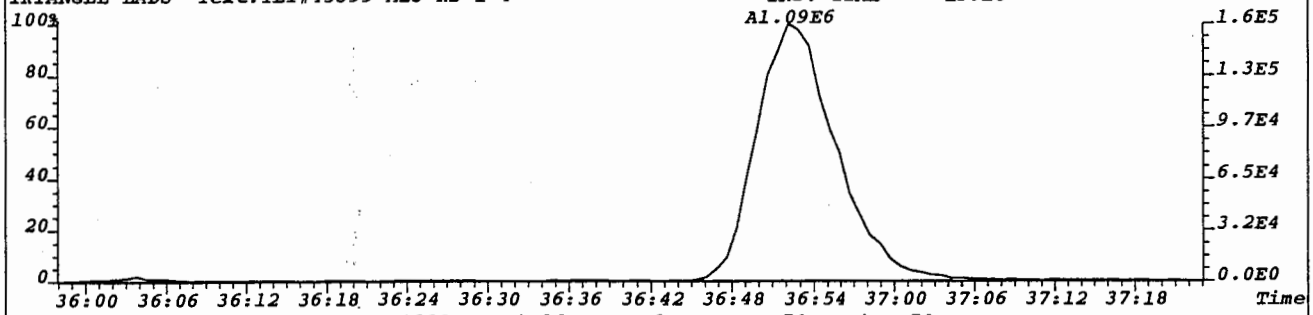
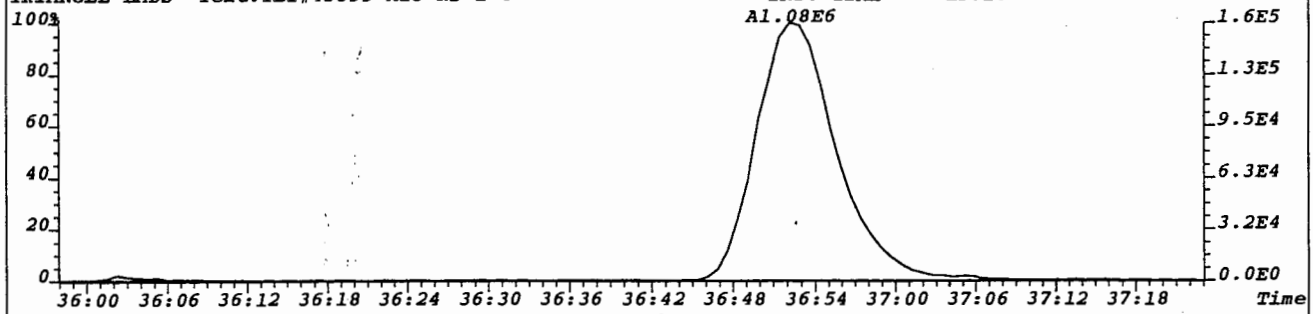
425.7737 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,156.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



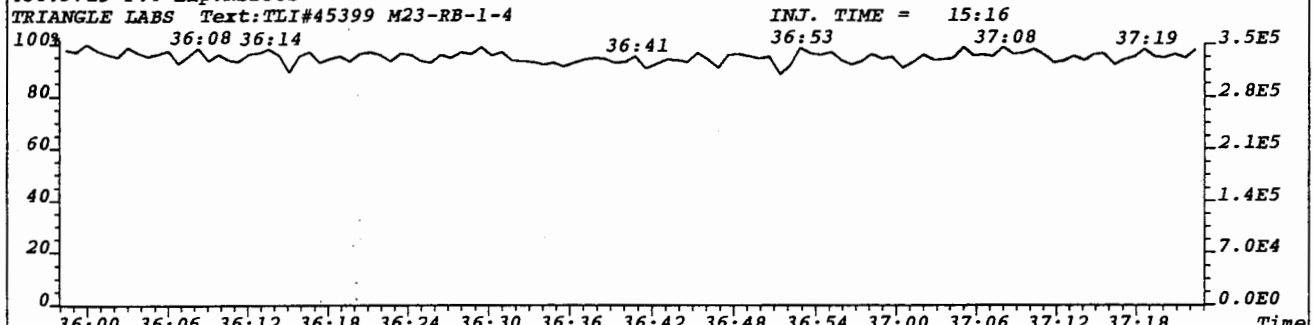
File:S982310 #1-569 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:78
435.8169 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,312.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



File:S982310 #1-569 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:70
437.8140 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,280.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



File:S982310 #1-569 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



File:S982310 #1-569 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:41
441.7428 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,164.0,1.00%,F,T) Exp:NDB5US
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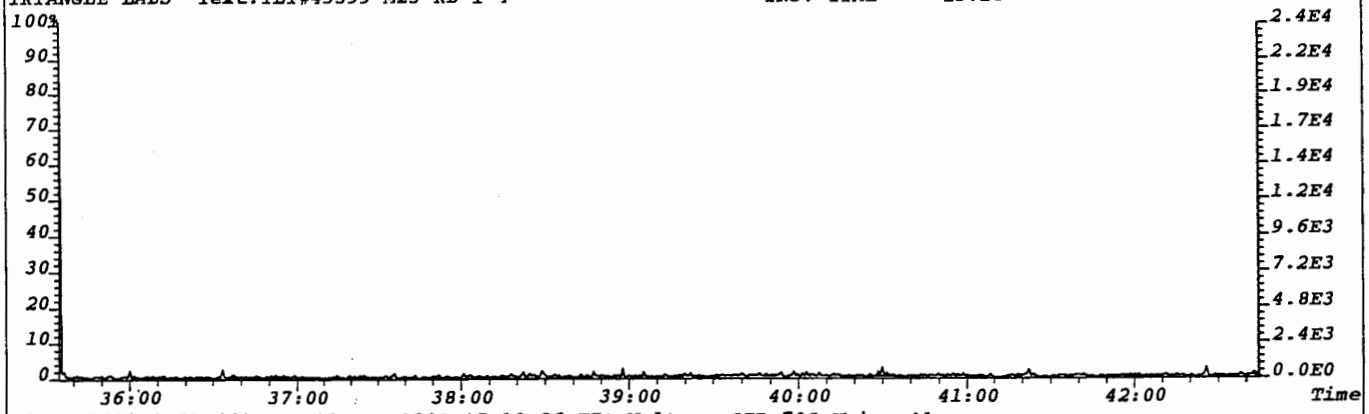

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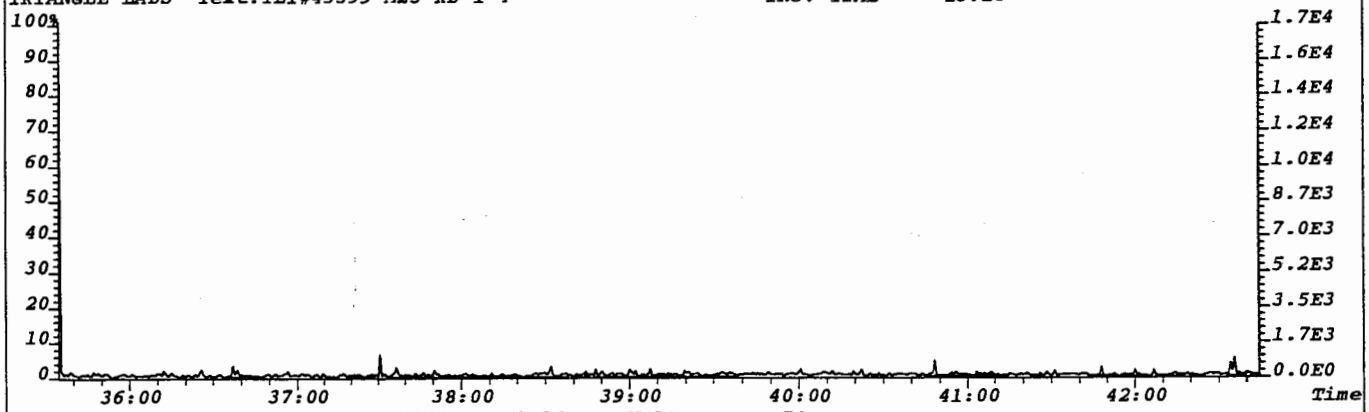
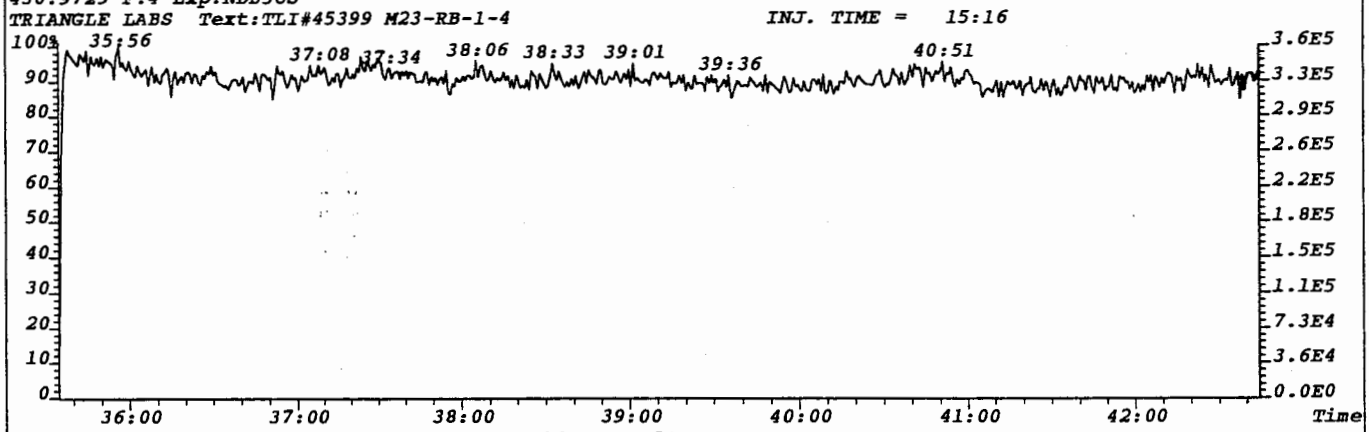
443.7399 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,164.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



File:S982310 #1-569 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



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513.6775 F:4 Exp:NDB5US
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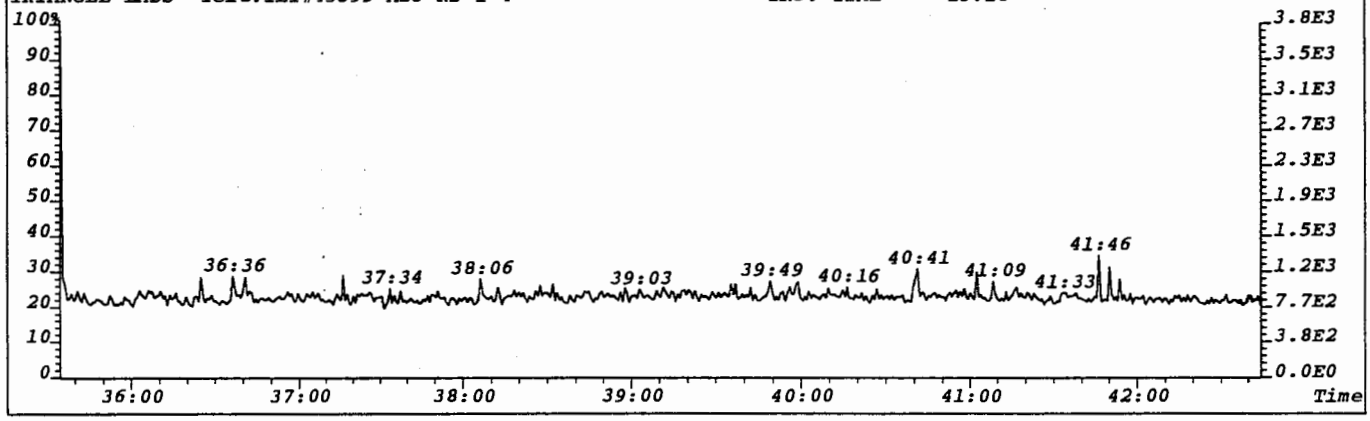
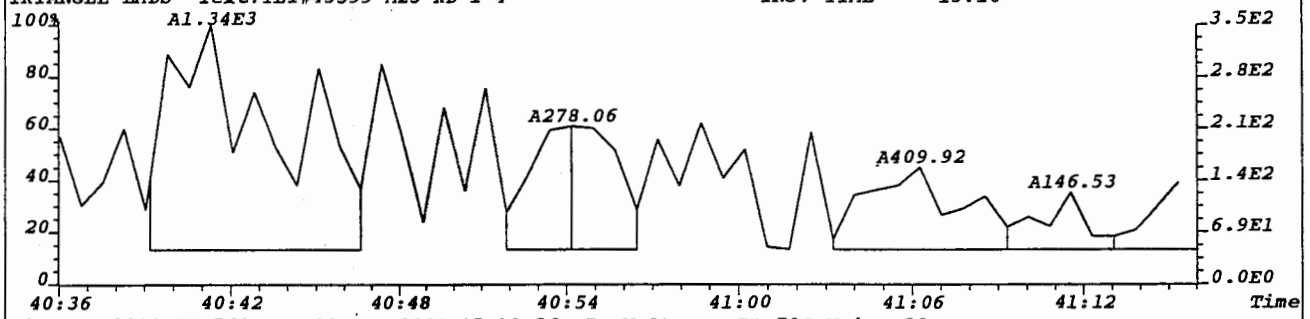


File:S982310 #1-569 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S Noise:39
457.7377 F:4 BSUB(256,30,-3.0) PKD(7,5,3,0.05%,156.0,1.00%,F,T) Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



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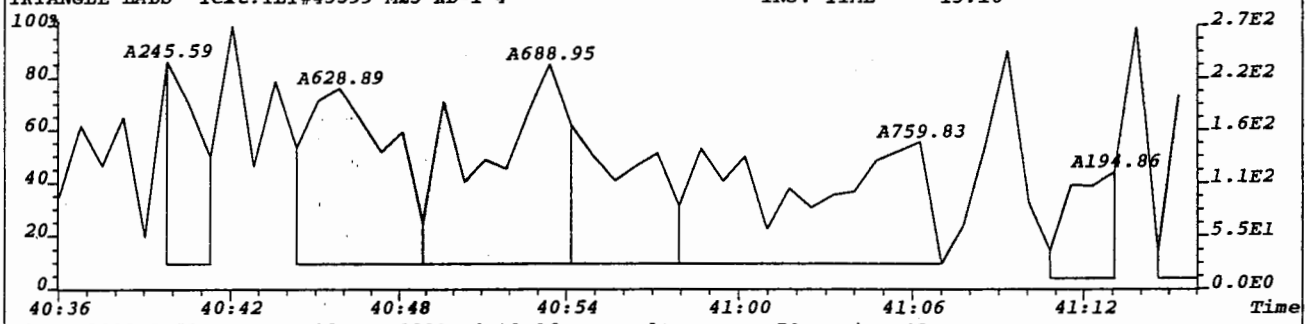
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16



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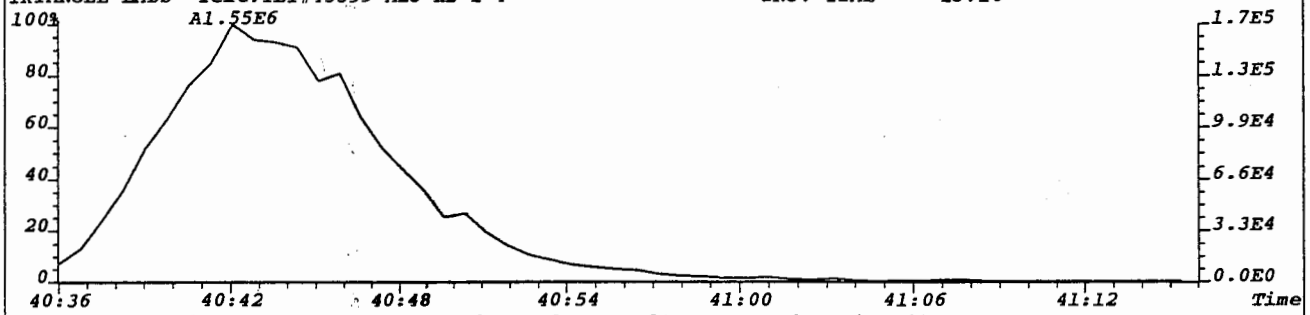

