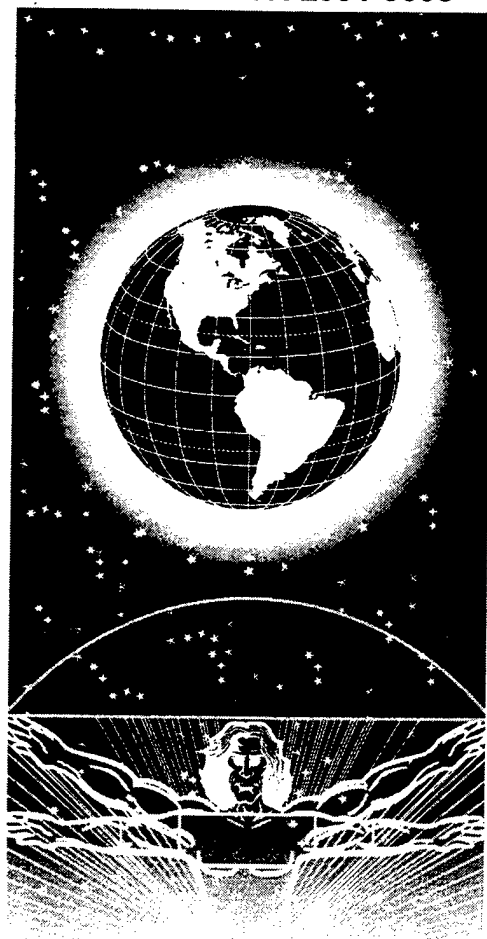




UNITED STATES AIR FORCE IERA

Medical Waste Incinerator Emissions Test Malcolm Grow Medical Center, Building 1056, Andrews Air Force Base, Maryland

Pacific Environmental Services, Inc.
560 Herndon Parkway, Suite 200
Herndon, VA 20170-5240

April 2001

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Air Force Institute for Environment, Safety
and Occupational Health Risk Analysis
Risk Analysis Directorate
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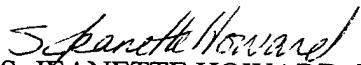
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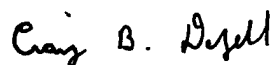
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ACRONYM AND ABBREVIATION LIST

AFB	Air Force Base
AFIERA	Air Force Institute for Environmental Safety and Occupational Health Risk Analysis
Alta	Alta Analytical Perspectives
ASTM	American Society of Testing Materials
BSM	Base Surveillance Monitor
Cd	cadmium
CEMs	continuous emission monitors
CO	carbon monoxide
CO ₂	carbon dioxide
COMAR	Code of Maryland Air Regulations
°F	degrees Fahrenheit
EPA	United States Environmental Protection Agency
FAL	First Analytical Laboratories
GC/MS	gas chromatography/mass spectrometry
GFC	Gas Filter Correlation
HCl	hydrogen chloride
Hg	mercury
ID	inner diameter
lb/hr	pounds per hour
MDE	Maryland Department of the Environment
MWI	medical waste incinerator
N ₂	nitrogen
NO	nitrogen oxide
NO _x	oxides of nitrogen
O ₂	oxygen
OSHA	Occupational Safety and Health Administration
%	percent
Pb	lead
PCDD/PCDF	dioxins/dibenzofurans
PES	Pacific Environmental Services, Inc.
PM	particulate matter
ppmv	parts per million by volume
QA/QC	quality assurance/quality control
SO ₂	sulfur dioxide
TPM	Technical Project Manager

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1.0 INTRODUCTION

The Malcolm Grow Medical Center operates a medical waste incinerator (MWI) at Andrews Air Force Base (AFB), Maryland. The MWI is permitted to burn Type O and infectious/pathological wastes and has a design (rated) capacity of 385 pounds per hour (lb/hr) for this type waste.

The MWI is operated under authority of Maryland Department of the Environment (MDE) Operating Permit No. 16-00655. The MWI is subject to the new MDE standards for medium size incinerators, **"Requirements for the Control of Emissions from Hospital Medical Infectious Waste Incinerators,"** Code of Maryland Air Regulations (COMAR) 26.11.08. These standards are derived from emission guidelines and compliance schedules published by the United States Environmental Protection Agency (EPA) on 15 September 1997 and implement sections 111(d) and 129 of the Clean Air Act and established emission limits for particulate matter (PM), carbon monoxide (CO), dioxins/dibenzofurans (PCDD/PCDF), hydrogen chloride (HCl), sulfur dioxide (SO₂), oxides of nitrogen (NO_x), lead (Pb), cadmium (Cd), and mercury (Hg). Initial performance testing was required for PM, CO, PCDD/PCDF, HCl, Pb, Cd, Hg, and opacity. In addition, the MDE required tests for SO₂ and NO_x.

Under contract to the United States Air Force Institute for Environmental Safety and Occupational Health Risk Analysis (AFIERA), Pacific Environmental Services, Inc. (PES) conducted the required testing during the period 31 January through 2 February 2001. The AFIERA point of contact and Technical Project Manager (TPM) for this delivery order was:

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2.0 RESULTS SUMMARY

The emissions results summary is shown in Table 2.1.

TABLE 2.1
EMISSIONS RESULTS SUMMARY

Run No./Date	1	2	3	Average	Standard ^a
Particulate Matter	2/2	2/2	2/2		
mg/dscm@7% O ₂	8	104	93	68	69
Carbon Monoxide	2/1	2/1	2/2		
ppmvd@7% O ₂	< 2	< 2	< 2	< 2	40
Dioxins/Furans	1/31	1/31	2/1		
ng/dscm total CDD/CDF@7% O ₂	1	1	< 1	< 1	125
Hydrogen Chloride	1/31	2/1	2/2		
ppmvd@7% O ₂	23	3	9	12	100
Sulfur Dioxide	2/1	2/1	2/2		
ppmvd@7% O ₂	< 2	3	< 2	< 2	55
Nitrogen Oxides	2/1	2/1	2/2		
ppmvd@7% O ₂	102	100	96	99	250
Lead	2/2	2/2	2/2		
mg/dscm@7% O ₂	0.6	0.8	0.6	0.7	1.2
Cadmium	2/2	2/2	2/2		
mg/dscm@7% O ₂	0	0.01	0.01	0.01	.16
Mercury	2/2	2/2	2/2		
mg/dscm@7% O ₂	0.09	0.01	0.00	0.03	0.55
Visual Opacity, %	2/2	2/2	2/2		
	0-5	0-5	0-5	0-5	10

^a MDE COMAR 26.11.08

3.0 SOURCE DESCRIPTION

The MWI is a Joy Energy Systems Model 480-E incinerator consisting of both a primary (lower) and a secondary (upper) combustion chamber. The primary chamber is equipped with an on/off natural gas burner and a manually adjusted underfire air blower. The secondary chamber is equipped with a modulating high/low natural gas burner. Additional combustion air is supplied by a modulating blower, located between the primary and secondary chambers. The primary and secondary combustion chambers operate at temperatures of approximately 1665°F and 1695°F, respectively.

The incinerator is utilized to burn Type O and infectious/pathological waste generated at the hospital. The rated capacity is 385 lb/hr. Loading of waste is accomplished with the use of a hopper/hydraulic ram mechanical waste feed system. Continuous monitoring instrumentation for the incinerator includes thermocouples and a circular chart recorder for recording primary and secondary combustion chamber temperature.

Particulate air emissions are controlled with an Airpol high energy venturi scrubber. Caustic sodium hydroxide is added to the scrubber to enhance removal of acid gases. The scrubber liquid is recirculated through the venturi system with a specified amount bled off and replaced with fresh make-up liquid. A stainless steel impact mist eliminator, located downstream of the venturi, helps control the amount of entrained water droplets carried over to the fan and stack. Continuous monitoring instrumentation for the scrubber includes a draft gage for measuring the pressure drop across the venturi, a thermocouple for measuring the venturi inlet gas temperature, a flow meter for measuring the scrubber liquid flow rate, and a meter for measuring the pH of the scrubber liquid.

4.0 SAMPLING LOCATION

The MWI is located in a single-story building. The stack extends vertically through the roof and to a height of about 10 feet above the roof. The sampling site for the manual sampling was located inside the MWI building in a 15-3/8 inch inner diameter (ID) round vertical stack, 170 inches (11.1 stack diameters) downstream of the nearest flow disturbance (fan outlet) and 175 inches (11.4 stack diameters) upstream of the nearest flow disturbance (atmosphere). According to EPA Method 1 criteria, this location requires 12 sample traverse points, 6 along each of 2 perpendicular diameters. Sampling was accomplished through two existing 3-inch ID test ports. The sample traverse point locations are shown in Figure 4.1. A separate test port for the portable continuous emission monitor (CEMs), which were used for the instrumental methods, was installed about 48 inches upstream of the manual methods sampling site. Access to the manual sampling location was provided by scaffold and staging, approved by the Occupational Safety and Health Administration (OSHA), erected by PES.

Although cyclonic flow conditions were not expected at the sampling locations, PES performed a check to verify the absence of cyclonic or nonparallel flow in accordance with the procedure specified in Section 2.4 of EPA Method 1. The results indicated an average angle of rotation of 0 degrees to obtain a null velocity reading.

Circular Stack Method 1 Calculation Results

Date: 03/23/01

Time: 10:23:10

Facility: Malcolm Grow Med. Center MWI

Source ID: C2 (MWI)

Source Name: Joy Energy Systems MWI

Date: 01/31/01

Calculated By: F. Meadows

Input Values

Traverse Point Type: Sample - M5

Inside of far wall to outside of nipple: 17 3/8 (inches)

Nipple Length: 2 even (inches)

Distance from Upstream Disturbance: 170 even (inches)

Distance from Downstream Disturbance: 175 even (inches)

Number of ports: 2 ports at 90 degrees

Calculated Values

Inside Diameter: 15.3750 (inches)

Upstream Duct Diameters: 11.05

Downstream Duct Diameters: 11.38

Minimum Traverse Points: 12

Traverse Point Number	Fraction of Length	Length (inches)	Product of Columns 2 & 3	Nipple Length (inches)	Traverse Point Location Sum of Col. 4 & 5
1	0.044	15 3/8	0 11/16	2 even	2 11/16
2	0.146	15 3/8	2 1/4	2 even	4 1/4
3	0.296	15 3/8	4 9/16	2 even	6 9/16
4	0.704	15 3/8	10 13/16	2 even	12 13/16
5	0.854	15 3/8	13 1/8	2 even	15 1/8
6	0.956	15 3/8	14 11/16	2 even	16 11/16

Figure 4.1 MWI Sample Traverse Point Locations

5.0 SAMPLING AND ANALYTICAL PROCEDURES

Table 5.1 summarizes the test parameters, test methods, number of tests, and duration of each sampling event. Brief descriptions of the methods conducted are provided 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 select the measurement site and to establish velocity and sample traverse point locations. The measurement site is discussed in Section 4.0.

5.2 DETERMINATION OF STACK GAS VOLUMETRIC FLOW RATE

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

TABLE 5.1
TEST PARAMETERS AND TEST METHODS SUMMARY

Parameter	EPA Test Methods	No. of Tests	Time per Test (minutes)
Volumetric Flow Rate	1 & 2	3	240
Molecular Weight, Emission Correction Factors	3A	^a	^a
Moisture	4	6 ^b	3 @ 60 each 3 @ 240 each
Sulfur Dioxide	6C	3	60
Nitrogen Oxides	7E	3	60
Carbon Monoxide	10	3	60
Dioxin/Furan (PCDD/PCDF)	23	3	240
Particulate Matter/Metals	5/29	3	60
Hydrogen Chloride	26	3	60

^a Continuous with all manual and CEM pollutant measurement runs.

^b Moisture content was determined using both the M23 and M5/29 sample trains.

5.3 DETERMINATION OF DRY MOLECULAR WEIGHT AND EMISSION CORRECTION FACTORS

EPA Method 3A, "Determination of Oxygen and Carbon Dioxide Concentration in Emissions From Stationary Sources (Instrumental Analyzer Procedure)," was used to determine oxygen (O_2) and carbon dioxide (CO_2) content of the stack gas. This procedure was part of the extractive continuous emission monitoring apparatus described in Section 5.8.

5.4 DETERMINATION OF STACK GAS MOISTURE CONTENT

EPA Method 4, "Determination of Moisture Content in Stack Gases," was used to determine stack gas moisture content. Moisture was determined using both the EPA Method 23 and EPA Method 29 sample trains. The quantity of condensed water was determined gravimetrically and then compared to the dry volume of gas sampled to determine the volume % moisture content. The moisture values obtained from the Method 23 and Method 29 sample trains were also used to adjust the SO_2 , NO_x , and CO concentrations to 7% O_2 .

5.5 DETERMINATION OF POLYCHLORINATED DIBENZO-P-DIOXINS AND POLYCHLORINATED DIBENZOFURANS

EPA Method 23, "Determination of Polychlorinated Dibenzo-p-Dioxins and Polychlorinated Dibenzofurans From Stationary Sources," was used to determine total PCDD/PCDF. Samples were withdrawn from the gas stream isokinetically and collected via the sample probe onto a glass fiber filter, followed by a packed column of XAD-2 adsorbent material. The PCDD/PCDF were extracted from the samples and analyzed using high resolution gas chromatography/mass spectrometry (GC/MS). PES selected Alta Analytical Perspectives (Alta),

Wilmington, North Carolina, to prepare the filters and adsorbent traps and to perform the required analyses.

A schematic of the Method 23 sampling apparatus is shown in Figure 5.1. Each measurement run was 4 hours in duration, as required by 40 CFR, Part 60, Subpart Ec, Paragraph 60.56c(b)(9).

5.6 DETERMINATION OF HYDROGEN CHLORIDE

EPA Method 26, "Determination of Hydrogen Chloride Emissions From Stationary Sources," was used to determine HCl emissions. An integrated sample was withdrawn from the stack and passed through a prepurged heated probe and filter into a series of midjet impingers containing dilute sulfuric acid and dilute sodium hydroxide solutions, which collected gaseous hydrogen halides and halogens. A schematic of the Method 26 sampling train is shown in Figure 5.2. Each measurement run was 1 hour in duration. PES selected First Analytical Laboratories (FAL), Chapel Hill, North Carolina, to perform the required analyses.

5.7 DETERMINATION OF PARTICULATE MATTER AND METALS

EPA Method 29, "Determination of Metals Emissions From Stationary Sources," was used to determine filterable particulate matter and metals. The target metals included Cd, Pb, and Hg. Samples were withdrawn from the gas stream isokinetically and collected via the sample probe onto a tared quartz-fiber filter, followed by a series of impingers containing aqueous acidic solutions of hydrogen peroxide (analyzed for Cd and Pb) and an aqueous acidic solution of potassium permanganate (analyzed for Hg). The probe filter fractions were analyzed

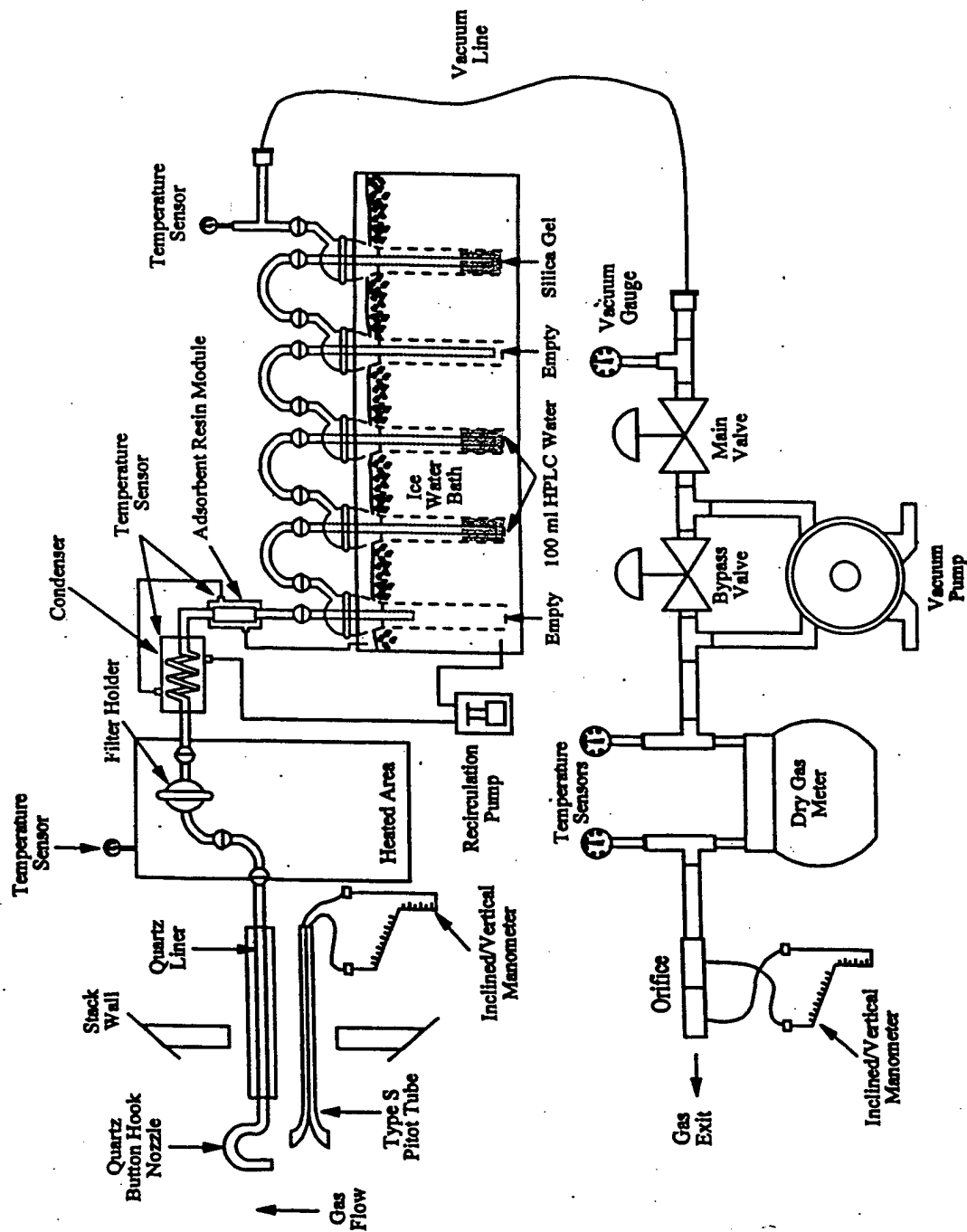


Figure 5.1 EPA Method 23 Sampling Apparatus

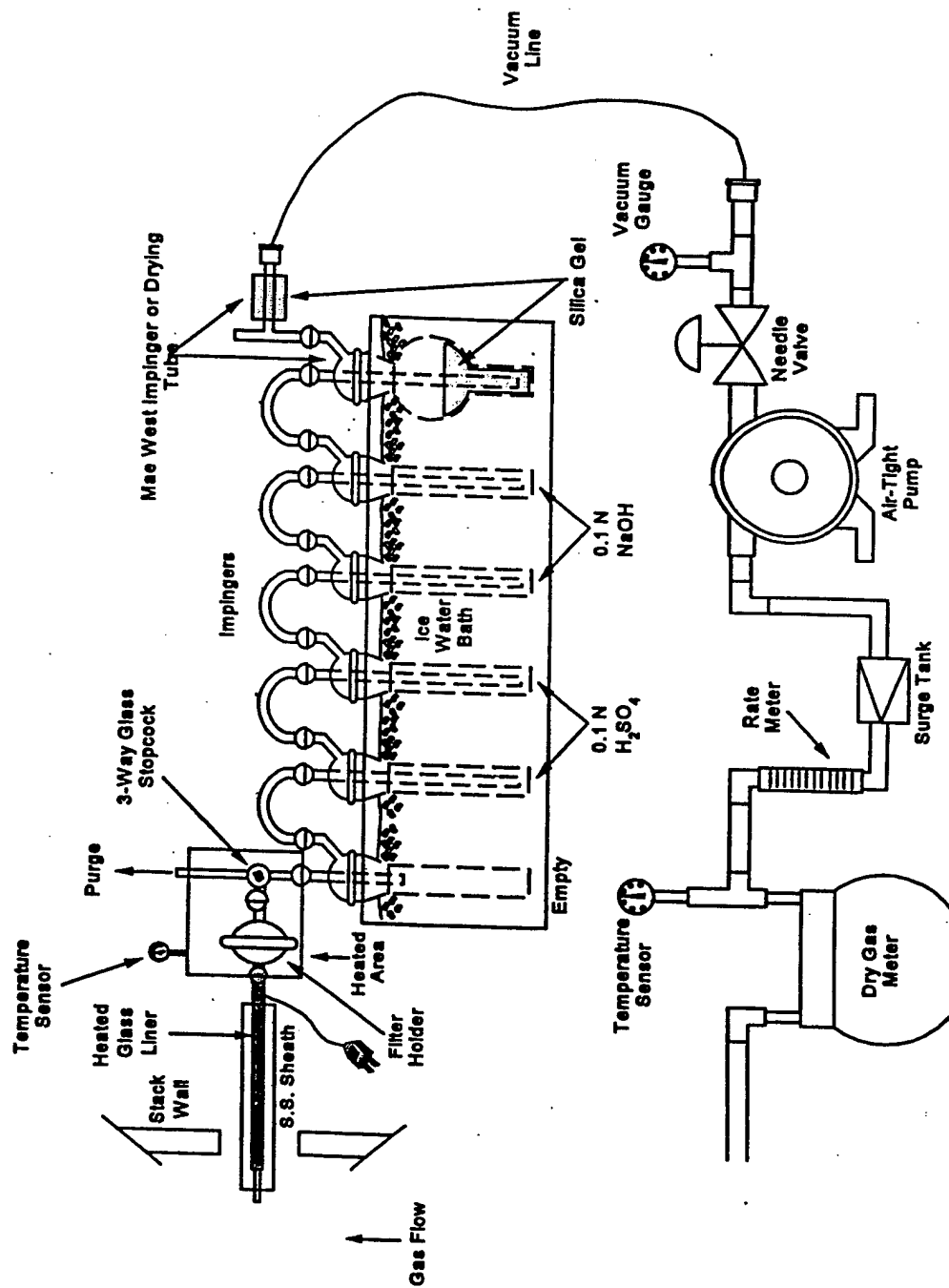


Figure 5.2 EPA Method 26 Hydrogen Chloride Sampling Apparatus

gravimetrically in the PES laboratory in Research Triangle Park, North Carolina, to determine filterable particulate matter. Upon completion of the particulate matter analyses, the particulate fractions and aqueous fractions were submitted to FAL for the metals analyses.

A schematic of the Method 29 sampling train is shown in Figure 5.3. Each measurement run was 1 hour in duration.

5.8 SULFUR DIOXIDE, OXIDES OF NITROGEN, AND CARBON MONOXIDE

SO₂, NO_x, and CO concentrations were measured using instrumental analyzers in accordance with EPA Methods 6C, 7E, and 10. An extractive sampling system was setup as shown in Figure 5.4. Although EPA Methods 6C, 7E, and 10 require a heated sample probe, Bill Reamy of the MDE approved the use of an unheated sample probe. This deviation from the method eliminated the need to install costly additional test ports in the stack. The sampling system consisted of a short sample probe about 8 inches in length, a heated out-of-stack filter, a calibration valve assembly, a short heated Teflon® sample line, a sample gas conditioner (chiller), an unheated Teflon® sample transport line, and a sample gas manifold to direct the sample gas to the analyzers.

The SO₂ analyzer was a Western Research Model 721 ATM unit that uses the analytical technique of ultraviolet fluorescence. The instrument had user-defined ranges of 50 to 5000 parts per million by volume (ppmv). The instrument was calibrated using SO₂-in-nitrogen (N₂) calibration gases prepared in accordance with EPA Protocol. Two upscale calibration gases corresponding to 40-60 and 80-100% of span and zero gas (ambient air) were used. The instrument was operated on a 0-100 ppmv range.

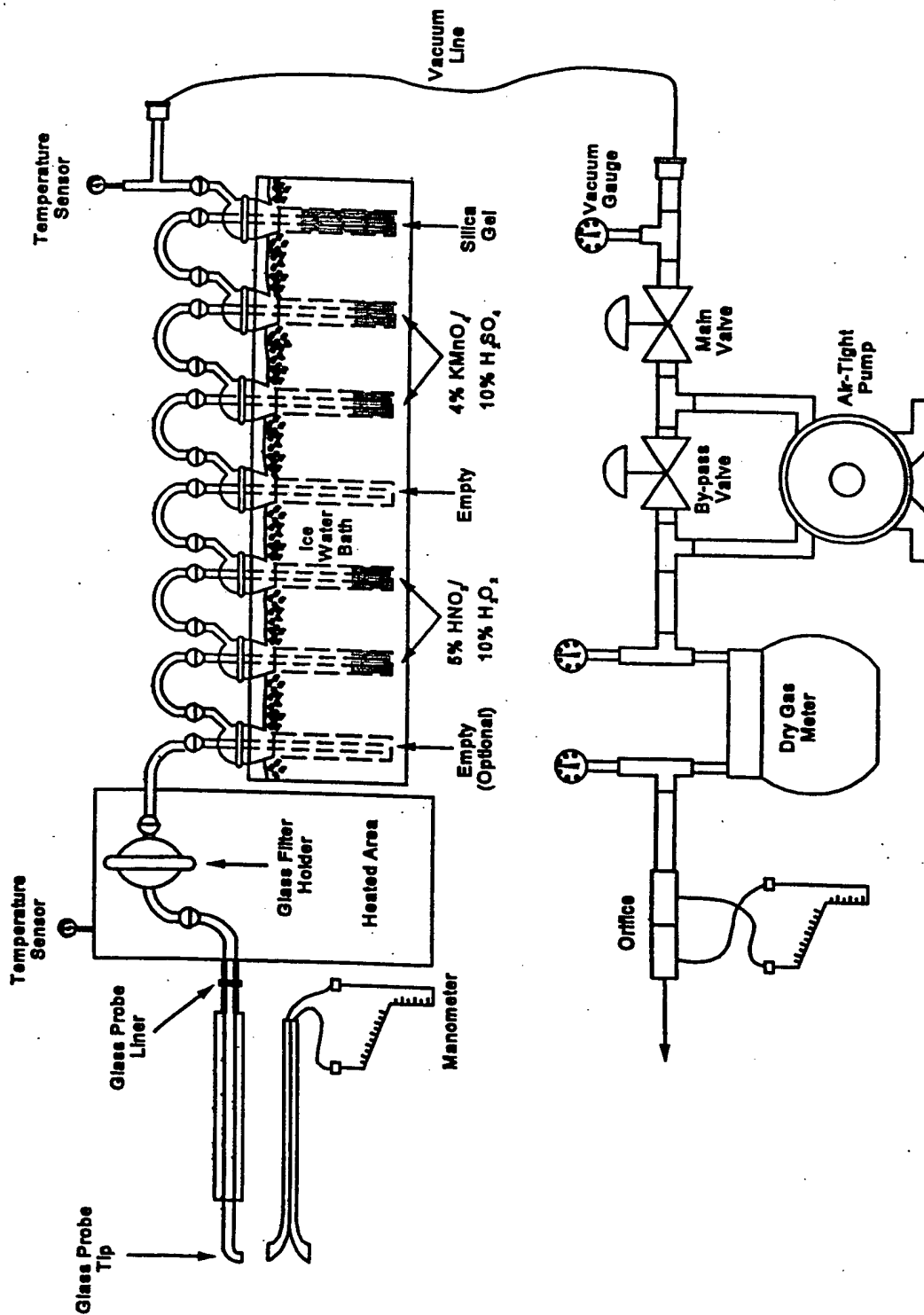


Figure 5.3 EPA Method 5/29 Particulate Matter/Metals Sampling Apparatus

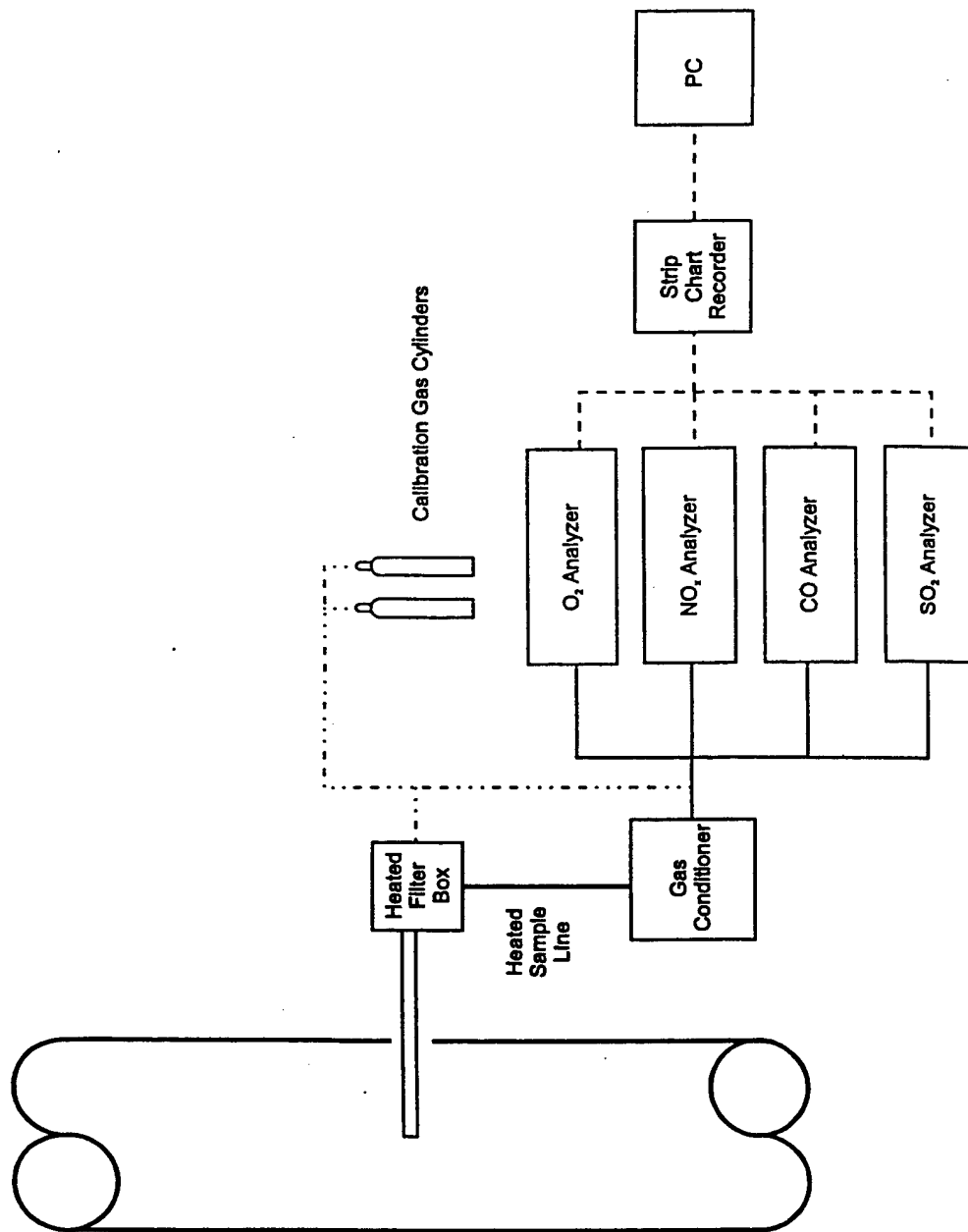


Figure 5.4 EPA Methods 3A, 6C, 7E, and 10 Instrumental Methods Extractive Sampling/Monitoring System

The NO_x analyzer was an API unit that uses the principle of chemiluminescence to determine the NO_x concentration continuously. The instrument was operated on the range of 0-500 ppmv as nitrogen oxide (NO). The instrument was calibrated using NO-in-N₂ calibration gases prepared in accordance with EPA Protocol. Two upscale calibration gases corresponding to 40-60 and 80-100% of span, and zero gas (ambient air) were used. Prior to testing, the NO₂ to NO conversion efficiency was checked in accordance with the procedures in Section 5.6.1 of EPA Method 20.

The CO analyzer was a Thermo Environmental Instruments Model 48C Gas Filter Correlation (GFC) unit that uses the principle of infrared absorption. The GFC system responds specifically to CO, so it was not necessary to make a CO₂ correction as specified in Section 9 of Method 10. The instrument was operated on the range of 0-100 ppmv. The instrument was calibrated using three upscale CO-in-N₂ calibration gases corresponding to approximately 30, 60, and 90% of span. Prepurified N₂ was used for the zero gas. The gases were certified by the manufacturer to be within $\pm 2\%$ of the specified concentration.

Pretest preparations included calibration error checks, sampling system bias checks, and response time checks for the respective analyzers. Post-test checks included zero and calibration drift tests. The output signal from each instrument was continuously recorded using a strip chart recorder and data logger.

5.9 DETERMINATION OF VISUAL OPACITY

EPA Method 9, "Visual Determination of the Opacity of Emissions From Stationary Sources," was used to determine visual opacity. PES provided a certified observer to observe and record opacity of the plume where condensed water was not present.

6.0 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

This section describes the specific quality assurance/quality control (QA/QC) procedures employed by PES in performing this series of tests. The goals of the QA/QC activities for this project were intended to ensure, to the highest degree possible, the accuracy of the data collected. The procedures contained in the "Quality Assurance Handbook for Air Pollution Measurement Systems, Volume III, Stationary Source Specific Methods," EPA-600/R-94/038C, served as the basis for the performance of all testing and related work activities on this project. All calibration requirements were met by the sampling equipment used to conduct this test program.

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 are presented below.

6.1.1 Barometers

PES uses aneroid barometers that 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 are calibrated using the procedure described in Section 3.4.2 of EPA's Quality Assurance Handbook.

Each temperature sensor was calibrated over the expected range of use against an American Society for Testing Materials (ASTM) 3C or 3F thermometer. Table 6.1 summarizes the types of calibrations performed and the acceptable levels of variance. Potentiometers were calibrated using a thermocouple simulator having a range of 0-2400°F.

6.1.3 Pitot Tubes

PES used Type S pitot tubes that were constructed to EPA Method 2 specifications. Pitot tubes meeting these criteria are assigned a baseline coefficient of 0.84 and need not be calibrated.

6.1.4 Differential Pressure Gages

PES used Dwyer inclined and inclined/vertical manometers to measure differential pressures. These parameters 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

Dry gas meters and orifices were calibrated in accordance with Section 3.3.2 of EPA's Quality Assurance Handbook. This procedure involved direct comparison of the dry gas meter to a reference dry test meter. The reference dry test meter was calibrated using a wet test meter or a liquid displacement technique. Before its initial use in the field, the metering system was calibrated over the entire range of operation. After each field use, the metering system was calibrated at a single intermediate setting based on the previous field test.

TABLE 6.1

SUMMARY OF TEMPERATURE CALIBRATIONS

Temperature Sensor	Number of Calibration Points	CALIBRATION MEDIA					Tolerances
		Ice Bath (0°C)	Ambient Air (20-25°C)	Hot Water (40-50°C)	Boiling Water (100°C)	Heated Oil (150-200°C)	
Impinger Outlet Thermocouple	2	*	*				± 1°C
Dry Gas Meter Thermometer	2		*	*			± 3°C
Stack Temperature Sensor	3	*			*	*	± 1.5°C of reference temperature

*: designates calibration point.

Acceptable tolerances for the initial and final dry gas meter factors and orifice calibration factors are ± 0.02 and ± 0.20 from average, respectively.

6.2 ON-SITE QA/QC

The on-site QA/QC activities are discussed below.

6.2.1 Measurement Sites

Prior to sampling, all stack dimensions were checked to verify measurement site locations, location of test ports, and inside stack dimensions. Inside dimensions were checked through all available test ports to verify uniformity of the stack cross-sectional area, and the sample test ports were checked to verify that they did not extend beyond the inside wall. The inside stack dimensions, wall thickness, and sample port depths were measured to the nearest 1/16 inch.

6.2.2 Velocity Measurements

All velocity measurement apparatus was 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 cross section.

6.2.3 Integrated Flue Gas Sampling

Integrated multipoint flue gas samples were collected in Tedlar® gas bags by traversing the stack cross-sectional area simultaneously with each PM/metals and PCDD/PCDF measurement run. The sample train was assembled and

leak-checked before and after each test run. Prior to each test run, the gas bags were leak-checked and purged with nitrogen to ensure that no contamination of the sample occurred.

During sampling, Fyrite[®] combustion gas analyzers were used to determine % concentrations of CO₂ and O₂. These instruments were used as a confirmatory technique for the Orsat analysis.

6.2.4 Moisture

Stack gas moisture content was determined simultaneously using both the PM/metals and the PCDD/PCDF sample trains. During sampling, the exit gas of the last impinger was maintained below 68°F to ensure complete condensation of the stack gas water vapor. The total moisture was determined gravimetrically and included the condensate collected in the Method 23 adsorbent trap.

6.2.5 Sulfur Dioxide, Oxides of Nitrogen, and Carbon Monoxide Instrumental Methods

The on-site QC requirements for EPA Methods 6C, 7E, and 10 included the following:

Analyzer Calibration Error – Less than $\pm 2\%$ of the span for the zero, mid-range, and high-range calibration gases.

Sampling System Bias – Less than $\pm 5\%$ of the span for the zero and mid- or high-range calibration gases.

Calibration Drift - Less than $\pm 3\%$ of the span over the period of each run.

EPA Methods 6C and 7E required the use of calibration gases prepared according to EPA Protocol and certified to be within $\pm 1\%$ of the specified concentrations. EPA Method 10 required the use of calibration gases that were certified to be within $\pm 2\%$ of the specified concentrations. Additional QC checks included up- and down-scale response time checks.

6.2.6 Dioxin/Furan (PCDD/PCDF)

The field sampling QA/QC procedures were similar to those for PM/metals. The adsorbent cartridges were spiked with surrogate standards in the laboratory prior to collecting the field samples.

6.2.7 Particulate Matter/Metals and Hydrogen Chloride

The field sampling QA/QC procedures included the cleaning and preparation of all sampling train glassware and sample containers, use of prescribed reagents and filters, pre- and post-test leak checks of the sampling apparatus, sample recovery as prescribed in the proposed method, and retention of unused filters and reagents for use as blanks.

6.2.8 Sample Handling and Chain-of-Custody

All samples not analyzed on site (PCDD/PCDF, HCl, PM/metals) were logged into a master logbook and given an alpha-numeric identification code. The samples were clearly labeled and sealed. Samples were stored in an area of limited access. Upon completion of the particulate analyses in the PES laboratory in Research

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Triangle Park, North Carolina, the PCDD/PCDF, HCl, and metals samples were hand-delivered to PES' contract laboratories for analyses. A chain-of-custody report form accompanied all samples delivered to each laboratory and documented all handling through final disposition.

6.3 ANALYSIS

6.3.1 Particulate Matter/Metals

Analysis for particulate matter was performed in the PES laboratory. Field blanks of acetone were taken directly from the wash bottle used in recovering the samples. Three (3) blank filters were also exposed and handled at the sample recovery site. The acetone blank and filter blanks were submitted to the laboratory and analyzed with the samples.

Upon receipt of the samples at the PES laboratory, the samples and blanks were analyzed in strict accordance with Section 4.3 of EPA Method 5. Prior to any weighings, PES' analytical balance was checked for calibration with known weights.

The sample and blank filters were placed in a tared glass weighing dish and desiccated for 24 hours in a desiccator containing anhydrous calcium sulfate. The filters were weighed to a constant weight and the results reported to the nearest 0.1 mg. The term "constant weight" means a difference of no more than 0.5 mg or 1% of total weight less tare weight, whichever is greater, between two consecutive weighings, with no less than 6 hours of desiccation time between weighings. The sample and blank acetone solutions were checked to confirm the level of liquid in the containers in order to determine whether or not leakage occurred during transport. If a noticeable amount of leakage had occurred, the

sample was voided, or other methods were used such as adjusting the final analysis for the amount of spillage. The liquid in each sample container was measured gravimetrically to ± 0.5 g. The contents were transferred to a tared 250-ml beaker and evaporated to dryness at ambient temperature and pressure. The beakers were then desiccated for 24 hours and weighed to a constant weight. The results were reported to the nearest 0.1 mg. Filterable particulate matter was the sum of the particulate matter in the acetone rinse (blank corrected) and that caught on the filter.

Upon completion of the particulate analyses, these samples, along with the metals train aqueous samples, were hand-delivered to FAL for determination of the target metals following the analytical and quality control procedures prescribed in Method 29. The samples were delivered to FAL within 6 working days after the completion of the field tests. The analyses were performed within 21 working days after receipt of the samples by FAL.

6.3.2 Dioxin/Furan (PCDD/PCDF)

The PCDD/PCDF samples were submitted to Alta for analysis following the procedures prescribed in Section 5 of Method 23 and proposed revisions. GC/MS system checks included initial calibration and daily performance checks. Specific QC checks included the determination of internal standard recovery efficiencies and the determination of surrogate recoveries. Recoveries of internal standards must be between 40 to 130% for the tetra-through hexachlorinated compounds, while the range is 25 to 130% for the higher hepta- and octachlorinated homologues. Surrogate recovery efficiencies were required to be between 70 and 130%.

APPENDIX A
PROCESS DATA

INCINERATOR OPERATION

ERATOR

	DATE	TIME	WEIGHT	PRIMARY	SECONDARY	BOXES
~~used pump~~	1-31-01	112	34	1881	1796	2
~~used pump~~	1-31-01	125	49	1874	1798	2
~~used pump~~	1-31-01	135	53	1860	1797	2
~~used pump~~	1-31-01	146	48	1860	1796	2
~~used pump~~	1-31-01	159	52	1855	1792	2
~~used pump~~	1-31-01	214	48	1666	1778	2
~~used pump~~	1-31-01	227	55	1612	1782	2
~~used pump~~	1-31-01	240	60	1645	1782	2
~~used pump~~	1-31-01	250	48	1960	1921	2
~~used pump~~	1-31-01	336	40	1153	1729	2
~~used pump~~	1-31-01	348	38	1456	1761	2
~~used pump~~	1-31-01	404	36	1342	1744	2
~~used pump~~	1-31-01	415	54	1479	1771	2
~~used pump~~	1-31-01	425	50	1605	1724	2
~~used pump~~	1-31-01	439	52	1633	1776	2
~~used pump~~	1-31-01	452	60	1710	1790	2
~~used pump~~	1-31-01	502	54	1948	1813	2

850

34

INCINERATOR OPERATION

ERATOR	DATE	TIME	WEIGHT	PRIMARY	SECODNARY	BOXES
~~Good shoring~~	1-31-01	513	51	2008	1759	2
~~Good shoring~~	1-31-01	523	54	1960	1802	2
~~Good shoring~~	1-31-01	540	50	1604	1764	2
~~Good shoring~~	1-31-01	550	57	1785	1800	2
~~Good shoring~~	1-31-01	603	52	1796	1782	2
~~Good shoring~~	1-31-01	614	54	1896	1797	2
~~Good shoring~~	1-31-01	624	51	1898	1797	2
~~Good shoring~~	1-31-01	638	53	1707	1729	2
~~Good shoring~~	1-31-01	649	80	1957	1804	2
~~Good shoring~~	1-31-01	700	51	2052	1837	2
~~Good shoring~~	1-31-01	712	49	1898	1800	2
~~Good shoring~~	1-31-01	723	60	1962	1802	2
~~Good shoring~~	1-31-01	733	57	1821	1789	2
~~Good shoring~~	1-31-01	746	46	1580	1780	2
~~Good shoring~~	1-31-01	756	52	1874	1801	2
~~Good shoring~~	1-31-01	806	49	1965	1829	2
~~Good shoring~~	1-31-01	816	51	1870	1806	2

897

34

INCINERATOR OPERATION

ERATOR

ERATOR	DATE	TIME	WEIGHT	PRIMARY	SECODNARY	BOXES
~~1st~~ ~~2nd~~ ~~3rd~~ ~~4th~~ ~~5th~~ ~~6th~~ ~~7th~~ ~~8th~~ ~~9th~~ ~~10th~~ ~~11th~~ ~~12th~~ ~~13th~~ ~~14th~~ ~~15th~~ ~~16th~~ ~~17th~~ ~~18th~~ ~~19th~~ ~~20th~~ ~~21st~~ ~~22nd~~ ~~23rd~~ ~~24th~~ ~~25th~~ ~~26th~~ ~~27th~~ ~~28th~~ ~~29th~~ ~~30th~~ ~~31st~~ ~~32nd~~ ~~33rd~~ ~~34th~~ ~~35th~~ ~~36th~~ ~~37th~~ ~~38th~~ ~~39th~~ ~~40th~~ ~~41st~~ ~~42nd~~ ~~43rd~~ ~~44th~~ ~~45th~~ ~~46th~~ ~~47th~~ ~~48th~~ ~~49th~~ ~~50th~~ ~~51st~~ ~~52nd~~ ~~53rd~~ ~~54th~~ ~~55th~~ ~~56th~~ ~~57th~~ ~~58th~~ ~~59th~~ ~~60th~~ ~~61st~~ ~~62nd~~ ~~63rd~~ ~~64th~~ ~~65th~~ ~~66th~~ ~~67th~~ ~~68th~~ ~~69th~~ ~~70th~~ ~~71st~~ ~~72nd~~ ~~73rd~~ ~~74th~~ ~~75th~~ ~~76th~~ ~~77th~~ ~~78th~~ ~~79th~~ ~~80th~~ ~~81st~~ ~~82nd~~ ~~83rd~~ ~~84th~~ ~~85th~~ ~~86th~~ ~~87th~~ ~~88th~~ ~~89th~~ ~~90th~~ ~~91st~~ ~~92nd~~ ~~93rd~~ ~~94th~~ ~~95th~~ ~~96th~~ ~~97th~~ ~~98th~~ ~~99th~~ ~~100th~~ ~~101st~~ ~~102nd~~ ~~103rd~~ ~~104th~~ ~~105th~~ ~~106th~~ ~~107th~~ ~~108th~~ ~~109th~~ ~~110th~~ 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~~1101st~~ ~~1102nd~~ ~~1103rd~~ ~~1104th~~ ~~1105th~~ ~~1106th~~ ~~1107th~~ ~~1108th~~ ~~1109th~~ ~~1110th~~ ~~1111st~~ ~~1112nd~~ ~~1113rd~~ ~~1114th~~ ~~1115th~~ ~~1116th~~ ~~1117th~~ ~~1118th~~ ~~1119th~~ ~~1120th~~ ~~1121st~~ ~~1122nd~~ ~~1123rd~~ ~~1124th~~ ~~1125th~~ ~~1126th~~ ~~1127th~~ ~~1128th~~ ~~1129th~~ ~~1130th~~ ~~1131st~~ ~~1132nd~~ ~~1133rd~~ ~~1134th~~ ~~1135th~~ ~~1136th~~ ~~1137th~~ ~~1138th~~ ~~1139th~~ ~~1140th~~ ~~1141st~~ ~~1142nd~~ ~~1143rd~~ ~~1144th~~ ~~1145th~~ ~~1146th~~ ~~1147th~~ ~~1148th~~ ~~1149th~~ ~~1150th~~ ~~1151st~~ ~~1152nd~~ ~~1153rd~~ ~~1154th~~ ~~1155th~~ ~~1156th~~ ~~1157th~~ ~~1158th~~ ~~1159th~~ ~~1160th~~ ~~1161st~~ ~~1162nd~~ ~~1163rd~~ ~~1164th~~ ~~1165th~~ ~~1166th~~ ~~1167th~~ ~~1168th~~ ~~1169th~~ ~~1170th~~ ~~1171st~~ ~~1172nd~~ ~~1173rd~~ ~~1174th~~ ~~1175th~~ ~~1176th~~ ~~1177th~~ ~~1178th~~ ~~1179th~~ ~~1180th~~ ~~1181st~~ ~~1182nd~~ ~~1183rd~~ ~~1184th~~ ~~1185th~~ ~~1186th~~ ~~1187th~~ ~~1188th~~ ~~1189th~~ ~~1190th~~ ~~1191st~~ ~~1192nd~~ ~~1193rd~~ ~~1194th~~ ~~1195th~~ ~~1196th~~ ~~1197th~~ ~~1198th~~ ~~1199th~~ ~~1200th~~ ~~1201st~~ ~~1202nd~~ ~~1203rd~~ ~~1204th~~ ~~1205th~~ ~~1206th~~ ~~1207th~~ ~~1208th~~ ~~1209th~~ ~~1210th~~ ~~1211st</~~						

INCINERATOR OPERATION

TERATOR	DATE	TIME	WEIGHT	PRIMARY	SECODNARY	BOXES
~~not shown~~	2-1-01	1152	46	1851	1785	2
~~not shown~~	2-1-01	1204	48	1682	1767	2
~~not shown~~	2-1-01	1216	45	1800	1794	2
~~not shown~~	2-1-01	1226	47	1701	1725	2
~~not shown~~	2-1-01	1237	52	1691	1763	2
~~not shown~~	2-1-01	1252	48	1561	1765	2
~~not shown~~	2-1-01	103	49	1970	18070	2
~~not shown~~	2-1-01	138	38	1401	1738	1 ~~1738~~
~~not shown~~	2-1-01	151	36	1432	1761	2
~~not shown~~	2-1-01	221	50	1188	1700	2
~~not shown~~	2-1-01	231	52	1502	1757	2
~~not shown~~	2-1-01	242	49	1496	1766	2
~~not shown~~	2-1-01	253	53	1641	1750	2
~~not shown~~	2-1-01	305	57	1596	1763	2
~~not shown~~	2-1-01	319	37	1597	1769	2
~~not shown~~	2-1-01	334	39	1410	1750	2
~~not shown~~	2-1-01	344	37	1470	1745	3

785

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Bob Cane on 2-2-01 scabble chart not printing

INCINERATOR OPERATION

ERATOR	DATE	TIME	WEIGHT	PRIMARY	SECODNARY	BOXES
~~not testing~~	2-1-01	406	37	137.6	1755	2
~~not testing~~	2-2-01	848	53	1443	1934	2
~~not testing~~	2-2-01	859	56	1443	1765	2
~~not testing~~	2-2-01	911	49	1412	1743	2
~~not testing~~	2-2-01	929	38	1310	1746	2
~~not testing~~	2-2-01	944	48	1411	1713	2
~~not testing~~	2-2-01	954	51	1462	1753	2
~~not testing~~	2-2-01	1004	53	1686	1767	2
~~not testing~~	2-2-01	1015	49	1850	1781	2
~~not testing~~	2-2-01	1025	47	1851	1772	2
~~not testing~~	2-2-01	1035	50	1856	1787	2
~~not testing~~	2-2-01	1048	60	1760	1788	2
~~not testing~~	2-2-01	1100	58	1795	1777	2
~~not testing~~	2-2-01	1229	49	17357	1738	2
~~not testing~~	2-2-01	140	48	1646	1751	2
~~not testing~~	2-2-01	150	50	1697	1782	2
~~not testing~~	2-2-01	200	50	1703	1786	2

846

34

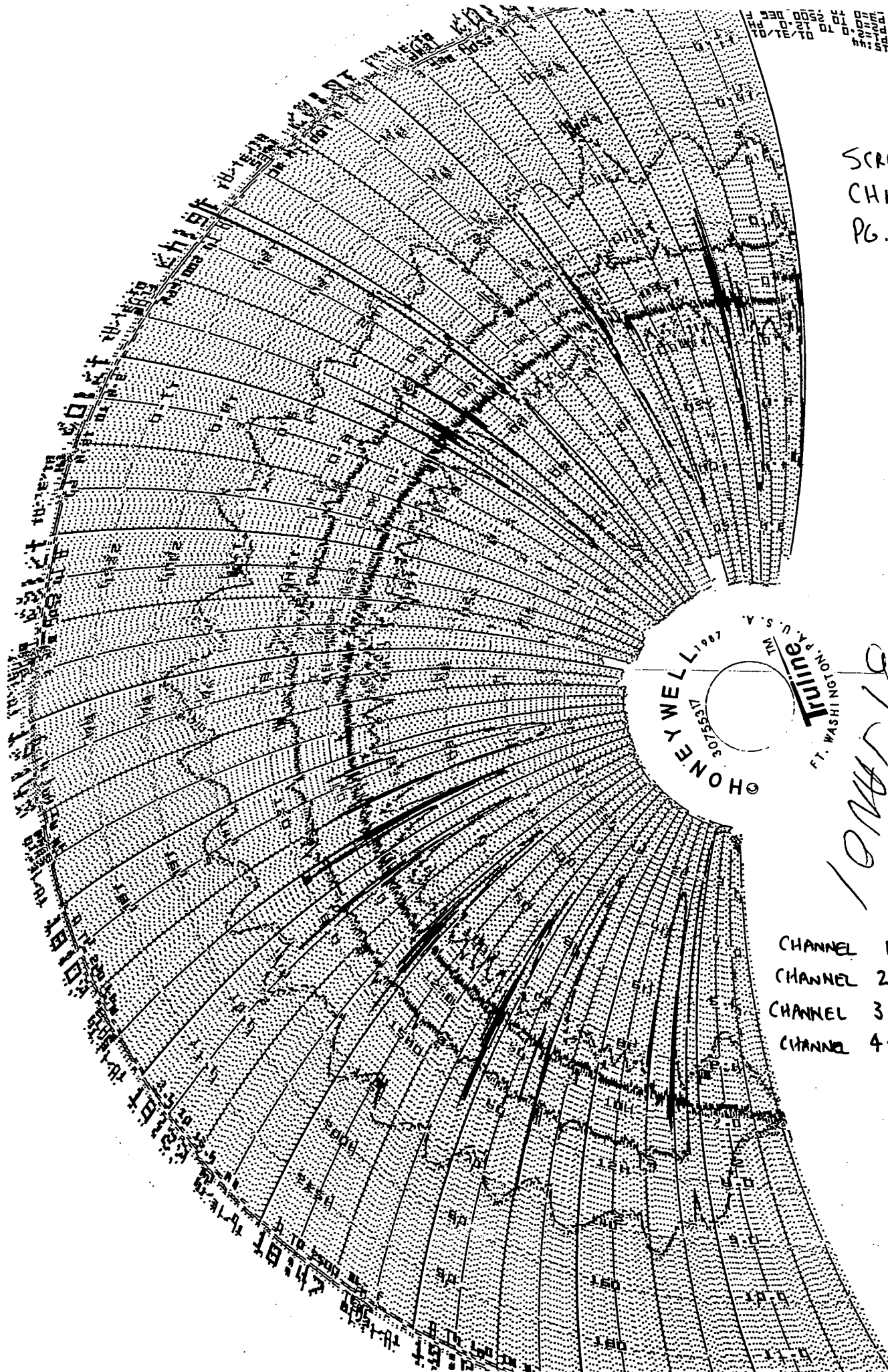
INCINERATOR OPERATION

ERATOR	DATE	TIME	WEIGHT	PRIMARY	SECODNARY	BOXES
~~East Throng~~	2-2-01	111	68	1626	1769	2
~~East Throng~~	2-2-01	124	45	1809	1793	2
~~West Throng~~	2-2-01	138	43	1881	1806	2
~~West Throng~~	2-2-01	148	40	1888	1885	2
~~East Throng~~	2-2-01	200	59	1700	1782	2
~~East Throng~~	2-2-01	210	46	1854	1795	2
~~West Throng~~	2-2-01	228	44	1510	1770	2
~~West Throng~~	2-2-01	238	40	1605	1773	2
~~East Throng~~	2-2-01	258	44	1750	1782	2
~~East Throng~~	2-2-01	302	47	1740	1786	2
~~East Throng~~	2-2-01	312	40	1850	1802	2
~~West Throng~~	2-5-01	758	44	1441	1920	2
~~West Throng~~	2-5-01	810	42	1249	1708	2
~~West Throng~~	2-5-01	820	44	4482	1711	2
~~East Throng~~	2-5-01	829	41	1412	1716	2
~~East Throng~~	2-5-01	839	38	1418	1718	2
~~East Throng~~	2-5-01	849	43	1420	1715	2

760

25

SCRUBBER 1/31/01
CHART
PG. 1/3



CHANNEL 1: pH
CHANNEL 2: INLET TEMP
CHANNEL 3: PRESSURE DROP
CHANNEL 4: WATER FLOW

SCHUBBER CHART 1/31/04
PAGE 2/3

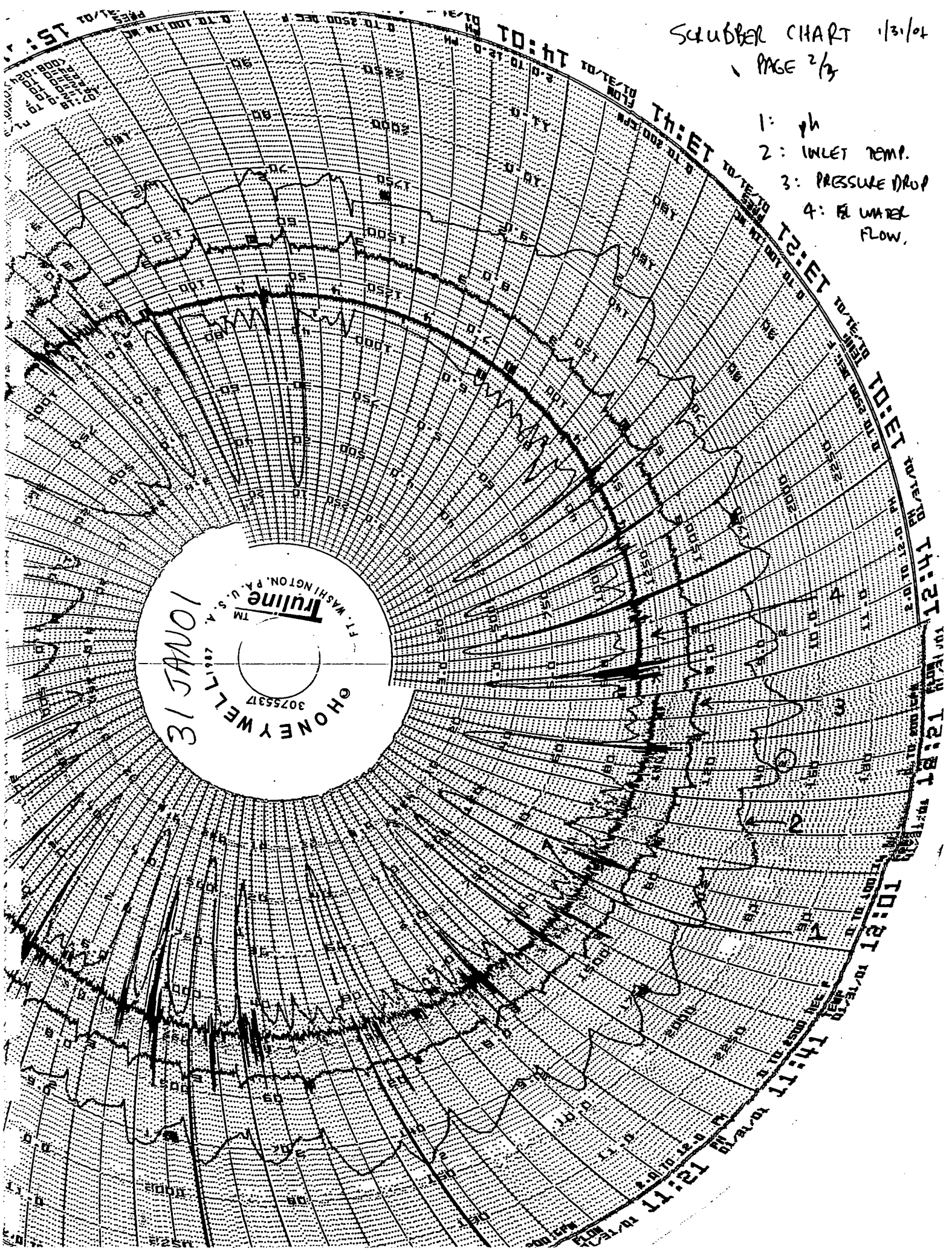
✓ PAGE 2/3

1: yh

2: INLET TEMP.

3: PRESSURE DROP

4: FL WATER
FLOW.



~~Scrub~~
SCRUBBER CITRUS 1/21/01
3/3

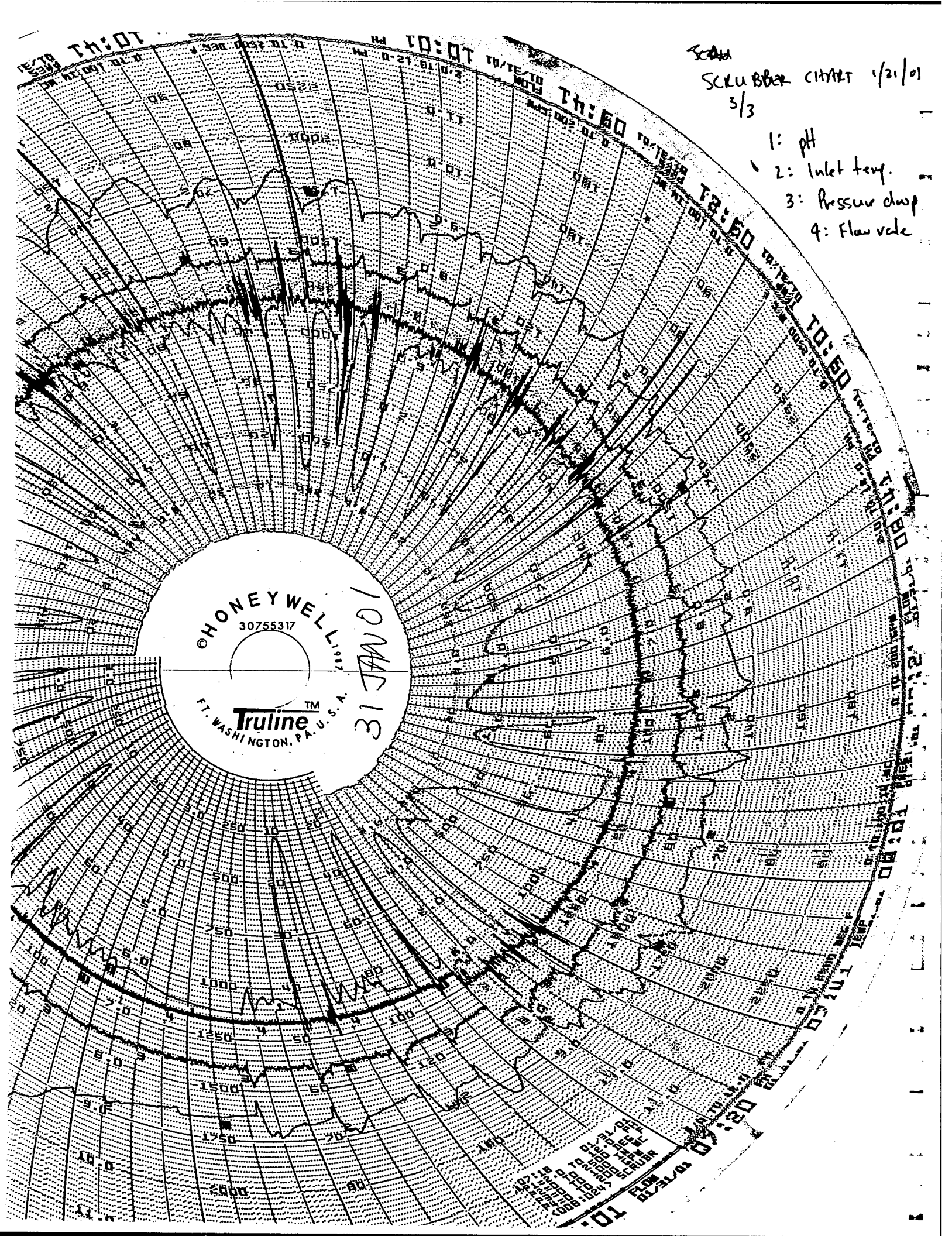
3/3

1: pH

2: Inlet temp.

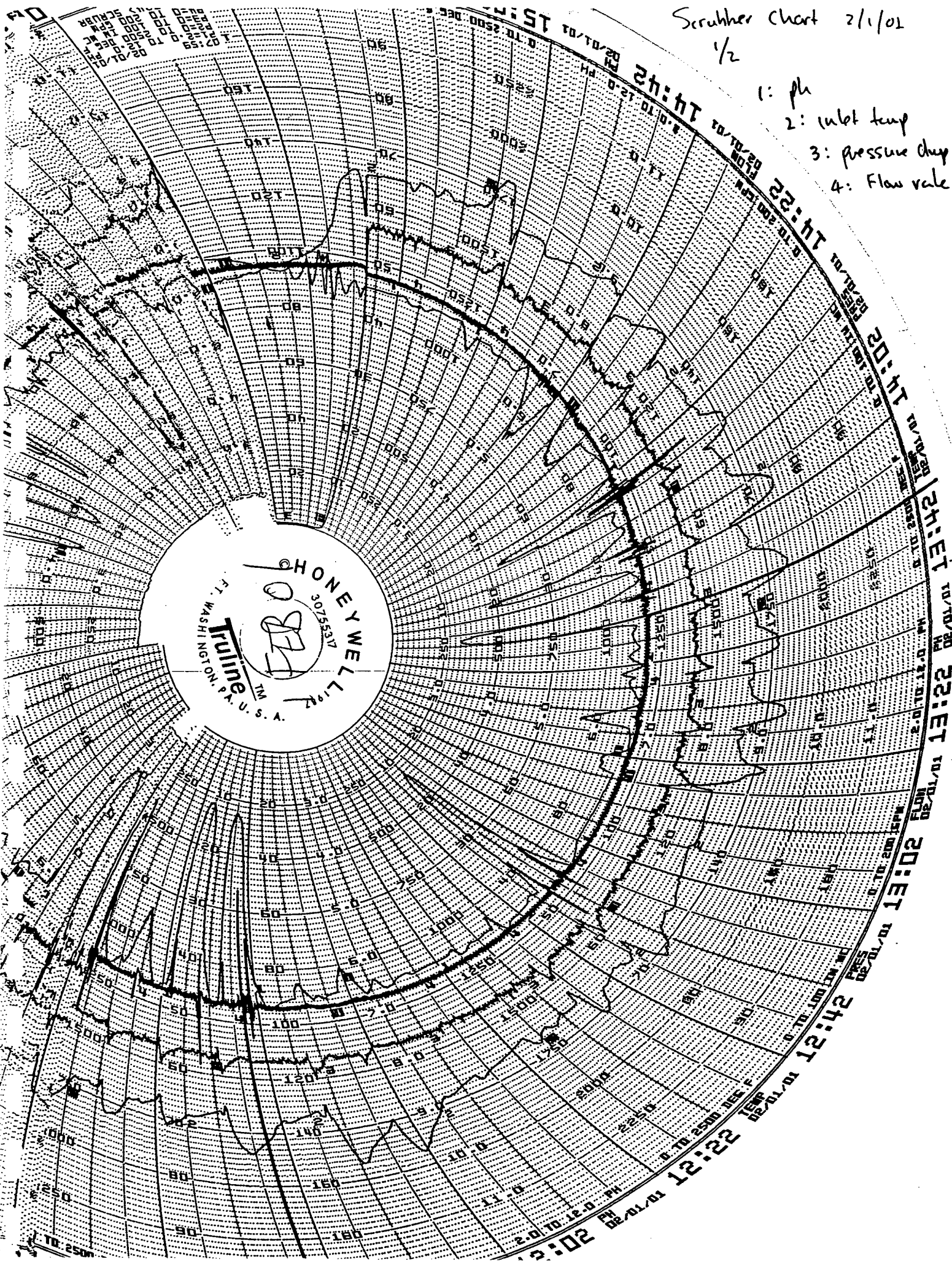
3: Pressure drop

q: Flow rate



Scrubber Chart 2/1/01
1/2

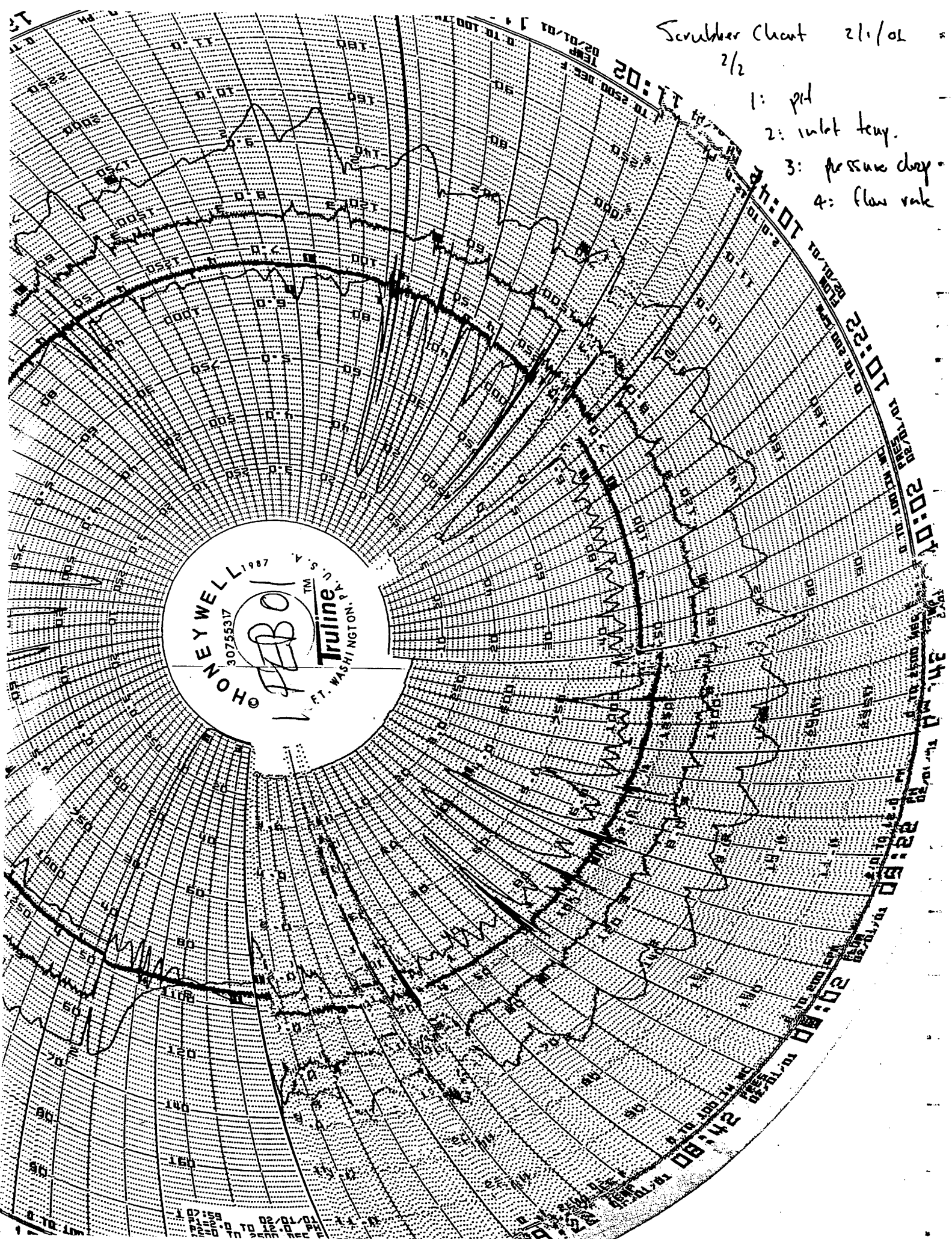
- 1: pH
- 2: inlet temp
- 3: pressure drop
- 4: Flow rate



Scrubber Chart 2/1/02

2/2

- 1: pH
- 2: inlet temp.
- 3: pressure drop
- 4: flow rate





PACIFIC ENVIRONMENTAL SERVICES, INC.

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Client

AAFB

Location

AAFB

Prepared By

Date

Checked By

Date

Sheet Title

JA

2/2/01

1

Time

SCRUBBER WALK
pH

9:50

6.3

9:55

5.8

10:00

6.5

10:05

6.5

10:10

6.6

10:15

6.5

10:20

6.6

10:25

6.0

10:30

3.3

10:35

6.2

10:40

6.6

10:45

6.6

10:50

6.2

11:00

6.5



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Client

AAFB

Location

AAFB

Prepared By

Date

Checked By

Date

Sheet Title

2

Time	① PH(5)	② Inlet temp (10)	③ Pressure (10) Drop	④ Flow rate (10) GPM
12:30	3.0	1706	56.9	93.3
12:35	3.2			
12:40	3.5	1650	58.8	93.8
12:45	2.8			
12:50	3.1	1724	57.0	92.6
12:55	3.0			
1:00	3.3	1701	57.3	93.0
1:05	3.0			
1:10	3.2	1650	56.9	93.0
1:15	3.2			
1:20	3.5	1713	55.4	93.1
1:25	4.4	1810	56.9	92.9
1:30	6.4	1759	56.4	92.7



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Client

AAFB

Location

AAFB

Prepared By

Date

Checked By

Date

Sheet Title

[Signature]

3/4/01

#3

Time

PH

inlet temp

Pressure Drop

Flow rate

2:05

5.9

1715

55.9

92.6

2:10

4.3

1673

58.7

93.1

2:15

5.0

1773

56.1

91.2

2:20

6.6

1697

55.8

92.8

2:25

6.5

1675

55.3

92.7

2:30

6.5

1694

55.8

93.0

2:35

6.6

1678

55.5

92.7

2:40

5.7

1845

55.6

91.4

2:45

6.7

1697

55.6

93.3

2:50

6.6

1652

56.7

92.8

2:55

4.6

1812

55.1

96.9

3:00

6.7

1683

56.1

93.1

3:05

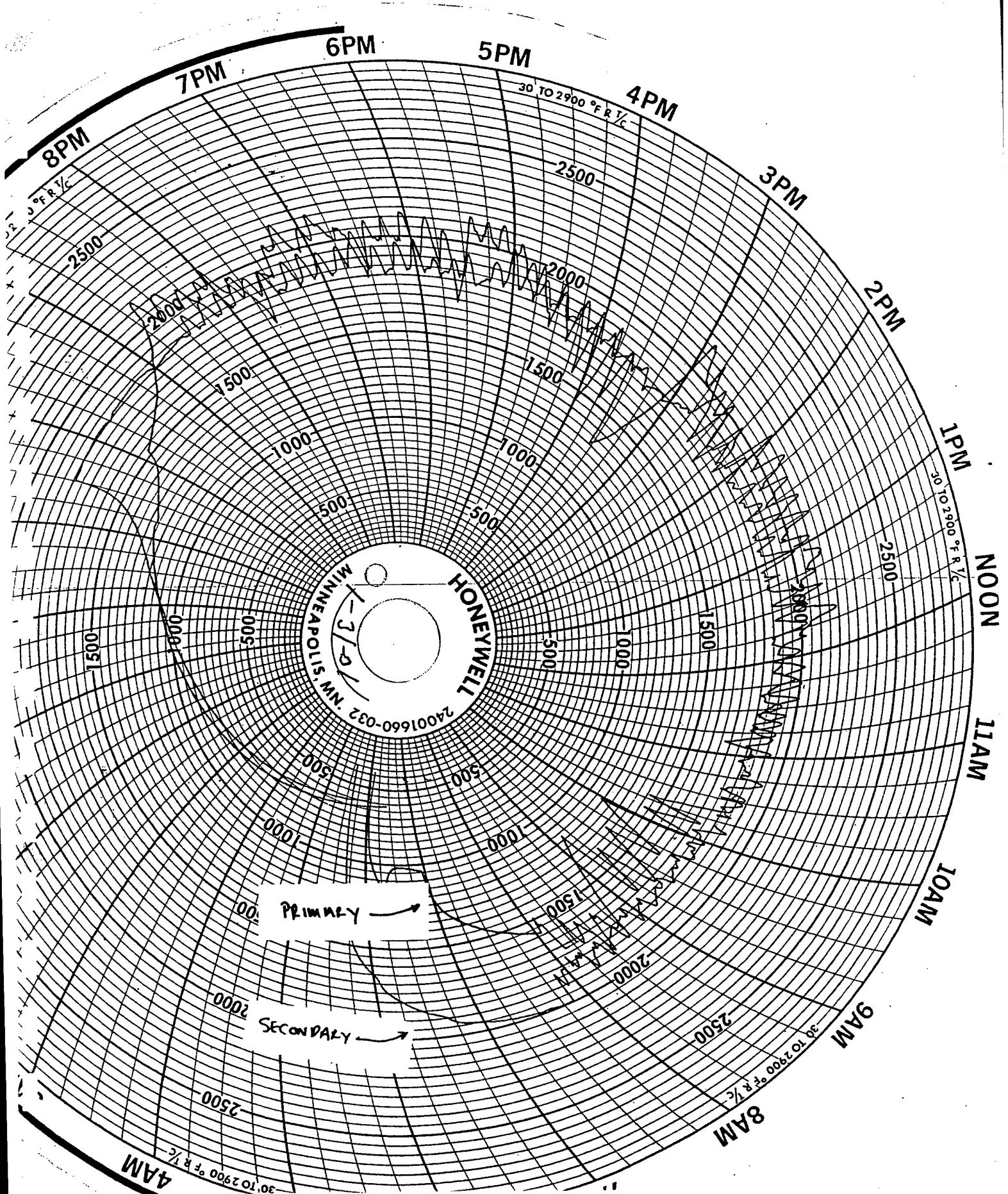
5.7

1834

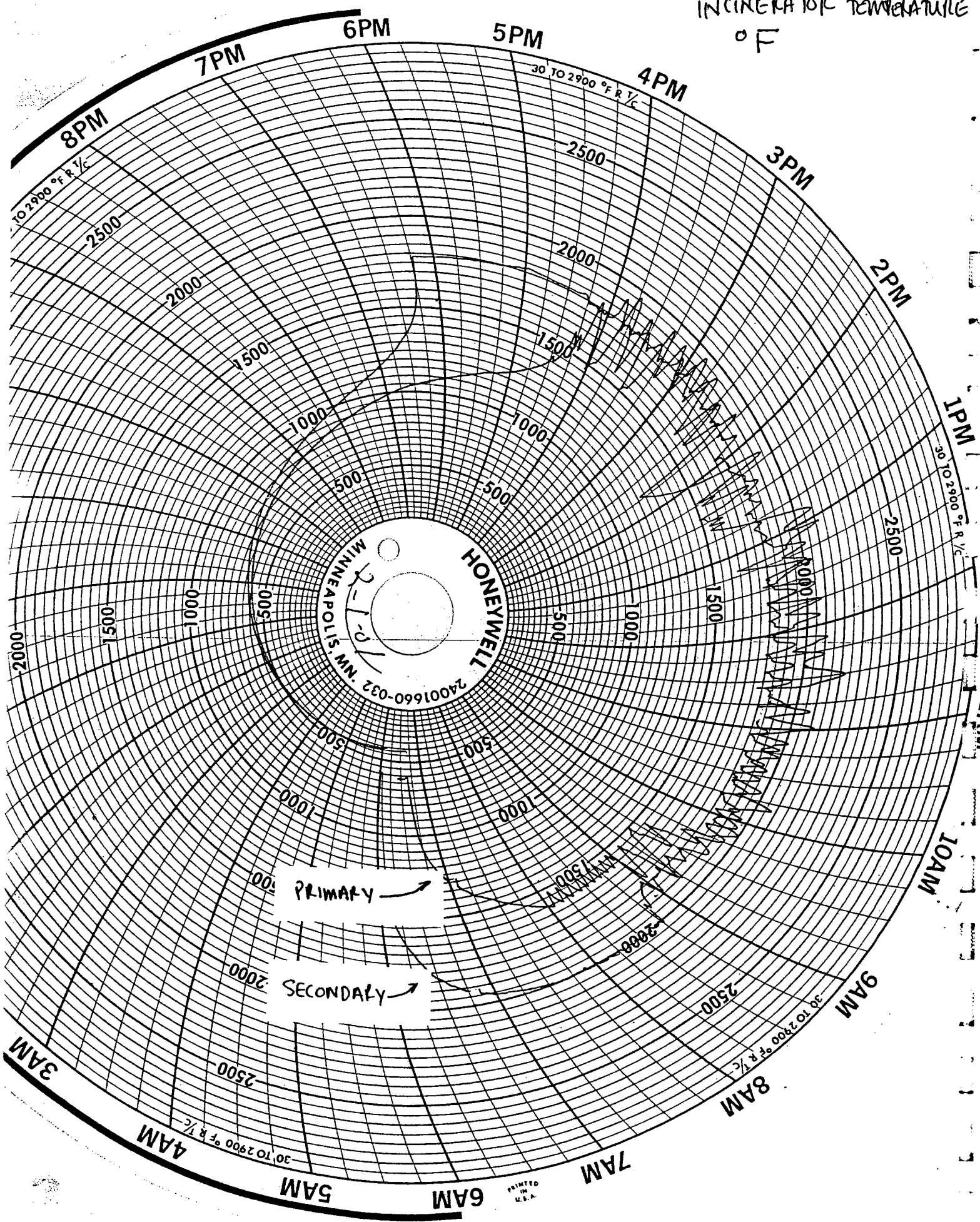
55.4

92.9

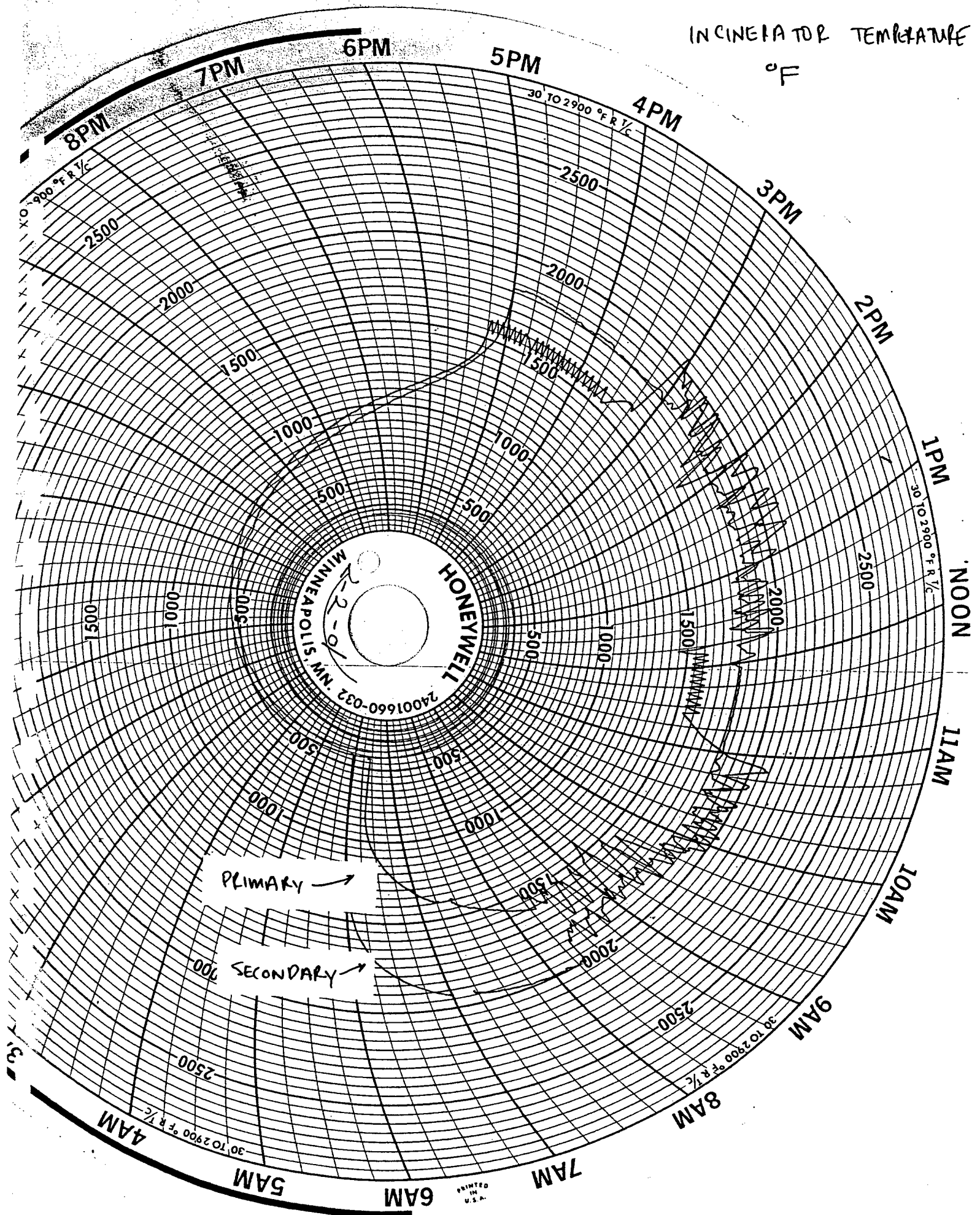
INCINERATOR TEMPERATURE
°F



INCINERATOR TEMPERATURE
°F



INCINERATOR TEMPERATURE
°F



1-260 / 123 PM Scorable Turn on

Did not begin 1-29-0.
Set at 100 testing 700 Stack

INCINERATOR OPERATION

ERATOR	DATE	TIME	WEIGHT	PRIMARY	SECODNARY	BOXES
~~Prof Thum~~	1-26-01	1054	38	1504	1809	2
~~Prof Thum~~	1-26-01	1110	42	1481	1777	2
~~Prof Thum~~	1-26-01	1124	38	1619	1803	2
~~Prof Thum~~	1-26-01	1135	40	1662	1792	2
~~Prof Thum~~	1-26-01	1155	40	1695	1785	2
~~Prof Thum~~	1-26-01	1223	44	1406	1778	2
~~Prof Thum~~	1-26-01	134	46	1500	1768	2
~~Prof Thum~~	1-26-01	149	38	1163	1734	2
~~Prof Thum~~	1-26-01	159	41	1444	1752	2
~~Prof Thum~~	1-26-01	209	38	1625	1783	2
~~Prof Thum~~	1-31-01	818	48	1451	1934	2
~~Prof Thum~~	1-31-01	828	43	1455	1754	2
~~Prof Thum~~	1-31-01	838	45	1532	1770	2
~~Prof Thum~~	1-31-01	850	43	1547	1767	2
~~Prof Thum~~	1-31-01	920	38	1058	1711	2
~~Prof Thum~~	1-31-01	932	40	1275	1725	2
~~Prof Thum~~	1-31-01	950	38	1215	1725	2

700

700

APPENDIX B
RAW FIELD DATA

Pacific Environmental Services

Appendix B.1
Raw Field Data
Particulate Matter/Metals (M29)

FIELD DATA SHEET

Plant: Anderson AFB
Sampling Location Stack
Run Number: M29-1 Date: 02-02-01
Pretest Leak Rate: 0.01 cfm @ 15 in. Hg.
Pretest Leak Check: Pilot: ☒ Orsat: N/A

Sample Type: M25 Operator: DDK
Pbar: 29.9 Ps: 1.15
CO2: 5 O2: 12
Probe Length/Type: 3'-61625 Pilot #: 00-19
Stack Diameter: 15 3/8" As: 185.78

Nozzle ID: .310 Thermocouple #: 25-9
 Assumed Bws: 232 Filter #: 104-007
 Meter Box #: 448-15 Y: 0.995 ΔH@: 1.80
 Post-Test Leak Rate: 0.00 cfm @ 15 in. Hg.
 Post-Test Leak Check: Pilot: ✓ Orsat: 2/4

[illegible]
$$\Delta V_m = \sqrt{\Delta p} =$$

三

10

MULTI-METALS SAMPLE RECOVERY DATA



Plant: <u>Andrews AFB MD</u>		Run No.: <u>M79-1</u>			
Date: <u>02/07/01</u>	Sample Box No.:	Job No.: <u>F81-001</u>			
Sample Location: <u>Inventor Outlet</u>					
Sample Type: <u>M29</u>					
Sample Recovery Person: <u>WDM</u>					
Container	Description	Volume, ml	Sealed/Level Marked		
Front Half					
1	Filter No.(s) <u>104-007</u>				
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	KMNO ₄ /H ₂ O Rinse - Impingers 5 & 6				
5C	HCl Rinse - Impingers 5 & 6				
Moisture Data					
Impinger No.	Contents	Initial Volume, ml	Weight, grams		
			Initial	Final	Net
1	Y.O.	0	616.8	828.1	211.3
2	HNO ₃	100	751.1	855.0	103.9
3	HNO ₃	100	634.1	658.1	24.0
4	MT	0	629.6	633.2	3.6
5	KMnO ₄	100	728.5	730.8	2.3
6	KMnO ₄	100	721.1	721.9	0.8
7	SS Gel	-	913.1	922.1	9
Total					354.9 ✓
Comments:					

FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: STEEL
Run Number: 1129-2 Date: 02-02-01
Pretest Leak Rate: 0.002 cfm @ 15 in. Hg.
Pretest Leak Check: Pilot: ☒ Orsat: 22/A
+3"

Sample Type: N29 Operator: DDH
Pbar: 25.50 Ps: + .14
CO2: 5 O2: 10
Probe Length/Type: 3' - Loss Pilot #: 20-1
Stack Diameter: 13 3/8" As: 185.78
K = 5.0

Nozzle ID: 310 Thermocouple #: RT-6
Assumed Bws: 52 Filter #: 108-003
Meter Box #: AWB-SY: 995 ΔH@: 1.80
Post-Test Leak Rate: 0.001 cfm @ 15 in. Hg.
Post-Test Leak Check: Pilot: ✓ Orsat: N/A

[illegible]

$\Delta V_m =$	$\sqrt{\Delta p} =$	$\Delta H =$	$T_0 =$	$T_m =$

MULTI-METALS SAMPLE RECOVERY DATA



Plant: <u>Ammons AFB MD</u>	Run No.: <u>M79-2</u>
Date: <u>02/02/01</u>	Sample Box No.: <u>Job No.: F181.01</u>

Sample Location: Incinerator Outlet

Sample Type: Method 29

Sample Recovery Person: MM/M

Container	Description	Volume, ml	Sealed/Level Marked

Front Half

1	Filter No.(s) <u>104-003</u>		
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	KMNO ₄ /H ₂ O Rinse - Impingers 5 & 6		
5C	HCl Rinse - Impingers 5 & 6		

Moisture Data

Impinger No.	Contents	Initial Volume, ml	Weight, grams		
			Initial	Final	Net
1	K ₂ O	0	643.2	776.5	133.3
2	HNO ₃	100	~~621.8~~ 713.0	828.6	115.6
3	HNO ₃	100	759.5	816.7	57.2
4	MT	0	523.8	536.1	12.3
5	KMnO ₄	100	760.6	768.7	8.1
6	KMnO ₄	100	732.8	734.1	1.3
7	≤ cel	-	1016.6	1027.9	11.3
Total					339.1

Comments:

FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M29-3 Date: 02-02-01
Pretest Leak Rate: 100.2 cfm @ 15 in. Hg.
Pretest Leak Check: Pilot: ☒ Orsat: N/A

Sample Type: M25 Operator: DDH
 Pbar: 29.9 Ps: + .15
 CO2: 5 O2: 12
 Probe Length/Type: 20-14 Pilot #: 3' 6-10-55
 Stack Diameter: 15 3/8" As: 185
1 = 5.050
 Nozzle ID: .310 Thermocouple #: RT-6
 Assumed Bws: 28 Filter #: 104-005
 Meter Box #: 11115-15 Y: 995 ΔH@: 1.85
 Post-Test Leak Rate: 0.4 cfm @ 15 in. Hg.
 Post-Test Leak Check: Pilot: ✓ Orsat: NA

[illegible]
$$\Delta V_m = \sqrt{\Delta p} =$$

11

1

MULTI-METALS SAMPLE RECOVERY DATA



Plant: <u>Andrews AFB</u>			Run No.: <u>M29-3</u>		
Date:		Sample Box No.:		Job No.:	
Sample Location:					
Sample Type:					
Sample Recovery Person:					
Container	Description	Volume, ml	Sealed/Level Marked		
Front Half					
1	Filter No.(s) <u>104-005</u>				
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	KMNO ₄ /H ₂ O Rinse - Impingers 5 & 6				
5C	HCl Rinse - Impingers 5 & 6				
Moisture Data					
Impinger No.	Contents	Initial Volume, ml	Weight, grams		
			Initial	Final	Net
1	K.O.	0	619.4	723.0	103.6
2	HNO ₃	100	747.2	858.4	111.2
3	HNO ₃	100	638.0	712.9	74.9
4	K.O.	0	630.7	651.6	20.9
5	KMnO ₄	100	729.5	748.1	18.6
6	KMnO ₄	100	719.1	725.4	6.3
7	Sr Gel	-	922.0	942.9	20.9
Total					350.4
Comments:					

Appendix B.2
Raw Field Data
Dioxins/Furans (M23)

Pacific Environmental Services



PACIFIC ENVIRONMENTAL SERVICES, INC.