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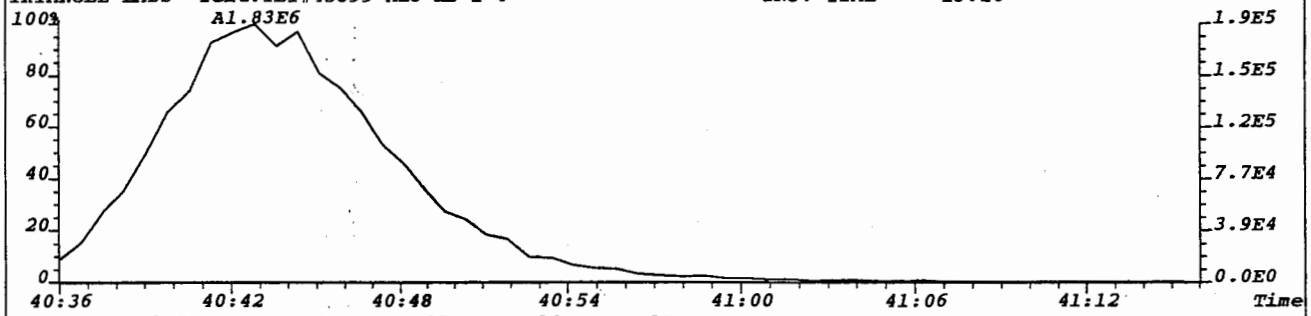
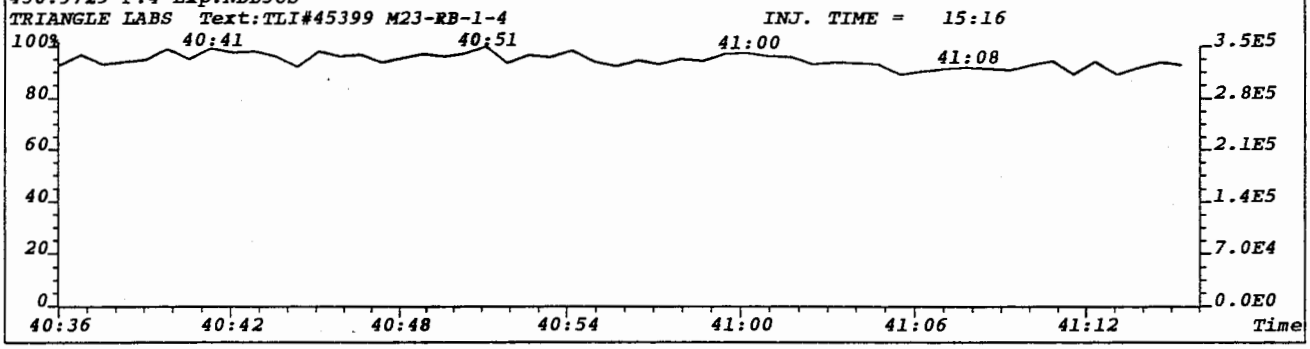
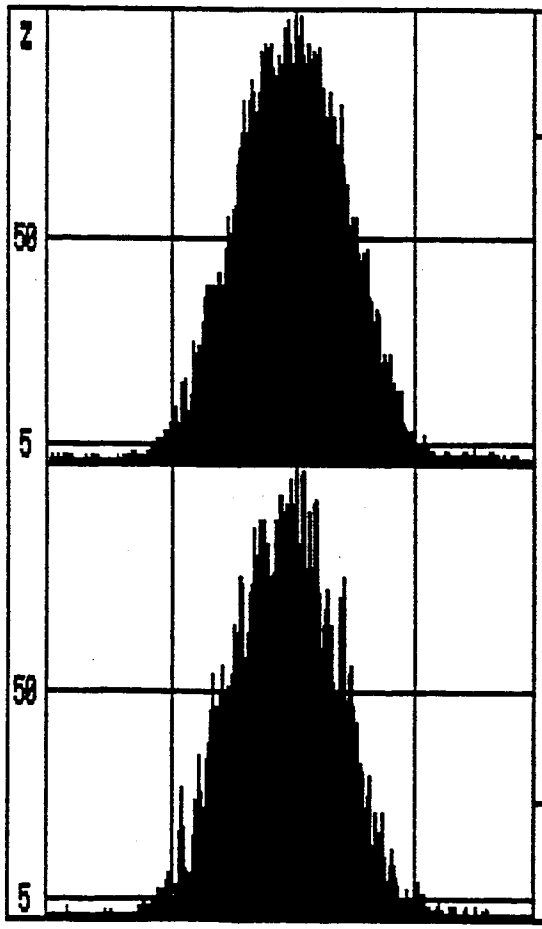


File:S982310 #1-569 Acq:18-APR-1998 15:13:36 EI+ Voltage SIR 70S
430.9729 F:4 Exp:NDB5US
TRIANGLE LABS Text:TLI#45399 M23-RB-1-4 INJ. TIME = 15:16





Channel I 330.9792 Peak top
Height .33 volts Span 200 ppm

System file name	NDB5US
Data file name	A:S982304
Resolution	10000
Group number	2
Ionization mode	EI+
Switching	VOLTAGE
Ref. masses	292.9825, 416.9760

A	293	J	331	S	368
B	304	K	332	T	370
C	306	L	334	U	376
D	316	M	340	V	410
E	318	N	342		
F	320	O	352		
G	322	P	354		
H	328	Q	356		
I	331	R	358		

Ref. mass 416.9760 Peak top
Height .08 volts Span 200 ppm

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

Initial Calibration Summary for UF51058

Analysis Date....: 01/05/98 Method.....: MIT2
Instrument.....: U

Analytes	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
Total MCDF	0.000	0.000	100%		4:35	18:35			0
Total MCDD	0.000	0.000	100%		5:18	19:18			0
Total DCDF	0.000	0.000	100%		11:35	19:35			0
Total DCDD	0.000	0.000	100%		12:18	20:18			0
Total TriCDF	0.000	0.000	100%		15:35	22:35			0
Total TriCDD	0.000	0.000	100%		17:18	23:18			0
1368-TCDF	1.298	0.073	6%	21:26	23:35	30:35	0.745		6
2378-TCDF	1.240	0.132	11%	24:36			0.743		6
TOTAL TCDF	1.240	0.132	11%				0.744		6
1368-TCDD	0.715	0.032	4%	22:46	24:18	31:18	0.776		6
1379-TCDD	0.360	0.021	6%	23:10			0.786		6
2378-TCDD	1.240	0.160	13%	25:19			0.787		6
TOTAL TCDD	1.240	0.160	13%				0.781		6
12378-PeCDF	1.051	0.090	9%	28:33	24:32	32:32	1.526		6
23478-PeCDF	1.019	0.078	8%	29:14			1.530		6
TOTAL PeCDF	1.035	0.084	8%				1.528		6
12378-PeCDD	1.333	0.125	9%	29:34	25:34	33:34	1.580		6
TOTAL PeCDD	1.333	0.125	9%				1.580		6
123478-HxCDF	1.007	0.074	7%	32:01	28:06	36:06	1.283		6
123678-HxCDF	1.253	0.089	7%	32:07			1.245		6
234678-HxCDF	0.985	0.082	8%	32:36			1.262		6
123789-HxCDF	0.870	0.047	5%	33:22			1.263		6
TOTAL HxCDF	1.029	0.071	7%				1.262		6
123478-HxCDD	0.765	0.051	7%	32:43	28:47	36:47	1.257		6
123678-HxCDD	0.976	0.079	8%	32:47			1.211		6
123789-HxCDD	0.941	0.068	7%	33:06			1.234		6
TOTAL HxCDD	0.894	0.064	7%				1.232		6
1234678-HpCDF	1.410	0.098	7%	35:00	30:59	38:59	1.060		6
1234789-HpCDF	1.096	0.071	6%	36:31			1.049		6
TOTAL HpCDF	1.253	0.084	7%				1.055		6
1234678-HpCDD	0.995	0.051	5%	36:01	32:00	40:00	1.028		6
TOTAL HpCDD	0.995	0.051	5%				1.028		6
OCDF	1.377	0.070	5%	39:47	35:34	43:34	0.891		6
OCDD	1.108	0.080	7%	39:35	35:34	43:34	0.836		6

Other Standards	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
37Cl-TCDD	1.001	0.056	6%	25:19	23:18	27:18			6
13C12-PeCDF 234	0.966	0.010	1%	29:14	26:32	30:32	1.498		6
13C12-HxCDF 478	0.825	0.042	5%	32:01			0.509		6
13C12-HxCDF 234	0.902	0.043	5%	32:35			0.508		6
13C12-HxCDF 789	0.695	0.042	6%	33:21			0.504		6
13C12-HxCDD 478	0.732	0.024	3%	32:42			1.214		6
13C12-HpCDF 789	0.802	0.016	2%	36:30	32:59	38:59	0.431		6

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Internal Standards	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
13C12-2378-TCDF	1.467	0.053	4%	24:35	23:35	25:35	0.755		6
13C12-2378-TCDD	1.118	0.049	4%	25:18	23:18	27:18	0.807		6
13C12-PeCDF 123	1.142	0.075	7%	28:32	24:32	32:32	1.478		6
13C12-PeCDD 123	0.590	0.045	8%	29:34	25:34	33:34	1.506		6
13C12-HxCDF 678	1.346	0.038	3%	32:06	28:06	36:06	0.506		6
13C12-HxCDD 678	0.995	0.017	2%	32:47	31:47	33:47	1.216		6
13C12-HpCDF 678	0.822	0.013	2%	34:59	32:59	38:59	0.434		6
13C12-HpCDD 678	0.726	0.011	2%	36:00	35:00	37:00	1.018		6
13C12-OCDD	0.545	0.038	7%	39:34	37:34	41:34	0.861		6

Recovery Standards	RF	SD	%RSD	RT	RT/LO	RT/HI	Ratio1	Ratio2	N
13C12-1234-TCDD	1.000	0.000	0%	25:08			0.812		6
13C12-HxCDD 789	1.000	0.000	0%	33:05			1.210		6

*** End of Report ***

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Date: 04/15/98 TRIANGLE LABORATORIES OF RTP, INC.

Continuing Calibration for U980771

Analysis Date....: 04/15/98 Method.....: MIT2
Operator.....: DL Instrument..: U
Init Calibration.: UF51058 Std.Conc....: 10.00
ICal Date.....: 01/05/98

Analyte Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
Total MCDF	0.000		3:22 17:22			0.000	0.000	100.0%
Total MCDD	0.000		4:08 18:08			0.000	0.000	100.0%
Total DCDF	0.000		10:22 18:22			0.000	0.000	100.0%
Total DCDD	0.000		11:08 19:08			0.000	0.000	100.0%
Total TriCDF	0.000		14:22 21:22			0.000	0.000	100.0%
Total TriCDD	0.000		16:08 22:08			0.000	0.000	100.0%
1368-TCDF	1.285	0.76	19:43 25:22	19:55	0.8524	1.298	-0.013	-1.0%
2378-TCDF	1.227	0.77		23:23	1.0007	1.240	-0.013	-1.1%
TOTAL TCDF	1.227	0.76				1.240	-0.013	-1.1%
1368-TCDD	0.702	0.79	21:12 25:20	21:24	0.8867	0.715	-0.013	-1.9%
1379-TCDD	0.321	0.78		21:50	0.9047	0.360	-0.039	-10.8%
2378-TCDD	1.125	0.78		24:09	1.0007	1.240	-0.115	-9.3%
TOTAL TCDD	1.125	0.78				1.240	-0.115	-9.3%
12378-PeCDF	1.081	1.51	25:16 29:26	27:34	1.0006	1.051	0.030	2.9%
23478-PeCDF	1.056	1.49		28:18	1.0272	1.019	0.037	3.6%
TOTAL PeCDF	1.069	1.50				1.035	0.034	3.2%
12378-PeCDD	1.250	1.61	26:35 29:17	28:39	1.0000	1.333	-0.083	-6.2%
TOTAL PeCDD	1.250	1.61				1.333	-0.083	-6.2%
123478-HxCDF	1.210	1.26	30:00 32:44	31:10	0.9968	1.007	0.203	20.2%
123678-HxCDF	1.267	1.24		31:17	1.0005	1.253	0.014	1.1%
234678-HxCDF	1.053	1.28		31:46	1.0160	0.985	0.068	6.9%
123789-HxCDF	1.031	1.30		32:30	1.0394	0.870	0.161	18.5%

Final

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Printed: 14:20 04/15/98

Date: 04/15/98 TRIANGLE LABORATORIES OF RTP, INC.

Continuing Calibration for U980771

TOTAL HxCDF	1.140	1.27				1.029	0.111	10.8%
123478-HxCDD	0.878	1.21	30:31 32:24	31:53	0.9979	0.765	0.113	14.8%
123678-HxCDD	0.916	1.22		31:58	1.0005	0.976	-0.060	-6.1%
123789-HxCDD	0.910	1.22		32:16	1.0099	0.941	-0.031	-3.3%
TOTAL HxCDD	0.901	1.21				0.894	0.007	0.8%
1234678-HpCDF	1.377	1.06	33:54 35:41	34:05	1.0005	1.410	-0.033	-2.3%
1234789-HpCDF	1.115	1.06		35:31	1.0426	1.096	0.019	1.7%
TOTAL HpCDF	1.246	1.06				1.253	-0.007	-0.6%
1234678-HpCDD	1.008	1.02	34:10 35:13	35:04	1.0005	0.995	0.013	1.3%
TOTAL HpCDD	1.008	1.02				0.995	0.013	1.3%
OCDF	1.279	0.91	34:23 42:23	38:34	1.0048	1.377	-0.098	-7.1%
OCDD	1.001	0.87	34:23 42:23	38:24	1.0004	1.108	-0.107	-9.6%

Other Standard Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
37Cl-TCDD	0.972		22:08 26:08	24:09	1.0007	1.001	-0.029	-2.9%
13C12-PeCDF 234	0.932	1.47	23:33 31:33	28:17	1.0266	0.966	-0.034	-3.5%
13C12-HxCDF 478	1.005	0.51		31:10	0.9968	0.825	0.180	21.9%
13C12-HxCDF 234	0.977	0.50		31:46	1.0160	0.902	0.075	8.3%
13C12-HxCDF 789	0.834	0.49		32:30	1.0394	0.695	0.139	20.0%
13C12-HxCDD 478	0.939	1.20		31:53	0.9979	0.732	0.207	28.3%
13C12-HpCDF 789	0.866	0.42	32:04 38:04	35:31	1.0426	0.802	0.064	8.0%

Internal Standard Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
13C12-2378-TCDF	1.484	0.76	22:22 24:22	23:22	1.0000	1.467	0.017	1.2%
13C12-2378-TCDD	1.121	0.81	22:08 26:08	24:08	1.0000	1.118	0.003	0.2%
13C12-PeCDF 123	1.085	1.49	23:33 31:33	27:33	1.0000	1.142	-0.057	-5.0%

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Continuing Calibration for U980771

13C12-PeCDD 123	0.607	1.46	24:39 32:39	28:39	1.0000	0.590	0.017	2.8%
13C12-HxCDF 678	1.289	0.51	27:16 35:16	31:16	1.0000	1.346	-0.057	-4.3%
13C12-HxCDD 678	1.043	1.23	30:57 32:57	31:57	1.0000	0.995	0.048	4.8%
13C12-HpCDF 678	0.879	0.43	32:04 38:04	34:04	1.0000	0.822	0.057	6.9%
13C12-HpCDD 678	0.741	1.06	34:03 36:03	35:03	1.0000	0.726	0.015	2.1%
13C12-OCDD	0.569	0.88	38:12 38:32	38:23	1.0000	0.545	0.024	4.3%

Recovery Standard Summary

Name	RF	Ratio 1&2	RT Lo/High	RT	Rel. RT	ICal RF	Delta RF	%D
13C12-1234-TCDD	1.000	0.82		23:56	0.9917	1.000	0.000	0.0%
13C12-HxCDD 789	1.000	1.20		32:15	1.0094	1.000	0.000	0.0%

QC Front End Check: 1.5693

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APPENDIX C

CALCULATIONS

Summary of Stack Gas Parameters and Test Results
Air Emissions Screening Test
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 3 Baghouse Inlet

	RUN NUMBER	**M23-3-I-2**
	RUN DATE	**3/24/98**
	RUN TIME	**1332-1709**
	MEASURED DATA	
γ	Meter Box Correction Factor	1.021
ΔH	Avg Meter Orifice Pressure, in. H_2O	1.23
P_{bar}	Barometric Pressure, inches Hg	30.00
V_m	Sample Volume, ft^3	101.856
T_m	Average Meter Temperature, °F	81.8
P_{static}	Stack Static Pressure, inches H_2O	-1.90
T_s	Average Stack Temperature, °F	902
V_{lc}	Condensate Collected, ml	184.0
CO_2	Carbon Dioxide content, % by volume	26.6
O_2	Oxygen content, % by volume	5.3
N_2	Nitrogen content, % by volume	68.1
C_p	Pitot Tube Coefficient	0.84
$\Delta p^{1/2}$	Average Square Root Δp, (in. $H_2O)^{1/2}$	0.5592
Θ	Sample Run Duration, minutes	180
D_n	Nozzle Diameter, inches	0.310
	CALCULATED DATA	
A_n	Nozzle Area, ft^2	0.00052
$V_{m(std)}$	Standard Meter Volume, dscf	101.881
$V_{m(std)}$	Standard Meter Volume, dscm	2.885
P_s	Stack Pressure, inches Hg	29.86
B_{ws}	Moisture, % by volume	7.8
V_{wstd}	Standard Water Vapor Volume, ft^3	8.661
$1-B_{ws}$	Dry Mole Fraction	0.922
M_d	Molecular Weight (d.b.), lb/lb•mole	32.47
M_s	Molecular Weight (w.b.), lb/lb•mole	31.33
V_s	Stack Gas Velocity, ft/s	48.4
A	Stack Area, ft^2	52.38
Q_a	Stack Gas Volumetric flow, acfm	152,264
Q_s	Stack Gas Volumetric flow, dscfm	54,286
$Q_{s(cmm)}$	Stack Gas Volumetric flow, dscmm	1,537
I	Isokinetic Sampling Ratio, %	104.2

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 3 Baghouse Inlet

	RUN NUMBER	**M23-3-I-2**
	RUN DATE	**3/24/98**
	RUN TIME	**1332-1709**
	EMISSIONS DATA	
	DIOXINS:	
	2378 TCDD	
ng	Catch, ng	(0.04)
ng/dscm	Concentration, ng/dscm, as measured	(0.0139)
µg/hr	Emission Rate, µg/hr	(1.28)
	Total TCDD	
ng	Catch, ng	0.25
ng/dscm	Concentration, ng/dscm, as measured	0.0867
µg/hr	Emission Rate, µg/hr	7.99
	12378 PeCDD	
ng	Catch, ng	(0.07)
ng/dscm	Concentration, ng/dscm, as measured	(0.0243)
µg/hr	Emission Rate, µg/hr	(2.24)
	Total PeCDD	
ng	Catch, ng	{0.11}
ng/dscm	Concentration, ng/dscm, as measured	{0.0381}
µg/hr	Emission Rate, µg/hr	{3.52}
	123478 HxCDD	
ng	Catch, ng	(0.09)
ng/dscm	Concentration, ng/dscm, as measured	(0.0312)
µg/hr	Emission Rate, µg/hr	(2.88)
	123678 HxCDD	
ng	Catch, ng	(0.08)
ng/dscm	Concentration, ng/dscm, as measured	(0.0277)
µg/hr	Emission Rate, µg/hr	(2.56)

( ) Not Detected. Value shown is the detection limit and is included in totals.

{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 3 Baghouse Inlet

	RUN NUMBER	**M23-3-I-2**
	RUN DATE	**3/24/98**
	RUN TIME	**1332-1709**
	EMISSIONS DATA -Continued	
	DIOXINS - Continued	
	123789 HxCDD	
ng	Catch, ng	(0.08)
ng/dscm	Concentration, ng/dscm, as measured	(0.0277)
µg/hr	Emission Rate, µg/hr	(2.56)
	Total HxCDD	
ng	Catch, ng	0.07
ng/dscm	Concentration, ng/dscm, as measured	0.0243
µg/hr	Emission Rate, µg/hr	2.24
	1234678 HpCDD	
ng	Catch, ng	(0.1)
ng/dscm	Concentration, ng/dscm, as measured	(0.0347)
µg/hr	Emission Rate, µg/hr	(3.20)
	Total HpCDD	
ng	Catch, ng	(0.1)
ng/dscm	Concentration, ng/dscm, as measured	(0.0347)
µg/hr	Emission Rate, µg/hr	(3.20)
	OCDD	
ng	Catch, ng	{0.29}
ng/dscm	Concentration, ng/dscm, as measured	{0.101}
µg/hr	Emission Rate, µg/hr	{9.27}
	Total PCDD	
ng	Catch, ng	(0.82)
ng/dscm	Concentration, ng/dscm, as measured	(0.284)
µg/hr	Emission Rate, µg/hr	(26.2)

( ) Not Detected. Value shown is the detection limit and is included in totals.

{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 3 Baghouse Inlet

	RUN NUMBER	**M23-3-I-2**
	RUN DATE	**3/24/98**
	RUN TIME	**1332-1709**
	EMISSIONS DATA - Continued	
	FURANS	
	2378 TCDF	
ng	Catch, ng	0.51
ng/dscm	Concentration, ng/dscm, as measured	0.177
µg/hr	Emission Rate, µg/hr	16.3
	Total TCDF	
ng	Catch, ng	12.1
ng/dscm	Concentration, ng/dscm, as measured	4.19
µg/hr	Emission Rate, µg/hr	387
	12378 PeCDF	
ng	Catch, ng	0.21
ng/dscm	Concentration, ng/dscm, as measured	0.0728
µg/hr	Emission Rate, µg/hr	6.71
	23478 PeCDF	
ng	Catch, ng	0.21
ng/dscm	Concentration, ng/dscm, as measured	0.0728
µg/hr	Emission Rate, µg/hr	6.71
	Total PeCDF	
ng	Catch, ng	2.7
ng/dscm	Concentration, ng/dscm, as measured	0.936
µg/hr	Emission Rate, µg/hr	86.3
	123478 HxCDF	
ng	Catch, ng	0.10
ng/dscm	Concentration, ng/dscm, as measured	0.0347
µg/hr	Emission Rate, µg/hr	3.20

( ) Not Detected. Value shown is the detection limit and is included in totals.

{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
emical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 3 Baghouse Inlet

	RUN NUMBER	**M23-3-I-2**
	RUN DATE	**3/24/98**
	RUN TIME	**1332-1709**
	EMISSIONS DATA - Continued	
	Furans - Continued	
	123678 HxCDF	
ng	Catch, ng	{0.05}
ng/dscm	Concentration, ng/dscm, as measured	{0.0173}
µg/hr	Emission Rate, µg/hr	{1.60}
	234678 HxCDF	
ng	Catch, ng	(0.06)
ng/dscm	Concentration, ng/dscm, as measured	(0.0208)
µg/hr	Emission Rate, µg/hr	(1.92)
	123789 HxCDF	
ng	Catch, ng	(0.07)
ng/dscm	Concentration, ng/dscm, as measured	(0.0243)
µg/hr	Emission Rate, µg/hr	(2.24)
	Total HxCDF	
ng	Catch, ng	0.33
ng/dscm	Concentration, ng/dscm, as measured	0.114
µg/hr	Emission Rate, µg/hr	10.6
	1234678 HpCDF	
ng	Catch, ng	{0.05}
ng/dscm	Concentration, ng/dscm, as measured	{0.0173}
µg/hr	Emission Rate, µg/hr	{1.60}
	1234789 HpCDF	
ng	Catch, ng	(0.1)
ng/dscm	Concentration, ng/dscm, as measured	(0.0347)
µg/hr	Emission Rate, µg/hr	(3.20)

( ) Not Detected. Value shown is the detection limit and is included in totals.

{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 3 Baghouse Inlet

	RUN NUMBER	**M23-3-I-2**
	RUN DATE	**3/24/98**
	RUN TIME	**1332-1709**
	EMISSIONS DATA - Continued	
	Furans - Continued	
	Total HpCDF	
ng	Catch, ng	{0.05}
ng/dscm	Concentration, ng/dscm, as measured	{0.0173}
µg/hr	Emission Rate, µg/hr	{1.60}
	OCDF	
ng	Catch, ng	(0.1)
ng/dscm	Concentration, ng/dscm, as measured	(0.0347)
µg/hr	Emission Rate, µg/hr	(3.20)
	Total PCDF	
ng	Catch, ng	(15.28)
ng/dscm	Concentration, ng/dscm, as measured	(5.30)
µg/hr	Emission Rate, µg/hr	(489)
	Total PCDD + PCDF	
ng	Catch, ng	(16.10)
ng/dscm	Concentration, ng/dscm, as measured	(5.58)
µg/hr	Emission Rate, µg/hr	(515)

( ) Not Detected. Value shown is the detection limit and is included in totals.

{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Air Emissions Screening Test
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 4 Baghouse Inlet

	RUN NUMBER	**M23-4-I-1**
	RUN DATE	**3/23/98**
	RUN TIME	**1400-1808**
	MEASURED DATA	
γ	Meter Box Correction Factor	1.021
ΔH	Avg Meter Orifice Pressure, in. H_2O	1.42
P_{bar}	Barometric Pressure, inches Hg	30.00
V_m	Sample Volume, ft^3	113.011
T_m	Average Meter Temperature, °F	72.2
P_{static}	Stack Static Pressure, inches H_2O	-3.40
T_s	Average Stack Temperature, °F	878
V_{lc}	Condensate Collected, ml	118.9
CO_2	Carbon Dioxide content, % by volume	20.1
O_2	Oxygen content, % by volume	8.1
N_2	Nitrogen content, % by volume	71.8
C_p	Pitot Tube Coefficient	0.84
$\Delta p^{1/2}$	Average Square Root Δp, (in. $H_2O)^{1/2}$	0.6080
Θ	Sample Run Duration, minutes	180
D_n	Nozzle Diameter, inches	0.310
	CALCULATED DATA	
A_n	Nozzle Area, ft^2	0.00052
$V_{m(std)}$	Standard Meter Volume, dscf	115.145
$V_{m(std)}$	Standard Meter Volume, dscm	3.261
P_s	Stack Pressure, inches Hg	29.75
B_{ws}	Moisture, % by volume	4.6
V_{wstd}	Standard Water Vapor Volume, ft^3	5.597
$1-B_{ws}$	Dry Mole Fraction	0.954
M_d	Molecular Weight (d.b.), lb/lb•mole	31.54
M_s	Molecular Weight (w.b.), lb/lb•mole	30.91
V_s	Stack Gas Velocity, ft/s	52.7
A	Stack Area, ft^2	52.38
Q_a	Stack Gas Volumetric flow, acfm	165,516
Q_s	Stack Gas Volumetric flow, dscfm	61,921
$Q_{s(cmm)}$	Stack Gas Volumetric flow, dscmm	1,753
I	Isokinetic Sampling Ratio, %	103.3

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 4 Baghouse Inlet

	RUN NUMBER	**M23-4-I-1**
	RUN DATE	**3/23/98**
	RUN TIME	**1400-1808**
	EMISSIONS DATA	
	DIOXINS:	
	2378 TCDD	
ng	Catch, ng	(0.03)
ng/dscm	Concentration, ng/dscm, as measured	(0.00920)
µg/hr	Emission Rate, µg/hr	(0.968)
	Total TCDD	
ng	Catch, ng	(0.03)
ng/dscm	Concentration, ng/dscm, as measured	(0.00920)
µg/hr	Emission Rate, µg/hr	(0.968)
	12378 PeCDD	
ng	Catch, ng	(0.05)
ng/dscm	Concentration, ng/dscm, as measured	(0.0153)
µg/hr	Emission Rate, µg/hr	(1.61)
	Total PeCDD	
ng	Catch, ng	(0.05)
ng/dscm	Concentration, ng/dscm, as measured	(0.0153)
µg/hr	Emission Rate, µg/hr	(1.61)
	123478 HxCDD	
ng	Catch, ng	(0.06)
ng/dscm	Concentration, ng/dscm, as measured	(0.0184)
µg/hr	Emission Rate, µg/hr	(1.94)
	123678 HxCDD	
ng	Catch, ng	(0.06)
ng/dscm	Concentration, ng/dscm, as measured	(0.0184)
µg/hr	Emission Rate, µg/hr	(1.94)

( ) Not Detected. Value shown is the detection limit and is included in totals.
{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 4 Baghouse Inlet

	RUN NUMBER	**M23-4-I-1**
	RUN DATE	**3/23/98**
	RUN TIME	**1400-1808**
	EMISSIONS DATA -Continued	
	DIOXINS - Continued	
	123789 HxCDD	
ng	Catch, ng	(0.06)
ng/dscm	Concentration, ng/dscm, as measured	(0.0184)
µg/hr	Emission Rate, µg/hr	(1.94)
	Total HxCDD	
ng	Catch, ng	(0.06)
ng/dscm	Concentration, ng/dscm, as measured	(0.0184)
µg/hr	Emission Rate, µg/hr	(1.94)
	1234678 HpCDD	
ng	Catch, ng	(0.09)
ng/dscm	Concentration, ng/dscm, as measured	(0.0276)
µg/hr	Emission Rate, µg/hr	(2.90)
	Total HpCDD	
ng	Catch, ng	(0.09)
ng/dscm	Concentration, ng/dscm, as measured	(0.0276)
µg/hr	Emission Rate, µg/hr	(2.90)
	OCDD	
ng	Catch, ng	(0.1)
ng/dscm	Concentration, ng/dscm, as measured	(0.0307)
µg/hr	Emission Rate, µg/hr	(3.23)
	Total PCDD	
ng	Catch, ng	(0.33)
ng/dscm	Concentration, ng/dscm, as measured	(0.101)
µg/hr	Emission Rate, µg/hr	(10.6)

( ) Not Detected. Value shown is the detection limit and is included in totals.

{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 4 Baghouse Inlet

	RUN NUMBER	**M23-4-I-1**
	RUN DATE	**3/23/98**
	RUN TIME	**1400-1808**
	EMISSIONS DATA - Continued	
	FURANS	
	2378 TCDF	
ng	Catch, ng	{0.007}
ng/dscm	Concentration, ng/dscm, as measured	{0.00215}
µg/hr	Emission Rate, µg/hr	{0.226}
	Total TCDF	
ng	Catch, ng	0.09
ng/dscm	Concentration, ng/dscm, as measured	0.0276
µg/hr	Emission Rate, µg/hr	2.90
	12378 PeCDF	
ng	Catch, ng	(0.03)
ng/dscm	Concentration, ng/dscm, as measured	(0.00920)
µg/hr	Emission Rate, µg/hr	(0.968)
	23478 PeCDF	
ng	Catch, ng	(0.04)
ng/dscm	Concentration, ng/dscm, as measured	(0.0123)
µg/hr	Emission Rate, µg/hr	(1.29)
	Total PeCDF	
ng	Catch, ng	{0.06}
ng/dscm	Concentration, ng/dscm, as measured	{0.0184}
µg/hr	Emission Rate, µg/hr	{1.94}
	123478 HxCDF	
ng	Catch, ng	(0.04)
ng/dscm	Concentration, ng/dscm, as measured	(0.0123)
µg/hr	Emission Rate, µg/hr	(1.29)

( ) Not Detected. Value shown is the detection limit and is included in totals.

{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 4 Baghouse Inlet

	RUN NUMBER	**M23-4-I-1**
	RUN DATE	**3/23/98**
	RUN TIME	**1400-1808**
	EMISSIONS DATA - Continued	
	Furans - Continued	
	123678 HxCDF	
ng	Catch, ng	(0.04)
ng/dscm	Concentration, ng/dscm, as measured	(0.0123)
µg/hr	Emission Rate, µg/hr	(1.29)
	234678 HxCDF	
ng	Catch, ng	(0.04)
ng/dscm	Concentration, ng/dscm, as measured	(0.0123)
µg/hr	Emission Rate, µg/hr	(1.29)
	123789 HxCDF	
ng	Catch, ng	(0.05)
ng/dscm	Concentration, ng/dscm, as measured	(0.0153)
µg/hr	Emission Rate, µg/hr	(1.61)
	Total HxCDF	
ng	Catch, ng	(0.04)
ng/dscm	Concentration, ng/dscm, as measured	(0.0123)
µg/hr	Emission Rate, µg/hr	(1.29)
	1234678 HpCDF	
ng	Catch, ng	(0.06)
ng/dscm	Concentration, ng/dscm, as measured	(0.0184)
µg/hr	Emission Rate, µg/hr	(1.94)
	1234789 HpCDF	
ng	Catch, ng	(0.08)
ng/dscm	Concentration, ng/dscm, as measured	(0.0245)
µg/hr	Emission Rate, µg/hr	(2.58)

( ) Not Detected. Value shown is the detection limit and is included in totals.