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

US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M23-1 Date: 01/31/01
Pretest Leak Rate: 0.010 cfm @ 15" in. Hg
Pretest Leak Check: Pitot: ✓ Orsat: ✓

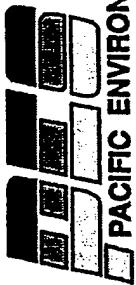
Sample Type: M23 Operator(s): DDH
P_{bar}: 29.90 P_s: 1.15
CO₂: 5 O₂: 12.0
Probe Length/Type: 3' Glass Pitot #: RP-15
Stack Diameter: 15.38" A_s: 185.78

Nozzle ID: XXIV-30 Thermocouple No.: ATC
Assumed B_{ws}: 353 Filter No.: DF
Meter Box No.: 648-15 γ: 2445 ΔH@: 1.80
Posttest Leak Rate: 0.010 cfm @ 15" in. Hg
Posttest Leak Check Rate: Pitot: ✓ Orsat: ✓

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (V _m , ft ³)	Velocity Head (ΔP, in H ₂ O)	Orifice Pressure (ΔH, in H ₂ O)		Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Temp (°F)	XAD Temp (°F)	Dry Gas Meter Temperature (°F)		Pump Vacuum (in. Hg)
					Desired	Actual						Inlet	Outlet	
A1	0	1020	220.290	.34	1.43	1.43	170	250	250	48	48	87	87	3
	5	1031	235.850	.35	1.47	1.47	170	247	251	49	48	88	88	3
	10	1036	239.264	.34	1.43	1.43	170	248	252	49	49	88	88	3
	15	1041	240.564	.35	1.47	1.47	170	249	251	49	49	88	88	3
	20	1046	246.123	.35	1.47	1.47	170	249	252	50	51	88	88	3
	25	1051	249.564	.36	1.51	1.51	170	251	252	51	51	88	88	3
3	30	1056	252.010	.36	1.51	1.51	170	251	252	51	51	88	88	3
	35	1101	255.560	.39	1.64	1.64	170	252	255	49	48	88	88	3
	40	1106	258.900	.32	1.34	1.34	171	251	251	49	49	88	88	3
	45	1111	261.815	.35	1.47	1.47	171	252	251	49	49	88	88	3
	50	1116	265.200	.36	1.51	1.51	171	252	251	49	49	88	88	3
	55	1121	268.650	.36	1.51	1.51	171	252	254	51	51	88	88	3
4	60	1126	272.000	.36	1.51	1.51	171	252	251	52	51	88	88	3
	65	1131	275.342	.36	1.51	1.51	171	252	251	52	51	88	88	3
	70	1136	278.900	.37	1.53	1.51	171	251	253	51	51	88	88	3
	75	1141	282.400	.36	1.53	1.56	171	252	254	51	50	88	88	3
	80	1146	285.000	.36	1.51	1.51	171	252	253	51	51	88	88	3
	85	1151	290.643	.36	1.51	1.51	171	253	251	51	51	88	88	3
6	90	1156	294.000	.36	1.72	1.22	171	253	251	51	51	88	88	3
	95	1201	298.000	.36	1.72	1.22	171	253	251	51	51	88	88	3
	100	1206	304.165	.36	1.63	1.63	171	252	251	52	52	88	88	3
	105	1211	305.675	.34	1.54	1.54	171	252	252	51	51	88	88	3
	110	1216	309.000	.33	1.49	1.49	172	251	251	51	50	88	88	3

ΔV_m: _____ ΔP: _____ ΔH: _____ T_s: _____

T_m: _____



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US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB
Sampling Location: Stack
Run Number: M23-1 Date: 01/31/01
Pretest Leak Rate: 0.015 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ Orsat: NA

Sample Type: M23 Operator(s): DDH
P_{bar}: 29.9 P_s: 7.15
CO₂: 5.86 O₂: 12.86
Probe Length/Type: 5' / G6-55 Pitot #: 22-15
Stack Diameter: 15.3" A_s: 185.78

Nozzle ID: 7112 Thermocouple No.: RT6
Assumed B_{ws}: ~3.2 Filter No.: DF
Meter Box No.: RM8-57 ΔH@: 1.80
Posttest Leak Rate: 0.015 cfm @ 15 in. Hg
Posttest Leak Check Rate: Pitot: ✓ Orsat: NA

46745

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (V _m , ft ³)	Velocity Head (ΔP, in H ₂ O)	Orifice Pressure Differential (ΔH, in H ₂ O)		Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Temp (°F)	XAD Temp (°F)	Dry Gas Meter Temperature (°F)		Pump Vacuum (in. Hg)
					Desired	Actual						Inlet	Outlet	
1	115	1221	313.043	.40	1.81	1.81	254	251	254	50	50	88	88	7
	120	1226	319.480	.38	1.48	1.48	253	252	253	51	50	88	88	7
	125	1235	322.720	.31	1.41	1.41	254	252	254	52	50	90	82	7
	130	1308	326.342	.32	1.45	1.45	251	251	251	51	50	90	90	7
	135	1305	329.545	.36	1.64	1.64	253	253	250	52	51	90	90	7
	140	1310	333.430	.39	1.77	1.77	254	253	254	52	51	90	90	7
3	145	1315	337.453	.40	1.82	1.82	250	253	250	52	52	91	90	7
	150	1320	340.980	.40	1.82	1.82	251	254	251	52	52	91	91	7
	155	1325	343.953	.32	1.45	1.45	254	254	254	51	51	90	90	7
	160	1330	347.341	.35	1.59	1.51	254	254	254	51	52	91	91	7
	165	1335	351.678	.35	1.59	1.59	251	252	251	52	52	92	91	7
	170	1340	354.456	.36	1.64	1.64	250	253	250	53	52	92	92	7
4	175	1345	357.986	.35	1.59	1.59	251	253	251	53	53	93	92	7
	180	1350	361.350	.35	1.59	1.59	251	252	251	52	52	93	92	7
	185	1355	364.900	.34	1.55	1.55	251	252	251	51	51	93	92	7
	190	1400	368.240	.34	1.56	1.56	250	253	250	52	52	93	93	7
	195	1405	372.642	.35	1.60	1.60	251	252	251	52	51	93	92	7
	200	1410	375.786	.36	1.65	1.65	252	252	252	52	51	93	92	7
5	205	1415	379.453	.35	1.60	1.60	251	252	251	52	52	93	93	7
	210	1420	382.987	.35	1.60	1.60	252	252	252	52	52	93	93	7
	215	1425	386.900	.36	1.65	1.65	252	252	252	51	51	92	93	7
	220	1430	389.960	.36	1.65	1.65	246	250	246	52	51	92	92	7

ΔV_m: _____ ΔP: _____ ΔH: _____ T_s: _____ T_m: _____



US EPA M23 FIELD DATA SHEET

Nozzle ID: 310 Thermocouple No.: DT-6
 Assumed B_{ws} : 32 Filter No.: DF
 Meter Box No.: RA6-57 $\Delta H@$: 1.80
 Posttest Leak Rate: 0.010 cfm @ 15 in. Hg
 Posttest Leak Check Rate: Pitot: ✓ Orsat: N/A

[illegible]
$$\Delta V_m: \quad \Delta p: \quad \Delta H: \quad T_s:$$

Time:



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Sample Train Recovery Data EPA Method 23

Facility: Andrews AFB - MD Project No.: F181.001
Date: 1/30/01 Run No.: M23-1
Clean-up person: MDM Sampling Location: Incinerator Outlet
Field Team Leader: MDM Samplers: PA DPH, JF, MDM
Comments: _____

Front-Half Data

Filter No.: un-numbered Filter Media: G/F Tare Wt (mg): _____
Filter No.: _____ Filter Media: _____ Tate Wt (mg): _____

Back-Half Data

	XAD-2 Sorbent Resin Trap	Knock-out Impinger	Impinger No. 1
Contents:	XAD-2 Sorbent Resin	<u>MT</u>	100 ml HPLC H ₂ O
Final mass (g):	<u>326.5</u>	<u>741.5</u>	<u>583.2</u>
Initial mass (g):	<u>308.8</u>	<u>495.7</u>	<u>584.3</u>
Net Mass (g)	<u>17.7</u>	<u>245.8</u>	<u>(1.1)</u>

	Impinger No. 2	Impinger No. 3	Impinger No. 4
Contents:	100 ml HPLC H ₂ O	MT	Silica Gel
Final mass (g):	<u>683.5</u>	<u>643.7</u>	<u>1081.4</u>
Initial mass (g):	<u>604.9</u>	<u>640.9</u>	<u>1015.7</u>
Net Mass (g)	<u>(1.4)</u>	<u>2.8</u>	<u>65.7</u>

Total Moisture Collected: (g): 1,390.2

Description of Impinger Catch: F 800.7 F 787.1
F 841.3
Impinger #2: 461.1 Nu 3: 496.1 Nu 4: 461.2
Net: 380.2 304.6 325.9



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Cermet Park West

US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB Sample Type: M23 Operator(s): DDH Nozzle ID: 2214 Thermocouple No.: RT6
Sampling Location: Stack P_{bar}: 29.9 P_s: 1.15 Assumed B_{ws}: 32 Filter No.: DF
Run Number: M23-3 Date: 01/31/01 CO₂: S O₂: 12 Meter Box No.: 448-57 ΔH@: 1.80
Pretest Leak Rate: 0.009 cfm @ 15 in. Hg Probe Length/Type: 3' GL-35 Pitot #: RP-19 Posttest Leak Rate: 0.009 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ Orsat: 2/4 Stack Diameter: 15 3/4" A_s: 185-28 Posttest Leak Check Rate: Pitot: 1.3" Orsat: N/A

KE 4.745 KE = 5.5675 MDR

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (V _m , ft ³)	Velocity Head (ΔP, in H ₂ O)	Orifice Pressure (ΔH, in H ₂ O)		Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Temp (°F)	XAD Temp (°F)	Dry Gas Meter Temperature (°F)		Pump Vacuum (in. Hg)
					Desired	Actual						Inlet	Outlet	
A 1	0	1610	406.115		1.63	1.63	171	254	251	49	47	89	89	6
	10	1615	410.102	.34	1.61	1.61	171	254	252	49	47	89	89	6
	15	1620	414.107	.34	1.61	1.61	171	252	251	49	47	89	89	6
	20	1625	418.109	.34	1.61	1.61	171	252	251	49	47	89	89	6
	25	1630	421.096	.34	1.61	1.61	172	253	251	48	48	100	100	6
2	30	1635	424.160	.34	1.70	1.70	172	253	251	48	48	100	100	6
	35	1640	427.325	.33	1.56	1.56	172	252	251	49	48	101	100	6
	40	1700	434.350	.34	1.61	1.61	172	252	251	50	50	102	102	6
	45	1705	438.460	.34	1.61	1.61	172	252	251	50	50	102	102	6
	50	1710	441.609	.35	1.66	1.66	172	253	252	51	51	102	102	6
4	55	1715	445.300	.34	1.61	1.61	172	252	250	52	50	102	102	6
	60	1720	449.017	.34	1.61	1.61	172	252	250	51	50	102	102	6
	65	1735	453.840	.34	1.61	1.61	172	252	250	52	52	102	102	6
	70	1740	457.140	.34	1.61	1.61	172	253	251	51	51	102	102	6
	75	1745	460.680	.36	1.70	1.70	172	253	252	51	51	102	102	6
5	80	1750	464.250	.35	1.66	1.66	172	253	251	52	52	102	102	6
	85	1755	468.270	.35	1.90	1.90	173	252	251	51	51	102	102	6
	90	1800	473.171	.30	1.64	1.64	173	252	251	52	52	102	102	6
	95	1805	476.910	.38	1.90	1.90	173	252	251	52	52	102	102	6
	100	1810	480.130	.37	2.01	2.01	172	252	251	52	52	102	102	6
6	105	1815	484.140	.37	2.01	2.01	172	251	250	52	50	102	102	6
	110	1820	487.702	.36	1.76	1.96	172	252	252	51	51	102	102	6

ΔV_m: _____ ΔP: _____ ΔH: _____ T_s: _____

T_m: _____



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US EPA M23 FIELD DATA SHEET

Plant: Address AFB
Sampling Location: Stack
Run Number: M23-3 Date: 01/21/01
Pretest Leak Rate: 0.003 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ Orsat: N/A

Sample Type: M23 Operator(s): AAA
P_{bar}: 29.9 P_s: 5.15
CO₂: 5 O₂: 12
Probe Length/Type: 3'-6" M23 Pitot #: 00-14
Stack Diameter: 15 3/8 A_s: 185.78

Nozzle ID: 5001-3.15 Thermocouple No.: 05-6
Assumed B_{ws}: 32 Filter No.: DF
Meter Box No.: AWB-57 ΔH@: 1.80

Posttest Leak Rate: 0.010 cfm @ 15 in. Hg
Posttest Leak Check Rate: Pitot: ✓ Orsat: N/A

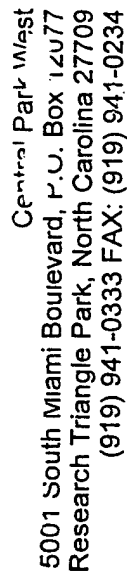
K=5.45675 V=5.80

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (V _m , ft ³)	Velocity Head (ΔP, in H ₂ O)	Orifice Pressure Differential (ΔH, in H ₂ O)		Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Temp (°F)	XAD Temp (°F)	Dry Gas Meter Temperature (°F)		Pump Vacuum (in. Hg)
					Desired	Actual						Inlet	Outlet	
1	115	1825	491.670	.34	2.12	2.12	174	251	252	46	45	108	107	7
2	120	1830	495.550	.34	1.96	1.96	171	253	251	46	45	108	106	7
3	125	1835	499.430	.34	1.74	1.74	172	252	251	46	45	108	107	7
4	130	1840	502.910	.32	1.74	1.74	172	252	251	47	46	108	107	7
5	135	1845	506.400	.32	1.74	1.74	171	251	251	47	46	108	108	7
6	140	1850	510.150	.34	1.86	1.86	172	251	250	47	47	107	108	7
7	145	1900	514.000	.34	1.86	1.86	172	252	251	46	47	107	108	7
8	150	1905	518.100	.35	2.03	2.03	172	251	250	46	47	107	106	7
9	155	1910	521.900	.37	2.14	2.14	172	252	250	47	47	107	107	7
10	160	1915	526.217	.35	2.03	2.03	172	251	251	48	47	108	108	7
11	165	1920	529.740	.35	2.03	2.03	172	252	252	48	47	108	108	7
12	170	1925	533.680	.33	1.91	1.91	172	252	250	48	48	108	107	7
13	175	1930	537.520	.33	1.91	1.91	172	252	251	48	47	108	108	7
14	180	1935	541.630	.38	2.20	2.20	172	253	251	48	47	108	107	7
15	185	1940	545.802	.38	2.20	2.20	172	253	252	48	48	108	108	7
16	190	1945	549.510	.32	2.20	2.20	171	252	251	48	48	109	108	7
17	195	1950	553.210	.31	1.79	1.79	171	252	251	48	49	109	109	7
18	200	2000	556.500	.31	1.79	1.79	171	252	252	48	49	109	109	10
19	205	2005	560.017	.26	1.50	1.50	171	251	250	48	48	109	110	10
20	210	2010	563.405	.26	1.50	1.50	172	252	251	48	49	109	110	10
21	215	2015	567.012	.26	1.50	1.50	172	252	251	48	49	109	112	10
22	220	2020	570.280	.27	1.56	1.56	172	251	251	48	49	109	109	10

ΔV_m: _____ ΔP: _____

ΔH: _____ T_s: _____

T_m: _____



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Plant: Andrews AFB
Sampling Location: Stack
Run Number: 443-2 Date: 01/31/01
Pretest Leak Rate: 0.009 cfm @ 12 in. Hg
Pretest Leak Check: Pilot: ☒ 15" Orsat: N/A

Sample Type: 233 Operator(s): DDH
 P_{bar} : 29.1 P_s : 45.15
 CO_2 : 5 O_2 : 12
 Probe Length/Type: 3' Glass Pitot #: RP-19
 Stack Diameter: 15 3/4" A: 185.78

Nozzle ID: 3510 . 310 Thermocouple No.: 85-6
Assumed B_{ws}: 32 Filter No.: DF
Meter Box No.: BWA-157 . 995 ΔH@: 1.80
Posttest Leak Rate: 0.009 cfm @ 15 in. Hg
Posttest Leak Check Rate: Pitot: ☒ Orsat: N/A

[illegible]
$$\Delta V_m: \quad \Delta p: \quad \Delta H: \quad T_s:$$

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Sample Train Recovery Data
EPA Method 23

Facility: Andrews AFB - MD Project No.: F181.001
Date: 1/31/01 Run No.: M23-2
Clean-up person: MDM Sampling Location: Incinerator Outlet
Field Team Leader: MDM Samplers: MDM, JF, DDH
Comments: _____

Front-Half Data

Filter No.: un-numbered Filter Media: GLR Tare Wt (mg): _____
Filter No.: _____ Filter Media: _____ Tare Wt (mg): _____

Back-Half Data

	XAD-2 Sorbent Resin Trap	Knock-out Impinger	Impinger No. 1
Contents:	XAD-2 Sorbent Resin	MT	100 ml HPLC H ₂ O
Final mass (g):	-	654.3	621.8
Initial mass (g):	276.5	464.2	619.8
Net Mass (g)	-	190.1	2.0

	Impinger No. 2	Impinger No. 3	Impinger No. 4
Contents:	100 ml HPLC H ₂ O	MT	Silica Gel
Final mass (g):	743.7	512.0	943.3
Initial mass (g):	743.6	507.5	883.9
Net Mass (g)	0.1	4.5 + 3.5	59.4

Total Moisture Collected: (g): ~~1190.7~~ 1,256.9

Description of Impinger Catch: _____

No. 2 F 702.3 No. 3 F 819.0 No. 4 F 787.1
I 461.5 I 464.7 I 461.4



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US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB Sample Type: M23 Operator(s): DATA Nozzle ID: -310 Thermocouple No.: RT-6
Sampling Location: Stack P_{bar}: 29.90 P_s: 4.14 Assumed B_{ws}: 32 Filter No.: DF
Run Number: M23-3 Date: 02-01-01 CO₂: 5 O₂: 12 Meter Box No.: 248-5 Y: 0.555 ΔH@: 1.80
Pretest Leak Rate: 0.003 cfm @ 15 in. Hg Probe Length/Type: 3' 6.665 Pitot #: 06-17 Posttest Leak Rate: 0.00 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ Orsat: N/A Stack Diameter: 15.34" A: 185.28 Posttest Leak Check Rate: Pitot: ✓ Orsat: N/A

(K=5.00)

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (V _m , ft ³)	Velocity Head (ΔP, in H ₂ O)	Orifice Pressure Differential (ΔH, in H ₂ O)		Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Temp (°F)	XAD Temp (°F)	Dry Gas Meter Temperature (°F)		Pump Vacuum (in. Hg)
					Desired	Actual						Inlet	Outlet	
A 1	0	0910	584.000		1.75	1.75	253.71	253	249	49	49	96	96	6
	5	0915	587.775	.35	1.80	1.80	171	252	251	49	49	97	96	6
	10	0920	591.043	.36	1.80	1.80	171	252	251	48	48	97	97	6
	15	0925	595.020	.36	1.75	1.75	171	252	252	48	48	97	98	6
	20/0	0930	598.750	.35	1.90	1.90	171	252	252	49	49	97	97	6
2	25	0935	602.801	.38	1.75	1.75	172	252	252	50	50	97	97	6
	30	0940	606.012	.35	1.75	1.75	172	252	251	50	50	97	97	6
	35	0945	609.902	.35	1.75	1.75	171	251	251	51	51	98	97	6
	40/0	0950	613.820	.32	1.60	1.60	171	252	251	52	51	98	98	6
	45	0955	617.125	.35	1.75	1.75	171	253	251	52	51	98	97	6
3	50	1000	620.705	.35	1.80	1.80	171	252	252	52	52	98	98	6
	55	1005	624.387	.36	1.80	1.80	171	253	252	52	52	94	98	6
	60/0	1010	627.570	.36	1.80	1.80	171	252	251	52	51	94	98	6
	65	1015	631.370	.36	1.80	1.80	171	252	251	52	51	94	98	6
	70	1020	635.200	.36	1.80	1.80	172	252	251	52	51	94	98	6
4	75	1025	638.810	.36	1.80	1.80	172	252	251	52	52	94	98	6
	80/0	1030	642.400	.35	1.75	1.75	172	251	251	52	52	94	98	6
	85	1035	646.035	.35	1.75	1.75	172	252	252	52	52	94	98	6
	90	1040	649.830	.33	1.65	1.65	172	251	251	52	51	94	98	6
	95	1045	653.550	.34	1.70	1.70	172	252	251	52	52	94	98	6
5	100	1050	657.030	.34	1.70	1.70	172	252	251	52	51	94	98	6
	105	1055	660.817	.35	1.75	1.75	172	251	251	51	51	94	98	6
	110	1060	664.125	.35	1.75	1.75	172	251	251	51	51	94	98	6
	115	1065	667.125	.35	1.75	1.75	172	251	251	51	51	94	98	6
	120	1070	670.125	.35	1.75	1.75	172	251	251	51	51	94	98	6

ΔV_m: _____ ΔP: _____ ΔH: _____ T_m: _____



PACIFIC ENVIRONMENTAL SERVICES, INC.

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

US EPA M23 FIELD DATA SHEET

Plant: Andrews AFB Sample Type: M23 Operator(s): DDK Nozzle ID: .310 Thermocouple No.: RT-C
Sampling Location: Stack P_{bar} : 29.9 P_s : 14 Assumed B_{ws} : 272 Filter No.: DF
Run Number: M23-3 Date: 02-01-01 CO_2 : 5 O_2 : 12 Meter Box No.: 448-15 Y 0.985 $\Delta H @$: 1.80
Pretest Leak Rate: 0.003 cfm @ 15 in. Hg Posttest Leak Rate: 0.008 cfm @ 15 in. Hg
Pretest Leak Check: Pitot: ✓ Orsat: N/A Stack Diameter: 15.3 A: 185.78 Posttest Leak Check Rate: Pitot: ✓ Orsat:

KL = 5.00

Traverse Point Number	Sampling Time (min)	Clock Time (24-hr)	Gas Meter Reading (V_m , ft ³)	Velocity Head (ΔP , in H ₂ O)	Orifice Pressure Differential (ΔH , in H ₂ O)		Stack Temp (°F)	Probe Temp (°F)	Filter Temp (°F)	Impinger Temp (°F)	XAD Temp (°F)	Dry Gas Meter Temperature (°F)		Pump Vacuum (in. Hg)
					Desired	Actual						Inlet	Outlet	
1	115	1110	667.870	.37	1.85	1.85	172	253	251	49	45	101	101	7
	120/0	1115	671.546	.37	1.85	1.85	172	252	252	46	47	101	101	7
	125	1135	675.520	.37	1.85	1.85	172	252	251	46	46	101	101	7
	130	1140	679.400	.36	1.80	1.80	172	251	252	47	48	101	102	7
	135	1145	683.145	.36	1.80	1.80	172	251	252	47	48	101	102	7
	140	1150	687.019	.35	1.75	1.75	172	252	250	47	47	102	102	7
2	145	1155	690.730	.35	1.75	1.75	172	251	251	47	47	102	102	7
	150	1200	694.121	.35	1.75	1.75	172	251	251	47	47	101	102	7
	155	1205	697.940	.34	1.70	1.70	172	252	251	47	48	101	101	7
	160	1210	701.123	.34	1.70	1.70	172	252	251	47	48	101	101	7
	165	1215	705.217	.35	1.75	1.75	172	251	251	47	47	101	101	7
	170	1220	708.860	.35	1.75	1.75	172	252	251	47	47	102	102	7
3	175	1225	712.406	.36	1.80	1.80	172	252	251	48	47	102	102	7
	180	1230	716.030	.35	1.75	1.75	172	251	251	48	47	102	102	7
	185	1235	719.620	.36	1.80	1.80	172	252	251	48	47	102	102	7
	190	1240	723.017	.36	1.80	1.80	172	252	252	48	48	103	102	7
	195	1245	727.317	.36	1.80	1.80	172	252	251	48	47	103	103	7
	200	1250	730.302	.36	1.80	1.80	172	252	251	48	47	103	102	7
4	205	1255	734.001	.32	1.60	1.60	172	252	251	49	48	103	103	7
	210	1300	737.615	.32	1.60	1.60	172	250	251	49	48	103	103	7
	215	1305	-	.32	1.60	1.60	172	251	251	50	49	103	102	7
	220	1310	-	.32	1.60	1.60	172	251	251	50	49	103	102	7

ΔV_m : ΔP : ΔH : T_s :

T_m :

Plant: Andrews AFB
Sampling Location: Wewater Outlet
Run Number: W03-3 Date: 2/1/04
Prestest Leak Rate: 6.008 cfm @ 15 in. Hg.
Prestest Leak Check: Pilot: — Orsat: N/A

Sample Type: Nettle Operator: DMH/mwh
 Pbar: 79.9 Ps: +0.14
 CO2: ~5 O2: ~12
 Probe Length/Type: 3'-g/55 Pilot #: PP-11
 Stack Diameter: 15 3/8 As: _____

Nozzle ID: 0.310 Thermocouple #: 9A-6
Assumed Bws: 7.5 Filter #: UN-Winked
UNW-15
Meter Box #: 0.005 Y: 1.80 ΔH @: 1.80
0.005
Post-Test Leak Rate: 0.03 cfm @ 12 in. Hg.
Post-Test Leak Check: Pilot: — Orsat: N/A

[illegible]

$\Delta V_m =$ _____ $\sqrt{\Delta p} =$ _____ $\overline{\Delta H} =$ _____ $T_0 =$ _____ $\frac{1}{E} =$ _____



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Sample Train Recovery Data
EPA Method 23

Facility: Andrews AFB - MD Project No.: F181001
Date: _____ Run No.: W23-3
Clean-up person: MM Sampling Location: _____
Field Team Leader: MM Samplers: DPH, JF, MM
Comments: _____

Front-Half Data

Filter No.: Un-numbered Filter Media: G/F Tare Wt (mg): _____
Filter No.: _____ Filter Media: _____ Tare Wt (mg): _____

Back-Half Data

	XAD-2 Sorbent Resin Trap	Knock-out Impinger	Impinger No. 1
Contents:	XAD-2 Sorbent Resin	MT	100 ml HPLC H ₂ O
Final mass (g):	320.0	824.8	578.8
Initial mass (g):	305.4	495.6	582.8
Net Mass (g)		329.2	

	Impinger No. 2	Impinger No. 3	Impinger No. 4
Contents:	100 ml HPLC H ₂ O	MT	Silica Gel
Final mass (g):	739.8	633.4	1083.2
Initial mass (g):	740.9	628.7	1024.0
Net Mass (g)			

Total Moisture Collected: (g): _____

Description of Impinger Catch: _____

No. 2 F 814.6 No. 3 F 729.1 891.9
I 461.5 ± 496.3 462.4

Appendix B.3
Raw Field Data
Hydrogen Chloride



M26
VOLATILE ORGANIC SAMPLING TRAIN (VOST) SAMPLING DATA

COMPANY: Andrews AFB CITY: Washington DC
DATE: 01/31/01 LOCATION: Stack
TIME: 1145 RUN #: M26-1
METER #: VB-6 Y-FACTOR: 1.004
BAROMETRIC PRESSURE, in. Hg: 29.9 OPERATOR: DDH
AMBIENT TEMPERATURE, °F: _____ PURGE TIME: _____

LEAK CHECK DATA

Vacuum

	Initial, (in. Hg)	Final, (in. Hg)	Time, (min.)
Pre-test:	<u>15" ✓</u>	<u>15" ✓</u>	_____
Post-test:	<u>15" ✓</u>	<u>15" ✓</u>	_____

Sample Time (min)	Clock Time, (24-hr)	Meter Volume, (liter)	Rotometer Setting	Dry Gas Meter Temp., (°F)	Vacuum, (in. Hg)	
0	10:45	1323.00	2.0	87	2	WC
5	10:50	1333.35	2.0	87	2	2.2
10	10:55	1343.12	2.0	87	3	2.2
15	11:00	1353.21	2.0	88	3	2.2
20	11:05	1363.19	2.0	88	2	2.2
25	11:10	1373.31	2.0	88	3	2.2
30	11:15	1383.10	2.0	91	3	2.2
35	11:20	1393.70	2.0	91	3	2.2
40	11:25	1403.10	2.0	92	3	2.2
45	11:30	1413.21	2.0	92	3	2.2
50	11:35	1423.10	2.0	92	3	2.2
55	11:40	1433.01	2.0	92	3	2.2

60 11:45 1443.10
Nitrogen purge/activated carbon packing in sample holding container: _____

$$V_{std} = V_m (\text{liters}) \times Y \times 17.647 \times \frac{P_b (\text{in. Hg})}{T_m (^\circ R)}$$

$V_{std} =$



VOLATILE ORGANIC SAMPLING TRAIN (VOST) SAMPLING DATA

COMPANY: Andrews AFB CITY: DC
DATE: 01/31/01 LOCATION: Stack
TIME: 1610 RUN #: M26-2
METER #: V3-6 Y-FACTOR: 1.004
BAROMETRIC PRESSURE, in. Hg: 29.9 OPERATOR: DDH
AMBIENT TEMPERATURE, °F: _____ PURGE TIME: 110

LEAK CHECK DATA

Vacuum
Initial, (in. Hg) Final, (in. Hg) Time, (min.)
Pre-test: 15 15 ✓
Post-test: 15 15 X

ABORTED
RUN

Run Aborted

Sample Time (min)	Clock Time, (24-hr)	Meter Volume, (liter)	Rotometer Setting	Dry Gas Meter Temp., (°F)	Vacuum, (in. Hg)
0	1610	1443.92	2.0 LPM	89	3
5	1615	1453.87		89	3
10	1620	1463.81		90	3
15	1625	1473.72		90	3
20	1630	1483.81		91	3
25	1635	1493.21		91	3
	1640	1503.17		91	3
	1645	1513.21		91	3
	1650	1523.20		91	3
	1655	1533.17		91	3
	1700	1543.22		91	3
	1705	1553.17	✓	91	3

Nitrogen purge/activated carbon 1710 1563.22 in sample holding container: _____

$$V_{std} = V_m(\text{liters}) \times Y \times 17.647 \times \frac{P_b(\text{in. Hg})}{T_m(^{\circ}\text{R})}$$

$V_{std} =$



VOLATILE ORGANIC SAMPLING TRAIN (VOST) SAMPLING DATA

COMPANY: Andrews AFB CITY: Washington DC
DATE: 01/21/01 02/01/01 LOCATION: Stack
TIME: 0910 - 1010 RUN #: M26-2
METER #: VB-6 Y-FACTOR: 1.004
BAROMETRIC PRESSURE, in. Hg: 29.90 OPERATOR: DDH
AMBIENT TEMPERATURE, °F: 100 PURGE TIME: _____

LEAK CHECK DATA

Vacuum
Initial, (in. Hg) Final, (in. Hg) Time, (min.)
Pre-test: 15" 15" ✓
Post-test: 15" 15" ✓

Sample Time (min)	Clock Time, (24-hr)	Meter Volume, (liter)	Rotometer Setting	Dry Gas Meter Temp., (°F)	Vacuum, (in. Hg)
0	0910	1565.55	2.0 (LPM)	108	3
5	0915	1575.60	2.0	108	3
10	0920	1585.41	2.0	108	3
15	0925	1595.23	2.0	109	3
20	0930	1605.17	2.0	109	3
25	0935	1615.29	2.0	109	3
30	0940	1625.42	2.0	110	3
35	0945	1635.50	2.0	110	3
40	0950	1645.40	2.0	110	3
45	0955	1655.32	2.0	110	3
50	1000	1665.19	2.0	110	3
55	1005	1675.29	2.0	110	3
60	1010	1685.36	2.0	110	3

Nitrogen purge/activated carbon packing in sample holding container: _____

$$V_{std} = V_m (\text{liters}) \times Y \times 17.647 \times \frac{P_b (\text{in. Hg})}{T_m (^\circ R)}$$

$V_{std} =$



VOLATILE ORGANIC SAMPLING TRAIN (VOST) SAMPLING DATA

COMPANY: Andrews AFB CITY: Washington DC
DATE: 02-02-01 LOCATION: stack
TIME: _____ RUN #: M2C-43
METER #: V/B-6 Y-FACTOR: 1.004
BAROMETRIC PRESSURE, in. Hg: 29.9 OPERATOR: DDH
AMBIENT TEMPERATURE, °F: 89 PURGE TIME: _____

LEAK CHECK DATA

Vacuum

Initial, (in. Hg) Final, (in. Hg) Time, (min.)

Pre-test: _____

Post-test: _____

Sample Time (min)	Clock Time, (24-hr)	Meter Volume, (liter)	Rotometer Setting	Dry Gas Meter Temp., (°F)	Vacuum, (in. Hg)
0	0945	2.0	1707.00	88	3
5	0950	2.0	1717.12	88	3
10	0955	2.0	1727.09	88	3
15	1000	2.0	1737.10	89	3
20	1005	2.0	1747.21	89	3
25	1010	2.0	1757.19	90	3
30	1015	2.0	1767.23	90	3
35	1025	2.0	1787.19	90	3
40	1030	2.0	1787.26	90	3
45	1035	2.0	1797.31	91	3
50	1040	2.0	1807.21	91	3
55	1045	2.0	1817.32	91	3

Nitrogen purge/activated carbon packing in sample holding container: _____

$$V_{std} = V_m(\text{liters}) \times Y \times 17.647 \times \frac{P_b(\text{in. Hg})}{T_m(^{\circ}\text{R})}$$

$V_{std} =$

Appendix B.4
Raw Field Data
CO₂, O₂, SO₂, NO_x, CO CEMS (M3A, M6C, 7E, 10)

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M23-1

Date	Time	O2	CO2
31-Jan-01	11:13:15	10.055	5.659
31-Jan-01	11:14:15	10.784	5.529
31-Jan-01	11:15:15	10.336	5.245
31-Jan-01	11:16:15	10.981	5.02
31-Jan-01	11:17:15	12.067	4.993
31-Jan-01	11:18:15	12.374	5.198
31-Jan-01	11:19:15	12.5	5.507
31-Jan-01	11:20:15	12.865	5.801
31-Jan-01	11:21:15	13.414	6.02
31-Jan-01	11:22:15	13.929	6.115
31-Jan-01	11:23:15	9.623	6.085
31-Jan-01	11:24:15	8.689	6.001
31-Jan-01	11:25:15	10.295	5.856
31-Jan-01	11:26:15	9.827	5.673
31-Jan-01	11:27:15	10.649	5.545
31-Jan-01	11:28:15	11.78	5.621
31-Jan-01	11:29:00	11	6
31-Jan-01	11:30:00	11.75	6
31-Jan-01	11:31:00	12.25	6.4
31-Jan-01	11:32:00	12.5	6.4
31-Jan-01	11:33:00	13	6.4
31-Jan-01	11:34:00	13.75	6.4
31-Jan-01	11:35:00	13.5	6.4
31-Jan-01	11:36:00	9.25	6.4
31-Jan-01	11:37:00	10	6.4
31-Jan-01	11:38:00	9.5	6
31-Jan-01	11:39:00	10.5	6.4
31-Jan-01	11:40:00	12	6.4
31-Jan-01	11:41:45	13.415	6.409
31-Jan-01	11:42:45	13.613	6.541
31-Jan-01	11:43:45	10.964	6.566
31-Jan-01	11:44:45	9.35	6.505
31-Jan-01	11:45:45	10.111	6.359
31-Jan-01	11:46:45	10.108	6.168
31-Jan-01	11:47:45	10.864	5.954
31-Jan-01	11:48:45	11.596	5.818
31-Jan-01	11:49:45	12.179	5.81
31-Jan-01	11:50:45	12.615	5.94
31-Jan-01	11:51:45	12.534	6.132
31-Jan-01	11:52:45	12.736	6.301
31-Jan-01	11:53:45	13.047	6.403

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M23-1

Date	Time	O2	CO2
31-Jan-01	11:54:45	13.338	6.433
31-Jan-01	11:55:45	10.8	6.388
31-Jan-01	11:56:45	8.601	6.28
31-Jan-01	11:57:45	7.645	6.134
31-Jan-01	11:58:45	8.61	5.967
31-Jan-01	11:59:45	9.654	5.805
31-Jan-01	12:00:45	10.38	5.718
31-Jan-01	12:01:45	10.679	5.768
31-Jan-01	12:02:45	11.02	6.021
31-Jan-01	12:03:45	11.119	6.388
31-Jan-01	12:04:45	11.522	6.76
31-Jan-01	12:05:45	11.932	6.779
31-Jan-01	12:06:45	8.933	8.359
31-Jan-01	12:07:45	8.012	9.079
31-Jan-01	12:08:45	9.739	8.005
31-Jan-01	12:09:45	11.224	6.74
31-Jan-01	12:10:45	11.445	6.448
31-Jan-01	12:11:45	11.565	6.301
31-Jan-01	12:12:45	11.925	5.998
31-Jan-01	12:13:45	12.256	5.73
31-Jan-01	12:14:45	12.547	5.517
31-Jan-01	12:15:45	10.502	7.305
31-Jan-01	12:16:45	9.121	8.283
31-Jan-01	12:17:45	9.61	7.726
31-Jan-01	12:18:45	9.988	7.513
31-Jan-01	12:19:45	10.988	6.74
31-Jan-01	12:20:45	11.583	6.253
31-Jan-01	12:21:45	11.924	5.946
31-Jan-01	12:22:45	12.01	5.871
31-Jan-01	12:23:45	12.073	5.767
31-Jan-01	12:24:45	12.134	5.719
31-Jan-01	12:25:45	12.145	5.738
31-Jan-01			
31-Jan-01	12:27:48	12.242	5.641
31-Jan-01	12:28:48	12.423	5.557
31-Jan-01	12:29:48	12.76	5.277
31-Jan-01	12:30:48	12.007	5.786
31-Jan-01	12:31:48	6.936	10.28
31-Jan-01	12:32:48	7.837	9.129
31-Jan-01	12:33:48	9.992	7.577
31-Jan-01	12:34:48	11.469	6.464

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M23-1

Date	Time	O2	CO2
31-Jan-01	12:35:48	11.682	6.202
31-Jan-01	12:36:48	11.73	6.079
31-Jan-01	12:37:48	11.967	5.846
31-Jan-01	12:38:48	12.083	5.728
31-Jan-01	12:39:48	12.353	5.545
31-Jan-01	12:40:48	12.815	5.239
31-Jan-01	12:41:48	8.464	9.2
31-Jan-01	12:42:48	7.617	9.285
31-Jan-01	12:43:48	8.816	8.44
31-Jan-01	12:44:48	11.097	6.856
31-Jan-01	12:45:48	11.683	6.518
31-Jan-01	12:46:48	11.833	6.536
31-Jan-01	12:47:48	12.445	6.529
31-Jan-01	12:48:48	12.839	6.495
31-Jan-01	12:49:48	13.121	6.4
31-Jan-01	12:50:48	12.778	6.238
31-Jan-01	12:51:48	8.399	6.026
31-Jan-01	12:52:48	8.944	5.809
31-Jan-01	12:53:48	10.595	5.629
31-Jan-01	12:54:48	11.406	5.591
31-Jan-01	12:55:48	12.046	5.871
31-Jan-01	12:56:48	12.483	6.343
31-Jan-01	12:57:48	12.66	6.73
31-Jan-01	12:58:48	12.849	6.906
31-Jan-01	12:59:48	12.907	6.893
31-Jan-01	13:00:48	13.156	6.722
31-Jan-01	13:01:48	13.396	6.487
31-Jan-01	13:02:48	13.774	6.236
31-Jan-01	13:03:48	9.86	6.002
31-Jan-01	13:04:48	10.645	5.796
31-Jan-01	13:05:48	11.49	5.625
31-Jan-01	13:06:48	11.997	5.473
31-Jan-01	13:07:48	12.523	5.411
31-Jan-01	13:08:48	13.028	5.502
31-Jan-01	13:09:48	13.311	5.705
31-Jan-01	13:10:48	13.266	5.884
31-Jan-01	13:11:48	13.717	6.012
31-Jan-01	13:12:48	13.691	6.021
31-Jan-01	13:13:48	7.006	5.962
31-Jan-01	13:14:48	7.752	5.84
31-Jan-01	13:21:28	13.122	6.398

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M23-1

Date	Time	O2	CO2
31-Jan-01	13:22:28	13.458	6.662
31-Jan-01	13:23:28	13.545	6.782
31-Jan-01	13:24:28	13.678	6.76
31-Jan-01	13:25:28	13.818	6.627
31-Jan-01	13:26:28	13.498	6.448
31-Jan-01	13:27:28	8.847	6.252
31-Jan-01	13:28:28	10.286	6.042
31-Jan-01	13:29:28	11.133	5.823
31-Jan-01	13:30:28	12.002	5.646
31-Jan-01	13:31:28	12.883	5.498
31-Jan-01	13:32:28	13.114	5.388
31-Jan-01	13:33:28	13.604	5.395
31-Jan-01	13:34:28	13.621	5.488
31-Jan-01	13:35:28	14.023	5.645
31-Jan-01	13:36:28	11.906	5.788
31-Jan-01	13:37:28	7.151	5.875
31-Jan-01	13:38:28	8.413	5.902
31-Jan-01	13:39:28	10.824	5.858
31-Jan-01	13:40:28	12.032	5.772
31-Jan-01	13:41:28		
31-Jan-01	13:42:28		
31-Jan-01	13:43:28		
31-Jan-01	13:44:28		
31-Jan-01	13:45:28		
31-Jan-01	13:46:28		
31-Jan-01	13:47:28		
31-Jan-01	13:48:28		
31-Jan-01	13:49:28		
31-Jan-01	13:50:28		
31-Jan-01	13:51:28		
31-Jan-01	13:52:28		
31-Jan-01	13:53:28	12.621	5.473
31-Jan-01	13:54:28	12.871	5.265
31-Jan-01	13:55:28	13.048	5.089
31-Jan-01	13:56:28	13.23	4.976
31-Jan-01	13:57:28	13.713	4.601
31-Jan-01	13:58:28	14.062	4.329
31-Jan-01	13:59:28	14.146	4.326
31-Jan-01	14:00:28	9.544	8.492
31-Jan-01	14:01:28	10.043	7.492
31-Jan-01	14:02:28	10.03	7.423

Cal Check

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M23-1

Date	Time	O2	CO2
31-Jan-01	14:03:28	11.203	6.543
31-Jan-01	14:04:28	11.992	5.932
31-Jan-01	14:05:28	12.75	5.32
31-Jan-01	14:06:28	13.009	5.089
31-Jan-01	14:07:28	13.187	4.976
31-Jan-01	14:08:28	13.815	4.542
31-Jan-01	14:09:28	14.248	4.216
31-Jan-01	14:10:28	14.24	4.178
31-Jan-01	14:11:28	14.347	4.097
31-Jan-01	14:12:28	14.618	3.894
31-Jan-01	14:13:28	14.697	3.828
31-Jan-01	14:14:28	14.873	3.768
31-Jan-01	14:15:28	10.243	7.832
31-Jan-01	14:16:28	9.986	7.5
31-Jan-01	14:17:28	9.246	7.792
31-Jan-01	14:18:28	9.805	7.58
31-Jan-01	14:19:28	11.121	6.548
31-Jan-01	14:20:28	12.251	5.755
31-Jan-01	14:21:28	13.267	4.976
31-Jan-01	14:22:28	13.933	4.482
31-Jan-01	14:23:28	14.08	4.295
31-Jan-01	14:24:28	14.354	4.122
31-Jan-01	14:25:28	14.684	3.864
31-Jan-01	14:26:28	14.592	3.888
31-Jan-01	14:27:28	14.781	3.763
31-Jan-01	14:28:28	15.141	3.581
31-Jan-01	14:29:28	10.97	7.203
31-Jan-01	14:30:28	10.477	7.225
31-Jan-01	14:31:28	9.971	7.284
31-Jan-01	14:32:28	10.297	7.242
31-Jan-01	14:33:28	12.03	5.878
31-Jan-01	14:34:28	13.047	5.137
31-Jan-01	14:35:28	13.439	4.792
31-Jan-01	14:36:28	13.944	4.455
31-Jan-01	14:37:28	14.03	4.358
31-Jan-01	14:38:28	14.324	4.145
31-Jan-01	14:39:28	14.53	3.97
31-Jan-01	14:40:28	14.803	3.825
31-Jan-01	14:41:28	11.39	6.654
31-Jan-01	14:42:28	8.339	8.695
31-Jan-01	14:43:28	8.546	8.532

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M23-1

Date	Time	O2	CO2
31-Jan-01	14:44:28	9.154	8.18
31-Jan-01	14:45:28	10.339	7.289
31-Jan-01	14:46:28	11.113	6.65
31-Jan-01	14:47:28	11.122	6.624
31-Jan-01	14:48:28	11.325	6.423
31-Jan-01	14:49:28	11.308	6.383
Average	M23-1	11.7	6.1

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-2

Date	Time	O2	CO2
31-Jan-01	16:10:42	13.981	4.38
31-Jan-01	16:11:42	14.323	4.125
31-Jan-01	16:12:42	14.511	3.97
31-Jan-01	16:13:42	14.717	3.81
31-Jan-01	16:14:42	15.139	3.565
31-Jan-01	16:15:42	11.357	6.914
31-Jan-01	16:16:42	8.068	8.967
31-Jan-01	16:17:42	9.252	8.032
31-Jan-01	16:18:42	10.875	6.827
31-Jan-01	16:19:42	12.376	5.693
31-Jan-01	16:20:42	12.874	5.242
31-Jan-01	16:21:42	13.247	4.908
31-Jan-01	16:22:42	13.504	4.713
31-Jan-01	16:23:42	13.887	4.435
31-Jan-01	16:24:42	14.188	4.208
31-Jan-01	16:25:42	14.625	3.936
31-Jan-01	16:26:42	10.514	7.581
31-Jan-01	16:27:42	9.016	8.377
31-Jan-01	16:28:42	9.451	7.862
31-Jan-01	16:29:42	10.719	6.888
31-Jan-01	16:30:42	11.758	6.1
31-Jan-01	16:31:42	12.387	5.596
31-Jan-01	16:32:42	12.623	5.362
31-Jan-01	16:33:42	12.948	5.121
31-Jan-01	16:34:42	13.485	4.691
31-Jan-01	16:35:42	13.512	4.661
31-Jan-01	16:36:42	13.858	4.409
31-Jan-01	16:37:42	Cal Check	
31-Jan-01	16:38:42		
31-Jan-01	16:39:42		
31-Jan-01	16:40:42		
31-Jan-01	16:41:42		
31-Jan-01	16:42:42		
31-Jan-01	16:43:42		
31-Jan-01	16:44:42		
31-Jan-01	16:45:42		
31-Jan-01	16:46:42	12.411	5.565
31-Jan-01	16:47:42	12.782	5.275
31-Jan-01	16:48:42	13.028	5.042
31-Jan-01	16:49:42	13.404	4.776
31-Jan-01	16:50:42	13.798	4.484

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-2

Date	Time	O2	CO2
31-Jan-01	16:51:42	14.074	4.255
31-Jan-01	16:52:42	14.391	4.062
31-Jan-01	16:53:42	9.81	8.222
31-Jan-01	16:54:42	9.805	7.702
31-Jan-01	16:55:42	9.801	7.648
31-Jan-01	16:56:42	10.562	7.084
31-Jan-01	16:57:42	11.329	6.505
31-Jan-01	16:58:42	11.938	6.049
31-Jan-01	16:59:42	12.236	5.793
31-Jan-01	17:00:42	12.407	5.653
31-Jan-01			
31-Jan-01	17:02:21	11.124	7.005
31-Jan-01	17:03:21	8.432	9.16
31-Jan-01	17:04:21	9.374	8.09
31-Jan-01	17:05:21	9.956	7.591
31-Jan-01	17:06:21	10.945	6.774
31-Jan-01	17:07:21	11.587	6.287
31-Jan-01	17:08:21	12.097	5.852
31-Jan-01	17:09:21	12.248	5.719
31-Jan-01	17:10:21	12.336	5.642
31-Jan-01	17:11:21	12.782	5.282
31-Jan-01	17:12:21	13.096	5.036
31-Jan-01	17:13:21	13.166	4.967
31-Jan-01	17:14:21	10.991	7.269
31-Jan-01	17:15:21	7.328	9.699
31-Jan-01	17:16:21	8.221	8.861
31-Jan-01	17:17:21	10.311	7.37
31-Jan-01	17:18:21	12.459	5.77
31-Jan-01	17:19:21	12.763	5.363
31-Jan-01	17:20:21	13.015	5.123
31-Jan-01	17:21:21	13.23	4.945
31-Jan-01	17:22:21	13.551	4.705
31-Jan-01	17:23:21	14.065	4.342
31-Jan-01	17:24:21	10.662	7.475
31-Jan-01	17:25:21	10.297	7.304
31-Jan-01	17:26:21	11.009	6.606
31-Jan-01	17:27:21	10.867	6.711
31-Jan-01	17:28:21	11.458	6.26
31-Jan-01	17:29:21	11.976	5.867
31-Jan-01	17:30:21	13.084	5.053
31-Jan-01	17:31:21	13.52	4.713

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-2

Date	Time	O2	CO2
31-Jan-01	17:32:21	14.007	4.373
31-Jan-01	17:33:21	13.843	4.447
31-Jan-01	17:34:21	14.216	4.173
31-Jan-01	17:35:21	14.486	3.963
31-Jan-01	17:36:21	14.658	3.826
31-Jan-01	17:37:21	14.75	3.759
31-Jan-01	17:38:21	14.852	3.67
31-Jan-01	17:39:21	14.928	3.613
31-Jan-01	17:40:21	14.975	3.585
31-Jan-01	17:41:21	14.94	3.617
31-Jan-01	17:42:21	12.031	6.471
31-Jan-01	17:43:21	8.693	8.513
31-Jan-01	17:44:21	9.304	7.907
31-Jan-01	17:45:21	11.288	6.432
31-Jan-01	17:46:21	12.6	5.468
31-Jan-01	17:47:21	13.098	5.039
31-Jan-01	17:48:21	13.464	4.744
31-Jan-01	17:49:21	13.682	4.542
31-Jan-01	17:50:21	14.071	4.275
31-Jan-01	17:51:21	14.689	3.862
31-Jan-01	17:52:21	9.804	8.31
31-Jan-01	17:53:21	10.491	7.174
31-Jan-01	17:54:21	11.466	6.392
31-Jan-01	17:55:21	11.768	6.168
31-Jan-01	17:56:21	12.659	5.469
31-Jan-01	17:57:21	12.742	5.345
31-Jan-01	17:58:21	13.144	5.038
31-Jan-01	17:59:21	13.244	4.925
31-Jan-01	18:00:21	13.456	4.748
31-Jan-01	18:01:21	13.84	4.471
31-Jan-01	18:02:21	14.093	4.292
31-Jan-01	18:03:21	14.473	4.045
31-Jan-01	18:04:21	10.853	7.466
31-Jan-01	18:05:21	10.612	7.12
31-Jan-01	18:06:21	11.108	6.613
31-Jan-01	18:07:21	11.366	6.408
31-Jan-01	18:08:21	12.341	5.642
31-Jan-01	18:09:21	12.864	5.208
31-Jan-01	18:10:21	12.804	5.187
31-Jan-01	18:11:21	13.256	4.841
31-Jan-01	18:12:21	13.732	4.505

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-2

Date	Time	O2	CO2
31-Jan-01	18:13:21	14.112	4.237
31-Jan-01	18:14:21	11.466	6.834
31-Jan-01	18:15:21	7.967	9.059
31-Jan-01	18:16:21	8.954	8.206
31-Jan-01	18:17:21	10.433	7.106
31-Jan-01	18:18:21	11.703	6.15
31-Jan-01	18:19:21	12.274	5.681
31-Jan-01	18:20:21	12.514	5.458
31-Jan-01	18:21:21	12.944	5.144
31-Jan-01	18:22:21	13.316	4.857
31-Jan-01	18:23:21	13.795	4.496
31-Jan-01	18:24:21	13.879	4.411
31-Jan-01	18:25:21	11.887	6.416
31-Jan-01	18:26:21	8.705	8.851
31-Jan-01	18:27:21	9.937	7.551
31-Jan-01	18:28:21	10.581	6.997
31-Jan-01	18:29:21	11.57	6.21
31-Jan-01	18:30:21	12.434	5.607
31-Jan-01	18:31:21	12.947	5.195
31-Jan-01	18:32:21	13.364	4.846
31-Jan-01	18:33:21	13.671	4.581
31-Jan-01	18:34:21	14.1	4.265
31-Jan-01	18:35:21	14.164	4.193
31-Jan-01	18:36:21	14.485	3.965
31-Jan-01	18:37:21	14.694	3.797
31-Jan-01	18:38:21	14.84	3.693
31-Jan-01	18:39:21	14.978	3.636
31-Jan-01	18:40:21	9.458	8.634
31-Jan-01	18:41:21	9.4	8.097
31-Jan-01	18:42:21	9.748	7.732
31-Jan-01	18:43:21	10.776	6.868
31-Jan-01	18:44:21	11.989	5.951
31-Jan-01	18:45:21	12.714	5.406
31-Jan-01	18:46:21	13.014	5.148
31-Jan-01	18:47:21	13.229	4.964
31-Jan-01	18:48:21	13.152	4.989
31-Jan-01	18:49:21	12.136	6.112
31-Jan-01	18:50:21	7.219	10.038
31-Jan-01	18:51:21	7.664	9.392
31-Jan-01	18:52:21	9.429	8.28
31-Jan-01	18:53:21	11.403	6.834

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-2

Date	Time	O2	CO2
31-Jan-01	18:54:21	11.882	6.371
31-Jan-01	18:55:21	11.692	6.383
31-Jan-01	18:56:21	11.826	6.239
31-Jan-01	18:57:21	12.156	5.929
31-Jan-01	18:58:21	12.321	5.787
31-Jan-01	18:59:21	12.45	5.666
31-Jan-01	19:00:21	12.816	5.37
31-Jan-01	19:01:21	13.087	5.209
31-Jan-01	19:02:21	8.274	9.598
31-Jan-01	19:03:21	9.977	7.787
31-Jan-01	19:04:21	11.253	6.646
31-Jan-01	19:05:21	11.716	6.28
31-Jan-01	19:06:21	12.394	5.753
31-Jan-01	19:07:21	12.829	5.391
31-Jan-01	19:08:21	13.214	5.079
31-Jan-01	19:09:21	13.553	4.805
31-Jan-01	19:10:21	13.663	4.695
31-Jan-01	19:11:21	13.823	4.565
31-Jan-01	19:12:21	14.309	4.224
31-Jan-01	19:13:21	10.581	7.677
31-Jan-01	19:14:21	9.505	8.089
31-Jan-01	19:15:21	10.174	7.499
31-Jan-01	19:16:21	10.977	6.83
31-Jan-01	19:17:21	11.736	6.203
31-Jan-01	19:18:21	12.291	5.763
31-Jan-01	19:19:21	12.589	5.501
31-Jan-01	19:20:21	13.08	5.102
31-Jan-01	19:21:21	13.241	4.949
31-Jan-01	19:22:21	13.502	4.761
31-Jan-01	19:23:21	13.908	4.452
31-Jan-01	19:24:21	11.564	6.722
31-Jan-01	19:25:21	8.584	8.748
31-Jan-01	19:26:21	9.973	7.439
31-Jan-01	19:27:21	11.184	6.522
31-Jan-01			
31-Jan-01	19:29:31	13.399	4.836
31-Jan-01	19:30:31	13.686	4.603
31-Jan-01	19:31:31	14.023	4.335
31-Jan-01	19:32:31	14.344	4.098
31-Jan-01	19:33:31	14.811	3.774
31-Jan-01	19:34:31	9.996	8.011

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-2

Date	Time	O2	CO2
31-Jan-01	19:35:31	8.861	8.328
31-Jan-01	19:36:31	10.395	7.09
31-Jan-01	19:37:31	11.673	6.136
31-Jan-01	19:38:31	12.531	5.494
31-Jan-01	19:39:31	13.025	5.123
31-Jan-01	19:40:31	13.637	4.646
31-Jan-01	19:41:31	14.154	4.229
31-Jan-01	19:42:31	14.488	3.958
31-Jan-01	19:43:31	14.681	3.827
31-Jan-01	19:44:31	14.482	3.929
31-Jan-01	19:45:31	14.65	3.818
31-Jan-01	19:46:31	14.763	3.725
31-Jan-01	19:47:31	13.48	5.136
31-Jan-01	19:48:31	10.616	7.368
31-Jan-01	19:49:31	9.963	7.554
31-Jan-01	19:50:31	9.083	8.168
31-Jan-01	19:51:31	10.554	7.018
31-Jan-01	19:52:31	11.621	6.196
31-Jan-01	19:53:31	12.34	5.642
31-Jan-01	19:54:31	12.604	5.438
31-Jan-01	19:55:31	12.937	5.156
31-Jan-01	19:56:31	13.312	4.863
31-Jan-01	19:57:31	11.965	6.191
31-Jan-01	19:58:31	9.017	8.68
31-Jan-01	19:59:31	10.349	7.241
31-Jan-01	20:00:31	10.987	6.671
31-Jan-01	20:01:31	11.524	6.265
31-Jan-01	20:02:31	11.797	6.051
31-Jan-01	20:03:31	12.178	5.749
31-Jan-01	20:04:31	12.3	5.646
31-Jan-01	20:05:31	12.499	5.474
31-Jan-01	20:06:31	12.466	5.508
31-Jan-01	20:07:31	9.349	8.619
31-Jan-01	20:08:31	10.128	7.439
31-Jan-01	20:09:31	10.879	6.711
31-Jan-01	20:10:31	11.749	6.062
31-Jan-01	20:11:31	12.654	5.395
31-Jan-01	20:12:31	13.087	5.03
31-Jan-01	20:13:31	13.271	4.88
31-Jan-01	20:14:31	13.468	4.719
31-Jan-01	20:15:31	13.586	4.615

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-2

Date	Time	O2	CO2
31-Jan-01	20:16:31	11.945	6.43
31-Jan-01	20:17:31	9.95	7.911
31-Jan-01	20:18:31	10.619	7.092
31-Jan-01	20:19:31	10.632	7.096
31-Jan-01	20:20:31	11.807	6.171
31-Jan-01	20:21:31	12.609	5.507
31-Jan-01	20:22:31	12.945	5.209
31-Jan-01	20:23:31	13.196	5.008
31-Jan-01	20:24:31	13.467	4.789
31-Jan-01	20:25:31	13.365	4.856
31-Jan-01	20:26:31	14.008	4.406
31-Jan-01	20:27:31	10.33	7.846
31-Jan-01	20:28:31	10.006	7.474
31-Jan-01	20:29:31	11.794	7.05
31-Jan-01	20:30:31	Cal Check	
31-Jan-01	20:31:31		
31-Jan-01	20:32:31		
31-Jan-01	20:34:00		
31-Jan-01	20:35:00		
31-Jan-01	20:36:00		
31-Jan-01	20:37:00		
31-Jan-01	20:38:00		
31-Jan-01	20:39:00		
31-Jan-01	20:40:00		
Average	M23-2	12.2	5.9

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-3

Date	Time	O2	CO2
2/ 1/101	9:10:00	12.832	5.33
2/ 1/101	9:11:00	13.373	4.869
2/ 1/101	9:12:00	13.966	4.419
2/ 1/101	9:13:00	14.29	4.17
2/ 1/101	9:14:00	14.513	3.989
2/ 1/101	9:15:00	13.408	4.554
2/ 1/101	9:16:00	13.451	4.574
2/ 1/101	9:17:00	10.678	7.566
2/ 1/101	9:18:00	9.866	7.777
2/ 1/101	9:19:00	9.84	7.612
2/ 1/101	9:20:00	10.2	7.443
2/ 1/101	9:21:00	12.279	5.749
2/ 1/101	9:22:00	12.997	5.158
2/ 1/101	9:23:00	13.609	4.676
2/ 1/101	9:24:00	13.882	4.425
2/ 1/101	9:25:00	13.991	4.314
2/ 1/101	9:26:00	14.214	4.142
2/ 1/101	9:27:00	14.517	3.902
2/ 1/101	9:28:00	13.94	4.221
2/ 1/101	9:29:00	13.846	4.275
2/ 1/101	9:30:00	14.453	3.941
2/ 1/101	9:31:00	10.26	7.872
2/ 1/101	9:32:00	9.142	8.036
2/ 1/101	9:33:00	8.592	8.282
2/ 1/101	9:34:00	10.308	7.231
2/ 1/101	9:35:00	12.22	5.866
2/ 1/101	9:36:00	12.845	5.333
2/ 1/101	9:37:00	13.379	4.882
2/ 1/101	9:38:00	13.968	4.387
2/ 1/101	9:39:00	14.439	4.032
2/ 1/101	9:40:00	14.248	4.416
2/ 1/101	9:41:00	10.234	7.878
2/ 1/101	9:42:00	11.043	6.824
2/ 1/101	9:43:00	9.472	7.999
2/ 1/101	9:44:00	10.376	7.322
2/ 1/101	9:45:00	11.534	6.376
2/ 1/101	9:46:00	12.437	5.668
2/ 1/101	9:47:00	13.16	5.079
2/ 1/101	9:48:00	13.625	4.721
2/ 1/101	9:49:00	14.316	4.246
2/ 1/101	9:50:00	10.638	7.819

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-3

Date	Time	O2	CO2	
2/ 1/101	9:51:00	10.535	7.33	
2/ 1/101	9:52:00	8.936	8.458	
2/ 1/101	9:53:00	8.673	8.738	
2/ 1/101	9:54:00	10.017	7.619	
2/ 1/101	9:55:00	10.574	7.152	
2/ 1/101	9:56:00	10.951	6.871	
2/ 1/101	9:57:00	11.449	6.484	
2/ 1/101	9:58:00	11.642	6.299	
2/ 1/101	9:59:00	12.154	5.916	
2/ 1/101	10:00:00	12.566	5.554	
2/ 1/101	10:01:00	10.903	7.365	
2/ 1/101	10:02:00	8.964	8.744	
2/ 1/101	10:03:00	9.559	8.092	
2/ 1/101	10:04:00	9.668	7.908	
2/ 1/101	10:05:00	10.545	7.141	
2/ 1/101	10:06:00	11.244	6.566	
2/ 1/101	10:07:00	11.936	6.043	
2/ 1/101	10:08:00	12.305	5.788	
2/ 1/101	10:09:00	12.52	5.593	
2/ 1/101	10:10:00	12.909	5.275	M26-3 Average
2/ 1/101	10:11:00	13.475	4.902	11.9
2/ 1/101	10:12:00	9.177	8.761	
2/ 1/101	10:13:00	8.577	8.649	
2/ 1/101	10:14:00	9.085	8.282	
2/ 1/101	10:15:00	10.279	7.375	
2/ 1/101	10:16:00			Cal Check
2/ 1/101	10:17:00			
2/ 1/101	10:18:00			
2/ 1/101	10:19:00			
2/ 1/101	10:20:00			
2/ 1/101	10:21:00			
2/ 1/101	10:22:00			
2/ 1/101	10:23:00			
2/ 1/101	10:24:00			
2/ 1/101	10:25:00			
2/ 1/101	10:26:00			
2/ 1/101	10:27:00			
2/ 1/101	10:28:00			
2/ 1/101	10:29:00			
2/ 1/101	10:30:00			
2/ 1/101	10:31:00			

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-3

Date	Time	O2	CO2
2/ 1/101	10:32:00		
2/ 1/101	10:33:00		
2/ 1/101	10:34:00		
2/ 1/101	10:35:00		
2/ 1/101	10:36:00		
2/ 1/101	10:37:00	12.878	10.19
2/ 1/101	10:38:00	15.437	8.115
2/ 1/101	10:39:00	11.785	6.203
2/ 1/101	10:40:00	12.042	6.019
2/ 1/101	10:41:00	12.564	5.612
2/ 1/101	10:42:00	12.63	5.56
2/ 1/101	10:43:00	13.289	5.076
2/ 1/101	10:44:00	10.305	7.95
2/ 1/101	10:45:00	8.945	8.683
2/ 1/101	10:46:00	9.727	7.897
2/ 1/101	10:47:00	10.6	7.177
2/ 1/101	10:48:00	11.646	6.379
2/ 1/101	10:49:00	12.215	5.94
2/ 1/101	10:50:00	12.597	5.642
2/ 1/101	10:51:00	12.665	5.577
2/ 1/101	10:52:00	12.924	5.355
2/ 1/101	10:53:00	13.463	4.988
2/ 1/101	10:54:00	9.969	8.326
2/ 1/101	10:55:00	9.096	8.671
2/ 1/101	10:56:00	10.469	7.507
2/ 1/101	10:57:00	11.319	6.751
2/ 1/101	10:58:00	12.158	6.073
2/ 1/101	10:59:00	12.506	5.768
2/ 1/101	11:00:00	12.869	5.43
2/ 1/101	11:01:00	13.481	4.946
2/ 1/101	11:02:00	13.759	4.688
2/ 1/101	11:03:00	13.836	4.641
2/ 1/101	11:04:00	10.62	7.743
2/ 1/101	11:05:00	6.191	10.729
2/ 1/101	11:06:00	10.01	7.683
2/ 1/101	11:07:00	11.518	6.523
2/ 1/101	11:08:00	12.299	5.897
2/ 1/101	11:09:00	12.537	5.683
2/ 1/101	11:10:00	12.884	5.396
2/ 1/101	11:11:00	13.218	5.137
2/ 1/101	11:12:00	13.494	4.911

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-3

Date	Time	O2	CO2
2/ 1/101	11:13:00	13.805	4.689
2/ 1/101	11:14:00	14.098	4.486
2/ 1/101	11:15:00	13.186	5.444
2/ 1/101	11:16:00	9.176	8.904
2/ 1/101	11:17:00	11.267	6.771
2/ 1/101	11:18:00	11.588	6.419
2/ 1/101	11:19:00	12.523	5.703
2/ 1/101	11:20:00	12.933	5.366
2/ 1/101	11:21:00	13.341	5.052
2/ 1/101	11:22:00	13.693	4.788
2/ 1/101	11:23:00	13.854	4.649
2/ 1/101	11:24:00	14.074	4.477
2/ 1/101	11:25:00	14.241	4.344
2/ 1/101	11:26:00	14.573	4.173
2/ 1/101	11:27:00	9.687	8.461
2/ 1/101	11:28:00	8.1	9.214
2/ 1/101	11:29:00	9.455	8.134
2/ 1/101	11:30:00	10.169	7.642
2/ 1/101	11:31:00	11.088	6.935
2/ 1/101	11:32:00	11.505	6.614
2/ 1/101	11:33:00	11.613	6.505
2/ 1/101	11:34:00	11.614	6.492
2/ 1/101	11:35:00	11.974	6.215
2/ 1/101	11:36:00	12.005	6.178
2/ 1/101	11:37:00	12.393	5.877
2/ 1/101	11:38:00	12.308	5.9
2/ 1/101	11:39:00	12.506	5.751
2/ 1/101	11:40:00	12.946	5.407
2/ 1/101	11:41:00	13.334	5.102
2/ 1/101	11:42:00	13.596	4.895
2/ 1/101	11:43:00	Cal check	
2/ 1/101	11:44:00		
2/ 1/101	11:45:00		
2/ 1/101	11:46:00		
2/ 1/101	11:47:00		
2/ 1/101	11:48:00		
2/ 1/101	11:49:00		
2/ 1/101	11:50:00		
2/ 1/101	11:51:00		
2/ 1/101	11:52:00		
2/ 1/101	11:53:00		

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-3

Date	Time	O2	CO2
2/ 1/101	11:54:00		
2/ 1/101	11:55:00		
2/ 1/101	11:56:00		
2/ 1/101	11:57:00		
2/ 1/101	11:58:00		
2/ 1/101	11:59:00		
2/ 1/101	12:00:00	12.137	9.942
2/ 1/101	12:01:00	12.143	9.954
2/ 1/101	12:02:00	12.146	9.963
2/ 1/101	12:03:00	12.15	9.978
2/ 1/101	12:04:00	12.154	9.983
2/ 1/101	12:05:00	12.159	9.989
2/ 1/101	12:06:00	12.16	10.002
2/ 1/101	12:07:00	11.257	8.915
2/ 1/101	12:08:00	10.168	7.656
2/ 1/101	12:09:00	10.95	7.008
2/ 1/101	12:10:00	11.835	6.326
2/ 1/101	12:11:00	12.539	5.76
2/ 1/101	12:12:00	12.933	5.435
2/ 1/101	12:13:00	13.227	5.167
2/ 1/101	12:14:00	13.667	4.81
2/ 1/101	12:15:00	13.788	4.706
2/ 1/101	12:16:00	14.031	4.536
2/ 1/101	12:17:00	11.588	7.121
2/ 1/101	12:18:00	10.083	7.839
2/ 1/101	12:19:29	11.206	6.727
2/ 1/101	12:20:29	12.101	6.049
2/ 1/101	12:21:29	13.215	5.192
2/ 1/101	12:22:29	13.592	4.891
2/ 1/101	12:23:29	14.004	4.546
2/ 1/101	12:24:29	14.23	4.381
2/ 1/101	12:25:29	14.516	4.178
2/ 1/101	12:26:29	14.943	3.923
2/ 1/101	12:27:29	10.235	8.31
2/ 1/101	12:28:29	11.381	6.825
2/ 1/101	12:29:29	11.542	6.538
2/ 1/101	12:30:29	11.738	6.358
2/ 1/101	12:31:29	12.576	5.688
2/ 1/101	12:32:29	13.078	5.288
2/ 1/101	12:33:29	13.652	4.834

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-3

Date	Time	O2	CO2
2/ 1/101	12:34:29	13.947	4.603
2/ 1/101	12:35:29	14.347	4.323
2/ 1/101	12:36:29	14.64	4.091
2/ 1/101	12:37:29	14.511	4.325
2/ 1/101	12:38:29	9.614	8.613
2/ 1/101	12:39:29	9.201	8.442
2/ 1/101	12:40:29	9.453	8.197
2/ 1/101	12:41:29	10.643	7.267
2/ 1/101	12:42:29	11.428	6.624
2/ 1/101	12:43:29	11.791	6.321
2/ 1/101	12:44:29	12.191	6.02
2/ 1/101	12:45:29	12.961	5.435
2/ 1/101	12:46:29	13.6	4.94
2/ 1/101	12:47:29	13.781	4.746
2/ 1/101	12:48:29	14.249	4.423
2/ 1/101	12:49:29	14.535	4.212
2/ 1/101	12:50:29	14.724	4.071
2/ 1/101	12:51:29	14.934	3.898
2/ 1/101	12:52:29	14.969	3.842
2/ 1/101	12:53:29	14.979	3.871
2/ 1/101	12:54:29	12.102	6.74
2/ 1/101	12:55:29	7.532	9.453
2/ 1/101	12:56:29	6.595	10.288
2/ 1/101	12:57:29	9.149	8.485
2/ 1/101	12:58:29	11.267	6.889
2/ 1/101	12:59:29	11.513	6.646
2/ 1/101	13:00:29	11.824	6.325
2/ 1/101	13:01:29	11.852	6.281
2/ 1/101	13:02:29	12.271	5.962
2/ 1/101	13:03:29	12.545	5.801
2/ 1/101	13:04:29	7.915	9.943
2/ 1/101	13:05:29	7.933	9.476
2/ 1/101	13:06:29	10.095	7.887
2/ 1/101	13:07:29	11.466	6.831
2/ 1/101	13:08:29	12.128	6.236
2/ 1/101	13:09:29	12.243	6.052
2/ 1/101	13:10:29	12.46	5.851
2/ 1/101	13:11:29	12.75	5.625
2/ 1/101	13:12:29	13.198	5.272
2/ 1/101	13:13:29	13.126	5.316
2/ 1/101	13:14:29	13.437	5.067

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M23-3

Date	Time	O2	CO2
2/ 1/101	13:15:29	13.82	4.778
2/ 1/101	13:16:29	14.073	4.581
2/ 1/101	13:17:29	14.328	4.386
2/ 1/101	13:18:29	14.566	4.204
2/ 1/101	13:19:29	14.35	4.334
2/ 1/101	13:20:29	14.645	4.135
2/ 1/101	13:21:29	14.811	3.993
2/ 1/101	13:22:29	14.913	3.933
2/ 1/101	13:23:29	15.023	3.85
2/ 1/101	13:24:29	15.111	3.781
2/ 1/101	13:25:29	15.172	3.739
2/ 1/101	13:26:29	15.246	3.676
2/ 1/101	13:27:29	15.318	3.633
2/ 1/101	13:28:29	15.34	3.603
2/ 1/101	13:29:29	14.024	4.357
2/ 1/101	13:30:29	13.709	4.563
Average	M23-3	12.2	6.2

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M26-1

Date	Time	O2	CO2
31-Jan-01	10:45	12.0	5.6
31-Jan-01	10:46	12.5	5.6
31-Jan-01	10:47	12.5	4.8
31-Jan-01	10:48	13.0	4.8
31-Jan-01	10:49	13.3	4.0
31-Jan-01	10:50	13.5	8.8
31-Jan-01	10:51	9.3	8.0
31-Jan-01	10:52	9.5	8.0
31-Jan-01	10:53	10.0	7.2
31-Jan-01	10:54	11.3	5.2
31-Jan-01	10:55	12.8	4.8
31-Jan-01	10:56	13.0	4.8
31-Jan-01	10:57	8.8	8.0
31-Jan-01	10:58	9.8	8.4
31-Jan-01	10:59	10.8	8.8
31-Jan-01	11:00	10.8	8.8
31-Jan-01	11:01	12.0	8.4
31-Jan-01	11:02	12.8	8.0
31-Jan-01	11:03	13.3	8.0
31-Jan-01	11:04	13.5	7.2
31-Jan-01	11:05	13.8	6.8
31-Jan-01	11:06	14.0	6.4
31-Jan-01	11:07	14.0	6.0
31-Jan-01	11:08	15.0	5.6
31-Jan-01	11:09	10.3	5.2
31-Jan-01	11:10	11.0	4.8
31-Jan-01	11:11	9.3	5.2
31-Jan-01	11:12	11.8	5.6
31-Jan-01	11:13:15	10.055	5.659
31-Jan-01	11:14:15	10.784	5.529
31-Jan-01	11:15:15	10.336	5.245
31-Jan-01	11:16:15	10.981	5.02
31-Jan-01	11:17:15	12.067	4.993
31-Jan-01	11:18:15	12.374	5.198
31-Jan-01	11:19:15	12.5	5.507
31-Jan-01	11:20:15	12.865	5.801
31-Jan-01	11:21:15	13.414	6.02
31-Jan-01	11:22:15	13.929	6.115
31-Jan-01	11:23:15	9.623	6.085
31-Jan-01	11:24:15	8.689	6.001
31-Jan-01	11:25:15	10.295	5.856

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M26-1

Date	Time	O2	CO2
31-Jan-01	11:26:15	9.827	5.673
31-Jan-01	11:27:15	10.649	5.545
31-Jan-01	11:28:15	11.78	5.621
31-Jan-01	11:29:00	11	6
31-Jan-01	11:30:00	11.75	6
31-Jan-01	11:31:00	12.25	6.4
31-Jan-01	11:32:00	12.5	6.4
31-Jan-01	11:33:00	13	6.4
31-Jan-01	11:34:00	13.75	6.4
31-Jan-01	11:35:00	13.5	6.4
31-Jan-01	11:36:00	9.25	6.4
31-Jan-01	11:37:00	10	6.4
31-Jan-01	11:38:00	9.5	6
31-Jan-01	11:39:00	10.5	6.4
31-Jan-01	11:40:00	12	6.4
31-Jan-01	11:41:45	13.415	6.409
31-Jan-01	11:42:45	13.613	6.541
31-Jan-01	11:43:45	10.964	6.566
31-Jan-01	11:44:45	9.35	6.505
Average(		11.7	6.2

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M26-3

Date	Time	O2	CO2
2/ 1/101	9:10:00	12.832	5.33
2/ 1/101	9:11:00	13.373	4.869
2/ 1/101	9:12:00	13.966	4.419
2/ 1/101	9:13:00	14.29	4.17
2/ 1/101	9:14:00	14.513	3.989
2/ 1/101	9:15:00	13.408	4.554
2/ 1/101	9:16:00	13.451	4.574
2/ 1/101	9:17:00	10.678	7.566
2/ 1/101	9:18:00	9.866	7.777
2/ 1/101	9:19:00	9.84	7.612
2/ 1/101	9:20:00	10.2	7.443
2/ 1/101	9:21:00	12.279	5.749
2/ 1/101	9:22:00	12.997	5.158
2/ 1/101	9:23:00	13.609	4.676
2/ 1/101	9:24:00	13.882	4.425
2/ 1/101	9:25:00	13.991	4.314
2/ 1/101	9:26:00	14.214	4.142
2/ 1/101	9:27:00	14.517	3.902
2/ 1/101	9:28:00	13.94	4.221
2/ 1/101	9:29:00	13.846	4.275
2/ 1/101	9:30:00	14.453	3.941
2/ 1/101	9:31:00	10.26	7.872
2/ 1/101	9:32:00	9.142	8.036
2/ 1/101	9:33:00	8.592	8.282
2/ 1/101	9:34:00	10.308	7.231
2/ 1/101	9:35:00	12.22	5.866
2/ 1/101	9:36:00	12.845	5.333
2/ 1/101	9:37:00	13.379	4.882
2/ 1/101	9:38:00	13.968	4.387
2/ 1/101	9:39:00	14.439	4.032
2/ 1/101	9:40:00	14.248	4.416
2/ 1/101	9:41:00	10.234	7.878
2/ 1/101	9:42:00	11.043	6.824
2/ 1/101	9:43:00	9.472	7.999
2/ 1/101	9:44:00	10.376	7.322
2/ 1/101	9:45:00	11.534	6.376
2/ 1/101	9:46:00	12.437	5.668
2/ 1/101	9:47:00	13.16	5.079
2/ 1/101	9:48:00	13.625	4.721
2/ 1/101	9:49:00	14.316	4.246

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M26-3

Date	Time	O2	CO2
2/ 1/101	9:50:00	10.638	7.819
2/ 1/101	9:51:00	10.535	7.33
2/ 1/101	9:52:00	8.936	8.458
2/ 1/101	9:53:00	8.673	8.738
2/ 1/101	9:54:00	10.017	7.619
2/ 1/101	9:55:00	10.574	7.152
2/ 1/101	9:56:00	10.951	6.871
2/ 1/101	9:57:00	11.449	6.484
2/ 1/101	9:58:00	11.642	6.299
2/ 1/101	9:59:00	12.154	5.916
2/ 1/101	10:00:00	12.566	5.554
2/ 1/101	10:01:00	10.903	7.365
2/ 1/101	10:02:00	8.964	8.744
2/ 1/101	10:03:00	9.559	8.092
2/ 1/101	10:04:00	9.668	7.908
2/ 1/101	10:05:00	10.545	7.141
2/ 1/101	10:06:00	11.244	6.566
2/ 1/101	10:07:00	11.936	6.043
2/ 1/101	10:08:00	12.305	5.788
2/ 1/101	10:09:00	12.52	5.593
Average		11.93	6.08

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M26-4

Date	Time	O2	CO2
2-Feb-01	9:45:00	13.314	5.328
2-Feb-01	9:46:00	10.023	7.636
2-Feb-01	9:47:00	9.985	7.295
2-Feb-01	9:48:00	7.953	9.017
2-Feb-01	9:49:00	11.025	6.729
2-Feb-01	9:50:00	12.542	5.567
2-Feb-01	9:51:00	13.149	5.055
2-Feb-01	9:52:00	13.659	4.666
2-Feb-01	9:53:00	13.887	4.462
2-Feb-01	9:54:00	14.0	4.8
2-Feb-01	9:55:00	14.3	4.8
2-Feb-01	9:56:00	14.4	4.4
2-Feb-01	9:57:00	13.8	7.6
2-Feb-01	9:58:00	13.8	9.6
2-Feb-01	9:59:00	10.0	8.0
2-Feb-01	10:00:00	10.0	6.4
2-Feb-01	10:01:00	10.3	5.2
2-Feb-01	10:02:00	10.5	4.8
2-Feb-01	10:03:00	12.0	4.4
2-Feb-01	10:04:00	12.8	6.0
2-Feb-01	10:05:00	13.5	10.4
2-Feb-01	10:06:00	14.0	8.4
2-Feb-01	10:07:00	13.8	6.4
2-Feb-01	10:08:00	6.5	6.4
2-Feb-01	10:09:00	10.8	6.0
2-Feb-01	10:10:00	11.8	5.6
2-Feb-01	10:11:00	12.0	5.2
2-Feb-01	10:12:00	12.0	8.0
2-Feb-01	10:13:00	12.3	8.0
2-Feb-01	10:14:00	13.0	7.6
2-Feb-01	10:15:00	13.5	8.4
2-Feb-01	10:16:00	13.3	6.8
2-Feb-01	10:17:00	10.0	6.8
2-Feb-01	10:18:00	10.3	6.4
2-Feb-01	10:19:00	8.3	6.4
2-Feb-01	10:20:00	10.8	6.0
2-Feb-01	10:21:00	11.0	6.0
2-Feb-01	10:22:00	11.5	5.6
2-Feb-01	10:23:00	11.5	4.8
2-Feb-01	10:24:00	12.0	9.2

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M26-4

Date	Time	O2	CO2
2-Feb-01	10:25:00	12.3	7.2
2-Feb-01	10:26:00	12.5	8.0
2-Feb-01	10:27:00	8.3	7.2
2-Feb-01	10:28:00	9.8	5.2
2-Feb-01	10:29:00	9.5	4.8
2-Feb-01	10:30:00	10.3	8.8
2-Feb-01	10:31:00	11.0	9.6
2-Feb-01	10:32:00	12.5	8.8
2-Feb-01	10:33:00	8.5	8.0
2-Feb-01	10:34:00	6.8	6.8
2-Feb-01	10:35:00	9.0	6.0
2-Feb-01	10:36:00	10.0	5.6
2-Feb-01	10:37:00	11.0	5.2
2-Feb-01	10:38:50	9.142	8.334
2-Feb-01	10:39:50	10.356	7.383
2-Feb-01	10:40:50	11.154	6.732
2-Feb-01	10:41:50	11.859	6.201
2-Feb-01	10:42:50	12.379	5.83
2-Feb-01	10:43:50	12.548	5.689
2-Feb-01	10:44:50	12.721	5.542
2-Feb-01	10:45:50	12.999	5.308
2-Feb-01	10:46:50	13.341	5.033
2-Feb-01	10:47:50	13.797	4.686
2-Feb-01	10:48:50	13.441	5.162
2-Feb-01	10:49:50	9.002	8.805
2-Feb-01	10:50:50	7.876	9.207
Average		11.43	6.59

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M29-1

Date	Time	O2	CO2
2-Feb-01	9:45:00	13.314	5.328
2-Feb-01	9:46:00	10.023	7.636
2-Feb-01	9:47:00	9.985	7.295
2-Feb-01	9:48:00	7.953	9.017
2-Feb-01	9:49:00	11.025	6.729
2-Feb-01	9:50:00	12.542	5.567
2-Feb-01	9:51:00	13.149	5.055
2-Feb-01	9:52:00	13.659	4.666
2-Feb-01	9:53:00	13.887	4.462
2-Feb-01	9:54:00	14.0	4.8
2-Feb-01	9:55:00	14.3	4.8
2-Feb-01	9:56:00	14.4	4.4
2-Feb-01	9:57:00	13.8	7.6
2-Feb-01	9:58:00	13.8	9.6
2-Feb-01	9:59:00	10.0	8.0
2-Feb-01	10:00:00	10.0	6.4
2-Feb-01	10:01:00	10.3	5.2
2-Feb-01	10:02:00	10.5	4.8
2-Feb-01	10:03:00	12.0	4.4
2-Feb-01	10:04:00	12.8	6.0
2-Feb-01	10:05:00	13.5	10.4
2-Feb-01	10:06:00	14.0	8.4
2-Feb-01	10:07:00	13.8	6.4
2-Feb-01	10:08:00	6.5	6.4
2-Feb-01	10:09:00	10.8	6.0
2-Feb-01	10:10:00	11.8	5.6
2-Feb-01	10:11:00	12.0	5.2
2-Feb-01	10:12:00	12.0	8.0
2-Feb-01	10:13:00	12.3	8.0
2-Feb-01	10:14:00	13.0	7.6
2-Feb-01	10:15:00	13.5	8.4
2-Feb-01	10:16:00	13.3	6.8
2-Feb-01	10:17:00	10.0	6.8
2-Feb-01	10:18:00	10.3	6.4
2-Feb-01	10:19:00	8.3	6.4
2-Feb-01	10:20:00	10.8	6.0
2-Feb-01	10:21:00	11.0	6.0
2-Feb-01	10:22:00	11.5	5.6
2-Feb-01	10:23:00	11.5	4.8
2-Feb-01	10:24:00	12.0	9.2