{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 4 Baghouse Inlet

	RUN NUMBER	**M23-4-I-1**
	RUN DATE	**3/23/98**
	RUN TIME	**1400-1808**
	EMISSIONS DATA - Continued	
	Furans - Continued	
	Total HpCDF	
ng	Catch, ng	(0.06)
ng/dscm	Concentration, ng/dscm, as measured	(0.0184)
µg/hr	Emission Rate, µg/hr	(1.94)
	OCDF	
ng	Catch, ng	(0.1)
ng/dscm	Concentration, ng/dscm, as measured	(0.0307)
µg/hr	Emission Rate, µg/hr	(3.23)
	Total PCDF	
ng	Catch, ng	(0.35)
ng/dscm	Concentration, ng/dscm, as measured	(0.107)
µg/hr	Emission Rate, µg/hr	(11.3)
	Total PCDD + PCDF	
ng	Catch, ng	(0.68)
ng/dscm	Concentration, ng/dscm, as measured	(0.209)
µg/hr	Emission Rate, µg/hr	(21.9)

( ) Not Detected. Value shown is the detection limit and is included in totals.
{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Air Emissions Screening Test
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 3 Baghouse & Kiln No. 4 Baghouse Stack

	RUN NUMBER	**M23-O-1**
	RUN DATE	**3/23/98**
	RUN TIME	**1400-1806**
	MEASURED DATA	
γ	Meter Box Correction Factor	1.000
ΔH	Avg Meter Orifice Pressure, in. H_2O	1.48
P_{bar}	Barometric Pressure, inches Hg	30.00
V_m	Sample Volume, ft^3	108.116
T_m	Average Meter Temperature, °F	67.8
P_{static}	Stack Static Pressure, inches H_2O	-0.98
T_s	Average Stack Temperature, °F	417
V_{lc}	Condensate Collected, ml	390.3
CO_2	Carbon Dioxide content, % by volume	19.0
O_2	Oxygen content, % by volume	10.0
N_2	Nitrogen content, % by volume	71.0
C_p	Pitot Tube Coefficient	0.84
$\Delta p^{1/2}$	Average Square Root Δp, (in. $H_2O)^{1/2}$	0.8349
Θ	Sample Run Duration, minutes	180
D_n	Nozzle Diameter, inches	0.250
	CALCULATED DATA	
A_n	Nozzle Area, ft^2	0.00034
$V_{m(std)}$	Standard Meter Volume, dscf	108.805
$V_{m(std)}$	Standard Meter Volume, dscm	3.081
P_s	Stack Pressure, inches Hg	29.93
B_{ws}	Moisture, % by.volume	14.4
V_{wstd}	Standard Water Vapor Volume, ft^3	18.371
$1-B_{ws}$	Dry Mole Fraction	0.856
M_d	Molecular Weight (d.b.), lb/lb•mole	31.44
M_s	Molecular Weight (w.b.), lb/lb•mole	29.50
V_s	Stack Gas Velocity, ft/s	59.7
A	Stack Area, ft^2	78.54
Q_a	Stack Gas Volumetric flow, acfm	281,552
Q_s	Stack Gas Volumetric flow, dscfm	145,044
$Q_{s(cmm)}$	Stack Gas Volumetric flow, dscmm	4,107
I	Isokinetic Sampling Ratio, %	96.0

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 3 Baghouse & Kiln No. 4 Baghouse Stack

	RUN NUMBER	**M23-O-1**
	RUN DATE	**3/23/98**
	RUN TIME	**1400-1806**
	EMISSIONS DATA	
	DIOXINS:	
	2378 TCDD	
ng	Catch, ng	(0.01)
ng/dscm	Concentration, ng/dscm, as measured	(0.00325)
µg/hr	Emission Rate, µg/hr	(0.800)
	Total TCDD	
ng	Catch, ng	0.03
ng/dscm	Concentration, ng/dscm, as measured	0.00974
µg/hr	Emission Rate, µg/hr	2.40
	12378 PeCDD	
ng	Catch, ng	(0.02)
ng/dscm	Concentration, ng/dscm, as measured	(0.00649)
µg/hr	Emission Rate, µg/hr	(1.60)
	Total PeCDD	
ng	Catch, ng	(0.02)
ng/dscm	Concentration, ng/dscm, as measured	(0.00649)
µg/hr	Emission Rate, µg/hr	(1.60)
	123478 HxCDD	
ng	Catch, ng	(0.02)
ng/dscm	Concentration, ng/dscm, as measured	(0.00649)
µg/hr	Emission Rate, µg/hr	(1.60)
	123678 HxCDD	
ng	Catch, ng	(0.02)
ng/dscm	Concentration, ng/dscm, as measured	(0.00649)
µg/hr	Emission Rate, µg/hr	(1.60)

( ) Not Detected. Value shown is the detection limit and is included in totals.
{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 3 Baghouse & Kiln No. 4 Baghouse Stack

	RUN NUMBER	***M23-O-1***
	RUN DATE	***3/23/98***
	RUN TIME	***1400-1806***
	EMISSIONS DATA -Continued	
	DIOXINS - Continued	
	123789 HxCDD	
ng	Catch, ng	(0.02)
ng/dscm	Concentration, ng/dscm, as measured	(0.00649)
µg/hr	Emission Rate, µg/hr	(1.60)
	Total HxCDD	
ng	Catch, ng	(0.02)
ng/dscm	Concentration, ng/dscm, as measured	(0.00649)
µg/hr	Emission Rate, µg/hr	(1.60)
	1234678 HpCDD	
ng	Catch, ng	(0.03)
ng/dscm	Concentration, ng/dscm, as measured	(0.00974)
µg/hr	Emission Rate, µg/hr	(2.40)
	Total HpCDD	
ng	Catch, ng	(0.03)
ng/dscm	Concentration, ng/dscm, as measured	(0.00974)
µg/hr	Emission Rate, µg/hr	(2.40)
	OCDD	
ng	Catch, ng	(0.05)
ng/dscm	Concentration, ng/dscm, as measured	(0.0162)
µg/hr	Emission Rate, µg/hr	(4.00)
	Total PCDD	
ng	Catch, ng	(0.15)
ng/dscm	Concentration, ng/dscm, as measured	(0.0487)
µg/hr	Emission Rate, µg/hr	(12.0)

( ) Not Detected. Value shown is the detection limit and is included in totals.

{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 3 Baghouse & Kiln No. 4 Baghouse Stack

	RUN NUMBER	**M23-O-1**
	RUN DATE	**3/23/98**
	RUN TIME	**1400-1806**
	EMISSIONS DATA - Continued	
	FURANS	
	2378 TCDF	
ng	Catch, ng	(0.01)
ng/dscm	Concentration, ng/dscm, as measured	(0.00325)
µg/hr	Emission Rate, µg/hr	(0.800)
	Total TCDF	
ng	Catch, ng	{0.02}
ng/dscm	Concentration, ng/dscm, as measured	{0.00649}
µg/hr	Emission Rate, µg/hr	{1.60}
	12378 PeCDF	
ng	Catch, ng	(0.01)
ng/dscm	Concentration, ng/dscm, as measured	(0.00325)
µg/hr	Emission Rate, µg/hr	(0.800)
	23478 PeCDF	
ng	Catch, ng	(0.01)
ng/dscm	Concentration, ng/dscm, as measured	(0.00325)
µg/hr	Emission Rate, µg/hr	(0.800)
	Total PeCDF	
ng	Catch, ng	{0.01}
ng/dscm	Concentration, ng/dscm, as measured	{0.00325}
µg/hr	Emission Rate, µg/hr	{0.800}
	123478 HxCDF	
ng	Catch, ng	(0.01)
ng/dscm	Concentration, ng/dscm, as measured	(0.00325)
µg/hr	Emission Rate, µg/hr	(0.800)

( ) Not Detected. Value shown is the detection limit and is included in totals.

{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 3 Baghouse & Kiln No. 4 Baghouse Stack

	RUN NUMBER	**M23-O-1**
	RUN DATE	**3/23/98**
	RUN TIME	**1400-1806**
	EMISSIONS DATA - Continued	
	Furans - Continued	
	123678 HxCDF	
ng	Catch, ng	(0.01)
ng/dscm	Concentration, ng/dscm, as measured	(0.00325)
µg/hr	Emission Rate, µg/hr	(0.800)
	234678 HxCDF	
ng	Catch, ng	(0.01)
ng/dscm	Concentration, ng/dscm, as measured	(0.00325)
µg/hr	Emission Rate, µg/hr	(0.800)
	123789 HxCDF	
ng	Catch, ng	(0.01)
ng/dscm	Concentration, ng/dscm, as measured	(0.00325)
µg/hr	Emission Rate, µg/hr	(0.800)
	Total HxCDF	
ng	Catch, ng	(0.01)
ng/dscm	Concentration, ng/dscm, as measured	(0.00325)
µg/hr	Emission Rate, µg/hr	(0.800)
	1234678 HpCDF	
ng	Catch, ng	(0.02)
ng/dscm	Concentration, ng/dscm, as measured	(0.00649)
µg/hr	Emission Rate, µg/hr	(1.60)
	1234789 HpCDF	
ng	Catch, ng	(0.02)
ng/dscm	Concentration, ng/dscm, as measured	(0.00649)
µg/hr	Emission Rate, µg/hr	(1.60)

( ) Not Detected. Value shown is the detection limit and is included in totals.

{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 3 Baghouse & Kiln No. 4 Baghouse Stack

	RUN NUMBER	**M23-O-1**
	RUN DATE	**3/23/98**
	RUN TIME	**1400-1806**
	EMISSIONS DATA - Continued	
	Furans - Continued	
	Total HpCDF	
ng	Catch, ng	(0.02)
ng/dscm	Concentration, ng/dscm, as measured	(0.00649)
µg/hr	Emission Rate, µg/hr	(1.60)
	OCDF	
ng	Catch, ng	(0.04)
ng/dscm	Concentration, ng/dscm, as measured	(0.0130)
µg/hr	Emission Rate, µg/hr	(3.20)
	Total PCDF	
ng	Catch, ng	(0.10)
ng/dscm	Concentration, ng/dscm, as measured	(0.0325)
µg/hr	Emission Rate, µg/hr	(8.00)
	Total PCDD + PCDF	
ng	Catch, ng	(0.25)
ng/dscm	Concentration, ng/dscm, as measured	(0.0811)
µg/hr	Emission Rate, µg/hr	(20.0)

( ) Not Detected. Value shown is the detection limit and is included in totals.
{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Air Emissions Screening Test
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 3 Baghouse & Kiln No. 4 Baghouse Stack

	RUN NUMBER	**M23-O-2**
	RUN DATE	**3/24/98**
	RUN TIME	**1332-1709**
	MEASURED DATA	
γ	Meter Box Correction Factor	1.000
ΔH	Avg Meter Orifice Pressure, in. H_2O	1.58
P_{bar}	Barometric Pressure, inches Hg	30.00
V_m	Sample Volume, ft^3	115.075
T_m	Average Meter Temperature, °F	79.7
P_{static}	Stack Static Pressure, inches H_2O	-6.20
T_s	Average Stack Temperature, °F	416
V_{lc}	Condensate Collected, ml	406.0
CO_2	Carbon Dioxide content, % by volume	18.6
O_2	Oxygen content, % by volume	10.0
N_2	Nitrogen content, % by volume	71.4
C_p	Pitot Tube Coefficient	0.84
$\Delta p^{1/2}$	Average Square Root Δp, (in. $H_2O)^{1/2}$	0.8163
Θ	Sample Run Duration, minutes	180
D_n	Nozzle Diameter, inches	0.250
	CALCULATED DATA	
A_n	Nozzle Area, ft^2	0.00034
$V_{m(std)}$	Standard Meter Volume, dscf	113.279
$V_{m(std)}$	Standard Meter Volume, dscm	3.208
P_s	Stack Pressure, inches Hg	29.54
B_{ws}	Moisture, % by volume	14.4
V_{wstd}	Standard Water Vapor Volume, ft^3	19.110
$1-B_{ws}$	Dry Mole Fraction	0.856
M_d	Molecular Weight (d.b.), lb/lb•mole	31.38
M_s	Molecular Weight (w.b.), lb/lb•mole	29.45
V_s	Stack Gas Velocity, ft/s	58.8
A	Stack Area, ft^2	78.54
Q_a	Stack Gas Volumetric flow, acfm	277,133
Q_s	Stack Gas Volumetric flow, dscfm	141,129
$Q_{s(cmm)}$	Stack Gas Volumetric flow, dscmm	3,996
I	Isokinetic Sampling Ratio, %	102.8

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 3 Baghouse & Kiln No. 4 Baghouse Stack

	RUN NUMBER	**M23-O-2**
	RUN DATE	**3/24/98**
	RUN TIME	**1332-1709**
	EMISSIONS DATA	
	DIOXINS:	
	2378 TCDD	
ng	Catch, ng	(0.006)
ng/dscm	Concentration, ng/dscm, as measured	(0.00187)
µg/hr	Emission Rate, µg/hr	(0.449)
	Total TCDD	
ng	Catch, ng	0.08
ng/dscm	Concentration, ng/dscm, as measured	0.0249
µg/hr	Emission Rate, µg/hr	5.98
	12378 PeCDD	
ng	Catch, ng	(0.009)
ng/dscm	Concentration, ng/dscm, as measured	(0.00281)
µg/hr	Emission Rate, µg/hr	(0.673)
	Total PeCDD	
ng	Catch, ng	0.03
ng/dscm	Concentration, ng/dscm, as measured	0.00935
µg/hr	Emission Rate, µg/hr	2.24
	123478 HxCDD	
ng	Catch, ng	(0.01)
ng/dscm	Concentration, ng/dscm, as measured	(0.00312)
µg/hr	Emission Rate, µg/hr	(0.748)
	123678 HxCDD	
ng	Catch, ng	(0.01)
ng/dscm	Concentration, ng/dscm, as measured	(0.00312)
µg/hr	Emission Rate, µg/hr	(0.748)

( ) Not Detected. Value shown is the detection limit and is included in totals.
{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 3 Baghouse & Kiln No. 4 Baghouse Stack

	RUN NUMBER	**M23-O-2**
	RUN DATE	**3/24/98**
	RUN TIME	**1332-1709**
	EMISSIONS DATA -Continued	
	DIOXINS - Continued	
	123789 HxCDD	
ng	Catch, ng	(0.01)
ng/dscm	Concentration, ng/dscm, as measured	(0.00312)
µg/hr	Emission Rate, µg/hr	(0.748)
	Total HxCDD	
ng	Catch, ng	(0.01)
ng/dscm	Concentration, ng/dscm, as measured	(0.00312)
µg/hr	Emission Rate, µg/hr	(0.748)
	1234678 HpCDD	
ng	Catch, ng	0.01
ng/dscm	Concentration, ng/dscm, as measured	0.00312
µg/hr	Emission Rate, µg/hr	0.748
	Total HpCDD	
ng	Catch, ng	0.01
ng/dscm	Concentration, ng/dscm, as measured	0.00312
µg/hr	Emission Rate, µg/hr	0.748
	OCDD	
ng	Catch, ng	{0.03}
ng/dscm	Concentration, ng/dscm, as measured	{0.00935}
µg/hr	Emission Rate, µg/hr	{2.24}
	Total PCDD	
ng	Catch, ng	(0.16)
ng/dscm	Concentration, ng/dscm, as measured	(0.0499)
µg/hr	Emission Rate, µg/hr	(12.0)

( ) Not Detected. Value shown is the detection limit and is included in totals.

{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 3 Baghouse & Kiln No. 4 Baghouse Stack

	RUN NUMBER	**M23-O-2**
	RUN DATE	**3/24/98**
	RUN TIME	**1332-1709**
	EMISSIONS DATA - Continued	
	FURANS	
	2378 TCDF	
ng	Catch, ng	0.01
ng/dscm	Concentration, ng/dscm, as measured	0.00312
µg/hr	Emission Rate, µg/hr	0.748
	Total TCDF	
ng	Catch, ng	0.25
ng/dscm	Concentration, ng/dscm, as measured	0.0779
µg/hr	Emission Rate, µg/hr	18.7
	12378 PeCDF	
ng	Catch, ng	(0.006)
ng/dscm	Concentration, ng/dscm, as measured	(0.00187)
µg/hr	Emission Rate, µg/hr	(0.449)
	23478 PeCDF	
ng	Catch, ng	(0.006)
ng/dscm	Concentration, ng/dscm, as measured	(0.00187)
µg/hr	Emission Rate, µg/hr	(0.449)
	Total PeCDF	
ng	Catch, ng	0.02
ng/dscm	Concentration, ng/dscm, as measured	0.00624
µg/hr	Emission Rate, µg/hr	1.50
	123478 HxCDF	
ng	Catch, ng	(0.008)
ng/dscm	Concentration, ng/dscm, as measured	(0.00249)
µg/hr	Emission Rate, µg/hr	(0.598)

( ) Not Detected. Value shown is the detection limit and is included in totals.
{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 3 Baghouse & Kiln No. 4 Baghouse Stack

	RUN NUMBER	**M23-O-2**
	RUN DATE	**3/24/98**
	RUN TIME	**1332-1709**
	EMISSIONS DATA - Continued	
	Furans - Continued	
	123678 HxCDF	
ng	Catch, ng	(0.007)
ng/dscm	Concentration, ng/dscm, as measured	(0.00218)
µg/hr	Emission Rate, µg/hr	(0.523)
	234678 HxCDF	
ng	Catch, ng	(0.009)
ng/dscm	Concentration, ng/dscm, as measured	(0.00281)
µg/hr	Emission Rate, µg/hr	(0.673)
	123789 HxCDF	
ng	Catch, ng	(0.01)
ng/dscm	Concentration, ng/dscm, as measured	(0.00312)
µg/hr	Emission Rate, µg/hr	(0.75)
	Total HxCDF	
ng	Catch, ng	{0.007}
ng/dscm	Concentration, ng/dscm, as measured	{0.00218}
µg/hr	Emission Rate, µg/hr	{0.523}
	1234678 HpCDF	
ng	Catch, ng	{0.01}
ng/dscm	Concentration, ng/dscm, as measured	{0.00312}
µg/hr	Emission Rate, µg/hr	{0.748}
	1234789 HpCDF	
ng	Catch, ng	(0.02)
ng/dscm	Concentration, ng/dscm, as measured	(0.00624)
µg/hr	Emission Rate, µg/hr	(1.50)

( ) Not Detected. Value shown is the detection limit and is included in totals.
{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Chemical Lime Company - Montevallo, Alabama
US EPA Test Method 23 - PCDDs / PCDFs
Kiln No. 3 Baghouse & Kiln No. 4 Baghouse Stack

	RUN NUMBER	**M23-O-2**
	RUN DATE	**3/24/98**
	RUN TIME	**1332-1709**
	EMISSIONS DATA - Continued	
	Furans - Continued	
	Total HpCDF	
ng	Catch, ng	{0.01}
ng/dscm	Concentration, ng/dscm, as measured	{0.00312}
µg/hr	Emission Rate, µg/hr	{0.748}
	OCDF	
ng	Catch, ng	(0.03)
ng/dscm	Concentration, ng/dscm, as measured	(0.00935)
µg/hr	Emission Rate, µg/hr	(2.24)
	Total PCDF	
ng	Catch, ng	(0.317)
ng/dscm	Concentration, ng/dscm, as measured	(0.0988)
µg/hr	Emission Rate, µg/hr	(23.7)
	Total PCDD + PCDF	
ng	Catch, ng	(0.477)
ng/dscm	Concentration, ng/dscm, as measured	(0.149)
µg/hr	Emission Rate, µg/hr	(35.7)

( ) Not Detected. Value shown is the detection limit and is included in totals.