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M29-1

Date	Time	O2	CO2
2-Feb-01	10:25:00	12.3	7.2
2-Feb-01	10:26:00	12.5	8.0
2-Feb-01	10:27:00	8.3	7.2
2-Feb-01	10:28:00	9.8	5.2
2-Feb-01	10:29:00	9.5	4.8
2-Feb-01	10:30:00	10.3	8.8
2-Feb-01	10:31:00	11.0	9.6
2-Feb-01	10:32:00	12.5	8.8
2-Feb-01	10:33:00	8.5	8.0
2-Feb-01	10:34:00	6.8	6.8
2-Feb-01	10:35:00	9.0	6.0
2-Feb-01	10:36:00	10.0	5.6
2-Feb-01	10:37:00	11.0	5.2
2-Feb-01	10:38:50	9.142	8.334
2-Feb-01	10:39:50	10.356	7.383
2-Feb-01	10:40:50	11.154	6.732
2-Feb-01	10:41:50	11.859	6.201
2-Feb-01	10:42:50	12.379	5.83
2-Feb-01	10:43:50	12.548	5.689
2-Feb-01	10:44:50	12.721	5.542
2-Feb-01	10:45:50	12.999	5.308
2-Feb-01	10:46:50	13.341	5.033
2-Feb-01	10:47:50	13.797	4.686
2-Feb-01	10:48:50	13.441	5.162
2-Feb-01	10:49:50	9.002	8.805
2-Feb-01	10:50:50	7.876	9.207
Average		11.4	6.6

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

M29-2

Date	Time	O2	CO2
2/ 2/101	13:10:40	12.234	10.311
2/ 2/101	13:11:40	12.206	10.314
2/ 2/101	13:12:40	12.756	10.317
2/ 2/101	13:13:40	14.074	10.309
2/ 2/101	13:14:40	13.328	9.972
2/ 2/101	13:15:40	10.234	7.67
2/ 2/101	13:16:40	11.05	7.004
2/ 2/101	13:17:40	11.536	6.625
2/ 2/101	13:18:40	11.618	6.53
2/ 2/101	13:19:40	11.92	6.294
2/ 2/101	13:20:40	12.272	5.982
2/ 2/101	13:21:40	12.518	5.758
2/ 2/101	13:22:40	12.732	5.584
2/ 2/101	13:23:40	13.156	5.244
2/ 2/101	13:24:40	13.666	4.887
2/ 2/101	13:25:40	9.666	8.662
2/ 2/101	13:26:40	9.954	7.847
2/ 2/101	13:27:40	10.525	7.298
2/ 2/101	13:28:40	10.578	7.215
2/ 2/101	13:29:40	10.941	6.885
2/ 2/101	13:30:40	11.39	6.555
2/ 2/101	13:31:40	11.845	6.212
2/ 2/101	13:32:40	12.062	6.027
2/ 2/101	13:33:40	12.517	5.692
2/ 2/101	13:34:40	12.331	5.808
2/ 2/101	13:35:40	12.425	5.735
Average		11.9	7.2

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M29-3

Date	Time	O2	CO2
2/ 2/101	14:05:40	11.067	6.854
2/ 2/101	14:06:40	12.001	6.139
2/ 2/101	14:07:40	12.618	5.666
2/ 2/101	14:08:40	12.799	5.49
2/ 2/101	14:09:40	12.477	5.712
2/ 2/101	14:10:40	13.105	5.259
2/ 2/101	14:11:40	13.592	4.935
2/ 2/101	14:12:40	9.819	8.358
2/ 2/101	14:13:40	8.463	9.02
2/ 2/101	14:14:40	9.677	8.046
2/ 2/101	14:15:40	10.817	7.177
2/ 2/101	14:16:40	12.037	6.247
2/ 2/101	14:17:40	12.796	5.649
2/ 2/101	14:18:40	13.024	5.44
2/ 2/101	14:19:40	13.155	5.3
2/ 2/101	14:20:40	13.629	4.916
2/ 2/101	14:21:40	14.112	4.56
2/ 2/101	14:22:40	14.351	4.379
2/ 2/101	14:23:40	14.475	4.27
2/ 2/101	14:24:40	14.376	4.313
2/ 2/101	14:25:40	14.53	4.196
2/ 2/101	14:26:40	14.627	4.109
2/ 2/101	14:27:40	14.71	4.045
2/ 2/101	14:28:40	14.759	4.007
2/ 2/101	14:29:40	14.893	3.932
2/ 2/101	14:30:40	10.106	8.306
2/ 2/101	14:31:40	8.54	9.271
2/ 2/101	14:32:40	11.493	6.733
2/ 2/101	14:33:40	12.352	5.993
2/ 2/101	14:34:40	12.726	5.615
2/ 2/101	14:35:40	13.453	5.064
2/ 2/101	14:36:40	13.989	4.628
2/ 2/101	14:37:40	14.408	4.314
2/ 2/101	14:38:40	14.506	4.2
2/ 2/101	14:39:40	14.414	4.437
2/ 2/101	14:40:40	9.517	8.583
2/ 2/101	14:41:40	9.219	8.215
2/ 2/101	14:42:40	9.438	7.957
2/ 2/101	14:43:40	11.199	6.607
2/ 2/101	14:44:40	12.119	5.929

Malcolm Grow Medical Center - Andrews AFB, MD
Medical Waste Incinerator
CEM Responses

M29-3

Date	Time	O2	CO2
2/ 2/101	14:45:40	12.499	5.637
2/ 2/101	14:46:40	12.631	5.51
2/ 2/101	14:47:40	13.095	5.183
2/ 2/101	14:48:40	13.289	5.01
2/ 2/101	14:49:40	13.679	4.731
2/ 2/101	14:50:40	14.163	4.4
2/ 2/101	14:51:40	13.954	4.725
2/ 2/101	14:52:40	7.934	9.962
2/ 2/101	14:53:40	8.355	8.839
2/ 2/101	14:54:40	8.583	8.571
2/ 2/101	14:55:40	10.17	7.502
2/ 2/101	14:56:40	11.624	6.438
2/ 2/101	14:57:40	12.475	5.779
Average		12.3	6.0

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

Run 1

Date	Time	O2	CO2	NOx	CO	SO2
1-Feb-01	9:11:00	13.4	4.9	42.0	1.4	1.8
1-Feb-01	9:12:00	14.0	4.4	42.3	1.4	1.4
1-Feb-01	9:13:00	14.3	4.2	41.7	1.3	1.1
1-Feb-01	9:14:00	14.5	4.0	39.9	1.3	0.8
1-Feb-01	9:15:00	13.4	4.6	39.3	1.4	0.7
1-Feb-01	9:16:00	13.5	4.6	41.1	1.3	0.6
1-Feb-01	9:17:00	10.7	7.6	46.2	1.3	0.4
1-Feb-01	9:18:00	9.9	7.8	65.4	1.3	0.8
1-Feb-01	9:19:00	9.8	7.6	49.5	1.6	3.4
1-Feb-01	9:20:00	10.2	7.4	43.6	1.8	3.4
1-Feb-01	9:21:00	12.3	5.7	30.5	1.7	3.1
1-Feb-01	9:22:00	13.0	5.2	30.6	1.6	2.5
1-Feb-01	9:23:00	13.6	4.7	33.4	1.2	1.8
1-Feb-01	9:24:00	13.9	4.4	34.3	0.9	1.3
1-Feb-01	9:25:00	14.0	4.3	35.3	0.6	1.0
1-Feb-01	9:26:00	14.2	4.1	35.2	0.4	0.7
1-Feb-01	9:27:00	14.5	3.9	34.2	0.3	0.6
1-Feb-01	9:28:00	13.9	4.2	34.1	0.1	0.4
1-Feb-01	9:29:00	13.8	4.3	36.0	0.2	0.3
1-Feb-01	9:30:00	14.5	3.9	34.4	0.3	0.5
1-Feb-01	9:31:00	10.3	7.9	143.0	0.3	0.5
1-Feb-01	9:32:00	9.1	8.0	203.9	0.3	0.5
1-Feb-01	9:33:00	8.6	8.3	162.6	0.4	0.4
1-Feb-01	9:34:00	10.3	7.2	117.7	0.4	0.9
1-Feb-01	9:35:00	12.2	5.9	51.4	0.4	2.1
1-Feb-01	9:36:00	12.8	5.3	40.8	0.6	2.6
1-Feb-01	9:37:00	13.4	4.9	42.3	0.7	2.2
1-Feb-01	9:38:00	14.0	4.4	43.6	0.6	1.8
1-Feb-01	9:39:00	14.4	4.0	40.9	0.5	1.4
1-Feb-01	9:40:00	14.2	4.4	34.8	0.6	1.1
1-Feb-01	9:41:00	10.2	7.9	66.6	0.6	1.1
1-Feb-01	9:42:00	11.0	6.8	78.1	0.6	0.7
1-Feb-01	9:43:00	9.5	8.0	67.4	0.5	1.1
1-Feb-01	9:44:00	10.4	7.3	43.6	0.6	1.6
1-Feb-01	9:45:00	11.5	6.4	36.9	0.3	2.3
1-Feb-01	9:46:00	12.4	5.7	37.5	0.3	2.2
1-Feb-01	9:47:00	13.2	5.1	37.4	0.2	1.7
1-Feb-01	9:48:00	13.6	4.7	36.9	0.1	1.3
1-Feb-01	9:49:00	14.3	4.2	34.8	-0.1	1.1
1-Feb-01	9:50:00	10.6	7.8	54.2	-0.2	0.9
1-Feb-01	9:51:00	10.5	7.3	109.1	-0.3	0.8

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

Run 1

Date	Time	O2	CO2	NOx	CO	SO2
1-Feb-01	9:52:00	8.9	8.5	137.7	-0.2	1.1
1-Feb-01	9:53:00	8.7	8.7	136.1	-0.1	1.8
1-Feb-01	9:54:00	10.0	7.6	106.0	-0.3	2.5
1-Feb-01	9:55:00	10.6	7.2	88.8	-0.3	2.9
1-Feb-01	9:56:00	11.0	6.9	76.1	-0.3	2.8
1-Feb-01	9:57:00	11.4	6.5	62.4	-0.1	2.4
1-Feb-01	9:58:00	11.6	6.3	52.1	0.1	2.2
1-Feb-01	9:59:00	12.2	5.9	42.1	0.2	1.9
1-Feb-01	10:00:00	12.6	5.6	39.8	0.4	1.6
1-Feb-01	10:01:00	10.9	7.4	55.9	0.3	1.4
1-Feb-01	10:02:00	9.0	8.7	106.2	0.0	1.4
1-Feb-01	10:03:00	9.6	8.1	116.8	-0.5	2.1
1-Feb-01	10:04:00	9.7	7.9	129.5	-0.8	3.7
1-Feb-01	10:05:00	10.5	7.1	103.4	-1.0	3.8
1-Feb-01	10:06:00	11.2	6.6	84.3	-0.9	3.3
1-Feb-01	10:07:00	11.9	6.0	57.1	-1.0	2.6
1-Feb-01	10:08:00	12.3	5.8	38.5	-0.8	2.2
1-Feb-01	10:09:00	12.5	5.6	43.0	-0.5	1.8
1-Feb-01	10:10:00	12.9	5.3	49.7	-0.5	1.6
Average		11.9	6.1	63.3	0.4	1.6

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

Run 2

Date	Time	O2	CO2	NOx	CO	SO2
1-Feb-01	10:42:00	12.6	5.6	49.3	0.7	2.8
1-Feb-01	10:43:00	13.3	5.1	50.1	0.0	2.6
1-Feb-01	10:44:00	10.3	8.0	67.3	-0.3	2.5
1-Feb-01	10:45:00	8.9	8.7	112.5	-0.2	2.7
1-Feb-01	10:46:00	9.7	7.9	98.7	-0.2	4.7
1-Feb-01	10:47:00	10.6	7.2	90.2	-0.4	4.6
1-Feb-01	10:48:00	11.6	6.4	68.9	-0.6	3.7
1-Feb-01	10:49:00	12.2	5.9	50.4	-0.6	3.2
1-Feb-01	10:50:00	12.6	5.6	36.3	-0.4	2.7
1-Feb-01	10:51:00	12.7	5.6	40.9	-0.4	2.4
1-Feb-01	10:52:00	12.9	5.4	44.4	-0.5	2.1
1-Feb-01	10:53:00	13.5	5.0	48.6	-0.6	2.0
1-Feb-01	10:54:00	10.0	8.3	75.4	-0.8	1.9
1-Feb-01	10:55:00	9.1	8.7	100.2	-0.9	2.0
1-Feb-01	10:56:00	10.5	7.5	89.2	-1.0	5.1
1-Feb-01	10:57:00	11.3	6.8	70.2	-0.9	5.5
1-Feb-01	10:58:00	12.2	6.1	48.1	-0.9	4.6
1-Feb-01	10:59:00	12.5	5.8	38.2	-0.7	3.8
1-Feb-01	11:00:00	12.9	5.4	43.1	-0.6	3.1
1-Feb-01	11:01:00	13.5	4.9	50.8	-0.7	2.7
1-Feb-01	11:02:00	13.8	4.7	50.8	-0.8	2.2
1-Feb-01	11:03:00	13.8	4.6	48.4	-1.0	2.0
1-Feb-01	11:04:00	10.6	7.7	66.6	-1.0	1.7
1-Feb-01	11:05:00	6.2	10.7	126.9	-0.9	2.6
1-Feb-01	11:06:00	10.0	7.7	102.4	-0.8	17.0
1-Feb-01	11:07:00	11.5	6.5	80.2	-0.8	15.1
1-Feb-01	11:08:00	12.3	5.9	51.6	-0.6	12.1
1-Feb-01	11:09:00	12.5	5.7	36.9	-0.2	10.0
1-Feb-01	11:10:00	12.9	5.4	36.1	0.2	8.3
1-Feb-01	11:11:00	13.2	5.1	39.9	0.2	6.7
1-Feb-01	11:12:00	13.5	4.9	44.9	-0.3	6.0
1-Feb-01	11:13:00	13.8	4.7	44.3	-0.8	5.1
1-Feb-01	11:14:00	14.1	4.5	43.8	-1.1	4.1
1-Feb-01	11:15:00	13.2	5.4	39.2	-1.2	3.2
1-Feb-01	11:16:00	9.2	8.9	180.0	-1.1	2.7
1-Feb-01	11:17:00	11.3	6.8	96.5	-1.0	2.8
1-Feb-01	11:18:00	11.6	6.4	57.3	-0.7	3.9
1-Feb-01	11:19:00	12.5	5.7	36.6	-0.4	3.9
1-Feb-01	11:20:00	12.9	5.4	38.0	-0.5	3.5
1-Feb-01	11:21:00	13.3	5.1	43.9	-0.6	3.2

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

Run 2

Date	Time	O2	CO2	NOx	CO	SO2
1-Feb-01	11:22:00	13.7	4.8	42.8	-1.0	2.8
1-Feb-01	11:23:00	13.9	4.6	40.6	-1.0	2.4
1-Feb-01	11:24:00	14.1	4.5	40.9	-1.0	2.2
1-Feb-01	11:25:00	14.2	4.3	40.2	-1.0	2.0
1-Feb-01	11:26:00	14.6	4.2	38.7	-1.0	1.8
1-Feb-01	11:27:00	9.7	8.5	59.1	-1.0	1.6
1-Feb-01	11:28:00	8.1	9.2	113.0	-0.8	1.7
1-Feb-01	11:29:00	9.5	8.1	120.7	-0.9	5.6
1-Feb-01	11:30:00	10.2	7.6	114.8	-1.0	7.5
1-Feb-01	11:31:00	11.1	6.9	95.5	-1.0	7.1
1-Feb-01	11:32:00	11.5	6.6	79.9	-0.7	6.0
1-Feb-01	11:33:00	11.6	6.5	69.1	-0.3	4.7
1-Feb-01	11:34:00	11.6	6.5	60.2	0.2	3.9
1-Feb-01	11:35:00	12.0	6.2	49.3	0.8	3.6
1-Feb-01	11:36:00	12.0	6.2	41.3	1.2	3.4
1-Feb-01	11:37:00	12.4	5.9	39.3	1.1	3.2
1-Feb-01	11:38:00	12.3	5.9	43.5	0.6	2.9
1-Feb-01	11:39:00	12.5	5.8	45.4	0.0	2.6
1-Feb-01	11:40:00	12.9	5.4	45.1	-0.5	2.3
1-Feb-01	11:41:00	13.3	5.1	46.6	-0.8	2.0
Average		11.9	6.2	62.7	-0.5	4.2

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

Run 3

Date	Time	O2	CO2	NOx	CO	SO2
2-Feb-01	9:48:00	8.0	9.0	90.0	-0.4	1.1
2-Feb-01	9:49:00	11.0	6.7	45.5	-0.4	1.6
2-Feb-01	9:50:00	12.5	5.6	39.6	-0.5	1.6
2-Feb-01	9:51:00	13.1	5.1	38.3	-0.6	1.4
2-Feb-01	9:52:00	13.7	4.7	36.8	-0.5	1.2
2-Feb-01	9:53:00	13.9	4.5	36.2	-0.5	1.0
2-Feb-01	9:54:00	14.0	4.8	40.0	0.0	1.0
2-Feb-01	9:55:00	14.3	4.8	40.0	0.0	1.0
2-Feb-01	9:56:00	14.4	4.4	35.0	0.0	1.0
2-Feb-01	9:57:00	13.8	7.6	55.0	0.0	2.0
2-Feb-01	9:58:00	13.8	9.6	75.0	0.0	2.0
2-Feb-01	9:59:00	10.0	8.0	90.0	0.0	2.0
2-Feb-01	10:00:00	10.0	6.4	70.0	0.0	1.5
2-Feb-01	10:01:00	10.3	5.2	50.0	0.0	1.5
2-Feb-01	10:02:00	10.5	4.8	35.0	0.0	1.5
2-Feb-01	10:03:00	12.0	4.4	40.0	0.0	1.5
2-Feb-01	10:04:00	12.8	6.0	45.0	0.0	1.5
2-Feb-01	10:05:00	13.5	10.4	40.0	0.0	1.5
2-Feb-01	10:06:00	14.0	8.4	35.0	0.0	1.5
2-Feb-01	10:07:00	13.8	6.4	105.0	0.0	1.5
2-Feb-01	10:08:00	6.5	6.4	110.0	0.0	1.5
2-Feb-01	10:09:00	10.8	6.0	100.0	0.0	1.5
2-Feb-01	10:10:00	11.8	5.6	60.0	0.0	1.5
2-Feb-01	10:11:00	12.0	5.2	55.0	0.0	1.5
2-Feb-01	10:12:00	12.0	8.0	45.0	0.0	1.5
2-Feb-01	10:13:00	12.3	8.0	40.0	0.0	1.5
2-Feb-01	10:14:00	13.0	7.6	40.0	0.0	1.5
2-Feb-01	10:15:00	13.5	8.4	40.0	0.0	1.5
2-Feb-01	10:16:00	13.3	6.8	35.0	0.0	1.5
2-Feb-01	10:17:00	10.0	6.8	100.0	0.0	1.5
2-Feb-01	10:18:00	10.3	6.4	100.0	0.0	2.0
2-Feb-01	10:19:00	8.3	6.4	95.0	0.0	2.0
2-Feb-01	10:20:00	10.8	6.0	95.0	0.0	2.0
2-Feb-01	10:21:00	11.0	6.0	80.0	0.0	2.0
2-Feb-01	10:22:00	11.5	5.6	45.0	0.0	2.0
2-Feb-01	10:23:00	11.5	4.8	40.0	0.0	2.0
2-Feb-01	10:24:00	12.0	9.2	45.0	0.0	1.5
2-Feb-01	10:25:00	12.3	7.2	50.0	0.0	1.5
2-Feb-01	10:26:00	12.5	8.0	50.0	0.0	1.5
2-Feb-01	10:27:00	8.3	7.2	150.0	0.0	1.0

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

CEM Responses

Run 3

Date	Time	O2	CO2	NOx	CO	SO2
2-Feb-01	10:28:00	9.8	5.2	200.0	0.0	2.0
2-Feb-01	10:29:00	9.5	4.8	135.0	0.0	3.0
2-Feb-01	10:30:00	10.3	8.8	125.0	0.0	3.0
2-Feb-01	10:31:00	11.0	9.6	85.0	0.0	2.5
2-Feb-01	10:32:00	12.5	8.8	65.0	0.0	2.0
2-Feb-01	10:33:00	8.5	8.0	50.0	0.5	1.5
2-Feb-01	10:34:00	6.8	6.8	35.0	1.0	1.5
2-Feb-01	10:35:00	9.0	6.0	40.0	0.5	1.0
2-Feb-01	10:36:00	10.0	5.6	40.0	0.0	2.0
2-Feb-01	10:37:00	11.0	5.2	145.0	0.0	2.0
2-Feb-01	10:38:50	9.1	8.3	120.4	-0.1	2.1
2-Feb-01	10:39:50	10.4	7.4	107.6	0.0	2.2
2-Feb-01	10:40:50	11.2	6.7	84.6	-0.2	2.1
2-Feb-01	10:41:50	11.9	6.2	63.3	-0.2	2.0
2-Feb-01	10:42:50	12.4	5.8	38.9	0.0	1.8
2-Feb-01	10:43:50	12.5	5.7	32.3	0.2	1.6
2-Feb-01	10:44:50	12.7	5.5	40.8	0.2	1.5
2-Feb-01	10:45:50	13.0	5.3	45.7	0.1	1.3
2-Feb-01	10:46:50	13.3	5.0	48.6	0.0	1.4
2-Feb-01	10:47:50	13.8	4.7	46.0	-0.2	1.3
Average		11.5	6.5	66.1	0.0	1.7

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Oxygen Analyzer Drift Calculations and Gas Corrections

1-Feb-01

Calibration Gases	System Calibration	Direct Calibration
0.0 %	0.1	0.0
12.53 %	12.4	12.5
22.4 %		22.5

Correlation	1.000000	Correlation	0.99999
Slope	0.981644	Slope	1.004162
Intercept	0.100000	Intercept	-0.025126

Sampling System Bias	Calibration Error
0.40%	0.00%
0.40%	0.12%
	0.40%

Pre Cal 0.1
 12.4

Run 1	11.9	Corrected	12.0 % O ₂

Post Cal 0.1 Drift 0.00%
 12.5 0.40%

Run 2	11.9	Corrected	12.2 % O ₂

Post Cal 0.10 Drift 0.00%
 12.10 1.60%

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Oxygen Analyzer Drift Calculations and Gas Corrections

2-Feb-01

Calibration Gases	System Calibration	Direct Calibration
0.0 %	0.0	0.0
12.53 %	12.1	12.5
22.4 %		22.4

Correlation 1.000000
Slope 0.965682
Intercept 0.000000

Correlation 0.999999
Slope 0.999894
Intercept -0.008771

Sampling System Bias
0.00%
1.60%

Calibration Error
0.00%
0.12%
0.00%

Pre Cal 0.0
 12.1

Run 3	11.5	Corrected	11.8 % O ₂

Post Cal 0.1 Drift 0.40%
 12.3 0.80%

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Carbon Dioxide Analyzer Drift Calculations and Gas Corrections

1-Feb-01

Calibration Gases	System Calibration
0.0 %	1.0
10.04 %	10.1
22.4 %	

Direct Calibration
0.0
10.1
22.4

Correlation	1.000000
Slope	0.906375
Intercept	1.000000

Correlation	0.999995
Slope	0.999816
Intercept	0.021993

Sampling System Bias
4.00%
0.00%

Calibration Error
0.00%
0.24%
0.00%

Pre Cal	0.0
	10.1

Run 1	6.1	Corrected	6.0 % CO ₂

Post Cal	0.1	Drift	0.40%
	10.2		0.40%

Run 2	6.2	Corrected	6.1 % CO ₂

Post Cal	0.20	Drift	0.40%
	10.00		0.80%

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Carbon Dioxide Analyzer Drift Calculations and Gas Corrections

2-Feb-01

Calibration Gases	System Calibration
0.0 %	0.1
10.04 %	9.9
22.4 %	

Direct Calibration
0.0
10.1
22.3

Correlation	1.000000
Slope	0.976096
Intercept	0.100000
Sampling System Bias	
	0.40%
	0.80%

Correlation	0.999985
Slope	0.995214
Intercept	0.038422
Calibration Error	
	0.00%
	0.24%
	0.40%

Pre Cal 0.1
 9.9

Run 3	6.5	Corrected	6.5 % CO ₂

Post Cal 0.3 Drift 0.80%
 10.0 0.40%

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Nitrogen Oxides Analyzer Drift Calculations and Gas Corrections

1-Feb-01

Calibration Gases	System Calibration	Direct Calibration
0.0 ppm	-0.5	0.2
254.1 ppm	248.2	252.7
472.4 ppm		472.9

Correlation	1.000000
Slope	0.978749
Intercept	-0.500000

Sampling System Bias
0.14%
0.90%

Correlation	0.999991
Slope	1.000447
Intercept	-0.341592

Calibration Error
0.04%
0.28%
0.10%

Pre Cal	-0.5
	248.2

Run 1	63.3	Corrected	65.3 ppm NO _x

Post Cal	-0.4	Drift	0.02%
	247.4		0.16%

Run 2	62.7	Corrected	62.4 ppm NO _x

Post Cal	4.90	Drift	1.06%
	249.30		0.38%

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Nitrogen Oxides Analyzer Drift Calculations and Gas Corrections

2-Feb-01

Calibration Gases	System Calibration
0.0 ppm	-0.1
254.1 ppm	249.9
472.4 ppm	

Direct Calibration
-0.4
472.3
253.5

Correlation	1.000000
Slope	0.983865
Intercept	-0.100000
Sampling System Bias	
0.06%	
44.48%	

Correlation	0.573006
Slope	0.573348
Intercept	102.9543
Calibration Error	
0.08%	
43.64%	
43.78%	

Pre Cal -0.1
 249.9

Run 3	66.1	Corrected	67.6 ppm NO _x

Post Cal -0.4 Drift 0.06%
 248.5 0.28%

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Carbon Monoxide Analyzer Drift Calculations and Gas Corrections

1-Feb-01

Calibration Gases	System Calibration
0.0 ppm	2.1
30.2 ppm	29.1
59.5 ppm	
89.7 ppm	

Direct Calibration
-0.4
30.0
60.0
90.7

Correlation 1.000000
Slope 0.894040
Intercept 2.100000

Sampling System Bias
2.50%
0.90%

Correlation 0.999995
Slope 1.016406
Intercept -0.510816

Calibration Error
0.40%
0.20%
0.50%
1.00%

Pre Cal 2.1
29.1

Run 1	0.4	Corrected	-0.8 ppm CO

Post Cal 0.1 Drift 2.00%
26.5 2.60%

Run 2	-0.5	Corrected	-0.7 ppm CO

Post Cal 0.10 Drift 0.00%
26.50 0.00%

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Carbon Monoxide Analyzer Drift Calculations and Gas Corrections

2-Feb-01

Calibration Gases	System Calibration	Direct Calibration
0.0 ppm	-0.5	0.8
30.2 ppm	29.7	30.7
59.5 ppm		60.9
89.7 ppm		90.9

Correlation	1.000000	Correlation	0.99997
Slope	1.000000	Slope	1.006991
Intercept	-0.500000	Intercept	0.661463

Sampling System Bias	Calibration Error
1.30%	0.80%
1.00%	0.50%
	1.40%
	1.20%

Pre Cal -0.5
 29.7

Run 3	0.0	Corrected	0.0 ppm CO

Post Cal 0.4 Drift 0.90%
 30.4 0.70%

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Sulfur Dioxide Analyzer Drift Calculations and Gas Corrections

1-Feb-01

Calibration Gases	System Calibration	Direct Calibration
0.0 ppm	2.1	-0.2
45.1 ppm	41.2	44.9
91.7 ppm		92.1

Correlation	1.000000	Correlation	0.999993
Slope	0.866962	Slope	1.006578
Intercept	2.100000	Intercept	-0.299964

Sampling System Bias	Calibration Error
2.30%	0.20%
3.70%	0.20%
	0.40%

Pre Cal 2.1
 41.2

Run 1	1.6	Corrected	-0.6 ppm SO ₂

Post Cal 2.2 Drift 0.10%
 41.0 0.20%

Run 2	4.2	Corrected	2.1 ppm SO ₂

Post Cal 2.60 Drift 0.40%
 41.20 0.20%

Malcolm Grow Medical Center - Andrews AFB, MD

Medical Waste Incinerator

Sulfur Dioxide Analyzer Drift Calculations and Gas Corrections

2-Feb-01

Calibration Gases	System Calibration
0.0 ppm	3.0
45.1 ppm	41.3
91.7 ppm	

Direct Calibration
0.1
45.1
91.5

Correlation	1.000000
Slope	0.849224
Intercept	3.000000
Sampling System Bias	
	2.90%
	3.80%

Correlation	1
Slope	0.996723
Intercept	0.116107
Calibration Error	
	0.10%
	0.00%
	0.20%

Pre Cal 3.0
 41.3

Run 3	1.7	Corrected	-2.0 ppm SO ₂

Post Cal 3.7 Drift 0.70%
 41.0 0.30%

Appendix B.5
Raw Field Data
Visible Emissions (M9)

VISIBLE EMISSIONS EVALUATOR

This is to certify that

Bill Dunstan, Jr.

met the specifications of Federal Reference Method 9 and qualified as a visible emissions evaluator.

Maximum deviation on white and black smoke did not exceed 7.5% opacity and no single error exceeding 15% opacity was incurred during the certification test conducted by Eastern Technical Associates of Raleigh, North Carolina. This certificate is valid for six months from date of issue.

281351

Certificate Number

Springfield, Virginia

Location

October 18, 2000

Date of Issue

Thomas Hore

President

Michael W. Langford

Director of Training

**6-MINUTE AVERAGES
ANDREWS AFB, MD
HOSPITAL INCINERATOR, BUILDING 1055**

2/1/01, 1440-1510	
six-minute interval	six-minute average
0-6	0
6-12	0
12-18	0
18-24	0
24-30	0
Total Avg.	0

2/1/01, 1610-1640	
six-minute interval	six-minute average
90-96	0
96-102	0
102-108	0
108-114	0
114-120	0
Total Avg.	0

2/2/01, 945-1015	
six-minute interval	six-minute average
0-6	0
6-12	0
12-18	0
18-24	0
24-30	0
Total Avg.	0

2/2/01, 1255-1325	
six-minute interval	six-minute average
90-96	0
96-102	0
102-108	0
108-114	0
114-120	0
Total Avg.	0

2/1/01, 1510-1540	
six-minute interval	six-minute average
30-36	0
36-42	0
42-48	0
48-54	0
54-60	0
Total Avg.	0

2/2/01, 1015-1045	
six-minute interval	six-minute average
30-36	0
36-42	0
42-48	0
48-54	0
54-60	0
Total Avg.	0

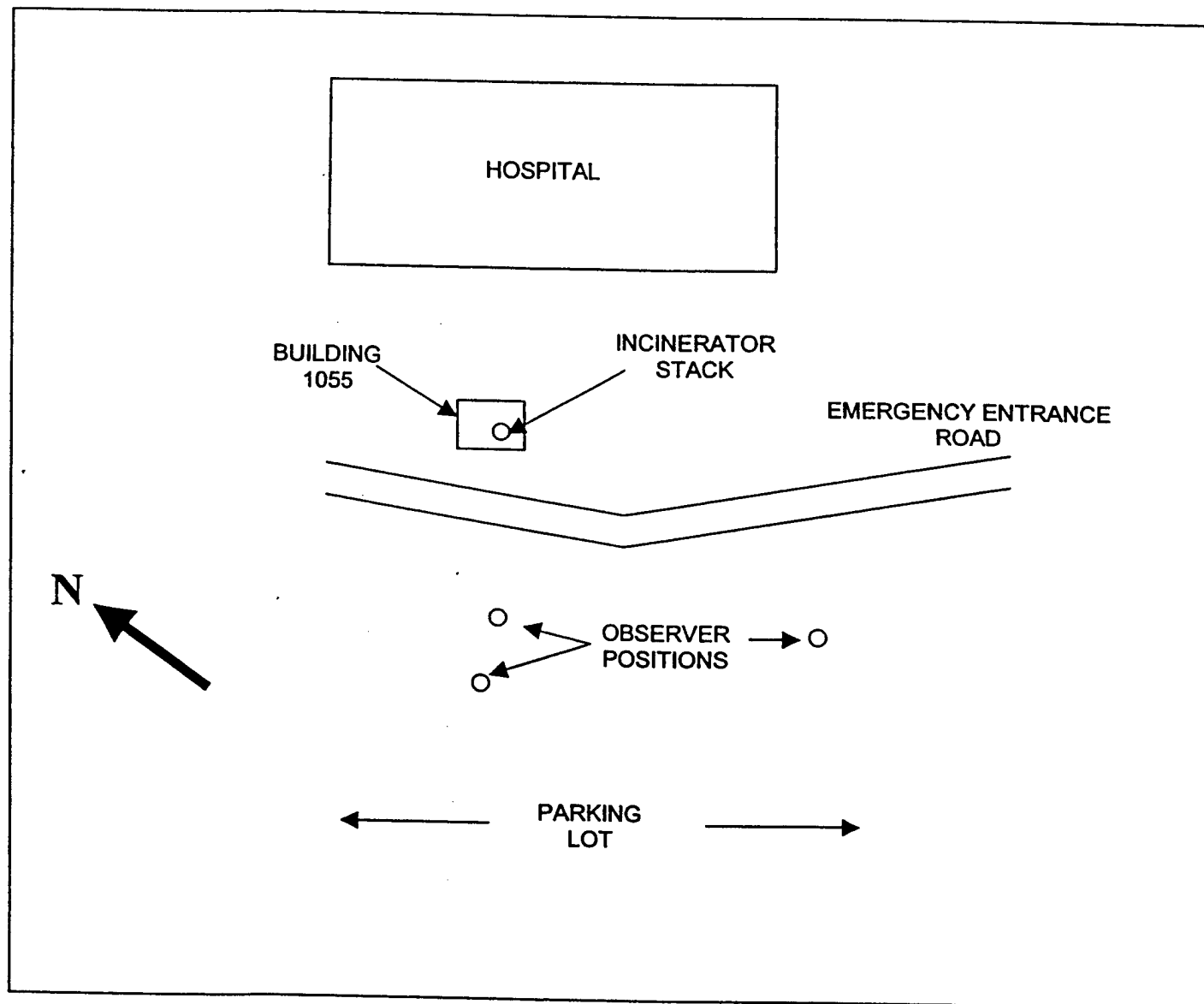
2/2/01, 1405-1435	
six-minute interval	six-minute average
120-126	0
126-132	0
132-138	0
138-144	0
144-150	0
Total Avg.	0

2/1/01, 1540-1610	
six-minute interval	six-minute average
60-66	0
66-72	0
72-78	0
78-84	0
84-90	0
Total Avg.	0

2/2/01, 1225-1255	
six-minute interval	six-minute average
60-66	0
66-72	0
72-78	0
78-84	0
84-90	0
Total Avg.	0

2/2/01, 1435-1505	
six-minute interval	six-minute average
150-156	0
156-162	0
162-168	0
168-174	0
174-180	0
Total Avg.	0

ANDREWS AFB, MD
HOSPITAL WASTE INCINERATOR – BUILDING 1055



VISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One) Method 9 203A 203B Other: _____

Company Name Andrews AFB
 Facility Name Hospital Incinerator - Bldg. 1055
 Street Address _____
 City Andrews AFB State MD Zip _____

Process waste incineration Unit # _____ Operating Mode _____
 Control Equipment scrubber Operating Mode _____

Describe Emission Point southernmost stack
 Height of Emiss. Pt. Start 30' End same Height of Emiss. Pt. Rel. to Observer Start 25' End same
 Distance to Emiss. Pt. Start 60' End same Direction to Emiss. Pt. (Degrees) Start 35° NE End same

Vertical Angle to Obs. Pt. Start 20' End same Direction to Obs. Pt. (Degrees) Start 35° NE End same
 Distance and Direction to Observation Point from Emission Point Start 15' above End same

Describe Emissions Start none (steam) End same
 Emission Color _____ Water Droplet Plume _____
 Start _____ End same Attached ☒ Detached ☐ None ☐

Describe Plume Background Start sky End same
 Background Color blue-gray Sky Conditions Start cloudy End same
 Wind Speed Start 1-3 End same Wind Direction Start NE End same
 Ambient Temp. _____ Wet Bulb Temp. _____ RH Percent _____

Source Layout Sketch

 Draw North Arrow ☐ TN ☐ MN
 Scale View
 Stack With Plume
 Sun
 Wind
 Longitude _____ Latitude _____ Destination _____

Additional Information _____

Form Number _____ Page _____ Of _____
 Continued on VEO Form Number _____

Observation Date		Time Zone		Start Time	End Time
2/11/01		EST		1440	1510
Sec	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print) Bill Dunstan Jr.
 Observer's Signature William Dunstan Jr. Date 2/11/01
 Organization Pacific Environmental Services
 Certified By Eastern Technical Associates Date 10/18/00

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One)
 Method 9 203A 203B Other: _____

Company Name
 Andrews AFB
 Facility Name
 Hospital Incinerator - Bldg. 1055
 Street Address
 City
 Andrews AFB State MD Zip

Process
 Waste incineration Unit # Operating Mode
 Control Equipment
 Scrubber Operating Mode

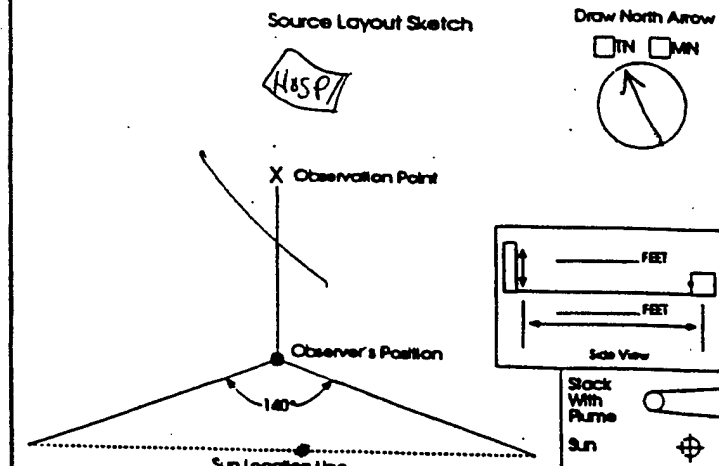
Describe Emission Point
 Southernmost stack

Height of Emiss. Pt.
 Start 30' End Same
 Distance to Emiss. Pt.
 Start 60' End Same
 Height of Emiss. Pt. Rel. to Observer
 Start 25' End Same
 Direction to Emiss. Pt. (Degrees)
 Start 35 NE End Same

Vertical Angle to Obs. Pt.
 Start 20° End Same
 Distance and Direction to Observation Point from Emission Point
 Start 15' above End Same
 Direction to Obs. Pt. (Degrees)
 Start 35 NE End Same

Describe Emissions
 Start none (steam) End Same
 Emission Color
 Start Water Droplet Plume
 Attached ☒ Detached ☐ None ☐

Describe Plume Background
 Start Sky End Same
 Background Color
 Start blue gray End Same
 Wind Speed
 Start 1-3 End Same
 Ambient Temp.
 Start Wind Direction
 Start NE End Same
 Wet Bulb Temp.
 RH Percent

Source Layout Sketch
 Draw North Arrow
☐ TN ☐ MN

 Longitude Latitude Declination

Additional Information

VEOF1.1

Form Number _____ Page _____ Or _____
 Continued on VEO Form Number _____

Observation Date		Time Zone		Start Time	End Time	
2/1/01		EST		1510	1540	
Sec	Min	0	15	30	45	Comments
1	0	0	0	0		
2	0	0	0	0		
3	0	0	0	0		
4	0	0	0	0		
5	0	0	0	0		
6	0	0	0	0		
7	0	0	0	0		
8	0	0	0	0		
9	0	0	0	0		
10	0	0	0	0		
11	0	0	0	0		
12	0	0	0	0		
13	0	0	0	0		
14	0	0	0	0		
15	0	0	0	0		
16	0	0	0	0		
17	0	0	0	0		
18	0	0	0	0		
19	0	0	0	0		
20	0	0	0	0		
21	0	0	0	0		
22	0	0	0	0		
23	0	0	0	0		
24	0	0	0	0		
25	0	0	0	0		
26	0	0	0	0		
27	0	0	0	0		
28	0	0	0	0		
29	0	0	0	0		
30	0	0	0	0		

Observer's Name (Print)
 Bill Dunstan Jr.
 Observer's Signature
 William Dunstan Jr.
 Organization
 Pacific Environmental Services
 Certified By
 Eastern Technical Associates
 Date
 2/1/01
 10/18/00

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One) Method 9 203A 203B Other: _____

Company Name Andrews AFB
 Facility Name Hospital Incinerator - Bldg. 1055
 Street Address _____
 City Andrews AFB State MD Zip _____

Process waste incineration Unit # _____ Operating Mode _____
 Control Equipment Scrubber Operating Mode _____

Describe Emission Point Southernmost stack

Height of Emiss. Pt. Start 30' End same Height of Emiss. Pt. Rel. to Observer Start 25' End same
 Distance to Emiss. Pt. Start 80' End same Direction to Emiss. Pt. (Degrees) Start 30° NE End same

Vertical Angle to Obs. Pt. Start 20° End same Direction to Obs. Pt. (Degrees) Start 30° NE End same
 Distance and Direction to Observation Point from Emission Point Start 15' above End same

Describe Emissions Start White (Steam) End same
 Emission Color Start _____ End same Water Droplet Plume Attached ☒ Detached ☐ None ☐

Describe Plume Background Start sky End same
 Background Color Start blue-gray End same Sky Conditions Start f. cloudy End same
 Wind Speed Start 1-3 End same Wind Direction Start NE End same
 Ambient Temp. Start _____ End same Wet Bulb Temp. _____ RH Percent _____

Source Layout Sketch

Draw North Arrow ☐ TN ☐ MN

Observer's Position

Stack With Plume

Sun

Wind

Longitude _____ Latitude _____ Declination _____

Additional Information _____

Form Number: _____ Page _____ Of _____
 Continued on VEO Form Number _____

Observation Date	Time Zone	Start Time	End Time	Comments	
2/1/01	EST	1540	1610		
Sec Min	0	15	30	45	
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print) Bill Dunstan, Jr.
 Observer's Signature William Dunstan, Jr. Date 2/1/01
 Organization Pacific Environmental Services
 Certified By Eastern Technical Associates Date 10/18/00

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One)
 Method 9 203A 203B Other: _____

Company Name
 Andrews AFB
 Facility Name
 Hospital Incinerator - Bldg. 1055
 Street Address
 City
 Andrews AFB State MD Zip

Process
 Waste incineration Unit # Operating Mode
 Control Equipment
 Scrubber Operating Mode

Describe Emission Point
 Southernmost stack

Height of Emiss. Pt.
 Start 30' End Same
 Height of Emiss. Pt. Rel. to Observer
 Start 25' End Same
 Distance to Emiss. Pt.
 Start 80' End Same
 Direction to Emiss. Pt. (Degrees)
 Start 30° NE End Same

Vertical Angle to Obs. Pt.
 Start 20° End Same
 Direction to Obs. Pt. (Degrees)
 Start 30° NE End Same
 Distance and Direction to Observation Point from Emission Point
 Start 15' above End Same

Describe Emissions
 Start None (Steam) End Same
 Emission Color
 Start — End Same
 Attached ☒ Detached ☐ None ☐

Describe Plume Background
 Start Sky End Same
 Background Color
 Start Blue-gray End Same
 Sky Conditions
 Start Partly cloudy End Same
 Wind Speed
 Start 1-3 End Same
 Wind Direction
 Start NE End Same
 Ambient Temp.
 Start — End Same
 Wet Bulb Temp.
 Start — End Same
 RH Percent
 Start — End Same

Source Layout Sketch

Draw North Arrow
☐ TN ☐ MN

Observer's Position

Stack With Plume

Sun Location Line

Scale View

FEET

FEET

Sun

Wind

Longitude Latitude Destination

Additional Information

VEOF1.1

Form Number _____ Page _____ Or _____
 Continued on VEO Form Number _____

Observation Date		Time Zone			Start time	End time
2/1/01		EST			1618	1640
Sec Min	0	15	30	45	Comments	
1	0	0	0	0		
2	0	0	0	0		
3	0	0	0	0		
4	0	0	0	0		
5	0	0	0	0		
6	0	0	0	0		
7	0	0	0	0		
8	0	0	0	0		
9	0	0	0	0		
10	0	0	0	0		
11	0	0	0	0		
12	0	0	0	0		
13	0	0	0	0		
14	0	0	0	0		
15	0	0	0	0		
16	0	0	0	0		
17	0	0	0	0		
18	0	0	0	0		
19	0	0	0	0		
20	0	0	0	0		
21	0	0	0	0		
22	0	0	0	0		
23	0	0	0	0		
24	0	0	0	0		
25	0	0	0	0		
26	0	0	0	0		
27	0	0	0	0		
28	0	0	0	0		
29	0	0	0	0		
30	0	0	0	0		

Observer's Name (Print)
 Bill Dunstan Jr.
 Observer's Signature
 William Dunstan Jr.
 Organization
 Pacific Environmental Services
 Certified By
 Eastern Technical Associates
 Date
 2/1/01
 10/18/00

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One)
 Method 9 203A 203B Other: _____

Company Name Andrews AFB
 Facility Name Hospital Incinerator - Bldg. 1055
 Street Address _____
 City Andrews AFB State MD Zip _____

Process waste incineration Unit # _____ Operating Mode _____
 Control Equipment scrubber Operating Mode _____

Describe Emission Point southernmost stack
 Height of Emiss. Pt. Start 30' End same Height of Emiss. Pt. Rel. to Observer Start 25' End same
 Distance to Emiss. Pt. Start 100' End same Direction to Emiss. Pt. (Degrees) Start 344°NW End same

Vertical Angle to Obs. Pt. Start 20' End same Direction to Obs. Pt. (Degrees) Start 10NE End same
 Distance and Direction to Observation Point from Emission Point Start 20-30' E End same

Describe Emissions Start hike (steam) End same
 Emission Color _____ Water Droplet Pume Attached ☒ Detached ☐ None ☐

Describe Plume Background Start sky End same
 Background Color _____ Sky Conditions Start p. cloudy End same
 Wind Speed Start 1-3 End same Wind Direction Start E End same
 Ambient Temp. Start 10°C End same Wet Bulb Temp. _____ RH Percent _____

Source Layout Sketch

Observer's Position

Observation Point

Sun Location Line

Stack With Plume

Sun

Wind

Longitude _____ Latitude _____ Declination _____

Additional Information _____

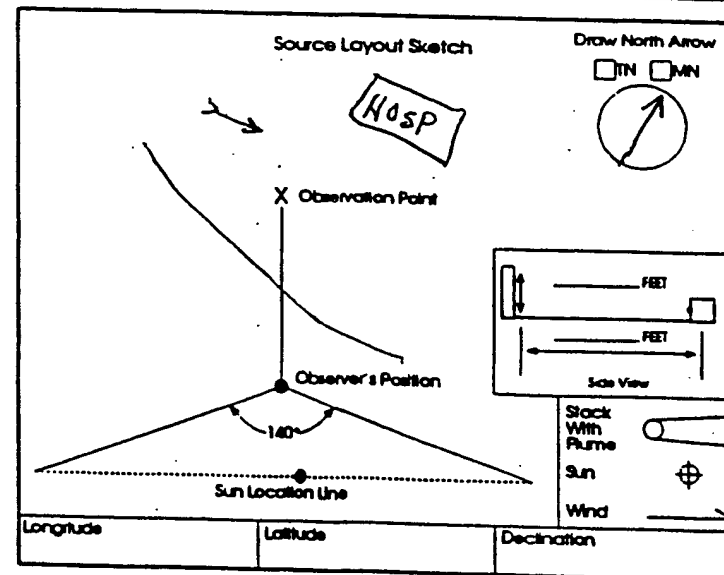
Form Number _____ Page _____ Or _____
 Continued on VEO Form Number _____

Observation Date		Time Zone		Start time	End time
2/2/01		EST		945	1015
Sec Min	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print) Bill Dunstan Jr.
 Observer's Signature William Dunstan Jr. Date 2/2/01
 Organization Pacific Environmental Services
 Certified By Eastern Technical Associates Date 10/18/2000

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One)
Method 9 203A 2038 Other: _____Company Name
Andrews AFB
Facility Name
Hospital Incinerator - Bldg. 1055
Street Address
City
Andrews AFB State MD ZipProcess
waste incineration Unit # Operating Mode
Control Equipment
Scrubber Operating ModeDescribe Emission Point
Southernmost stackHeight of Emiss. Pt.
Start 30' End Same Height of Emiss. Pt. Rel. to Observer
Start 25' End Same
Distance to Emiss. Pt.
Start 100' End Same Direction to Emiss. Pt. (Degrees)
Start 344°NW End SameVertical Angle to Obs. Pt.
Start 20° End Same Direction to Obs. Pt. (Degrees)
Start 10°NE End Same
Distance and Direction to Observation Point from Emission Point
Start 20-30° E End SameDescribe Emissions
Start none (steam) End Same
Emission Color
Start — End Same Water Droplet Plume
Attached ☒ Detached ☐ None ☐Describe Plume Background
Start sky End Same
Background Color
Start blue/white End Same Sky Conditions
Start p. cloudy End Same
Wind Speed
Start 1-3 End Same Wind Direction
Start E End Same
Ambient Temp.
Start 9°C End Same Wet Bulb Temp. RH Percent

Additional Information

Form Number _____ Page _____
Continued on VEO Form Number _____

Observation Date		Time Zone			Start time	End Time
2/2/01		EST			1015	1045
Sec Min	0	15	30	45	Comments	
1	0	0	0	0		
2	0	0	0	0		
3	0	0	0	0		
4	0	0	0	0		
5	0	0	0	0		
6	0	0	0	0		
7	0	0	0	0		
8	0	0	0	0		
9	0	0	0	0		
10	0	0	0	0		
11	0	0	0	0		
12	0	0	0	0		
13	0	0	0	0		
14	0	0	0	0		
15	0	0	0	0		
16	0	0	0	0		
17	0	0	0	0		
18	0	0	0	0		
19	0	0	0	0		
20	0	0	0	0		
21	0	0	0	0		
22	0	0	0	0		
23	0	0	0	0		
24	0	0	0	0		
25	0	0	0	0		
26	0	0	0	0		
27	0	0	0	0		
28	0	0	0	0		
29	0	0	0	0		
30	0	0	0	0		

Observer's Name (Print)
Bill Dunstan, Jr.
Observer's Signature
William Dunstan, Jr.
Date
2/2/01
Organization
Pacific Environmental Services
Certified By
Eastern Technical Associates
Date
10/18/00

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One)
 Method 9 203A 203B Other: _____

Company Name
 Facility Name
 Street Address
 City State Zip
 Andrews AFB MD 20

Process
 Control Equipment
 Unit #
 Operating Mode
 Waste incineration
 Scrubber

Describe Emission Point
 Southernmost stack
 Height of Emiss. Pt.
 Start 30' End Same
 Distance to Emiss. Pt.
 Start 80' End Same
 Height of Emiss. Pt. Rel. to Observer
 Start 25' End Same
 Direction to Emiss. Pt. (Degrees)
 Start 30°NE End Same

Vertical Angle to Obs. Pt.
 Start 20' End Same
 Direction to Obs. Pt. (Degrees)
 Start 45°NE End Same
 Distance and Direction to Observation Point from Emission Point
 Start 15'E End Same

Describe Emissions
 Start none (steam) End Same
 Emission Color
 Start — End Same
 Water Droplet Plume
 Attached ☒ Detached ☐ None ☐

Describe Plume Background
 Start sky End Same
 Background Color
 Start blue End Same
 Wind Speed
 Start 1-3 End Same
 Wind Direction
 Start E End Same
 Ambient Temp.
 Start 11°C End Same
 Sky Conditions
 Start P. cloudy End Same
 Wet Bulb Temp.
 RH Percent

Source Layout Sketch
 HOSP
 X Observation Point
 Observer's Position
 Sun Location Line
 140°
 Draw North Arrow
☐ TN ☐ MN
 Scale View
 Feet
 Feet
 Stack With Plume
 Sun
 Wind

Additional Information

Form Number: _____ Page _____ Of _____
 Continued on VEO Form Number: _____

Observation Date	Time Zone	Start Time	End Time		
2/2/01	EST	1225	1255		
Sec	0	15	30	45	Comments
Min	0	0	0	0	
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print)
 Bill Dunstan Jr.
 Observer's Signature
 William Dunstan Jr.
 Organization
 Pacific Environmental Services
 Certified By
 Eastern Technical Associates
 Date
 2/2/01
 Date
 2/18/00

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One)
 Method 203A 203B Other: _____

Company Name Andrews AFB
 Facility Name Hospital Incinerator - Bldg. 1055
 Street Address _____
 City Andrews AFB State MD Zip _____

Process Waste incineration Unit # _____ Operating Mode _____
 Control Equipment Scrubber Operating Mode _____

Describe Emission Point Southernmost stack

Height of Emiss. Pt. Start 30' End Same Height of Emiss. Pt. Rel. to Observer Start 25' End Same
 Distance to Emiss. Pt. Start 80' End Same Direction to Emiss. Pt. (Degrees) Start 30°NE End Same

Vertical Angle to Obs. Pt. Start 20° End Same Direction to Obs. Pt. (Degrees) Start 45°NE End Same
 Distance and Direction to Observation Point from Emission Point Start 15' E End Same

Describe Emissions
 Start None (Steam) End Same
 Emission Color _____ Water Droplet Plume
 Start _____ End Same Attached ☒ Detached ☐ None ☐

Describe Plume Background
 Start SKY End Same
 Background Color _____ Sky Conditions
 Start Blue End Same Start Pt. cloudy End Same
 Wind Speed _____ Wind Direction
 Start 1-3 End Same Start E End Same
 Ambient Temp. _____ Wet Bulb Temp. _____ RH Percent
 Start 11°C End Same

Source Layout Sketch

 Draw North Arrow ☐ TN ☐ NW
 Longitude _____ Latitude _____ Declination _____

Additional Information _____

Form Number: _____ Page _____
 Continued on VEO Form Number: _____

Observation Date		Time Zone			Start time	End time
2/2/01		EST			1255	1325
Sec Min	0	15	30	45	Comments	
1	0	0	0	0		
2	0	0	0	0		
3	0	0	0	0		
4	0	0	0	0		
5	0	0	0	0		
6	0	0	0	0		
7	0	0	0	0		
8	0	0	0	0		
9	0	0	0	0		
10	0	0	0	0		
11	0	0	0	0		
12	0	0	0	0		
13	0	0	0	0		
14	0	0	0	0		
15	0	0	0	0		
16	0	0	0	0		
17	0	0	0	0		
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19	0	0	0	0		
20	0	0	0	0		
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22	0	0	0	0		
23	0	0	0	0		
24	0	0	0	0		
25	0	0	0	0		
26	0	0	0	0		
27	0	0	0	0		
28	0	0	0	0		
29	0	0	0	0		
30	0	0	0	0		

Observer's Name (Print) Bill Dunstan Jr.
 Observer's Signature William Dunstan Jr. Date 2/2/01
 Organization Pacific Environmental Services
 Certified By Eastern Technical Associates Date 10/18/00

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One)
 Method 9 203A 2038 Other: _____

Company Name Andrews AFB
 Facility Name Hospital Incinerator - Bldg. 1055
 Street Address _____
 City Andrews AFB State MD Zip _____

Process waste incineration Unit # _____ Operating Mode _____
 Control Equipment scrubber Operating Mode _____

Describe Emission Point
southernmost stack
 Height of Emiss. Pt. Start 30' End same Height of Emiss. Pt. Rel. to Observer Start 25' End same
 Distance to Emiss. Pt. Start 80' End same Direction to Emiss. Pt. (Degrees) Start 30° NE End same

Vertical Angle to Obs. Pt. Start 20° End same Direction to Obs. Pt. (Degrees) Start 45° NE End same
 Distance and Direction to Observation Point from Emission Point Start 15' E End same

Describe Emissions
 Start none (steam) End same
 Emission Color _____ Water Droplet Plume Attached ☒ Detached ☐ None ☐
 Start _____ End same

Describe Plume Background
 Start sky End same
 Background Color blue End same Sky Conditions Start partly cloudy End same
 Wind Speed Start 1-3 End same Wind Direction Start E End same
 Ambient Temp. Start 11°C End same Wet Bulb Temp. _____ RH Percent _____

Source Layout Sketch
 Draw North Arrow ☐ TN ☐ MN

 Longitude _____ Latitude _____ Declination _____

Additional Information

Form Number _____ Page _____ Of _____
 Continued on VEO Form Number _____

Observation Date	Time Zone	Start Time	End Time		
2/2/01	EST	1405	1435		
Sec Min	0	15	30	45	Comments
1	0	0	0	0	
2	0	0	0	0	
3	0	0	0	0	
4	0	0	0	0	
5	0	0	0	0	
6	0	0	0	0	
7	0	0	0	0	
8	0	0	0	0	
9	0	0	0	0	
10	0	0	0	0	
11	0	0	0	0	
12	0	0	0	0	
13	0	0	0	0	
14	0	0	0	0	
15	0	0	0	0	
16	0	0	0	0	
17	0	0	0	0	
18	0	0	0	0	
19	0	0	0	0	
20	0	0	0	0	
21	0	0	0	0	
22	0	0	0	0	
23	0	0	0	0	
24	0	0	0	0	
25	0	0	0	0	
26	0	0	0	0	
27	0	0	0	0	
28	0	0	0	0	
29	0	0	0	0	
30	0	0	0	0	

Observer's Name (Print) Bill Dunstan Jr.
 Observer's Signature William Dunstan Jr. Date 2/2/01
 Organization Pacific Environmental Services
 Certified by Eastern Technical Associates Date 10/18/00

EPA

VISIBLE EMISSION OBSERVATION FORM 1

Method Used (Circle One)
 Method 203A 203B Other: _____

Company Name Andrews AFB
 Facility Name Hospital Incinerator - Bldg. 1055
 Street Address _____
 City Andrews AFB State MD Zip _____

Process waste incineration Unit # _____ Operating Mode _____
 Control Equipment scrubber Operating Mode _____

Describe Emission Point southernmost stack

Height of Emiss. Pt. Start 30' End same Height of Emiss. Pt. Rel. to Observer Start 25' End same
 Distance to Emiss. Pt. Start 80' End same Direction to Emiss. Pt. (Degrees) Start 30° NE End same

Vertical Angle to Obs. Pt. Start 20' End same Direction to Obs. Pt. (Degrees) Start 45° NE End same
 Distance and Direction to Observation Point from Emission Point Start 15' E End same

Describe Emissions Start none (steam) End same
 Emission Color _____ Water Droplet Plume Attached ☒ Detached ☐ None ☐
 Start _____ End same

Describe Plume Background Start sky End same
 Background Color _____ Sky Conditions _____
 Start blue End same Start p. cloudy End same
 Wind Speed _____ Wind Direction _____
 Start 1-3 End same Start E End same
 Ambient Temp. _____ Wet Bulb Temp. _____ RH Percent _____
 Start 11°C End same

Source Layout Sketch

Draw North Arrow ☐ TN ☐ MN

Observer's Position

Sun Location Line

Stack With Plume

Sun

Wind

Longitude _____ Latitude _____ Declination _____

Additional Information _____

Form Number: _____ Page _____ Of _____
 Continued on VEO Form Number: _____

Observation Date		Time Zone				Start Time	End Time
2/2/01		EST				1435	1505
Sec	Min	0	15	30	45	Comments	
1	0	0	0	0			
2	0	0	0	0			
3	0	0	0	0			
4	0	0	0	0			
5	0	0	0	0			
6	0	0	0	0			
7	0	0	0	0			
8	0	0	0	0			
9	0	0	0	0			
10	0	0	0	0			
11	0	0	0	0			
12	0	0	0	0			
13	0	0	0	0			
14	0	0	0	0			
15	0	0	0	0			
16	0	0	0	0			
17	0	0	0	0			
18	0	0	0	0			
19	0	0	0	0			
20	0	0	0	0			
21	0	0	0	0			
22	0	0	0	0			
23	0	0	0	0			
24	0	0	0	0			
25	0	0	0	0			
26	0	0	0	0			
27	0	0	0	0			
28	0	0	0	0			
29	0	0	0	0			
30	0	0	0	0			

Observer's Name (Print) Bill Dunstan Jr.
 Observer's Signature William Dunstan Jr. Date 2/2/01
 Organization Pacific Environmental Services
 Certified by Eastern Technical Associates Date 10/18/00

APPENDIX C
ANALYTICAL DATA

Pacific Environmental Services

Appendix C.1
Analytical Data
Particulate Matter/Metals (M29)
Hydrogen Chloride (M26)



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

SAMPLE ANALYSIS FORM FOR FILTERABLE PARTICULATE

Plant: Andrews AFB MD Medical Waste Incinerator

Run ID: M29-1Sample Location: Incinerator OutletAnalytical Balance S/P 182 Lab Relative Humidity: 30%Amb. Temp. 75

RINSE CONTAINER ID: M29-1-AR				Rinse Beaker ID: 1	
Lab Added Vol., ml	<u>75</u>	Density of Acetone (ρ_a)	<u>0.7848</u>	g/ml	
Container Final Wt	<u>234.3</u>	Acetone Blank Concent (C_a)	<u>0.00000084</u>	g/g	ok
Container Initial Wt	<u>168.4</u>	Acetone Rinse Volume (V_{aw})	<u>159</u>	ml	
Net Volume Wt., g	65.9	$W_a = C_a V_{aw} \rho_a =$	0.00011	g	0.0001% ok
Weighing Date	2/8/01	Time	1645	Gross Wt	108.8239 g
Last Weighing Date	2/9/01	Time	0910	Gross Wt	108.8237 g
Average of 2 Consecutive Weighings Meeting Criteria				108.8238	g
Blank Beaker ID <u>4</u>		- Rinse Beaker Tare Wt		108.8209	g
Acetone Volume, ml <u>150.99</u>		- Acetone Blank (W_a)		<u>0.0001</u>	g
Acetone Residue, g <u>0.0001</u>		Weight in Acetone Rinse (m_a)		0.0028	g
				= Weight in Acetone Rinse (m_a)	2.79 mg

FILTER SAMPLE ID: M29-1-F				Filter/Container ID: 104-007	
Weighing Date	2/6/01	Time	1700	Gross Wt	34.5242 g
Last Weighing Date	2/7/01	Time	920	Gross Wt	34.5237 g
Average of 2 Consecutive Weighings Meeting Criteria				34.52395	g
- Filter & Container Tare Wt				<u>34.5204</u>	g
				= Weight on Filter (m_f)	0.00355 g
				= Weight on Filter (m_f)	3.55 mg

SUMMARY	Weight on Filter (m_f)	3.55	mg
	+ Weight in Acetone Rinse (m_a)	2.79	mg
	= Total Particulate (m_n)	6.34	mg

v1.0 10/15/00

Signature of Analyst _____

Signature of Reviewer _____



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

SAMPLE ANALYSIS FORM FOR FILTERABLE PARTICULATE

Plant: Andrews AFB MD Medical Waste Incinerator

Run ID: M29-2

Sample Location: Incinerator Outlet

Analytical Balance S/P 182 Lab Relative Humidity: 30%

Amb. Temp. 75

RINSE CONTAINER ID: M29-2-AR				Rinse Beaker ID: 2			
Lab Added Vol., ml	<u>75</u>	Density of Acetone (ρ_a)	<u>0.7848</u>	g/ml			
Container Final Wt	<u>252.4</u>	Acetone Blank Concent (C_a)	<u>0.00000084</u>	g/g		ok	
Container Initial Wt	<u>167.9</u>	Acetone Rinse Volume (V_{aw})	<u>182.7</u>	ml			
Net Volume Wt., g	<u>84.5</u>	$W_a = C_a V_{aw} \rho_a =$	<u>0.00012</u>	g		0.0001% ok	
Weighing Date	<u>2/8/01</u>	Time	<u>1645</u>	Gross Wt	<u>101.4551</u>	g	
Last Weighing Date	<u>2/9/01</u>	Time	<u>0910</u>	Gross Wt	<u>101.4551</u>	g	
Average of 2 Consecutive Weighings Meeting Criteria				<u>101.4551</u>	g		
Blank Beaker ID <u>4</u>		- Rinse Beaker Tare Wt		<u>101.4507</u>	g		
Acetone Volume, ml <u>150.99</u>		- Acetone Blank (W_a)		<u>0.0001</u>	g		
Acetone Residue, g <u>0.0001</u>		Weight in Acetone Rinse (m_a)		<u>0.0043</u>	g		
				= Weight in Acetone Rinse (m_a)	<u>4.28</u>	mg	

FILTER SAMPLE ID: M29-2-F				Filter/Container ID: 104-003			
Weighing Date	<u>2/6/01</u>	Time	<u>1700</u>	Gross Wt	<u>34.9589</u>	g	
Last Weighing Date	<u>2/7/01</u>	Time	<u>920</u>	Gross Wt	<u>34.9585</u>	g	
Average of 2 Consecutive Weighings Meeting Criteria				<u>34.9587</u>	g		
- Filter & Container Tare Wt				<u>34.888</u>	g		
= Weight on Filter (m_f)				<u>0.0707</u>	g		
= Weight on Filter (m_f)				<u>70.7</u>	mg		

SUMMARY	Weight on Filter (m_f)	<u>70.7</u>	mg
	+ Weight in Acetone Rinse (m_a)	<u>4.28</u>	mg
	= Total Particulate (m_n)	<u>75.0</u>	mg

v1.0 10/15/00

Signature of Analyst _____

Signature of Reviewer _____



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

SAMPLE ANALYSIS FORM FOR FILTERABLE PARTICULATE

Plant: Andrews AFB MD Medical Waste Incinerator

Run ID: **M29-3**

Sample Location: Incinerator Outlet

Analytical Balance S/P 182 Lab Relative Humidity: 30%

Amb. Temp. 75

RINSE CONTAINER ID: M29-3-AR				Rinse Beaker ID: 3	
Lab Added Vol., ml	<u>75</u>	Density of Acetone (ρ_a)	<u>0.7848</u>	g/ml	
Container Final Wt	<u>219.4</u>	Acetone Blank Concent (C_a)	<u>0.00000084</u>	g/g	ok
Container Initial Wt	<u>167.6</u>	Acetone Rinse Volume (V_{aw})	<u>141</u>	ml	
Net Volume Wt., g	<u>51.8</u>	$W_a = C_a V_{aw} \rho_a =$	<u>0.00009</u>	g	0.0001% ok
Weighing Date	<u>2/8/01</u>	Time	<u>1645</u>	Gross Wt	<u>105.0907</u> g
Last Weighing Date	<u>2/9/01</u>	Time	<u>0910</u>	Gross Wt	<u>105.0907</u> g
Average of 2 Consecutive Weighings Meeting Criteria				<u>105.0907</u>	g
Blank Beaker ID	<u>4</u>	- Rinse Beaker Tare Wt		<u>105.0856</u>	g
Acetone Volume, ml	<u>150.99</u>	- Acetone Blank (W_a)		<u>0.00009</u>	g
Acetone Residue, g	<u>0.0001</u>	Weight in Acetone Rinse (m_a)		<u>0.00501</u>	g
				= Weight in Acetone Rinse (m_a)	<u>5.01</u> mg

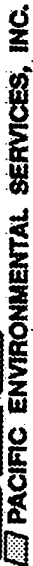
FILTER SAMPLE ID: M29-3-F				Filter/Container ID: 104-005	
Weighing Date	<u>2/7/01</u>	Time	<u>0920</u>	Gross Wt	<u>35.1023</u> g
Last Weighing Date	<u>2/7/01</u>	Time	<u>1705</u>	Gross Wt	<u>35.1024</u> g
Average of 2 Consecutive Weighings Meeting Criteria				<u>35.10235</u>	g
- Filter & Container Tare Wt				<u>35.0363</u>	g
= Weight on Filter (m_f)				<u>0.06605</u>	g
= Weight on Filter (m_f)				<u>66.05</u>	mg

SUMMARY	Weight on Filter (m_f)	<u>66.05</u>	mg
	+ Weight in Acetone Rinse (m_a)	<u>5.01</u>	mg
	= Total Particulate (m_n)	<u>71.06</u>	mg

v1.0 10/15/00

Signature of Analyst _____

Signature of Reviewer _____


PACIFIC ENVIRONMENTAL SERVICES, INC.

FINAL WEIGHT DATA SHEET

Project Number: F181.001

Plant: Andrews AFB Medical Waste Ininerator

Item Weighed

F.1 hrs

Date	2/6/01	2/6/01	2/7/01	2/7/01
Time	1100	1700	0920	1705
Relative Humidity (%):	28%	31%	30	32.5
Temperature (°F)	78.5	74.5	77.4	75.7
Standard Weight (g):	44.9998	44.9998	44.9998	50.0000
Analyst:	WDM	WDM	WDM	WDM

[illegible]

Lab-grav.xls Lab\Weighins

2/6/01 10:52 AM



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

Method 5 Tare Weights

Project Number: F181.001

Item Weighed:

Beakers

[illegible]

TARE WEIGHT

Item Weighed: Filters

PACIFIC ENVIRONMENTAL SERVICES, INC.

First Analytical Laboratories

ANALYSIS REPORT

Method 29: Multi-Metals

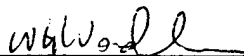
Method 26A: HCl

Project # 104-01-0048

Prepared for:

Pacific Environmental Services, Inc.
5001 South Miami Blvd.
Research Triangle Park, NC 27709

Reviewed and Approved by:



William H. Wadlin, Ph. D.
Laboratory Manager

February 19, 2001

First Analytical Laboratories

CASE NARRATIVE

Project #: 10204

Report Date: 19-Feb-01

Client: Pacific Environmental Services

Client Project ID: 101-01-0048

Samples:

Four sets of Method 29 Multi-Metals Trains were submitted, one of which was the blank set. The elements of interest were cadmium, lead and mercury. In addition, four samples were submitted for determination of HCl by Method 26A. All of the samples were hand delivered in good condition, with no apparent leakage or damage.

Preparation:

The metals samples were all prepared and analyzed according to EPA Method 29, *Determination of Metals Emissions from Stationary Sources*. The Method 26A samples did not require any sample preparation.

Analysis:

Cadmium and lead were determined by Graphite Furnace Atomic Absorption Spectrophotometry (GFAA). Mercury was determined by Cold Vapor Atomic Absorption Spectrophotometry (CVAA). HCl was determined as chloride by Ion Chromatography with conductivity detection (IC).

Results:

The metals results are presented as total micrograms of element found in the whole analytical fraction listed, for each such fraction specified in the method. The HCl results are given as total milligrams present in the whole original sample. All of the target elements were measurable in all of the runs. The highest levels found were for lead, at about 500 μg per run. The mercury levels found decreased exponentially with run number from about 73 μg to 0.6 μg .

Quality Control:

None of the target elements were found in the blanks. All of the spike recoveries were within the normal range of 75% to 125%. All of the samples were analyzed in duplicate. Whenever the sample levels were at least five times the detection limit, the duplicates agreed within the normal range of 20%.

Chain of Custody Record

Project Num	Project Name	Andravs AFB Medical Waste Incinerator				Analysis Requested					Remarks
F181.001	Samplers: DD Holschuh, J Falank, MD Maret										
Date	Time	Field Sample ID	Sample Description	CO	PA	SH					
2/2/01	0945	M29-1-1	Filter, dry	✓	✓	✓					
2/2/01	0945	M29-1-2	Front Half Acetone Dry-down residue	✓	✓	✓					Beaker No. 1
2/2/01	0945	M29-1-3	0.1 N HNO ₃ Front Half Rinse	✓	✓	✓					
2/2/01	0945	M29-1-4	Contents of Imps. 1-3 and 0.1 N HNO ₃ Rinse	✓	✓	✓					
2/2/01	0945	M29-1-5A	Contents of Imp 4 and 0.1 N HNO ₃ Rinse	✓	✓	✓					
2/2/01	0945	M29-1-5B	Contents of Imps. 5-6, KMnO ₄ and DI Rinses	✓	✓	✓					
2/2/01	0945	M29-1-5C	Imps. 5-6 8N HCl Rinse	✓	✓	✓					
2/2/01	1230	M29-2-1	Filter, dry	✓	✓	✓					
2/2/01	1230	M29-2-2	Front Half Acetone Dry-down residue	✓	✓	✓					Beaker No. 2
2/2/01	1230	M29-2-3	0.1 N HNO ₃ Front Half Rinse	✓	✓	✓					
2/2/01	1230	M29-2-4	Contents of Imps. 1-3 and 0.1 N HNO ₃ Rinse	✓	✓	✓					
2/2/01	1230	M29-2-5A	Contents of Imp 4 and 0.1 N HNO ₃ Rinse	✓	✓	✓					
2/2/01	1230	M29-2-5B	Contents of Imps. 5-6, KMnO ₄ and DI Rinses	✓	✓	✓					
2/2/01	1230	M29-2-5C	Imps. 5-6 8N HCl Rinse	✓	✓	✓					
2/2/01	1405	M29-3-1	Filter, dry	✓	✓	✓					
2/2/01	1405	M29-3-2	Front Half Acetone Dry-down residue	✓	✓	✓					
2/2/01	1405	M29-3-3	0.1 N HNO ₃ Front Half Rinse	✓	✓	✓					Beaker No. 3
2/2/01	1405	M29-3-4	Contents of Imps. 1-3 and 0.1 N HNO ₃ Rinse	✓	✓	✓					
2/2/01	1405	M29-3-5A	Contents of Imp 4 and 0.1 N HNO ₃ Rinse	✓	✓	✓					
2/2/01	1405	M29-3-5B	Contents of Imps. 5-6, KMnO ₄ and DI Rinses	✓	✓	✓					
2/2/01	1405	M29-3-5C	Imps. 5-6 8N HCl Rinse	✓	✓	✓					

Page 1/2



PACIFIC ENVIRONMENTAL SERVICES, INC.

Chain of Custody Record

[illegible]



First Analytical Laboratories
1126 Burning Tree Dr. Chapel Hill, NC 27514

Tel. (919) 942-8607
FAX (919) 929-8688

ANALYSIS REPORT

Project #: 10204
Client: Pacific Environmental Services
Client Project ID: 104-01-0048

Report Date: 19-Feb-01
Date Received: 12-Feb-01

Total Micrograms in Analytical Fraction

Sample	Cd μg	Pb μg
M29-1 Front	1.86	427
M29-1 Back	1.69	7.1
M29-2 Front	6.22	550
M29-2 Back	0.44	4.4
M29-3 Front	6.09	480
M29-3 Back	0.24	1.2
Blank Front	<0.02	<0.5
Blank Back	<0.03	<0.6

QC SUMMARY

Front Spike, %Recov.	101%	100%
Back Spike, %Recov.	105%	104%



First Analytical Laboratories

1126 Burning Tree Dr. Chapel Hill, NC 27514

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FAX (919) 929-8688

ANALYSIS REPORT

Project #: 10204

Client: Pacific Environmental Services

Client Project ID:

Report Date: 15-Feb-01

Date Received: 12-Feb-01

Total Micrograms Mercury in Analytical Fraction

Sample	Frac1	Frac2B	Frac3A	Frac3B	Frac3C	Total
Blank	<0.40	<0.95	<0.10	<0.12	<0.58	<2.15
M29-1	<0.40	58.8	1.09	3.98	9.17	73.0
M29-2	<0.40	3.85	<0.12	0.56	<1.12	4.41
M29-3	<0.40	<2.28	0.10	0.45	<1.12	0.55

Q C SUMMARY

Back Spike, %Recov.

106%



First Analytical Laboratories

1126 Burning Tree Dr. Chapel Hill, NC 27514

Tel. (919) 942-8607
FAX (919) 929-8688

ANALYSIS REPORT

Project #: 10204
Client: Pacific Environmental Services
Client Project ID: 104-01-0048

Report Date: 19-Feb-01
Date Received: 12-Feb-01

Total Milligrams in Sample

	HCl mg
M26A-1	2.8
M26A-3 <i>2</i> <i>Al</i>	0.3
M26A-3 <i>3</i> <i>Al</i>	1.1
Blank	0.8

Spike, % Recovery 116%

CADMIUM

GFAA ANALYSIS RUN SUMMARY AND CALCULATION WORKSHEET

Client: Pacific Environmental Services
 Proj. #: 10204
 Date: 19-Feb-01

IDL = 0.2 µg/L
 Postdig'n spike conc. = 5.0 µg/L

Client	Sample ID FAL	Test Sol'n µg/L	Dig'te Conc µg/L	FV ml	Dil'n Factor	Total Volume ml	Volume Dig'd ml	Total µg
FRONT HALVES								
Blank	10204.B-1	0.06	0.06	100	1			
M29-1	10204.1-1	3.71	18.55	100	5			< 0.02
M29-2	10204.2-1	6.22	62.20	100	10			1.86
M29-3	10204.3-1	6.09	60.90	100	10			6.22
								6.09
BACK HALVES								
Blank	10204.B-2A	0.05	0.05	100	1	238	188	< 0.03
M29-1	10204.1-2A	2.86	14.30	100	5	641	541	1.69
M29-1	10204.2-2A	3.74	3.74	100	1	631	531	0.44
M29-3	10204.3-2A	1.97	1.97	100	1	570	470	0.24
FRONT SPIKE	10204.1-1S	8.78						
BACK SPIKE	10204.1-2AS	8.09						
						% REC = 101.4%		
						% REC = 104.6%		

Calibration Data

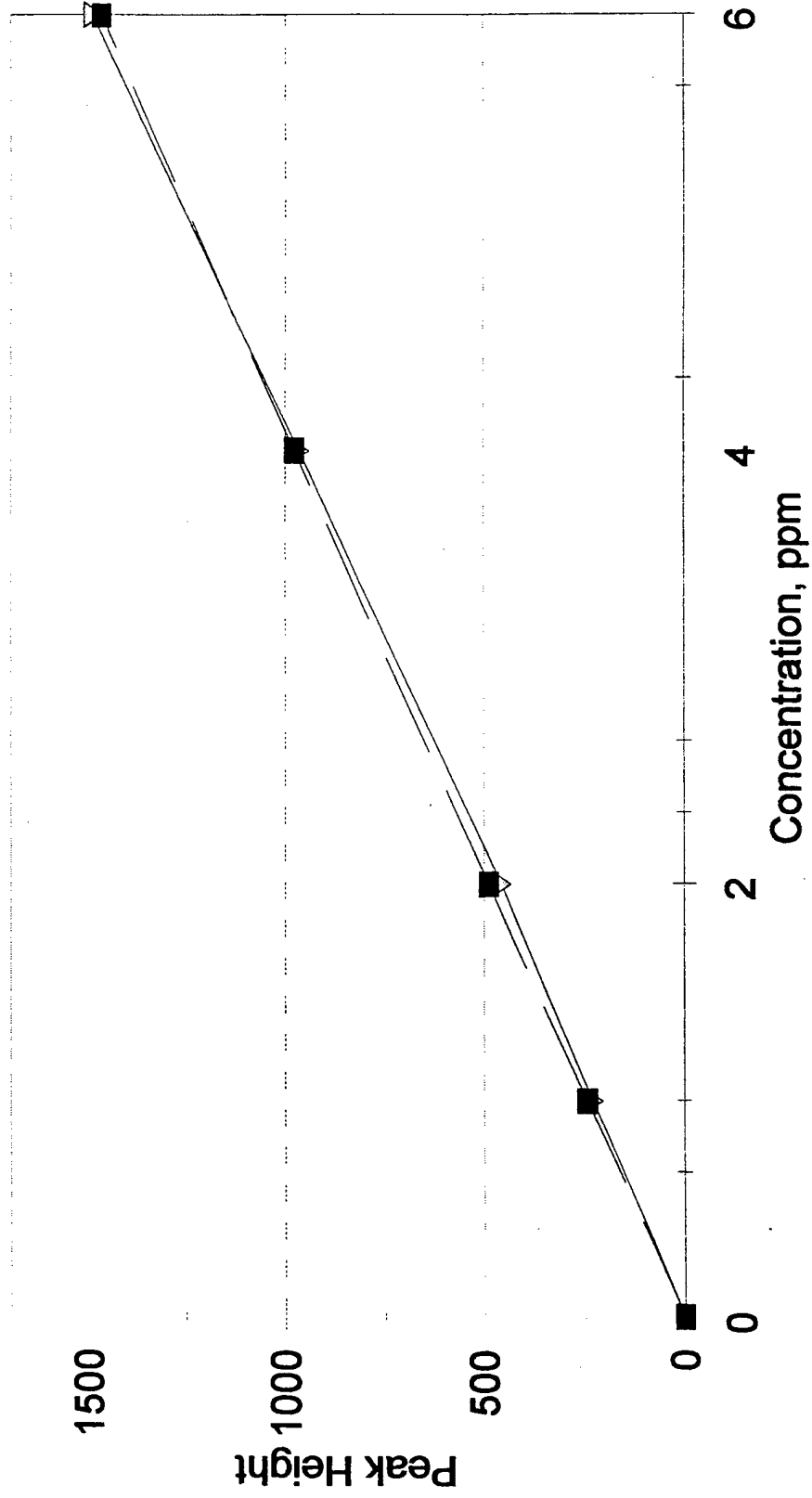
	True conc., µg/L	Abs.
Blank	0.0	0.000
Standard 1	0.5	0.042
Standard 2	2.0	0.150
Standard 3	5.0	0.361
Standard 4	10.0	0.644

Calibration Verifications

ICV = 5	5.17	CCV2 = 5	5.41
ICB = 0	0.05	CCB2 = 0	0.02
CCV1 = 5	5.35		
CCB1 = 0	0.07		

Chloride Calibration

FAL 10204; 02/13/01



LEAD

GFAA ANALYSIS RUN SUMMARY AND CALCULATION WORKSHEET

Client: Pacific Environmental Services
 Proj. #: 10204
 Date: 19-Feb-01

IDL = 5 µg/L
 Postdig'n spike conc. = 100 µg/L

Sample ID	FAL	Test Sol'n µg/L	Dig'te Conc µg/L	FV ml	Dil'n Factor	Total Volume ml	Volume Dig'd ml	Total µg
FRONT HALVES								
Blank	10204.B-1	3.3	3.3	100	1			< 0.5
M29-1	10204.1-1	106.7	4268.0	100	40			426.8
M29-2	10204.2-1	137.6	5504.0	100	40			550.4
M29-3	10204.3-1	119.9	4796.0	100	40			479.6
BACK HALVES								
Blank	10204.B-2A	0.1	0.1	100	1	238	188	< 0.6
M29-1	10204.1-2A	59.8	59.8	100	1	641	541	7.1
M29-1	10204.2-2A	36.8	36.8	100	1	631	531	4.4
M29-3	10204.3-2A	9.9	9.9	100	1	570	470	1.2
FRONT SPIKE	10204.1-1S	206.9						% REC = 100.2%
BACK SPIKE	10204.1-2AS	164.0						% REC = 104.2%

Calibration Data

	True conc., µg/L	Abs.
Blank	0.0	0.000
Standard 1	10	0.031
Standard 2	50	0.133
Standard 3	100	0.254
Standard 4	200	0.449

Calibration Verifications

ICV = 100	103.2	CCV2 = 100	106.0
ICB = 0	1.1	CCB2 = 0	1.0
CCV1 = 100	104.5		
CCB1 = 0	0.7		

MERCURY
CVAA ANALYSIS RUN SUMMARY AND CALCULATION WORKSHEET

Client: Pacific Environmental Services

Proj. #: 10204

Date: 14-Feb-01

IDL = 0.2 µg/L

Postdig'n spike conc. = 5.0 µg/L

Sample ID		Test	Dig'te		Dil'n		Digst'd	
Client	FAL	Sol'n	Conc	FV	Factor	Volume	Vol.	Total
		µg/L	µg/L	ml		ml	ml	µg
FRONT HALVES								
Blank	10204.B-1	-0.13	-0.13	100	1	100	5 <	0.40
M29-1	10204.1-1	-0.10	-0.10	100	1	100	5 <	0.40
M29-2	10204.2-1	-0.02	-0.02	100	1	100	5 <	0.40
M29-3	10204.3-1	0.16	0.16	100	1	100	5 <	0.40
FRACTIONS 2B								
Blank	10204.B-2B	-0.13	-0.13	100	1	238	5 <	0.95
M29-1	10204.1-2B	2.75	2.75	100	1	641	3	58.76
M29-2	10204.2-2B	0.31	0.31	100	1	631	5	3.85
M29-3	10204.3-2B	0.18	0.18	100	1	570	5 <	2.28
BACK SPK	10204.1-2BS	8.05				%REC = 106.0%		
FRACTIONS 3A								
Blank	10204.B-3A	0.11	0.11	100	1	50	10 <	0.10
M29-1	10204.1-3A	1.88	1.88	100	1	58	10	1.09
M29-2	10204.2-3A	0.15	0.15	100	1	59	10 <	0.12
M29-3	10204.3-3A	0.27	0.27	100	1	39	10	0.10
FRACTIONS 3B								
Blank	10204.B-3B	0.07	0.07	100	1	118	20 <	0.12
M29-1	10204.1-3B	1.89	1.89	100	1	421	20	3.98
M29-2	10204.2-3B	0.25	0.25	100	1	446	20	0.56
M29-3	10204.3-3B	0.21	0.21	100	1	432	20	0.45
FRACTIONS 3C								
Blank	10204.B-3C	0.13	0.13	100	1	144	5 <	0.58
M29-1	10204.1-3C	1.62	1.62	100	1	284	5	9.17
M29-2	10204.2-3C	0.17	0.17	100	1	281	5 <	1.12
M29-3	10204.3-3C	0.11	0.11	100	1	279	5 <	1.12

MERCURY
CVAA ANALYSIS RUN SUMMARY AND CALCULATION WORKSHEET

Client: Pacific Environmental Services

Proj. #: 10204

Date: 14-Feb-01

Calibration Data

	Run1	
	Abs.	True conc., $\mu\text{g/L}$
Blank	0.000	0.00
Standard 1	0.007	0.50
Standard 2	0.018	1.00
Standard 3	0.044	2.00
Standard 4	0.107	5.00
Standard 5	0.208	10.00

Calibration Verifications

ICV = 5	5.30	CCV2 = 5	5.13
ICB = 0	-0.15	CCB2 = 0	-0.04
CCV1 = 5	5.40	CCV3 = 5	5.15
CCB1 = 0	-0.21	CCB3 = 0	0.13

Element File: CD.GEL Element: Cd Wavelength: 228.8
Date: 02/09/81 Time: 08:24 Slit: 0.70 L
Data File: 10204CD.DAT ID/Wt File: 10204.IDW Lamp Current: 5
Technique: HGA Calib. Type: Nonlinear Energy: 42

~~~~~  
Cd      ID: BLANK                      Seq. No.: 00001      A/S Pos.: 0      Date: 02/09/81

Replicate 1                      Time: 08:24  
Peak Area (A-s): -0.001                      Peak Height (A): 0.019  
Background Pk Area (A-s): 0.007                      Background Pk Height (A): 0.014  
Blank Corrected Pk Area (A-s): -0.001

Replicate 2                      Time: 08:28  
Peak Area (A-s): -0.005                      Peak Height (A): 0.017  
Background Pk Area (A-s): 0.056                      Background Pk Height (A): 0.031  
Blank Corrected Pk Area (A-s): -0.005

Mean Pk Area (A-s):      -0.003      SD: 0.0028      RSD(%): 83.54

Auto-zero performed.

~~~~~  
Cd ID: 0.5 PPB CD Seq. No.: 00002 A/S Pos.: 1 Date: 02/09/81

Replicate 1 Time: 08:31
Peak Area (A-s): 0.038 Peak Height (A): 0.083
Background Pk Area (A-s): 0.081 Background Pk Height (A): 0.040
Blank Corrected Pk Area (A-s): 0.041

Replicate 2 Time: 08:34
Peak Area (A-s): 0.039 Peak Height (A): 0.087
Background Pk Area (A-s): 0.086 Background Pk Height (A): 0.043
Blank Corrected Pk Area (A-s): 0.043

Mean Pk Area (A-s): 0.042 SD: 0.0011 RSD(%): 2.74

Standard number 1 applied. [0.50]

Correlation coefficient: 1.00000 Slope: 0.0839

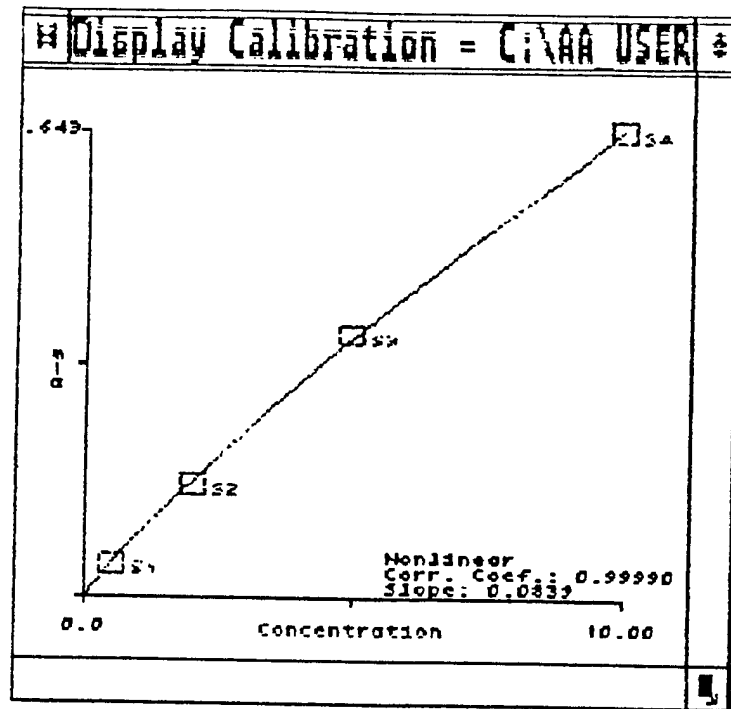
~~~~~  
Cd      ID: 2 PPB CD                      Seq. No.: 00003      A/S Pos.: 2      Date: 02/09/81

Replicate 1                      Time: 08:37  
Peak Area (A-s): 0.146                      Peak Height (A): 0.280  
Background Pk Area (A-s): 0.110                      Background Pk Height (A): 0.053  
Blank Corrected Pk Area (A-s): 0.150  
Concentration (ug/L ): 1.78

Replicate 2                      Time: 08:40  
Peak Area (A-s): 0.147                      Peak Height (A): 0.297  
Background Pk Area (A-s): 0.111                      Background Pk Height (A): 0.045  
Blank Corrected Pk Area (A-s): 0.150  
Concentration (ug/L ): 1.79

Mean Conc (ug/L ):      1.79      SD: 0.005      RSD(%): 0.30

Standard number 2 applied. [2.00]



OK

~~~~~  
Cd ID: ICV Seq. No.: 00006 A/S Pos.: 5 Date: 02/09/

Replicate 1 Time: 08:58
Concentration (ug/L): 5.22

Replicate 2 Time: 09:01
Concentration (ug/L): 5.11

Mean Conc (ug/L): 5.17 SD: 0.084 RSD(%): 1.62

QC sample is within range

~~~~~  
Cd ID: ICB Seq. No.: 00007 A/S Pos.: 0 Date: 02/09/

Replicate 1 Time: 09:04  
Concentration (ug/L ): 0.06

Replicate 2 Time: 09:08  
Concentration (ug/L ): 0.03

Mean Conc (ug/L ): 0.05 SD: 0.020 RSD(%): 44.02

QC sample is within range

~~~~~  
Cd ID: 10204.B-1 Seq. No.: 00008 A/S Pos.: 6 Date: 02/09/

Replicate 1 Time: 09:11
Concentration (ug/L): 0.04

Replicate 2 Time: 09:14

Concentration (ug/L): 0.08

Mean Conc (ug/L): 0.06 SD: 0.029 RSD(%): 45.11

~~~~~  
Cd ID: 10204.1-1 X20 Seq. No.: 00009 A/S Pos.: 7 Date: 02/09/

Replicate 1 Time: 09:17  
Concentration (ug/L ): 0.97 Corrected Conc (ug/L ): 19.4

~~~~~  
Cd ID: 10204.1-1 X5 Seq. No.: 00010 A/S Pos.: 7 Date: 02/09/

Replicate 1 Time: 09:25
Concentration (ug/L): 3.64 Corrected Conc (ug/L): 18.2

Replicate 2 Time: 09:28
Concentration (ug/L): 3.78 Corrected Conc (ug/L): 18.88

Mean Conc (ug/L): 3.71 SD: 0.098 RSD(%): 2.65
Corrected Conc (ug/L): 18.5

~~~~~  
Cd ID: 10204.1-1 X5 Seq. No.: 00011 A/S Pos.: 7 Date: 02/09/

Replicate 1 Time: 09:32  
Concentration (ug/L ): 8.73 Corrected Conc (ug/L ): 43.7

Replicate 2 Time: 09:35  
Concentration (ug/L ): 8.82 Corrected Conc (ug/L ): 44.1

Mean Conc (ug/L ): 8.78 SD: 0.062 RSD(%): 0.71  
Corrected Conc (ug/L ): 43.9

Recovery is 101.4%

~~~~~  
Cd ID: 10204.2-1 X5 Seq. No.: 00012 A/S Pos.: 8 Date: 02/09/

Sample abs. is greater than that of the largest standard.

Replicate 1 Time: 09:38
Concentration (ug/L): 12.08 Corrected Conc (ug/L): 60.4

~~~~~  
Cd ID: 10204.2-1 X10 Seq. No.: 00014 A/S Pos.: 8 Date: 02/09/

Replicate 1 Time: 09:45  
Concentration (ug/L ): 6.38 Corrected Conc (ug/L ): 63.8

Replicate 2 Time: 09:49  
Concentration (ug/L ): 6.06 Corrected Conc (ug/L ): 60.6

Mean Conc (ug/L ): 6.22 SD: 0.223 RSD(%): 3.59  
Corrected Conc (ug/L ): 62.2

~~~~~  
Cd ID: 10204.3-1 X10 Seq. No.: 00015 A/S Pos.: 9 Date: 02/09/

Replicate 1
Concentration (ug/L): 6.14

Time: 09:52
Corrected Conc (ug/L): 61.4

Replicate 2
Concentration (ug/L): 6.05

Time: 09:55
Corrected Conc (ug/L): 60.5

Mean Conc (ug/L): 6.09
Corrected Conc (ug/L): 60.9

SD: 0.061 RSD(%): 1.01

~~~~~  
Cd ID: CCV

Seq. No.: 00016 A/S Pos.: 3 Date: 02/09/

Replicate 1  
Concentration (ug/L ): 5.30

Time: 09:59

Replicate 2  
Concentration (ug/L ): 5.39

Time: 10:02

Mean Conc (ug/L ): 5.35

SD: 0.066 RSD(%): 1.23

QC sample is within range

~~~~~  
Cd ID: CCB

Seq. No.: 00017 A/S Pos.: 0 Date: 02/09/

Replicate 1
Concentration (ug/L): 0.04

Time: 10:05

Replicate 2
Concentration (ug/L): 0.09

Time: 10:08

Mean Conc (ug/L): 0.07

SD: 0.033 RSD(%): 50.2

QC sample is within range

~~~~~  
Cd ID: 10204.B-2A

Seq. No.: 00018 A/S Pos.: 10 Date: 02/09/

Replicate 1  
Concentration (ug/L ): -0.07

Time: 10:11

Replicate 2  
Concentration (ug/L ): 0.16

Time: 10:15

Mean Conc (ug/L ): 0.05

SD: 0.162 RSD(%): 342.5

~~~~~  
Cd ID: 10204.1-2A

Seq. No.: 00019 A/S Pos.: 11 Date: 02/09/

Sample abs. is greater than that of the largest standard.

Replicate 1
Concentration (ug/L): 13.89

Time: 10:18

~~~~~  
Cd ID: 10204.1-2A X5

Seq. No.: 00020 A/S Pos.: 11 Date: 02/09/

Replicate 1  
Concentration (ug/L ): 2.94

Time: 10:24  
Corrected Conc (ug/L ): 14.7

Replicate 2  
Concentration (ug/L ): 2.79

Time: 10:28  
Corrected Conc (ug/L ): 13.9

Mean Conc (ug/L ): 2.86  
Corrected Conc (ug/L ): 14.3

SD: 0.109 RSD(%): 3.81

~~~~~  
Cd ID: 10204.1-2A X5 Seq. No.: 00021 A/S Pos.: 11 Date: 02/09/01

Replicate 1
Concentration (ug/L): 8.14

Time: 10:31
Corrected Conc (ug/L): 40.7

Replicate 2
Concentration (ug/L): 8.04

Time: 10:34
Corrected Conc (ug/L): 40.2

Mean Conc (ug/L): 8.09
Corrected Conc (ug/L): 40.5

SD: 0.067 RSD(%): 0.83

Recovery is 104.5%

~~~~~  
Cd ID: 10204.2-2A X5 Seq. No.: 00022 A/S Pos.: 12 Date: 02/09/01

Replicate 1  
Concentration (ug/L ): 0.78

Time: 10:37  
Corrected Conc (ug/L ): 3.9

~~~~~  
Cd ID: 10204.2-2A Seq. No.: 00023 A/S Pos.: 12 Date: 02/09/01

Replicate 1
Concentration (ug/L): 3.62

Time: 10:41

Replicate 2
Concentration (ug/L): 3.86

Time: 10:45

Mean Conc (ug/L): 3.74

SD: 0.170 RSD(%): 4.54

~~~~~  
Cd ID: 10204.3-2A Seq. No.: 00024 A/S Pos.: 13 Date: 02/09/01

Replicate 1  
Concentration (ug/L ): 2.05

Time: 10:48

Replicate 2  
Concentration (ug/L ): 1.90

Time: 10:51

Mean Conc (ug/L ): 1.97

SD: 0.106 RSD(%): 5.39

~~~~~  
Cd ID: CCV Seq. No.: 00025 A/S Pos.: 3 Date: 02/09/01

Replicate 1
Concentration (ug/L): 5.43

Time: 10:54

Replicate 2
Concentration (ug/L): 5.39

Time: 10:57

Mean Conc (ug/L): 5.41

SD: 0.031 RSD(%): 0.57

QC sample is within range

~~~~~

Cd ID: CCB Seq. No.: 00026 A/S Pos.: 0 Date: 02/09/11

Replicate 1 Time: 11:01  
Concentration (ug/L ): 0.06

Replicate 2 Time: 11:04  
Concentration (ug/L ): -0.03

Mean Conc (ug/L ): 0.02 SD: 0.062 RSD(%): 408.1

QC sample is within range

-----  
Element File: PB.GEL                      Element: Pb                      Wavelength: 283.3  
Date: 02/08/81                      Time: 07:59                      Slit: 0.70 L  
Data File:                      ID/Wt File: 20203.IDW                      Lamp Current: 10  
Technique: HGA                      Calib. Type: Nonlinear                      Energy: 47  
-----

~~~~~  
Pb ID: BLANK Seq. No.: 00001 A/S Pos.: 0 Date: 02/08/E

Replicate 1 Time: 07:59
Peak Area (A-s): 0.002 Peak Height (A): 0.014
Background Pk Area (A-s): 0.039 Background Pk Height (A): 0.044
Blank Corrected Pk Area (A-s): 0.002

Replicate 2 Time: 08:02
Peak Area (A-s): 0.000 Peak Height (A): 0.016
Background Pk Area (A-s): 0.025 Background Pk Height (A): 0.032
Blank Corrected Pk Area (A-s): 0.000

Mean Pk Area (A-s): 0.001 SD: 0.0010 RSD(%): 88.39

Auto-zero performed.

~~~~~  
Pb      ID: 10 PPB PB                      Seq. No.: 00002      A/S Pos.: 1      Date: 02/08/E

Replicate 1                      Time: 08:06  
Peak Area (A-s): 0.033                      Peak Height (A): 0.064  
Background Pk Area (A-s): 0.058                      Background Pk Height (A): 0.122  
Blank Corrected Pk Area (A-s): 0.031

Replicate 2                      Time: 08:09  
Peak Area (A-s): 0.032                      Peak Height (A): 0.083  
Background Pk Area (A-s): 0.027                      Background Pk Height (A): 0.039  
Blank Corrected Pk Area (A-s): 0.031

Mean Pk Area (A-s):              0.031                      SD: 0.0002                      RSD(%): 0.52

Standard number 1 applied. [10.0]  
Correlation coefficient: 1.00000                      Slope: 0.0031

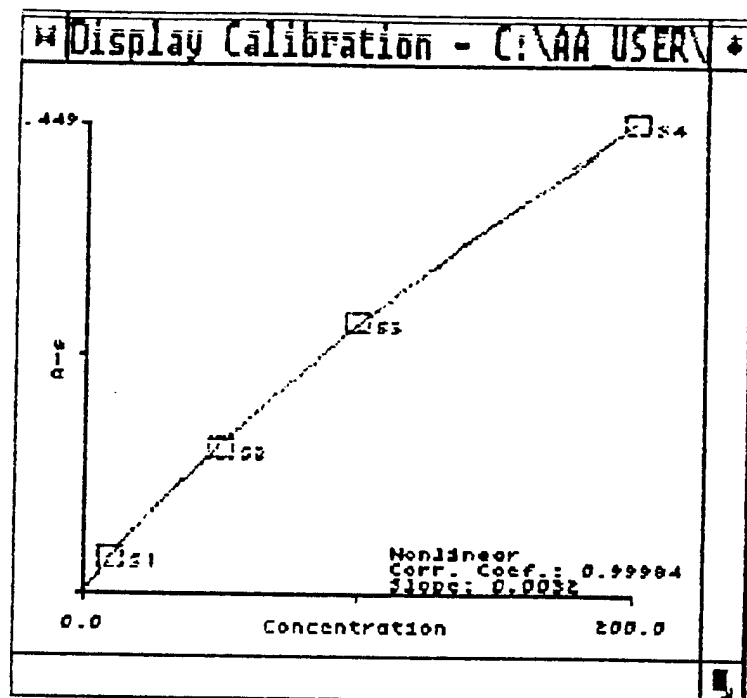
~~~~~  
Pb ID: 50 PPB PB Seq. No.: 00003 A/S Pos.: 2 Date: 02/08/E

Replicate 1 Time: 08:12
Peak Area (A-s): 0.134 Peak Height (A): 0.333
Background Pk Area (A-s): 0.050 Background Pk Height (A): 0.071
Blank Corrected Pk Area (A-s): 0.133
Concentration (ug/L): 42.4

Replicate 2 Time: 08:16
Peak Area (A-s): 0.133 Peak Height (A): 0.329
Background Pk Area (A-s): 0.050 Background Pk Height (A): 0.072
Blank Corrected Pk Area (A-s): 0.132
Concentration (ug/L): 42.3

Mean Conc (ug/L): 42.3 SD: 0.03 RSD(%): 0.08

Standard number 2 applied. [50.0]



OK

Pb ID: ICB Seq. No.: 00008 A/S Pos.: 5 Date: 02/08/01

Replicate 1 Time: 08:45
Concentration (ug/L): 99.7

Replicate 2 Time: 08:48
Concentration (ug/L): 106.7

Mean Conc (ug/L): 103.2 SD: 4.93 RSD(%): 4.77

QC sample is within range 79.5 - 120.49

Pb ID: ICB Seq. No.: 00009 A/S Pos.: 0 Date: 02/08/01

Replicate 1 Time: 08:52
Concentration (ug/L): 1.7

Replicate 2 Time: 08:55
Concentration (ug/L): 0.5

Mean Conc (ug/L): 1.1 SD: 0.83 RSD(%): 74.89

QC sample is within range -5.49 - 5.49

Pb ID: 20203.LB1 Seq. No.: 00010 A/S Pos.: 6 Date: 02/08/01

Replicate 1 Time: 08:58
Concentration (ug/L): 1.1

Replicate 2 Time: 09:02
Concentration (ug/L): 1.1

Concentration (ug/L): 144.8

Replicate 2

Time: 14:57

Concentration (ug/L): 144.1

Mean Conc (ug/L): 144.5

SD: 0.48

RSD(%): 0.33

Pb ID: 20203.30-3

Seq. No.: 00064

A/S Pos.: 26

Date: 02/08/00

Replicate 1

Time: 15:01

Concentration (ug/L): 142.4

Replicate 2

Time: 15:04

Concentration (ug/L): 143.5

Mean Conc (ug/L): 143.0

SD: 0.77

RSD(%): 0.54

Pb ID: 20203.30-4

Seq. No.: 00065

A/S Pos.: 27

Date: 02/08/00

Replicate 1

Time: 15:07

Concentration (ug/L): 153.3

Replicate 2

Time: 15:11

Concentration (ug/L): 152.1

Mean Conc (ug/L): 152.7

SD: 0.84

RSD(%): 0.55

Pb ID: 20203.30-6

Seq. No.: 00066

A/S Pos.: 28

Date: 02/08/00

Replicate 1

Time: 15:14

Concentration (ug/L): 137.5

Replicate 2

Time: 15:17

Concentration (ug/L): 136.8

Mean Conc (ug/L): 137.2

SD: 0.50

RSD(%): 0.37

Pb ID: 20203.30-7

Seq. No.: 00067

A/S Pos.: 29

Date: 02/08/00

Replicate 1

Time: 15:21

Concentration (ug/L): 3.0

Replicate 2

Time: 15:24

Concentration (ug/L): 1.3

Mean Conc (ug/L): 2.1

SD: 1.19

RSD(%): 56.46

Pb ID: CCV

Seq. No.: 00068

A/S Pos.: 3

Date: 02/08/00

Replicate 1

Time: 15:27

Concentration (ug/L): 104.3

Replicate 2

Time: 15:31

Concentration (ug/L): 104.8

Mean Conc (ug/L): 104.5 SD: 0.34 RSD(%): 0.33

QC sample is within range 79.5 - 120.49

Pb ID: CCB Seq. No.: 00069 A/S Pos.: 0 Date: 02/08/8

Replicate 1 Time: 15:34
Concentration (ug/L): 1.2

Replicate 2 Time: 15:38
Concentration (ug/L): 0.3

Mean Conc (ug/L): 0.7 SD: 0.65 RSD(%): 90.37

QC sample is within range -5.49 - 5.49

Pb ID: 10204.B-1 Seq. No.: 00070 A/S Pos.: 6 Date: 02/08/8

Replicate 1 Time: 15:44
Concentration (ug/L): 3.1

Replicate 2 Time: 15:48
Concentration (ug/L): 3.4

Mean Conc (ug/L): 3.3 SD: 0.22 RSD(%): 6.64

Pb ID: 10204.1-1 X20 Seq. No.: 00071 A/S Pos.: 7 Date: 02/08/8

Replicate 1 Time: 15:51
Concentration (ug/L): 204.6 Corrected Conc (ug/L): 4092.

Pb ID: 10204.1-1 X40 Seq. No.: 00072 A/S Pos.: 7 Date: 02/08/8

Replicate 1 Time: 15:57
Concentration (ug/L): 108.1 Corrected Conc (ug/L): 4322.

Replicate 2 Time: 16:00
Concentration (ug/L): 105.4 Corrected Conc (ug/L): 4216.

Mean Conc (ug/L): 106.7 SD: 1.88 RSD(%): 1.76
Corrected Conc (ug/L): 4269.

Pb ID: 10204.1-1 X40 Seq. No.: 00073 A/S Pos.: 7 Date: 02/08/8

Replicate 1 Time: 16:04
Concentration (ug/L): 209.8 Corrected Conc (ug/L): 8390.

Replicate 2 Time: 16:07
Concentration (ug/L): 204.1 Corrected Conc (ug/L): 8164.

Mean Conc (ug/L): 206.9 SD: 3.99 RSD(%): 1.93
Corrected Conc (ug/L): 8277.

Recovery is 100.2%


~~~~~  
Pb ID: 10204.2-1 X40 Seq. No.: 00074 A/S Pos.: 8 Date: 02/08/8

Replicate 1 Time: 16:11  
Concentration (ug/L ): 138.2 Corrected Conc (ug/L ): 5529.

Replicate 2 Time: 16:14  
Concentration (ug/L ): 137.0 Corrected Conc (ug/L ): 5480.

Mean Conc (ug/L ): 137.6 SD: 0.86 RSD(%): 0.63  
Corrected Conc (ug/L ): 5505.

~~~~~  
Pb ID: 10204.3-1 X40 Seq. No.: 00075 A/S Pos.: 9 Date: 02/08/8

Replicate 1 Time: 16:17
Concentration (ug/L): 121.6 Corrected Conc (ug/L): 4863.

Replicate 2 Time: 16:21
Concentration (ug/L): 118.3 Corrected Conc (ug/L): 4731.

Mean Conc (ug/L): 119.9 SD: 2.34 RSD(%): 1.95
Corrected Conc (ug/L): 4797.

~~~~~  
Pb ID: 10204.8-2A Seq. No.: 00076 A/S Pos.: 10 Date: 02/08/8

Replicate 1 Time: 16:24  
Concentration (ug/L ): 0.7

Replicate 2 Time: 16:27  
Concentration (ug/L ): -0.4

Mean Conc (ug/L ): 0.1 SD: 0.77 RSD(%): 595.48

~~~~~  
Pb ID: 10204.1-2A Seq. No.: 00077 A/S Pos.: 11 Date: 02/08/8

Replicate 1 Time: 16:31
Concentration (ug/L): 59.2

Replicate 2 Time: 16:34
Concentration (ug/L): 60.3

Mean Conc (ug/L): 59.8 SD: 0.82 RSD(%): 1.38

~~~~~  
Pb ID: 10204.1-2A Seq. No.: 00078 A/S Pos.: 11 Date: 02/08/8

Replicate 1 Time: 16:38  
Concentration (ug/L ): 165.0

Replicate 2 Time: 16:41  
Concentration (ug/L ): 163.0

Mean Conc (ug/L ): 164.0 SD: 1.45 RSD(%): 0.88

Recovery is 104.3%

~~~~~  
Pb ID: 10204.2-2A Seq. No.: 00079 A/S Pos.: 12 Date: 02/08/83

Replicate 1 Time: 16:44
Concentration (ug/L): 37.5

Replicate 2 Time: 16:48
Concentration (ug/L): 36.0

Mean Conc (ug/L): 36.8 SD: 1.08 RSD(%): 2.94

~~~~~  
Pb ID: 10204.3-2A Seq. No.: 00080 A/S Pos.: 13 Date: 02/08/83

Replicate 1 Time: 16:51  
Concentration (ug/L ): 10.4

Replicate 2 Time: 16:54  
Concentration (ug/L ): 9.4

Mean Conc (ug/L ): 9.9 SD: 0.69 RSD(%): 6.99