{ } Estimated Maximum Possible Concentration. EMPC values are included in totals.

Summary of Stack Gas Parameters and Test Results
Air Emissions Screening Test
Chemical Lime Company - Montevallo, Alabama
US EPA Test Methods 2 - Volumetric Air Flow Rates
Kiln No. 3 Baghouse and Kiln No. 4 Baghouse Inlets
Page 1 of 1

		Kiln No. 3 Baghouse Inlet	Kiln No. 4 Baghouse Inlet
	RUN NUMBER	**M2-3-I-1**	**M2-4-I-2**
	RUN DATE	**3/23/98**	**3/24/98**
	RUN TIME	**1440-1455**	**1430-1450**
	MEASURED DATA		
P_{static}	Stack Static Pressure, inches H_2O	-3.4	-2.6
P_{bar}	Barometric Pressure, inches Hg	30.00	30.00
C_p	Pitot Tube Coefficient	0.84	0.84
$\Delta p^{1/2}$	Average Square Root Δp, (in. $H_2O)^{1/2}$	0.6841	0.6426
T_s	Average Stack Temperature, °F	933.7	884.8
CO_2	Carbon Dioxide content, % by volume	26.6	20.1
O_2	Oxygen content, % by volume	5.3	8.1
N_2	Nitrogen content, % by volume	68.1	71.8
	Estimated Moisture, %	7.80	4.60
Dia	Diameter or Dimensions, inches	98.00	98.00
	CALCULATED DATA		
P_s	Stack Pressure, inches Hg	29.75	29.81
B_{ws}	Moisture, % by volume	7.80	4.60
$1-B_{ws}$	Dry Mole Fraction	0.922	0.954
M_d	Molecular Weight (d.b.), lb/lb•mole	32.47	31.54
M_s	Molecular Weight (w.b.), lb/lb•mole	31.34	30.92
V_s	Stack Gas Velocity, ft/s	60.1	55.7
A	Stack Area, ft^2	52.38	52.38
Q_a	Stack Gas Volumetric flow, acfm	188,771	175,191
Q_s	Stack Gas Volumetric flow, dscfm	65,537	65,354
Q_s	Stack Gas Volumetric flow, dscmm	1,856	1,851

Summary of Stack Gas Parameters and Test Results
Air Emissions Screening Test
Chemical Lime Company - Montevallo, Alabama
US EPA Test Methods 2 - Volumetric Air Flow Rates
Kiln No. 3 Baghouse & Kiln No. 4 Baghouse Stack
Page 1 of 1

	RUN NUMBER	**M2-O-3**
	RUN DATE	**3/25/98**
	RUN TIME	**0910-0915**
	MEASURED DATA	
P_{static}	Stack Static Pressure, inches H_2O	-0.65
P_{bar}	Barometric Pressure, inches Hg	30.00
C_p	Pitot Tube Coefficient	0.84
$\Delta p^{1/2}$	Average Square Root Δp, (in. $H_2O)^{1/2}$	0.8074
T_s	Average Stack Temperature, °F	409.0
CO_2	Carbon Dioxide content, % by volume	17.7
O_2	Oxygen content, % by volume	10.0
N_2	Nitrogen content, % by volume	72.3
	Estimated Moisture, %	14.0
Dia	Diameter or Dimensions, inches	120.00
	CALCULATED DATA	
P_s	Stack Pressure, inches Hg	29.95
B_{ws}	Moisture, % by volume	14.0
$1-B_{ws}$	Dry Mole Fraction	0.860
M_d	Molecular Weight (d.b.), lb/lb•mole	31.23
M_s	Molecular Weight (w.b.), lb/lb•mole	29.38
V_s	Stack Gas Velocity, ft/s	57.6
A	Stack Area, ft^2	78.54
Q_a	Stack Gas Volumetric flow, acfm	271,519
Q_s	Stack Gas Volumetric flow, dscfm	141,973
Q_s	Stack Gas Volumetric flow, dscmm	4,020

Summary of Stack Gas Parameters and Test Results
Air Emissions Screening Test
Chemical Lime Company - Montevallo, Alabama
US EPA Test Methods 2 - Volumetric Air Flow Rates
CO_2 Bubbler Slipstream Off Kiln No. 3 & Kiln No. 4 Stack
Page 1 of 1

	RUN NUMBER	**M2-CBS-1**	**M2-CBS-2**
	RUN DATE	**3/23/98**	**3/24/98**
	RUN TIME	**1440-1455**	**1430-1450**
	MEASURED DATA		
P_{static}	Stack Static Pressure, inches H_2O	-1.5	-1.5
P_{bar}	Barometric Pressure, inches Hg	30.00	30.00
C_p	Pitot Tube Coefficient	0.84	0.84
$\Delta p^{1/2}$	Average Square Root Δp, (in. $H_2O)^{1/2}$	0.4868	0.4285
T_s	Average Stack Temperature, °F	302.7	315.4
CO_2	Carbon Dioxide content, % by volume	19.0	18.6
O_2	Oxygen content, % by volume	10.0	10.0
N_2	Nitrogen content, % by volume	71.0	71.4
	Estimated Moisture, %	14.40	14.40
Dim	Diameter or Dimensions, inches	29.50	29.50
	CALCULATED DATA		
P_s	Stack Pressure, inches Hg	29.89	29.89
B_{ws}	Moisture, % by volume	14.40	14.40
$1-B_{ws}$	Dry Mole Fraction	0.856	0.856
M_d	Molecular Weight (d.b.), lb/lb•mole	31.44	31.38
M_s	Molecular Weight (w.b.), lb/lb•mole	29.50	29.45
V_s	Stack Gas Velocity, ft/s	32.5	28.9
A	Stack Area, ft^2	4.75	4.75
Q_a	Stack Gas Volumetric flow, acfm	9,258	8,226
Q_s	Stack Gas Volumetric flow, dscfm	5,479	4,788
Q_s	Stack Gas Volumetric flow, dscmm	155	136

Example Calculations
Chemical Lime Company- Montevallo, Alabama
US EPA Method 23-PCDD/PCDF
(Using Data from Run M23-O-1)

Note: Discrepancies may exist between the computer generated reported results, which use more significant figures, and the values manually calculated from the displayed values.

1. Volume of dry gas sampled corrected to standard conditions of 68°F, 29.92 in. Hg, ft^3.

$$V_{m(std)} = 17.64 V_m Y \left(\frac{P_{bar} + \frac{\Delta H}{13.6}}{460 + t_m} \right)$$

$$V_{m(std)} = (17.64)(108.116)(1.000) \left(\frac{30.0 + \frac{1.475}{13.6}}{460 + 67.75} \right)$$

$$V_{m(std)} = 108.805 \text{ dscf}$$

2. Volume of dry gas sampled corrected to standard conditions of 68°F, 29.92 in. Hg, m^3.

$$V_{m(std)m^3} = V_{m(std)}(0.028317)$$

$$V_{m(std)m^3} = (108.805)(0.028317)$$

$$V_{m(std)m^3} = 3.081 \text{ dscm}$$

3. Volume of water vapor at standard conditions, ft^3.

$$V_{w(std)} = 0.04707 V_{1c}$$

$$V_{w(std)} = (0.04707)(390.3)$$

$$V_{w(std)} = 18.371 \text{ scf}$$

4. Moisture content in stack gas.

$$B_{ws} = \frac{V_{w(std)}}{\left(V_{m(std)} + V_{w(std)}\right)}$$

$$B_{ws} = \frac{18.371}{108.805 + 18.371}$$

$$B_{ws} = 0.1445$$

5. Dry molecular weight of stack gas, lb/lb-mol.

$$M_d = 0.440(\%CO_2) + 0.320(\%O_2) + 0.280(\%N_2 + \%CO)$$

$$M_d = 0.440(19.0) + 0.320(10.0) + 0.280(71 + 0)$$

$$M_d = 31.44 \text{ lb/lbmol}$$

6. Molecular weight of stack gas, lb/lb-mol.

$$M_s = M_d(1 - B_{ws}) + 18(B_{ws})$$

$$M_s = 31.44(1 - 0.1445) + 18(0.1445)$$

$$M_s = 31.44(0.8555) + 18(0.1445)$$

$$M_s = 26.89692 + 2.601$$

$$M_s = 29.50 \text{ lb/lbmol}$$

7. Absolute stack gas pressure, in. Hg.

$$P_s = P_{bar} + \frac{P_{static}}{13.6}$$

$$P_s = 30.0 + \frac{(-0.98)}{13.6}$$

$$P_s = 29.93 \text{ inches Hg}$$

8. Stack velocity at stack conditions, fps.

$$V_s = 85.49\ C_p \left(\sqrt{\Delta P}\right)_{avg} \sqrt{\frac{T_s + 460}{M_s\ P_s}}$$

$$V_s = (85.49)(0.84)(0.8349) \sqrt{\frac{(416.75+460)}{(29.50)(29.93)}}$$

$$V_s = 59.75 \text{ fps}$$

9. Isokinetic Variation.

$$\%I = \frac{\left(V_{m(std)}\right)\left(T_s + 460\right)(17.32)}{\left(V_s\right)\left(D_n^2\right)(\theta)\left(P_s\right)\left(1 - B_{ws}\right)}$$

$$\%I = \frac{(108.805)\ (416.75+460)\ (17.32)}{(59.75)\ (0.250)^2\ (180)\ (29.93)\ (1-0.1445)}$$

$$\%I = 96.0$$

10. Stack gas volumetric flow rate at stack conditions, acfm.

$$Q_s = (60)\ (A)\ (V_s)$$

$$Q_s = (60)\ (78.54)\ (59.75)$$

$$Q_s = 281{,}552 \text{ acfm}$$

11. Dry stack gas volumetric flow rate at standard conditions, dscfm.

$$Q_{s(std)} = 17.64\ Q_s \frac{P_s}{T_s} \left(1 - B_{ws}\right)$$

$$Q_{s(std)} = (17.64)\ (281{,}552) \left(\frac{29.93}{417+460}\right) \left(1 - 0.1445\right)$$

$$Q_{s(std)} = 145{,}044 \text{ dscfm}$$

12. Dry stack gas volumetric flow rate at standard conditions, dscmm.

$$Q_{s(std)m^3/min} = Q_{s(std)}\ 0.028317$$

$$Q_{s(std)m^3/min} = (145{,}044)\ (0.028317)$$

$$Q_{s(std)m^3/min} = 4{,}107 \text{ dscmm}$$

13. Pollutant (2378 TCDD) concentration, ng/dscm.

$$\text{ng/dscm} = \frac{\text{ng}}{V_{m(std)m^3}}$$

$$\text{ng/dscm} = \frac{0.01}{3.081}$$

$$\text{ng/dscm} = 0.00325 \text{ ng/dscm}$$

14. Pollutant (2378 TCDD) concentration, ng/dscm adjusted to 7 percent oxygen.

$$\text{ng/dscm@7\%O}_2 = (\text{ng/dscm}) \frac{(20.9 - 7)}{(20.9 - \%O_2)}$$

$$\text{ng/dscm@7\%O}_2 = (0.00325) \frac{13.9}{(20.9 - 10.0)}$$

$$\text{ng/dscm@7\%O}_2 = 0.00414 \text{ ng/dscm@7\%O}_2$$

15. Pollutant (2378 TCDD) emission rate, μg/hr.

$$\mu\text{g/hr} = \frac{(60)\ (\text{ng})\ (Q_{s(std)})}{(10^3)\ (V_{m(std)})}$$

$$\mu\text{g/hr} = \frac{(60)\ (0.01)\ (145.044)}{(10^3)\ (108.805)}$$

$$\mu\text{g/hr} = 0.800\ \mu\text{g/hr}$$

APPENDIX D

CALIBRATION DATA

PACIFIC ENVIRONMENTAL SERVICES, INC.
Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

Initial Dry Gas Meter Calibration Form (English Units)

Date: 9/1/97 Calibrator: Tom McDonald Meter Box No.: MB-10

P_{bar}, in Hg 30.16 Reference Meter Correction Factor: 1.0049 (8/28/96)

ΔH = 0.5

		Dry Gas Meter MB-10								
	Trial	Gas Volume			Meter Temperatures					
	Duration	Initial	Final	Net	Initial, Inlet	Final, Inlet	Avg. Inlet	Initial, Outlet	inal, Outle	Avg. Outlet
Trial	(min)	(ft^3)	(ft^3)	(ft^3)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)
1	19	994.409	1001.982	7.573	74	78	76	73	75	74
2	19	1001.982	1009.513	7.531	77	80	78.5	75	77	76
3	19	1009.513	1017.050	7.537	80	81	80.5	77	78	77.5

	Reference Meter						Meter Box	Reference
	Gas Volume			Meter Temperature			Correction	Orifice Press
	Initial	Final	Net	Initial	Final	Avg.	Factor	$\Delta H_@$
Trial	(ft^3)	(ft^3)	(ft^3)	(°F)	(°F)	(°F)	γ	(in. H_2O)
1	600.523	608.185	7.662	72	74	73	1.019	1.71
2	608.185	615.801	7.616	74	76	75	1.019	1.74
3	615.801	623.430	7.629	76	77	76.5	1.021	1.74

ΔH = 0.75

		Dry Gas Meter MB-10								
	Trial	Gas Volume			Meter Temperatures					
	Duration	Initial	Final	Net	Initial, Inlet	Final, Inlet	Avg. Inlet	Initial, Outlet	inal, Outle	Avg. Outlet
Trial	(min)	(ft^3)	(ft^3)	(ft^3)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)
1	15	17.220	24.350	7.130	80	82	81	78	79	78.5
2	15	24.350	31.563	7.213	82	83	82.5	79	79	79
3	15	31.563	38.780	7.217	82	83	82.5	79	81	80

	Reference Meter						Meter Box	Reference
	Gas Volume			Meter Temperature			Correction	Orifice Press
	Initial	Final	Net	Initial	Final	Avg.	Factor	$\Delta H_@$
Trial	(ft^3)	(ft^3)	(ft^3)	(°F)	(°F)	(°F)	γ	(in. H_2O)
1	623.622	630.833	7.211	77	77	77	1.020	1.82
2	630.833	638.141	7.308	78	78	78	1.021	1.77
3	638.141	645.425	7.284	78	78.5	78.25	1.018	1.79

ΔH = 1.0

		Dry Gas Meter MB-10								
	Trial	Gas Volume			Meter Temperatures					
	Duration	Initial	Final	Net	Initial, Inlet	Final, Inlet	Avg. Inlet	Initial, Outlet	inal, Outle	Avg. Outlet
Trial	(min)	(ft^3)	(ft^3)	(ft^3)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)
1	10	38.946	44.490	5.544	81	83	82	80	80	80
2	10	44.490	50.050	5.560	83	84	83.5	80	80	80
3	10	50.050	55.585	5.535	84	84	84	80	80	80

	Reference Meter						Meter Box	Reference
	Gas Volume			Meter Temperature			Correction	Orifice Press
	Initial	Final	Net	Initial	Final	Avg.	Factor	$\Delta H_@$
Trial	(ft^3)	(ft^3)	(ft^3)	(°F)	(°F)	(°F)	γ	(in. H_2O)
1	645.614	651.22	5.606	78	78	78	1.019	1.79
2	651.220	656.829	5.609	78	78	78	1.018	1.78
3	656.829	662.435	5.606	78	78	78	1.023	1.78

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ΔH = 2.0		Dry Gas Meter MB-10								
	Trial	Gas Volume			Meter Temperatures					
Trial	Duration (min)	Initial (ft^3)	Final (ft^3)	Net (ft^3)	Initial, Inlet (°F)	Final, Inlet (°F)	Avg. Inlet (°F)	Initial, Outlet (°F)	inal, Outle (°F)	Avg. Outlet (°F)
1	10	55.868	63.519	7.651	84	86	85	81	81	81
2	10	63.519	71.182	7.663	86	86	86	81	81	81
3	10	71.182	78.845	7.663	86	87	86.5	81	81	81

	Reference Meter						Meter Box Correction Factor	Reference Orifice Press
	Gas Volume			Meter Temperature				
Trial	Initial (ft^3)	Final (ft^3)	Net (ft^3)	Initial (°F)	Final (°F)	Avg. (°F)	γ	$\Delta H_@$ (in. H_2O)
1	662.729	670.472	7.743	78	78	78	1.021	1.87
2	670.472	678.244	7.772	78	78	78	1.025	1.86
3	678.244	686.010	7.766	78	78	78	1.024	1.86

ΔH = 4.0		Dry Gas Meter MB-10								
	Trial	Gas Volume			Meter Temperatures					
Trial	Duration (min)	Initial (ft^3)	Final (ft^3)	Net (ft^3)	Initial, Inlet (°F)	Final, Inlet (°F)	Avg. Inlet (°F)	Initial, Outlet (°F)	inal, Outle (°F)	Avg. Outlet (°F)
1	8	79.058	86.620	7.562	85	88	86.5	81	82	81.5
2	8	86.620	94.185	7.565	87	89	88	82	82	82
3	8	94.185	101.754	7.569	89	89	89	82	82	82

	Reference Meter						Meter Box Correction Factor	Reference Orifice Press
	Gas Volume			Meter Temperature				
Trial	Initial (ft^3)	Final (ft^3)	Net (ft^3)	Initial (°F)	Final (°F)	Avg. (°F)	γ	$\Delta H_@$ (in. H_2O)
1	686.208	693.895	7.687	78	78	78	1.023	2.44
2	693.895	701.558	7.663	78	78	78	1.021	2.45
3	701.558	709.244	7.686	78	78	78	1.025	2.43

Calibration Results

ΔH	γ	$\Delta H_@$
0.50	1.020	1.73
0.75	1.020	1.79
1.0	1.020	1.78
2.0	1.023	1.86
4.0	1.023	2.44

Dry Gas Meter MB-10 on 09/01/97

Meter Box Calibration Factor	**1.021**
Meter Box Reference Orifice Pressure	**1.92**

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(919) 941-0333 FAX: (919) 941-0234

Posttest Dry Gas Meter Calibration Form (English Units)

Pretest Calibration Factor 1.021
System Vacuum Setting, (in Hg) 16
Reference Meter Correction Factor 1.0077
Date: 5/2/98 P_{bar}, in Hg 29.94 Calibrator: D. Holzschuh Meter Box No. MB-10

ΔH = 1.41		Dry Gas Meter								
Trial	Duration (min)	Initial (ft³)	Final (ft³)	Net (ft³)	Initial, Inlet (°F)	Final, Inle (°F)	Avg. Inlet (°F)	Initial, Outlet (°F)	Final, Outlet (°F)	Avg. Outlet (°F)
1	15	902.1	912.624	10.524	75	76	75.5	74	74	74
2	8	912.624	917.993	5.369	76	76	76	74	74	74
3	8	917.493	923.154	5.661	76	76	76	74	74	74

	Reference Meter						Meter Box Correction Factor	Reference Orifice Press
	Gas Volume			Meter Temperature				
Trial	Initial (ft³)	Final (ft³)	Net (ft³)	Initial (°F)	Final (°F)	Avg. (°F)	γ	$\Delta H_@$ (in. H2O)
1	320.645	331.244	10.601	75	75	75	1.011	1.59
2	331.244	336.545	5.301	72	73	72.5	0.996	1.79
3	336.545	341.865	5.32	73	73	73	0.947	1.78

AVERAGE	0.985	1.722
% Change	-3.56%	

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Initial Dry Gas Meter Calibration Form (English Units)

Date: 10/13/97 Calibrator: MMD Meter Box No.: RMB-15

P_{bar}, in Hg 29.86 Reference Meter Correction Factor: 1.0077 (10/5/97)

ΔH = 0.5

		Dry Gas Meter RMB-15								
	Trial	Gas Volume			Meter Temperatures					
	Duration	Initial	Final	Net	Initial, Inlet	Final, Inlet	Avg. Inlet	Initial, Outlet	inal, Outle	Avg. Outlet
Trial	(min)	(ft^3)	(ft^3)	(ft^3)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)
1	15	48.833	54.722	5.889	73	77	75	72	75	73.5
2	13	54.722	59.821	5.099	78	80	79	74	75	74.5
3	12	59.821	64.544	4.723	80	83	81.5	76	77	76.5

	Reference Meter						Meter Box	Reference
	Gas Volume			Meter Temperature			Correction	Orifice Press
	Initial	Final	Net	Initial	Final	Avg.	Factor	$\Delta H_@$
Trial	(ft^3)	(ft^3)	(ft^3)	(°F)	(°F)	(°F)	γ	(in. H_2O)
1	34.044	39.829	5.785	70	70	70	0.997	1.86
2	39.829	44.843	5.014	71	70	70.5	1.001	1.86
3	44.843	49.463	4.620	71	71	71	0.999	1.86

ΔH = 0.75

		Dry Gas Meter RMB-15								
	Trial	Gas Volume			Meter Temperatures					
	Duration	Initial	Final	Net	Initial, Inlet	Final, Inlet	Avg. Inlet	Initial, Outlet	inal, Outle	Avg. Outlet
Trial	(min)	(ft^3)	(ft^3)	(ft^3)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)
1	8	69.524	73.327	3.803	74	74	74	77	75	76
2	21	73.327	83.322	9.995	77	83	80	76	77	76.5
3	13	83.322	89.571	6.249	78	82	80	78	74	76

	Reference Meter						Meter Box	Reference
	Gas Volume			Meter Temperature			Correction	Orifice Press
	Initial	Final	Net	Initial	Final	Avg.	Factor	$\Delta H_@$
Trial	(ft^3)	(ft^3)	(ft^3)	(°F)	(°F)	(°F)	γ	(in. H_2O)
1	54.365	58.108	3.743	72	72	72	0.996	1.91
2	58.108	67.912	9.804	72	73	72.5	0.997	1.91
3	67.912	74.036	6.124	73	73	73	0.995	1.88

ΔH = 1.0

		Dry Gas Meter RMB-15								
	Trial	Gas Volume			Meter Temperatures					
	Duration	Initial	Final	Net	Initial, Inlet	Final, Inlet	Avg. Inlet	Initial, Outlet	inal, Outle	Avg. Outlet
Trial	(min)	(ft^3)	(ft^3)	(ft^3)	(°F)	(°F)	(°F)	(°F)	(°F)	(°F)
1	19	89.777	100.214	10.437	82	86	84	79	80	79.5
2	8	100.214	104.614	4.400	85	87	86	81	81	81
3	16	104.614	113.404	8.790	85	88	86.5	82	83	82.5

	Reference Meter						Meter Box	Reference
	Gas Volume			Meter Temperature			Correction	Orifice Press
	Initial	Final	Net	Initial	Final	Avg.	Factor	$\Delta H_@$
Trial	(ft^3)	(ft^3)	(ft^3)	(°F)	(°F)	(°F)	γ	(in. H_2O)
1	74.254	84.44	10.186	73	73	73	0.997	1.92
2	84.440	88.743	4.303	73	73	73	1.002	1.91
3	88.743	97.302	8.559	73	73	73	1.000	1.92

PACIFIC ENVIRONMENTAL SERVICES, INC.
Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

ΔH = 2.0		Dry Gas Meter RMB-15								
	Trial	Gas Volume			Meter Temperatures					
Trial	Duration (min)	Initial (ft^3)	Final (ft^3)	Net (ft^3)	Initial, Inlet (°F)	Final, Inlet (°F)	Avg. Inlet (°F)	Initial, Outlet (°F)	inal, Outle (°F)	Avg. Outlet (°F)
1	9	13.863	20.884	7.021	87	91	89	83	83	83
2	7	20.884	26.372	5.488	90	92	91	84	84	84
3	7	26.372	31.871	5.499	90	93	91.5	84	84	84

	Reference Meter						Meter Box Correction Factor	Reference Orifice Press
	Gas Volume			Meter Temperature				
Trial	Initial (ft^3)	Final (ft^3)	Net (ft^3)	Initial (°F)	Final (°F)	Avg. (°F)	γ	$\Delta H_@$ (in. H_2O)
1	97.749	104.591	6.842	73	73	73	1.001	1.90
2	104.591	109.929	5.338	73	73	73	1.002	1.89
3	109.929	115.281	5.352	73	74	73.5	1.002	1.88

ΔH = 4.0		Dry Gas Meter RMB-15								
	Trial	Gas Volume			Meter Temperatures					
Trial	Duration (min)	Initial (ft^3)	Final (ft^3)	Net (ft^3)	Initial, Inlet (°F)	Final, Inlet (°F)	Avg. Inlet (°F)	Initial, Outlet (°F)	inal, Outle (°F)	Avg. Outlet (°F)
1	6.5	32.371	39.484	7.113	92	94	93	85	85	85
2	15.5	39.484	56.484	17.000	93	97	95	87	87	87

	Reference Meter						Meter Box Correction Factor	Reference Orifice Press
	Gas Volume			Meter Temperature				
Trial	Initial (ft^3)	Final (ft^3)	Net (ft^3)	Initial (°F)	Final (°F)	Avg. (°F)	γ	$\Delta H_@$ (in. H_2O)
1	15.775	22.732	6.957	73	74	73.5	1.004	1.92
2	22.732	39.287	16.555	73	73	73	1.005	1.92

Calibration Results

ΔH	γ	$\Delta H_@$	
0.50	0.999	1.86	
0.75	0.996	1.90	
1.0	1.000	1.92	
2.0	1.002	1.89	
4.0	1.004	1.92	<---- Two Trial Average

Dry Gas Meter RMB-15 on 10/13/97

Meter Box Calibration Factor	**1.000**
Meter Box Reference Orifice Pressure	**1.90**

PACIFIC ENVIRONMENTAL SERVICES, INC.

Central Park West
5001 South Miami Boulevard, P.O. Box 12077
Research Triangle Park, North Carolina 27709-2077
(919) 941-0333 FAX: (919) 941-0234

Posttest Dry Gas Meter Calibration Form (English Units)

Pretest Calibration Factor 1.000
System Vacuum Setting, (in Hg) 12
Reference Meter Correction Factor 1.0077
Date: 5/2/98 P_{bar}, in Hg 29.94 Calibrator: D. Holzschuh Meter Box No. MB-15

ΔH = 1.41		Dry Gas Meter								
Trial	Duration (min)	Initial (ft^3)	Final (ft^3)	Net (ft^3)	Initial, Inlet (°F)	Final, Inle (°F)	Avg. Inlet (°F)	Initial, Outlet (°F)	Final, Outlet (°F)	Avg. Outlet (°F)
1	8	776.09	781.709	5.619	71	73	72	69	70	69.5
2	8	781.709	787.439	5.730	73	73	73	70	71	70.5
3	11	787.439	795.344	7.905	73	73	73	71	71	71

	Reference Meter						Meter Box Correction Factor	Reference Orifice Press
	Gas Volume			Meter Temperature				
Trial	Initial (ft^3)	Final (ft^3)	Net (ft^3)	Initial (°F)	Final (°F)	Avg. (°F)	γ	$\Delta H_@$ (in. H2O)
1	343.209	348.9	5.691	72	72	72	1.015	1.56
2	348.9	354.597	5.697	72	72	72	0.998	1.56
3	354.597	362.414	7.817	72	72	72	0.993	1.56

AVERAGE	1.002	1.562
% Change	0.17%	

REFERENCE METER CALIBRATION
ENGLISH REFERENCE METER UNITS

DGM Serial # 6841495
Date 10/5/97

Filename: F:\DATAFILE\CALIBRAT\CAL_MENU.DSK\DGM_REF.
Revised: 06/08/95

Barometric Pressure 29.82
Meter Yw 1.00000
K (deg R/inches Hg) 17.64

Time (min)	Pressure (in. H20)	Dry Gas Meter (DGM) Meter Readings Initial	Final	Volume (cubic feet)	Temperature Initial (deg F)	Final (deg F)	Wet Test Meter (WTM) Meter Readings Initial	Final	Volume (cubic feet)	Temp (deg F)	DGM Coefficient Yds	Coefficient Variation Yds-(Avg.Yds)	Flow Rate (CFM)
20.50	-8.000	742.719	768.193	25.474	78.0	79.0	671.890	697.180	25.290	77.0	1.016	0.002	1.208
5.00	-8.000	768.193	774.402	6.209	79.0	79.0	697.180	703.325	6.145	77.0	1.013	0.000	1.204
13.00	-8.000	774.402	790.575	16.173	79.0	79.0	703.325	719.309	15.984	77.0	1.012	-0.002	1.204
									Max Yds - Min Yds =0.003626886 Must be no greater than 0.030				
									Average Yds =1.013636253 Must be between 0.95 to 1.05				
8.50	-5.400	790.575	798.821	8.246	79.0	79.0	719.309	727.485	8.176	77.0	1.009	0.001	0.942
27.50	-5.400	798.821	825.423	26.602	79.0	80.0	727.485	753.809	26.324	77.0	1.008	0.000	0.938
26.50	-5.400	825.423	850.983	25.560	80.0	81.0	753.809	779.025	25.216	77.0	1.006	-0.001	0.932
									Max Yds - Min Yds =0.002262496 Must be no greater than 0.030				
									Average Yds =1.007525980 Must be between 0.95 to 1.05				
14.00	-3.800	850.983	861.899	10.916	81.0	81.0	779.025	789.820	10.795	77.0	1.006	0.001	0.755
15.50	-3.800	861.899	873.960	12.061	81.0	82.0	789.820	801.740	11.920	77.0	1.006	0.001	0.753
12.50	-3.800	953.219	962.970	9.751	86.0	86.0	879.651	889.205	9.554	78.0	1.004	-0.001	0.747
									Max Yds - Min Yds =0.002245979 Must be no greater than 0.030				
									Average Yds =1.005164785 Must be between 0.95 to 1.05				
23.50	-2.400	962.970	976.611	13.641	86.0	87.0	889.205	902.599	13.394	78.0	1.003	-0.001	0.557
17.50	-2.400	976.611	986.740	10.129	87.0	87.0	902.599	912.545	9.946	78.0	1.004	0.000	0.556
15.00	-2.400	986.740	995.413	8.673	87.0	88.0	912.545	921.069	8.524	78.0	1.006	0.002	0.556
									Max Yds - Min Yds =0.002785363 Must be no greater than 0.030				
									Average Yds =1.004591811 Must be between 0.95 to 1.05				
32.00	-1.600	995.413	1008.596	13.183	88.0	89.0	921.069	934.025	12.956	78.0	1.006	-0.002	0.396
35.00	-1.600	1008.596	1022.986	14.390	89.0	89.0	934.025	948.175	14.150	78.0	1.007	0.000	0.395
15.00	-1.600	1022.986	1029.158	6.172	89.0	90.0	948.175	954.255	6.080	78.0	1.010	0.002	0.396
									Max Yds - Min Yds =0.004205886 Must be no greater than 0.030				
									Average Yds =1.007822494 Must be between 0.95 to 1.05				

Overall Average Yds =1.007748265

I certify that the above Dry Gas Meter was calibrated in accordance with E.P.A. Method 5 , paragraph 7.1 ;CFR 40 Part 60, using the Precision Wet Test Meter # 11AE6, which in turn was calibrated using the American Bell Prover # 3785, certificate # F107, which is traceable to the National Bureau of Standards (N.I.S.T.).

Signature _____ Date 10-5-97

REFERENCE METER CALIBRATION
ENGLISH REFERENCE METER UNITS

Barometric Pressure 29.73
Meter Yw 1.00000
K (deg R/inches Hg) 17.64

DGM Serial # 6841495
Date 8/28/96

Filename: F:\DATAFILE\CALIBRAT\CAL_MENU.DSK\DGM_REF.
Revised: 06/08/95

Time (min)	Pressure (in. H20)	Dry Gas Meter (DGM) Meter Readings Initial	Final	Volume (cubic feet)	Temperature Initial (deg F)	Final (deg F)	Wet Test Meter (WTM) Meter Readings Initial	Final	Volume (cubic feet)	Temp (deg F)	DGM Coefficient Yds	Coefficient Variation Yds-(Avg.Yds)	Flow Rate (CFM)
6.00	-6.60	374.451	381.901	7.450	73.0	76.0	496.572	503.987	7.415	77.0	1.007	-0.004	1.207
24.00	-6.60	381.901	411.424	29.523	74.0	76.0	503.987	533.471	29.484	77.0	1.011	0.000	1.200
8.00	-6.60	411.424	421.233	9.809	76.0	76.0	533.471	543.279	9.808	77.0	1.015	0.004	1.197
											Max Yds - Min Yds =0.007489914	Must be no greater than 0.030	
											Average Yds =1.011058546	Must be between 0.95 to 1.05	
10.00	-4.00	421.233	430.675	9.442	76.0	77.0	543.279	552.761	9.482	77.0	1.013	0.009	0.926
35.00	-4.00	430.675	464.147	33.472	77.0	77.0	552.761	585.965	33.204	77.0	1.002	-0.003	0.926
16.50	-4.00	464.147	479.992	15.845	77.0	78.0	585.965	601.625	15.660	77.0	0.999	-0.006	0.927
											Max Yds - Min Yds =0.014197179	Must be no greater than 0.030	
											Average Yds =1.004786738	Must be between 0.95 to 1.05	
12.50	-2.80	479.992	489.698	9.706	78.0	78.0	601.625	611.270	9.645	77.0	1.003	0.002	0.754
14.00	-2.80	489.698	500.594	10.896	78.0	78.0	611.270	622.061	10.791	77.0	0.999	-0.002	0.753
58.50	-2.80	500.594	546.063	45.469	78.0	79.0	622.061	667.125	45.064	77.0	1.001	0.000	0.752
											Max Yds - Min Yds = 0.00338145	Must be no greater than 0.030	
											Average Yds =1.000808891	Must be between 0.95 to 1.05	
16.50	-1.60	574.496	583.672	9.176	79.0	79.0	695.390	704.530	9.140	77.0	1.004	0.000	0.541
42.00	-1.60	590.619	614.123	23.504	80.0	80.0	711.429	734.785	23.356	77.0	1.003	0.000	0.543
66.50	-1.60	614.123	651.520	37.397	80.0	81.0	734.785	771.901	37.116	77.0	1.003	0.000	0.545
											Max Yds - Min Yds =0.000835063	Must be no greater than 0.030	
											Average Yds =1.003302205	Must be between 0.95 to 1.05	
15.00	-1.00	651.520	657.572	6.052	81.0	82.0	771.901	777.994	6.093	78.0	1.016	0.011	0.396
13.50	-1.00	657.572	663.065	5.493	82.0	82.0	777.994	783.400	5.406	78.0	0.994	-0.010	0.390
35.00	-1.00	663.065	677.274	14.209	82.0	82.0	783.400	797.515	14.115	78.0	1.003	-0.001	0.393
											Max Yds - Min Yds =0.021724294	Must be no greater than 0.030	
											Average Yds =1.004344616	Must be between 0.95 to 1.05	

Overall Average Yds =1.004860199

I certify that the above Dry Gas Meter was calibrated in accordance with E.P.A. Method 5 , paragraph 7.1 ;CFR 40 Part 60, using the Precision Wet Test Meter # 11AE6, which in turn was calibrated using the American Bell Prover # 3785, certificate # F107, which is traceable to the National Bureau of Standards (N.I.S.T.).