~~~~~  
Pb ID: CCV Seq. No.: 00081 A/S Pos.: 3 Date: 02/08/83

Replicate 1 Time: 16:58
Concentration (ug/L): 105.2

Replicate 2 Time: 17:01
Concentration (ug/L): 106.7

Mean Conc (ug/L): 106.0 SD: 1.05 RSD(%): 0.99

QC sample is within range 79.5 - 120.49

~~~~~  
Pb ID: CCB Seq. No.: 00082 A/S Pos.: 0 Date: 02/08/83

Replicate 1 Time: 17:04  
Concentration (ug/L ): 1.9

Replicate 2 Time: 17:08  
Concentration (ug/L ): 0.2

Mean Conc (ug/L ): 1.0 SD: 1.24 RSD(%): 119.0

QC sample is within range -5.49 - 5.49

HG                      AA-BG      BG  
MAIN: 0.004            PA-0.011 -0.220  
                      PH 0.004 -0.001

0.000      AUTOZERO

HG                      AA-BG      BG  
MAIN: 0.007            PA 0.200    0.191  
                      PH 0.007    0.003

0.50      1. STANDARD

HG                      AA-BG      BG  
MAIN: 1.32 UG/L       PA 0.435    0.188  
                      PH 0.018    0.002

E61 Sample concentration greater than highest standard

1.04      2. STANDARD

HG                      AA-BG      BG  
MAIN: 2.54 UG/L       PA 0.961    0.190  
                      PH 0.044    0.002

E61 Sample concentration greater than highest standard

2.09      3. STANDARD

HG                      AA-BG      BG  
MAIN: 5.09 UG/L       PA 2.214    0.173  
                      PH 0.107    0.001

E61 Sample concentration greater than highest standard

5.01      4. STANDARD

HG                      AA-BG      BG  
MAIN: 9.75 UG/L       PA 4.273    0.232  
                      PH 0.208    0.004

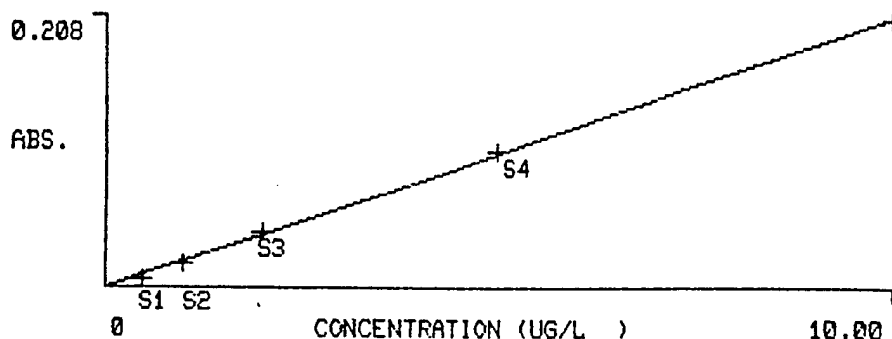
E61 Sample concentration greater than highest standard

9.94      5. STANDARD

HGA DISPLAY CALIBRATION MODE  
ELEMENT: HG - PEAK HEIGHT

PRINTER: ON  
BG CORR: ON  
UNITS : UG/L  
CH.MASS:

9.94



READ  
PEAK AREA (A-S)  
S5 AA-BG: 4.273  
BG: 0.232

PEAK HEIGHT (A)  
AA-BG: 0.208  
BG: 0.004

|       |              |          |       |       |            |
|-------|--------------|----------|-------|-------|------------|
| ===== |              |          | ===== |       |            |
| HG    | <i>ICV</i>   | AA-BG    | BG    | HG    | <i>ICB</i> |
| MAIN: | 5.30 UG/L    | PA 2.157 | 0.244 | MAIN: | -0.15 UG/L |
|       |              | PH 0.111 | 0.004 |       | PA-0.021   |
|       |              |          |       |       | PH-0.003   |
|       |              |          |       |       | BG 0.002   |
| ----- |              |          | ----- |       |            |
| HG    | <i>B-2B</i>  | AA-BG    | BG    | HG    |            |
| MAIN: | -0.13 UG/L   | PA-0.015 | 0.183 | MAIN: | -0.13 UG/L |
|       |              | PH-0.003 | 0.000 |       | PA 0.003   |
|       |              |          |       |       | PH-0.003   |
|       |              |          |       |       | BG 0.002   |
| ----- |              |          | ----- |       |            |
| HG    | <i>1-2B</i>  | AA-BG    | BG    | HG    |            |
| MAIN: | 2.73 UG/L    | PA 1.150 | 0.241 | MAIN: | 2.77 UG/L  |
|       |              | PH 0.057 | 0.004 |       | PA 1.217   |
|       |              |          |       |       | PH 0.058   |
|       |              |          |       |       | BG 0.003   |
| ----- |              |          | ----- |       |            |
| HG    | <i>1-2BS</i> | AA-BG    | BG    | HG    |            |
| MAIN: | 8.01 UG/L    | PA 3.245 | 0.243 | MAIN: | 8.09 UG/L  |
|       |              | PH 0.168 | 0.003 |       | PA 3.301   |
|       |              |          |       |       | PH 0.170   |
|       |              |          |       |       | BG 0.004   |
| ----- |              |          | ----- |       |            |
| HG    | <i>2-2B</i>  | AA-BG    | BG    | HG    |            |
| MAIN: | 0.38 UG/L    | PA 0.165 | 0.152 | MAIN: | 0.23 UG/L  |
|       |              | PH 0.008 | 0.000 |       | PA 0.161   |
|       |              |          |       |       | PH 0.005   |
|       |              |          |       |       | BG 0.003   |
| ----- |              |          | ----- |       |            |
| HG    | <i>3-2B</i>  | AA-BG    | BG    | HG    |            |
| MAIN: | 0.21 UG/L    | PA 0.143 | 0.238 | MAIN: | 0.15 UG/L  |
|       |              | PH 0.004 | 0.003 |       | PA 0.141   |
|       |              |          |       |       | PH 0.003   |
|       |              |          |       |       | BG 0.001   |
| ----- |              |          | ----- |       |            |
| HG    | <i>B-1</i>   | AA-BG    | BG    | HG    |            |
| MAIN: | -0.13 UG/L   | PA-0.026 | 0.244 | MAIN: | -0.13 UG/L |
|       |              | PH-0.003 | 0.003 |       | PA 0.010   |
|       |              |          |       |       | PH-0.003   |
|       |              |          |       |       | BG 0.002   |
| ----- |              |          | ----- |       |            |
| HG    | <i>1-1</i>   | AA-BG    | BG    | HG    |            |
| MAIN: | -0.10 UG/L   | PA 0.022 | 0.239 | MAIN: | -0.10 UG/L |
|       |              | PH-0.002 | 0.003 |       | PA 0.020   |
|       |              |          |       |       | PH-0.002   |
|       |              |          |       |       | BG 0.003   |
| ----- |              |          | ----- |       |            |
| HG    | <i>2-1</i>   | AA-BG    | BG    | HG    | <i>CCV</i> |
| MAIN: | -0.10 UG/L   | PA-0.009 | 0.260 | MAIN: | 5.40 UG/L  |
|       |              | PH-0.002 | 0.004 |       | PA 2.297   |
|       |              |          |       |       | PH 0.113   |
|       |              |          |       |       | BG 0.002   |
| ----- |              |          | ----- |       |            |
| HG    | <i>CCB</i>   | AA-BG    | BG    |       |            |
| MAIN: | -0.21 UG/L   | PA-0.035 | 0.148 |       |            |
|       |              | PH-0.004 | 0.002 |       |            |
|       |              |          |       |       |            |

0.00 AUTOZERO

5 ml  
HG 2-1 AA-BG BG HG 3-1 AA-BG BG  
MAIN: 0.06 UG/L PA 0.042 0.101 MAIN: 0.21 UG/L PA 0.114 0.058  
PH 0.001 0.002 PH 0.004 -0.000

11  
HG 3-1 AA-BG BG  
MAIN: 0.11 UG/L PA 0.080 0.070  
PH 0.002 0.001

10 ml  
HG B-3A AA-BG BG HG AA-BG BG  
MAIN: 0.11 UG/L PA 0.042 0.083 MAIN: 0.10 UG/L PA 0.029 -0.038  
PH 0.002 0.003 PH 0.002 -0.002

HG 1-3A AA-BG BG HG AA-BG BG  
MAIN: 1.85 UG/L PA 0.746 0.114 MAIN: 1.91 UG/L PA 0.802 0.107  
PH 0.039 0.002 PH 0.040 0.000

HG 2-3A AA-BG BG HG AA-BG BG  
MAIN: 0.15 UG/L PA 0.052 0.101 MAIN: 0.15 UG/L PA 0.076 0.102  
PH 0.003 0.000 PH 0.003 0.000

HG 3-3A AA-BG BG HG AA-BG BG  
MAIN: 0.19 UG/L PA 0.094 0.090 MAIN: 0.34 UG/L PA 0.114 0.014  
PH 0.004 -0.000 PH 0.007 0.000

20 ml  
HG B-3B AA-BG BG HG AA-BG BG  
MAIN: 0.02 UG/L PA 0.034 0.088 MAIN: 0.11 UG/L PA 0.036 0.089  
PH 0.000 -0.000 PH 0.002 0.000

HG 1-3B AA-BG BG HG AA-BG BG  
MAIN: 1.95 UG/L PA 0.773 0.073 MAIN: 1.83 UG/L PA 0.742 0.136  
PH 0.041 0.002 PH 0.038 0.002

HG CCV AA-BG BG HG CCB AA-BG BG  
MAIN: 5.13 UG/L PA 2.166 -0.056 MAIN: -0.04 UG/L PA -0.004 0.016  
PH 0.108 0.006 PH -0.001 0.004

HG 2-3B AA-BG BG HG AA-BG BG  
MAIN: 0.29 UG/L PA 0.122 -0.208 MAIN: 0.21 UG/L PA 0.115 -0.092  
PH 0.006 -0.000 PH 0.004 0.003

HG 3-3B AA-BG BG HG AA-BG BG  
MAIN: 0.23 UG/L PA 0.106 -0.254 MAIN: 0.19 UG/L PA 0.077 -0.220  
PH 0.005 0.003 PH 0.004 -0.000

5 ml  
HG B-3C AA-BG BG HG AA-BG BG  
MAIN: 0.06 UG/L PA 0.022 -0.648 MAIN: 0.19 UG/L PA 0.058 -0.106  
PH 0.001 -0.001 PH 0.004 0.024

HG 1-3C AA-BG BG HG AA-BG BG  
MAIN: 1.55 UG/L PA 0.682 -0.195 MAIN: 1.68 UG/L PA 0.687 -0.359  
PH 0.032 -0.001 PH 0.035 0.016

HG 2-3C AA-BG BG HG AA-BG BG  
MAIN: 0.17 UG/L PA 0.084 -0.488 MAIN: 0.17 UG/L PA 0.074 0.011  
PH 0.004 0.012 PH 0.004 0.003

HG 3-3C AA-BG BG HG AA-BG BG  
MAIN: 0.13 UG/L PA 0.041 -0.265 MAIN: 0.08 UG/L PA 0.019 0.004  
PH 0.003 0.013 PH 0.002 0.000

| HG    | <i>CCV</i> | AA-BG    | BG    | HG    | <i>CCB</i> | AA-BG    | BG    |
|-------|------------|----------|-------|-------|------------|----------|-------|
| MAIN: | 5.15 UG/L  | PA 2.200 | 0.026 | MAIN: | 0.13 UG/L  | PA 0.054 | 0.056 |
|       |            | PH 0.108 | 0.003 |       |            | PH 0.003 | 0.000 |

**Appendix C.2**  
**Analytical Data**  
**Dioxins/Furans (M23)**

Pacific Environmental Services

25 FEB 2001

Michael Maret  
PES  
5001 South Miami Blvd  
Research Triangle Park, NC 27703

Ph.: 919-941-0333  
Fax: 919-941-0234

Dear Mike;

Attached to this narrative are the analytical results you requested on samples submitted for the determination of polychlorinated dibenzo-*p*-dioxins and dibenzofurans. The insert below summarizes the relevant information pertaining to your project. In particular, the QC annotations bring to your attention specific analytical observations and assessments made during the sample handling and data interpretation phases. A brief description of the report's components is provided on the next page.

|                                |                |
|--------------------------------|----------------|
| Your Project No.:              | F181.001       |
| AAP Project No.:               | P1388          |
| Analytical Protocol:           | Method 23      |
| No. of Samples Submitted:      | 4 (RB on hold) |
| No. of Samples Analyzed:       | 3              |
| No. of Lab Method Blanks (MB): | 1              |
| No. of OPRs:                   | 1              |

QC Annotations:

1. The data meet QA/QC requirements.
2. An "A" data qualifier is used for analytes with a concentration falling below the calibration curve.
3. Sample "M23-1" required additional cleanup to produce data of acceptable quality.

Alta Analytical Perspectives remains committed to serving you in the most effective manner. Should you have any questions or need additional information and technical support, please, do not hesitate to contact us at the telephone numbers shown below. We wanted to thank you for choosing Alta Analytical Perspectives as part of your analytical support team.

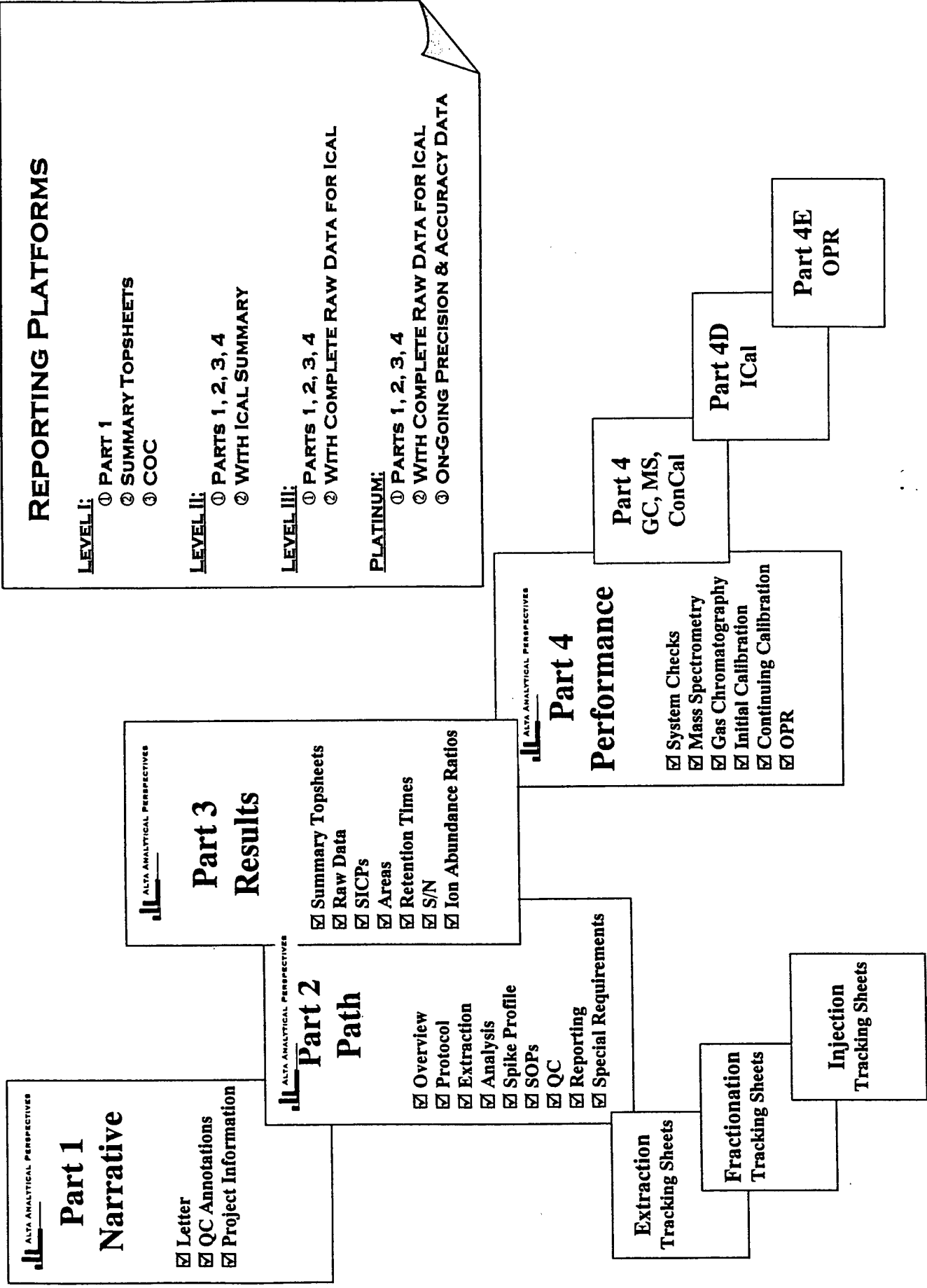
Sincerely,



Yves Tondeur, Ph.D.

2714 EXCHANGE DRIVE  
WILMINGTON  
NORTH CAROLINA 28405  
TEL.: 910-794-1613 FAX: 910-794-3919





ALTA ANALYTICAL PERSPECTIVES

# Part 1

## Narrative

- ☒ Letter
- ☒ QC Annotations
- ☒ Project Information

ALTA ANALYTICAL PERSPECTIVES

# Part 3

## Results

- ☒ Summary Topsheets
- ☒ Raw Data
- ☒ SICPs
- ☒ Areas
- ☒ Retention Times
- ☒ S/N
- ☒ Ion Abundance Ratios

ALTA ANALYTICAL PERSPECTIVES

# Part 2

## Path

- ☒ Overview
- ☒ Protocol
- ☒ Extraction
- ☒ Analysis
- ☒ Spike Profile
- ☒ SOPs
- ☒ QC
- ☒ Reporting
- ☒ Special Requirements

ALTA ANALYTICAL PERSPECTIVES

# Part 4

## Performance

- ☒ System Checks
- ☒ Mass Spectrometry
- ☒ Gas Chromatography
- ☒ Initial Calibration
- ☒ Continuing Calibration
- ☒ OPR

## Part 4

### GC, MS, ConCal

## Part 4D

### ICAL

## Part 4E

### OPR

## Extraction

### Tracking Sheets

## Fractionation

### Tracking Sheets

## Injection

### Tracking Sheets

# Sample Summary Method M23

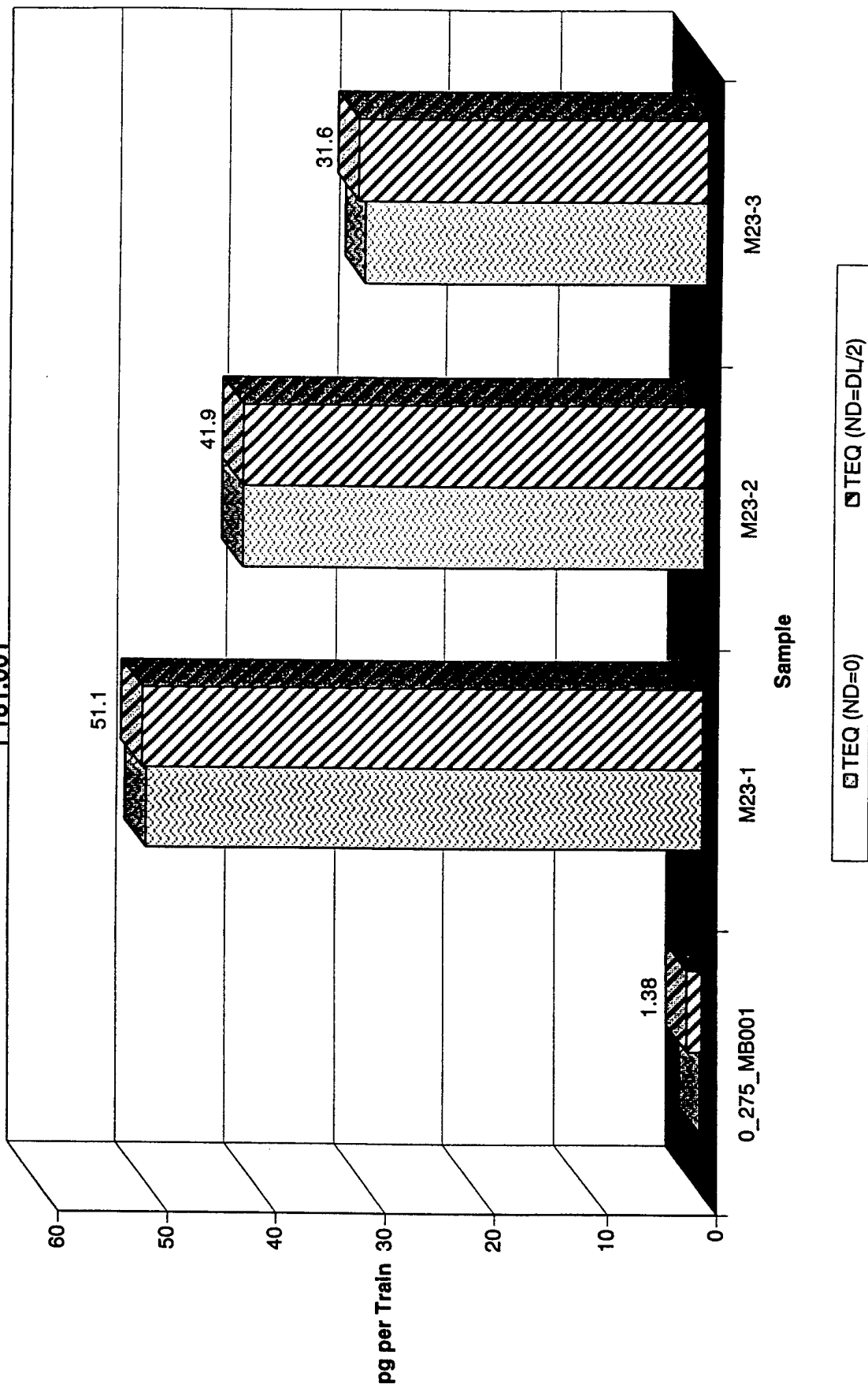
| Analyte                  | 0_275_MB001<br>pg | M23-1<br>pg | M23-2<br>pg | M23-3<br>pg |
|--------------------------|-------------------|-------------|-------------|-------------|
| 2,3,7,8-TCDD             | [1.29]            | (0.792)     | 0.945       | (0.58)      |
| 1,2,3,7,8-PeCDD          | (0.997)           | [1.74]      | 2.44        | (1.63)      |
| 1,2,3,4,7,8-HxCDD        | (1.68)            | 4.56        | [1.96]      | 2.54        |
| 1,2,3,6,7,8-HxCDD        | (1.87)            | 7.58        | [5.04]      | 4.63        |
| 1,2,3,7,8,9-HxCDD        | (1.68)            | 4.64        | 2.76        | [2.25]      |
| 1,2,3,4,6,7,8-HpCDD      | [1.9]             | 27.3        | 21.5        | 20.5        |
| OCDD                     | 12.9              | 74.4        | 57.1        | 63.3        |
| 2,3,7,8-TCDF             | (1.27)            | 11.3        | 8.77        | 7.39        |
| 1,2,3,7,8-PeCDF          | (1.84)            | 20.9        | 15.2        | 11.6        |
| 2,3,4,7,8-PeCDF          | (1.81)            | 46.6        | 36.1        | 26.5        |
| 1,2,3,4,7,8-HxCDF        | 1.69              | 48.9        | 40          | 28.9        |
| 1,2,3,6,7,8-HxCDF        | (0.552)           | 54.6        | 45.7        | 35.5        |
| 2,3,4,6,7,8-HxCDF        | (0.586)           | 87.3        | 73.7        | 60.2        |
| 1,2,3,7,8,9-HxCDF        | (0.67)            | 13.7        | 11.1        | 8.99        |
| 1,2,3,4,6,7,8-HpCDF      | 1.86              | 234         | 208         | 172         |
| 1,2,3,4,7,8,9-HpCDF      | (2.03)            | 26.5        | 22.2        | 18.8        |
| OCDF                     | (2.83)            | 145         | 118         | 113         |
| <b>Totals &amp; TEQs</b> |                   |             |             |             |
| TCDDs                    | ND                | 17.3        | 13          | 3.93        |
| PeCDDs                   | ND                | 41.3        | 31.3        | 18.8        |
| HxCDDs                   | ND                | 68.2        | 42.9        | 38.9        |
| HpCDDs                   | 1.83              | 55.6        | 44.4        | 41.5        |
| TCDFs                    | ND                | 345         | 265         | 205         |
| PeCDFs                   | ND                | 451         | 354         | 277         |
| HxCDFs                   | 1.69              | 517         | 441         | 345         |
| HpCDFs                   | 1.86              | 370         | 328         | 274         |
| <b>Total PCDD/Fs</b>     | <b>18.3</b>       | <b>2090</b> | <b>1690</b> | <b>1380</b> |
| <b>TEQ (ND=0)</b>        | <b>0.200</b>      | <b>50.7</b> | <b>41.9</b> | <b>30.9</b> |
| <b>TEQ (ND=DL/2)</b>     | <b>1.38</b>       | <b>51.1</b> | <b>41.9</b> | <b>31.6</b> |

() = DL  
[] = EMPC

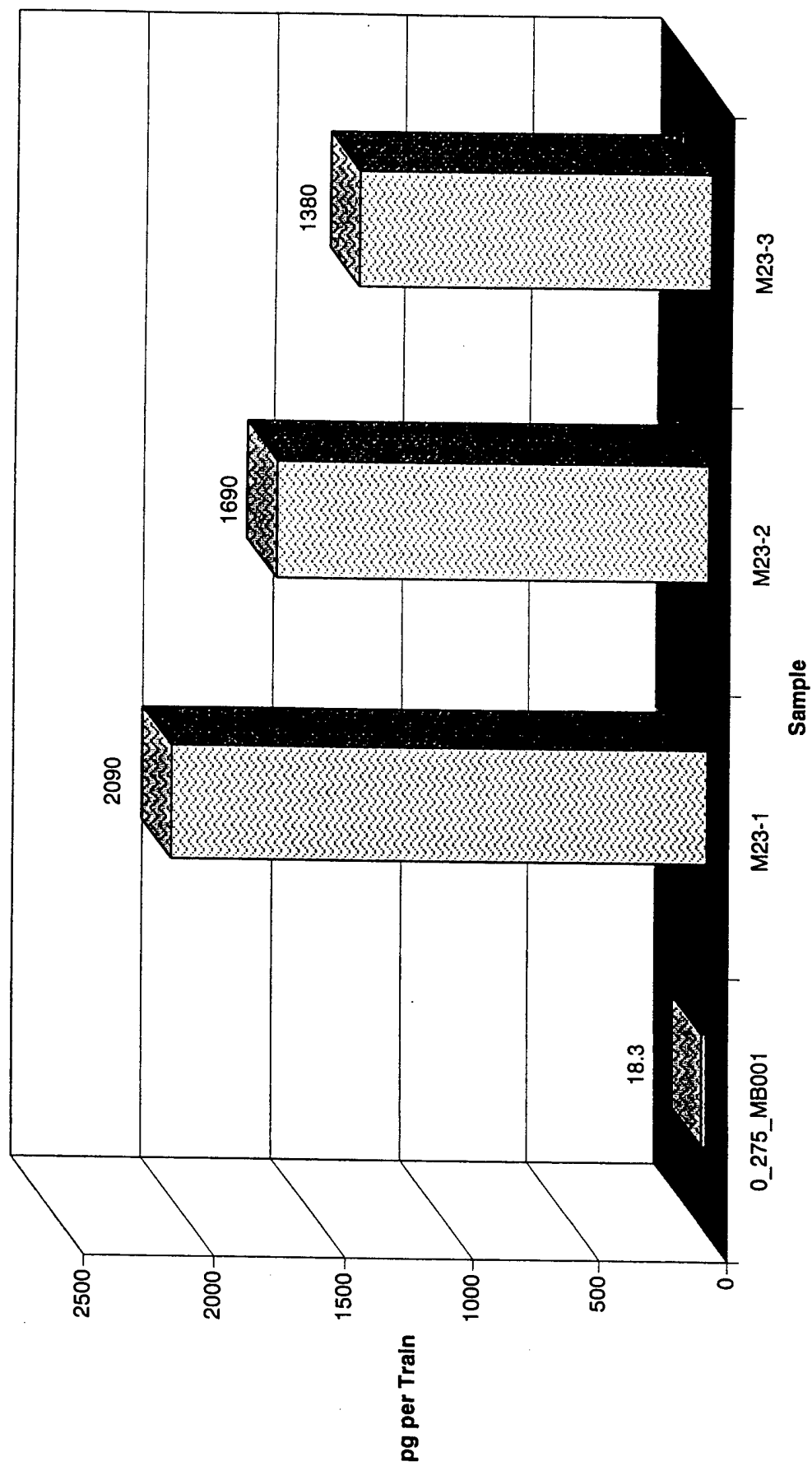
Reviewer  
Date

25 Feb 01

TEQ  
P1388  
F181.001



Total PCDD/Fs  
P1388  
F181.001



## Method M23

|          |           |
|----------|-----------|
| Reviewer | ce        |
| Date     | 25 Feb 01 |

# Sample ID: M23-1

## Method M23

| Client Data                                                                         |             |          | Sample Data    |           | Laboratory Data                                                                              |                 |                 |           |
|-------------------------------------------------------------------------------------|-------------|----------|----------------|-----------|----------------------------------------------------------------------------------------------|-----------------|-----------------|-----------|
| Name:                                                                               | PES         | Alr      | Matrix:        | 1         | Project No.:                                                                                 | P1388           | Date Received:  | 6-Feb-01  |
| Project ID:                                                                         | F181.001    |          | Weight/Volume: |           | Sample ID:                                                                                   | P1388_275_001CU | Date Extracted: | 8-Feb-01  |
| Date Collected:                                                                     | 31-Jan-01   |          |                |           | QC Batch No.:                                                                                | 275             | Date Analyzed:  | 23-FEB-01 |
| Analyte                                                                             | Conc.<br>pg | DL<br>pg | EMPC<br>pg     | Qualifier | Recoveries                                                                                   |                 |                 |           |
|                                                                                     |             |          |                |           | IS                                                                                           | SS              | AS              |           |
| 2,3,7,8-TCDD                                                                        | ND          | 0.792    | 1.74           |           | 102                                                                                          | 96.5            | 97.9            |           |
| 1,2,3,7,8-PeCDD                                                                     | EMPC        |          |                | A         | 99.7                                                                                         | 93.1            | 97.9            |           |
| 1,2,3,4,7,8-HxCDD                                                                   | 4.56        |          |                | A         | 104                                                                                          | 91.1            | 97.9            |           |
| 1,2,3,6,7,8-HxCDD                                                                   | 7.58        |          |                | A         | 104                                                                                          | 91.1            | 97.9            |           |
| 1,2,3,7,8,9-HxCDD                                                                   | 4.64        |          |                | A         | 104                                                                                          | 91.1            | 97.9            |           |
| 1,2,3,4,6,7,8-HpCDD                                                                 | 27.3        |          |                | A B       | 96.5                                                                                         | 90.3            | 97.9            |           |
| OCDD                                                                                | 74.4        |          |                | A B       | 83.6                                                                                         | 90.3            | 97.9            |           |
| 2,3,7,8-TCDF                                                                        | 11.3        |          |                |           | 100                                                                                          | 96.5            | 97.9            |           |
| 1,2,3,7,8-PeCDF                                                                     | 20.9        |          |                | A         | 91.1                                                                                         | 93.1            | 97.9            |           |
| 2,3,4,7,8-PeCDF                                                                     | 46.6        |          |                | A         | 91.1                                                                                         | 93.1            | 97.9            |           |
| 1,2,3,4,7,8-HxCDF                                                                   | 48.9        |          |                | A B       | 90.7                                                                                         | 96.9            | 97.9            |           |
| 1,2,3,6,7,8-HxCDF                                                                   | 54.6        |          |                |           | 90.7                                                                                         | 96.9            | 97.9            |           |
| 2,3,4,6,7,8-HxCDF                                                                   | 87.3        |          |                |           | 90.7                                                                                         | 96.9            | 97.9            |           |
| 1,2,3,7,8,9-HxCDF                                                                   | 13.7        |          |                | A         | 90.7                                                                                         | 96.9            | 97.9            |           |
| 1,2,3,4,6,7,8-HpCDF                                                                 | 234         |          |                | B         | 86                                                                                           | 90.3            | 97.9            |           |
| 1,2,3,4,7,8,9-HpCDF                                                                 | 26.5        |          |                | A         | 86                                                                                           | 90.3            | 97.9            |           |
| OCDF                                                                                | 145         |          |                |           | 81.3                                                                                         | 90.3            | 97.9            |           |
| Totals & TEQs                                                                       |             |          |                |           |                                                                                              |                 |                 |           |
| TCDDs                                                                               | 17.3        |          | 48.5           |           |                                                                                              |                 |                 |           |
| PeCDDs                                                                              | 41.3        |          |                |           |                                                                                              |                 |                 |           |
| HxCDDs                                                                              | 68.2        |          |                |           |                                                                                              |                 |                 |           |
| HpCDDs                                                                              | 55.6        |          |                |           |                                                                                              |                 |                 |           |
| TCDFs                                                                               | 345         |          | 370            |           |                                                                                              |                 |                 |           |
| PeCDFs                                                                              | 451         |          | 456            |           |                                                                                              |                 |                 |           |
| HxCDFs                                                                              | 517         |          |                |           |                                                                                              |                 |                 |           |
| HpCDFs                                                                              | 370         |          |                |           |                                                                                              |                 |                 |           |
| Total PCDD/Fs                                                                       | 2090        |          | 2120           | ITEF      |                                                                                              |                 |                 |           |
| TEQ (ND=0)                                                                          | 50.7        |          | 51.5           | ITEF      |                                                                                              |                 |                 |           |
| TEQ (ND=DL/2)                                                                       | 51.1        |          | 51.9           |           |                                                                                              |                 |                 |           |
|  |             |          |                |           | ALTA ANALYTICAL PERSPECTIVES                                                                 |                 |                 |           |
|                                                                                     |             |          |                |           | 2714 Exchange Drive<br>Wilmington<br>North Carolina 28405<br>USA                             |                 |                 |           |
|                                                                                     |             |          |                |           | Tel: 910 794-1613<br>Fax: 910 794-3919<br>e-mail: ytondeur@cs.com<br>web: www.ultratrace.com |                 |                 |           |



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web: www.ultratrace.com

Reviewer  
Date

25 Feb 01

# Sample ID: M23-2

# Method M23

| Client Data              |             |     | Sample Data    |           | Laboratory Data |               |                          |
|--------------------------|-------------|-----|----------------|-----------|-----------------|---------------|--------------------------|
| Name:                    | PES         | Air | Matrix:        | 1         | Project No.:    | P1388         | Date Received: 6-Feb-01  |
| Project ID:              | F181.001    |     | Weight/Volume: |           | Sample ID:      | P1388_275_002 | Date Extracted: 8-Feb-01 |
| Date Collected:          | 31-Jan-01   |     |                |           | QC Batch No.:   | 275           | Date Analyzed: 14-FEB-01 |
| Analyte                  | Conc.       | DL  | EMPC           | Qualifier | Recoveries      |               |                          |
|                          | pg          | pg  | pg             |           | IS              | SS            | AS                       |
| 2,3,7,8-TCDD             | 0.945       |     |                | A B       | 98              | 102           | 86.2                     |
| 1,2,3,7,8-PeCDD          | 2.44        |     |                | A         | 108             | 105           | 86.2                     |
| 1,2,3,4,7,8-HxCDD        | EMPC        |     | 1.96           | A         | 97.4            | 102           | 86.2                     |
| 1,2,3,6,7,8-HxCDD        | EMPC        |     | 5.04           | A         | 97.4            | 102           | 86.2                     |
| 1,2,3,7,8,9-HxCDD        | 2.76        |     |                | A         | 97.4            | 102           | 86.2                     |
| 1,2,3,4,6,7,8-HpCDD      | 21.5        |     |                | A B       | 98.1            | 104           | 86.2                     |
| OCDD                     | 57.1        |     |                | A B       | 91.3            | 104           | 86.2                     |
| 2,3,7,8-TCDF             | 8.77        |     |                | A         | 94              | 102           | 86.2                     |
| 1,2,3,7,8-PeCDF          | 15.2        |     |                | A         | 95.4            | 105           | 86.2                     |
| 2,3,4,7,8-PeCDF          | 36.1        |     |                | A         | 95.4            | 105           | 86.2                     |
| 1,2,3,4,7,8-HxCDF        | 40          |     |                | A B       | 85.9            | 104           | 86.2                     |
| 1,2,3,6,7,8-HxCDF        | 45.7        |     |                | A         | 85.9            | 104           | 86.2                     |
| 2,3,4,6,7,8-HxCDF        | 73.7        |     |                | A         | 85.9            | 104           | 86.2                     |
| 1,2,3,7,8,9-HxCDF        | 11.1        |     |                | A         | 85.9            | 104           | 86.2                     |
| 1,2,3,4,6,7,8-HpCDF      | 208         |     |                | B         | 85.4            | 104           | 86.2                     |
| 1,2,3,4,7,8,9-HpCDF      | 22.2        |     |                | A         | 85.4            | 104           | 86.2                     |
| OCDF                     | 118         |     |                |           | 88.9            | 104           | 86.2                     |
| <b>Totals &amp; TEQs</b> |             |     |                |           |                 |               |                          |
| TCDDs                    | 13          |     | 15.6           |           |                 |               |                          |
| PeCDDs                   | 31.3        |     | 33.9           |           |                 |               |                          |
| HxCDDs                   | 42.9        |     | 49.9           |           |                 |               |                          |
| HpCDDs                   | 44.4        |     |                |           |                 |               |                          |
| TCDFs                    | 265         |     |                |           |                 |               |                          |
| PeCDFs                   | 354         |     | 360            |           |                 |               |                          |
| HxCDFs                   | 441         |     |                |           |                 |               |                          |
| HpCDFs                   | 328         |     |                |           |                 |               |                          |
| <b>Total PCDD/Fs</b>     | <b>1690</b> |     | <b>1710</b>    |           |                 |               |                          |
| <b>TEQ (ND=0)</b>        | <b>41.9</b> |     | <b>42.6</b>    | ITEF      |                 |               |                          |
| <b>TEQ (ND=DL/2)</b>     | <b>41.9</b> |     | <b>42.6</b>    | ITEF      |                 |               |                          |



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Reviewer  
Date

25 Feb 01

| Sample ID: M23-3    |             |                |              | Method M23                                                                                   |               |                 |           |
|---------------------|-------------|----------------|--------------|----------------------------------------------------------------------------------------------|---------------|-----------------|-----------|
| Client Data         |             | Sample Data    |              | Laboratory Data                                                                              |               |                 |           |
| Name:               | PES         | Matrix:        | Air          | Project No.:                                                                                 | P1388         | Date Received:  | 6-Feb-01  |
| Project ID:         | F181.001    | Weight/Volume: | 1            | Sample ID:                                                                                   | P1388_275_003 | Date Extracted: | 8-Feb-01  |
| Date Collected:     | 1-Feb-01    |                |              | QC Batch No.:                                                                                | 275           | Date Analyzed:  | 14-FEB-01 |
| Analyte             | Conc.<br>pg | DL<br>pg       | EMPC<br>pg   | Qualifier                                                                                    | Recoveries    |                 |           |
|                     |             |                |              |                                                                                              | IS            | SS              | AS        |
| 2,3,7,8-TCDD        | ND          | 0.58           |              |                                                                                              | 103           | 84              | 89.8      |
| 1,2,3,7,8-PeCDD     | ND          | 1.63           |              |                                                                                              | 111           | 83.5            | 89.8      |
| 1,2,3,4,7,8-HxCDD   | 2.54        |                |              | A                                                                                            | 102           | 84.1            | 89.8      |
| 1,2,3,6,7,8-HxCDD   | 4.63        |                |              | A                                                                                            | 102           | 84.1            | 89.8      |
| 1,2,3,7,8,9-HxCDD   | EMPC        |                | 2.25         | A                                                                                            | 102           | 84.1            | 89.8      |
| 1,2,3,4,6,7,8-HpCDD | 20.5        |                |              | AB                                                                                           | 103           | 85.7            | 89.8      |
| OCDD                | 63.3        |                |              | AB                                                                                           | 94.1          | 85.7            | 89.8      |
| 2,3,7,8-TCDF        | 7.39        |                |              | A                                                                                            | 98.5          | 84              | 89.8      |
| 1,2,3,7,8-PeCDF     | 11.6        |                |              | A                                                                                            | 99.5          | 83.5            | 89.8      |
| 2,3,4,7,8-PeCDF     | 26.5        |                |              | A                                                                                            | 99.5          | 83.5            | 89.8      |
| 1,2,3,4,7,8-HxCDF   | 28.9        |                |              | AB                                                                                           | 90.2          | 82.3            | 89.8      |
| 1,2,3,6,7,8-HxCDF   | 35.5        |                |              | A                                                                                            | 90.2          | 82.3            | 89.8      |
| 2,3,4,6,7,8-HxCDF   | 60.2        |                |              | A                                                                                            | 90.2          | 82.3            | 89.8      |
| 1,2,3,7,8,9-HxCDF   | 8.99        |                |              | A                                                                                            | 90.2          | 82.3            | 89.8      |
| 1,2,3,4,6,7,8-HpCDF | 172         |                |              | B                                                                                            | 87.7          | 85.7            | 89.8      |
| 1,2,3,4,7,8,9-HpCDF | 18.8        |                |              | A                                                                                            | 87.7          | 85.7            | 89.8      |
| OCDF                | 113         |                |              |                                                                                              | 90.4          | 85.7            | 89.8      |
| Totals & TEQs       |             |                |              |                                                                                              |               |                 |           |
| TCDDs               | 3.93        |                | 6.91         |                                                                                              |               |                 |           |
| PeCDDs              | 18.8        |                |              |                                                                                              |               |                 |           |
| HxCDDs              | 38.9        |                | 43           |                                                                                              |               |                 |           |
| HpCDDs              | 41.5        |                |              |                                                                                              |               |                 |           |
| TCDFs               | 205         |                |              |                                                                                              |               |                 |           |
| PeCDFs              | 277         |                |              |                                                                                              |               |                 |           |
| HxCDFs              | 345         |                |              |                                                                                              |               |                 |           |
| HpCDFs              | 274         |                |              |                                                                                              |               |                 |           |
| Total PCDD/Fs       | 1380        |                |              |                                                                                              |               |                 |           |
| TEQ (ND=0)          | 30.9        |                | 1390         | ITEF                                                                                         |               |                 |           |
| TEQ (ND=DL/2)       | 31.6        |                | 31.1<br>31.8 | ITEF                                                                                         |               |                 |           |
|                     |             |                |              | ALTA ANALYTICAL PERSPECTIVES                                                                 |               |                 |           |
|                     |             |                |              | 2714 Exchange Drive<br>Wilmington<br>North Carolina 28405<br>USA                             |               |                 |           |
|                     |             |                |              | Tel: 910 794-1613<br>Fax: 910 794-3919<br>e-mail: ytondeur@cs.com<br>web: www.ultratrace.com |               |                 |           |



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Reviewer *CL*  
Date *25 Feb 01*





## **PART 2**

# **SAMPLE PATH**

DOCUMENTATION FOR THE ANALYSIS  
OF  
POLYCHLORINATED DIBENZO-*p*-DIOXINS & DIBENZOFURANS

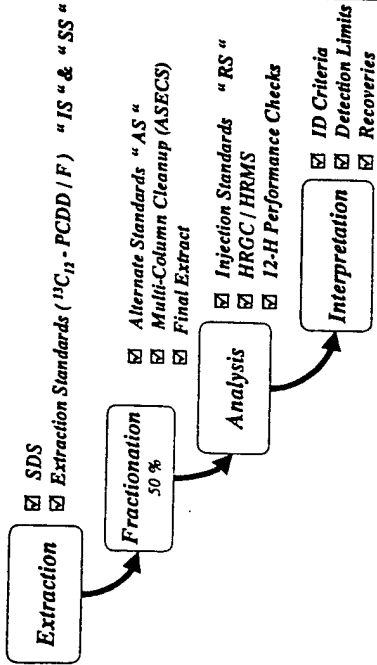


ALTA ANALYTICAL PERSPECTIVES

# SAMPLE PATH

AAP PROJECT NO.: P1388  
PROTOCOL: 23

## SAMPLE PROCESSING



## SPIKE PROFILE

NS: 100 PG (10 µL; 0.01 NG/µL) FOR OPR ONLY  
IS: 4 NG (25 µL; 0.16 NG/µL)  
AS & SS: 4 NG (25 µL; 0.16 NG/µL)  
RS: 2 NG (10 µL; 0.2 NG/µL)

## SOPS

EXTRACTION: AP-SP-E  
FRACTIONATION: AP-SP-CU  
ANALYSIS: AP-SP-A  
CONCENTRATION: AP-SP-N  
FORTIFICATION: AP-SP-F  
DATA VALIDATION: AP-SP-R

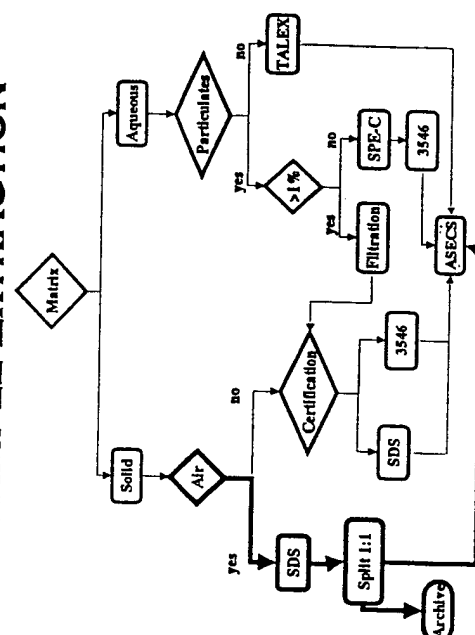
## QC PROFILE

LMB: ALWAYS REQUIRED  
OPR: ALWAYS REQUIRED

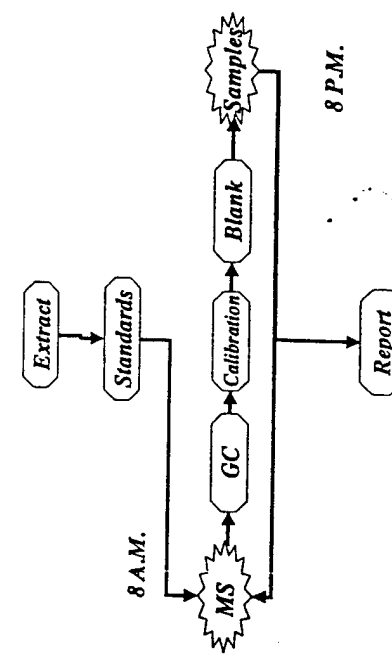
## REPORTING PLATFORM

LEVEL: I II III PLATINUM

## SAMPLE EXTRACTION



## SAMPLE ANALYSIS



## SPECIAL REQUIREMENTS

### SUPPLIES IDS

SAND 05199  
TOLUENE 01152001A  
ACID SILICA 02002001A  
BASE SILICA 01182001  
SILICA 01182001  
FLORISIL SP07058  
HEXANE 007436  
CH<sub>2</sub>CL<sub>2</sub> 005597  
TETRADECANE 138078

Project: P1388 Extraction Set: 275 Chemist: CMR 02/08/01

Method(s): EPA Method 23

| ALTA Sample ID | Client Sample ID | PUF/Trap Prep Date | XAD Lot# | IS/NS | CHM/ WIT | Impinger Extraction Date | AS | CHM/WIT | CHM/MSF | ASECS | CHM/DATE | CHM/WIT | CHM/DATE |
|----------------|------------------|--------------------|----------|-------|----------|--------------------------|----|---------|---------|-------|----------|---------|----------|
| 0_275_MB001    | —                | —                  | —        | BT    | BT       | —                        | BT | BT      | BT      | BT    | BT       | BT      | BT       |
| 0_275_OPR001   | —                | —                  | —        | BT    | BT       | —                        | BT | BT      | BT      | BT    | BT       | BT      | BT       |
| P1388_275_001  | M23-1            | —                  | —        | BT    | BT       | —                        | BT | BT      | BT      | BT    | BT       | BT      | BT       |
| P1388_275_002  | M23-2            | —                  | —        | BT    | BT       | —                        | BT | BT      | BT      | BT    | BT       | BT      | BT       |
| P1388_275_003  | M23-3            | —                  | —        | BT    | BT       | —                        | BT | BT      | BT      | BT    | BT       | BT      | BT       |

Vial Box ID: BT 02/08/01

001 filter - dry, water, grey, yellow XAD - showing no coloration of black or grey, white, wet, smoky odor  
 002 filter - dry, grey XAD - trap arrived broken, on lot end XAD sticking no coloration of wet, white  
 003 filter - dry, grey, yellow XAD - sticking no coloration of wet, white

02/27/01 Took Arrived vial\*  
 CMR and put in a vial  
 and out. No 2 to 3  
 # 2 was 9 ml RS for final  
 vol of 10 ml. Billed  
 vial as such and  
 sent to NSpec.

001: final extract is yellow.

→ Distilled fuel extract before 6:15.

(XXXX) } 2 fl of 10 fl fuel volume  
 + 2 fl of RS (0.24 fl)  
 → + 16 fl of C14 (-2)

\* note: original vial medium 10 fl C14 - No AS  
 extracted to it → Cap, Stop, Save. y.t.

P1370  
 PACIFIC ENVIRONMENTAL SERVICE  
 PREP: 01 JAN 25  
 EXPIRATION: 02 FEB 08  
 4 NG SAMPLING STANDARDS PCDD/Fs  
 INITIALS: JCF

|                     |                   |                   |                    |            |                     |
|---------------------|-------------------|-------------------|--------------------|------------|---------------------|
| IS ID #1: 000919C ② | AS ID #1: 000919B | RS ID #1: 000919E | Cycle #1: 02/08/01 | Split: / / | Check Out: 02/08/01 |
| IS ID #2: 428-NS    | AS ID #2: 428-AS  | RS ID #2: 428-RS  | Start 5:30pm       | 1:4        | Chemist: CMB        |
| IS ID #3: 428-NS    | AS ID #3: 428-AS  | RS ID #3: 428-RS  | Stop: 11:30AM      | ①:2        | Check-In: 02/08/01  |
| IS ID #4: 428-NS    | AS ID #4: 428-AS  | RS ID #4: 428-RS  |                    |            | Chemist: 02/08/01   |

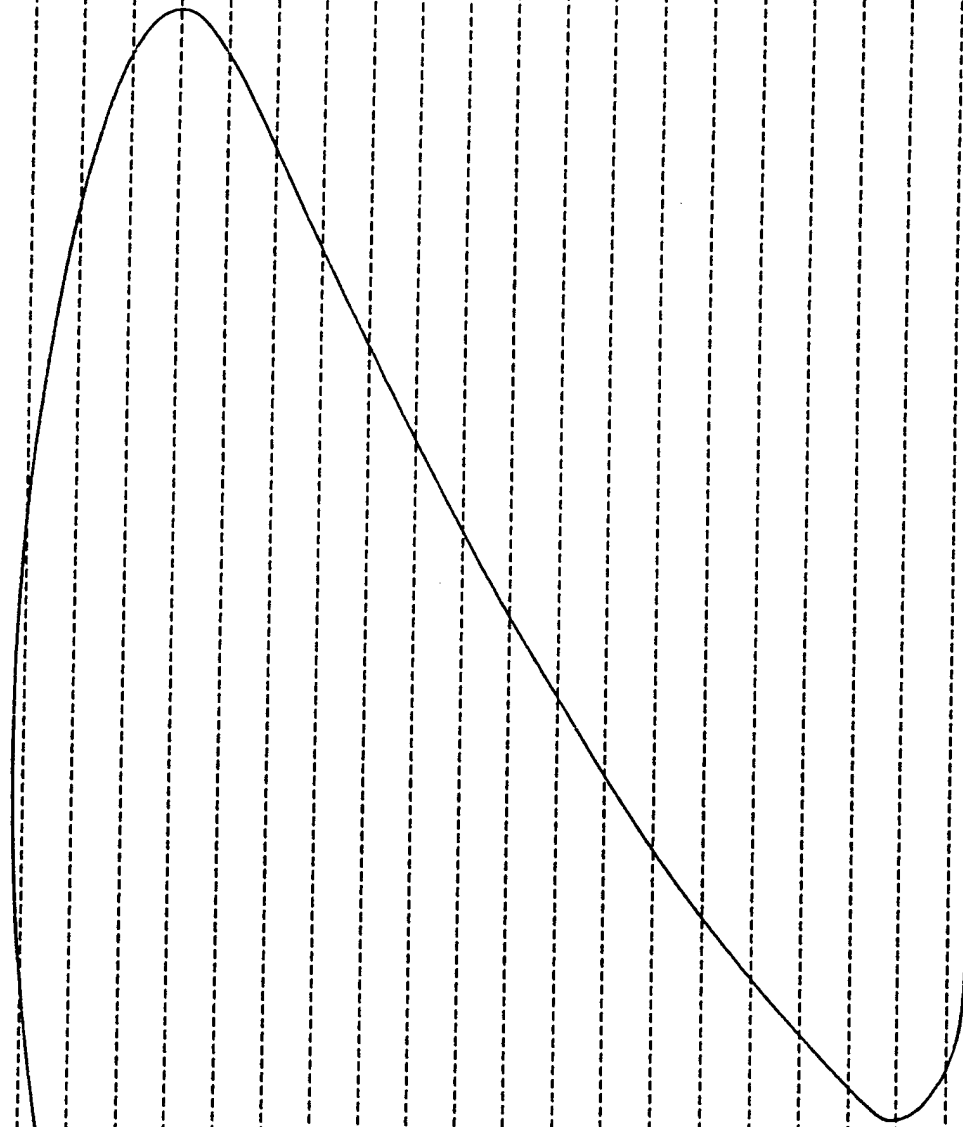


ALTA ANALYTICAL PERSPECTIVES

## SAMPLE PATH

AAP PROJECT NO.: P1388  
PROTOCOL: 23

COMMUNICATIONS



25 Feb 01



# Sample Inventory Report: MM5 Sampling Train

Project No.: P1388 Project Name: General Analytical HRMS

Date Rec.: 6-Feb-01

| Lab. Sample ID | Collection Date | Client Sample ID | Component ID |
|----------------|-----------------|------------------|--------------|
| 001            | 31-Jan-01       | M23-1            | Ace/Me       |
|                | 31-Jan-01       |                  | Filter       |
|                | 31-Jan-01       |                  | XAD          |
| 002            | 31-Jan-01       | M23-2            | Ace/Me       |
|                | 31-Jan-01       |                  | Filter       |
|                | 31-Jan-01       |                  | XAD          |
| 003            | 1-Feb-01        | M23-3            | Ace/Me       |
|                | 1-Feb-01        |                  | Filter       |
|                | 1-Feb-01        |                  | XAD          |
| 004            | 1-Feb-01        | Reagent Blk      | Ace/Me       |
|                | 1-Feb-01        |                  | Toluene      |
|                | 1-Feb-01        |                  | XAD          |

Hold

OK  
J.F.  
06 Feb 01

# PROCESS SHEET

Project No.-AR: P1388-1 of 1

Project Due: 2/27/01

Client: Pacific Environmental Services (PAENC01A)

TAT: 21

Client Manager: Yves Tondeur

Extraction Due: 3/2/01

Method: EPA Method 23  
Extraction Type: EPA Method 23

Matrix: MM5  
Split Type: 1:2

Component: PCDD/F (Tetra - Octa)

| LabID | Client-ID | Component Type | Client Component ID | Date Received | SLoc |
|-------|-----------|----------------|---------------------|---------------|------|
| 001   | M23-1     | Filter#1       | Filter              | 2/6/01        | F-2  |
|       |           | Solvent#1      | Ace/Me              | 2/6/01        | F-2  |
|       |           | XAD#1          | XAD                 | 2/6/01        | F-2  |
| 002   | M23-2     | Filter#1       | Filter              | 2/6/01        | F-2  |
|       |           | Solvent#1      | Ace/Me              | 2/6/01        | F-2  |
|       |           | XAD#1          | XAD                 | 2/6/01        | F-2  |
| 003   | M23-3     | Filter#1       | Filter              | 2/6/01        | F-2  |
|       |           | Solvent#1      | Ace/Me              | 2/6/01        | F-2  |
|       |           | XAD#1          | XAD                 | 2/6/01        | F-2  |

## Instructions:

## Report Options

Report Level: 1

EDD Type:

Vial Box ID: \_\_\_\_\_

Date Requested: 2/20/01  
HRMSAirAR.rpt



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

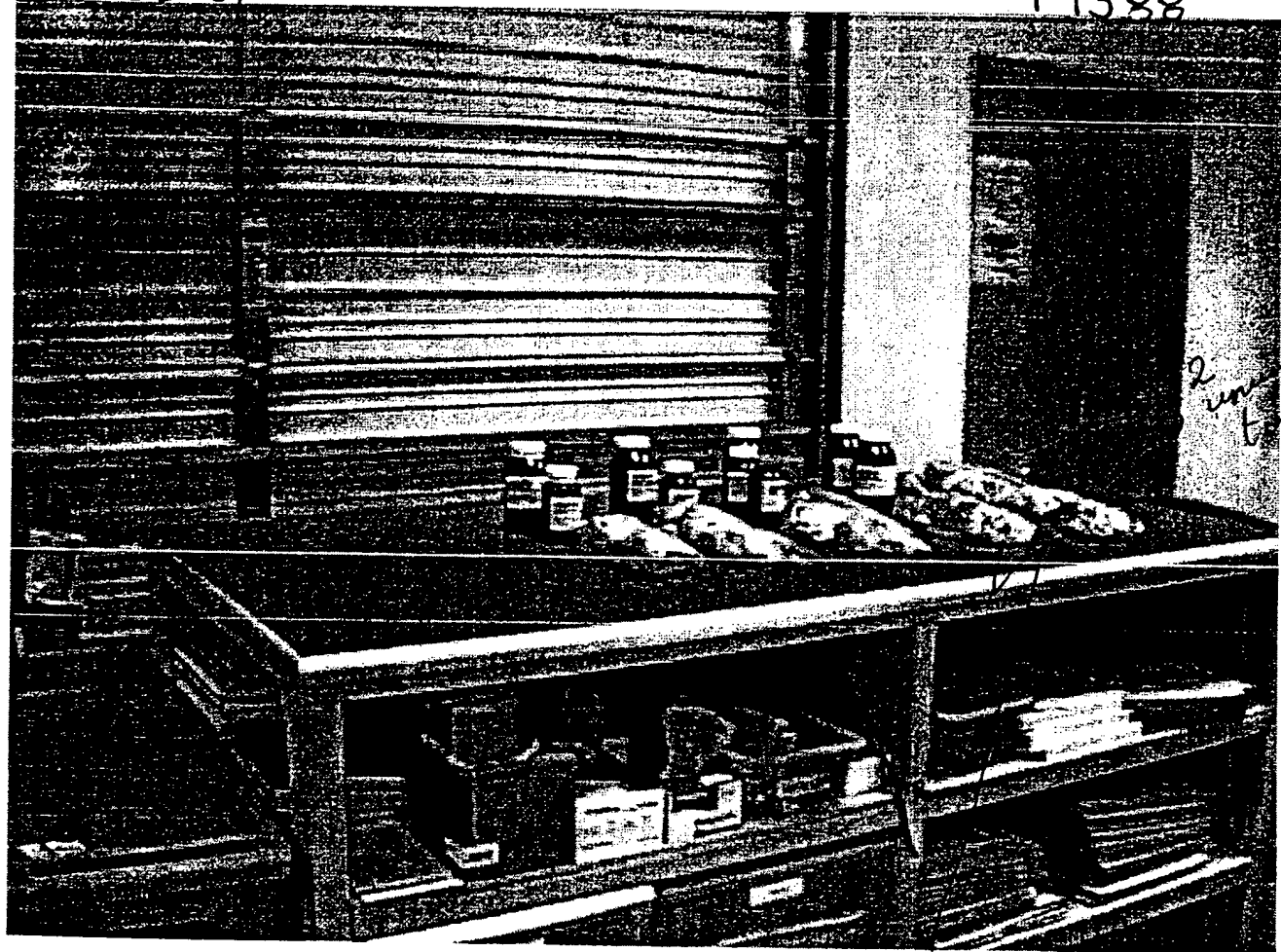
## Chain of Custody Record

| Project Number: F181.001     |      | Project Name: DD Holzschuh, J Falank, MD Maret |                                            | Andrews AFB Medical Waste Incinerator |                          | Analysis Requested |                   |  |                              |  | Remarks           |
|------------------------------|------|------------------------------------------------|--------------------------------------------|---------------------------------------|--------------------------|--------------------|-------------------|--|------------------------------|--|-------------------|