Signature [illegible] (UHT) Date 9-28-96

Table C-1
Montevallo and Saginaw Calibration Table

Montevallo CALIBRATION ERROR TEST(METHOD 6C-6.3) 3/23/93

Kiln #4 Initial Outlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	0.4	0.4	0.80%
LOW RANGE	10.7	10.7	0	0.00%
MID RANGE	26	27.7	1.7	3.40%
HIGH RANGE	37.6	38.2	0.6	1.20%

Kiln #4 Final Outlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	1.1	1.1	2.20%
LOW RANGE	10.7	10.8	0.1	0.20%
MID RANGE	26	27.8	1.8	3.60%
HIGH RANGE	37.6	37.5	0.1	0.20%

Kiln #4 Initial Inlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	0.3	0.3	0.60%
LOW RANGE	10.7	8.3	2.4	4.80%
MID RANGE	26	27.4	1.4	2.80%
HIGH RANGE	37.6	38.1	0.5	1.00%

Kiln #4 Final Inlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	1.2	1.2	2.40%
LOW RANGE	10.7	10.2	0.5	1.00%
MID RANGE	26	26.9	0.9	1.80%
HIGH RANGE	37.6	38.3	0.7	1.40%

Montevallo CALIBRATION ERROR TEST(METHOD 6C-6.3) 3/24/93

Kiln #3 Initial Outlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	0.8	0.8	1.60%
LOW RANGE	10.7	10.9	0.2	0.40%
MID RANGE	26	26.3	0.3	0.60%
HIGH RANGE	37.6	37.5	0.1	0.20%

Kiln #3 Final Outlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	1.1	1.1	2.20%
LOW RANGE	10.7	11.4	0.7	1.40%
MID RANGE	26	28.5	2.5	5.00%
HIGH RANGE	37.6	38.9	1.3	2.60%

Kiln #3 Initial Inlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	0.8	0.8	1.60%
LOW RANGE	10.7	10.9	0.2	0.40%
MID RANGE	26	26.3	0.3	0.60%
HIGH RANGE	37.6	37.5	0.1	0.20%

Kiln #3 Final Inlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	1.7	1.7	3.40%
LOW RANGE	10.7	10.7	0	0.00%
MID RANGE	26	25.5	0.5	1.00%
HIGH RANGE	37.6	37.2	0.4	0.80%

Saginaw CALIBRATION ERROR TEST(METHOD 6C-6.3) 3/26/93

Kiln #4Initial Outlet

	ACTUAL CONC	RESPONSE	DIFFEFENCE	% OF SPAN
ZERO GAS	0	0	0	0.00%
LOW RANGE	10.7	12.5	1.8	3.60%
MID RANGE	26	24.9	1.1	2.20%
HIGH RANGE	37.6	37.6	0	0.00%

Kiln #4 Final Outlet

	ACTUAL CONC	RESPONSE	DIFFERENCE	% OF SPAN
ZERO GAS	0	2.5	2.5	5.00%
LOW RANGE	10.7	12.2	1.5	3.00%
MID RANGE	26	29.5	3.5	7.00%
HIGH RANGE	37.6	43.5	5.9	11.80%

O_2, CO_2, NOx Calibration

Scott Specialty Gases

Shipped From: 1290 COMBERMERE STREET
TROY MI 48083
Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ANALYSIS

PACIFIC ENVIRONMENTAL SERVICES
JOHN POWELL
C/O AIR POLUTION C & C LT
60 INDUSTRIAL PARK RD W.
TOLLAND CT 06084

PROJECT #: 05-23193-001
PO#: 104-98-0125
ITEM #: 0502243202 5A
DATE: 2/25/98

CYLINDER #: A018685
FILL PRESSURE: 2000 PSI

ANALYTICAL ACCURACY: +/-5%
PRODUCT EXPIRATION: 8/26/1998

BLEND TYPE : CERTIFIED WORKING STD

COMPONENT	REQUESTED GAS CONC MOLES		ANALYSIS (MOLES)	
HYDROGEN CHLORIDE	10.	PPM	10.7	PPM
NITROGEN		BALANCE		BALANCE

CERTIFIED WORKING STANDARD

ANALYST: Bob Pahl

Scott Specialty Gases

Shipped From: 1290 COMBERMERE STREET
TROY MI 48083
Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ANALYSIS

PACIFIC ENVIRONMENTAL SERVICES
JOHN POWELL
C/O AIR POLUTION C & C LT
60 INDUSTRIAL PARK RD W.
TOLLAND CT 06084

PROJECT #: 05-23193-002
PO#: 104-98-0125
ITEM #: 0502243202 5A
DATE: 2/13/98

CYLINDER #: A018704
FILL PRESSURE: 2000 PSI

ANALYTICAL ACCURACY: +/-5%
PRODUCT EXPIRATION: 8/12/1998

BLEND TYPE : CERTIFIED WORKING STD

COMPONENT	REQUESTED GAS CONC MOLES		ANALYSIS (MOLES)	
HYDROGEN CHLORIDE	25.	PPM	26.0	PPM
NITROGEN		BALANCE		BALANCE

CERTIFIED WORKING STANARD

ANALYST: Sarah Reinter

Scott Specialty Gases

Shipped From: 1290 COMBERMERE STREET
TROY MI 48083
Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ANALYSIS

PACIFIC ENVIRONMENTAL SERVICES
JOHN POWELL
C/O AIR POLUTION C & C LT
60 INDUSTRIAL PARK RD W.
TOLLAND CT 06084

PROJECT #: 05-23193-003
PO#: 104-98-0125
ITEM #: 0502243202 5A
DATE: 2/25/98

CYLINDER #: A018749
FILL PRESSURE: 2000 PSI

ANALYTICAL ACCURACY: +/-5%
PRODUCT EXPIRATION: 8/25/1998

BLEND TYPE : CERTIFIED WORKING STD

COMPONENT	REQUESTED GAS CONC MOLES		ANALYSIS (MOLES)	
HYDROGEN CHLORIDE	40.	PPM	37.6	PPM
NITROGEN		BALANCE		BALANCE

CERTIFIED WORKING STANDARD

ANALYST: _____

Scott Specialty Gases

Shipped From: 1290 COMBERMERE STREET
TROY MI 48083
Phone: 248-589-2950 Fax: 248-589-2134

CERTIFICATE OF ANALYSIS

PACIFIC ENVIRONMENTAL SERVICES
JOHN POWELL
C/O AIR POLUTION C & C LT
60 INDUSTRIAL PARK RD W.
TOLLAND CT 06084

PROJECT #: 05-23193-004
PO#: 104-98-0125
ITEM #: 05022430 5A
DATE: 2/12/98

CYLINDER #: A017718
FILL PRESSURE: 2000 PSI

ANALYTICAL ACCURACY: +/-5%
PRODUCT EXPIRATION: 8/12/1998

BLEND TYPE : CERTIFIED WORKING STD

COMPONENT	REQUESTED GAS CONC MOLES		ANALYSIS (MOLES)	
HYDROGEN CHLORIDE	100.	PPM	101.	PPM
NITROGEN		BALANCE		BALANCE

CERTIFIED WORKING STANDARD

ANALYST: [signature]

Airgas

Airgas Specialty Gases
325 McCausland Court
Cheshire, CT 06410
Phone: (203) 250-6827
FAX: (203) 250-6842

CERTIFICATE OF ANALYSIS

Date: 11/4/97

Record Number: 3350

Customer Name: Airgas Cheshire

Purchase Order #: 127383

Grade of Product: Primary Standard

Cylinder Number:	Component	Required Concentration	Actual Concentration
CC79006	Methane	30 ppm	29.97 ppm
	Nitrogen	Balance	Balance

Uncertainty Of Analytical Result 1 %

Approval Signature

✓ CP.

Matheson Gas Products
World Leader in Specialty Gases & Equipment

CERTIFICATE OF ANALYSIS CALMAT DAILY STANDARD

CUSTOMER: ABCO Welding and Industrial Supply
CYLINDER #: SX-27307
CYLINDER PRESSURE: 2000 psig
ANALYSIS DATE : 8/20/96
EXPIRATION DATE: 8/20/99

REFERENCE: 109-51846
CALMAT DAILY: 2

COMPONENT: Methane

CONC: 51.1 ppm

COMPONENT:

CONC:

COMPONENT:

CONC:

BALANCE GAS: Nitrogen

REFERENCE STANDARDS

COMPONENT:	Methane
REFERENCE #:	SRM-2750
CYLINDER #:	SX-20007

CERTIFICATION METHOD

COMPONENT:	Methane
METHOD #:	1-1405-04-T1
INSTRUMENT:	HP-5730A
SERIAL #:	2151A97413
MEASUREMENT PRINC:	GC-FID
LAST CALIBRATION:	8/20/96

THIS CERTIFICATION WAS PERFORMED ACCORDING TO STANDARD OPERATING PROCEDURES AND IS TRACEABLE TO AN NIST STANDARD.

ANALYST Thomas J Purdon DATE 2/24/97

1680 Enterprise Parkway
Twinsburg, Ohio 44087
Phone: (216) 425-4406
Toll Free: (800) 426-9427

Airgas

Airgas Specialty Gases
325 McCauleland Court
Cheshire, CT 06410
Phone: (203) 250-6827
FAX: (203) 250-6842

CERTIFICATE OF ANALYSIS

Date : 03-5-97 Record Number: 1987

Customer Name: NORTHEAST AIRGAS CHESHIRE
Address:

Purchase Order #: 98537

Grade of Product: Primary Standard

Cylinder Number:	Component	Required Concentration	Actual Concentration
CC46103	METHANE	85 PPM	84.8 PPM
	NITROGEN	BALANCE	BALANCE

Uncertainty of Analytical Result : ± 1%

Approval Signature

Airgas

Airgas Specialty Gases

325 McCausland Court
Cheshire, CT 06410
Phone: (203) 250-6827
FAX: (203) 250-6842

Certificate of Analysis: E.P.A. Protocol Gas Mixture

Rec#	4149		
Cylinder No :	CC84096	Purchase Order #	139680
Cylinder Pressure:	2000	Expiration Date:	3/2/01
Certification Date	3/2/98	Laboratory:	Cheshire, CT

Reference Standard Information:

Type	Component	Cyl. Number	Concentration
GMIS	Carbon Dioxide	CC34977	14.08 %
GMIS	Oxygen	CC19914	20.98 %

Instrumentation:

Instrument/Model/Serial No.	Analytical Principle
Rosemount/NGA2000/Rack#1	NDIR
Servomex/244/701/488	Parmagnetic

Analytical Methodology does not require correction for analytical interferences.

Certified Concentrations:

Component	Concentration	Accuracy	Procedure
Carbon Dioxide	10.99 %	+/- 2%	G1
Oxygen	11.05 %	+/- 2%	G1
Nitrogen	Balance		

Analytical Results:

1st Component: Carbon Dioxide

1st Analysis Date: 2/16/98

R	3.259	S	2.895	Z	0.305	Conc	10.900 %
S	2.942	Z	0.256	R	3.305	Conc	10.996 %
Z	0.265	R	3.298	S	2.946	Conc	11.065 %
						AVG:	10.987 %

2nd Component: Oxygen

1st Analysis Date: 3/2/98

R	173.630	S	91.150	Z	1.460	Conc	11.060 %
S	91.230	Z	1.420	R	173.610	Conc	11.060 %
Z	1.890	R	173.630	S	91.270	Conc	11.032 %
						AVG:	11.051 %

Certification performed in accordance with "EPA Traceability Protocol (Jan. 1998)" using the assay procedures listed.

Do not use cylinder below 150 psig.

Approved for Release

NATIONAL SPECIALTY GASES
630 UNITED DRIVE
DURHAM, NC
27713
(919)544-3772

CERTIFICATE OF ANALYSIS - EPA PROTOCOL MIXTURES

REFERENCE #:	88-46838	CYLINDER #:	CC60029	CYL. PRESSURE:	2000 PSIG	P.O. #:	18778
EXP. DATE:	4/3/99	LAST ANALYSIS DATE:	4/3/96	CUSTOMER:	CONNECTICUT AIRGAS		

METHOD: ANALYZED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS-SEPTEMBER 1993:G-1 THIS STANDARD SHOULD NOT BE USED WHEN ITS GAS PRESSURE IS BELOW 1.0 MEGAPASCALS (150 PSIG).

COMPONENT:	CARBON DIOXIDE	COMPONENT:	OXYGEN
STANDARD		STANDARD	
SRM #	1675B	SRM #:	2659A
CYL. #:	CLM 6481	CYL. #	CLM 6737
CONC:	14.01 %	CONC:	20.72 %
INSTRUMENT:	ROSEMOUNT NDIR	INSTRUMENT:	BECKMAN PARAMAGNETIC
MODEL #:	880	MODEL #:	755
SERIAL #:	2000418	SERIAL #:	1001419
LAST CAL.:	3/21/96	LAST CAL.:	4/1/96
MEAN CONC.:	20.2% +/- 0.2 %	MEAN CONC:	20.4% +/- 0.2 %

REPLICATE CONC.				REPLICATE CONC.			
DATE:	4/3/96	DATE:		DATE:	4/3/96	DATE:	
20.2	%			20.4	%		
20.1	%			20.4	%		
20.2	%			20.5	%		

BALANCE GAS: NITROGEN

REPLICATE DATA						REPLICATE DATA						REPLICATE DATA					
DATE:	4/3/96					DATE:	4/3/96										
Z	0	R	14.1	C	20.3	Z	0	R	394	C	390						
R	14.0	Z	0	C	20.1	R	394	Z	0	C	392						
Z	0	C	20.3	R	14.1	Z	0	C	390	R	394						

Z= ZERO C=CANDIDATE R=REFERENCE

ANALYST: Mark H. K. APPROVED BY: Laura Thayters

THIS REPORT STATED ACCURATELY THE RESULTS OF THE INVESTIGATION MADE UPON THE MATERIAL SUBMITTED TO THE ANALYTICAL LABORATORY. EVERY EFFORT HAS BEEN MADE TO DETERMINE OBJECTIVELY THE INFORMATION REQUESTED; HOWEVER, IN CONNECTION WITH THIS REPORT, NATIONAL SPECIALTY GASES SHALL HAVE NO LIABILITY IN EXCESS OF ITS ESTABLISHED CHARGE FOR THE SERVICE.

ASSAYED AT: NATIONAL SPECIALTY GASES, 630 UNITED DRIVE, DURHAM, NC 27713. (919)544-3772

4E

PACIFIC ENVIRONMENTAL SERVICES, INC.