| Date                         | Time | Field Sample ID                                | Sample Description                         | PCDD                                  | PCDF                     |                    |                   |  |                              |  |                   |
| 1/31/01                      | 1000 | M23-1-1                                        | Filter, dry                                |                                       |                          |                    |                   |  |                              |  |                   |
| 1/31/01                      | 1000 | M23-1-2                                        | XAD Sorbent Module                         |                                       |                          |                    |                   |  |                              |  |                   |
| 1/31/01                      | 1000 | M23-1-3                                        | Front Half Back Half Acetone/Toluene rinse |                                       |                          |                    |                   |  |                              |  |                   |
| 1/31/01                      | 1000 | M23-1-4A                                       | Impinger Contents Fraction 1               |                                       |                          |                    |                   |  |                              |  |                   |
| 1/31/01                      | 1000 | M23-1-4B                                       | Impinger Contents Fraction 2               |                                       |                          |                    |                   |  |                              |  |                   |
| 1/31/01                      | 1500 | M23-2-1                                        | Filter, dry                                |                                       |                          |                    |                   |  |                              |  |                   |
| 1/31/01                      | 1500 | M23-2-2                                        | XAD Sorbent Module                         |                                       |                          |                    |                   |  |                              |  |                   |
| 1/31/01                      | 1500 | M23-2-3                                        | Front Half Back Half Acetone/Toluene rinse |                                       |                          |                    |                   |  |                              |  |                   |
| 1/31/01                      | 1500 | M23-2-4A                                       | Impinger Contents Fraction 1               |                                       |                          |                    |                   |  |                              |  |                   |
| 1/31/01                      | 1500 | M23-2-4A                                       | Impinger Contents Fraction 2               |                                       |                          |                    |                   |  |                              |  |                   |
| 2/1/01                       | 0900 | M23-3-1                                        | Filter, dry                                |                                       |                          |                    |                   |  |                              |  |                   |
| 2/1/01                       | 0900 | M23-3-2                                        | XAD Sorbent Module                         |                                       |                          |                    |                   |  |                              |  |                   |
| 2/1/01                       | 0900 | M23-3-3                                        | Front Half Back Half Acetone/Toluene rinse |                                       |                          |                    |                   |  |                              |  |                   |
| 2/1/01                       | 0900 | M23-3-3A                                       | Front Half Back Half Acetone/Toluene rinse |                                       |                          |                    |                   |  |                              |  |                   |
| 2/1/01                       | 0900 | M23-3-4A                                       | Impinger Contents Fraction 1               |                                       |                          |                    |                   |  |                              |  |                   |
| 2/1/01                       | 0900 | M23-3-4B                                       | Impinger Contents Fraction 2               |                                       |                          |                    |                   |  |                              |  |                   |
| 2/1/01                       | 1400 | M23-B-2                                        | XAD Sorbent Module                         |                                       |                          |                    |                   |  |                              |  |                   |
| 2/1/01                       | 1400 | M23-DI                                         | HPLC Water Reagent                         |                                       |                          |                    |                   |  |                              |  |                   |
| 2/1/01                       | 1400 | M23-A                                          | Acetone Reagent Blank                      |                                       |                          |                    |                   |  |                              |  |                   |
| 2/1/01                       | 1400 | M23-T                                          | Toluene Reagent Blank                      |                                       |                          |                    |                   |  |                              |  |                   |
| Relinquished by: (Signature) |      |                                                |                                            | Date/Time: 2/6/01                     | Received by: (Signature) |                    | Date/Time: 10:20  |  | Relinquished by: (Signature) |  | Date/Time: 2/6/01 |
| Relinquished by: (Signature) |      |                                                |                                            | Date/Time: 2-6-01                     | Received by: (Signature) |                    | Date/Time: 1/25   |  | Relinquished by: (Signature) |  | Date/Time: 2/6/01 |
| Relinquished by: (Signature) |      |                                                |                                            | Date/Time: 2/6/01                     | Received by: (Signature) |                    | Date/Time: 2/6/01 |  | Relinquished by: (Signature) |  | Date/Time: 2/6/01 |

4-2 nightingale lot labeled container  
PH/BK  
2-3  
Fuels

02-06-01

P1388



2 unopened traps

Note: Imp. Goshawk (2 bottles) spc)  
not shown.  
TIT  
06 Feb 01.

Blank  
(Held)



## STANDARD OPERATING PROCEDURE



Attachment 1

ALTA ANALYTICAL PERSPECTIVES Project No.: P 1388

| Sample Log-In Checklist                                                                                                                       | Yes                                 | No                                  |
|-----------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------|-------------------------------------|
| 1. Date Samples Arrived: <u>02-06-01</u> Initials: <u>BT</u>                                                                                  |                                     |                                     |
| 2. Time / Date logged in: <u>1:28 02-06-01</u> Location <u>F-2</u> Initials: <u>BT</u>                                                        |                                     |                                     |
| 3. Samples Arrived By: (circle one) Airborne Express Federal Express UPS Emery<br>Freezer Truck <u>Company Courier</u> DHL Other              |                                     |                                     |
| 4. Shipping Preservation: (circle) Ice / Blue Ice / Dry Ice <u>(None)</u> Temp °C <u>19°</u>                                                  |                                     |                                     |
| 5. Shipping Documentation Present? (circle one) Shipping Label<br>Airbill Tracking Number                                                     |                                     | <input checked="" type="checkbox"/> |
| 6. Shipping Container(s) Intact? If no, describe condition below.                                                                             | <input checked="" type="checkbox"/> |                                     |
| 7. Container Custody Seals Present and Intact? If not intact, describe condition below.                                                       |                                     | <input checked="" type="checkbox"/> |
| 8. Sample Custody Seals Present and Intact? If not intact, describe condition below.<br>No. of Seals _____ or Seal No. _____                  |                                     | <input checked="" type="checkbox"/> |
| 9. Sample Container Intact? If no, indicate sample condition below.                                                                           | <input checked="" type="checkbox"/> |                                     |
| 10. Chain of Custody (COC) or other Sample Documentation Present?                                                                             | <input checked="" type="checkbox"/> |                                     |
| 11. COC/Documentation Acceptable? If no, complete COC Anomaly Form.                                                                           | <input checked="" type="checkbox"/> |                                     |
| 12. Shipping Container: (circle) <u>ALTA ANALYTICAL PERSPECTIVES</u> Return or <u>Retain</u> or Dispose<br>Client Return or Retain or Dispose |                                     |                                     |
| 13. Container and/or Bottles Requested?                                                                                                       |                                     | <input checked="" type="checkbox"/> |
| 14. Sample Control Check In/Out Log Completed?                                                                                                | <input checked="" type="checkbox"/> |                                     |
| 15. Drinking Water Sample? If yes, Acceptable Preservation? (circle) Y or N                                                                   |                                     | <input checked="" type="checkbox"/> |
| 16. Imported Soil? If yes, apply appropriate label.                                                                                           |                                     | <input checked="" type="checkbox"/> |

Name: Brian Pendur

Date Samples Reconciled: \_\_\_\_\_

Comments:

## Alta Analytical Perspectives - Injection Log

Page 1 of 1

GC Column ID: db-5

Run file: 010214P1

| Data file | S# | Vial# | Lab ID           | Sample ID (Chrom. Text)           | Analyst | Acq date  | Acq time |
|-----------|----|-------|------------------|-----------------------------------|---------|-----------|----------|
| 010214P1  | 1  | 3     | CS3RC            | DB5 CPSM / M23 CS3                | GAG     | 14-FEB-01 | 11:05:47 |
| 010214P1  | 2  | 76    | 0_275_OPR001     | 0_275_OPR001                      | GAG     | 14-FEB-01 | 11:57:29 |
| 010214P1  | 3  | 77    | 0_275_MB001      | 0_275_MB001                       | GAG     | 14-FEB-01 | 12:49:16 |
| 010214P1  | 4  | 78    | P1388_275_001D10 | P1388_275_001 M23-1 Air Train D10 | GAG     | 14-FEB-01 | 13:41:03 |
| 010214P1  | 5  | 79    | P1388_275_002    | P1388_275_002 M23-2 Air Train     | GAG     | 14-FEB-01 | 14:32:45 |
| 010214P1  | 6  | 80    | P1388_275_003    | P1388_275_003 M23-3 Air Train     | GAG     | 14-FEB-01 | 15:24:32 |
| 010214P1  | 7  | 3     | CS3RC            | DB5 CPSM / M23 CS3                | GAG     | 14-FEB-01 | 16:16:11 |
| 010223P1  | 1  | 3     | CS3RC            | DB5 CPSM / M23 CS3                | GAG     | 23-FEB-01 | 11:17:52 |
| 010223P1  | 2  | 15    | SB               | SOLVENT BLANK                     | GAG     | 23-FEB-01 | 12:09:30 |
| 010223P1  | 3  | 65    | P1388_275_001CU  | P1388_275_001 M23-1 Air Train CU  | GAG     | 23-FEB-01 | 13:01:16 |
| 010223P1  | 4  | 3     | CS3RC            | DB5 CPSM / M23 CS3                | GAG     | 23-FEB-01 | 13:52:50 |

Not  
processed  
see st.  
run

resolution plot for function 5 of 1 CS3 on 14 Feb 01 not printed  
(SIDS communication lost while centerholding function 5 - system had to  
be rebooted)  
OK Y.T.



ALTA ANALYTICAL PERSPECTIVES

## **PART 3**

# **ANALYTICAL RESULTS**

DOCUMENTATION FOR THE ANALYSIS  
OF  
POLYCHLORINATED DIBENZO-*p*-DIOXINS & DIBENZOFURANS

Sample ID: 0\_275\_MB001

Method M23

| Client Data         |             |                | Sample Data |                                                                                                                                                                                                                                                                                                                      | Laboratory Data |                 |           | Method M23 |  |  |
|---------------------|-------------|----------------|-------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|-----------------|-----------|------------|--|--|
| Name:               | PES         | Matrix:        | Air         | Project No.:                                                                                                                                                                                                                                                                                                         | P1388           | Date Received:  | n/a       |            |  |  |
| Project ID:         | F181.001    | Weight/Volume: | 1           | Sample ID:                                                                                                                                                                                                                                                                                                           | 0_275_MB001     | Date Extracted: | 8-Feb-01  |            |  |  |
| Date Collected:     | n/a         |                |             | QC Batch No.:                                                                                                                                                                                                                                                                                                        | 275             | Date Analyzed:  | 14-FEB-01 |            |  |  |
| Analyte             | Conc.<br>pg | DL<br>pg       | EMPC<br>pg  | Qualifier                                                                                                                                                                                                                                                                                                            | Recoveries      |                 |           | AS         |  |  |
|                     |             |                |             |                                                                                                                                                                                                                                                                                                                      | IS              | SS              |           |            |  |  |
| 2,3,7,8-TCDD        | EMPC        |                | 1.29        | A                                                                                                                                                                                                                                                                                                                    | 99.6            | 98.2            | 85.4      |            |  |  |
| 1,2,3,7,8-PeCDD     | ND          | 0.997          |             |                                                                                                                                                                                                                                                                                                                      | 100             | 96.4            | 85.4      |            |  |  |
| 1,2,3,4,7,8-HxCDD   | ND          | 1.68           |             |                                                                                                                                                                                                                                                                                                                      | 100             | 97.1            | 85.4      |            |  |  |
| 1,2,3,6,7,8-HxCDD   | ND          | 1.87           |             |                                                                                                                                                                                                                                                                                                                      | 100             | 97.1            | 85.4      |            |  |  |
| 1,2,3,7,8,9-HxCDD   | ND          | 1.68           |             |                                                                                                                                                                                                                                                                                                                      | 100             | 97.1            | 85.4      |            |  |  |
| 1,2,3,4,6,7,8-HpCDD | EMPC        |                | 1.9         | A                                                                                                                                                                                                                                                                                                                    | 100             | 97.1            | 85.4      |            |  |  |
| OCDD                | 12.9        |                |             | A                                                                                                                                                                                                                                                                                                                    | 95.7            | 99.1            | 85.4      |            |  |  |
| 2,3,7,8-TCDF        | ND          | 1.27           |             |                                                                                                                                                                                                                                                                                                                      | 100             | 98.2            | 85.4      |            |  |  |
| 1,2,3,7,8-PeCDF     | ND          | 1.84           |             |                                                                                                                                                                                                                                                                                                                      | 93.6            | 96.4            | 85.4      |            |  |  |
| 2,3,4,7,8-PeCDF     | ND          | 1.81           |             |                                                                                                                                                                                                                                                                                                                      | 93.6            | 96.4            | 85.4      |            |  |  |
| 1,2,3,4,7,8-HxCDF   | 1.69        |                |             |                                                                                                                                                                                                                                                                                                                      | 86.5            | 97.3            | 85.4      |            |  |  |
| 1,2,3,6,7,8-HxCDF   | ND          | 0.552          |             | A                                                                                                                                                                                                                                                                                                                    | 86.5            | 97.3            | 85.4      |            |  |  |
| 2,3,4,6,7,8-HxCDF   | ND          | 0.586          |             |                                                                                                                                                                                                                                                                                                                      | 86.5            | 97.3            | 85.4      |            |  |  |
| 1,2,3,7,8,9-HxCDF   | ND          | 0.67           |             |                                                                                                                                                                                                                                                                                                                      | 86.5            | 97.3            | 85.4      |            |  |  |
| 1,2,3,4,6,7,8-HpCDF | 1.86        |                |             | A                                                                                                                                                                                                                                                                                                                    | 88              | 99.1            | 85.4      |            |  |  |
| 1,2,3,4,7,8,9-HpCDF | ND          | 2.03           |             |                                                                                                                                                                                                                                                                                                                      | 88              | 99.1            | 85.4      |            |  |  |
| OCDF                | ND          | 2.83           |             |                                                                                                                                                                                                                                                                                                                      | 91              | 99.1            | 85.4      |            |  |  |
| Totals & TEQs       |             |                |             |                                                                                                                                                                                                                                                                                                                      |                 |                 |           |            |  |  |
| TCDDs               | ND          |                | 1.29        |                                                                                                                                                                                                                                                                                                                      |                 |                 |           |            |  |  |
| PeCDDs              | ND          | 0.997          |             |                                                                                                                                                                                                                                                                                                                      |                 |                 |           |            |  |  |
| HxCDDs              | ND          | 1.74           |             |                                                                                                                                                                                                                                                                                                                      |                 |                 |           |            |  |  |
| HpCDDs              | 1.83        |                | 3.73        |                                                                                                                                                                                                                                                                                                                      |                 |                 |           |            |  |  |
| TCDFs               | ND          | 1.27           |             |                                                                                                                                                                                                                                                                                                                      |                 |                 |           |            |  |  |
| PeCDFs              | ND          | 1.83           |             |                                                                                                                                                                                                                                                                                                                      |                 |                 |           |            |  |  |
| HxCDFs              | 1.69        |                |             |                                                                                                                                                                                                                                                                                                                      |                 |                 |           |            |  |  |
| HpCDFs              | 1.86        |                |             |                                                                                                                                                                                                                                                                                                                      |                 |                 |           |            |  |  |
| Total PCDD/Fs       | 18.3        |                |             |                                                                                                                                                                                                                                                                                                                      |                 |                 |           |            |  |  |
| TEQ (ND=0)          | 0.200       |                | 21.5        | ITEF                                                                                                                                                                                                                                                                                                                 |                 |                 |           |            |  |  |
| TEQ (ND=DL/2)       | 1.38        |                | 1.5         | ITEF                                                                                                                                                                                                                                                                                                                 |                 |                 |           |            |  |  |
|                     |             |                | 2.68        |                                                                                                                                                                                                                                                                                                                      |                 |                 |           |            |  |  |
|                     |             |                |             | <div>ALTA ANALYTICAL PERSPECTIVES</div> <div>2714 Exchange Drive<br/>Wilmington<br/>North Carolina 28405<br/>USA</div> <div>Tel: 910 794-1613<br/>Fax: 910 794-3919<br/>e-mail: ytondeur@cs.com<br/>web: www.ultratrace.com</div> |                 |                 |           |            |  |  |



2714 Exchange Drive  
Wilmington  
North Carolina 28405  
USA

Tel: 910 794-1613  
Fax: 910 794-3919  
e-mail: ytondeur@cs.com  
web: www.ultratrace.com

Reviewer  
Date

25 Feb 01

Client ID: 0\_275\_MB001  
Lab ID: 0\_275\_MB001Filename: 010214P1 S: 3 Acq: 14-FEB-01 12:49:16  
GC Column ID: db-5 ICal: MM1\_M23\_0. wt/vol: 1.000ConCal: 010214P1-  
EndCal: 010214P1-

Page 3 of 3

| IS | RS/RT | Name                    | Resp     | RA     | RRF  | RT    | Conc | Qualif. | CDE | noise | Fac | DL    |
|----|-------|-------------------------|----------|--------|------|-------|------|---------|-----|-------|-----|-------|
|    |       | 2,3,7,8-TCDD            | 2.88e+04 | 0.39 n | 1.26 | 27:45 | 1.29 |         |     | 837   | 2.5 | 0.685 |
|    |       | 1,2,3,7,8-PeCDD         | *        | *      | 1.01 | NotF  | *    |         |     | 596   | 2.5 | 0.997 |
|    |       | 1,2,3,4,7,8-HxCDD       | *        | *      | 1.14 | NotF  | *    |         |     | 1072  | 2.5 | 1.68  |
|    |       | 1,2,3,6,7,8-HxCDD       | *        | *      | 1.02 | NotF  | *    |         |     | 1072  | 2.5 | 1.87  |
|    |       | 1,2,3,7,8,9-HxCDD       | *        | *      | 1.14 | NotF  | *    |         |     | 1072  | 2.5 | 1.68  |
|    |       | 1,2,3,4,6,7,8-HpCDD     | 2.58e+04 | 1.46 n | 1.13 | 41:31 | 1.90 |         |     | 748   | 2.5 | 1.58  |
|    |       | OCDD                    | 1.23e+05 | 0.88 y | 1.03 | 46:51 | 12.9 |         |     | 700   | 2.5 | 2.49  |
|    |       | 2,3,7,8-TCDF            | *        | *      | 1.05 | NotF  | *    |         |     | 1614  | 2.5 | 1.27  |
|    |       | 1,2,3,7,8-PeCDF         | *        | *      | 1.04 | NotF  | *    |         |     | 1607  | 2.5 | 1.84  |
|    |       | 2,3,4,7,8-PeCDF         | *        | *      | 1.05 | NotF  | *    |         |     | 1607  | 2.5 | 1.81  |
|    |       | 1,2,3,4,7,8-HxCDF       | 2.81e+04 | 1.13 y | 1.13 | 36:08 | 1.69 |         |     | 788   | 2.5 | 0.603 |
|    |       | 1,2,3,6,7,8-HxCDF       | *        | *      | 1.24 | NotF  | *    |         |     | 788   | 2.5 | 0.552 |
|    |       | 2,3,4,6,7,8-HxCDF       | *        | *      | 1.16 | NotF  | *    |         |     | 788   | 2.5 | 0.586 |
|    |       | 1,2,3,7,8,9-HxCDF       | *        | *      | 1.02 | NotF  | *    |         |     | 788   | 2.5 | 0.670 |
|    |       | 1,2,3,4,6,7,8-HpCDF     | 3.02e+04 | 1.05 y | 1.54 | 39:53 | 1.86 |         |     | 1564  | 2.5 | 1.71  |
|    |       | 1,2,3,4,7,8,9-HpCDF     | *        | *      | 1.30 | NotF  | *    |         |     | 1564  | 2.5 | 2.03  |
|    |       | OCDF                    | *        | *      | 1.15 | NotF  | *    |         |     | 962   | 2.5 | 2.83  |
|    |       | Total Tetra-Dioxins     | *        | *      | 1.26 | NotF  | *    |         |     | 837   | 2.5 | 0.685 |
|    |       | Total Penta-Dioxins     | *        | *      | 1.01 | NotF  | *    |         |     | 596   | 2.5 | 0.997 |
|    |       | Total Hexa-Dioxins      | *        | *      | 1.10 | NotF  | *    |         |     | 1072  | 2.5 | 1.74  |
|    |       | Total Hepta-Dioxins     | 2.49e+04 | 1.04 y | 1.13 | 40:19 | 1.83 |         |     | 748   | 2.5 | 1.58  |
|    |       | Total Tetra-Furans      | *        | *      | 1.05 | NotF  | *    |         |     | 1614  | 2.5 | 1.27  |
|    |       | 1st Fnc. Penta-Furans   | *        | *      | 1.05 | NotF  | *    |         |     | 1804  | 2.5 | 2.05  |
|    |       | Total Penta-Furans      | *        | *      | 1.05 | NotF  | *    |         |     | 1607  | 2.5 | 1.83  |
|    |       | PeCDF Totals:           |          |        |      |       | 0.00 |         |     |       |     | 0.00  |
|    |       | Total Hexa-Furans       | 2.81e+04 | 1.13 y | 1.14 | 36:08 | 1.69 |         |     | 788   | 2.5 | 0.600 |
|    |       | Total Hepta-Furans      | 3.02e+04 | 1.05 y | 1.42 | 39:53 | 1.86 |         |     | 1564  | 2.5 | 1.86  |
|    |       | 13C-2,3,7,8-TCDD        | 7.11e+07 | 0.79 y | 1.13 | 27:43 | 3980 |         |     | 99.6  | -   | -     |
|    |       | 13C-1,2,3,7,8-PeCDD     | 5.84e+07 | 1.58 y | 0.93 | 33:11 | 4010 |         |     | 100   | -   | -     |
|    |       | 13C-1,2,3,6,7,8-HxCDD   | 4.96e+07 | 1.25 y | 0.93 | 37:12 | 4000 |         |     | 100   | -   | -     |
|    |       | 13C-1,2,3,4,6,7,8-HpCDD | 4.82e+07 | 1.04 y | 0.91 | 41:30 | 4010 |         |     | 100   | -   | -     |
|    |       | 13C-OCDD                | 3.73e+07 | 0.90 y | 0.73 | 46:50 | 3830 |         |     | 95.7  | -   | -     |
|    |       | 13C-2,3,7,8-TCDF        | 8.92e+07 | 0.77 y | 1.06 | 26:50 | 4000 |         |     | 100   | -   | -     |
|    |       | 13C-1,2,3,7,8-PeCDF     | 7.53e+07 | 1.54 y | 0.96 | 31:42 | 3740 |         |     | 93.6  | -   | -     |
|    |       | 13C-1,2,3,6,7,8-HxCDF   | 5.89e+07 | 0.52 y | 1.28 | 36:15 | 3460 |         |     | 86.5  | -   | -     |
|    |       | 13C-1,2,3,4,6,7,8-HpCDF | 4.22e+07 | 0.44 y | 0.90 | 39:52 | 3520 |         |     | 88.0  | -   | -     |
|    |       | 13C-OCDF                | 3.92e+07 | 0.89 y | 0.81 | 47:09 | 3640 |         |     | 91.0  | -   | -     |
|    |       | 13C-1,2,3,4-TCDD        | 6.29e+07 | 0.79 y | 1.00 | 27:04 | 4000 |         |     | -     | -   | -     |
|    |       | 13C-1,2,3,4-TCDF        | 8.40e+07 | 0.77 y | 1.00 | 25:28 | 4000 |         |     | -     | -   | -     |
|    |       | 13C-1,2,3,7,8,9-HxCDD   | 5.31e+07 | 1.26 y | 1.00 | 37:31 | 4000 |         |     | -     | -   | -     |
|    |       | 37Cl-2,3,7,8-TCDD       | 3.59e+07 |        | 0.51 | 27:45 | 3930 |         |     | 98.2  | -   | -     |
|    |       | 13C-2,3,4,7,8-PeCDF     | 7.06e+07 | 1.55 y | 0.97 | 32:50 | 3850 |         |     | 96.4  | -   | -     |
|    |       | 13C-1,2,3,4,7,8-HxCDD   | 4.44e+07 | 1.26 y | 0.92 | 37:05 | 3890 |         |     | 97.1  | -   | -     |
|    |       | 13C-1,2,3,4,7,8-HxCDF   | 5.21e+07 | 0.52 y | 0.91 | 36:06 | 3890 |         |     | 97.3  | -   | -     |
|    |       | 13C-1,2,3,4,7,8,9-HpCDF | 3.57e+07 | 0.43 y | 0.85 | 42:19 | 3970 |         |     | 99.1  | -   | -     |
|    |       | 13C-1,2,3,7,8,9-HxCDF   | 4.85e+07 | 0.52 y | 1.07 | 37:55 | 3420 |         |     | 85.4  | -   | -     |

Analyst: GAE

Date: 23 Feb 01

Totals class: TCDD EMPC  
File Name: 010214P1 Sample #: 3 Function: 1 Run #: 10  
Sample text: 0\_275\_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: 1.2852

Unnamed Conc.: \*

| RT | m1 Resp mod. | m2 Resp mod. | RA | Resp | Adj_Resp | S/N | Conc. Name |
|----|--------------|--------------|----|------|----------|-----|------------|
|----|--------------|--------------|----|------|----------|-----|------------|

|       |           |   |           |   |      |   |           |           |          |   |      |              |
|-------|-----------|---|-----------|---|------|---|-----------|-----------|----------|---|------|--------------|
| 27:45 | 1.254e+04 | Y | 3.230e+04 | n | 0.39 | n | 2.484e+04 | 2.882e+04 | 1.07e+01 | Y | 1.29 | 2,3,7,8-TCDD |
|-------|-----------|---|-----------|---|------|---|-----------|-----------|----------|---|------|--------------|

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Totals class: PeCDD EMPC  
File Name: 010214P1 Sample #: 3 Function: 2 Run #: 10  
Sample text: 0\_275\_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: \*

Unnamed Conc.: \*

| RT | m1 Resp mod. | m2 Resp mod. | RA | Resp | Adj_Resp | S/N | Conc. Name |
|----|--------------|--------------|----|------|----------|-----|------------|
|----|--------------|--------------|----|------|----------|-----|------------|

|       |     |     |     |   |   |   |   |   |   |   |
|-------|-----|-----|-----|---|---|---|---|---|---|---|
| NotF* | * n | * n | * n | * | * | * | * | * | n | * |
|-------|-----|-----|-----|---|---|---|---|---|---|---|

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Totals class: HxCDD EMPC  
File Name: 010214P1 Sample #: 3 Function: 3 Run #: 10  
Sample text: 0\_275\_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: \*

Unnamed Conc.: \*

| RT | m1 Resp mod. | m2 Resp mod. | RA | Resp | Adj_Resp | S/N | Conc. Name |
|----|--------------|--------------|----|------|----------|-----|------------|
|----|--------------|--------------|----|------|----------|-----|------------|

|       |     |     |     |   |   |   |   |   |   |   |
|-------|-----|-----|-----|---|---|---|---|---|---|---|
| NotF* | * n | * n | * n | * | * | * | * | * | n | * |
|-------|-----|-----|-----|---|---|---|---|---|---|---|

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Totals class: HxCDD EMPC  
File Name: 010214P1 Sample #: 3 Function: 4 Run #: 10  
Sample text: 0\_275\_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: 3.7295

Unnamed Conc.: 1.832

| RT | m1 Resp mod. | m2 Resp mod. | RA | Resp | Adj_Resp | S/N | Conc. Name |
|----|--------------|--------------|----|------|----------|-----|------------|
|----|--------------|--------------|----|------|----------|-----|------------|

|       |           |   |           |   |      |   |           |           |          |   |      |                     |
|-------|-----------|---|-----------|---|------|---|-----------|-----------|----------|---|------|---------------------|
| 40:19 | 1.273e+04 | Y | 1.221e+04 | Y | 1.04 | Y | 2.494e+04 | 2.494e+04 | 2.95e+00 | Y | 1.83 |                     |
| 41:31 | 1.854e+04 | Y | 1.266e+04 | Y | 1.46 | n | 2.583e+04 | 2.38e+00  | 2.38e+00 | n | 1.90 | 1,2,3,4,6,7,8-HpCDD |

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Totals class: TCDF EMPC

Function: 1 Run #: 10

File Name: 010214P1 Sample #: 3 Sample text: 0\_275\_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: \*

Unnamed Conc.: \*

RT m1 Resp mod. m2 Resp mod. RA Resp Adj\_Resp S/N Conc. Name

NotF, \* n \* n \* n \* \* \* n \* Page 12 of 18

Totals class: 1st Fnc. PeCDF EMPC Function: 1 Run #: 10  
File Name: 010214P1 Sample #: 3 Sample text: 0\_275\_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: \*

Unnamed Conc.: \*

RT m1 Resp mod. m2 Resp mod. RA Resp Adj\_Resp S/N Conc. Name

NotF, \* n \* n \* n \* \* \* n \* Page 14 of 18

Totals class: PeCDF EMPC Function: 2 Run #: 10  
File Name: 010214P1 Sample #: 3 Sample text: 0\_275\_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: \*

Unnamed Conc.: \*

RT m1 Resp mod. m2 Resp mod. RA Resp Adj\_Resp S/N Conc. Name

NotF, \* n \* n \* n \* \* \* n \* 1,2,3,7,8-PeCDF  
Page 16 of 18Totals class: HxCDF EMPC Function: 3 Run #: 10  
File Name: 010214P1 Sample #: 3 Sample text: 0\_275\_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

Total Conc.: 1.6885

Unnamed Conc.: \*

RT m1 Resp mod. m2 Resp mod. RA Resp Adj\_Resp S/N Conc. Name

36:08 1.490e+04 Y 1.322e+04 Y 1.13 Y/2.813e+04 2.813e+04 5.10e+00 Y 1.69 1,2,3,4,7,8-HxCDF  
Page 18 of 18Totals class: HpCDF EMPC Function: 4 Run #: 10  
File Name: 010214P1 Sample #: 3 Sample text: 0\_275\_MB001

Acquired: 14-FEB-01 12:49:16 Processed: 20-FEB-01 12:06:57

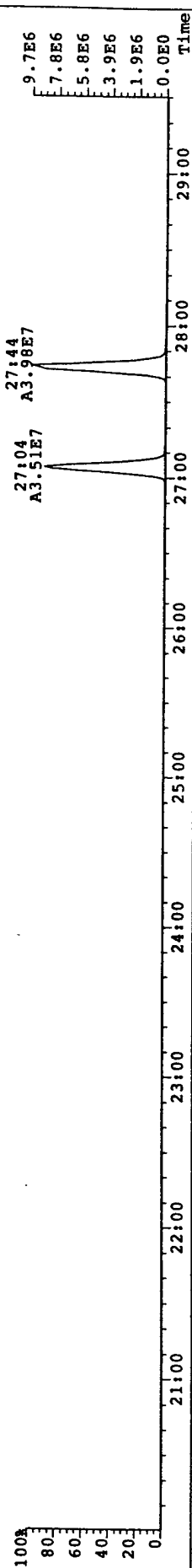
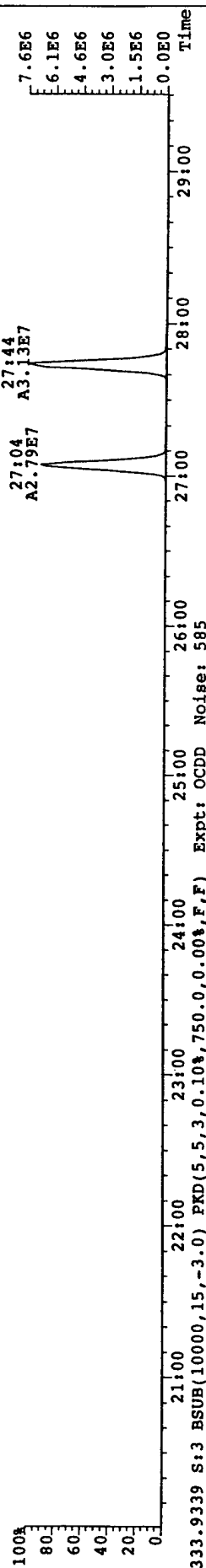
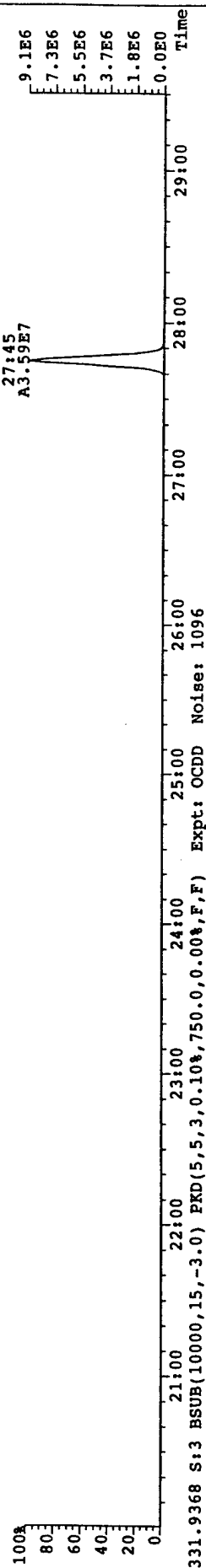
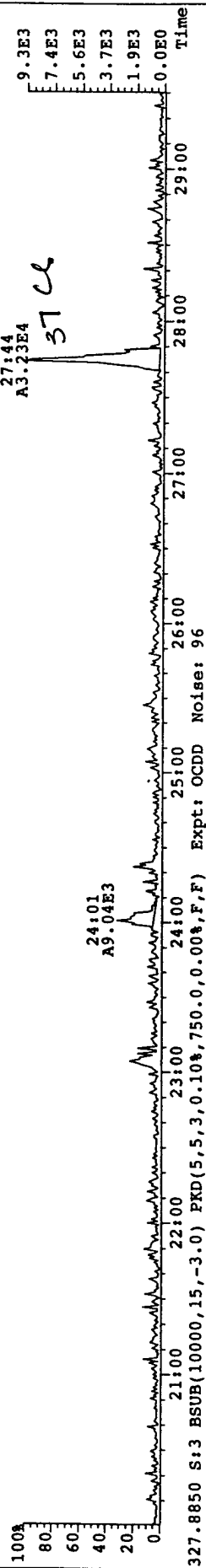
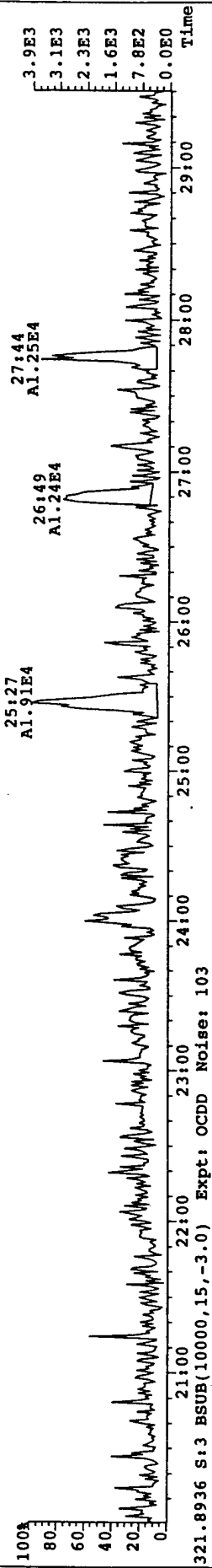
Total Conc.: 1.8583

Unnamed Conc.: \*

| RT    | m1 Resp mod.           | m2 Resp mod. | RA | Resp   | Adj_Resp             | S/N       | Conc. Name |                          |
|-------|------------------------|--------------|----|--------|----------------------|-----------|------------|--------------------------|
| 39:53 | <del>1.546e+04</del> Y | 1.477e+04    | Y  | 1.05 Y | <del>3.023e+04</del> | 3.023e+04 | 2.35e+00   | 1.86 1,2,3,4,6,7,8-HpCDF |



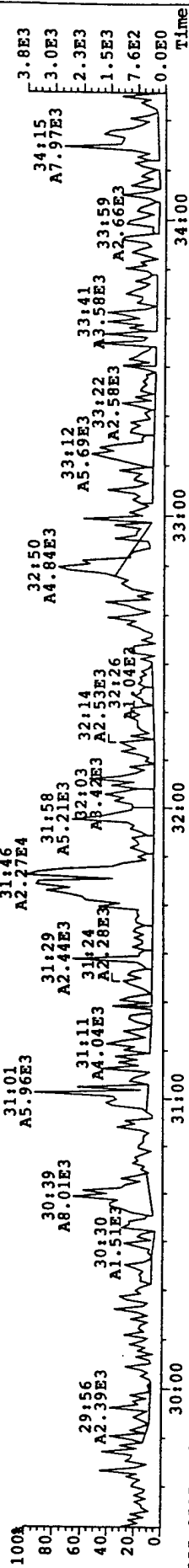
File: 010214PI Acq: 14-FEB-2001 12:49:16 GC EIT Voltage SIR Autospec-UltimaE  
Sample# 3 Text: 0 275 MB001 Vial# 77 File Text: AAP DB5  
319.8965 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 192



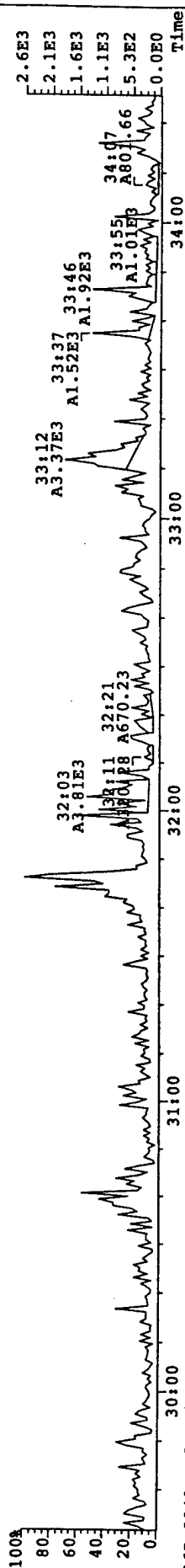
File: 010214PI Acq: 14-FEB-2001 12:49:16 GC RT+ Voltage SIR Autospec-Ultimate

Sample# 3 Text: 0.275.MB001 Vial# 77 File Text: AAP DB5

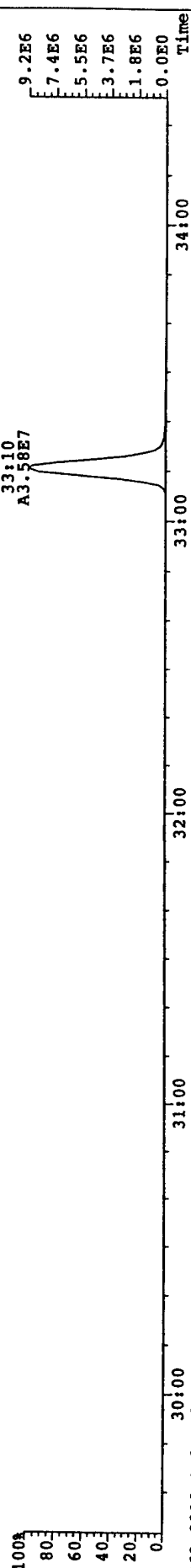
355.8546 S:3 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 199



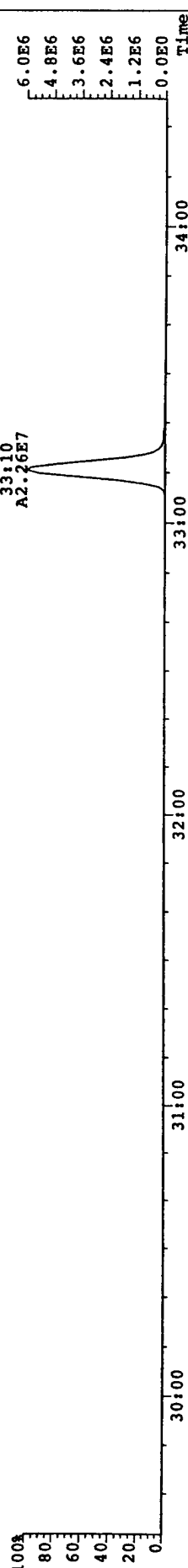
357.8517 S:3 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 82



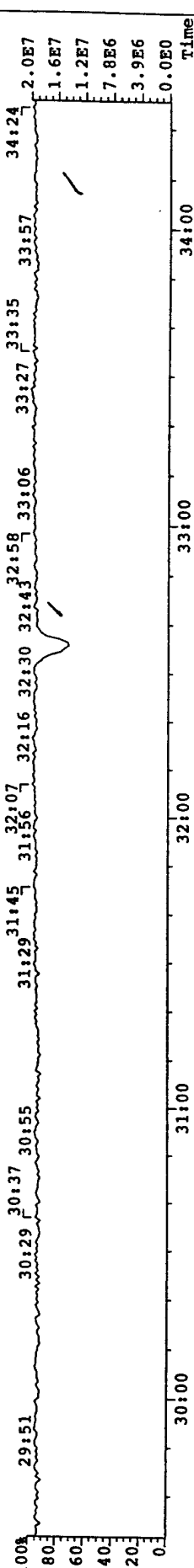
367.8949 S:3 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 738



369.8919 S:3 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 321

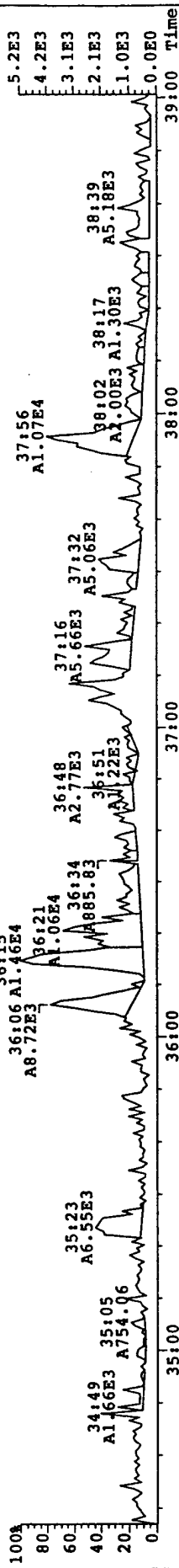


366.9792 S:3 F:2 Expt: OCDD

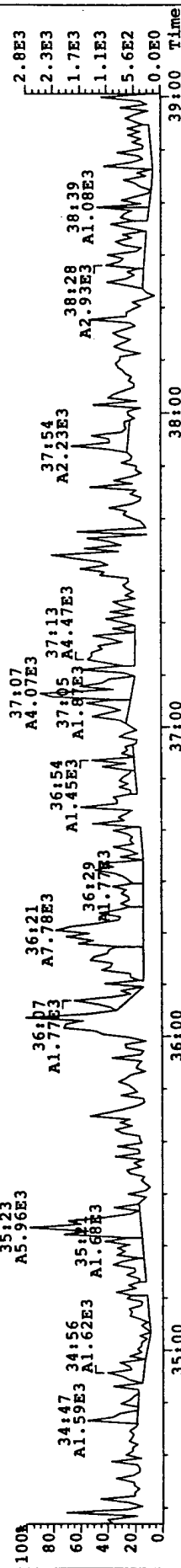


File: 010214PI Acq: 14-FEB-2001 12:49:16 GC RT+ Voltage SIR Autospec-Ultimae

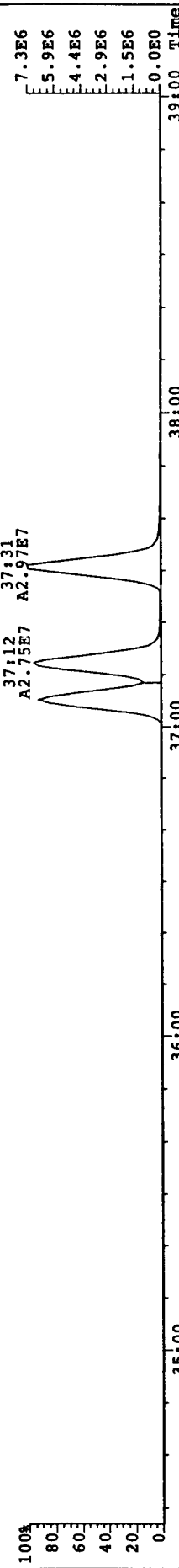
Sample# 3 Text: 0.275 MB001 Vial# 77 File Text: AAP DB5  
389.8156 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 246



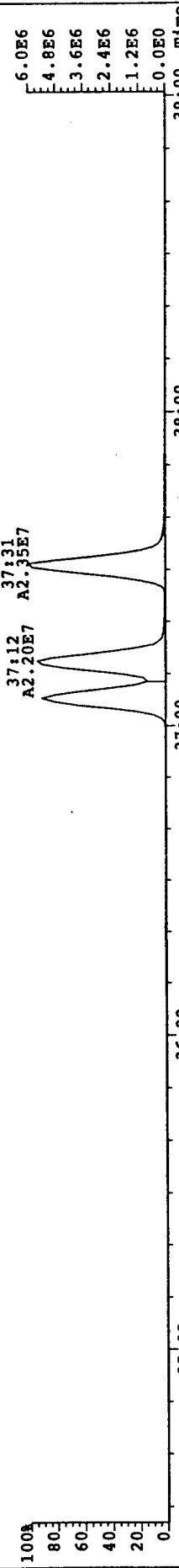
391.8127 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 219



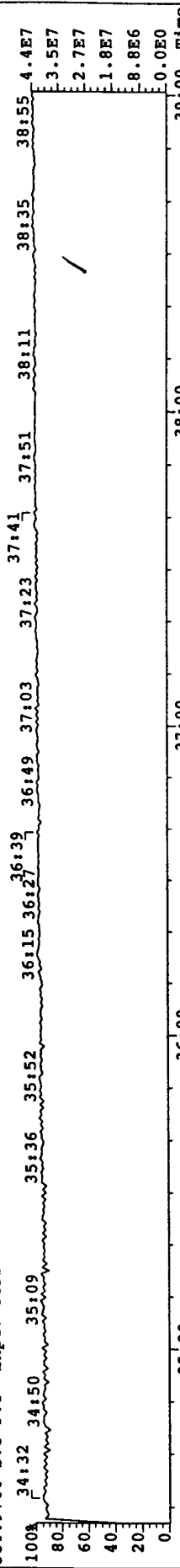
401.8559 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 315



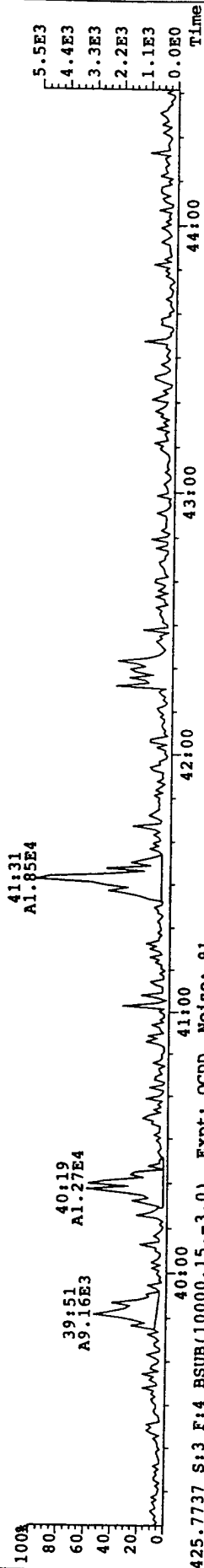
403.8530 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 187



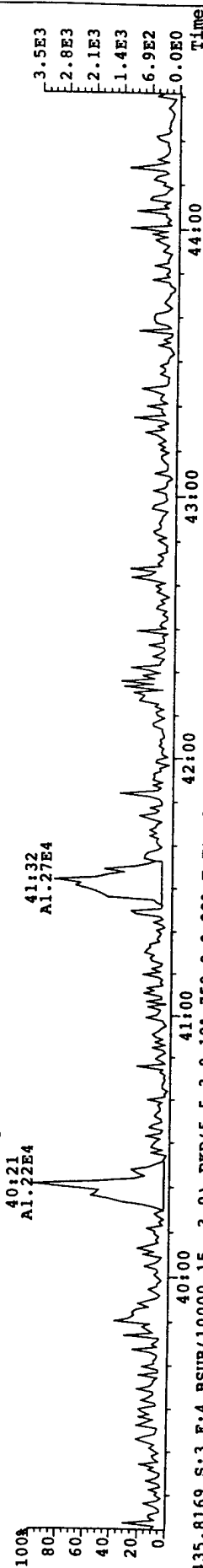
380.9760 S:3 F:3 Expt: OCDD



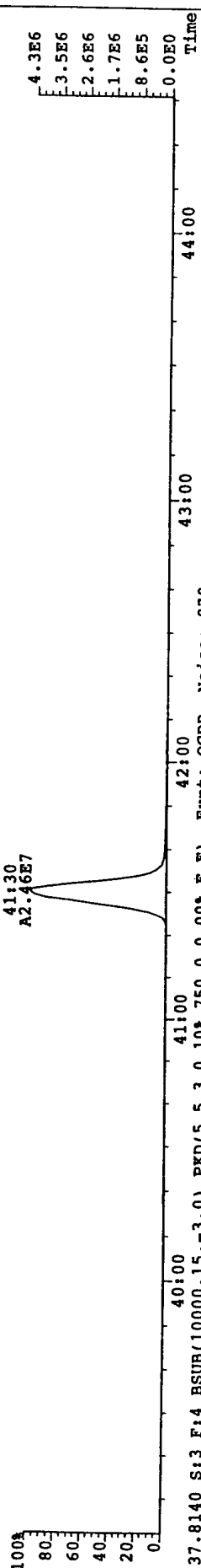
File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC F1+ Voltage SIR Autospec-Ultimate  
Sample# 3 Text: 0 275 MB001 Vial# 77 File Text: AAP DB5  
423.7767 S:3 F:4 BSUB(10000,15,-3.0) Expt: OCDD Noise: 110



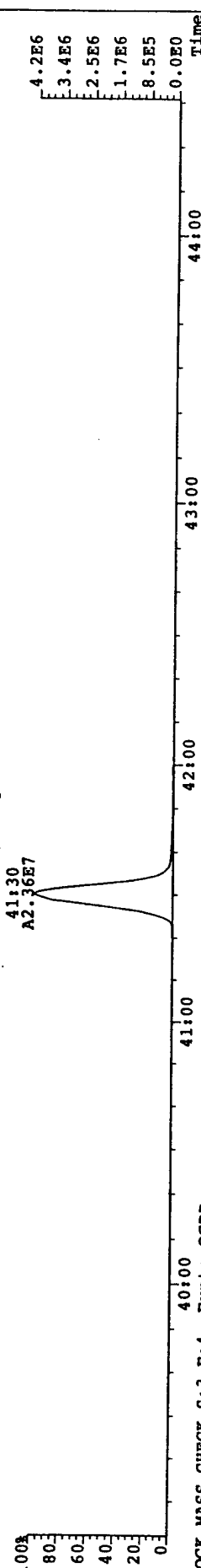
425.7737 S:3 F:4 BSUB(10000,15,-3.0) Expt: OCDD Noise: 91



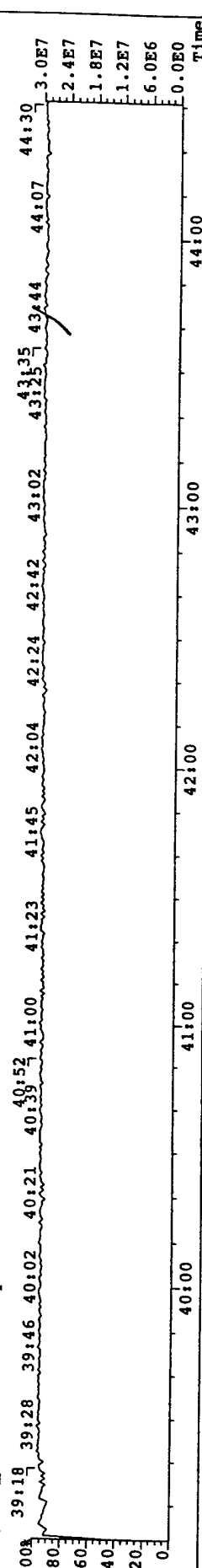
435.8169 S:3 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1533



437.8140 S:3 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 870



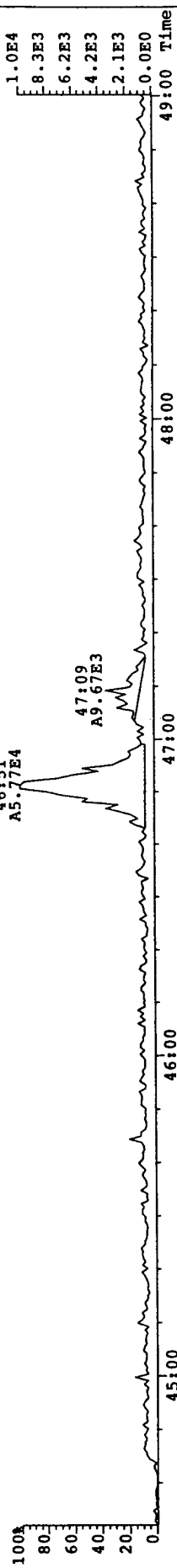
LOCK\_MASS\_CHECK S:3 F:4 Expt: OCDD



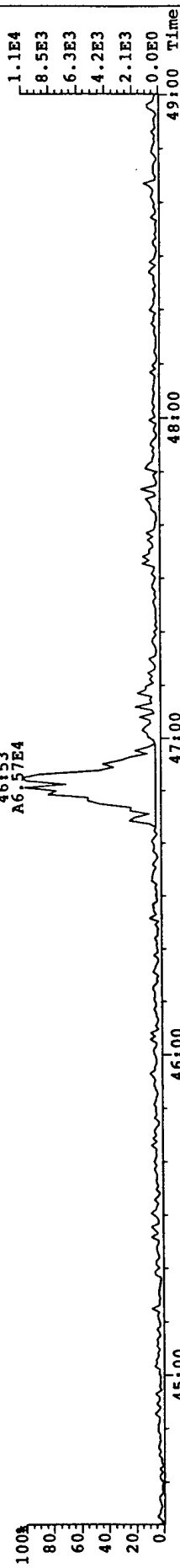
File: U0214P1 Acq: 14-FEB-2001 12:49:16 GC E1+ Voltage SIR Autospec-UltimaE

Sample# 3 Text: 0 275 MB001 Vial# 77 File Text: AAP DB5

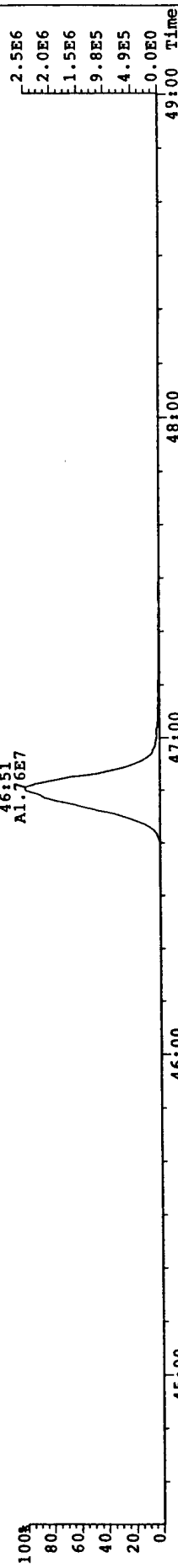
457.7377 S:3 F:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 262



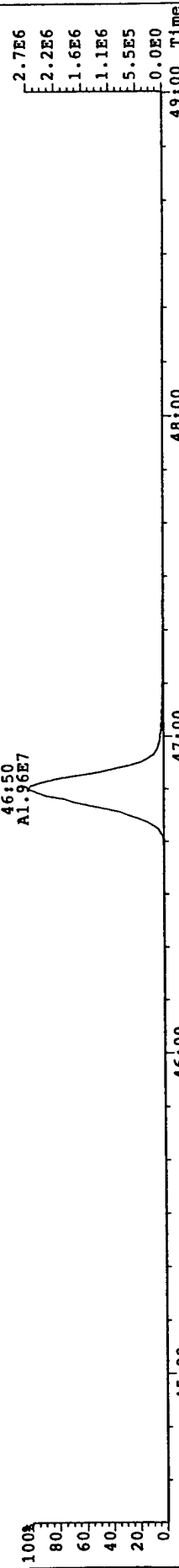
459.7348 S:3 F:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 131



469.7780 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 207

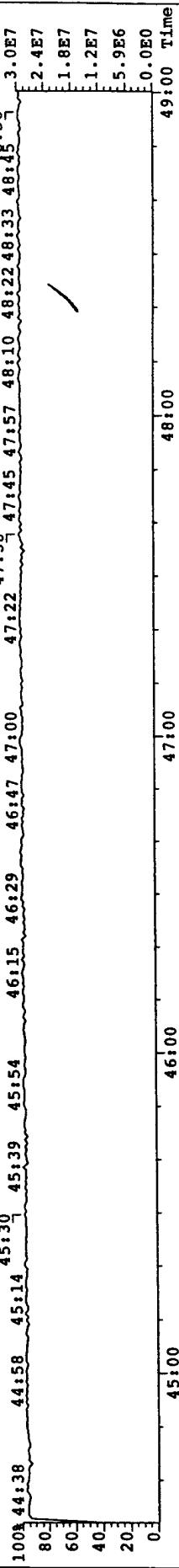


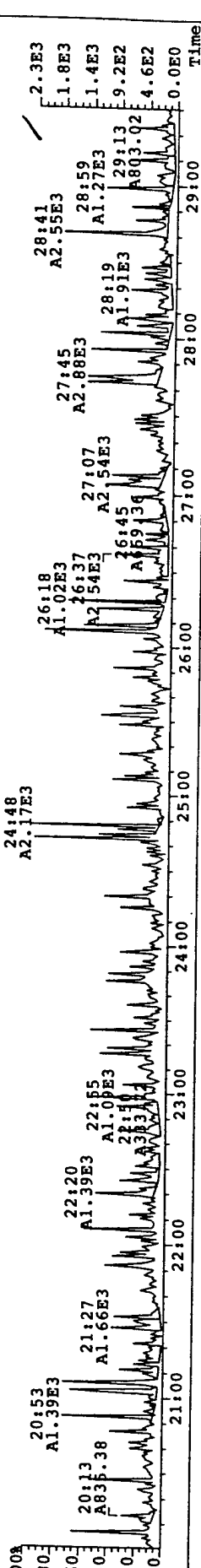
471.7750 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 102



LOCK\_MASS\_CHECK S:3 F:5 Expt: OCDD

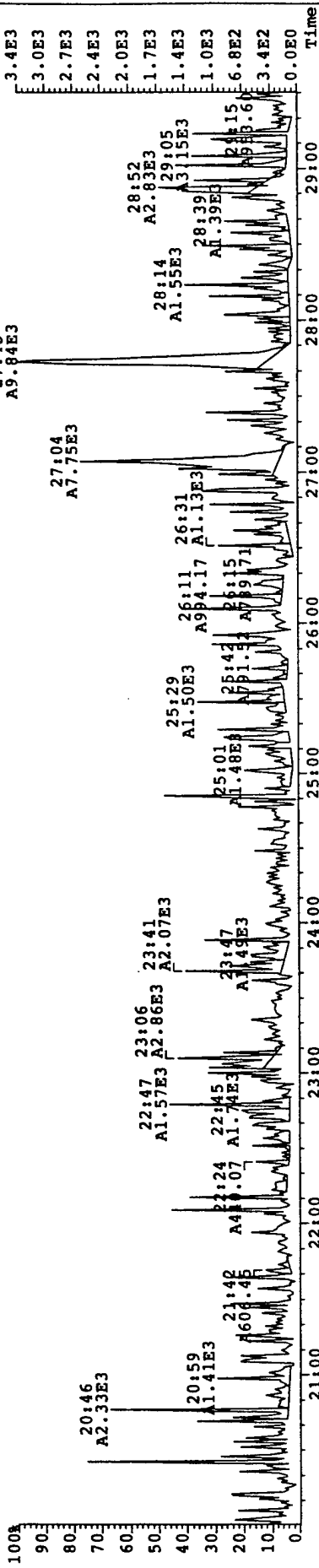
100% 44:38 44:58 45:14 45:30 45:39 45:54 46:15 46:29 46:47 47:00 47:22 47:38 47:45 47:57 48:10 48:22 48:33 48:45 48:56



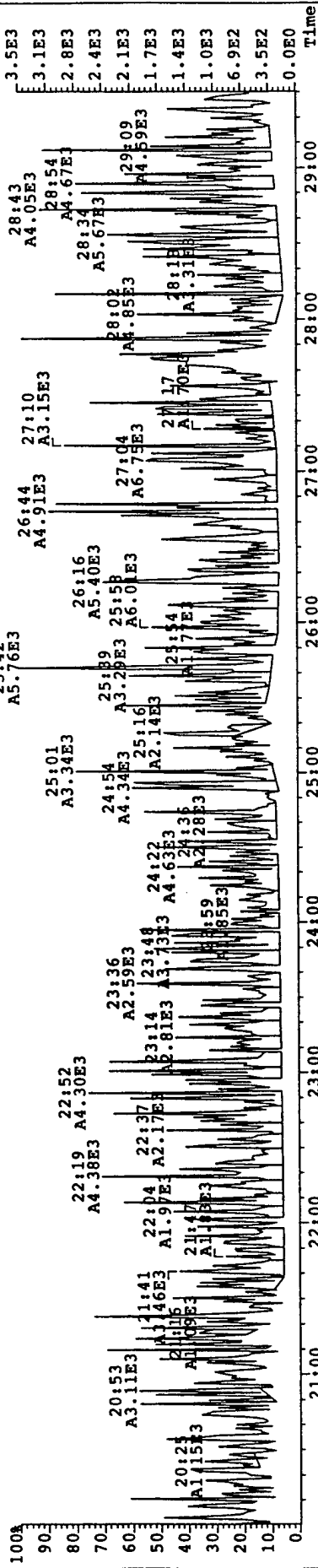
[illegible]

File: 010214P1 Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-Ultima

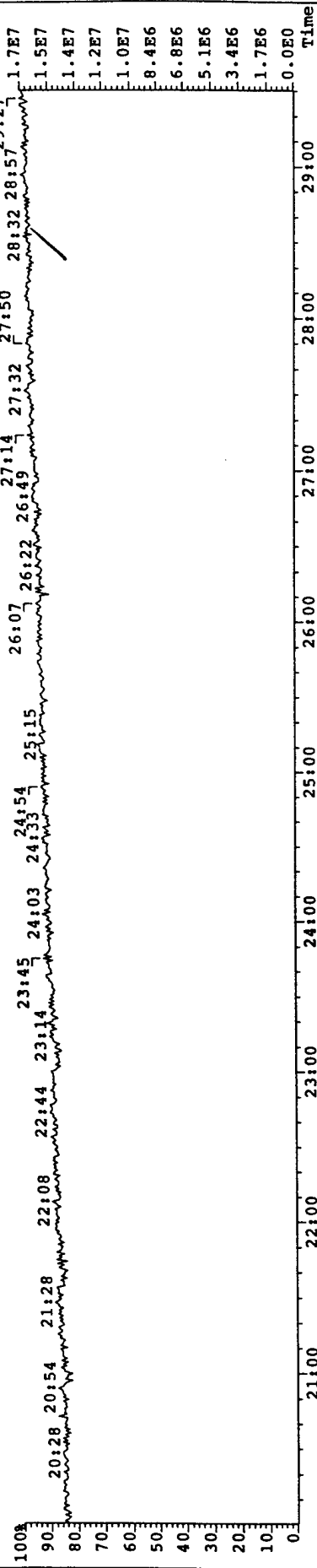
Sample# 3 Text: 0.275 MB001 Vial# 77 File Text: AAP DB5  
339.8597 S:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 71



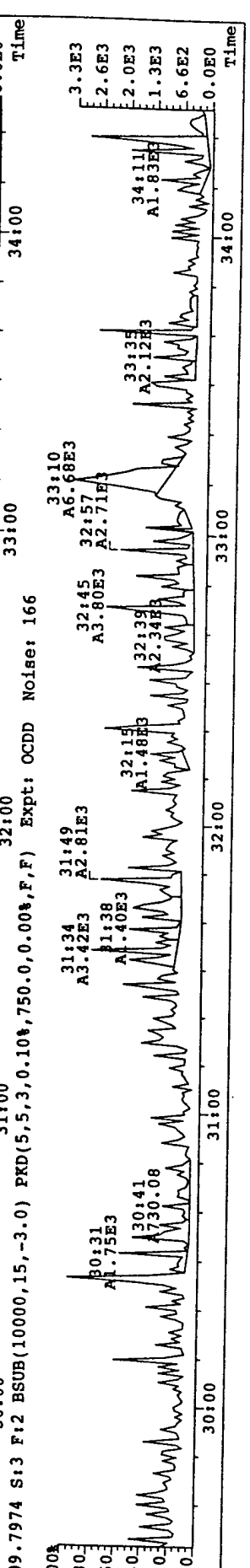
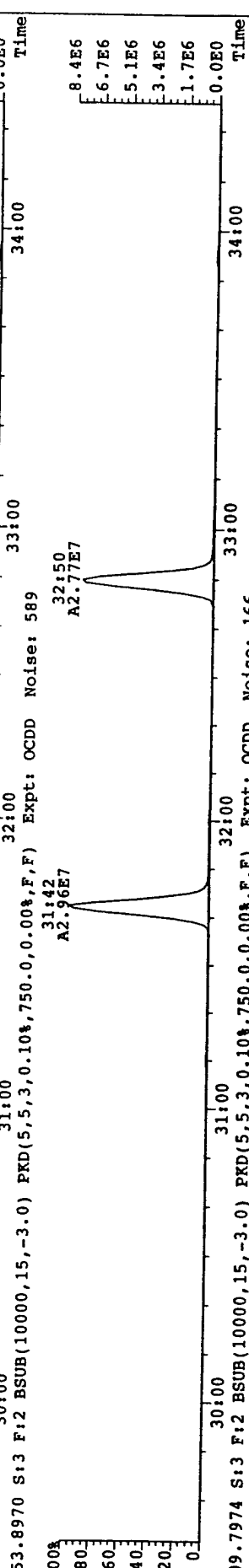
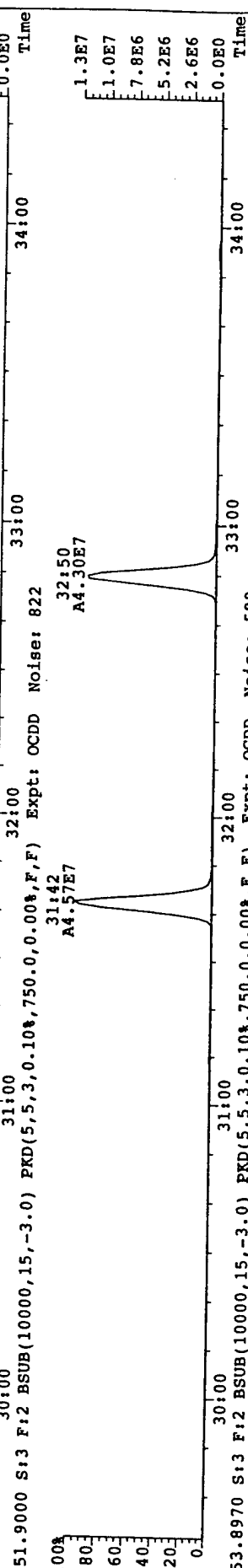
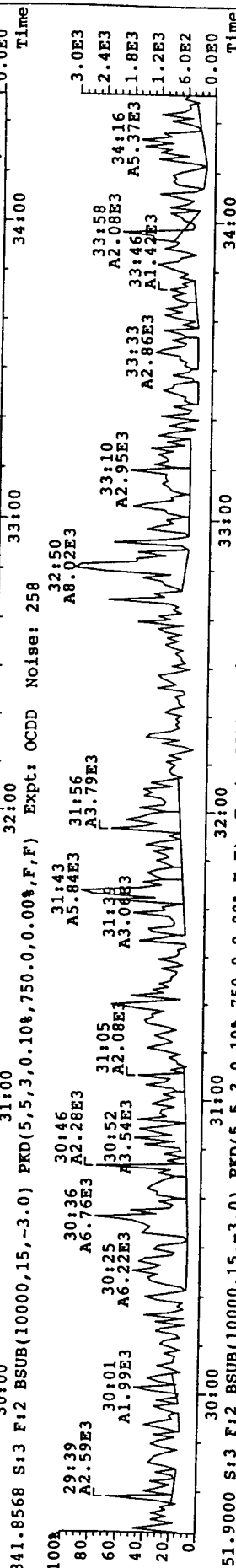
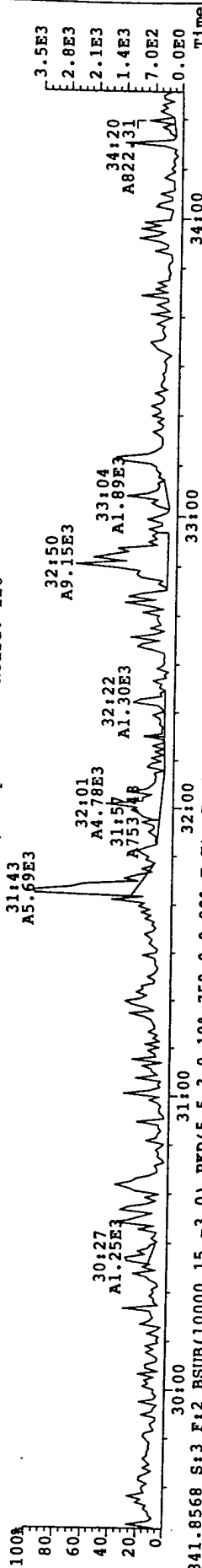
341.8568 S:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 170



316.9824 S:3 Expt: OCDD



File: 010212PI Acq: 14-FEB-2001 12:49:16 GC EIT Voltage STR Autospec-UltimaE  
Sample# 3 Text: 0.275 MB001 Vial# 77 File Text: AAP DB5  
339.8597 S:3 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 126





File: 010214PI Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-UltimaE

Sample# 3 Text: 0.275.MB001 Vial# 77 File Text: AAP DB5

373.8207 S:3 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 157

36:08 A1.49E4

34:56 A8.47E3

36:17 A1.29E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

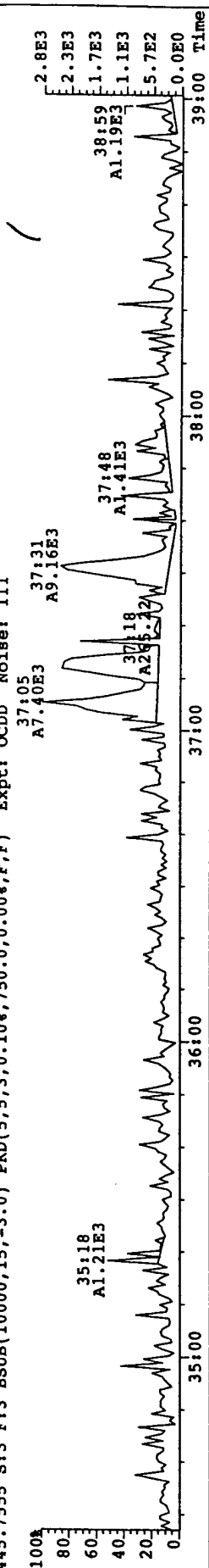
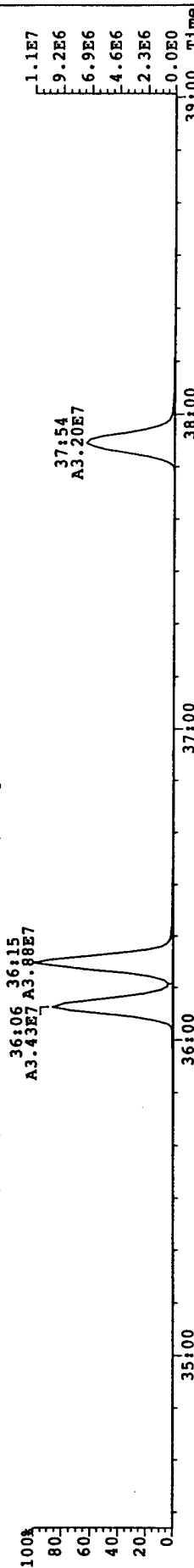
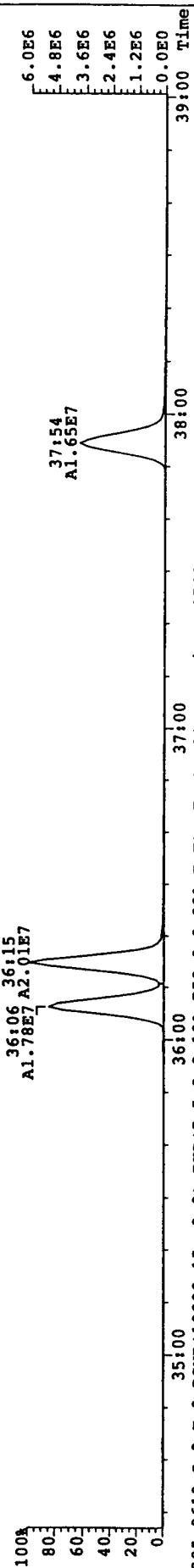
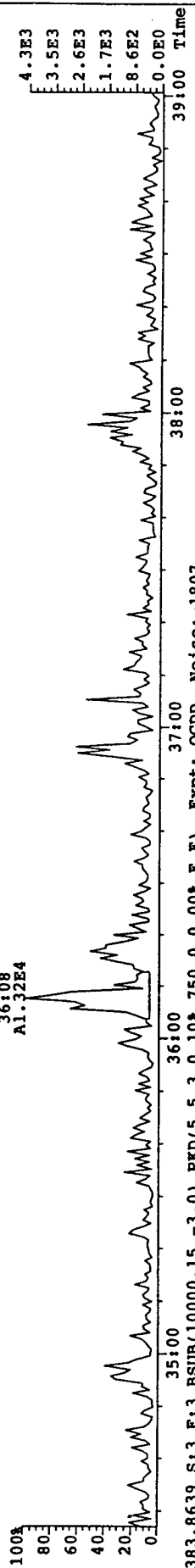
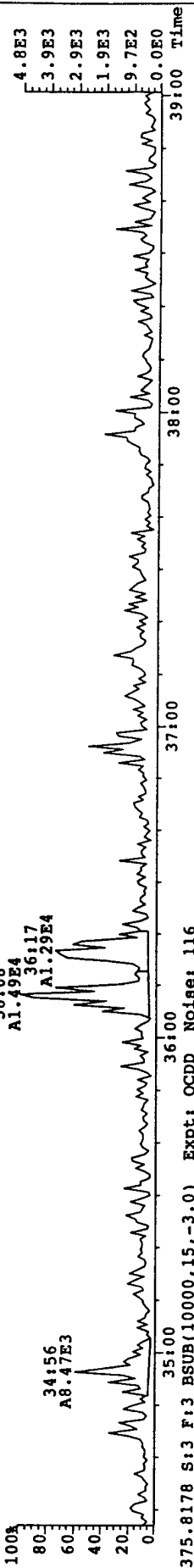
36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

36:08 A1.32E4

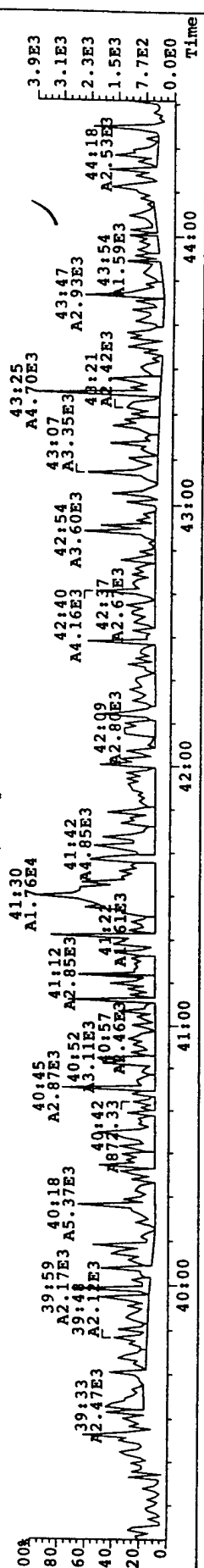
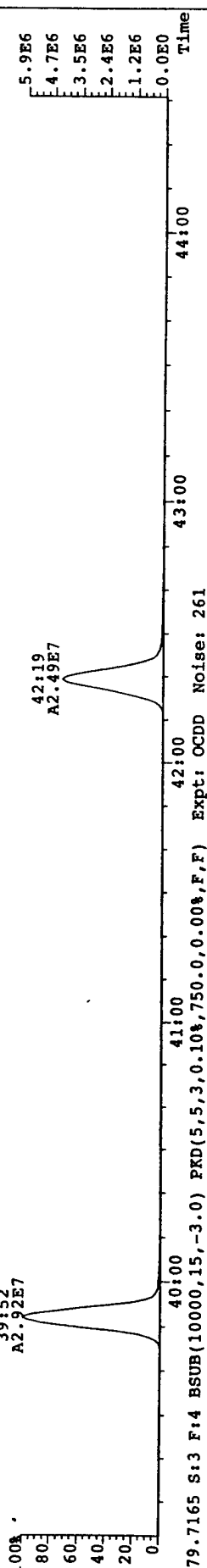
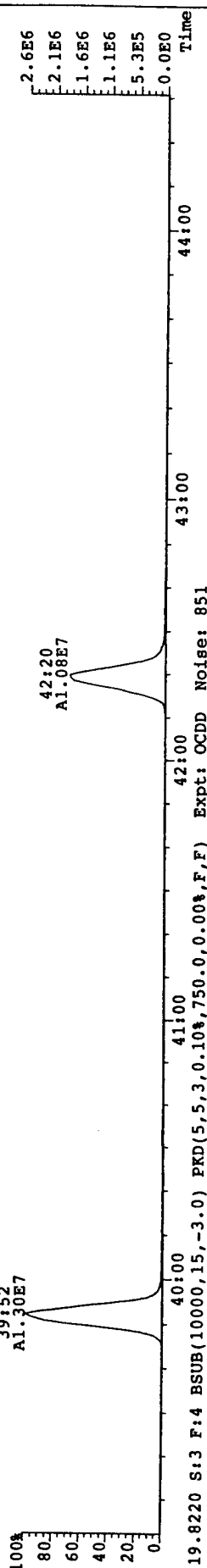
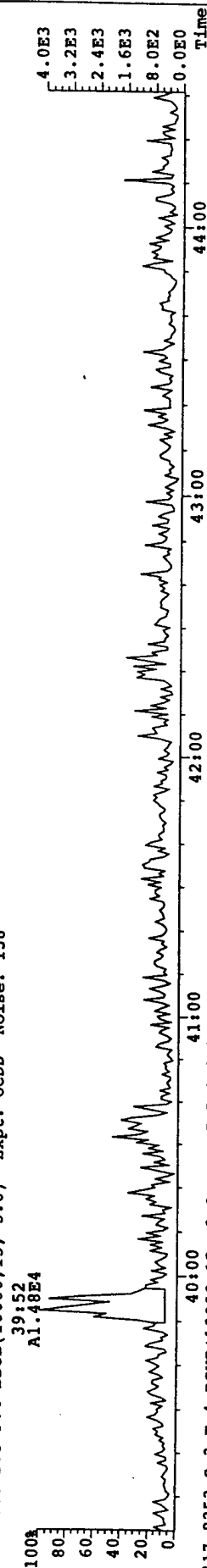
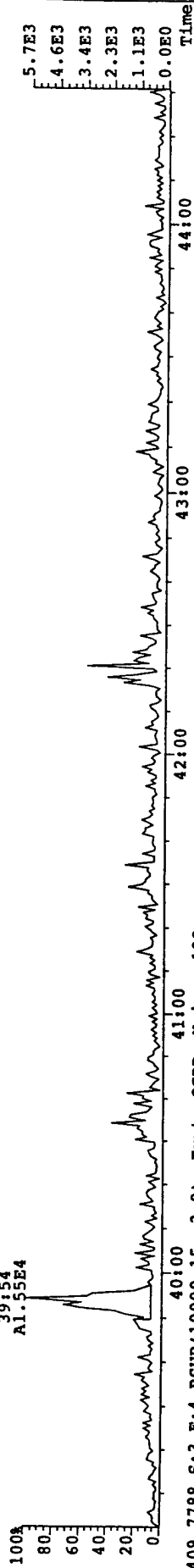
36:08 A1.32E4

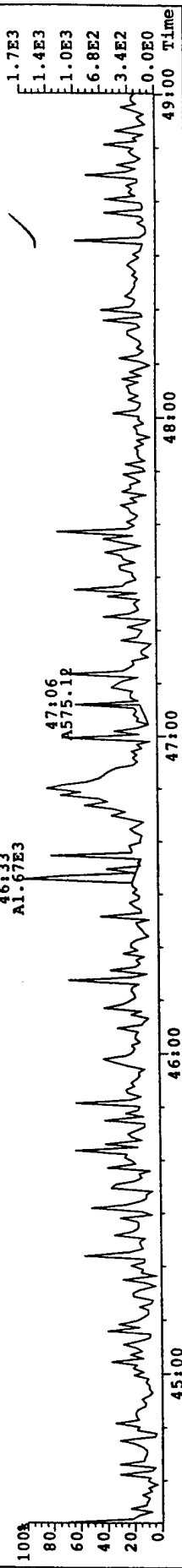


File: 010214PI Acq: 14-FEB-2001 12:49:16 GC EI+ Voltage SIR Autospec-ULTImae

Sample# 3 Text: 0\_275\_MB001 Vial# 77 File Text: AAP DB5  
 :.AAC: 01021441 ACQ: 14-FEB-2001 12:49:16 GC El+ Voltage:

407.7818 S:3 F:4 BSUB(1000,15,-3.0) Expt: OCDD Noise: 133



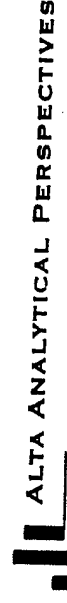


# Sample ID: M23-1

## Method M23

Method M23

| Client Data         |             | Sample Data    |            | Laboratory Data |                              |      |      |
|---------------------|-------------|----------------|------------|-----------------|------------------------------|------|------|
| Name:               | PES         | Matrix:        | Air        | Project No.:    | P1388                        |      |      |
| Project ID:         | F181.001    | Weight/Volume: | 1          | Sample ID:      | P1388_275_001CU              |      |      |
| Date Collected:     | 31-Jan-01   |                |            | QC Batch No.:   | 275                          |      |      |
|                     |             |                |            | Date Received:  | 6-Feb-01                     |      |      |
|                     |             |                |            | Date Extracted: | 8-Feb-01                     |      |      |
|                     |             |                |            | Date Analyzed:  | 23-FEB-01                    |      |      |
| Analyte             | Conc.<br>pg | DL<br>pg       | EMPC<br>pg | Qualifier       | Recoveries                   |      |      |
|                     |             |                |            |                 | IS                           | SS   | AS   |
| 2,3,7,8-TCDD        | ND          | 0.792          | 1.74       |                 | 102                          | 96.5 | 97.9 |
| 1,2,3,7,8-PeCDD     | EMPC        |                |            | A               | 99.7                         | 93.1 | 97.9 |
| 1,2,3,4,7,8-HxCDD   | 4.56        |                |            | A               | 104                          | 91.1 | 97.9 |
| 1,2,3,6,7,8-HxCDD   | 7.58        |                |            | A               | 104                          | 91.1 | 97.9 |
| 1,2,3,7,8,9-HxCDD   | 4.64        |                |            | A               | 104                          | 91.1 | 97.9 |
| 1,2,3,4,6,7,8-HpCDD | 27.3        |                |            | AB              | 96.5                         | 90.3 | 97.9 |
| OCDD                | 74.4        |                |            | AB              | 83.6                         | 90.3 | 97.9 |
| 2,3,7,8-TCDF        | 11.3        |                |            |                 | 100                          | 96.5 | 97.9 |
| 1,2,3,7,8-PeCDF     | 20.9        |                |            | A               | 91.1                         | 93.1 | 97.9 |
| 2,3,4,7,8-PeCDF     | 46.6        |                |            | A               | 91.1                         | 93.1 | 97.9 |
| 1,2,3,4,7,8-HxCDF   | 48.9        |                |            | AB              | 90.7                         | 96.9 | 97.9 |
| 1,2,3,6,7,8-HxCDF   | 54.6        |                |            |                 | 90.7                         | 96.9 | 97.9 |
| 2,3,4,6,7,8-HxCDF   | 87.3        |                |            |                 | 90.7                         | 96.9 | 97.9 |
| 1,2,3,7,8,9-HxCDF   | 13.7        |                |            | A               | 90.7                         | 96.9 | 97.9 |
| 1,2,3,4,6,7,8-HpCDF | 234         |                |            | B               | 86                           | 90.3 | 97.9 |
| 1,2,3,4,7,8,9-HpCDF | 26.5        |                |            | A               | 86                           | 90.3 | 97.9 |
| OCDF                | 145         |                |            |                 | 81.3                         | 90.3 | 97.9 |
| Totals & TEQs       |             |                |            |                 |                              |      |      |
| TCDDs               | 17.3        |                | 48.5       |                 |                              |      |      |
| PeCDDs              | 41.3        |                |            |                 |                              |      |      |
| HxCDDs              | 68.2        |                |            |                 |                              |      |      |
| HpCDDs              | 55.6        |                |            |                 |                              |      |      |
| TCDFs               | 345         |                | 370        |                 |                              |      |      |
| PeCDFs              | 451         |                | 456        |                 |                              |      |      |
| HxCDFs              | 517         |                |            |                 |                              |      |      |
| HpCDFs              | 370         |                |            |                 |                              |      |      |
| Total PCDD/Fs       | 2090        |                | 2120       |                 |                              |      |      |
| TEQ (ND=0)          | 50.7        |                | 51.5       | ITEF            |                              |      |      |
| TEQ (ND=DL/2)       | 51.1        |                | 51.9       | ITEF            |                              |      |      |
|                     |             |                |            |                 | ALTA ANALYTICAL PERSPECTIVES |      |      |
|                     |             |                |            |                 | 2714 Exchange Drive          |      |      |
|                     |             |                |            |                 | Wilmington                   |      |      |
|                     |             |                |            |                 | North Carolina 28405         |      |      |
|                     |             |                |            |                 | USA                          |      |      |
|                     |             |                |            |                 | Tel: 910 794-1613            |      |      |
|                     |             |                |            |                 | Fax: 910 794-3919            |      |      |
|                     |             |                |            |                 | e-mail: ytondeur@cs.com      |      |      |
|                     |             |                |            |                 | web: www.ultratrace.com      |      |      |



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Reviewer

Date

25 Feb 01

Client ID: M23-1 CU  
Lab ID: P1388\_275\_001CU  
Filename: 010223P1  
GC Column ID: db-5  
S: 3  
Acq: 23-FEB-01 13:01:16  
ICal: MM1\_M23\_0, wt/vol: 1.000  
ConCal: 010223P1-  
EndCal: 010223P1-  
Page 9 of 10

Reviewer: C  
Date: 25 Feb 01

| Name                  | Resp                    | RA       | RRF    | RT    | Conc | Qualif. | CDE | noise        | Fac | DL    |
|-----------------------|-------------------------|----------|--------|-------|------|---------|-----|--------------|-----|-------|
| 2,3,7,8-TCDD          | 3.09e+05                | 0.69 Y   | 1.05   | 26:48 | 11.3 |         |     | 1564         | 2.5 | 1.11  |
| 1,2,3,7,8-PeCDF       | 4.68e+05                | 1.49 Y   | 1.04   | 31:39 | 20.9 |         |     | 1856         | 2.5 | 1.95  |
| 2,3,4,7,8-PeCDF       | 1.06e+06                | 1.55 Y   | 1.05   | 32:46 | 46.6 |         |     | 1856         | 2.5 | 1.92  |
| 1,2,3,4,7,8-HxCDF     | 8.99e+05                | 1.18 Y   | 1.13   | 36:03 | 48.9 |         |     | 1260         | 2.5 | 0.919 |
| 1,2,3,6,7,8-HxCDF     | 1.10e+06                | 1.25 Y   | 1.24   | 36:11 | 54.6 |         |     | 1260         | 2.5 | 0.840 |
| 2,3,4,6,7,8-HxCDF     | 1.65e+06                | 1.20 Y   | 1.16   | 36:51 | 87.3 |         |     | 1260         | 2.5 | 0.893 |
| 1,2,3,7,8,9-HxCDF     | 2.27e+05                | 1.34 Y   | 1.02   | 37:53 | 13.7 |         |     | 1260         | 2.5 | 1.02  |
| 1,2,3,4,6,7,8-HpCDF   | 3.91e+06                | 1.01 Y   | 1.54   | 39:48 | 234  |         |     | 1208         | 2.5 | 1.11  |
| 1,2,3,4,7,8,9-HpCDF   | 3.74e+05                | 1.04 Y   | 1.30   | 42:15 | 26.5 |         |     | 1208         | 2.5 | 1.32  |
| OCDF                  | 1.54e+06                | 0.89 Y   | 1.15   | 47:04 | 145  |         |     | 1327         | 2.5 | 3.40  |
| Total Tetra-Dioxins   | 4.54e+05                | 0.79 Y   | 1.26   | 23:58 | 17.3 |         |     | 1110         | 2.5 | 0.792 |
| Total Penta-Dioxins   | 6.97e+05                | 1.60 Y   | 1.01   | 30:36 | 41.3 |         |     | 1185         | 2.5 | 1.70  |
| Total Hexa-Dioxins    | 1.02e+06                | 1.31 Y   | 1.10   | 35:19 | 68.2 |         |     | 967          | 2.5 | 1.35  |
| Total Hepta-Dioxins   | 7.67e+05                | 1.03 Y   | 1.13   | 40:15 | 55.6 |         |     | 1220         | 2.5 | 2.16  |
| Total Tetra-Furans    | 9.46e+06                | 0.72 Y   | 1.05   | 21:46 | 345  |         |     | 1564         | 2.5 | 1.11  |
| 1st Fnc. Penta-Furans | 1.06e+06                | 1.64 Y   | 1.05   | 28:50 | 46.8 |         |     | 4180         | 2.5 | 4.35  |
| Total Penta-Furans    | 9.14e+06                | 1.51 Y   | 1.05   | 30:22 | 405  |         |     | 1856         | 2.5 | 1.93  |
| PeCDF Totals:         |                         |          |        |       | 451  |         |     |              |     |       |
| Total Hexa-Furans     | 9.66e+06                | 1.20 Y   | 1.14   | 34:40 | 517  |         |     | 1260         | 2.5 | 0.914 |
| Total Hepta-Furans    | 5.97e+06                | 1.01 Y   | 1.42   | 39:48 | 370  |         |     | 1208         | 2.5 | 1.20  |
| IS                    | 13C-2,3,7,8-TCDD        | 0.80 Y   | 1.13   | 27:41 | 3250 |         |     | Rec          |     |       |
| IS                    | 13C-1,2,3,7,8-PeCDD     | 1.57 Y   | 0.93   | 33:06 | 3190 |         |     | 102          |     |       |
| IS                    | 13C-1,2,3,6,7,8-HxCDD   | 1.25 Y   | 0.93   | 37:08 | 3320 |         |     | 99.7         |     |       |
| IS                    | 13C-1,2,3,4,6,7,8-HpCDD | 1.04 Y   | 0.91   | 41:25 | 3090 |         |     | 104          |     |       |
| IS                    | 13C-OCDD                | 0.89 Y   | 0.73   | 46:44 | 2680 |         |     | 96.5         |     |       |
| IS                    | 13C-2,3,7,8-TCDF        | 0.79 Y   | 1.06   | 26:48 | 3200 |         |     | 83.6         |     |       |
| IS                    | 13C-1,2,3,7,8-PeCDF     | 1.56 Y   | 0.96   | 31:38 | 2920 |         |     | 100          |     |       |
| IS                    | 13C-1,2,3,6,7,8-HxCDF   | 0.52 Y   | 1.28   | 36:10 | 2900 |         |     | 91.1         |     |       |
| IS                    | 13C-1,2,3,4,6,7,8-HpCDF | 0.44 Y   | 0.90   | 39:47 | 2750 |         |     | 90.7         |     |       |
| IS                    | 13C-OCDF                | 0.88 Y   | 0.81   | 47:03 | 2600 |         |     | 86.0         |     |       |
| RS/RT                 | 13C-1,2,3,4-TCDD        | 0.79 Y   | 1.00   | 27:01 | 3200 |         |     | 81.3         |     |       |
| RS                    | 13C-1,2,3,4-TCDF        | 0.78 Y   | 1.00   | 25:25 | 3200 |         |     | -            |     |       |
| RS/RT                 | 13C-1,2,3,7,8,9-HxCDD   | 1.25 Y   | 1.00   | 37:26 | 3200 |         |     | -            |     |       |
| PS                    | 37Cl-2,3,7,8-TCDD       | 3.31e+07 | 0.51   | 27:42 | 3090 |         |     | Analyst: GAG |     |       |
| PS                    | 13C-2,3,4,7,8-PeCDF     | 6.26e+07 | 0.97   | 32:45 | 2980 |         |     | 96.5         |     |       |
| PS                    | 13C-1,2,3,4,7,8-HxCDD   | 3.64e+07 | 0.92   | 37:00 | 2910 |         |     | 93.1         |     |       |
| PS                    | 13C-1,2,3,4,7,8-HxCDF   | 4.59e+07 | 0.51 Y | 36:02 | 3100 |         |     | 91.1         |     |       |
| PS                    | 13C-1,2,3,4,7,8,9-HpCDF | 2.68e+07 | 0.43 Y | 42:14 | 2890 |         |     | 96.9         |     |       |
| AS                    | 13C-1,2,3,7,8,9-HxCDF   | 4.68e+07 | 0.52 Y | 37:50 | 3130 |         |     | 90.3         |     |       |
|                       |                         |          | 1.07   |       |      |         |     | 97.9         |     |       |

Totals class: TCDD EMPC  
File Name: 010223P1 Sample #: 3 Function: 1 Run #: 16  
Sample text: P1388\_275\_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 17.275

Unnamed Conc.: 17.275

| RT    | m1 Resp mod. | m2 Resp mod. | RA     | Resp      | Adj_Resp  | S/N        | Conc. Name |
|-------|--------------|--------------|--------|-----------|-----------|------------|------------|
| 23:58 | 8.749e+04 Y  | 7.279e+04 Y  | 0.79 Y | 1.303e+05 | 1.303e+05 | 1.40e+01 Y | 4.96       |
| 24:20 | 8.290e+04 Y  | 4.072e+04 Y  | 0.81 Y | 7.361e+04 | 7.361e+04 | 7.55e+00 Y | 2.80       |
| 24:46 | 2.128e+04 Y  | 3.106e+04 Y  | 0.69 Y | 5.234e+04 | 5.234e+04 | 6.00e+00 Y | 1.99       |
| 25:50 | 4.864e+04 Y  | 5.857e+04 Y  | 0.83 Y | 1.072e+05 | 1.072e+05 | 9.81e+00 Y | 4.08       |
| 27:25 | 3.946e+04 Y  | 5.103e+04 Y  | 0.77 Y | 9.049e+04 | 9.049e+04 | 8.18e+00 Y | 3.44       |

Totals class: PeCDD EMPC  
File Name: 010223P1 Sample #: 3 Function: 2 Run #: 16  
Sample text: P1388\_275\_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 48.519

Unnamed Conc.: 46.781

| RT    | m1 Resp mod. | m2 Resp mod. | RA     | Resp      | Adj_Resp  | S/N        | Conc. Name |
|-------|--------------|--------------|--------|-----------|-----------|------------|------------|
| 30:36 | 1.324e+05 Y  | 8.277e+04 Y  | 1.60 Y | 2.151e+05 | 2.151e+05 | 1.49e+01 Y | 12.7       |
| 31:08 | 2.218e+04 Y  | 1.291e+04 Y  | 1.72 Y | 3.509e+04 | 3.509e+04 | 3.23e+00 Y | 2.08       |
| 31:41 | 9.365e+04 Y  | 5.601e+04 Y  | 1.67 Y | 1.497e+05 | 1.497e+05 | 1.30e+01 Y | 8.86       |
| 31:52 | 2.066e+04 Y  | 1.711e+04 Y  | 1.21 Y | 3.777e+04 | 3.398e+04 | 5.06e+00 Y | 2.01       |
| 31:59 | 5.095e+04 Y  | 3.112e+04 Y  | 1.64 Y | 8.208e+04 | 8.208e+04 | 9.15e+00 Y | 4.86       |
| 32:14 | 5.054e+04 Y  | 3.510e+04 Y  | 1.44 Y | 8.564e+04 | 8.564e+04 | 6.62e+00 Y | 5.07       |
| 32:37 | 4.816e+04 Y  | 3.418e+04 Y  | 1.41 Y | 8.235e+04 | 8.235e+04 | 8.90e+00 Y | 4.88       |
| 33:07 | 3.585e+04 Y  | 2.776e+04 Y  | 1.29 Y | 6.362e+04 | 5.899e+04 | 7.53e+00 Y | 3.49       |
| 33:13 | 2.321e+04 Y  | 1.151e+04 Y  | 2.02 Y | 3.472e+04 | 2.935e+04 | 3.02e+00 Y | 1.74       |
| 33:34 | 2.919e+04 Y  | 1.782e+04 Y  | 1.64 Y | 4.702e+04 | 4.702e+04 | 4.04e+00 Y | 2.78       |

Totals class: HxCDD EMPC  
File Name: 010223P1 Sample #: 3 Function: 3 Run #: 16  
Sample text: P1388\_275\_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 68.237

Unnamed Conc.: 51.453

| RT    | m1 Resp mod. | m2 Resp mod. | RA     | Resp      | Adj_Resp  | S/N        | Conc. Name |
|-------|--------------|--------------|--------|-----------|-----------|------------|------------|
| 35:19 | 7.959e+04 n  | 6.088e+04 n  | 1.31 Y | 1.405e+05 | 1.405e+05 | 1.71e+01 Y | 9.41       |
| 35:58 | 1.502e+05 Y  | 1.132e+05 Y  | 1.33 Y | 2.634e+05 | 2.634e+05 | 3.42e+01 Y | 17.6       |
| 36:16 | 1.388e+05 Y  | 1.118e+05 Y  | 1.24 Y | 2.506e+05 | 2.506e+05 | 2.64e+01 Y | 16.8       |
| 36:23 | 2.866e+04 Y  | 2.107e+04 Y  | 1.36 Y | 4.973e+04 | 4.973e+04 | 7.59e+00 Y | 3.33       |
| 37:01 | 4.088e+04 Y  | 2.953e+04 Y  | 1.38 Y | 7.041e+04 | 7.041e+04 | 1.07e+01 Y | 4.56       |

1,2,3,4,7,8-HxCDD

37:08 6.002e+04 Y 4.510e+04 Y 1.33 Y 1.051e+05 1.051e+05 1.19e+01 Y 7.58 1,2,3,6,7,8-HxCDD  
37:21 3.341e+04 Y 3.075e+04 Y 1.09 Y 6.416e+04 6.416e+04 8.25e+00 Y 4.30  
37:28 4.083e+04 n 3.114e+04 Y 1.31 Y 7.197e+04 7.197e+04 7.91e+00 Y 4.64 1,2,3,7,8,9-HxCDD  
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Totals class: HPCDD EMPC

Function: 4 Run #: 16

File Name: 010223P1 Sample #: 3 Sample text: P1388\_275\_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 55.576

Unnamed Conc.: 28.312

| RT    | m1        | Resp mod. | m2        | Resp mod. | RA   | Resp      | Adj_Resp  | S/N      | Conc. Name                                  |
|-------|-----------|-----------|-----------|-----------|------|-----------|-----------|----------|---------------------------------------------|
| 40:15 | 1.979e+05 | n         | 1.927e+05 | n         | 1.03 | 3.906e+05 | 3.906e+05 | 3.19e+01 | Y 28.3                                      |
| 41:26 | 1.957e+05 | n         | 1.804e+05 | n         | 1.09 | 3.761e+05 | 3.761e+05 | 3.05e+01 | Y 27.3 1,2,3,4,6,7,8-HPCDD<br>Page 10 of 18 |

Totals class: TCDF EMPC

Function: 1 Run #: 16

File Name: 010223P1 Sample #: 3 Sample text: P1388\_275\_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 369.52

Unnamed Conc.: 358.236

| RT    | m1        | Resp mod. | m2        | Resp mod. | RA   | Resp      | Adj_Resp  | S/N      | Conc. Name          |
|-------|-----------|-----------|-----------|-----------|------|-----------|-----------|----------|---------------------|
| 21:46 | 1.185e+05 | n         | 1.653e+05 | n         | 0.72 | 2.838e+05 | 2.838e+05 | 1.82e+01 | Y 10.3              |
| 22:21 | 9.414e+04 | n         | 1.250e+05 | n         | 0.75 | 2.192e+05 | 2.192e+05 | 1.39e+01 | Y 7.99              |
| 23:01 | 1.592e+05 | n         | 2.202e+05 | n         | 0.72 | 3.794e+05 | 3.794e+05 | 2.68e+01 | Y 13.8              |
| 23:32 | 4.850e+05 | Y         | 6.572e+05 | Y         | 0.74 | 1.142e+06 | 1.142e+06 | 4.51e+01 | Y 41.7              |
| 23:55 | 3.308e+05 | Y         | 4.326e+05 | Y         | 0.76 | 7.634e+05 | 7.634e+05 | 3.18e+01 | Y 27.8              |
| 24:21 | 1.655e+05 | Y         | 1.998e+05 | Y         | 0.83 | 3.653e+05 | 3.653e+05 | 2.57e+01 | Y 13.3              |
| 24:30 | 7.081e+04 | Y         | 1.107e+05 | Y         | 0.64 | 1.815e+05 | 1.628e+05 | 1.40e+01 | Y 5.94              |
| 24:40 | 1.038e+05 | Y         | 1.364e+05 | Y         | 0.76 | 2.402e+05 | 2.402e+05 | 1.81e+01 | Y 8.76              |
| 25:03 | 1.292e+05 | Y         | 1.760e+05 | Y         | 0.74 | 3.059e+05 | 3.059e+05 | 2.33e+01 | Y 11.2              |
| 25:11 | 2.686e+05 | Y         | 3.484e+05 | Y         | 0.77 | 6.170e+05 | 6.170e+05 | 4.65e+01 | Y 22.5              |
| 25:25 | 7.666e+05 | Y         | 1.007e+06 | Y         | 0.76 | 1.774e+06 | 1.774e+06 | 8.16e+01 | Y 64.7              |
| 25:54 | 1.564e+05 | Y         | 2.080e+05 | Y         | 0.75 | 3.644e+05 | 3.644e+05 | 2.77e+01 | Y 13.3              |
| 26:01 | 2.236e+04 | Y         | 3.275e+04 | Y         | 0.68 | 5.511e+04 | 5.511e+04 | 6.19e+00 | Y 2.01              |
| 26:11 | 1.167e+05 | Y         | 1.654e+05 | Y         | 0.71 | 2.821e+05 | 2.821e+05 | 2.33e+01 | Y 10.3              |
| 26:23 | 2.310e+05 | n         | 3.303e+05 | Y         | 0.70 | 5.612e+05 | 5.612e+05 | 4.07e+01 | Y 20.5              |
| 26:35 | 2.698e+05 | Y         | 3.392e+05 | Y         | 0.80 | 6.090e+05 | 6.090e+05 | 4.75e+01 | Y 22.2              |
| 26:42 | 1.953e+05 | Y         | 3.041e+05 | Y         | 0.64 | 4.994e+05 | 4.489e+05 | 4.43e+01 | Y 16.4              |
| 26:48 | 1.266e+05 | Y         | 1.827e+05 | Y         | 0.69 | 3.093e+05 | 3.093e+05 | 2.51e+01 | Y 11.3 2,3,7,8-TCDF |
| 27:11 | 4.434e+05 | n         | 6.020e+05 | n         | 0.74 | 1.045e+06 | 1.045e+06 | 8.82e+01 | Y 38.1              |
| 27:26 | 2.648e+04 | Y         | 4.648e+04 | Y         | 0.57 | 7.297e+04 | 6.088e+04 | 6.01e+00 | Y 2.22              |
| 27:43 | 3.046e+04 | n         | 3.847e+04 | Y         | 0.79 | 6.894e+04 | 6.894e+04 | 5.35e+00 | Y 2.51              |
| 28:51 | 3.107e+04 | Y         | 4.395e+04 | n         | 0.71 | 7.502e+04 | 7.502e+04 | 6.48e+00 | Y 2.74              |

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Totals class: 1st Fnc.PeCDF EMPC

Function: 1 Run #: 16

File Name: 010223P1 Sample #: 3 Sample text: P1388\_275\_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 46.757

Unnamed Conc.: 46.757

RT m1 Resp mod. m2 Resp mod. RA Resp Adj\_Resp S/N Conc. Name

28:50 6.559e+05 n 3.996e+05 n 1.64 y 1.055e+06 1.055e+06 2.00e+01 y 46.8

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Totals class: PeCDF EMPC

Function: 2 Run #: 16

File Name: 010223P1 Sample #: 3 Sample text: P1388\_275\_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 409.15

Unnamed Conc.: 341.683

RT m1 Resp mod. m2 Resp mod. RA Resp Adj\_Resp S/N Conc. Name

30:22 7.295e+05 y 4.825e+05 y 1.51 y 1.212e+06 1.212e+06 1.00e+00 n 53.7  
30:31 7.874e+05 y 5.026e+05 y 1.57 y 1.290e+06 1.290e+06 9.67e-01 n 57.1  
30:38 1.972e+05 y 1.316e+05 y 1.50 y 1.288e+05 3.288e+05 3.49e-01 n 14.6  
30:44 6.448e+04 y 4.067e+04 y 1.59 y 1.051e+05 1.051e+05 1.23e-01 n 4.66  
30:58 1.158e+05 y 7.743e+04 y 1.50 y 1.933e+05 1.933e+05 1.83e-01 n 8.56  
31:07 1.859e+05 y 1.270e+05 y 1.46 y 3.129e+05 3.129e+05 4.36e-01 n 13.9  
31:13 8.298e+05 y 5.571e+05 y 1.49 y 1.387e+06 1.387e+06 1.04e+00 n 61.4  
31:27 1.904e+05 y 1.274e+05 y 1.50 y 3.178e+05 3.178e+05 3.71e-01 n 14.1  
31:39 2.803e+05 n 1.882e+05 y 1.49 y 4.685e+05 4.685e+05 2.89e+01 y 20.9 1,2,3,7,8-PeCDF  
31:56 5.285e+05 n 3.629e+05 n 1.46 y 8.914e+05 8.914e+05 6.52e-01 n 39.5  
32:30 5.696e+04 y 3.548e+04 y 1.61 y 9.243e+04 9.243e+04 1.18e-01 n 4.09  
32:39 8.356e+05 y 5.586e+05 y 1.50 y 1.394e+06 1.394e+06 1.57e+00 n 61.8  
32:46 6.440e+05 y 4.151e+05 y 1.55 y 1.059e+06 1.059e+06 5.69e+01 y 46.6 2,3,4,7,8-PeCDF  
33:06 6.309e+04 y 4.942e+04 y 1.28 n 1.125e+05 1.038e+05 1.21e-01 n 4.60  
33:51 4.986e+04 y 3.472e+04 y 1.44 y 8.458e+04 8.458e+04 1.03e-01 n 3.75

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Totals class: HxCDF EMPC

Function: 3 Run #: 16

File Name: 010223P1 Sample #: 3 Sample text: P1388\_275\_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

Total Conc.: 517.26

Unnamed Conc.: 312.763

RT m1 Resp mod. m2 Resp mod. RA Resp Adj\_Resp S/N Conc. Name

34:40 5.164e+05 n 4.299e+05 n 1.20 y 4.463e+05 9.463e+05 9.80e+01 y 51.1  
34:52 1.285e+06 n 1.082e+06 n 1.19 y 2.367e+06 2.367e+06 2.55e+02 y 128  
35:06 1.202e+05 n 1.012e+05 n 1.19 y 2.214e+05 2.214e+05 2.20e+01 y 12.0  
35:17 1.753e+05 n 1.393e+05 n 1.26 y 3.146e+05 3.146e+05 3.36e+01 y 17.0  
35:30 8.724e+04 n 6.709e+04 n 1.30 y 1.543e+05 1.543e+05 1.58e+01 y 8.34  
35:56 6.400e+05 n 5.010e+05 n 1.28 y 1.141e+06 1.141e+06 1.19e+02 y 61.7  
36:03 4.868e+05 n 4.120e+05 n 1.18 y 8.988e+05 8.988e+05 9.07e+01 y 48.9 1,2,3,4,7,8-HxCDF  
36:11 6.100e+05 n 4.891e+05 n 1.25 y 1.099e+06 1.099e+06 1.10e+02 y 54.6 1,2,3,6,7,8-HxCDF  
36:21 1.094e+05 n 8.865e+04 n 1.23 y 1.981e+05 1.981e+05 2.22e+01 y 10.7



|       |           |   |           |   |      |   |           |           |          |   |                        |
|-------|-----------|---|-----------|---|------|---|-----------|-----------|----------|---|------------------------|
| 36:29 | 1.290e+05 | n | 1.086e+05 | n | 1.19 | Y | 2.376e+05 | 2.376e+05 | 2.30e+01 | Y | 12.8                   |
| 36:37 | 1.190e+05 | n | 8.713e+04 | n | 1.37 | Y | 2.061e+05 | 2.061e+05 | 1.85e+01 | Y | 11.1                   |
| 36:51 | 9.000e+05 | n | 7.522e+05 | n | 1.20 | Y | 1.652e+06 | 1.652e+06 | 1.67e+02 | Y | 87.3 2,3,4,6,7,8-HxCDF |
| 37:53 | 1.302e+05 | n | 9.724e+04 | n | 1.34 | Y | 2.274e+05 | 2.274e+05 | 1.60e+01 | Y | 13.7 1,2,3,7,8,9-HxCDF |

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Totals class: HpCDF EMPC

Function: 4 Run #: 16

File Name: 010223P1 Sample #: 3 Sample text: P1388\_275\_001 M23-1 Air Train CU

Acquired: 23-FEB-01 13:01:16 Processed: 23-FEB-01 14:56:00

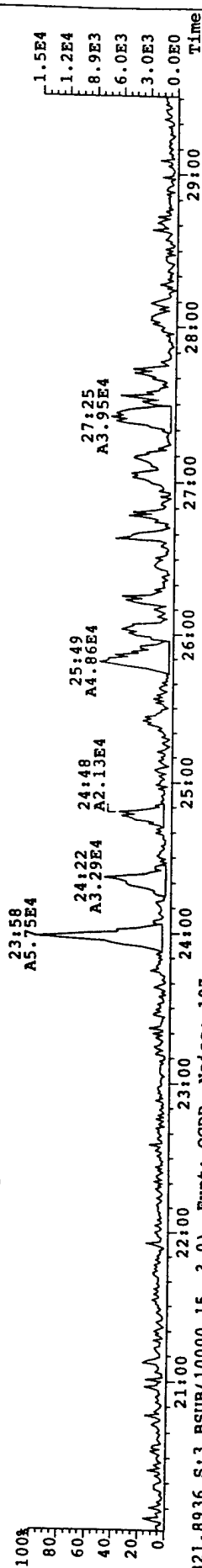
Total Conc.: 369.68

Unnamed Conc.: 109.495

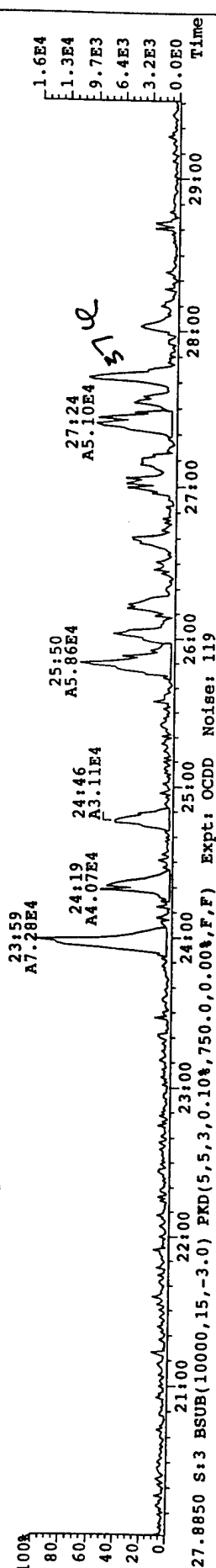
| RT    | m1        | Resp mod. | m2        | Resp mod. | RA   | Resp | Adj_Resp  | S/N       | Conc. Name |
|-------|-----------|-----------|-----------|-----------|------|------|-----------|-----------|------------|
| 39:48 | 1.962e+06 | n         | 1.948e+06 | n         | 1.01 | Y    | 3.911e+06 | 3.911e+06 | 3.57e+02 Y |
| 40:15 | 4.577e+05 | n         | 4.686e+05 | n         | 0.98 | Y    | 9.263e+05 | 9.263e+05 | 7.27e+01 Y |
| 40:29 | 3.927e+05 | n         | 3.693e+05 | n         | 1.06 | Y    | 7.620e+05 | 7.620e+05 | 7.24e+01 Y |
| 42:15 | 1.911e+05 | n         | 1.832e+05 | n         | 1.04 | Y    | 3.743e+05 | 3.743e+05 | 2.95e+01 Y |

234 1,2,3,4,6,7,8-HpCDF  
60.1  
49.4  
26.5 1,2,3,4,7,8,9-HpCDF

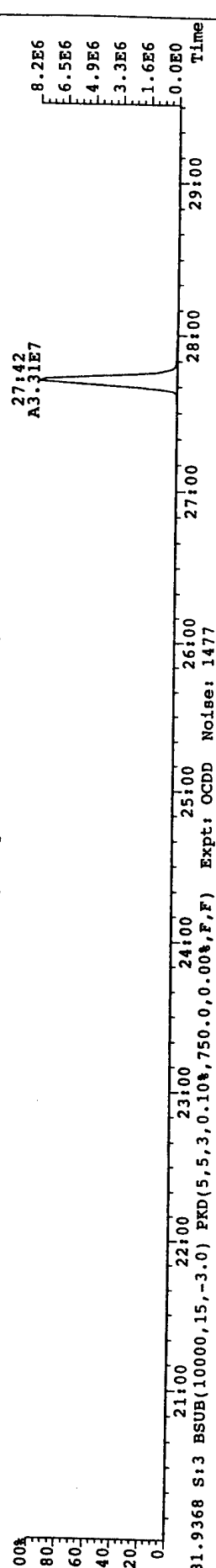
File: 010723PI Acq: 23-FEB-2001 13:01:16 GC EX+ Voltage SIR Autospec-UitimaE  
Sample# 3 Text: P1388.275 001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5  
319.8965 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 300



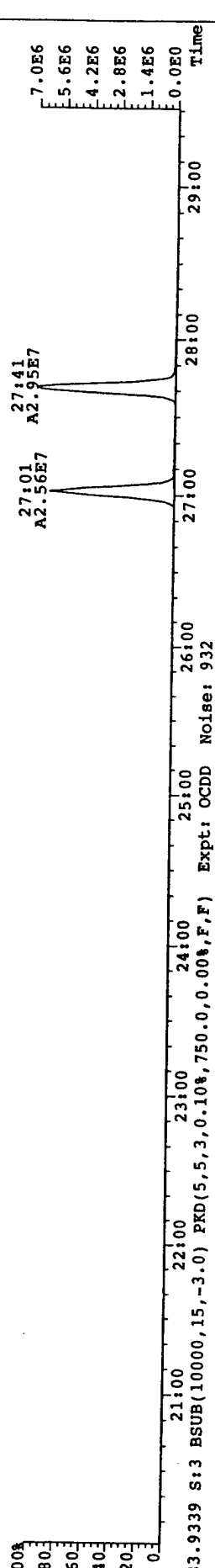
321.8936 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 197



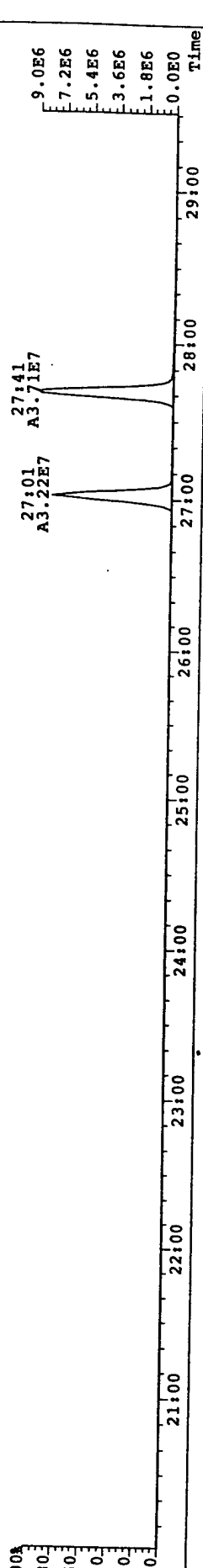
327.8850 S:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 119



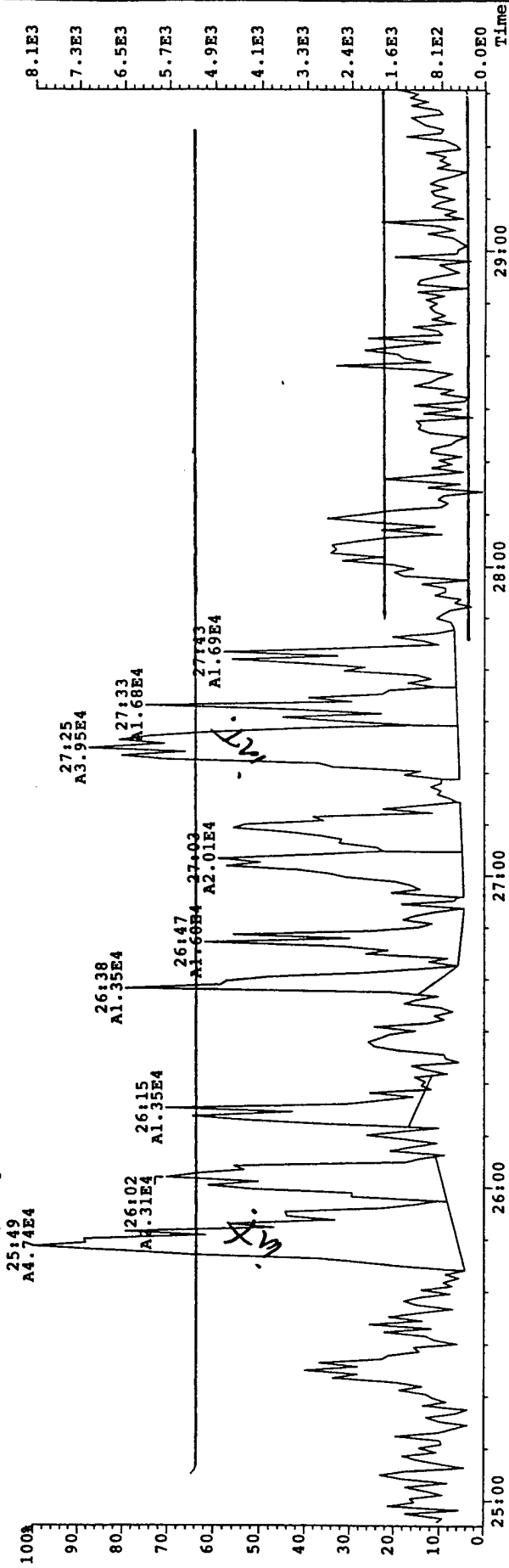
331.9368 S:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1477



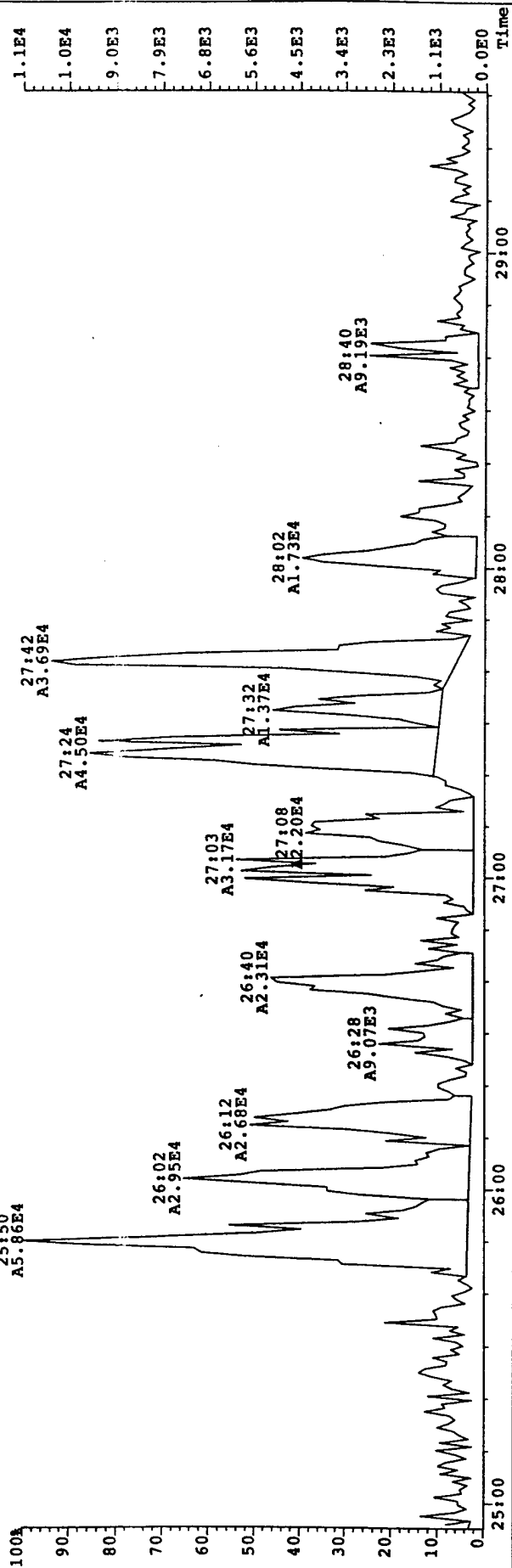
333.9339 S:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 932



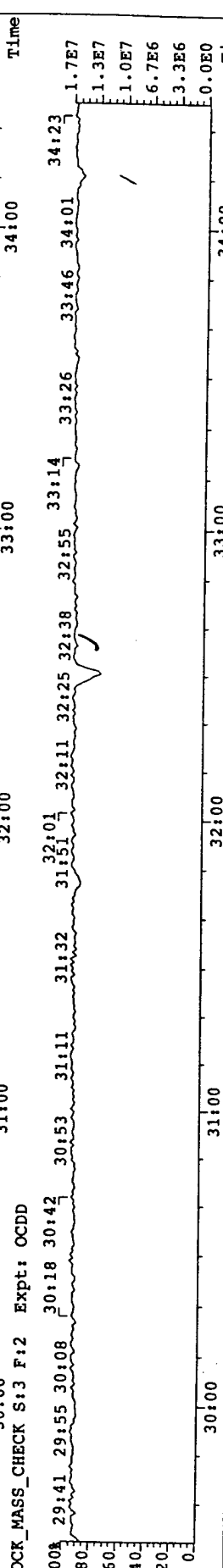
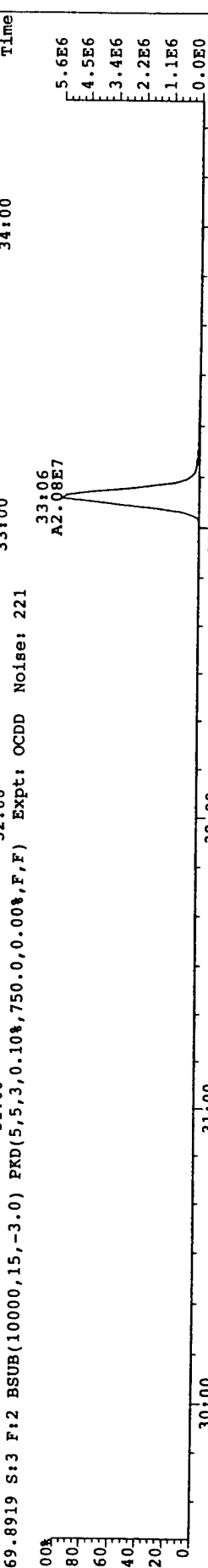
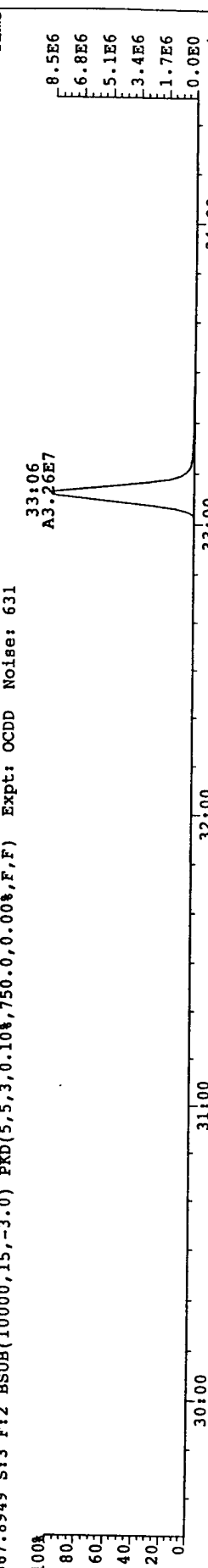
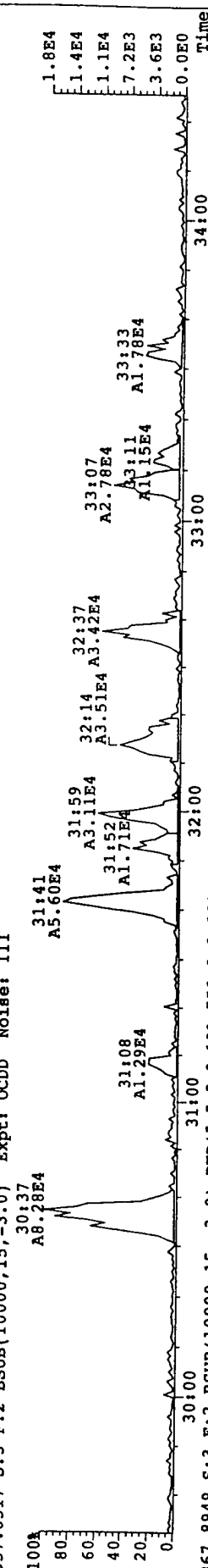
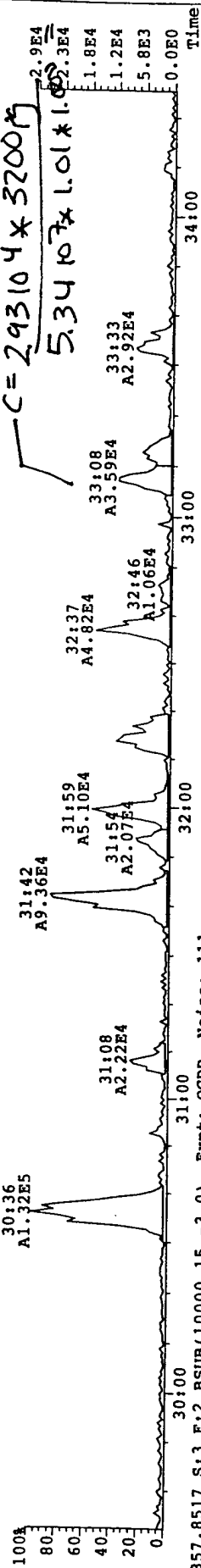
File: 010223PI Acq: 23-FEB-2001 13:01:16 GC EX+ Voltage SIR Autospec-UltimaE  
 Sample# 3 Text: PI388.275 001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5  
 319.8965 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 300



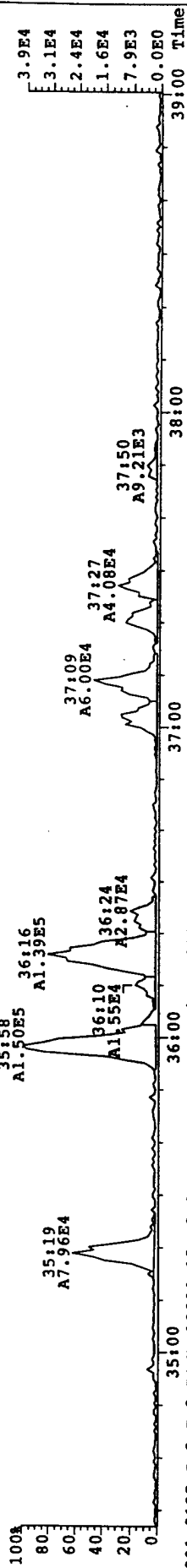
321.8936 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 197



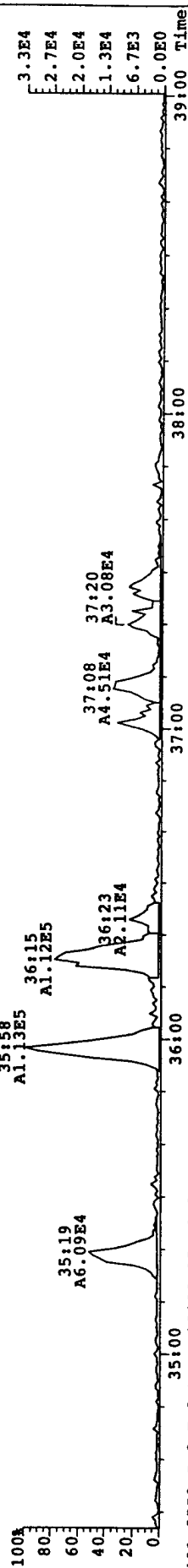
File: 010223PI Acq: 23-FEB-2001 13:01:16 GC Ext Voltage S/R Autospec-UltimaE  
Sample# 3 Text: F1388 275 001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5  
355.8546 S:3 F:2 BSUB(10000,15,-3.0) Expt: OCDD Noise: 210



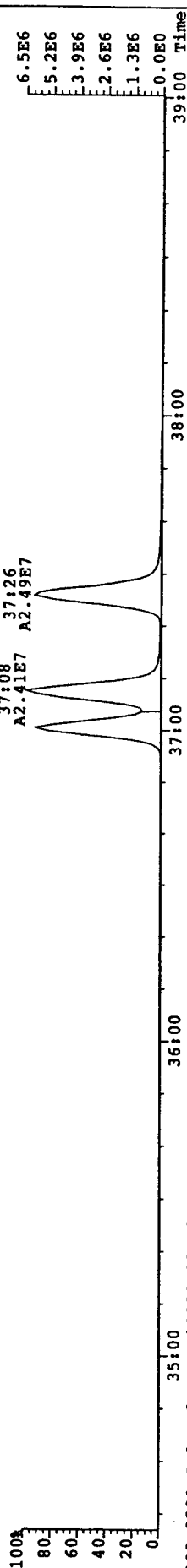
File: 010223PI Acq: 23-FEB-2001 13:01:16 GC RT+ Voltage SIR Autospec-UltimaE  
Sample# 3 Text: P1388 275.001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5  
389.8156 S:3 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 315



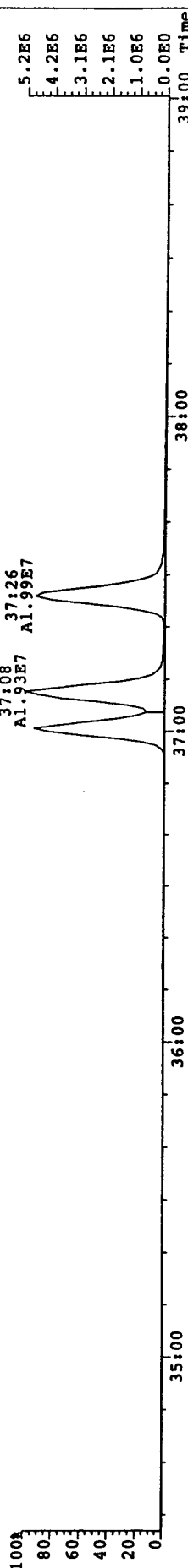
391.8127 S:3 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 223



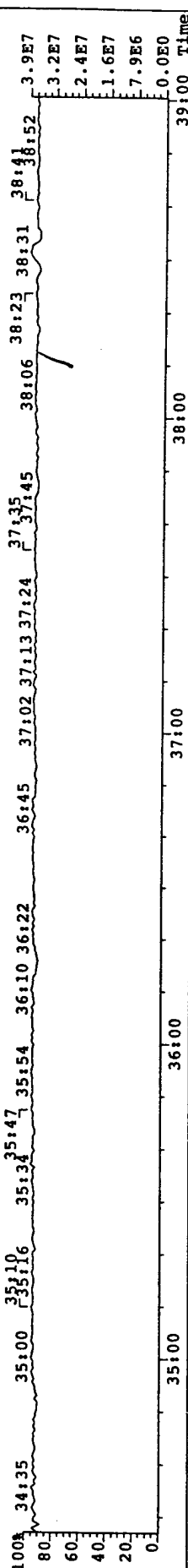
401.8559 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 520



403.8530 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 615



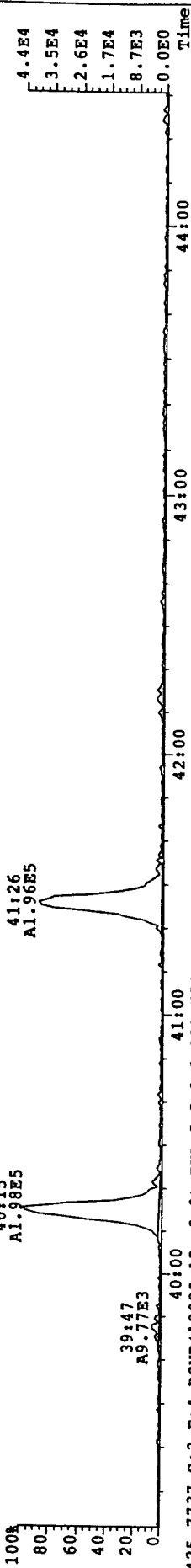
LOCK\_MASS\_CHECK S:3 F:3 Expt: OCDD



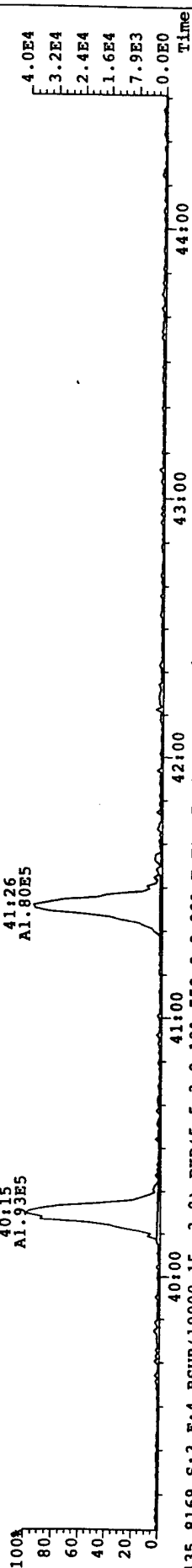
File: 010223PI Acq: 23-FEB-2001 13:41:16 GC FI+ Voltage SIR Autospec-UltimaE

Sample# 3 Text: PI388.275.001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5

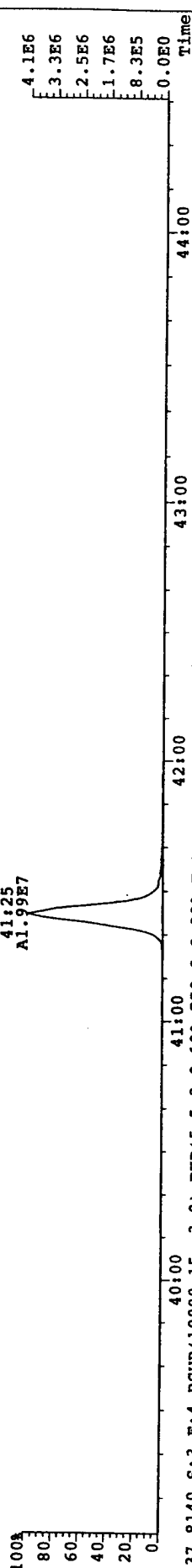
423.7767 S:3 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 115



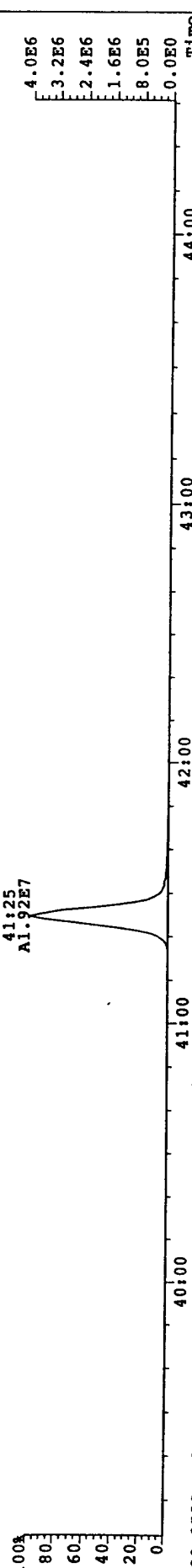
425.7737 S:3 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 126



435.8169 S:3 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1008



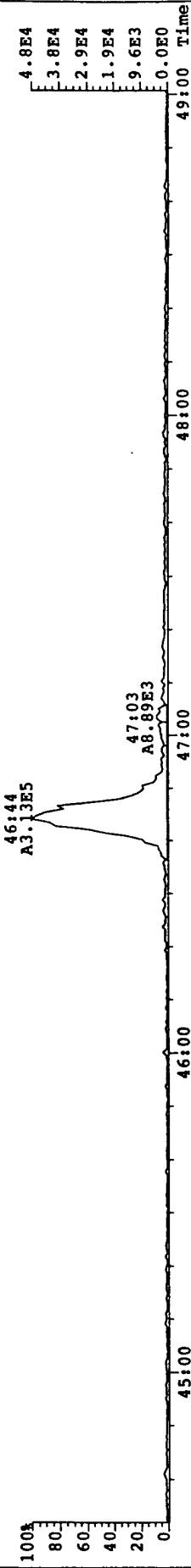
437.8140 S:3 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 549



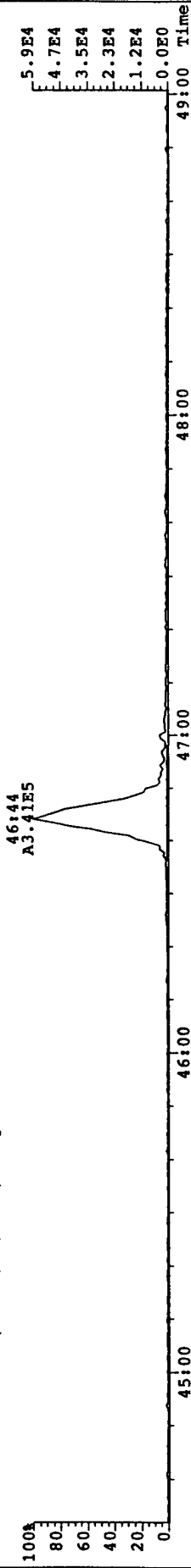
430.9728 S:3 F:4 Expt: OCDD



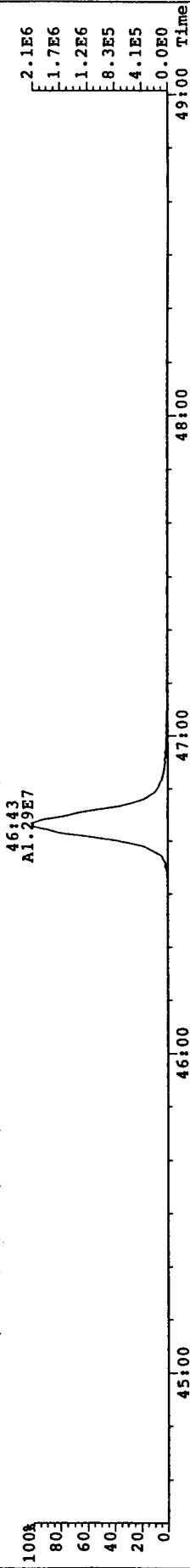
File: 010223PI Acq: 23-FEB-2001 13:01:16 GC EX+ Voltage SIR Autospec-Ultimate  
Sample# 3 Text: P1388 275.001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5  
457.7377 S:3 F:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 211



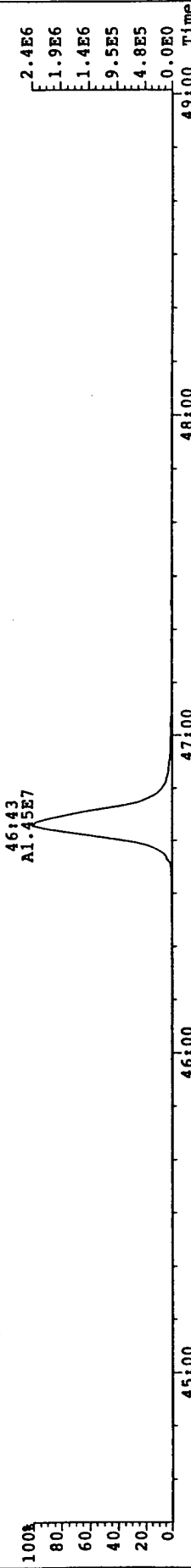
459.7348 S:3 F:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 130



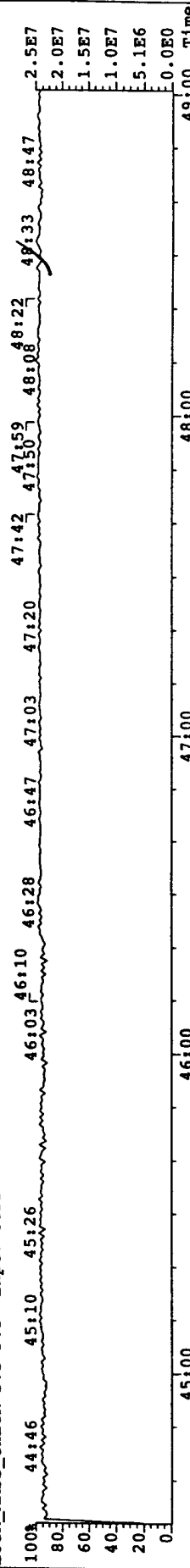
469.7780 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 179



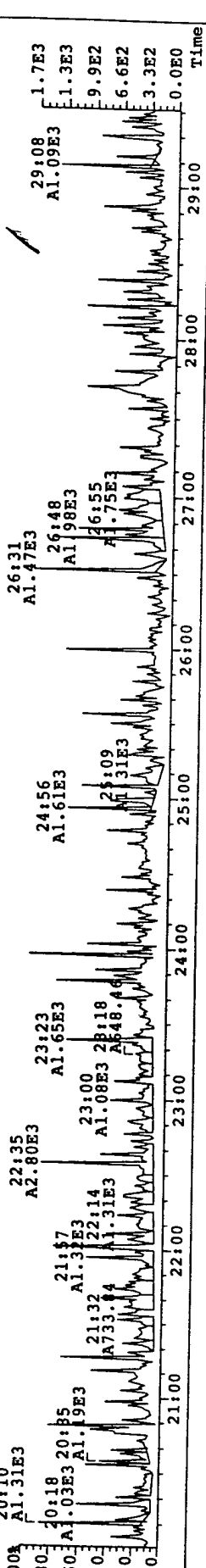
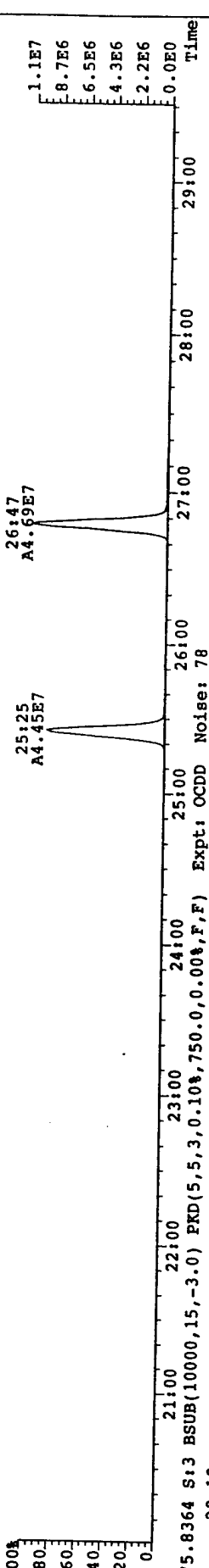
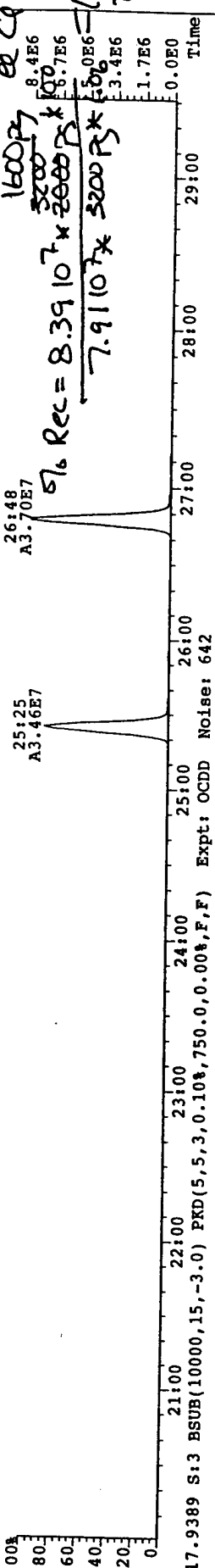
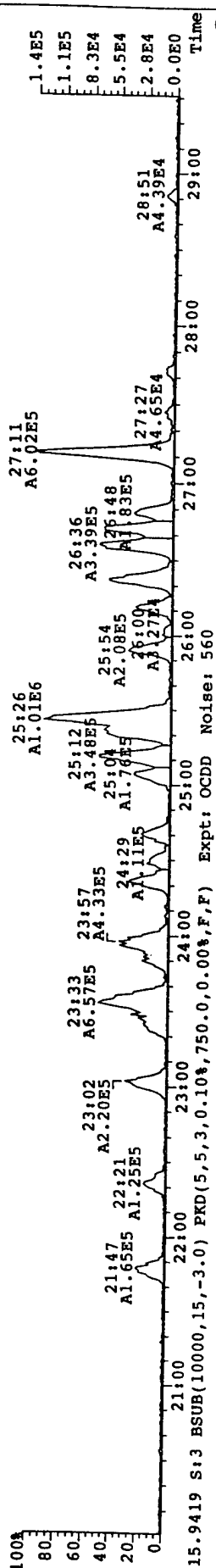
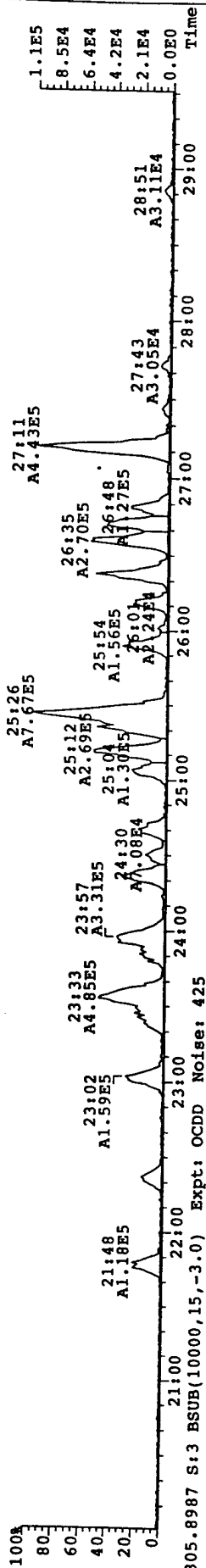
471.7750 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 184



LOCK\_MASS\_CHECK S:3 F:5 Expt: OCDD



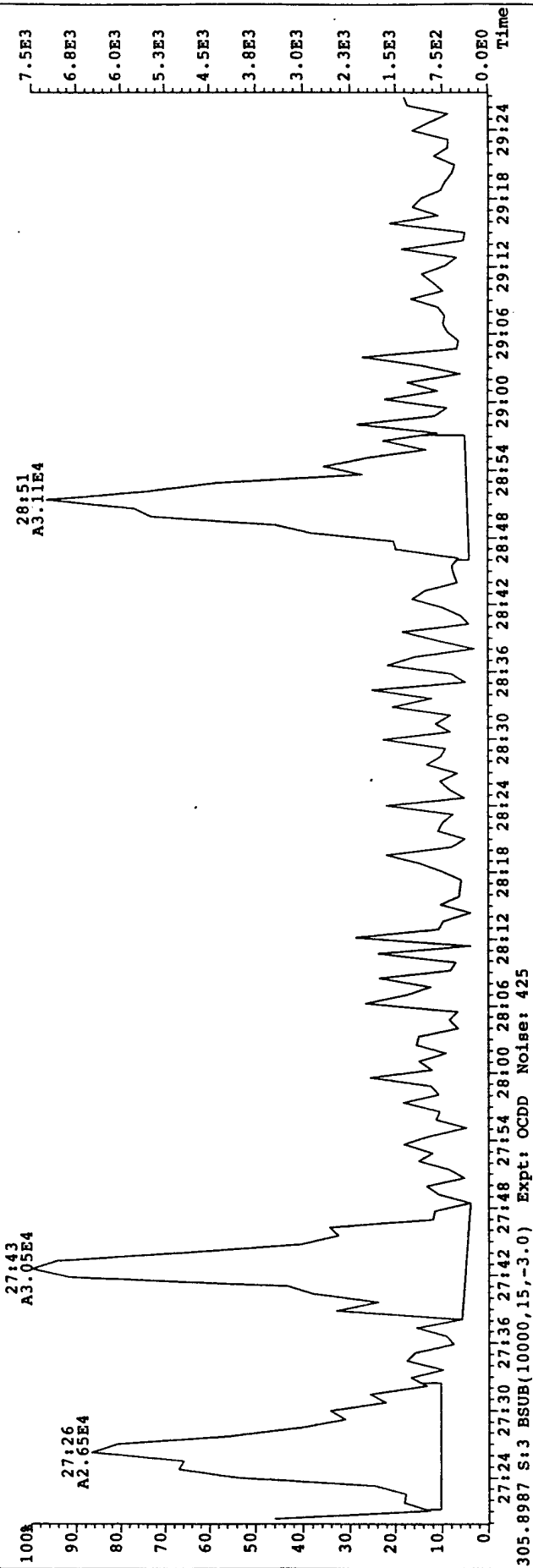
File: 010223PI Acq: 23-FEB-2001 13:01:16 GC EIT Voltage SIR Autospec-Ultimate  
Sample# 3 Text: P1388 275.001 M23-1 Air Train CU Vial# 65 File Text: AAP DBS  
303.9016 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 281



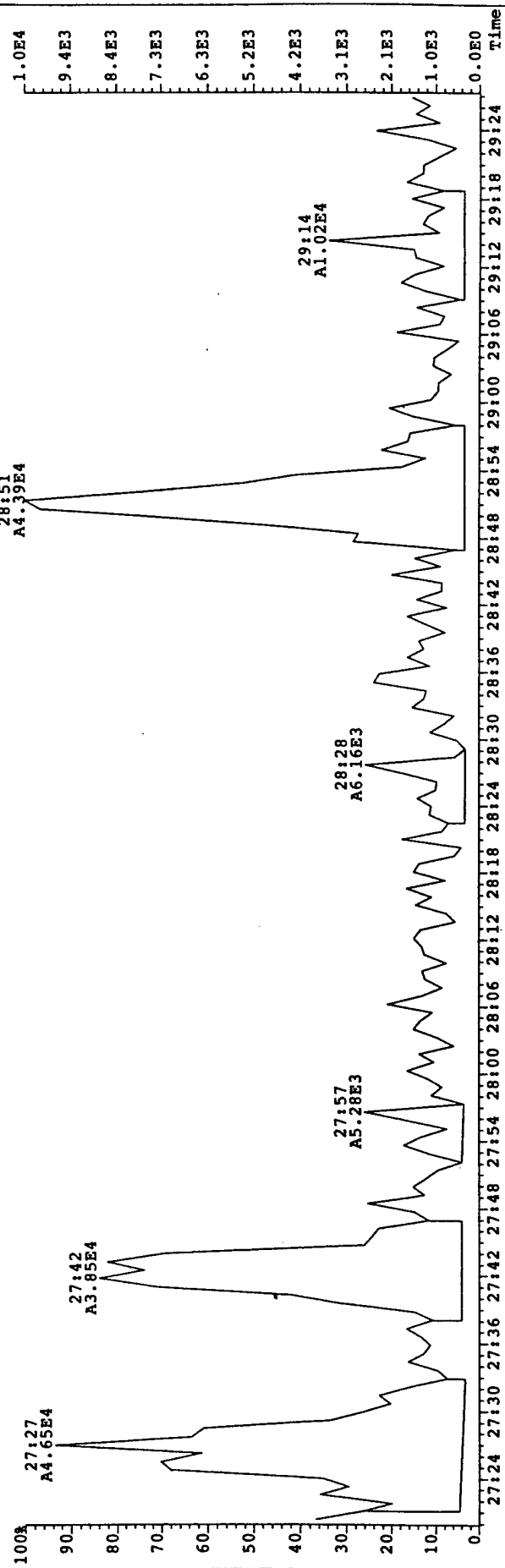
160077  
576 Rec =  $8.39 \times 10^7 \times 2000 \times 100$   
 $\frac{7.91 \times 10^7 \times 5200 \times 100}{100}$   
8.4E6  
8.7E6  
3.4E6  
1.7E6  
0.0E0  
26:48 A3.70E7  
25:25 A3.46E7  
25:47 A4.69E7  
26:31 A1.47E3  
26:48 A1.98E3  
26:55 A1.75E3  
27:08 A1.09E3  
29:08 A1.09E3  
1.7E3  
1.3E3  
9.9E2  
6.6E2  
3.3E2  
0.0E0



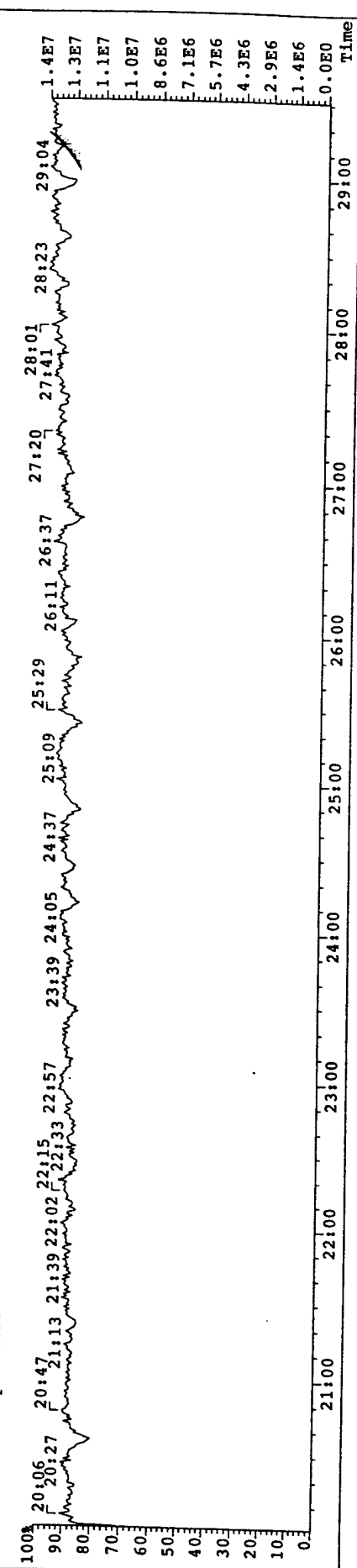
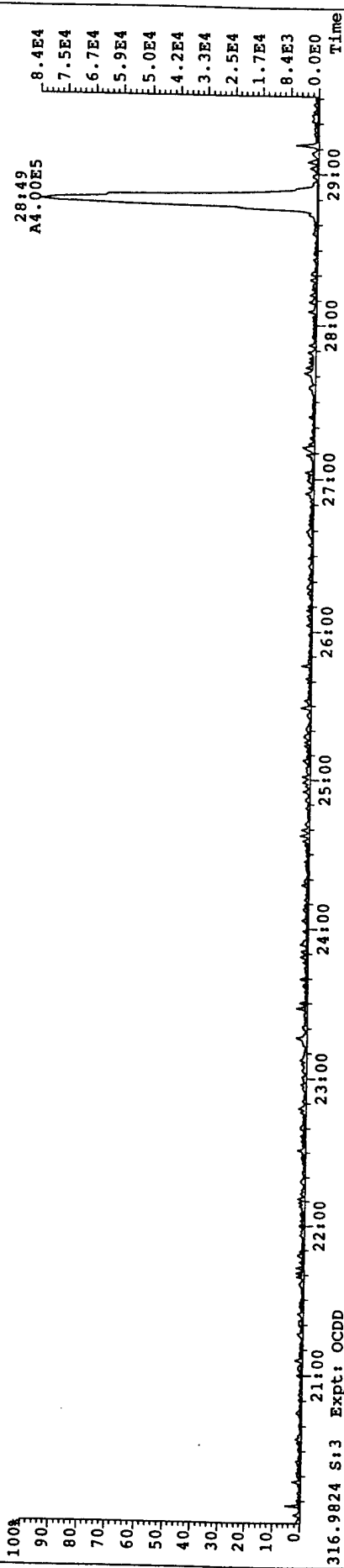
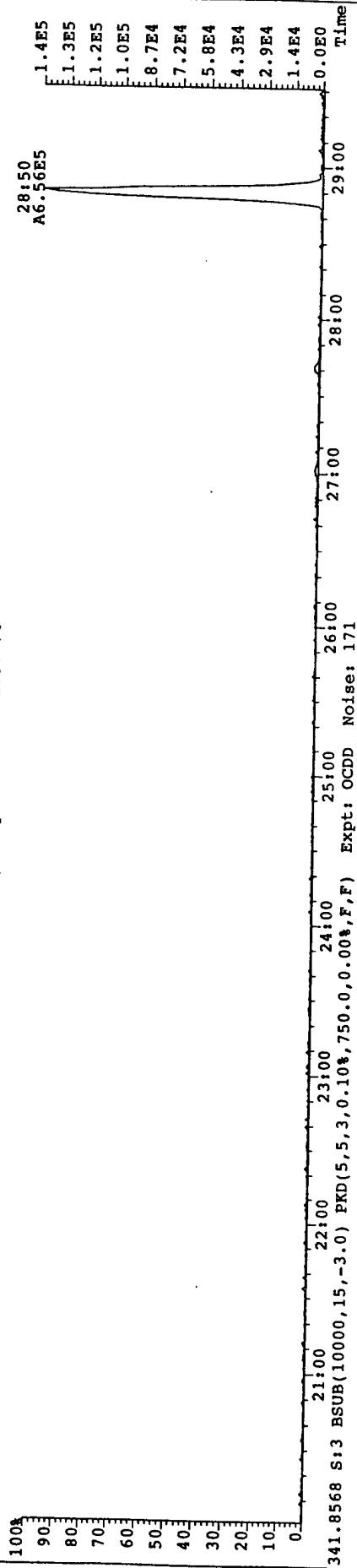
File: 010223PI Acq: 23-FEB-2001 13:01:16 GC EIT+ Voltage SIR Autospec-ULTimaE  
 Sample# 3 Text: P1388 275 001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5  
 303.9016 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 281



305.8987 S:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 425

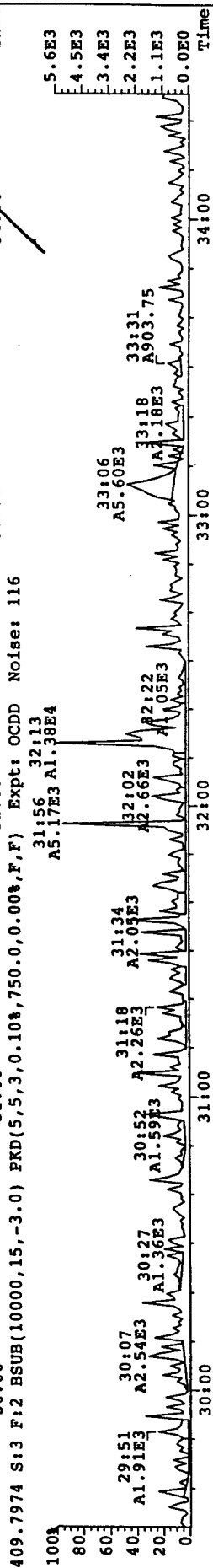
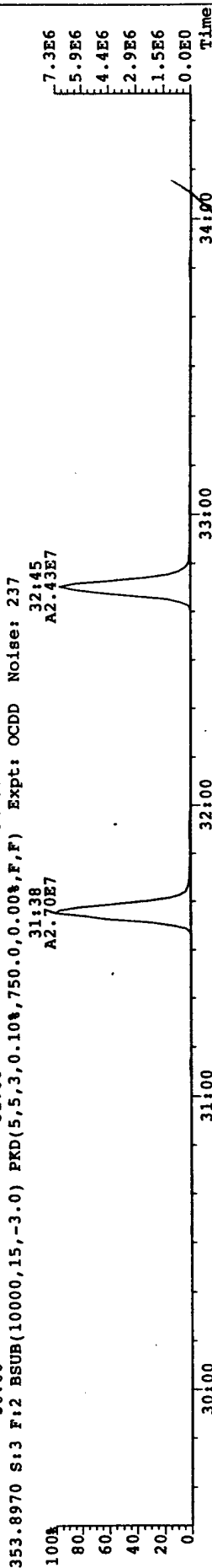
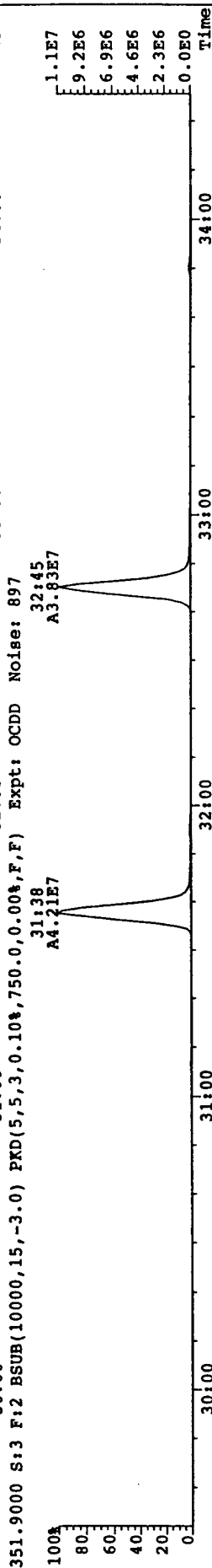
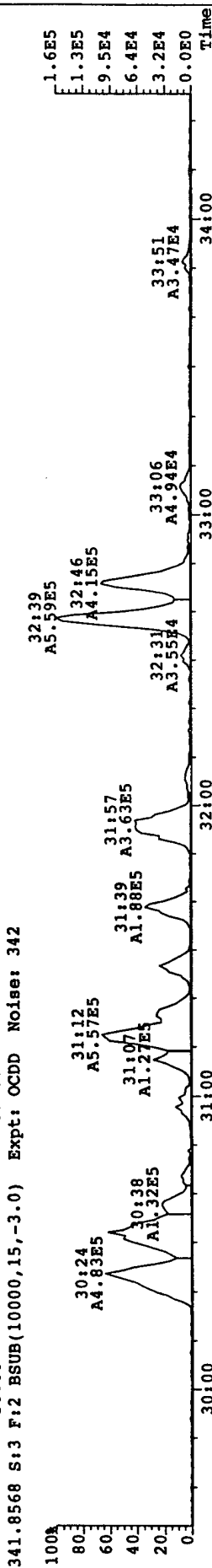


File: 010223PI Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-UltimaE  
Sample# 3 Text: P1388\_275-001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5  
339.8597 S:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 74

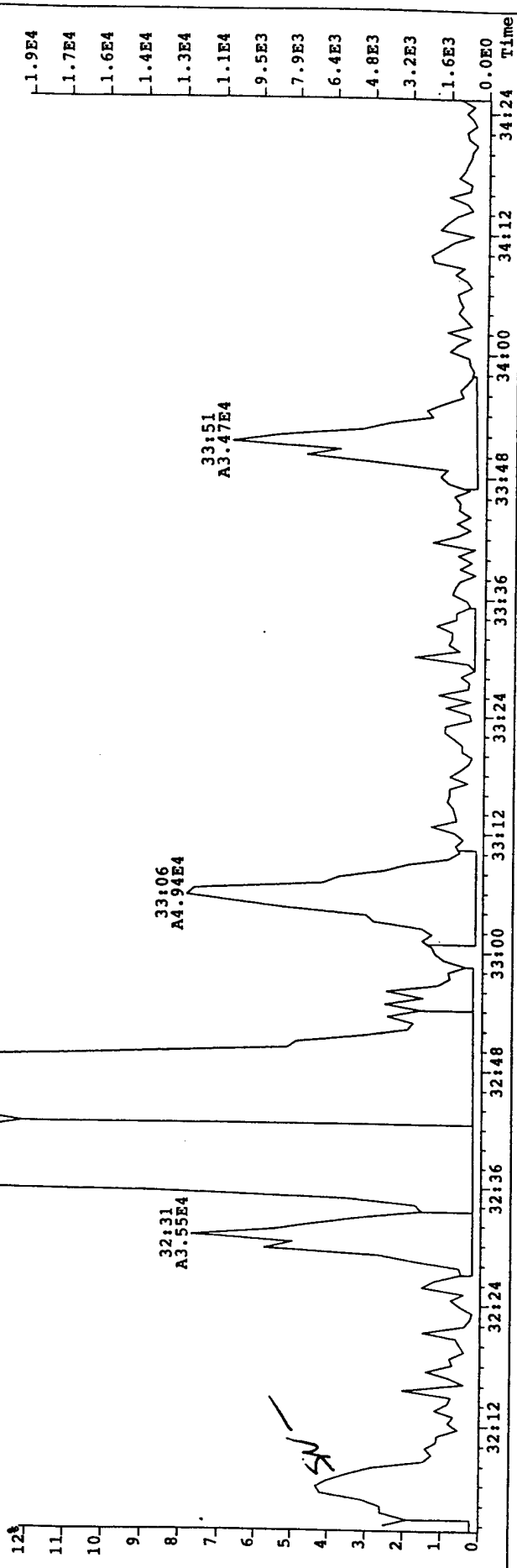
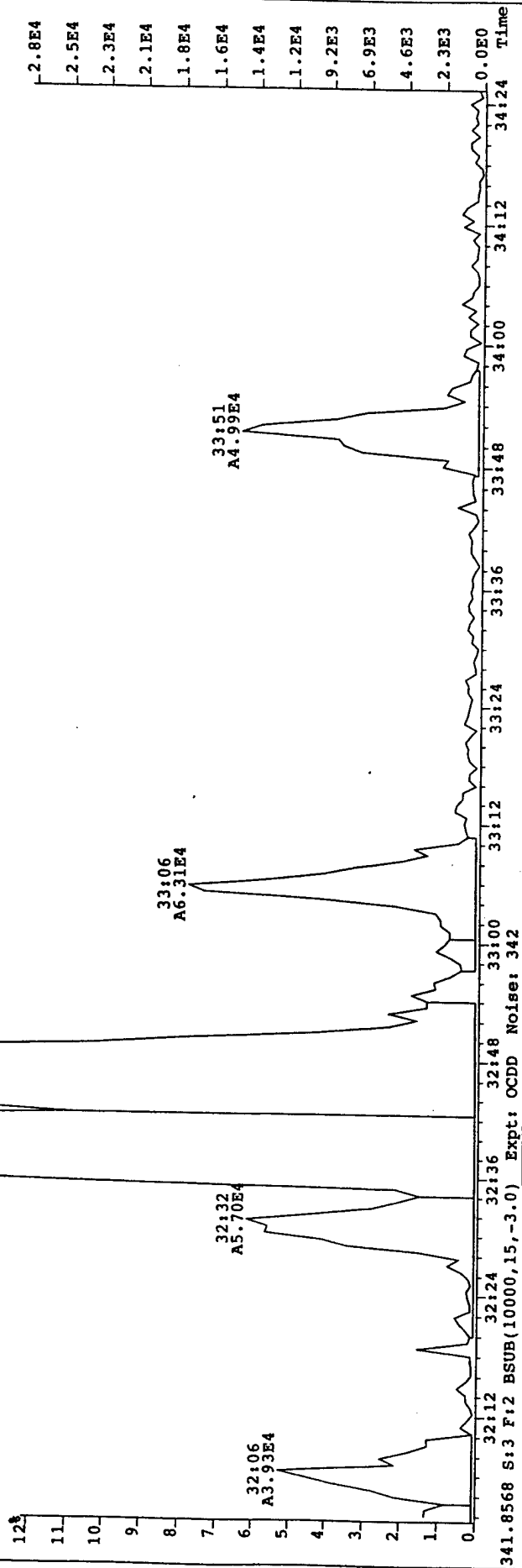


Chromatogram showing detector response (100A) versus Time (30:00 to 34:00). The plot displays several peaks, each labeled with a retention time and a sample identifier.

| Retention Time | Sample Identifier |
|----------------|-------------------|
| 30:32          | A7.87E5           |
| 30:37          | A1.97E5           |
| 31:07          | A1.86E5           |
| 31:12          | A8.30E5           |
| 31:39          | A2.80E5           |
| 31:57          | A5.29E5           |
| 32:32          | A5.70E4           |
| 32:46          | A6.44E5           |
| 33:06          | A6.31E4           |
| 33:51          | A4.99E4           |
| 34:00          | A4.99E4           |



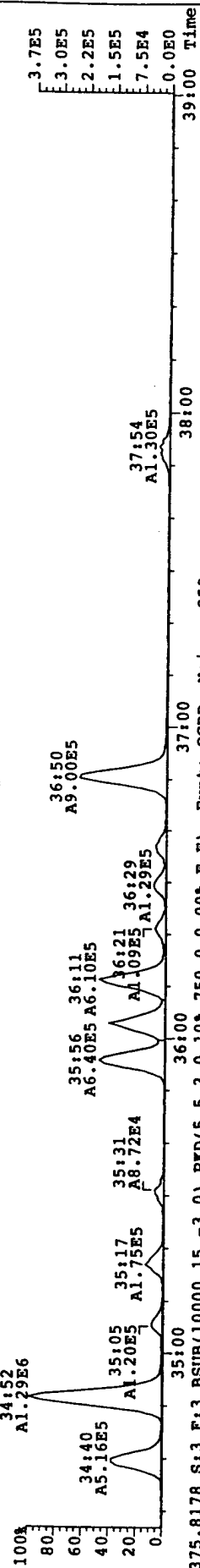
File: 010223P1 Acq: 23-FEB-2001 13:01:16 GC EL+ Voltage 51V Autospec-UltimaE  
Sample# 3 Text: P1388 275 001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5  
339.8597 S:3 F:2 BSUB(10000,15,-3.0) Expt: OCDD Noise: 160



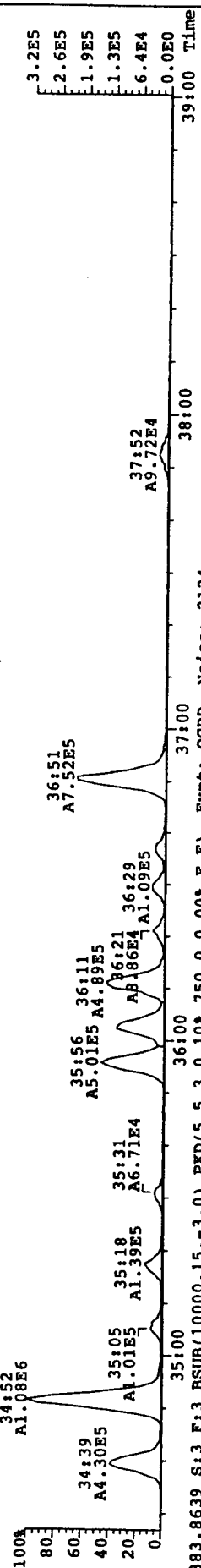
File: 010223PI Acq: 23-FEB-2001 13:01:16 GC E1+ Voltage SIR Autospec-VItimeE

Sample# 3 Text: P1388 275.001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5

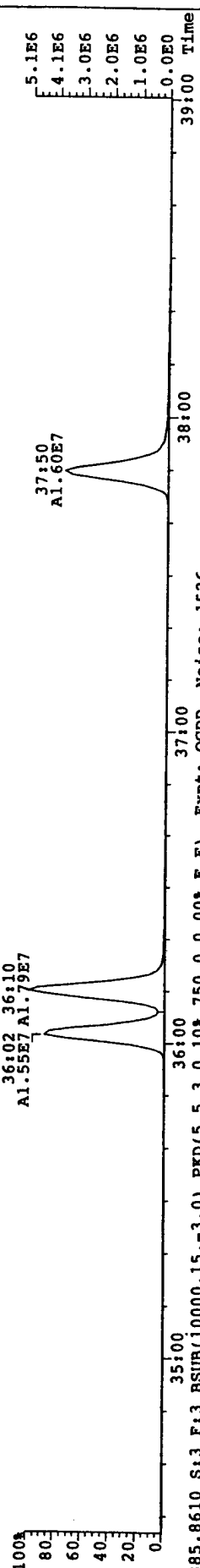
373.8207 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 355



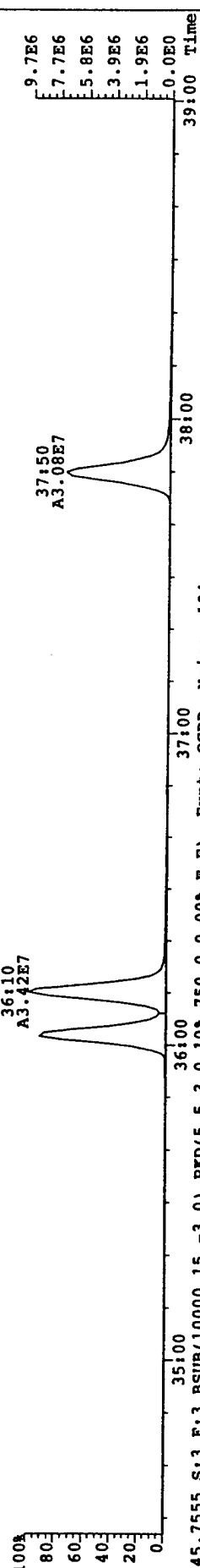
375.8178 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 259



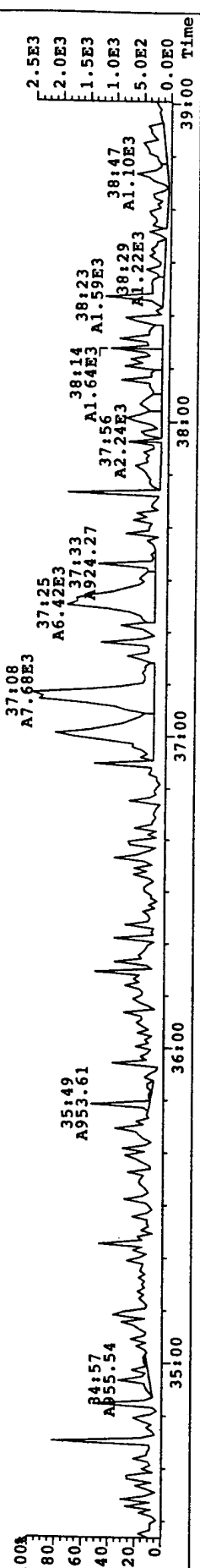
383.8639 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 2124



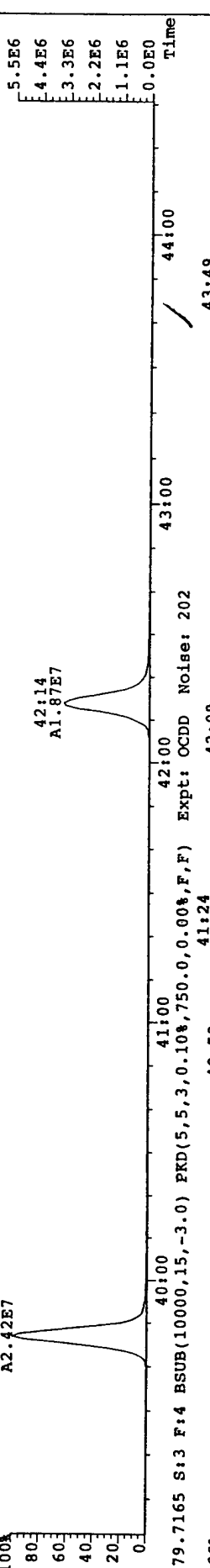
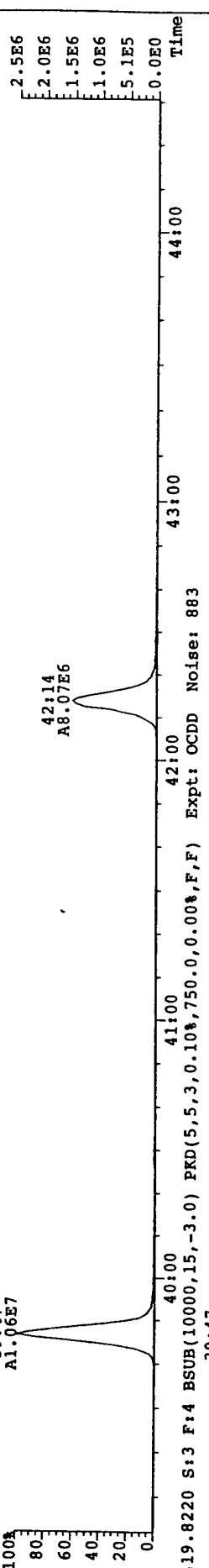
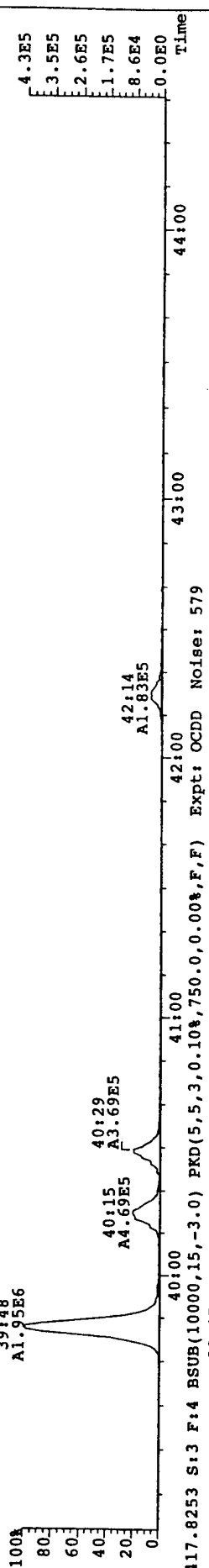
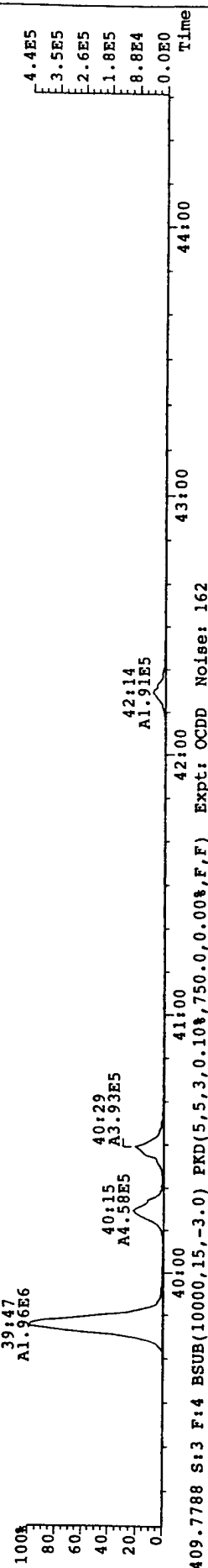
385.8610 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1526



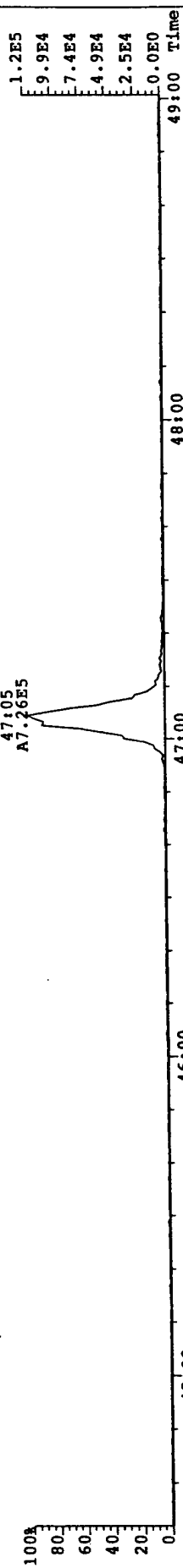
445.7555 S:3 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 104



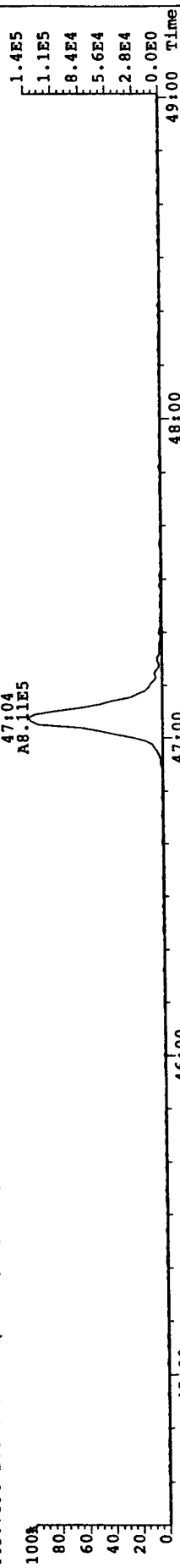
File: 010223PI Acq: 23-FEB-2001 13:01:16 GC E1+ Voltage SIR Autospec-UltimaE  
Sample# 3 Text: P1388 275 001 M23-1 Air Train CU Vial# 65 File Text: AAP DB5  
407.7818 S:3 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 191



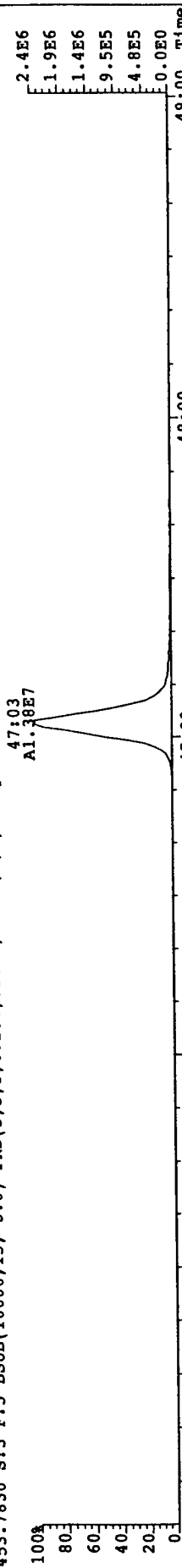
File: 010223PI Acq: 23-FEB-2001 13:01:16 GC EI+ Voltage SIR Autospec-Ultimate  
Sample# 3 Text: P1388 275.001 M23-1 Air Train CU Vial# 65 File Text: AAP DBS  
441.7428 S:3 F:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 146



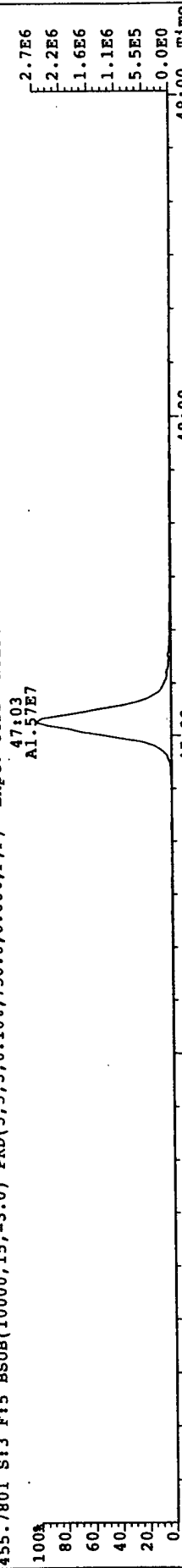
443.7398 S:3 F:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 242



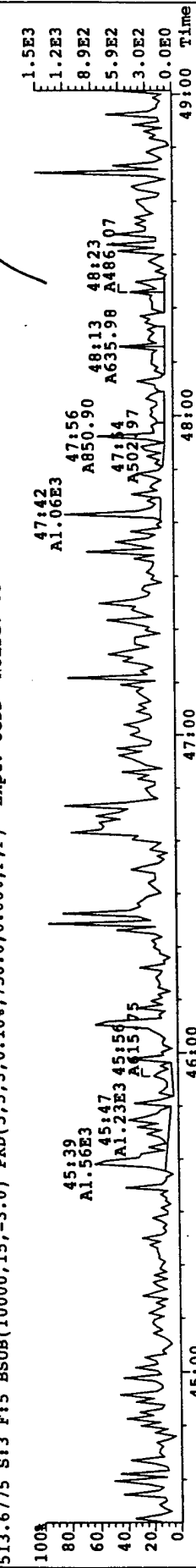
453.7830 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 102



455.7801 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1071



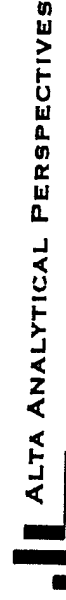
513.6775 S:3 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 68



# Sample ID: M23-2

## Method M23

| Client Data         |             |                | Sample Data |               | Laboratory Data                                                                                                                                                                                                                                                                                                      |                 | Method M23 |  |  |
|---------------------|-------------|----------------|-------------|---------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------|------------|--|--|
| Name:               | PES         | Matrix:        | Air         | Project No.:  | P1388                                                                                                                                                                                                                                                                                                                | Date Received:  | 6-Feb-01   |  |  |
| Project ID:         | F181.001    | Weight/Volume: | 1           | Sample ID:    | P1388_275_002                                                                                                                                                                                                                                                                                                        | Date Extracted: | 8-Feb-01   |  |  |
| Date Collected:     | 31-Jan-01   |                |             | QC Batch No.: | 275                                                                                                                                                                                                                                                                                                                  | Date Analyzed:  | 14-FEB-01  |  |  |
| Analyte             | Conc.<br>pg | DL<br>pg       | EMPC<br>pg  | Qualifier     | Recoveries                                                                                                                                                                                                                                                                                                           |                 |            |  |  |
|                     |             |                |             |               | IS                                                                                                                                                                                                                                                                                                                   | SS              | AS         |  |  |
| 2,3,7,8-TCDD        | 0.945       |                |             | A B           | 98                                                                                                                                                                                                                                                                                                                   | 102             | 86.2       |  |  |
| 1,2,3,7,8-PeCDD     | 2.44        |                |             | A             | 108                                                                                                                                                                                                                                                                                                                  | 105             | 86.2       |  |  |
| 1,2,3,4,7,8-HxCDD   | EMPC        |                | 1.96        | A             | 97.4                                                                                                                                                                                                                                                                                                                 | 102             | 86.2       |  |  |
| 1,2,3,6,7,8-HxCDD   | EMPC        |                | 5.04        | A             | 97.4                                                                                                                                                                                                                                                                                                                 | 102             | 86.2       |  |  |
| 1,2,3,7,8,9-HxCDD   | 2.76        |                |             | A             | 97.4                                                                                                                                                                                                                                                                                                                 | 102             | 86.2       |  |  |
| 1,2,3,4,6,7,8-HpCDD | 21.5        |                |             | A B           | 98.1                                                                                                                                                                                                                                                                                                                 | 104             | 86.2       |  |  |
| OCDD                | 57.1        |                |             | A B           | 91.3                                                                                                                                                                                                                                                                                                                 | 104             | 86.2       |  |  |
| 2,3,7,8-TCDF        | 8.77        |                |             | A             | 94                                                                                                                                                                                                                                                                                                                   | 102             | 86.2       |  |  |
| 1,2,3,7,8-PeCDF     | 15.2        |                |             | A             | 95.4                                                                                                                                                                                                                                                                                                                 | 105             | 86.2       |  |  |
| 2,3,4,7,8-PeCDF     | 36.1        |                |             | A             | 95.4                                                                                                                                                                                                                                                                                                                 | 105             | 86.2       |  |  |
| 1,2,3,4,7,8-HxCDF   | 40          |                |             | A B           | 85.9                                                                                                                                                                                                                                                                                                                 | 104             | 86.2       |  |  |
| 1,2,3,6,7,8-HxCDF   | 45.7        |                |             | A             | 85.9                                                                                                                                                                                                                                                                                                                 | 104             | 86.2       |  |  |
| 2,3,4,6,7,8-HxCDF   | 73.7        |                |             | A             | 85.9                                                                                                                                                                                                                                                                                                                 | 104             | 86.2       |  |  |
| 1,2,3,7,8,9-HxCDF   | 11.1        |                |             | A             | 85.9                                                                                                                                                                                                                                                                                                                 | 104             | 86.2       |  |  |
| 1,2,3,4,6,7,8-HpCDF | 208         |                |             | B             | 85.4                                                                                                                                                                                                                                                                                                                 | 104             | 86.2       |  |  |
| 1,2,3,4,7,8,9-HpCDF | 22.2        |                |             | A             | 85.4                                                                                                                                                                                                                                                                                                                 | 104             | 86.2       |  |  |
| OCDF                | 118         |                |             |               | 88.9                                                                                                                                                                                                                                                                                                                 | 104             | 86.2       |  |  |
| Totals & TEQs       |             |                |             |               |                                                                                                                                                                                                                                                                                                                      |                 |            |  |  |
| TCDDs               | 13          |                | 15.6        |               |                                                                                                                                                                                                                                                                                                                      |                 |            |  |  |
| PeCDDs              | 31.3        |                | 33.9        |               |                                                                                                                                                                                                                                                                                                                      |                 |            |  |  |
| HxCDDs              | 42.9        |                | 49.9        |               |                                                                                                                                                                                                                                                                                                                      |                 |            |  |  |
| HpCDDs              | 44.4        |                |             |               |                                                                                                                                                                                                                                                                                                                      |                 |            |  |  |
| TCDFs               | 265         |                |             |               |                                                                                                                                                                                                                                                                                                                      |                 |            |  |  |
| PeCDFs              | 354         |                | 360         |               |                                                                                                                                                                                                                                                                                                                      |                 |            |  |  |
| HxCDFs              | 441         |                |             |               |                                                                                                                                                                                                                                                                                                                      |                 |            |  |  |