4700 Duke Drive,
Suite 150
Mason, Ohio 45040
Phone: (513) 398-2556
Fax (513) 398-3342
www.pes.com

Pitot Tube Number: 4E Date: 12/23/97

Effective Length: 49" Calibrated By: S. Simon

Pitot Tube Openings Damaged? YES [NO]

Pitot Tube Assembly Level? [YES] NO

α_1 = 0 °(< 10°) α_2 = 1 °(< 10°)

β_1 = 1 °(< 5°) β_2 = 3 °(< 5°)

Y= 0 θ = 1 A = 0.973

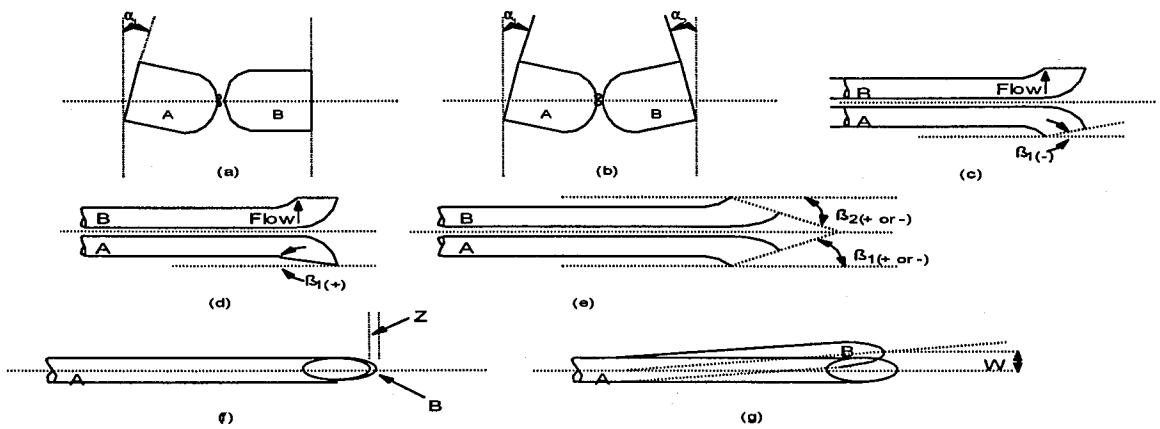
$z = A \sin \gamma$ = 0 cm (in.) 0.32 cm (< 1/8 in.)

$w = A \sin \theta$ = 0.0170 cm (in.) 0.08 cm (< 1/32 in.)

P_A = 0.487 cm (in.)

P_β = 0.486 cm (in.)

D_t = 0.375 cm (in.)



The types of face-opening misalignment shown above will not affect the baseline value of Cp(s) so long as α_1 and α_2 is less than or equal to 10°, β_1 and β_2 is less than or equal to 5°, z is less than or equal to 0.32 cm (1/8 in.), and w is less than or equal to 0.08 cm(1/32 in.) (reference 11.0 in Section 16.0).

Assigned Pitot Coefficient: 0.84

4F

PACIFIC ENVIRONMENTAL SERVICES, INC.

4700 Duke Drive,
Suite 150
Mason, Ohio 45040
Phone: (513) 398-2556
Fax (513) 398-3342
www.pes.com

Pitot Tube Number: 4F Date: 12/23/97

Effective Length: 49" Calibrated By: S. Simon

Pitot Tube Openings Damaged? YES [NO]

Pitot Tube Assembly Level? [YES] NO

α_1 = 1 °(< 10°) α_2 = 0 °(< 10°)

β_1 = 1 °(< 5°) β_2 = 0 °(< 5°)

γ = 1 θ = 0 A = 0.94

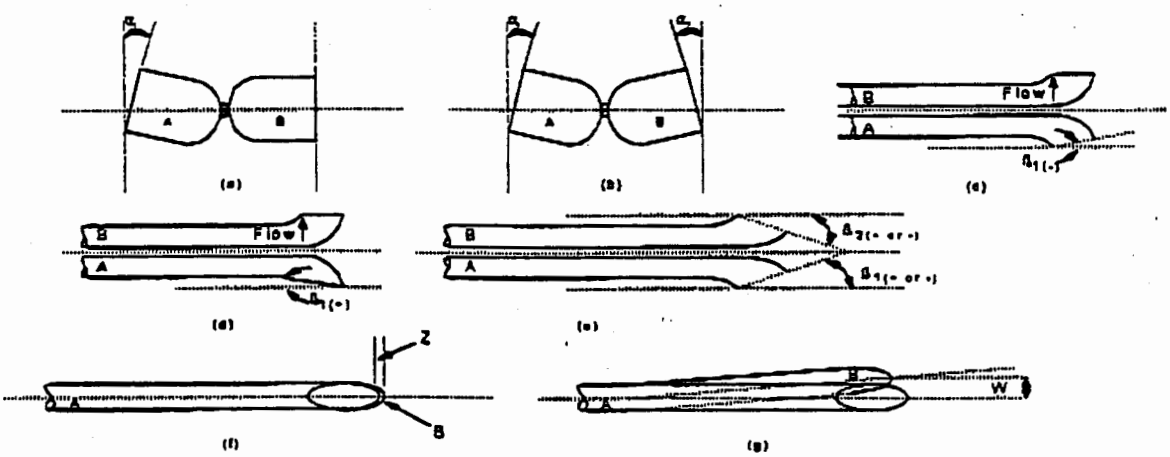
$z = A \sin \gamma$ = 0.017 cm (in.) 0.32 cm (< 1/8 in.)

$w = A \sin \theta$ = 0 cm (in.) 0.08 cm (< 1/32 in.)

P_A = 0.47 cm (in.)

P_β = 0.47 cm (in.)

D_t = 0.375 cm (in.)



The types of face-opening misalignment shown above will not affect the baseline value of Cp(s) so long as α_1 and α_2 is less than or equal to 10°, β_1 and β_2 is less than or equal to 5°, z is less than or equal to 0.32 cm (1/8 in.), and w is less than or equal to 0.08 cm (1/32 in.) (reference 11.0 in Section 16.0).

RP-21

PACIFIC ENVIRONMENTAL SERVICES, INC.

4700 Duke Drive,
Suite 150
Mason, Ohio 45040
Phone: (513) 398-2556
Fax (513) 398-3342
www.pes.com

Pitot Tube Number: RP-21 Date: 7/14/98

Effective Length: _____ Calibrated By: J. Brown

Pitot Tube Openings Damaged? YES **[NO]**

Pitot Tube Assembly Level? **[YES]** NO

α_1 = 0 °(< 10°) α_2 = 1 °(< 10°)

β_1 = 1 °(< 5°) β_2 = 0 °(< 5°)

γ = 1 θ = 0 A = 1.023

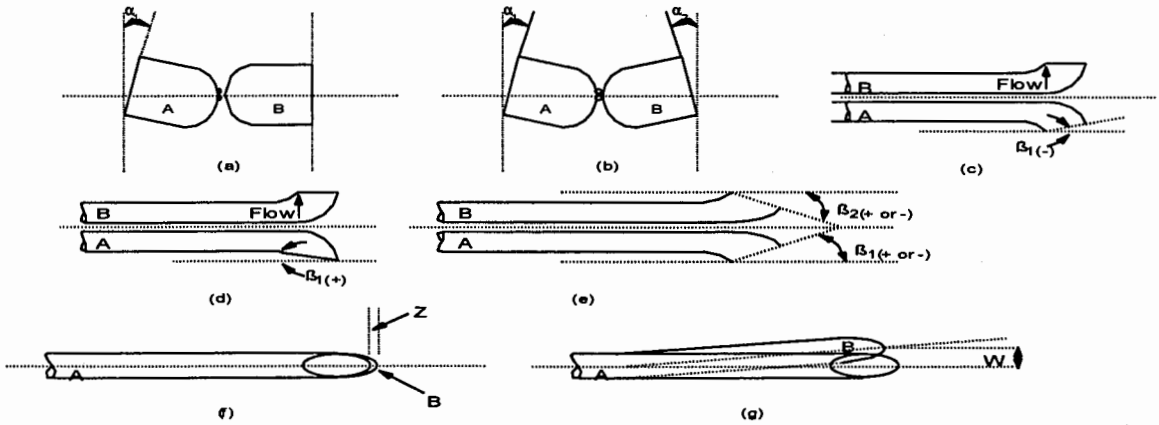
z = A sin γ = 0.0179 cm (in.) 0.32 cm (< 1/8 in. (0.125))

w = A sin θ = 0.0000 cm (in.) 0.08 cm (< 1/32 in. (0.03125))

P_A = 0.5115 cm (in.)

P_B = 0.5115 cm (in.)

D_t = 0.375 cm (in.)



The types of face-opening misalignment shown above will not affect the baseline value of Cp(s) so long as α_1 and α_2 is less than or equal to 10°, β_1 and β_2 is less than or equal to 5°, z is less than or equal to 0.32 cm (1/8 in.), and w is less than or equal to 0.08 cm (1/32 in.) (reference 11.0 in Section 16.0).

Assigned Pitot Coefficient, C_p: 0.84

TEMPERATURE SENSOR CALIBRATION FORM

DGM-IN

Temperature Sensor No. MB-10 **Sensor Type** K-TC **Length** 8"
Ambient Temp. °F 76 **Barometric Pressure, "Hg** 29.61"
Reference Temp. Sensor: _____

Date	Ref. Point No.	Temp. Source	Temp. °F		Temp. Diff. %	Within Limits Y/N	Calibrated By
			Ref. Sensor	Test Sensor			
3-20-98	1	ICE H2O	33	34			
"	2	AMB. AIR	76	76	0		
"	3	BOIL H2O	206	205			
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						

$$\%\ Temp.\ Diff = \frac{(Ref.\ Temp + 460) - (Test\ Temp. + 460)}{(Ref.\ Temp. + 460)} \times 100 \leq 1.5\ \%$$

TEMPERATURE SENSOR CALIBRATION FORM

DGM-OUT

Temperature Sensor No. MB-10 **Sensor Type** K-TC **Length** 12"
Ambient Temp. °F 76 **Barometric Pressure, "Hg** 29.61"
Reference Temp. Sensor: _____

Date	Ref. Point No.	Temp. Source	Temp. °F		Temp. Diff. %	Within Limits Y/N	Calibrated By
			Ref. Sensor	Test Sensor			
3-20-98	1	ICE H2O	32	34	.406	Y	WB
"	2	AMB, MR	76	77	.186	Y	WB
"	3	BOIL H2O	206	205	.150	Y	WB
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						

$$\%\ Temp.\ Diff = \frac{(Ref.\ Temp + 460) - (Test\ Temp. + 460)}{(Ref.\ Temp. + 460)} \times 100 \leq 1.5\ \%$$

TEMPERATURE SENSOR CALIBRATION FORM

Temperature Sensor No. RMB-15 DGM-1D Sensor Type K-TC Length 1'
Ambient Temp. °F 74 Barometric Pressure, "Hg 30.24"
Reference Temp. Sensor: _____

Date	Ref. Point No.	Temp. Source	Temp. °F		Temp. Diff. %	Within Limits Y/N	Calibrated By
			Ref. Sensor	Test Sensor			
3-18-98	1	ICE H_2O	33	35	.406	Y	JWB
"	2	AMB. AIR	74	74	0	Y	JWB
"	3	Boil. H_2O	208	210	.299	Y	JWB
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						

$$\% \text{ Temp. Diff} = \frac{(\text{Ref. Temp} + 460) - (\text{Test Temp.} + 460)}{(\text{Ref. Temp.} + 460)} \times 100 \leq 1.5\ \%$$

TEMPERATURE SENSOR CALIBRATION FORM

Temperature Sensor No. RMB-15 DGM-OUT Sensor Type K-TC Length 2'
Ambient Temp. °F 74 Barometric Pressure, "Hg 30.24"
Reference Temp. Sensor: _____

Date	Ref. Point No.	Temp. Source	Temp. °F		Temp. Diff. %	Within Limits Y/N	Calibrated By
			Ref. Sensor	Test Sensor			
3-18-98	1	ICE H_2O	33	33	0	Y	JWB
"	2	AMB AIR	74	75	.187	Y	JWB
"	3	BOIL. H_2O	208	208	0	Y	JWB
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						
	1						
	2						
	3						

$$\%\ Temp.\ Diff = \frac{(Ref.\ Temp + 460) - (Test\ Temp. + 460)}{(Ref.\ Temp. + 460)} \times 100 \leq 1.5\ \%$$

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www.pes.com

TEMPERATURE SENSOR CALIBRATION DATA FOR STACK THERMOCOUPLES

THERMOCOUPLE NUMBER: 4E

DATE: 12/23/97

BAROMETRIC PRES.(In.Hg): 29.52

REFERENCE:
Mercury-in-glass: ASTM-3F

Other:

AMBIENT TEMP. °F: 74

CALIBRATOR: G.Gay

Reference point number	Source[a] (Specify)	Reference Thermometer Temperature,°F	Thermocouple Potentiometer Temperature,°F	Temperature Difference,[b] %
1	Ambient Air	74	74	0.00
2	Cold Bath	38	38	0.00
3	Hot Bath	203	202	0.15
4	Hot Oil	339	340	0.13

[a]Type of calibration used.

[b]$\frac{(\text{ref. temp.}^{\circ}\text{F}+460)-(\text{test thermometer temp.}^{\circ}\text{F}+460)}{\text{ref temp.}^{\circ}\text{F}+460}$ X100 100≤1.5%

Comments:

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www.pes.com

TEMPERATURE SENSOR CALIBRATION DATA FOR STACK THERMOCOUPLES

THERMOCOUPLE NUMBER: 4F

DATE: 12/23/97

BAROMETRIC PRES.(In.Hg): 29.52

REFERENCE:
Mercury-in-glass: ASTM-3F

Other:

AMBIENT TEMP. °F: 76

CALIBRATOR: J.C.

Reference point number	Source[a] (Specify)	Reference Thermometer Temperature, °F	Thermocouple Potentiometer Temperature, °F	Temperature Difference,[b] %
1	Ambient Air	76	76	0.00
2	Cold Bath	38	38	0.00
3	Hot Bath	204	204	0.00
4	Hot Oil	341	342	0.12

[a]Type of calibration used.

[b]$\frac{(\text{ref. temp.}\ ^{\circ}F+460)-(\text{test thermometer temp.}\ ^{\circ}F+460)}{\text{ref temp.}\ ^{\circ}F+460}$ X100 100≤1.5%

Comments:

APPENDIX E

PARTICIPANTS

PROJECT PARTICIPANTS

Name	Affiliation	Responsibility
Michael L. Toney	US EPA Emissions Measurement Center	Work Assignment Manager
Frank J. Phoenix	Pacific Environmental Services, Inc.	Project Manager
Troy Abernathy	Pacific Environmental Services, Inc	Site Leader/Console Operator
Paul Siegel	Pacific Environmental Services, Inc	Site Leader/Console Operator
Gary Gay	Pacific Environmental Services, Inc	Sampling Technician
Mike Maret	Pacific Environmental Services, Inc	Sampling Technician/Sample Recovery
Cybelle Brockman	Research Triangle Institute	Process Data Recorder
Eric Dithrich[1]	APCC	CEM Team Leader
Terry Thomasson[1]	APCC	CEM Sampling Technician

[1] Subcontractor to Pacific Environmental Services, Inc.

TECHNICAL REPORT DATA

Please read instructions on the reverse before completing

1. REPORT NO. EPA-454/R-99-043	2.	3. RECIPIENT'S ACCESSION NO.
4. TITLE AND SUBTITLE Final Report Manual Testing and Continuous Emissions Monitoring, Lime Kiln Nos. 3 and 4 Baghouses Chemical Lime Company Montevallo, Alabama		5. REPORT DATE September 1999
		6. PERFORMING ORGANIZATION CODE
		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 EPA/200/04

15. SUPPLEMENTARY NOTES

16. ABSTRACT

The United States Environmental Protection Agency (EPA) Emission Standards Division (ESD) is investigating the lime manufacturing industry to identify and quantify hazardous air pollutants (HAPs) emitted from lime kilns. ESD requested that EPA's Emissions, Monitoring and Analysis Division (EMAD) conduct the required testing. EMAD issued a work assignment to Pacific Environmental Services, Inc. (PES) to conduct a screening test to collect air emissions data as specified in the ESD test request. The primary objective of the testing program was to characterize HAP emissions from two lime kilns at the Chemical Lime Company's facility located in Montevallo, Alabama. Based on the pollutant concentrations and emission rates calculated from the results of the screening tests, the kilns may be selected by EPA for further testing.

The tests were conducted to quantify the uncontrolled and controlled air emissions of hydrogen chloride (HCl), total hydrocarbons (THC), and polychlorinated dibenzo-*p*-dioxins and polyclorinated dibenzofurans (PCDDs/PCDFs). Emissions from each kiln were controlled by a baghouse dedicated to each kiln. Over a two-day period, testing was conducted at each baghouse inlet and at the common stack. Inlet and outlet runs on each kiln were conducted simultaneously. Oxygen (O_2) and carbon dioxide (CO_2) were also monitored at each location.

During the testing program another EPA contractor monitored and recorded process and emission control system operating parameters, and prepared Section 3.0, Process Description, of this report.

17. KEY WORDS AND DOCUMENT ANALYSIS

a. DESCRIPTIONS	b. IDENTIFIERS/OPEN ENDED TERMS	c. COASTI Field/Group
Baghouse Dioxins/Furans Hazardous Air Pollutants Hydrogen Chloride Total Hydrocarbons		
18. DISTRIBUTION STATEMENT Unlimited	19. SECURITY CLASS *(This Report)* Unclassified	21. NO. OF PAGES 436
	20. SECURITY CLASS *(This page)* Unclassified	22. PRICE

EPA Form 2220-1 (Rev. 4-77) PREVIOUS EDITION IS OBSOLETE F:\U\FMeadows\TRD.Frm\WP 6.1

TECHNICAL REPORT DATA

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