| HpCDFs              | 328         |                |             |               |                                                                                                                                                                                                                                                                                                                      |                 |            |  |  |
| Total PCDD/Fs       | 1690        |                |             |               |                                                                                                                                                                                                                                                                                                                      |                 |            |  |  |
| TEQ (ND=0)          | 41.9        |                | 1710        | ITEF          |                                                                                                                                                                                                                                                                                                                      |                 |            |  |  |
| TEQ (ND=DL/2)       | 41.9        |                | 42.6        | ITEF          |                                                                                                                                                                                                                                                                                                                      |                 |            |  |  |
|                     |             |                |             |               | <div>ALTA ANALYTICAL PERSPECTIVES</div> <div>2714 Exchange Drive<br/>Wilmington<br/>North Carolina 28405<br/>USA</div> <div>Tel: 910 794-1613<br/>Fax: 910 794-3919<br/>e-mail: yfondeur@cs.com<br/>web: www.ultratrace.com</div> |                 |            |  |  |



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Reviewer *CL*  
Date *25 Feb 01*



Client ID: M23-2      File Name: 010214P1      S: 5      Acq: 14-FEB-01 14:32:45      ConCal: 010214P1-      Page 5 of 5  
Lab ID: P1388\_275\_002      GC Column ID: db-5      ICal: MM1\_M23\_0,      wt/vol: 1.000      EndCal: 010214P1-

| Name                | Resp     | RA   | RRF  | RT    | Conc  | Qualif. | CDE | noise | Fac | DL    |
|---------------------|----------|------|------|-------|-------|---------|-----|-------|-----|-------|
| 2,3,7,8-TCDD        | 1.91e+04 | 0.25 | 1.26 | 27:44 | 0.903 |         |     | 461   | 2.5 | 0.408 |
| 1,2,3,7,8-PeCDF     | 3.73e+04 | 1.44 | 1.01 | 33:11 | 2.44  |         |     | 589   | 2.5 | 0.925 |
| 1,2,3,4,7,8-HxCDD   | 2.77e+04 | 1.04 | 1.14 | 37:06 | 1.96  |         |     | 1208  | 2.5 | 1.92  |
| 1,2,3,6,7,8-HxCDD   | 6.38e+04 | 1.50 | 1.02 | 37:13 | 5.04  |         |     | 1208  | 2.5 | 2.14  |
| 1,2,3,7,8,9-HxCDD   | 3.90e+04 | 1.07 | 1.14 | 37:32 | 2.76  |         |     | 1208  | 2.5 | 1.91  |
| 1,2,3,4,6,7,8-HpCDD | 2.94e+05 | 1.03 | 1.13 | 41:31 | 21.5  |         |     | 1157  | 2.5 | 2.46  |
| OCDD                | 5.34e+05 | 0.88 | 1.03 | 46:51 | 57.1  |         |     | 970   | 2.5 | 3.72  |
| 2,3,7,8-TCDF        | 1.86e+05 | 0.85 | 1.05 | 26:51 | 8.77  |         |     | 1198  | 2.5 | 1.08  |
| 1,2,3,7,8-PeCDF     | 2.93e+05 | 1.45 | 1.04 | 31:43 | 15.2  |         |     | 1919  | 2.5 | 2.26  |
| 2,3,4,7,8-PeCDF     | 7.09e+05 | 1.46 | 1.05 | 32:50 | 36.1  |         |     | 1919  | 2.5 | 2.23  |
| 1,2,3,4,7,8-HxCDF   | 6.78e+05 | 1.20 | 1.13 | 36:07 | 40.0  |         |     | 1794  | 2.5 | 1.41  |
| 1,2,3,6,7,8-HxCDF   | 8.49e+05 | 1.20 | 1.24 | 36:16 | 45.7  |         |     | 1794  | 2.5 | 1.29  |
| 2,3,4,6,7,8-HxCDF   | 1.29e+06 | 1.21 | 1.16 | 36:55 | 73.7  |         |     | 1794  | 2.5 | 1.37  |
| 1,2,3,7,8,9-HxCDF   | 1.69e+05 | 1.27 | 1.02 | 37:58 | 11.1  |         |     | 1794  | 2.5 | 1.57  |
| 1,2,3,4,6,7,8-HpCDF | 3.37e+06 | 1.01 | 1.54 | 39:53 | 208   |         |     | 929   | 2.5 | 1.03  |
| 1,2,3,4,7,8,9-HpCDF | 3.03e+05 | 1.15 | 1.30 | 42:20 | 22.2  |         |     | 1157  | 2.5 | 1.22  |
| OCDF                | 1.33e+06 | 0.84 | 1.15 | 47:10 | 118   |         |     | 1241  | 2.5 | 3.66  |

|                       |          |      |      |       |      |  |  |      |     |       |
|-----------------------|----------|------|------|-------|------|--|--|------|-----|-------|
| Total Tetra-Dioxins   | 2.55e+05 | 0.72 | 1.26 | 24:00 | 12.0 |  |  | 461  | 2.5 | 0.408 |
| Total Penta-Dioxins   | 4.79e+05 | 1.71 | 1.01 | 30:39 | 31.3 |  |  | 589  | 2.5 | 0.925 |
| Total Hexa-Dioxins    | 5.87e+05 | 1.24 | 1.10 | 35:23 | 42.9 |  |  | 1208 | 2.5 | 1.99  |
| Total Hepta-Dioxins   | 6.07e+05 | 1.04 | 1.13 | 40:19 | 44.4 |  |  | 1157 | 2.5 | 2.46  |
| Total Tetra-Furans    | 5.62e+06 | 0.67 | 1.05 | 21:50 | 265  |  |  | 1198 | 2.5 | 1.08  |
| 1st Fnc. Penta-Furans | 7.27e+05 | 1.72 | 1.05 | 28:52 | 37.3 |  |  | 2148 | 2.5 | 2.51  |
| Total Penta-Furans    | 6.17e+06 | 1.38 | 1.05 | 30:26 | 317  |  |  | 1919 | 2.5 | 2.24  |
| PeCDF Totals:         |          |      |      |       | 354  |  |  | 360  |     |       |
| Total Hexa-Furans     | 7.60e+06 | 1.23 | 1.14 | 34:44 | 441  |  |  | 1794 | 2.5 | 1.41  |
| Total Hepta-Furans    | 5.12e+06 | 1.01 | 1.42 | 39:53 | 328  |  |  | 929  | 2.5 | 1.12  |

|    |                         |          |      |      |       |      |  |      |  |  |
|----|-------------------------|----------|------|------|-------|------|--|------|--|--|
| IS | 13C-2,3,7,8-TCDD        | 6.72e+07 | 0.80 | 1.13 | 27:43 | 3920 |  | 98.0 |  |  |
| IS | 13C-1,2,3,7,8-PeCDD     | 6.05e+07 | 1.57 | 0.93 | 33:11 | 4330 |  | 108  |  |  |
| IS | 13C-1,2,3,6,7,8-HxCDD   | 4.95e+07 | 1.25 | 0.93 | 37:12 | 3900 |  | 97.4 |  |  |
| IS | 13C-1,2,3,4,6,7,8-HpCDD | 4.84e+07 | 1.04 | 0.91 | 41:30 | 3920 |  | 98.1 |  |  |
| IS | 13C-OCDD                | 3.65e+07 | 0.89 | 0.73 | 46:50 | 3650 |  | 91.3 |  |  |
| IS | 13C-2,3,7,8-TCDF        | 8.12e+07 | 0.78 | 1.06 | 26:49 | 3760 |  | 94.0 |  |  |
| IS | 13C-1,2,3,7,8-PeCDF     | 7.45e+07 | 1.57 | 0.96 | 31:42 | 3820 |  | 95.4 |  |  |
| IS | 13C-1,2,3,6,7,8-HxCDF   | 6.00e+07 | 0.51 | 1.28 | 36:15 | 3430 |  | 85.9 |  |  |
| IS | 13C-1,2,3,4,6,7,8-HpCDF | 4.20e+07 | 0.45 | 0.90 | 39:52 | 3420 |  | 85.4 |  |  |
| IS | 13C-OCDF                | 3.93e+07 | 0.88 | 0.81 | 47:09 | 3560 |  | 88.9 |  |  |

|       |                         |          |      |      |       |      |  |      |  |  |
|-------|-------------------------|----------|------|------|-------|------|--|------|--|--|
| RS/RT | 13C-1,2,3,4-TCDD        | 6.05e+07 | 0.79 | 1.00 | 27:03 | 4000 |  | -    |  |  |
| RS    | 13C-1,2,3,4-TCDF        | 8.14e+07 | 0.77 | 1.00 | 25:27 | 4000 |  | -    |  |  |
| RS/RT | 13C-1,2,3,7,8,9-HxCDD   | 5.45e+07 | 1.23 | 1.00 | 37:31 | 4000 |  | -    |  |  |
| PS    | 37Cl-2,3,7,8-TCDD       | 3.51e+07 |      | 0.51 | 27:44 | 4060 |  | 102  |  |  |
| PS    | 13C-2,3,4,7,8-PeCDD     | 7.61e+07 | 1.53 | 0.97 | 32:49 | 4200 |  | 105  |  |  |
| PS    | 13C-1,2,3,4,7,8-HxCDD   | 4.65e+07 | 1.26 | 0.92 | 37:05 | 4070 |  | 102  |  |  |
| PS    | 13C-1,2,3,4,7,8-HxCDF   | 5.67e+07 | 0.52 | 0.91 | 36:06 | 4150 |  | 104  |  |  |
| PS    | 13C-1,2,3,4,7,8,9-HpCDD | 3.75e+07 | 0.44 | 0.85 | 42:19 | 4180 |  | 104  |  |  |
| AS    | 13C-1,2,3,7,8,9-HxCDF   | 5.02e+07 | 0.52 | 1.07 | 37:55 | 3450 |  | 86.2 |  |  |

Analyst: GAGDate: 24 Feb 01Reviewer: SC  
Date: 24 Feb 01

41

Totals class: TCDD EMPC  
File Name: 010214P1 Sample #: 5 Function: 1 Run #: 12  
Sample text: P1388\_275\_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 15.595

Unnamed Conc.: 14.692

| RT    | m1        | Resp mod. | m2        | Resp mod. | RA   | Resp      | Adj_Resp  | S/N      | Conc. Name |
|-------|-----------|-----------|-----------|-----------|------|-----------|-----------|----------|------------|
| 24:00 | 2.372e+04 | Y         | 3.309e+04 | Y         | 0.72 | 5.681e+04 | 5.681e+04 | 1.51e+01 | Y 2.68     |
| 24:22 | 1.610e+04 | Y         | 1.791e+04 | Y         | 0.90 | 3.401e+04 | 3.170e+04 | 1.21e+01 | Y 1.50     |
| 24:48 | 1.411e+04 | Y         | 1.952e+04 | Y         | 0.72 | 3.363e+04 | 3.363e+04 | 8.93e+00 | Y 1.59     |
| 25:52 | 2.873e+04 | Y         | 3.291e+04 | Y         | 0.87 | 5.164e+04 | 6.164e+04 | 1.25e+01 | Y 2.91     |
| 26:04 | 1.571e+04 | Y         | 1.998e+04 | Y         | 0.79 | 3.569e+04 | 3.569e+04 | 1.09e+01 | Y 1.68     |
| 26:15 | 1.258e+04 | Y         | 1.383e+04 | Y         | 0.91 | 2.640e+04 | 2.447e+04 | 8.11e+00 | Y 1.15     |
| 27:26 | 2.114e+04 | Y         | 2.588e+04 | Y         | 0.82 | 4.702e+04 | 4.702e+04 | 1.21e+01 | Y 2.22     |
| 27:44 | 8.330e+03 | Y         | 3.278e+04 | Y         | 0.25 | 4.111e+04 | 1.915e+04 | 1.80e+01 | Y 0.903    |
| 28:04 | 8.657e+03 | Y         | 1.180e+04 | Y         | 0.73 | 2.045e+04 | 2.045e+04 | 7.31e+00 | Y 0.965    |

Totals class: PeCDD EMPC  
File Name: 010214P1 Sample #: 5 Function: 2 Run #: 12  
Sample text: P1388\_275\_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 33.882

Unnamed Conc.: 31.445

| RT    | m1        | Resp mod. | m2        | Resp mod. | RA   | Resp      | Adj_Resp  | S/N      | Conc. Name |
|-------|-----------|-----------|-----------|-----------|------|-----------|-----------|----------|------------|
| 30:39 | 8.110e+04 | Y         | 4.749e+04 | Y         | 1.71 | 1.286e+05 | 1.286e+05 | 1.65e+01 | Y 8.39     |
| 31:12 | 1.570e+04 | Y         | 1.101e+04 | Y         | 1.43 | 2.672e+04 | 2.672e+04 | 5.25e+00 | Y 1.74     |
| 31:45 | 6.211e+04 | Y         | 3.768e+04 | Y         | 1.65 | 9.979e+04 | 9.979e+04 | 1.58e+01 | Y 6.51     |
| 31:57 | 1.885e+04 | Y         | 1.122e+04 | Y         | 1.68 | 3.007e+04 | 3.007e+04 | 8.29e+00 | Y 1.96     |
| 32:03 | 2.815e+04 | Y         | 1.773e+04 | Y         | 1.59 | 4.588e+04 | 4.588e+04 | 9.42e+00 | Y 3.00     |
| 32:19 | 3.524e+04 | Y         | 2.142e+04 | Y         | 1.65 | 5.667e+04 | 5.667e+04 | 9.42e+00 | Y 3.70     |
| 32:41 | 3.312e+04 | Y         | 2.132e+04 | Y         | 1.55 | 5.444e+04 | 5.444e+04 | 1.19e+01 | Y 3.55     |
| 33:11 | 2.206e+04 | Y         | 1.527e+04 | Y         | 1.44 | 4.733e+04 | 3.733e+04 | 6.28e+00 | Y 2.44     |
| 33:17 | 1.248e+04 | Y         | 1.007e+04 | Y         | 1.24 | 2.255e+04 | 2.053e+04 | 5.25e+00 | Y 1.34     |
| 33:39 | 1.451e+04 | Y         | 7.442e+03 | Y         | 1.95 | 2.196e+04 | 1.898e+04 | 4.37e+00 | Y 1.24     |

Totals class: HxCDD EMPC  
File Name: 010214P1 Sample #: 5 Function: 3 Run #: 12  
Sample text: P1388\_275\_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 49.906

Unnamed Conc.: 40.154

| RT    | m1        | Resp mod. | m2        | Resp mod. | RA   | Resp      | Adj_Resp  | S/N      | Conc. Name |
|-------|-----------|-----------|-----------|-----------|------|-----------|-----------|----------|------------|
| 35:23 | 5.194e+04 | Y         | 4.180e+04 | Y         | 1.24 | 9.374e+04 | 9.374e+04 | 7.63e+00 | Y 6.87     |

|       |   |           |   |           |   |      |   |   |           |           |          |   |      |
|-------|---|-----------|---|-----------|---|------|---|---|-----------|-----------|----------|---|------|
| 36:03 | ✓ | 1.060e+05 | Y | 7.841e+04 | Y | 1.35 | Y | ✓ | 844e+05   | 1.844e+05 | 1.61e+01 | Y | 13.5 |
| 36:19 | ✓ | 1.166e+05 | Y | 8.288e+04 | Y | 1.41 | Y | ✓ | 1.995e+05 | 1.995e+05 | 1.29e+01 | Y | 14.6 |
| 36:28 | ✓ | 1.788e+04 | Y | 1.453e+04 | Y | 1.23 | Y | ✓ | 3.241e+04 | 3.241e+04 | 2.89e+00 | Y | 2.37 |
| 37:06 | ✓ | 1.531e+04 | Y | 1.477e+04 | Y | 1.04 | Y | ✓ | 3.008e+04 | 2.766e+04 | 3.95e+00 | Y | 1.96 |
| 37:13 | ✓ | 4.270e+04 | Y | 2.849e+04 | Y | 1.50 | Y | ✓ | 7.118e+04 | 6.381e+04 | 5.53e+00 | Y | 5.04 |
| 37:25 | ✓ | 2.083e+04 | Y | 1.718e+04 | Y | 1.21 | Y | ✓ | 3.802e+04 | 3.802e+04 | 3.71e+00 | Y | 2.79 |
| 37:32 | ✓ | 2.016e+04 | Y | 1.888e+04 | Y | 1.07 | Y | ✓ | 3.904e+04 | 3.904e+04 | 3.63e+00 | Y | 2.76 |

1,2,3,4,7,8-HxCDD

1,2,3,6,7,8-HxCDD

1,2,3,7,8,9-HxCDD

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Totals class: HpCDD EMPC

Function: 4 Run #: 12

File Name: 010214P1 Sample #: 5 Sample text: F1388\_275\_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 44.412

Unnamed Conc.: 22.863

| RT      | m1        | Resp mod. | m2        | Resp mod. | RA   | Resp | Adj_Resp  | S/N       | Conc.    | Name   |
|---------|-----------|-----------|-----------|-----------|------|------|-----------|-----------|----------|--------|
| 40:19 ✓ | 1.595e+05 | n         | 1.529e+05 | n         | 1.04 | Y ✓  | 1.124e+05 | 3.124e+05 | 2.93e+01 | Y 22.9 |
| 41:31 ✓ | 1.492e+05 | n         | 1.452e+05 | n         | 1.03 | Y ✓  | 1.944e+05 | 2.944e+05 | 2.29e+01 | Y 21.5 |

1,2,3,4,6,7,8-HpCDD  
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1,2,3,4,6,7,8-HpCDD

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Totals class: TCDF EMPC

Function: 1 Run #: 12

File Name: 010214P1 Sample #: 5 Sample text: F1388\_275\_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 264.52

Unnamed Conc.: 255.748

| RT                  | m1         | Resp mod. | m2        | Resp mod. | RA   | Resp        | Adj_Resp  | S/N      | Conc. | Name |
|---------------------|------------|-----------|-----------|-----------|------|-------------|-----------|----------|-------|------|
| 21:50               | ✓6.158e+04 | n         | 9.160e+04 | n         | 0.67 | Y✓1.532e+05 | 1.532e+05 | 1.38e+01 | Y     | 7.21 |
| 22:24               | ✓4.874e+04 | Y         | 7.249e+04 | Y         | 0.67 | Y✓1.212e+05 | 1.212e+05 | 1.12e+01 | Y     | 5.71 |
| 23:04               | ✓7.674e+04 | n         | 1.073e+05 | n         | 0.72 | Y✓1.840e+05 | 1.840e+05 | 1.58e+01 | Y     | 8.66 |
| 23:33               | ✓2.671e+05 | Y         | 3.706e+05 | n         | 0.72 | Y✓6.377e+05 | 6.377e+05 | 3.29e+01 | Y     | 30.0 |
| 23:58               | ✓1.743e+05 | Y         | 2.571e+05 | Y         | 0.68 | Y✓4.315e+05 | 4.315e+05 | 2.30e+01 | Y     | 20.3 |
| 24:24               | ✓8.418e+04 | Y         | 1.229e+05 | Y         | 0.68 | Y✓2.071e+05 | 2.071e+05 | 1.89e+01 | Y     | 9.75 |
| 24:32               | ✓5.088e+04 | Y         | 6.493e+04 | Y         | 0.78 | Y✓1.158e+05 | 1.158e+05 | 1.37e+01 | Y     | 5.45 |
| 24:42               | ✓5.749e+04 | Y         | 8.109e+04 | Y         | 0.71 | Y✓1.386e+05 | 1.386e+05 | 1.41e+01 | Y     | 6.52 |
| 25:05               | ✓6.451e+04 | Y         | 9.819e+04 | Y         | 0.66 | Y✓1.627e+05 | 1.627e+05 | 1.50e+01 | Y     | 7.66 |
| 25:13               | ✓1.388e+05 | Y         | 1.893e+05 | Y         | 0.73 | Y✓3.281e+05 | 3.281e+05 | 3.52e+01 | Y     | 15.4 |
| 25:22               | ✓1.202e+05 | Y         | 1.676e+05 | Y         | 0.72 | Y✓2.878e+05 | 2.878e+05 | 3.22e+01 | Y     | 13.5 |
| 25:29               | ✓2.469e+05 | Y         | 3.325e+05 | Y         | 0.74 | Y✓5.794e+05 | 5.794e+05 | 5.50e+01 | Y     | 27.3 |
| 25:56               | ✓8.901e+04 | Y         | 1.221e+05 | Y         | 0.73 | Y✓2.111e+05 | 2.111e+05 | 2.06e+01 | Y     | 9.94 |
| 26:03               | ✓1.704e+04 | n         | 2.516e+04 | Y         | 0.68 | Y✓4.220e+04 | 4.220e+04 | 4.70e+00 | Y     | 1.99 |
| 26:13               | ✓6.814e+04 | Y         | 9.639e+04 | Y         | 0.71 | Y✓1.645e+05 | 1.645e+05 | 2.11e+01 | Y     | 7.75 |
| 26:25               | ✓1.262e+05 | n         | 1.834e+05 | n         | 0.69 | Y✓3.096e+05 | 3.096e+05 | 3.39e+01 | Y     | 14.6 |
| 26:38               | ✓1.424e+05 | Y         | 2.081e+05 | Y         | 0.68 | Y✓3.505e+05 | 3.505e+05 | 4.02e+01 | Y     | 16.5 |
| 26:44               | ✓1.099e+05 | Y         | 1.539e+05 | Y         | 0.71 | Y✓2.638e+05 | 2.638e+05 | 3.10e+01 | Y     | 12.4 |
| 26:51               | ✓8.564e+04 | Y         | 1.007e+05 | Y         | 0.85 | Y✓1.863e+05 | 1.863e+05 | 2.34e+01 | Y     | 8.77 |
| 27:14               | ✓2.906e+05 | n         | 3.718e+05 | n         | 0.78 | Y✓6.624e+05 | 6.624e+05 | 6.59e+01 | Y     | 31.2 |
| 27:28               | ✓1.740e+04 | Y         | 2.214e+04 | Y         | 0.79 | Y✓3.954e+04 | 3.954e+04 | 4.21e+00 | Y     | 1.86 |
| 27:45               | ✓1.698e+04 | n         | 2.467e+04 | Y         | 0.69 | Y✓4.165e+04 | 4.165e+04 | 5.28e+00 | Y     | 1.96 |
| 8.77 2.3, 7, 8-TCDF |            |           |           |           |      |             |           |          |       |      |

2,3,7,8-TCDF

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Totals class: 1st Fnc.PeCDF EMPC  
File Name: 010214P1 Sample #: 5

Function: 1 Run #: 12  
Sample text: P1388\_275\_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 37.331

Unnamed Conc.: 37.331

| RT    | m1        | Resp mod. | m2        | Resp mod. | RA   | Resp | Adj_Resp  | S/N       | Conc. Name      |
|-------|-----------|-----------|-----------|-----------|------|------|-----------|-----------|-----------------|
| 28:52 | 4.599e+05 | n         | 2.671e+05 | n         | 1.72 | y    | 7.270e+05 | 7.270e+05 | 2.82e+01 y 37.3 |

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Totals class: PeCDF EMPC

Function: 2 Run #: 12

File Name: 010214P1 Sample #: 5 Sample text: P1388\_275\_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 322.27

Unnamed Conc.: 270.944

| RT    | m1        | Resp mod. | m2        | Resp mod. | RA   | Resp | Adj_Resp  | S/N       | Conc. Name      |
|-------|-----------|-----------|-----------|-----------|------|------|-----------|-----------|-----------------|
| 30:26 | 4.953e+05 | y         | 3.587e+05 | y         | 1.38 | y    | 8.540e+05 | 8.540e+05 | 3.62e+01 y 43.9 |
| 30:35 | 5.362e+05 | y         | 3.622e+05 | y         | 1.48 | y    | 8.984e+05 | 8.984e+05 | 3.44e+01 y 46.1 |
| 30:41 | 1.425e+05 | y         | 9.719e+04 | y         | 1.47 | y    | 2.396e+05 | 2.396e+05 | 1.44e+01 y 12.3 |
| 30:47 | 4.254e+04 | y         | 3.028e+04 | y         | 1.40 | y    | 7.282e+04 | 7.282e+04 | 4.58e+00 y 3.74 |
| 31:02 | 7.632e+04 | y         | 5.606e+04 | y         | 1.36 | y    | 1.324e+05 | 1.324e+05 | 5.91e+00 y 6.80 |
| 31:10 | 9.352e+04 | y         | 6.412e+04 | y         | 1.46 | y    | 1.576e+05 | 1.576e+05 | 1.20e+01 y 8.10 |
| 31:17 | 5.377e+05 | y         | 3.760e+05 | y         | 1.43 | y    | 9.137e+05 | 9.137e+05 | 3.56e+01 y 46.9 |
| 31:30 | 1.096e+05 | y         | 7.756e+04 | y         | 1.41 | y    | 1.871e+05 | 1.871e+05 | 1.12e+01 y 9.61 |
| 31:43 | 1.734e+05 | n         | 1.199e+05 | n         | 1.45 | y    | 2.933e+05 | 2.933e+05 | 1.94e+01 y 15.2 |
| 32:00 | 3.377e+05 | y         | 2.250e+05 | n         | 1.50 | y    | 5.627e+05 | 5.627e+05 | 2.04e+01 y 28.9 |
| 32:10 | 2.931e+04 | y         | 2.298e+04 | y         | 1.28 | n    | 5.229e+04 | 4.822e+04 | 2.86e+00 y 2.48 |
| 32:35 | 3.694e+04 | y         | 3.073e+04 | y         | 1.20 | n    | 6.766e+04 | 6.077e+04 | 5.14e+00 y 3.12 |
| 32:43 | 6.357e+05 | y         | 4.118e+05 | y         | 1.54 | y    | 1.048e+06 | 1.048e+06 | 5.95e+01 y 53.8 |
| 32:50 | 4.216e+05 | y         | 2.878e+05 | y         | 1.46 | y    | 7.094e+05 | 7.094e+05 | 3.66e+01 y 36.1 |
| 33:10 | 2.625e+04 | y         | 2.600e+04 | y         | 1.39 | y    | 6.225e+04 | 6.225e+04 | 3.70e+00 y 3.20 |
| 33:56 | 2.364e+04 | y         | 1.551e+04 | y         | 1.52 | y    | 3.915e+04 | 3.915e+04 | 2.80e+00 y 2.01 |

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Totals class: HxCDF EMPC

Function: 3 Run #: 12

File Name: 010214P1 Sample #: 5 Sample text: P1388\_275\_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45 Processed: 20-FEB-01 12:06:58

Total Conc.: 440.85

Unnamed Conc.: 270.352

| RT    | m1        | Resp mod. | m2        | Resp mod. | RA   | Resp | Adj_Resp  | S/N       | Conc. Name      |
|-------|-----------|-----------|-----------|-----------|------|------|-----------|-----------|-----------------|
| 34:44 | 3.916e+05 | n         | 3.188e+05 | n         | 1.23 | y    | 7.104e+05 | 7.104e+05 | 5.37e+01 y 41.6 |
| 34:56 | 1.075e+06 | n         | 8.895e+05 | n         | 1.21 | y    | 1.965e+06 | 1.965e+06 | 1.39e+02 y 115  |
| 35:10 | 9.354e+04 | n         | 7.599e+04 | n         | 1.23 | y    | 1.695e+05 | 1.695e+05 | 1.07e+01 y 9.93 |
| 35:22 | 1.351e+05 | n         | 1.158e+05 | n         | 1.17 | y    | 2.509e+05 | 2.509e+05 | 1.76e+01 y 14.7 |

|       |           |   |           |   |      |   |           |           |          |   |      |
|-------|-----------|---|-----------|---|------|---|-----------|-----------|----------|---|------|
| 35:35 | 7.291e+04 | n | 5.418e+04 | n | 1.35 | Y | 1.271e+05 | 1.271e+05 | 9.47e+00 | Y | 7.45 |
| 36:00 | 4.950e+05 | n | 4.046e+05 | n | 1.22 | Y | 8.996e+05 | 8.996e+05 | 6.53e+01 | Y | 52.7 |
| 36:07 | 3.707e+05 | n | 3.076e+05 | n | 1.20 | Y | 6.783e+05 | 6.783e+05 | 4.77e+01 | Y | 40.0 |
| 36:16 | 4.629e+05 | n | 3.859e+05 | n | 1.20 | Y | 8.488e+05 | 8.488e+05 | 6.45e+01 | Y | 45.7 |
| 36:25 | 7.853e+04 | n | 6.828e+04 | n | 1.15 | Y | 1.468e+05 | 1.468e+05 | 9.54e+00 | Y | 8.60 |
| 36:34 | 9.969e+04 | n | 8.190e+04 | n | 1.22 | Y | 1.816e+05 | 1.816e+05 | 1.29e+01 | Y | 10.6 |
| 36:42 | 8.692e+04 | n | 7.646e+04 | n | 1.14 | Y | 1.634e+05 | 1.634e+05 | 1.23e+01 | Y | 9.57 |
| 36:55 | 7.060e+05 | n | 5.812e+05 | n | 1.21 | Y | 1.287e+06 | 1.287e+06 | 8.62e+01 | Y | 73.7 |
| 37:58 | 9.479e+04 | n | 7.466e+04 | n | 1.27 | Y | 1.695e+05 | 1.695e+05 | 8.15e+00 | Y | 11.1 |

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Totals class: HPCDF EMPC

Function: 4 Run #: 12

File Name: 010214P1

Sample #: 5

Sample text: P1388\_275\_002 M23-2 Air Train

Acquired: 14-FEB-01 14:32:45

Processed: 20-FEB-01 12:06:58

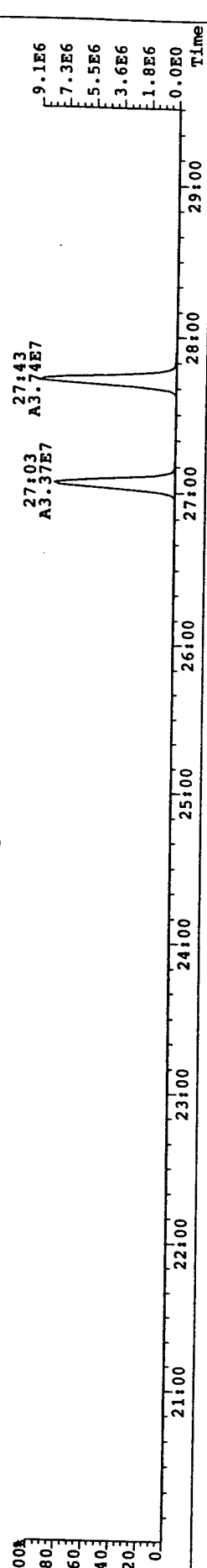
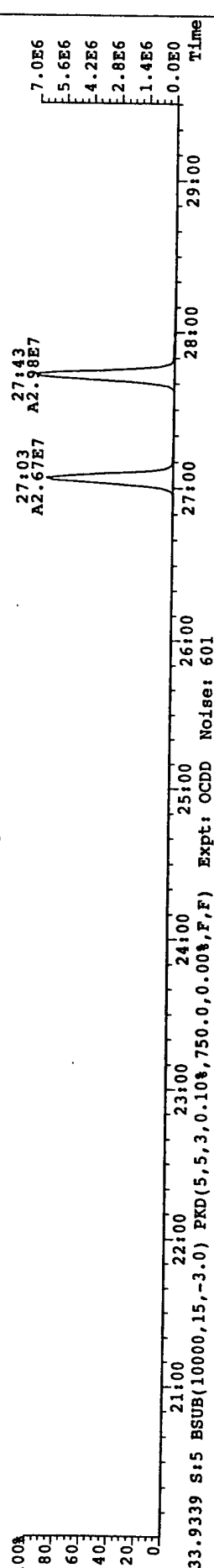
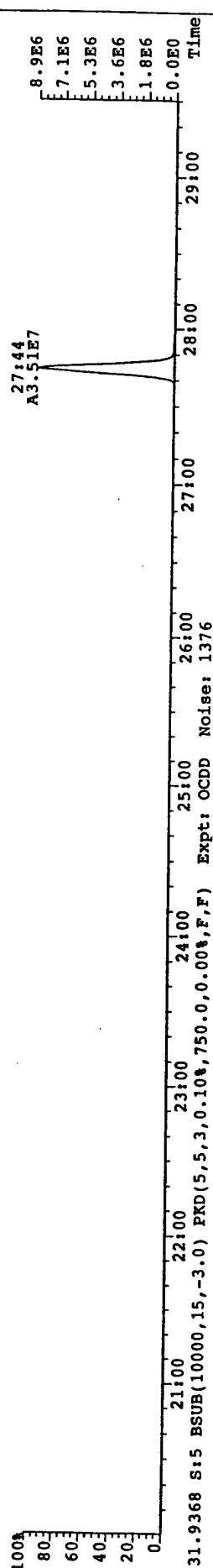
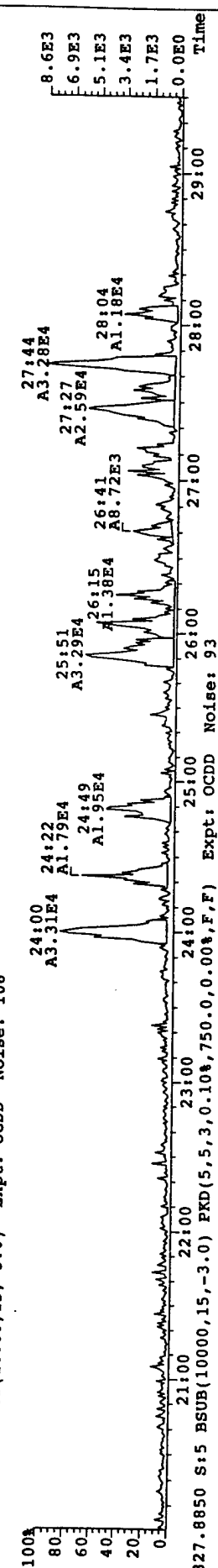
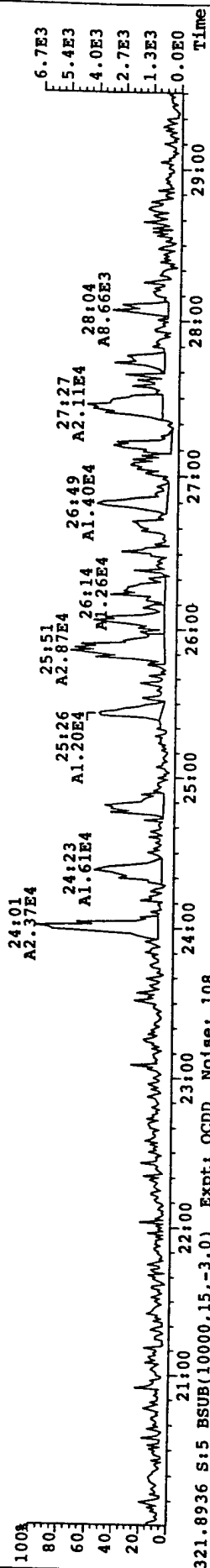
Total Conc.: 327.58

Unnamed Conc.: 96.887

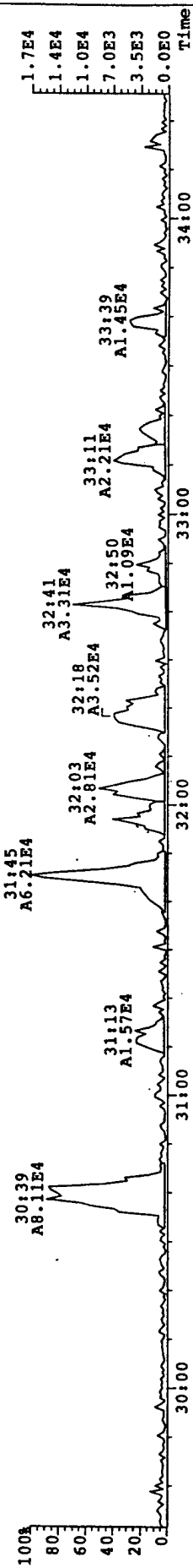
| RT    | m1        | Resp mod. | m2        | Resp mod. | RA   | Resp | Adj_Resp  | S/N       | Conc. Name |   |      |
|-------|-----------|-----------|-----------|-----------|------|------|-----------|-----------|------------|---|------|
| 39:53 | 1.698e+06 | n         | 1.677e+06 | n         | 1.01 | Y    | 3.375e+06 | 3.375e+06 | 3.76e+02   | Y | 208  |
| 40:19 | 3.964e+05 | n         | 4.117e+05 | n         | 0.96 | Y    | 8.081e+05 | 8.081e+05 | 8.62e+01   | Y | 54.2 |
| 40:34 | 3.310e+05 | n         | 3.057e+05 | n         | 1.08 | Y    | 6.367e+05 | 6.367e+05 | 6.70e+01   | Y | 42.7 |
| 42:20 | 1.617e+05 | n         | 1.412e+05 | n         | 1.15 | Y    | 3.029e+05 | 3.029e+05 | 3.08e+01   | Y | 22.2 |

208 1,2,3,4,6,7,8-HpCDF  
54.2  
42.7  
22.2 1,2,3,4,7,8,9-HpCDF

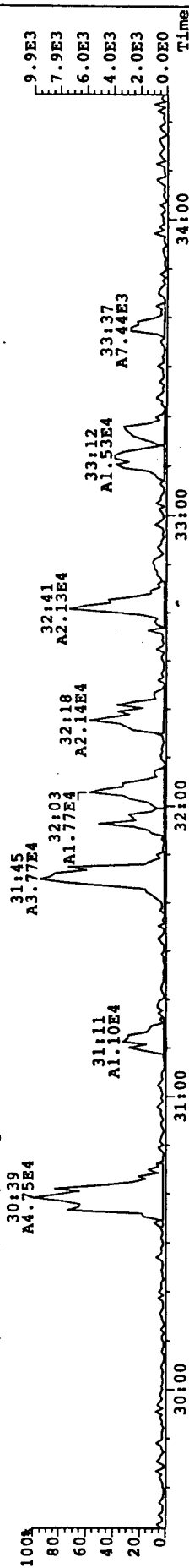
File: 010214P1 Acq: 14-FEB-2001 14:32:45 GC E1+ Voltage S1R Autospec-Ultimate  
Sample# 5 Text: P1388 275.002 M23-2 Air Train Vial# 79 File Text: AAP DB5  
319.8965 S:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 215



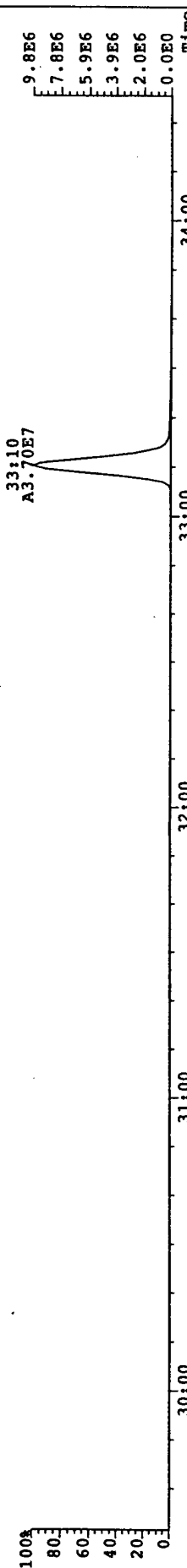
File: 010214PI Acq: 14-FEB-2001 14:32:45 GC EXT Voltage SIR Autospec-UltimaE  
Sample# 5 Text: PI388.275.002 M23-2 Air Train Vial# 79 File Text: AAP DB5  
355.8546 S:5 F:2 BSUB(10000,15,-3.0) Expt: OCDD Noise: 170



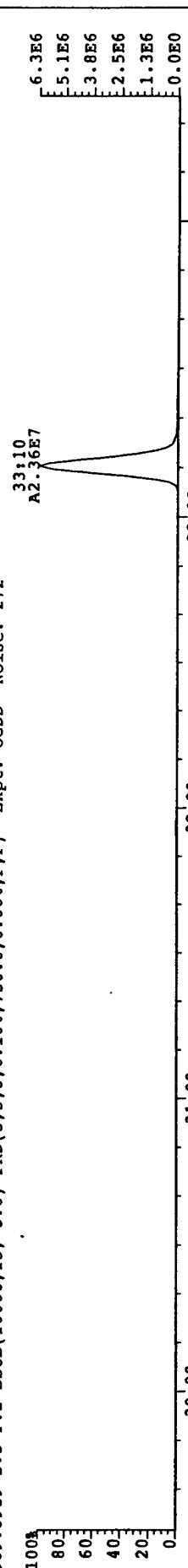
357.8517 S:5 F:2 BSUB(10000,15,-3.0) Expt: OCDD Noise: 74



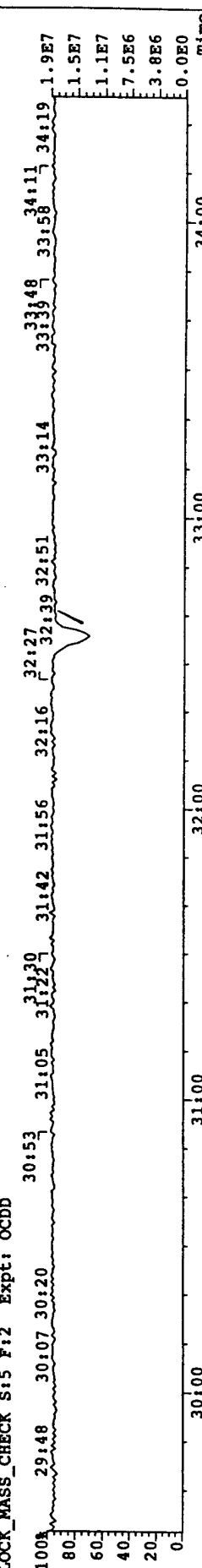
367.8949 S:5 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 709



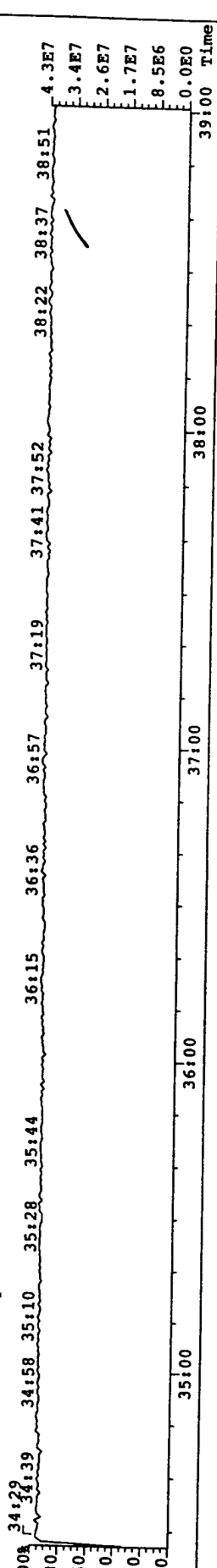
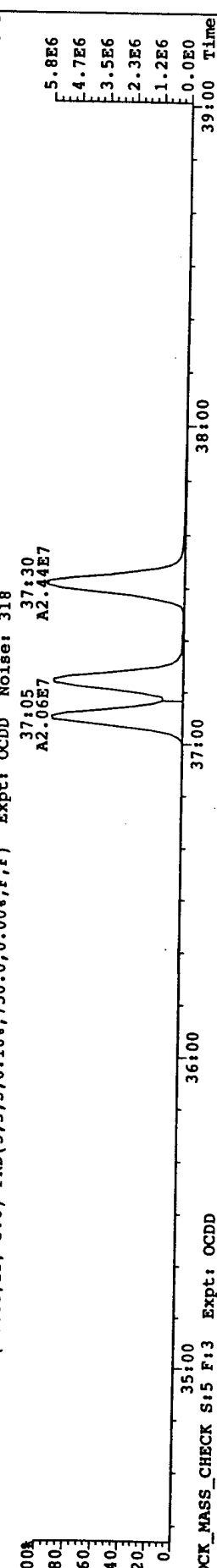
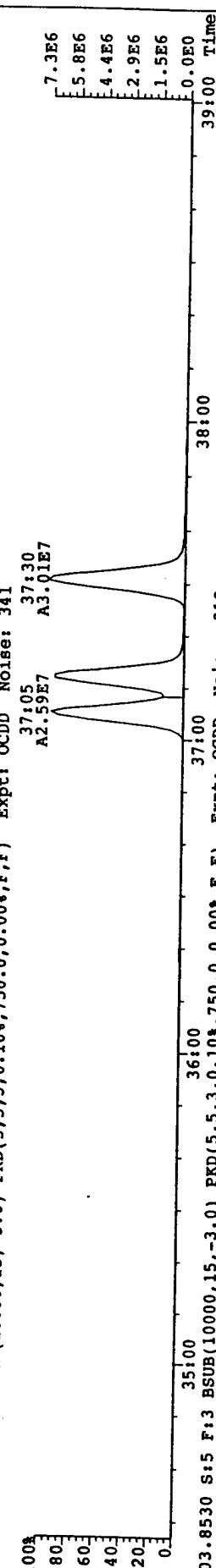
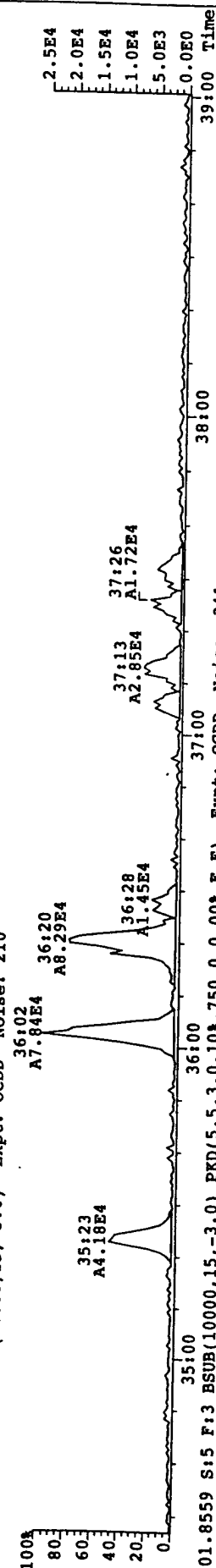
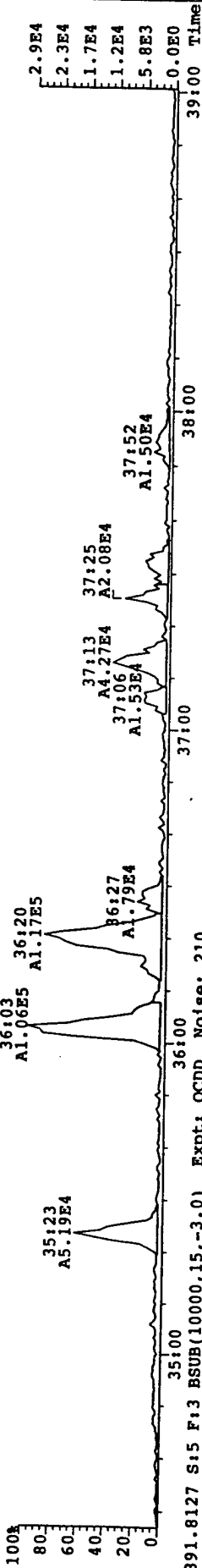
369.8919 S:5 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 272



LOCK\_MASS\_CHECK S:5 F:2 Expt: OCDD



File: 010214PI ACq: 14-FEB-2001 14:32:45 GC E1+ Voltage SIR Autospec-UltimaE  
Sample# 5 Text: P1388 275 002 M23-2 Air Train Vial# 79 File Text: AAP DB5  
389.8156 S:5 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 315

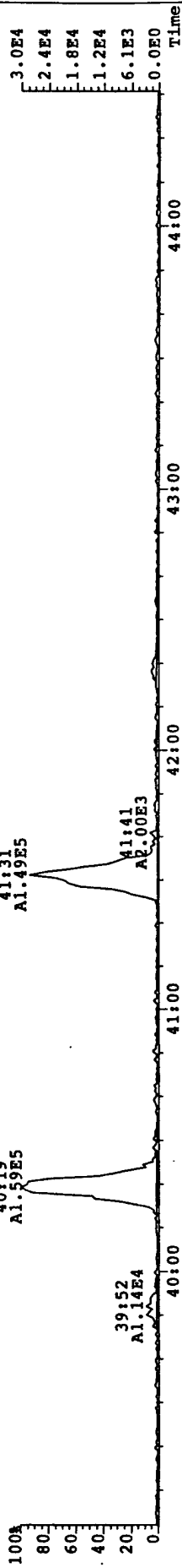




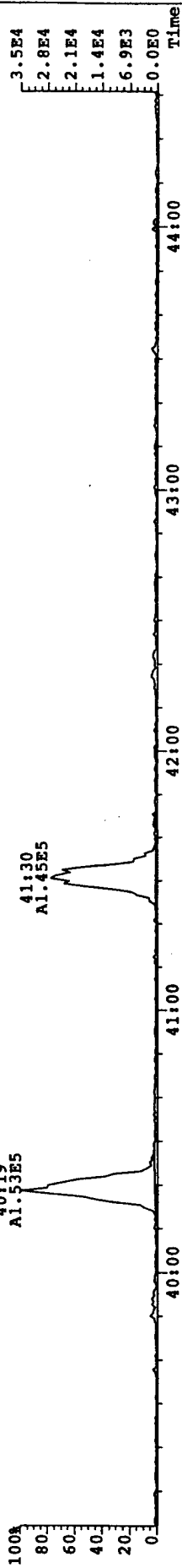
File: 010214PI Acq: 14-FEB-2001 14:32:45 GC E1+ Voltage SIR Autospec-ULTimaE

Sample# 5 Text: P1388 275.002 M23-2 Air Train Vial# 79 File Text: AAP DB5

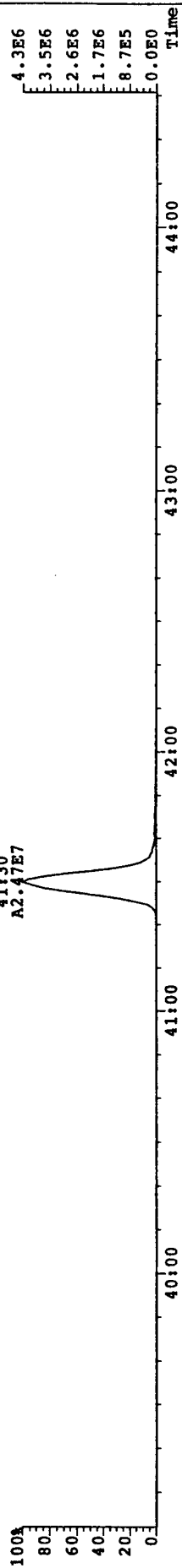
423.7767 S:5 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 116



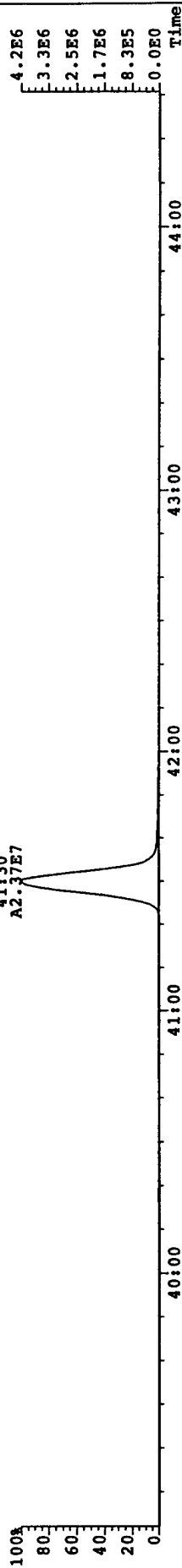
425.7737 S:5 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 109



435.8169 S:5 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1284

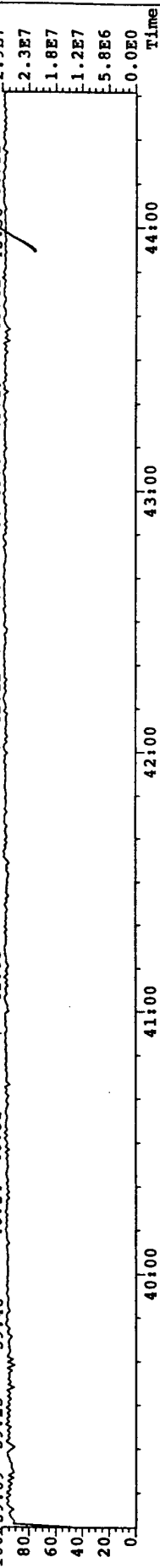


437.8140 S:5 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 863



430.9728 S:5 F:4 Expt: OCDD

100% 39:09 39:25 39:48 40:14 40:31 40:55 41:08 41:37 42:01 42:12 42:23 42:33 42:50 43:04 43:19 43:42 43:58 44:12



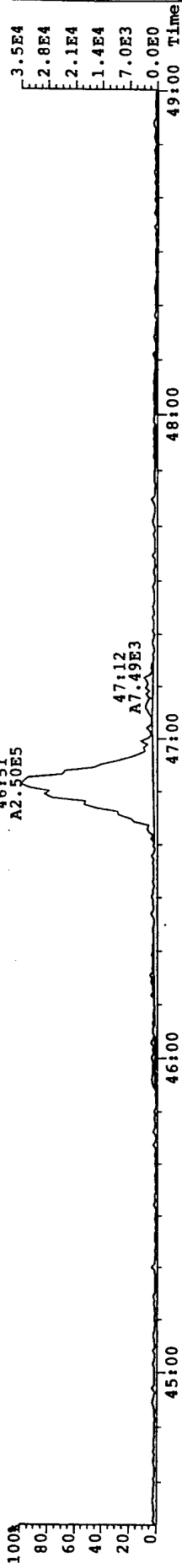
File: 010214P1 Acq: 14-FEB-2001 14:32:45 GC Exp: Voltage SIR Autospec-Ultimate

Sample# 5 Text: P1388 275 002 M23-2 Air Train Vial# 79 File Text: AAP DB5

457.7377 S:5 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 212

46:51

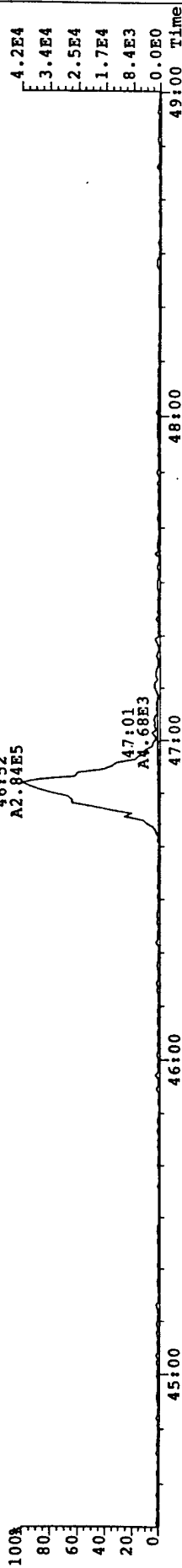
A2.50E5



459.7348 S:5 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 122

46:52

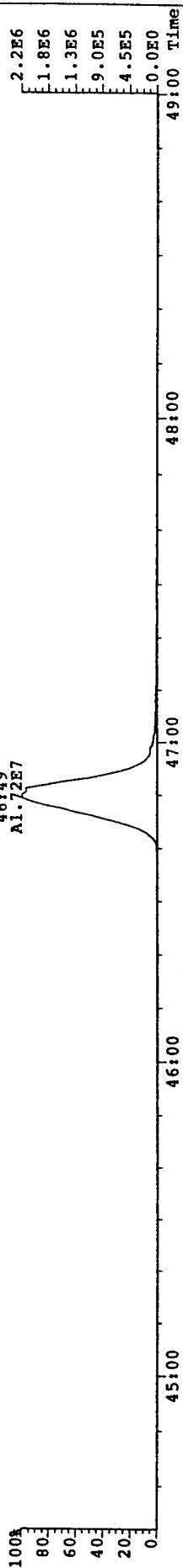
A2.84E5



469.7780 S:5 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 110

46:49

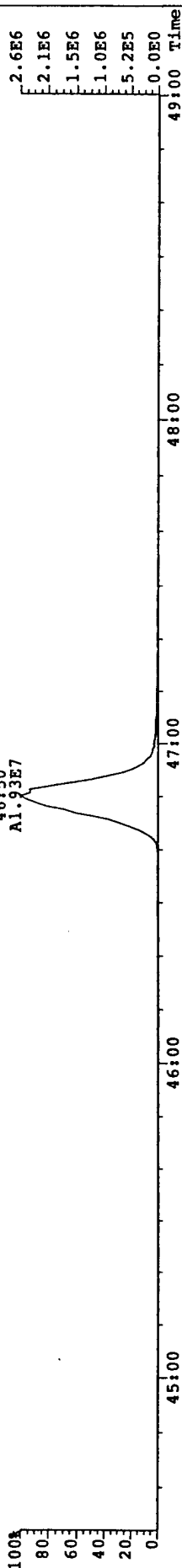
A1.72E7



471.7750 S:5 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 219

46:50

A1.93E7



454.9728 S:5 F:5 Expt: OCDD

44:35 44:53

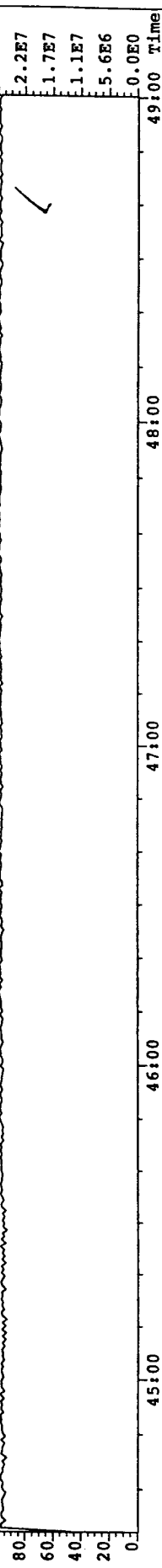
46:24 46:40

46:58 47:09

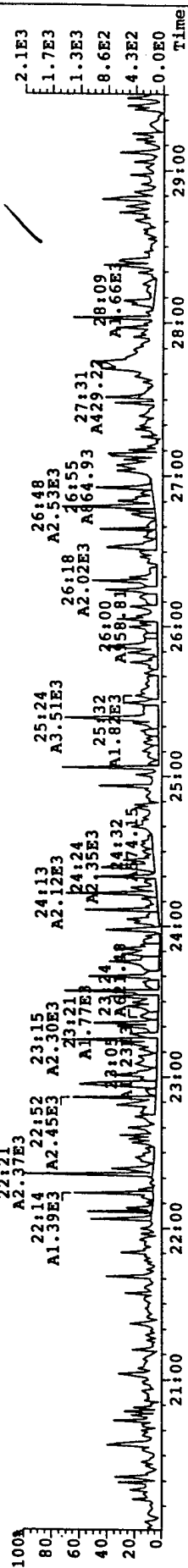
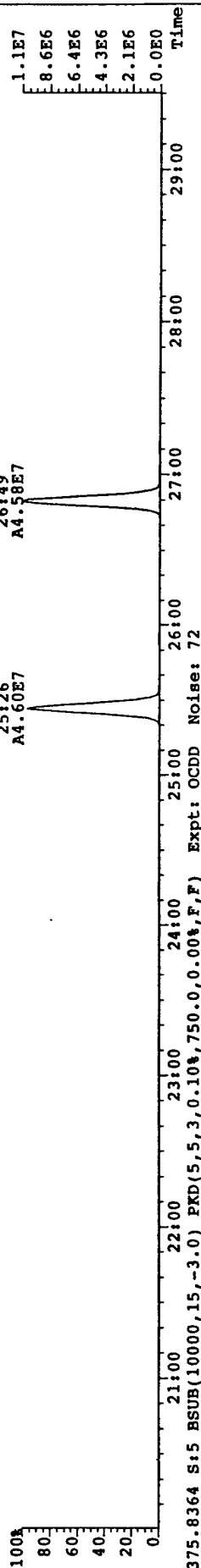
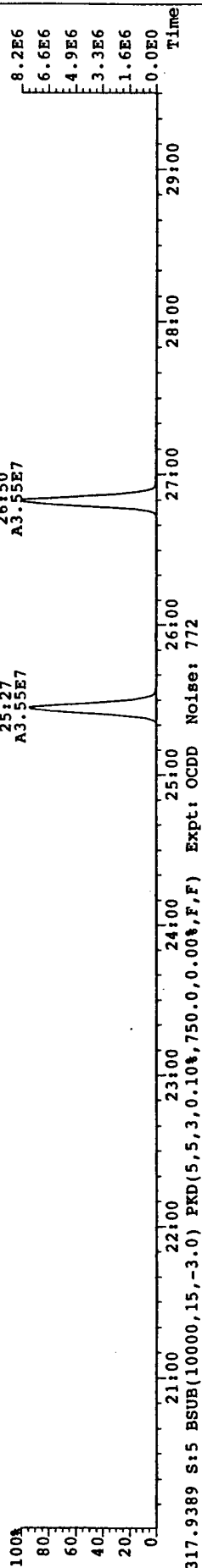
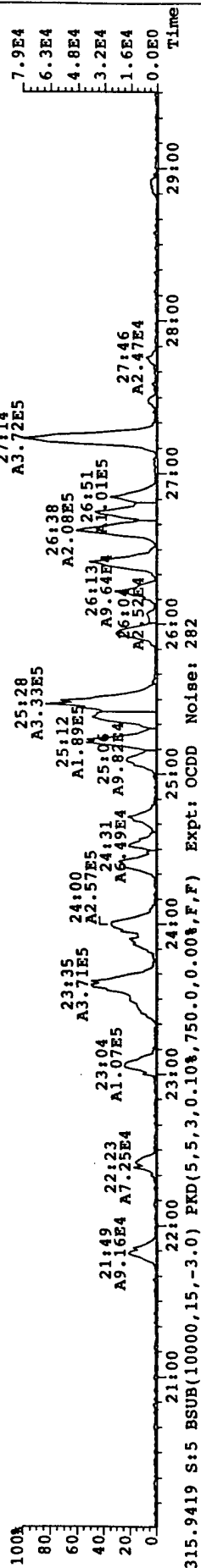
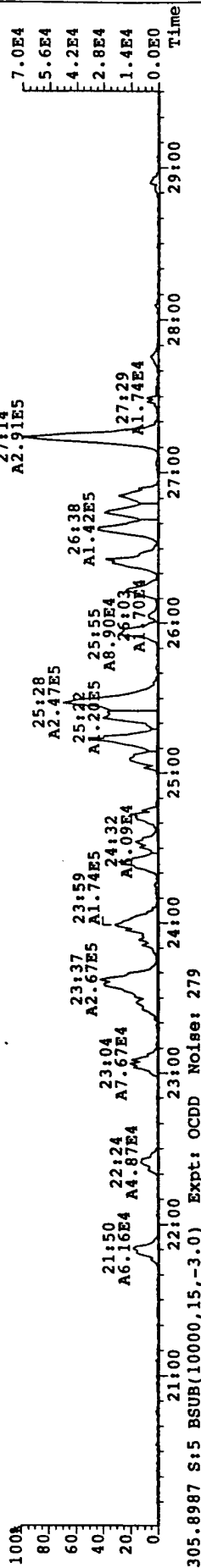
47:34 47:46 47:58

48:19 48:38 48:51

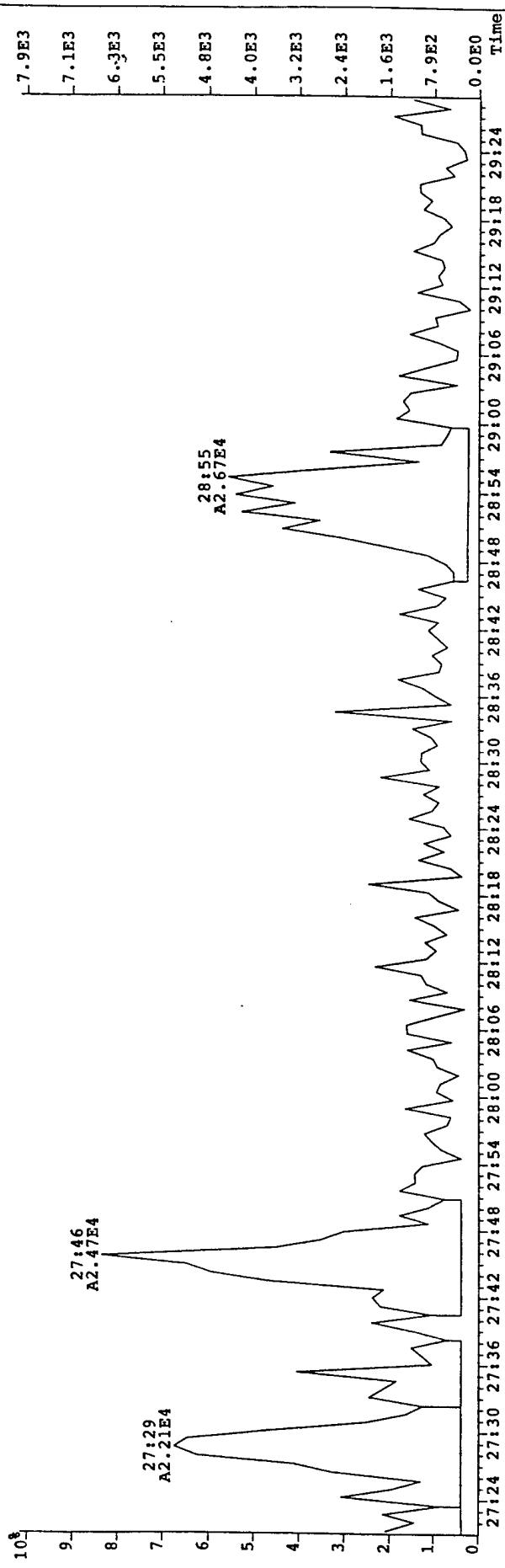
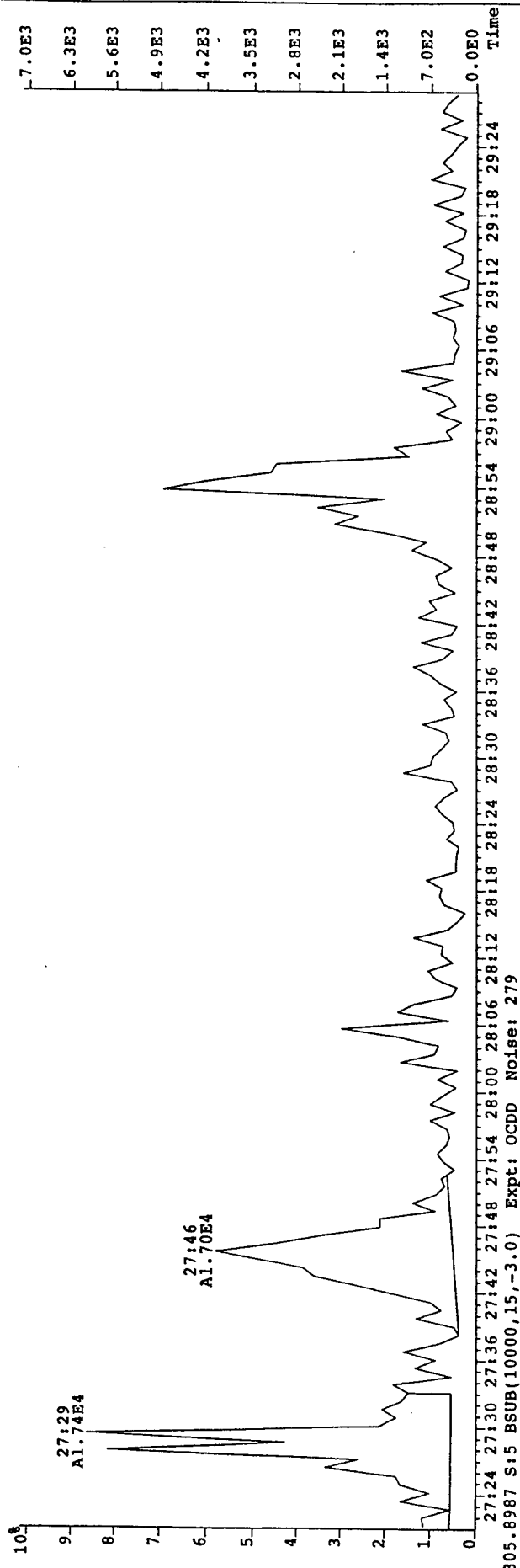
48:58 2.8E7

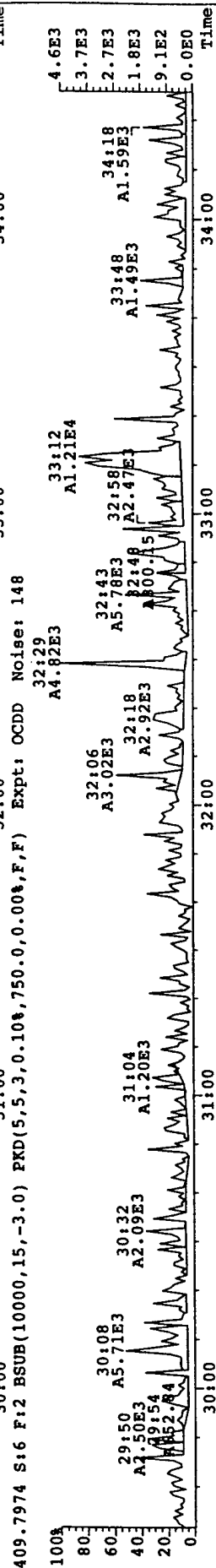
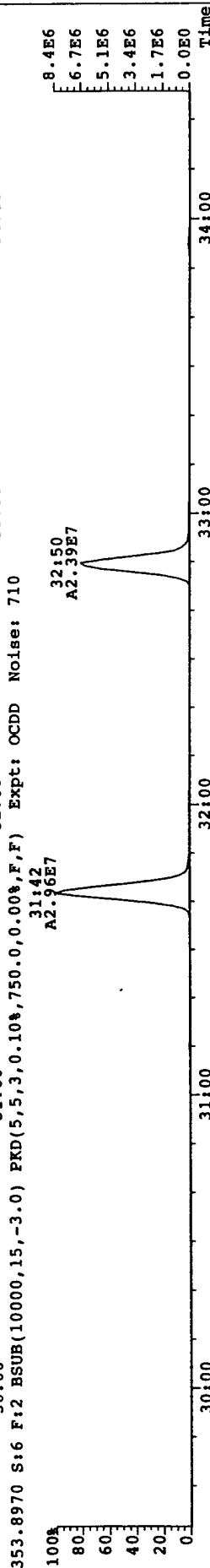
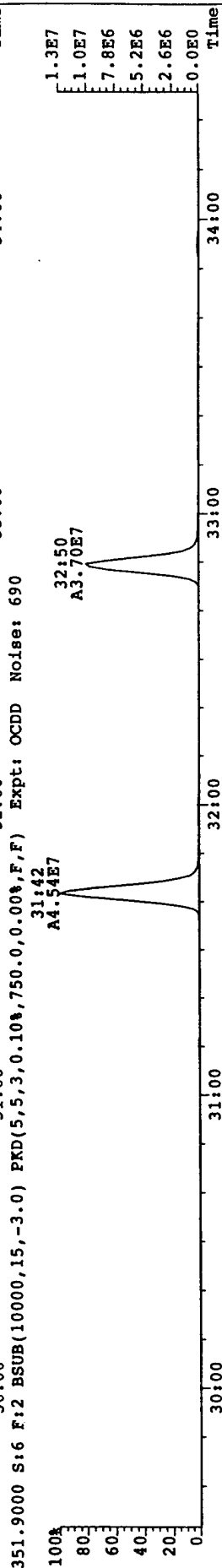
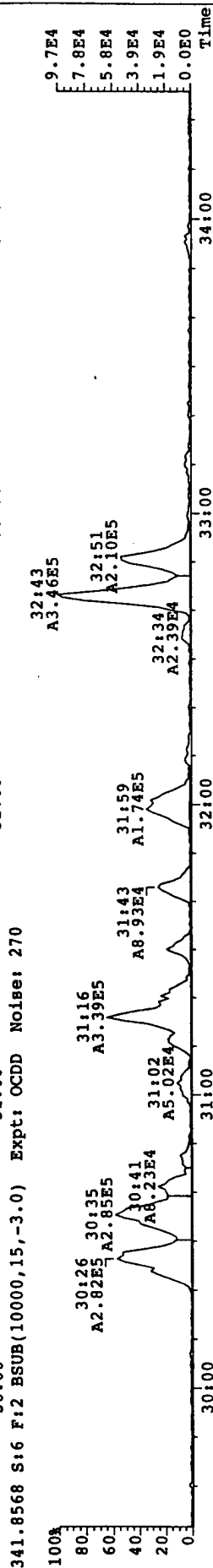
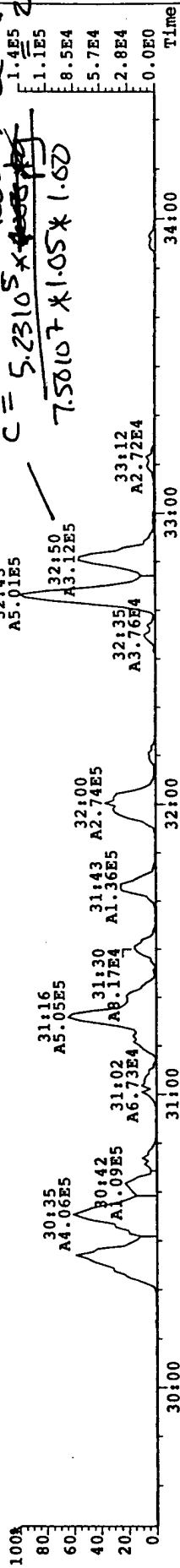


File: 010214PI Acq: 14-FEB-2001 14:32:45 GC EI+ Voltage SIR Autospec-UltimaE  
Sample# 5 Text: P1388 275 002 M23-2 Air Train Vial# 79 File Text: AAP DB5  
303.9016 S:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 149

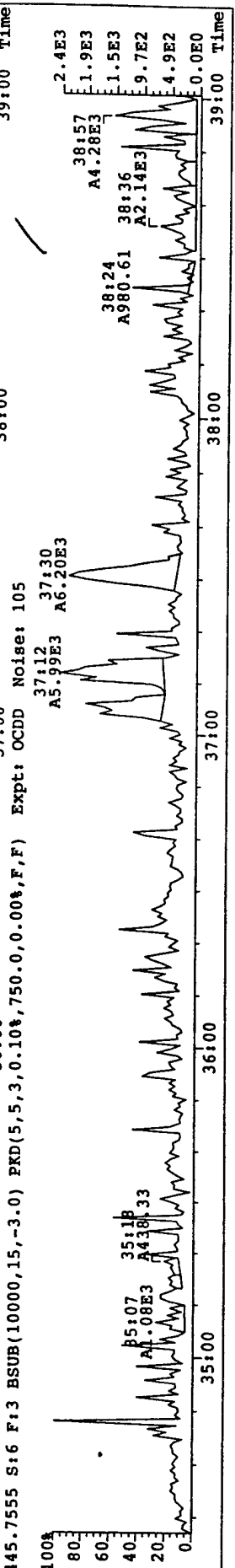
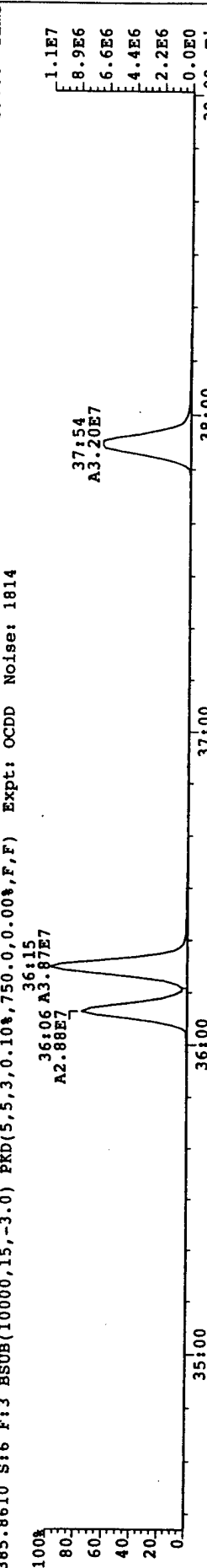
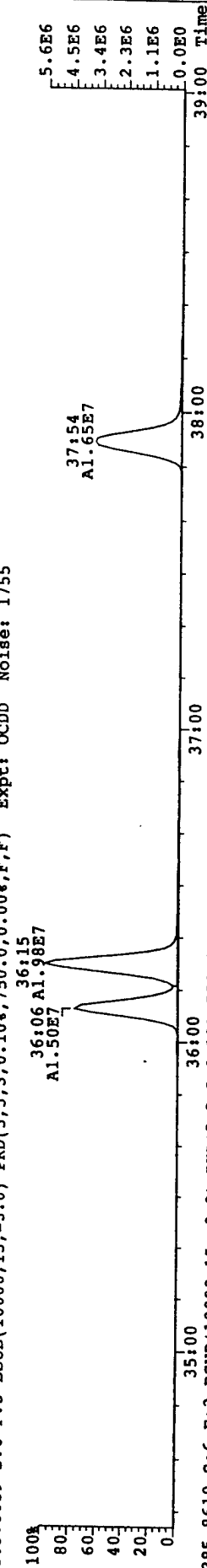
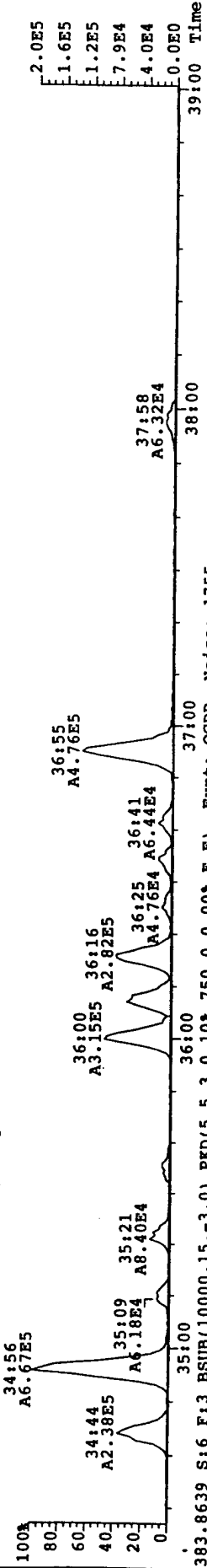
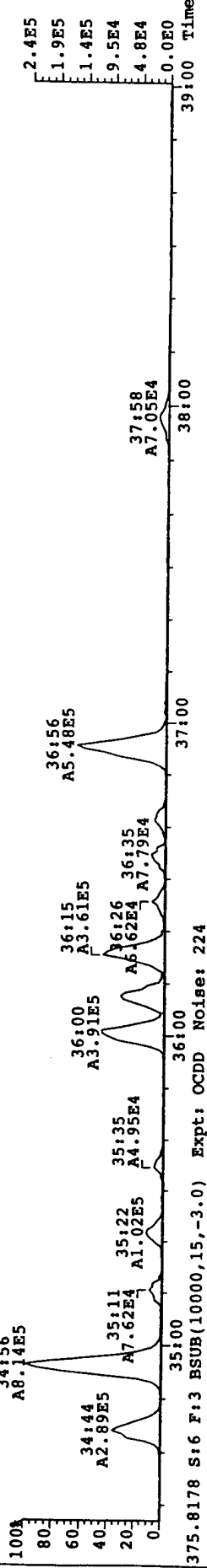


File: 010714P1 ACq: 14-FEB-2001 14:32:45 GC E1+ Voltage SIR Autospec-ULTimaE  
Sample# 5 Text: PI388\_275\_002 M23-2 Air Train Vial# 79 File Text: AAP DB5  
303.9016 S:5 BSUB(10000,15,-3.0) Expt: OCDD Noise: 149

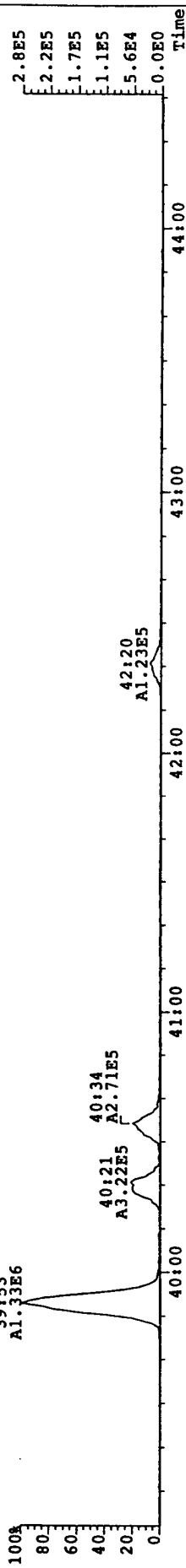


$$= \frac{5.23105 \times 4000 \text{ kg}}{7.58107 \times 1.05 \times 1.02}$$


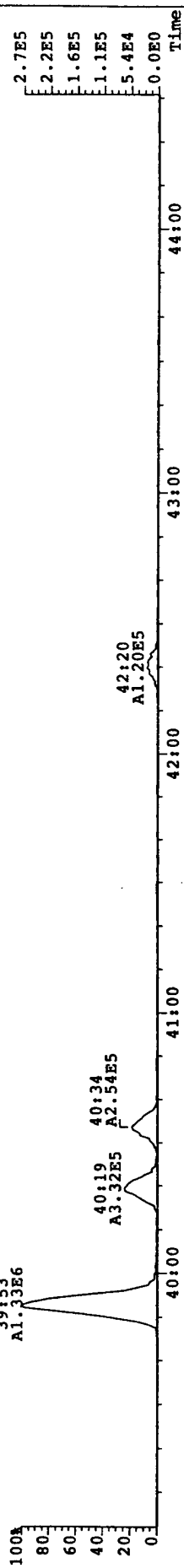
File: 010214PI Acq: 14-FEB-2001 15:24:32 GC E1+ Voltage SIR Autospec-ULTIMAE  
Sample# 6 Text: P1388 275.003 M23-3 Air Train Vial# 80 File Text: AAP DBS  
373.8207 S:6 F:3 BSUB(10000,15,-3.0) Expt: OCDD Noise: 239



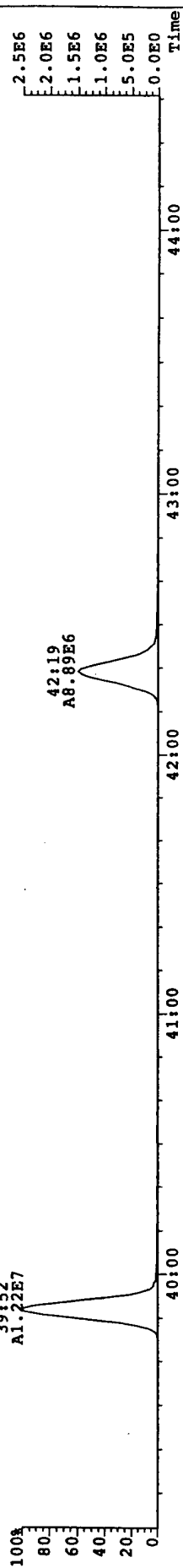
File: 010214PI Acq: 14-FEB-2001 15:24:32 GC EX+ Voltage SIR Autospec-UltimaE  
Sample# 6 Text: P1388 275 003 M23-3 Air Train Vial# 80 File Text: AAP DB5  
407.7818 S:6 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 145



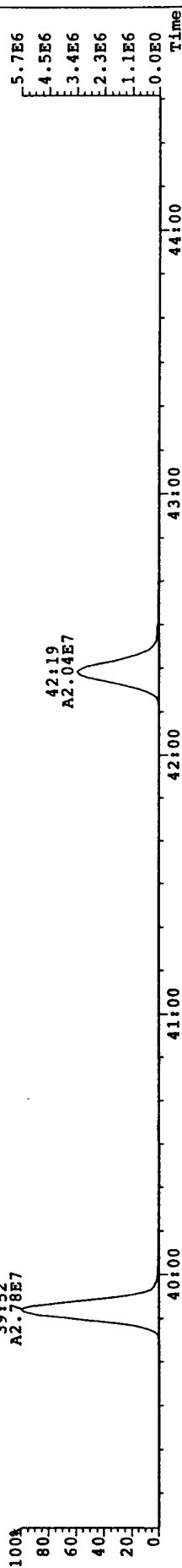
409.7788 S:6 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 93



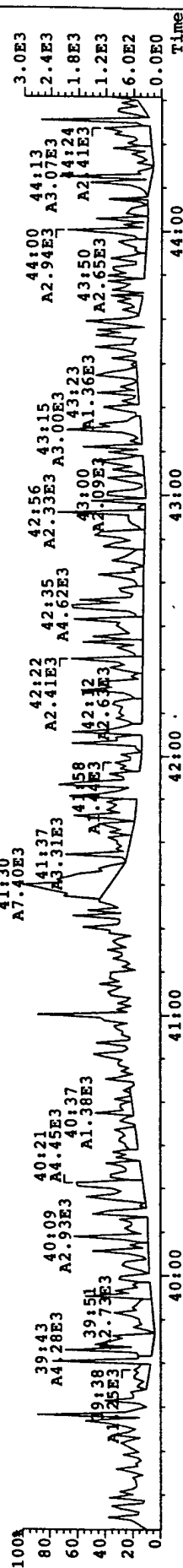
417.8253 S:6 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 643



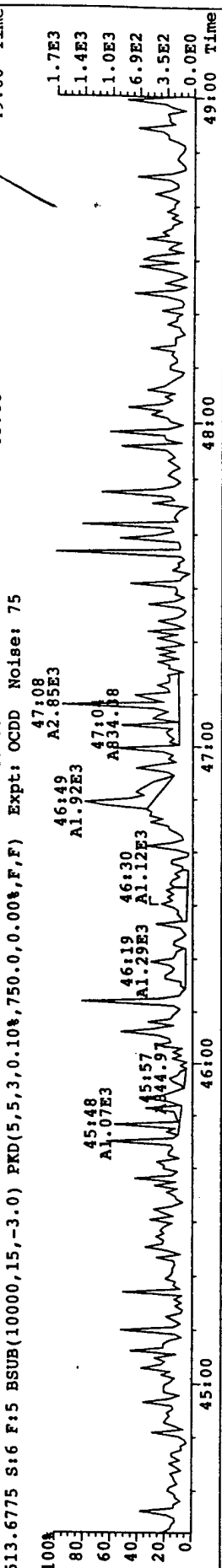
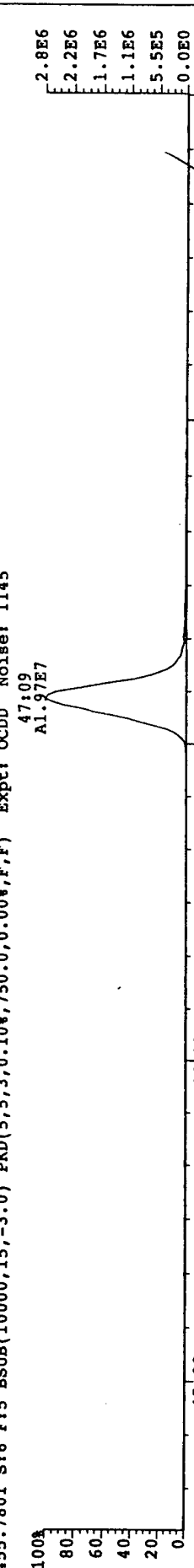
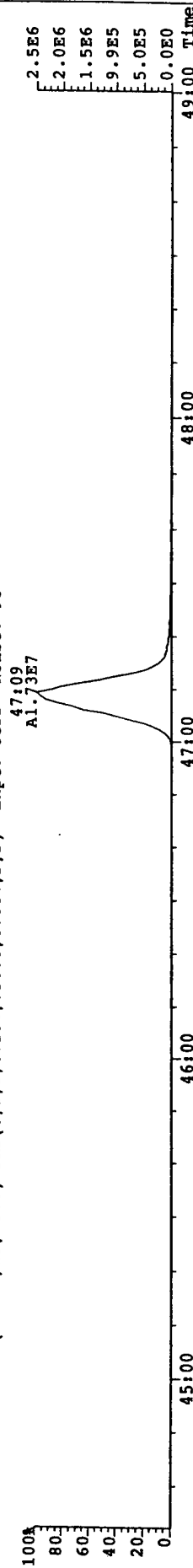
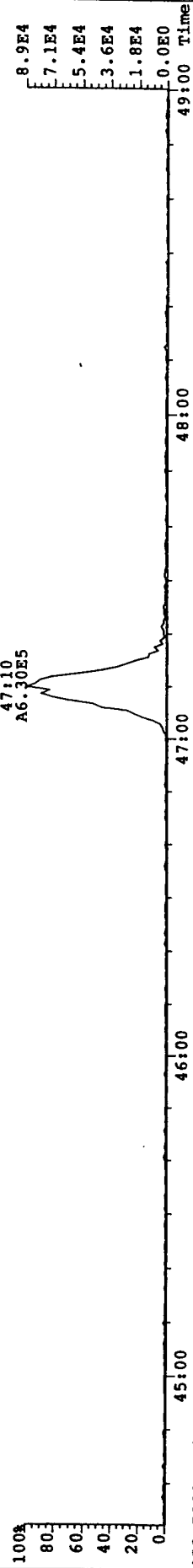
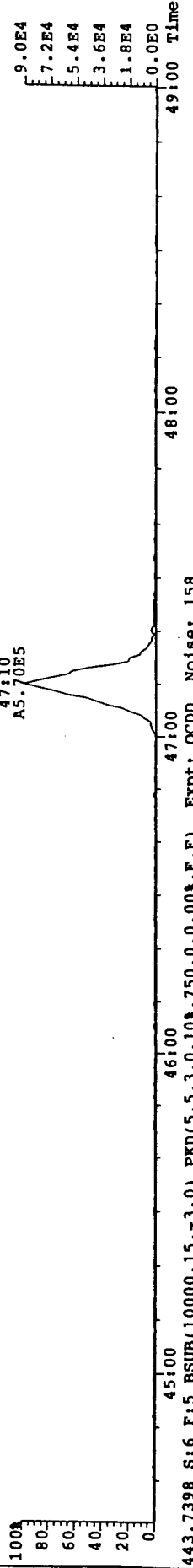
419.8220 S:6 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 827



479.7165 S:6 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 238



File: 010214PI Acq: 14-FEB-2001 15:24:32 GC Exp: Voltage SIR Autospec-UltimaE  
Sample# 6 Text: P1388 275 003 M23-3 Air Train Vial# 80 File Text: AAP DB5  
441.7428 S:6 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 114







**ALTA ANALYTICAL PERSPECTIVES**

## **PART 4**

# **SYSTEM PERFORMANCE**

**MS & GC  
CONCAL**

**DOCUMENTATION FOR THE ANALYSIS  
OF  
POLYCHLORINATED DIBENZO-*P*-DIOXINS & DIBENZOFURANS**

## PCDD/PCDF CALIBRATION VERIFICATION

## Alta Analytical Perspectives

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010214P1 S#1 Analysis Date: 14-FEB-01 Time: 11:05:47

Reviewer: CL  
Date: 24 Feb 01

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| NATIVE ANALYTES     | M/Z'S<br>FORMING<br>RATIO | ION<br>ABUND.<br>RATIO | QC<br>LIMITS | Pass | CONC.<br>FOUND | CONC.<br>RANGE<br>(ng/mL) |
|---------------------|---------------------------|------------------------|--------------|------|----------------|---------------------------|
|                     |                           |                        |              |      |                |                           |
| 2,3,7,8-TCDD        | M/M+2                     | 0.77                   | 0.65-0.89    | Y    | 5.38✓          | 3.75 - 6.25               |
| 1,2,3,7,8-PeCDD     | M+2/M+4                   | 1.57                   | 1.32-1.78    | Y    | 26.24✓         | 18.75-31.25               |
| 1,2,3,4,7,8-HxCDD   | M+2/M+4                   | 1.25                   | 1.05-1.43    | Y    | 25.21✓         | 18.75-31.25               |
| 1,2,3,6,7,8-HxCDD   | M+2/M+4                   | 1.24                   | 1.05-1.43    | Y    | 25.49✓         | 18.75-31.25               |
| 1,2,3,7,8,9-HxCDD   | M+2/M+4                   | 1.25                   | 1.05-1.43    | Y    | 24.67✓         | 18.75-31.25               |
| 1,2,3,4,6,7,8-HpCDD | M+2/M+4                   | 1.03                   | 0.88-1.20    | Y    | 25.05✓         | 18.75-31.25               |
| OCDD                | M+2/M+4                   | 0.88                   | 0.76-1.02    | Y    | 51.12✓         | 37 - 65                   |
| 2,3,7,8-TCDF        | M/M+2                     | 0.75                   | 0.65-0.89    | Y    | 4.54✓          | 3.75 - 6.25               |
| 1,2,3,7,8-PeCDF     | M+2/M+4                   | 1.53                   | 1.32-1.78    | Y    | 23.76✓         | 18.75-31.25               |
| 2,3,4,7,8-PeCDF     | M+2/M+4                   | 1.54                   | 1.32-1.78    | Y    | 23.32✓         | 18.75-31.25               |
| 1,2,3,4,7,8-HxCDF   | M+2/M+4                   | 1.23                   | 1.05-1.43    | Y    | 24.39✓         | 18.75-31.25               |
| 1,2,3,6,7,8-HxCDF   | M+2/M+4                   | 1.19                   | 1.05-1.43    | Y    | 24.08✓         | 18.75-31.25               |
| 2,3,4,6,7,8-HxCDF   | M+2/M+4                   | 1.23                   | 1.05-1.43    | Y    | 24.18✓         | 18.75-31.25               |
| 1,2,3,7,8,9-HxCDF   | M+2/M+4                   | 1.25                   | 1.05-1.43    | Y    | 24.51✓         | 18.75-31.25               |
| 1,2,3,4,6,7,8-HpCDF | M+2/M+4                   | 1.02                   | 0.88-1.20    | Y    | 23.56✓         | 18.75-31.25               |
| 1,2,3,4,7,8,9-HpCDF | M+2/M+4                   | 1.02                   | 0.88-1.20    | Y    | 23.07✓         | 18.75-31.25               |
| OCDF                | M+2/M+4                   | 0.89                   | 0.76-1.02    | Y    | 47.99✓         | 35 - 65                   |

Analyst: GAF  
Date: 20 Feb 01

## PCDD/PCDF CALIBRATION VERIFICATION

## Alta Analytical Perspectives

Reviewer: ca  
Date: 24 Feb 01

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010214P1 S#1 Analysis Date: 14-FEB-01 Time: 11:05:47

| Labeled Compounds       | M/Z'S<br>FORMING<br>RATIO | ION<br>ABUND.<br>RATIO | QC<br>LIMITS | Pass | CONC.   |                  |
|-------------------------|---------------------------|------------------------|--------------|------|---------|------------------|
|                         |                           |                        |              |      | FOUND   | RANGE<br>(ng/mL) |
| 13C-2,3,7,8-TCDD        | M/M+2                     | 0.78                   | 0.65-0.89    | Y    | 93.7 ✓  | 70.0 - 130.0     |
| 13C-1,2,3,7,8-PeCDD     | M+2/M+4                   | 1.57                   | 1.32-1.78    | Y    | 99.6 ✓  | 70.0 - 130.0     |
| 13C-1,2,3,6,7,8-HxCDD   | M+2/M+4                   | 1.23                   | 1.05-1.43    | Y    | 97.7 ✓  | 70.0 - 130.0     |
| 13C-1,2,3,4,6,7,8-HpCDD | M+2/M+4                   | 1.03                   | 0.88-1.20    | Y    | 92.1 ✓  | 70.0 - 130.0     |
| 13C-OCDD                | M+2/M+4                   | 0.89                   | 0.76-1.02    | Y    | 93.3 ✓  | 70.0 - 130.0     |
| 13C-2,3,7,8-TCDF        | M/M+2                     | 0.77                   | 0.65-0.89    | Y    | 92.9 ✓  | 70.0 - 130.0     |
| 13C-1,2,3,7,8-PeCDF     | M+2/M+4                   | 1.54                   | 1.32-1.78    | Y    | 94.5 ✓  | 70.0 - 130.0     |
| 13C-1,2,3,6,7,8-HxCDF   | M/M+2                     | 0.52                   | 0.43-0.59    | Y    | 82.8 ✓  | 70.0 - 130.0     |
| 13C-1,2,3,4,6,7,8-HpCDF | M/M+2                     | 0.44                   | 0.37-0.51    | Y    | 83.3 ✓  | 70.0 - 130.0     |
| 13C-OCDF                | M+2/M+4                   | 0.89                   | 0.76-1.02    | Y    | 87.3 ✓  | 70.0 - 130.0     |
| 37Cl-2,3,7,8-TCDD       |                           |                        |              |      | 103.3 ✓ | 75.0 - 125.0     |
| 13C-2,3,4,7,8-PeCDD     | M+2/M+4                   | 1.55                   | 1.32-1.78    | Y    | 101.3 ✓ | 75.0 - 125.0     |
| 13C-1,2,3,4,7,8-HxCDD   | M+2/M+4                   | 1.29                   | 1.05-1.43    | Y    | 100.7 ✓ | 75.0 - 125.0     |
| 13C-1,2,3,4,7,8-HxCDF   | M/M+2                     | 0.52                   | 0.43-0.59    | Y    | 104.1 ✓ | 75.0 - 125.0     |
| 13C-1,2,3,4,7,8,9-HpCDD | M/M+2                     | 0.43                   | 0.37-0.51    | Y    | 99.9 ✓  | 75.0 - 125.0     |
| 13C-1,2,3,7,8,9-HxCDF   | M/M+2                     | 0.52                   | 0.43-0.59    | Y    | 86.8,   | 75.0 - 125.0     |

Analyst: GAG  
Date: 20 Feb 01

Client ID: DB5 CRSM / M23 CS3  
Lab ID: CS3RCFilename: 010214P1 S: 1 Acq: 14-FEB-01 11:05:47  
GC Column ID: db-5 ICal: MMI\_M23\_0 WT/vol: 1.000ConCal: 010214P1-  
EndCal: 010214P1-

| Name                | Resp     | RA     | RRF  | RT    | Conc | Qualif. | CDE | noise | Fac | DL     |
|---------------------|----------|--------|------|-------|------|---------|-----|-------|-----|--------|
| 2,3,7,8-TCDD        | 4.34e+06 | 0.77 Y | 1.26 | 27:45 | 5.38 |         |     | 1127  | 2.5 | 0.0253 |
| 1,2,3,7,8-PeCDD     | 1.47e+07 | 1.57 Y | 1.01 | 33:12 | 26.2 |         |     | 1019  | 2.5 | 0.0434 |
| 1,2,3,4,7,8-HxCDD   | 1.40e+07 | 1.25 Y | 1.14 | 37:06 | 25.2 |         |     | 2400  | 2.5 | 0.0945 |
| 1,2,3,6,7,8-HxCDD   | 1.27e+07 | 1.24 Y | 1.02 | 37:13 | 25.5 |         |     | 2400  | 2.5 | 0.105  |
| 1,2,3,7,8,9-HxCDD   | 1.37e+07 | 1.25 Y | 1.14 | 37:32 | 24.7 |         |     | 2400  | 2.5 | 0.0942 |
| 1,2,3,4,6,7,8-HpCDD | 1.26e+07 | 1.03 Y | 1.13 | 41:31 | 25.0 |         |     | 2426  | 2.5 | 0.137  |
| OCDD                | 1.92e+07 | 0.88 Y | 1.03 | 46:51 | 51.1 |         |     | 1515  | 2.5 | 0.139  |
| 2,3,7,8-TCDF        | 3.83e+06 | 0.75 Y | 1.05 | 26:51 | 4.54 |         |     | 2169  | 2.5 | 0.0492 |
| 1,2,3,7,8-PeCDF     | 1.83e+07 | 1.53 Y | 1.04 | 31:43 | 23.8 |         |     | 1447  | 2.5 | 0.0435 |
| 2,3,4,7,8-PeCDF     | 1.82e+07 | 1.54 Y | 1.05 | 32:51 | 23.3 |         |     | 1447  | 2.5 | 0.0428 |
| 1,2,3,4,7,8-HxCDF   | 1.57e+07 | 1.23 Y | 1.13 | 36:08 | 24.4 |         |     | 2488  | 2.5 | 0.0544 |
| 1,2,3,6,7,8-HxCDF   | 1.69e+07 | 1.19 Y | 1.24 | 36:16 | 24.1 |         |     | 2488  | 2.5 | 0.0498 |
| 2,3,4,6,7,8-HxCDF   | 1.60e+07 | 1.23 Y | 1.16 | 36:55 | 24.2 |         |     | 2488  | 2.5 | 0.0529 |
| 1,2,3,7,8,9-HxCDF   | 1.42e+07 | 1.25 Y | 1.02 | 37:56 | 24.5 |         |     | 2488  | 2.5 | 0.0605 |
| 1,2,3,4,6,7,8-HpCDF | 1.46e+07 | 1.02 Y | 1.54 | 39:53 | 23.6 |         |     | 2715  | 2.5 | 0.0755 |
| OCDF                | 1.20e+07 | 1.02 Y | 1.30 | 42:20 | 23.1 |         |     | 2715  | 2.5 | 0.0896 |
| OCDF                | 2.08e+07 | 0.89 Y | 1.15 | 47:10 | 48.0 |         |     | 1591  | 2.5 | 0.122  |

|                       |          |        |      |       |      |  |  |      |     |        |
|-----------------------|----------|--------|------|-------|------|--|--|------|-----|--------|
| Total Tetra-Dioxins   | 1.74e+07 | 0.80 Y | 1.26 | 24:00 | 21.6 |  |  | 1127 | 2.5 | 0.0253 |
| Total Penta-Dioxins   | 3.92e+07 | 1.53 Y | 1.01 | 30:39 | 69.9 |  |  | 1019 | 2.5 | 0.0434 |
| Total Hexa-Dioxins    | 4.19e+07 | 1.26 Y | 1.10 | 35:24 | 78.0 |  |  | 2400 | 2.5 | 0.0977 |
| Total Hepta-Dioxins   | 2.32e+07 | 1.03 Y | 1.13 | 40:19 | 46.0 |  |  | 2426 | 2.5 | 0.137  |
| Total Tetra-Furans    | 9.58e+06 | 0.75 Y | 1.05 | 21:50 | 11.3 |  |  | 2169 | 2.5 | 0.0492 |
| 1st Fnc. Penta-Furans | 1.76e+07 | 1.58 Y | 1.05 | 28:51 | 22.6 |  |  | 2634 | 2.5 | 0.0785 |
| Total Penta-Furans    | 5.17e+07 | 1.53 Y | 1.05 | 31:43 | 66.6 |  |  | 1447 | 2.5 | 0.0431 |
| PeCDF Totals:         |          |        |      |       | 89.3 |  |  |      |     |        |
| Total Hexa-Furans     | 6.46e+07 | 1.24 Y | 1.14 | 34:44 | 100  |  |  | 2488 | 2.5 | 0.0541 |
| Total Hepta-Furans    | 2.67e+07 | 1.02 Y | 1.42 | 39:53 | 46.8 |  |  | 2715 | 2.5 | 0.0819 |

|    |                         |          |        |      |       |      |  |     |      |  |
|----|-------------------------|----------|--------|------|-------|------|--|-----|------|--|
| IS | 13C-2,3,7,8-TCDD        | 6.40e+07 | 0.78 Y | 1.13 | 27:43 | 93.7 |  | Rec | 93.7 |  |
| IS | 13C-1,2,3,7,8-PeCDD     | 5.54e+07 | 1.57 Y | 0.93 | 33:11 | 99.6 |  |     | 99.6 |  |
| IS | 13C-1,2,3,6,7,8-HxCDD   | 4.87e+07 | 1.23 Y | 0.93 | 37:12 | 97.7 |  |     | 97.7 |  |
| IS | 13C-1,2,3,4,6,7,8-HpCDD | 4.46e+07 | 1.03 Y | 0.91 | 41:30 | 92.1 |  |     | 92.1 |  |
| IS | 13C-OCDD                | 3.66e+07 | 0.89 Y | 0.73 | 46:50 | 93.3 |  |     | 93.3 |  |
| IS | 13C-2,3,7,8-TCDF        | 8.07e+07 | 0.77 Y | 1.06 | 26:50 | 92.9 |  |     | 92.9 |  |
| IS | 13C-1,2,3,7,8-PeCDF     | 7.42e+07 | 1.54 Y | 0.96 | 31:42 | 94.5 |  |     | 94.5 |  |
| IS | 13C-1,2,3,6,7,8-HxCDF   | 5.67e+07 | 0.52 Y | 1.28 | 36:15 | 82.8 |  |     | 82.8 |  |
| IS | 13C-1,2,3,4,6,7,8-HpCDF | 4.02e+07 | 0.44 Y | 0.90 | 39:52 | 83.3 |  |     | 83.3 |  |
| IS | 13C-OCDF                | 3.78e+07 | 0.89 Y | 0.81 | 47:09 | 87.3 |  |     | 87.3 |  |

|       |                         |          |        |      |       |      |  |  |  |  |
|-------|-------------------------|----------|--------|------|-------|------|--|--|--|--|
| RS/RT | 13C-1,2,3,4-TCDD        | 6.02e+07 | 0.79 Y | 1.00 | 27:03 | 100  |  |  |  |  |
| RS    | 13C-1,2,3,4-TCDF        | 8.20e+07 | 0.77 Y | 1.00 | 25:27 | 100  |  |  |  |  |
| RS/RT | 13C-1,2,3,7,8,9-HxCDD   | 5.34e+07 | 1.23 Y | 1.00 | 37:31 | 100  |  |  |  |  |
| PS    | 37Cl-2,3,7,8-TCDD       | 3.40e+07 |        | 0.51 | 27:45 | 103  |  |  |  |  |
| PS    | 13C-2,3,4,7,8-PeCDF     | 7.32e+07 | 1.55 Y | 0.97 | 32:50 | 101  |  |  |  |  |
| PS    | 13C-1,2,3,4,7,8-HxCDD   | 4.53e+07 | 1.29 Y | 0.92 | 37:05 | 101  |  |  |  |  |
| PS    | 13C-1,2,3,4,7,8-HxCDF   | 5.37e+07 | 0.52 Y | 0.91 | 36:06 | 104  |  |  |  |  |
| PS    | 13C-1,2,3,4,7,8,9-HpCDF | 3.43e+07 | 0.43 Y | 0.85 | 42:20 | 99.9 |  |  |  |  |
| AS    | 13C-1,2,3,7,8,9-HxCDF   | 4.96e+07 | 0.52 Y | 1.07 | 37:55 | 86.8 |  |  |  |  |

Analyst: GAG  
103  
101  
101-Date: 20 Feb 01  
104  
99.9  
86.8

## FORM 5

## PCDD/PCDF RT WINDOW AND ISOMER SPECIFICITY STANDARDS

Lab Name: Alta Analytical Perspectives Episode No.:

Contract No.:

SAS No.:

Instrument ID: MM-1

Initial Calibration Date: 10/5/00

RT Window Data Filename: 010214P1 S#1 Analysis Date: 14-FEB-01 Time: 11:05:47

DB-5 IS Data Filename: 010214P1 S#1 Analysis Date: 14-FEB-01 Time: 11:05:47

DB\_225 IS Data Filename:

Analysis Date:

Time:

Reviewer: ceDate: 24 Feb 01

## DB-5 RT WINDOW DEFINING STANDARDS RESULTS

| ISOMERS                 | ABSOLUTE<br>RT | ISOMERS                 | ABSOLUTE<br>RT |
|-------------------------|----------------|-------------------------|----------------|
| 1,3,6,8-TCDD (F)        | 24:00 ✓        | 1,3,6,8-TCDF (F)        | 21:50 ✓        |
| 1,2,8,9-TCDD (L)        | 28:45 ✓        | 1,2,8,9-TCDF (L)        | 28:54 ✓        |
| 1,2,4,7,9-PeCDD (F)     | 30:39 ✓        | 1,3,4,6,8-PeCDF (F)     | 28:51 ✓        |
| 1,2,3,8,9-PeCDD (L)     | 33:39 ✓        | 1,2,3,8,9-PeCDF (L)     | 33:56 ✓        |
| 1,2,4,6,7,9-HxCDD (F)   | 35:24 ✓        | 1,2,3,4,6,8-HxCDF (F)   | 34:44 ✓        |
| 1,2,3,7,8,9-HxCDD (L)   | 37:32 ✓        | 1,2,3,7,8,9-HxCDF (L)   | 37:56 ✓        |
| 1,2,3,4,6,7,9-HpCDD (F) | 40:19 ✓        | 1,2,3,4,6,7,8-HpCDF (F) | 39:53 ✓        |
| 1,2,3,4,6,7,8-HpCDD (L) | 41:31 ✓        | 1,2,3,4,7,8,9-HpCDF (L) | 42:20 ✓        |

(F) = First eluting isomer (DB-5); (L) = Last eluting isomer (DB-5).

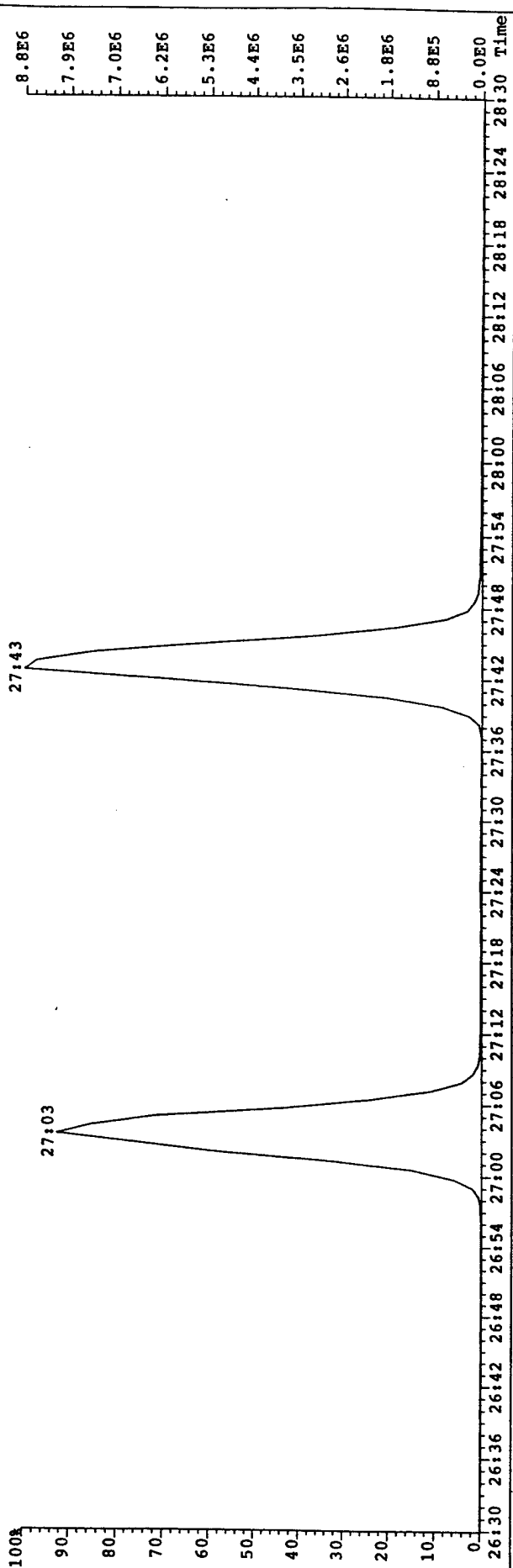
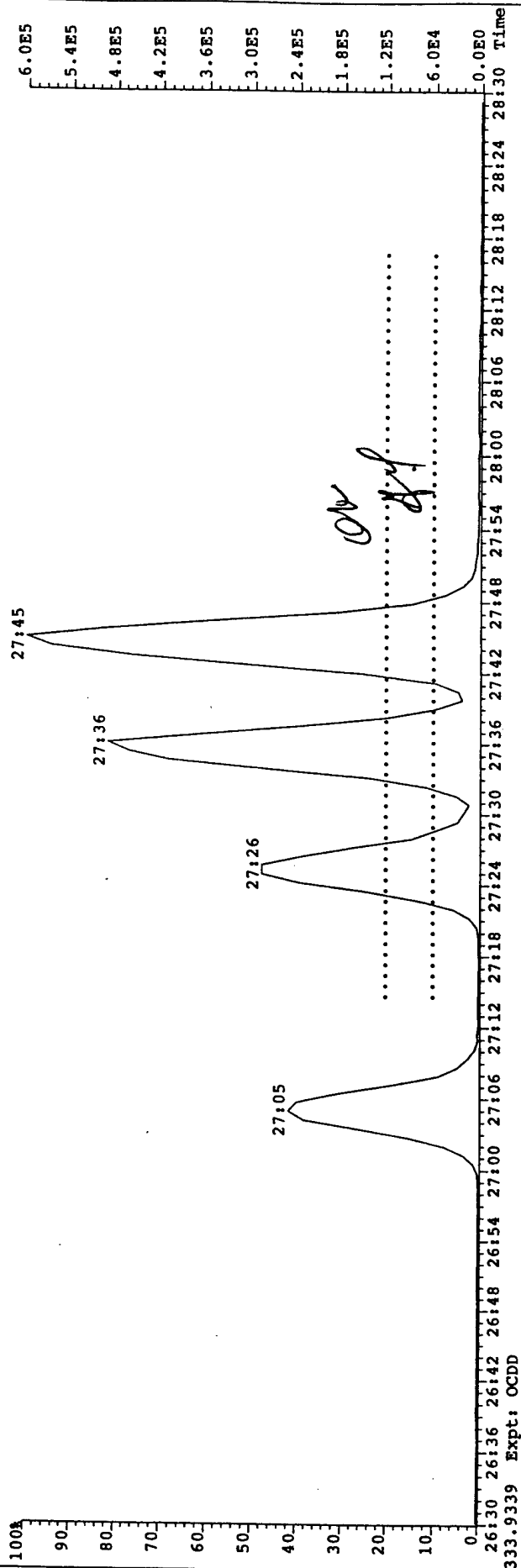
## ISOMER SPECIFICITY (IS) TEST STANDARD RESULTS

\* VALLEY HEIGHT  
BETWEEN  
COMPARED PEAKS (1)

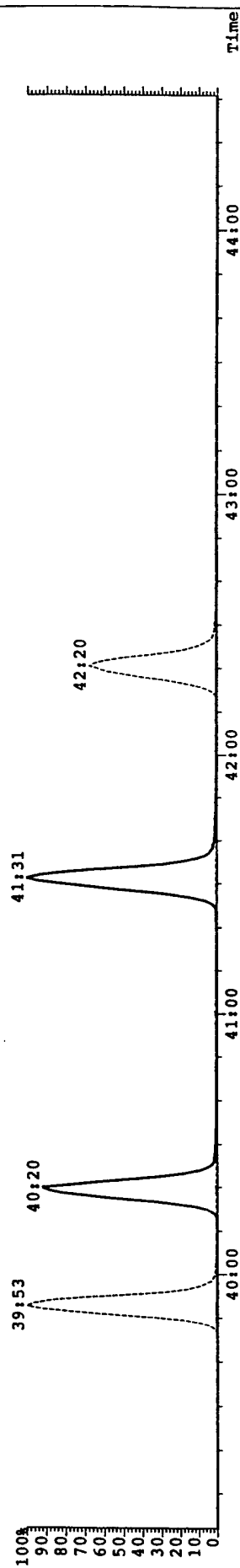
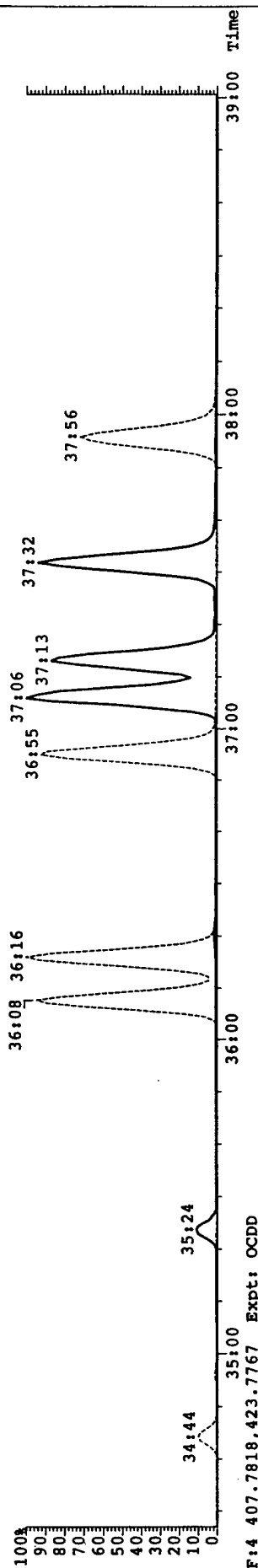
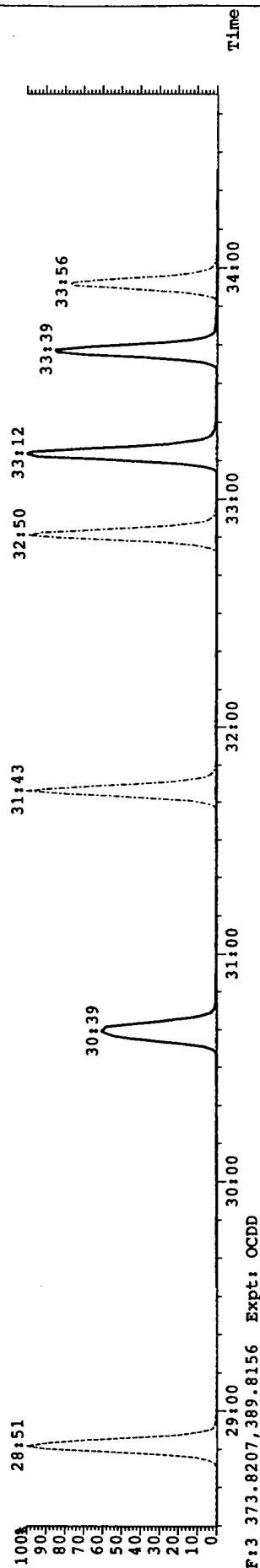
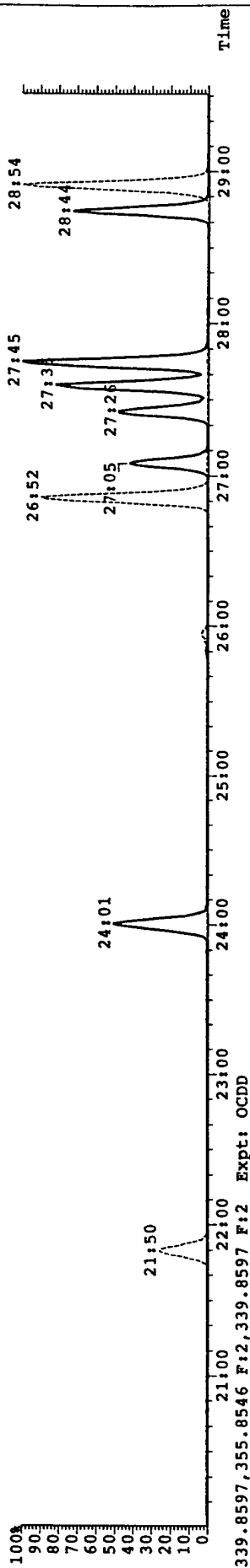
&lt;25%

Analyst: GAGDate: 20 Feb 01

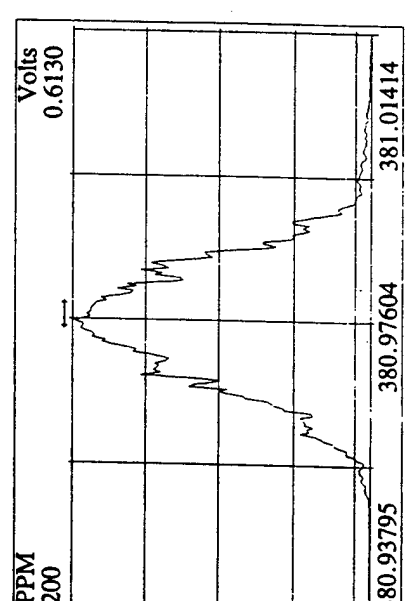
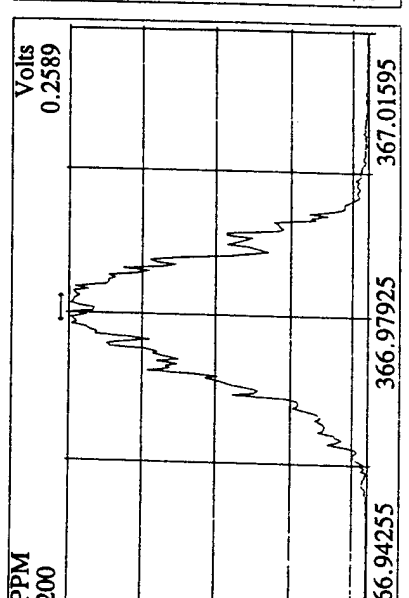
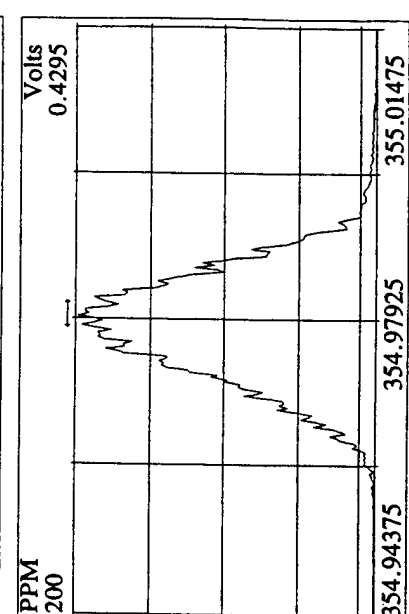
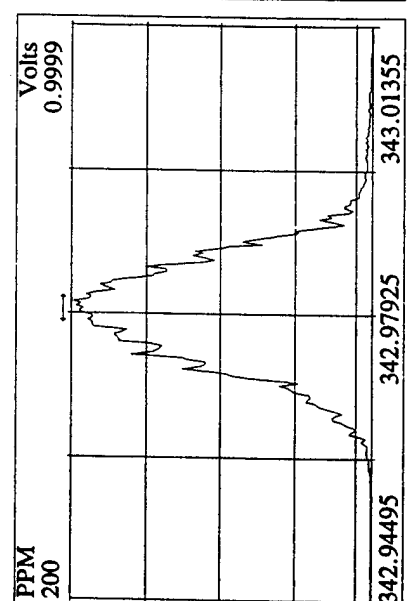
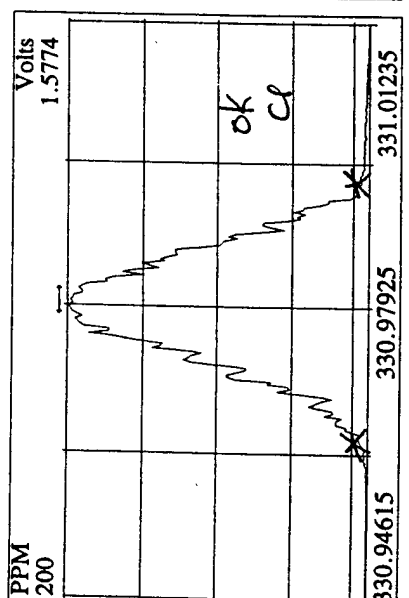
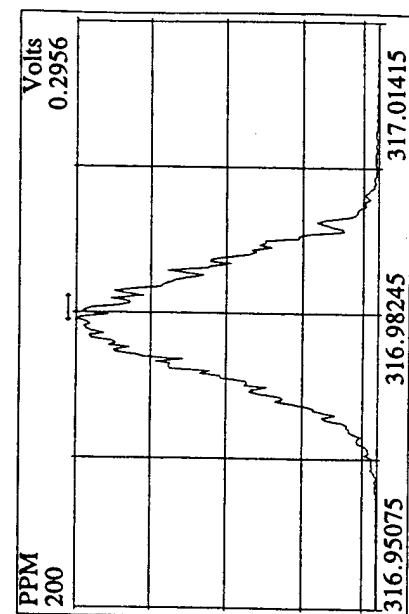
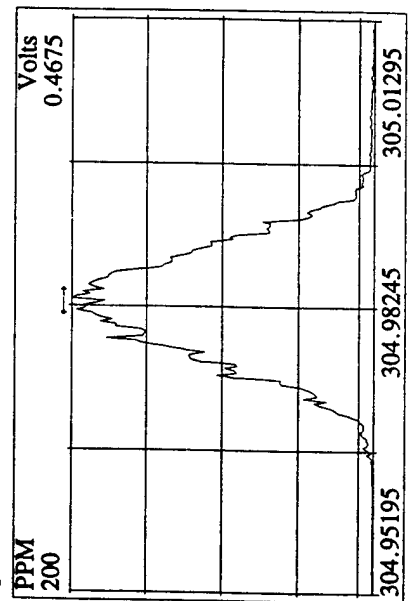
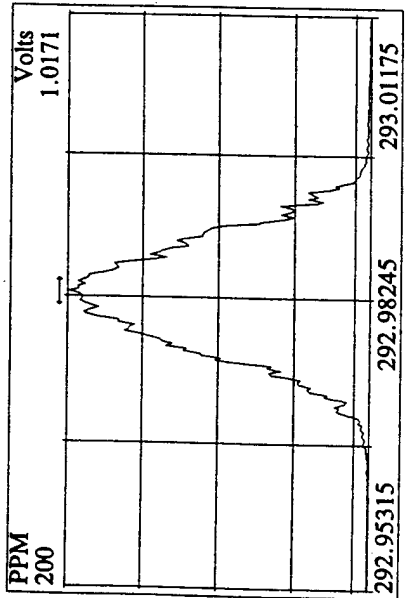
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Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5  
321.8936 Expt: OCDD



File: 010214PI Acq: 14-FEB-2001 11:05:47 GC EIT Voltage SIR Autospec-Ultimate  
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5  
305.8987,321.8936 Expt: OCDD

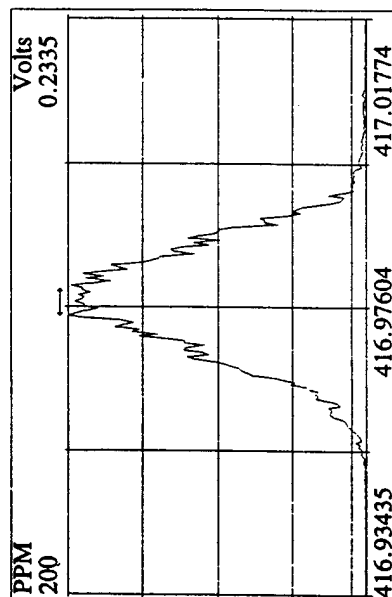
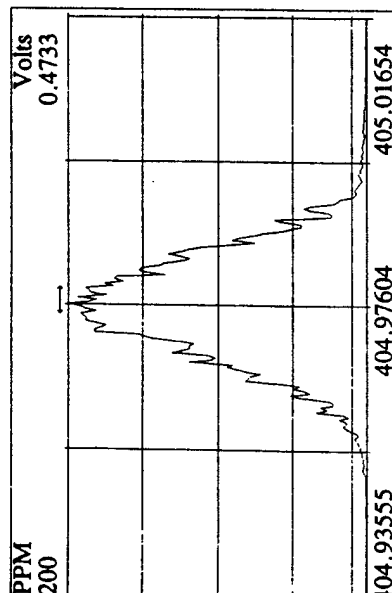
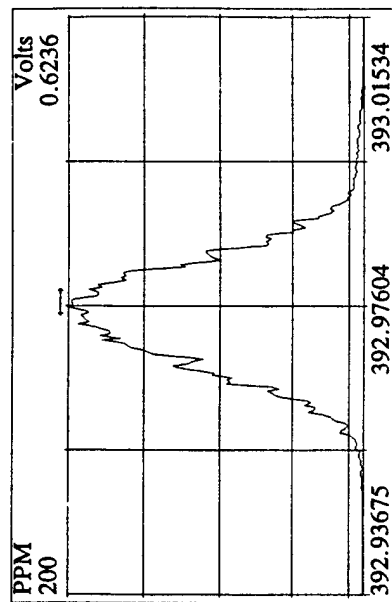
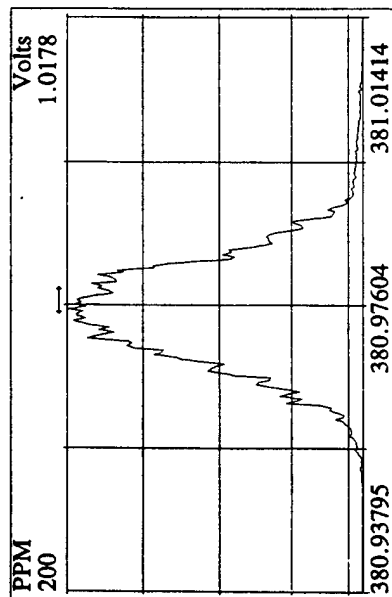
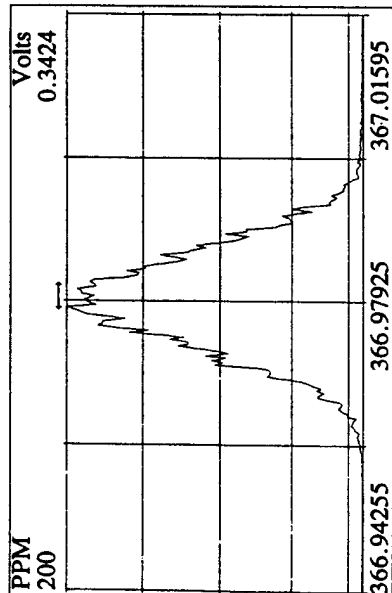
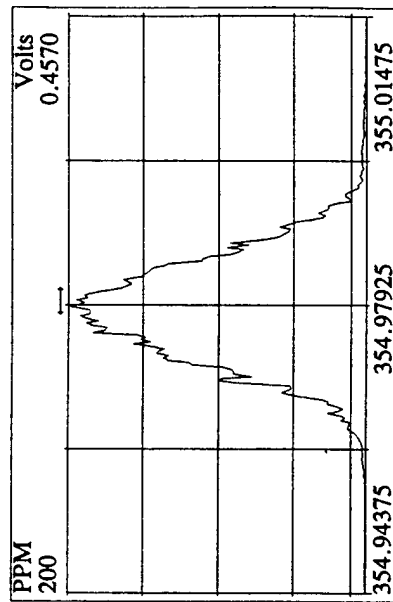
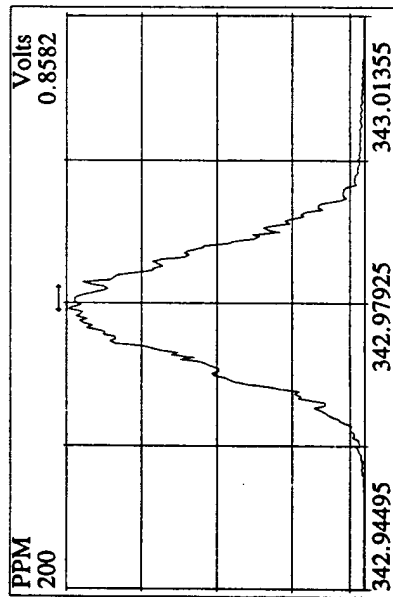
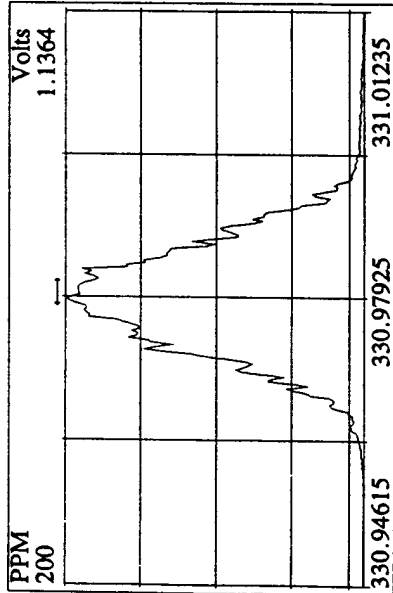


Peak Locate Examination: 14-FEB-2001: 11:02 File: 010214P1  
 Experiment: OCDD Function: 1 Reference: PFK2

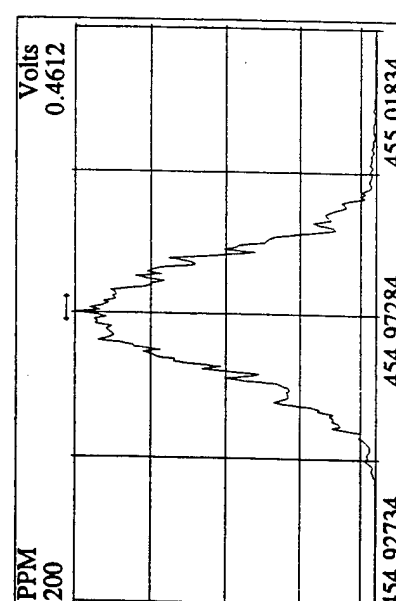
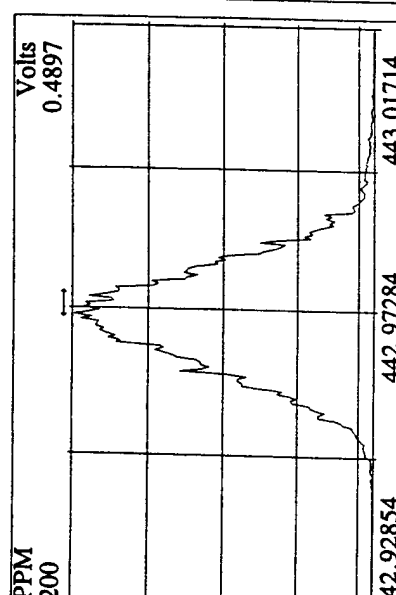
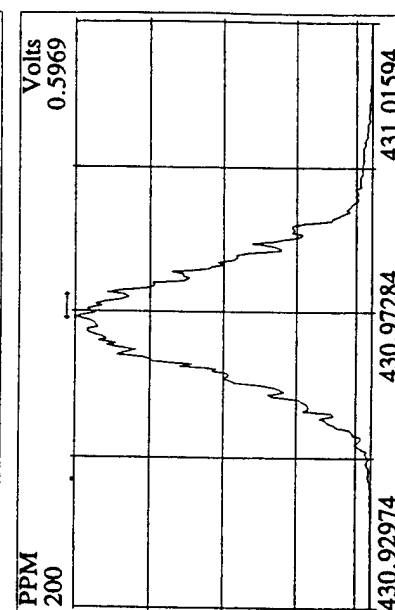
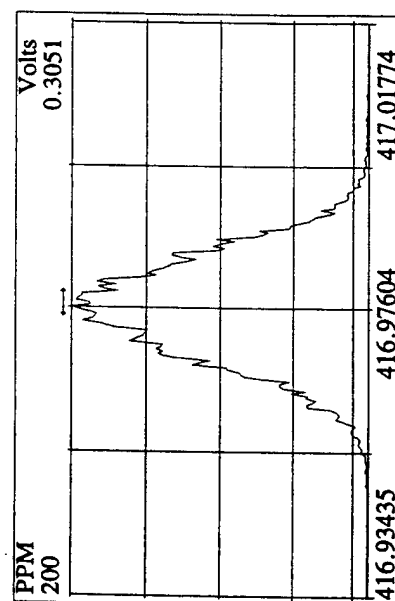
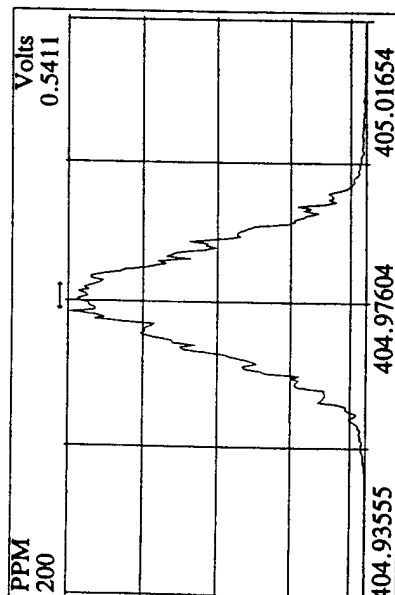
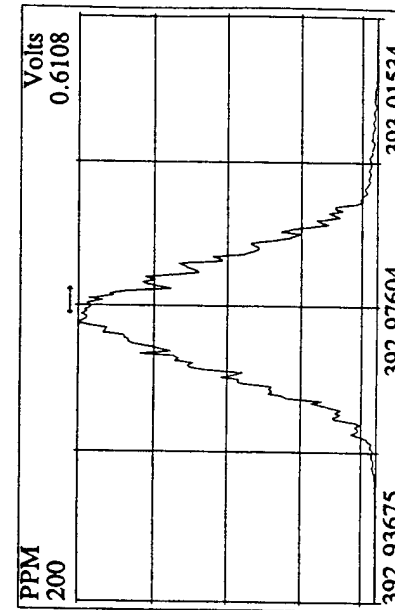
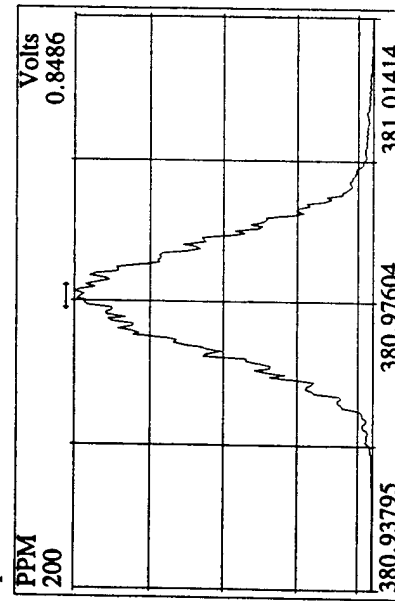
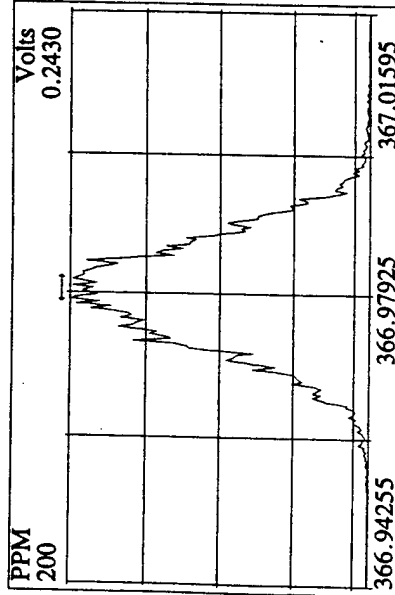




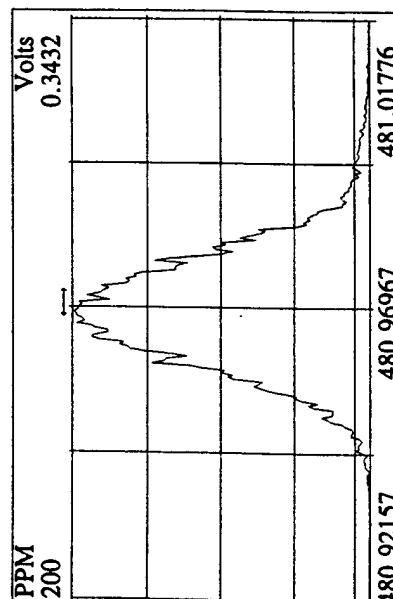
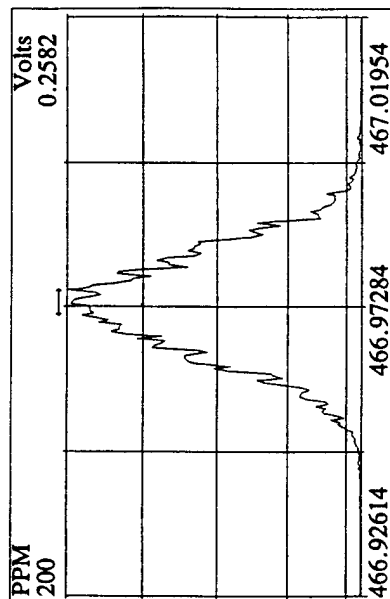
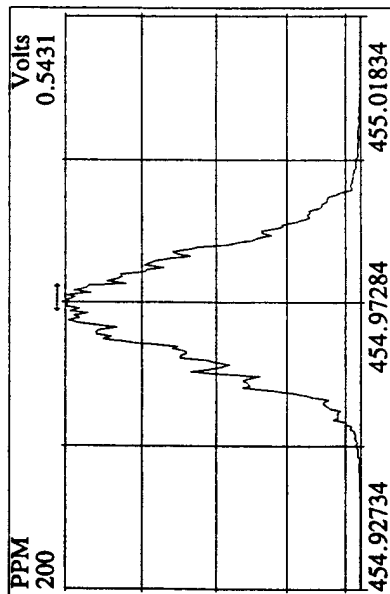
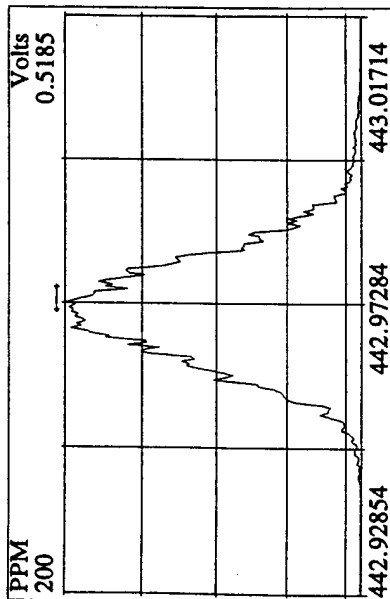
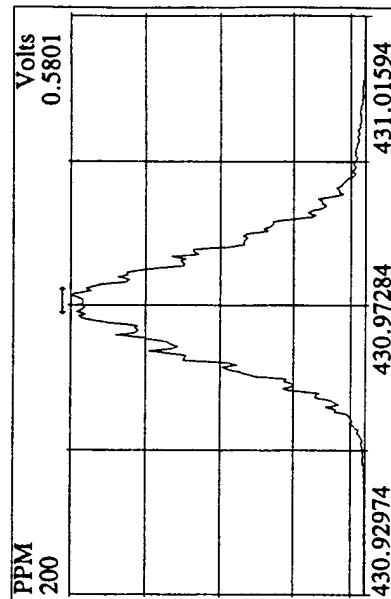
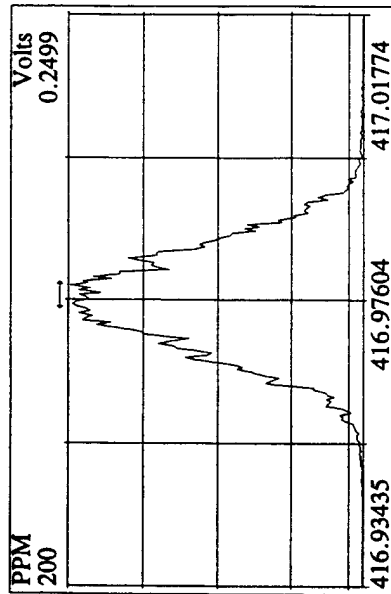
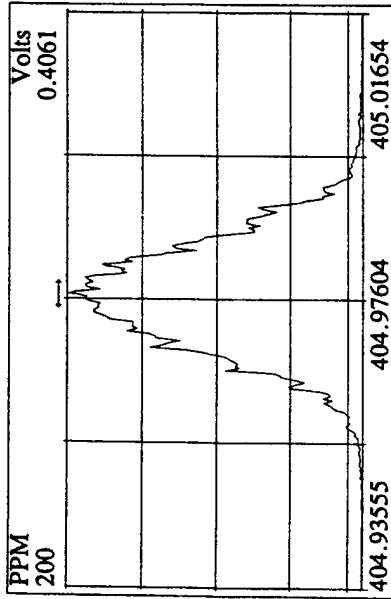
Peak Locate Examination: 14-FEB-2001:11:02 File:010214P1  
Experiment: OCDD Function: 2 Reference: PFK2



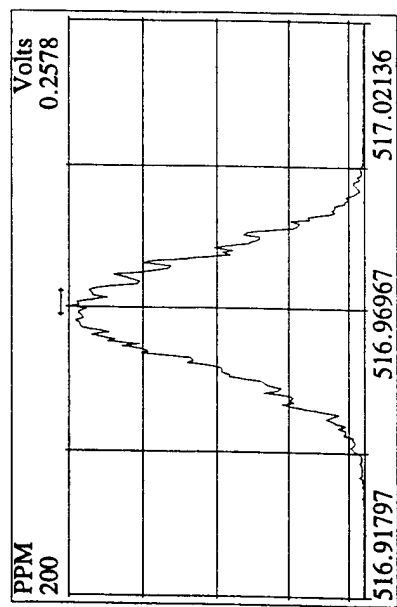
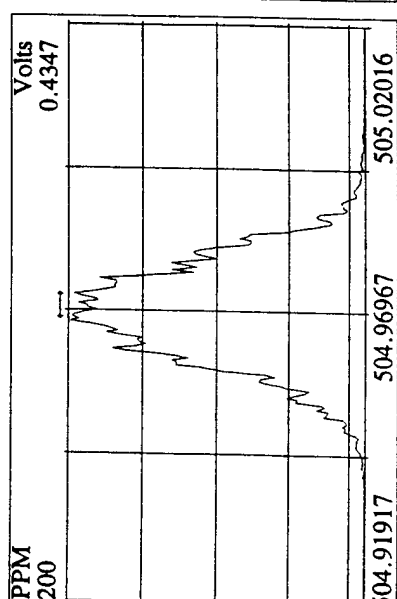
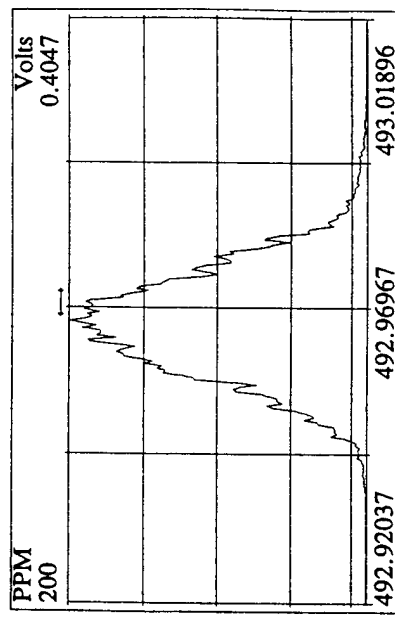
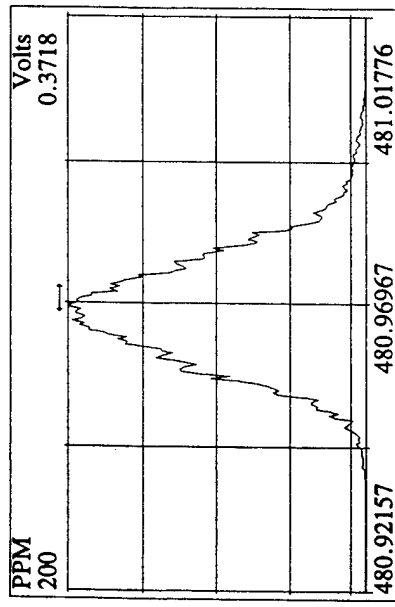
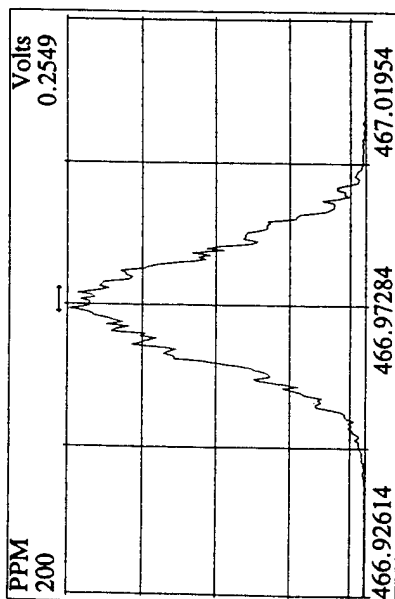
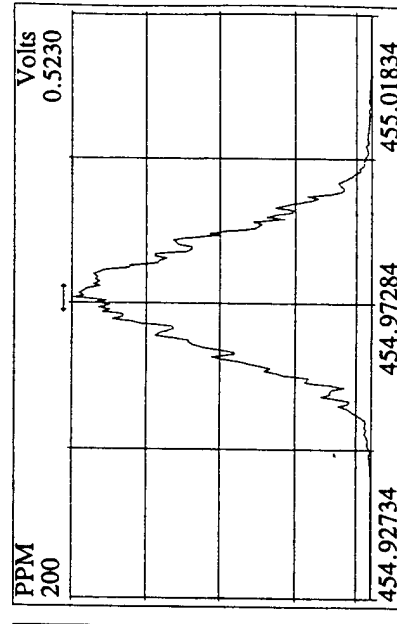
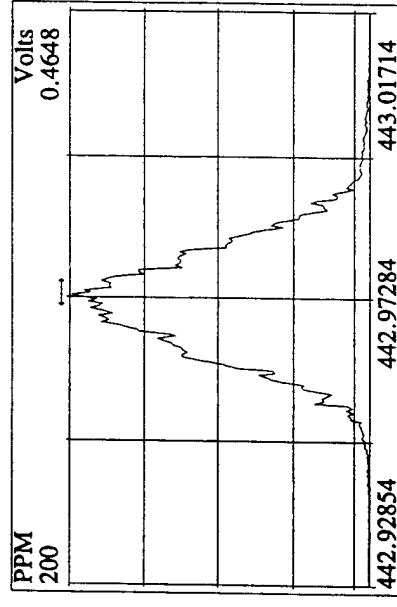
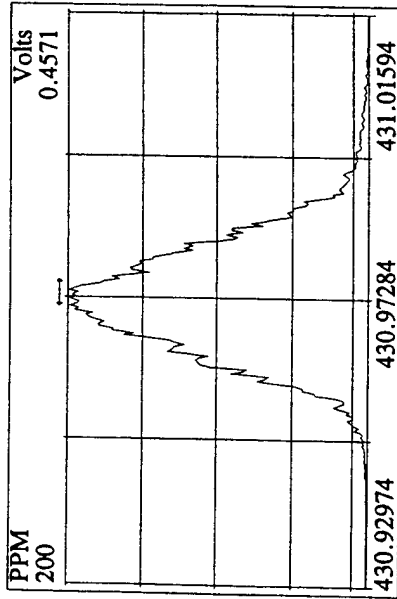
Peak Locate Examination: 14-FEB-2001: 11:03 File: 010214P1  
 Experiment: OCDD Function: 3 Reference: PFK2



Peak Locate Examination: 14-FEB-2001: 11:04 File: 010214P1  
 Experiment: OCDD Function: 4 Reference: PFK2

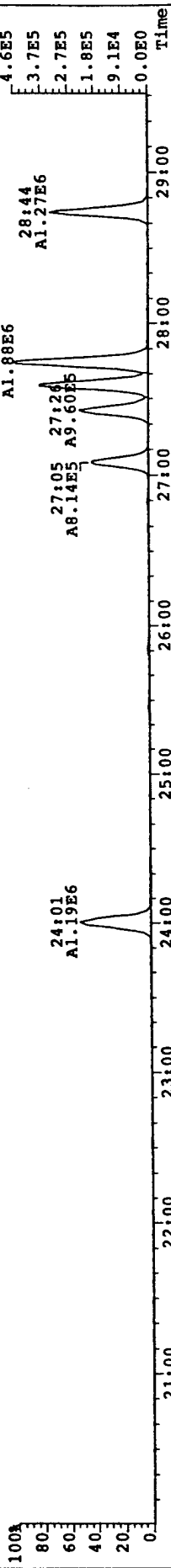


Peak Locate Examination: 14-FEB-2001: 11:04 File: 010214P1  
 Experiment: OCDD Function: 5 Reference: PFK2

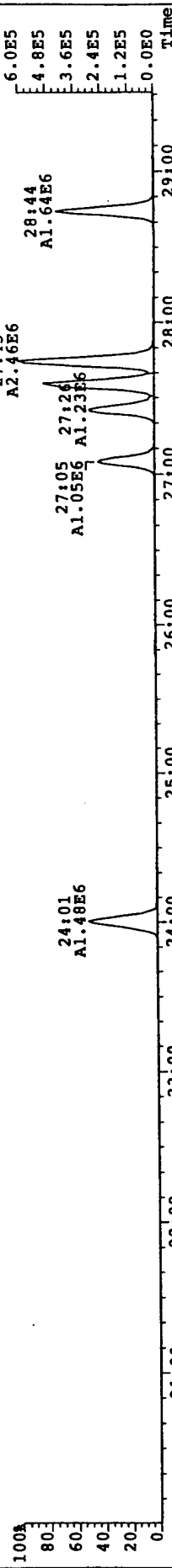


File: 010214PI Acq: 14-FEB-2001 11:05:47 GC EIT Voltage SWR Autospec-Ultimate

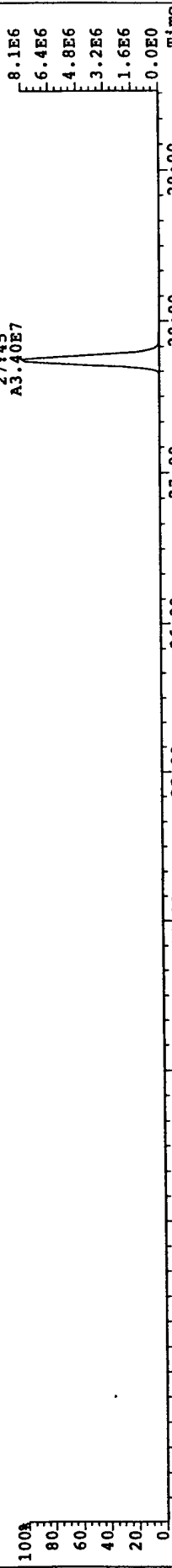
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5  
319.8965 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 243



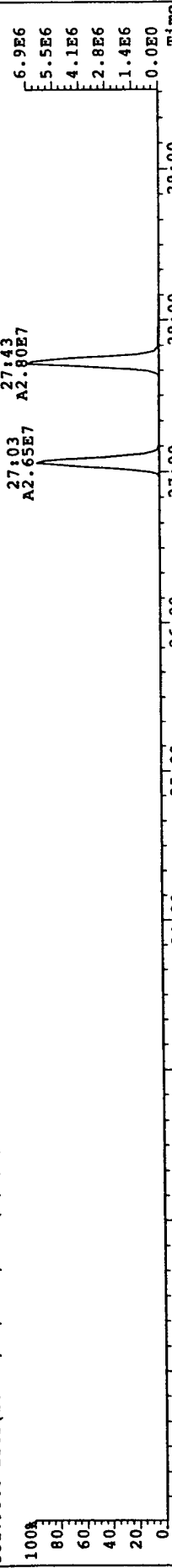
321.8936 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 124



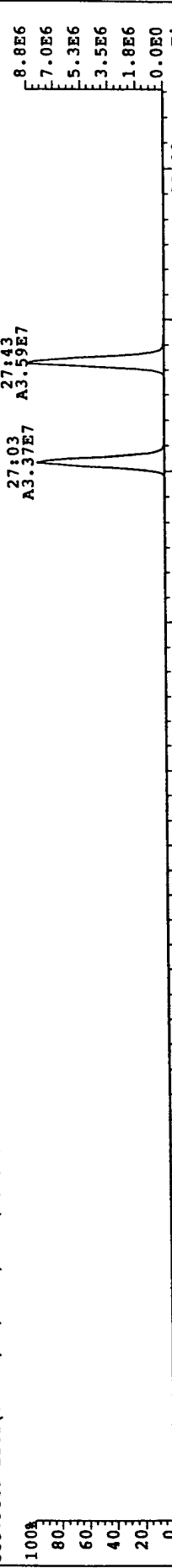
327.8850 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 171



331.9368 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1588



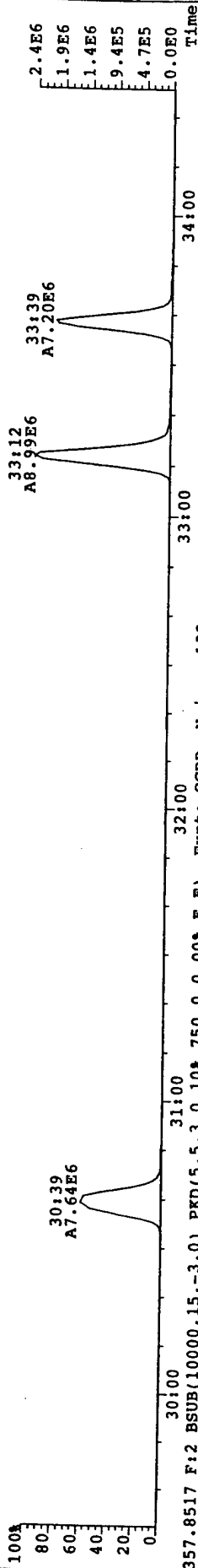
333.9339 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 835



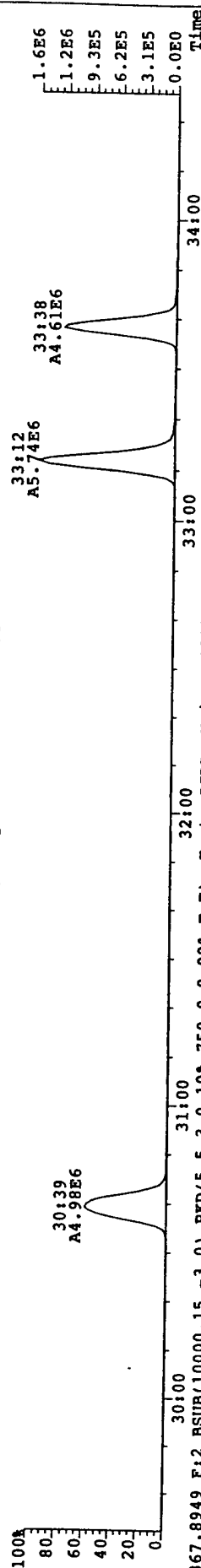
File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage 51V Autospec-UltimaE

Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

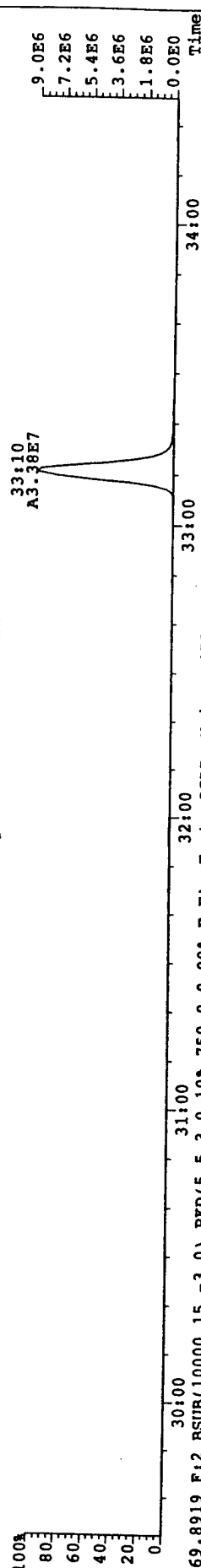
355.8546 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 400



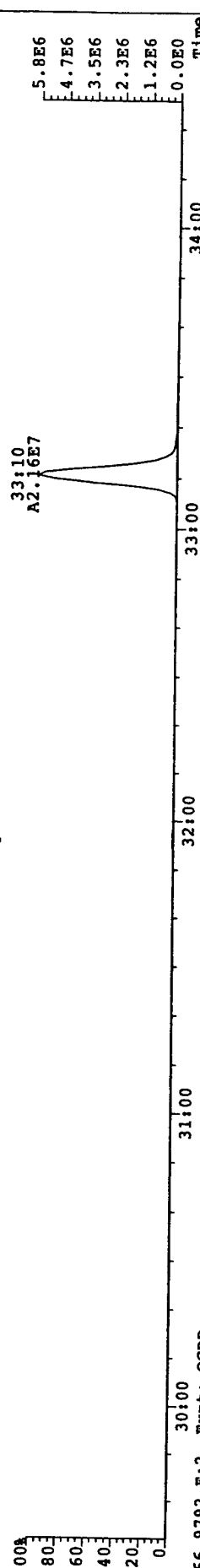
357.8517 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 133



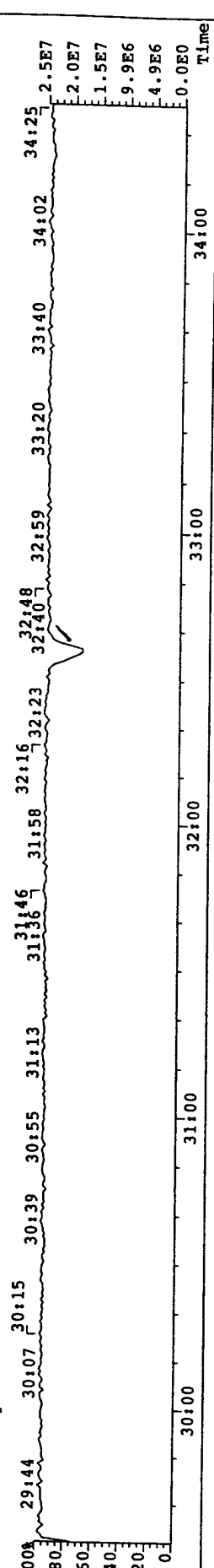
367.8949 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1212



369.8919 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 478



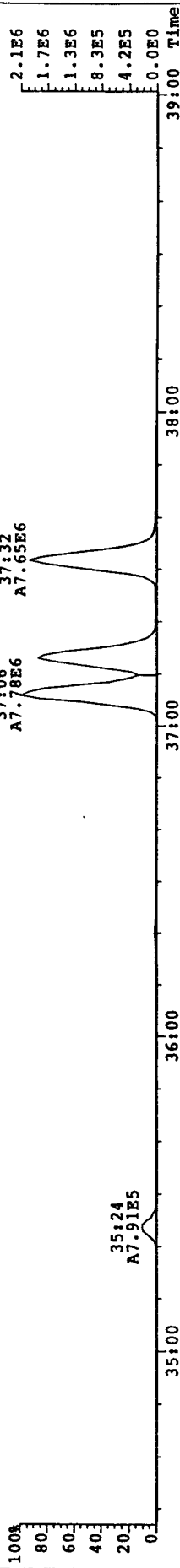
366.9792 F:2 Expt: OCDD



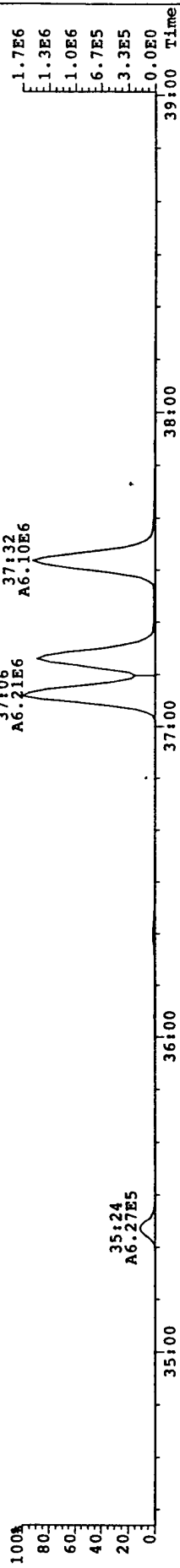
File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC Ex: Voltage SIR Autospec-UltimaE

Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

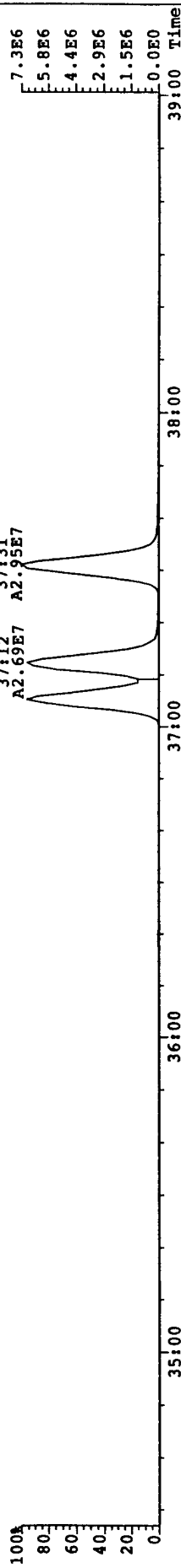
389.8156 F:3 BSUB(10000,15,-3.0) PKD(5,5,3.0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 511



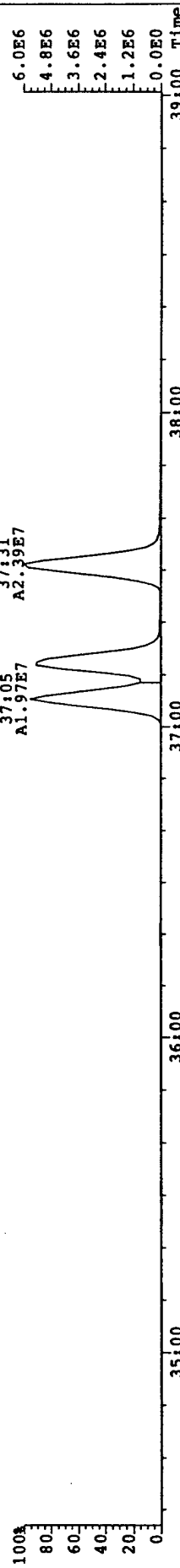
391.8127 F:3 BSUB(10000,15,-3.0) PKD(5,5,3.0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 293



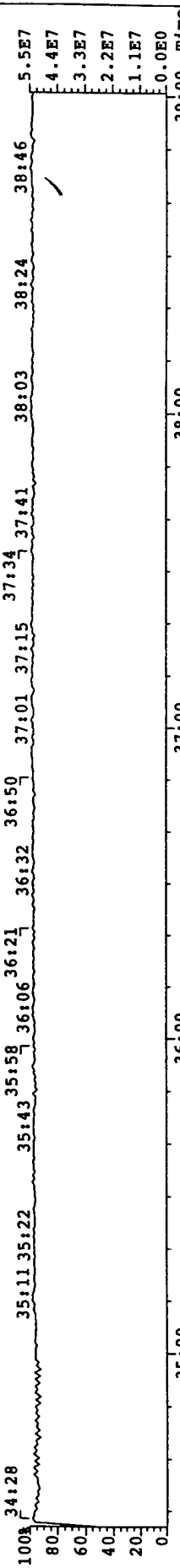
401.8559 F:3 BSUB(10000,15,-3.0) PKD(5,5,3.0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 441



403.8530 F:3 BSUB(10000,15,-3.0) PKD(5,5,3.0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 204

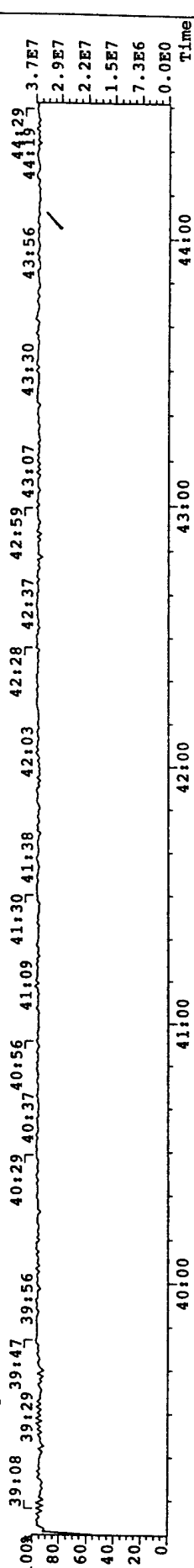
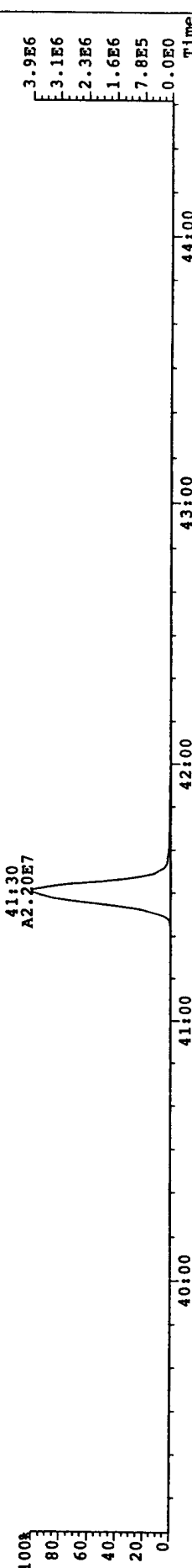
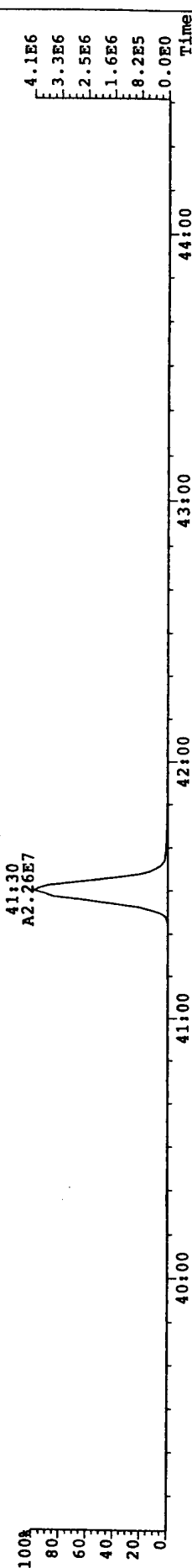
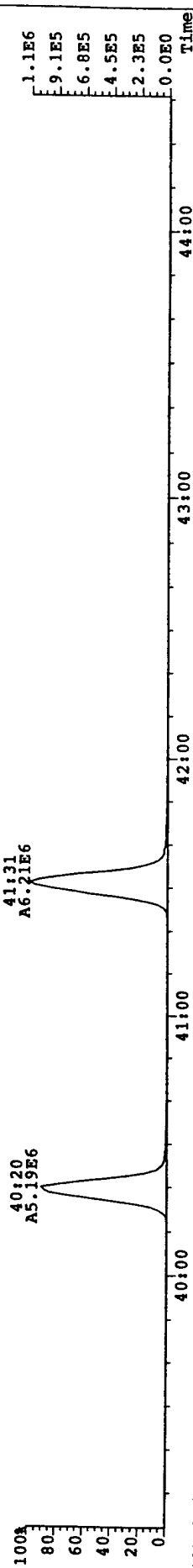
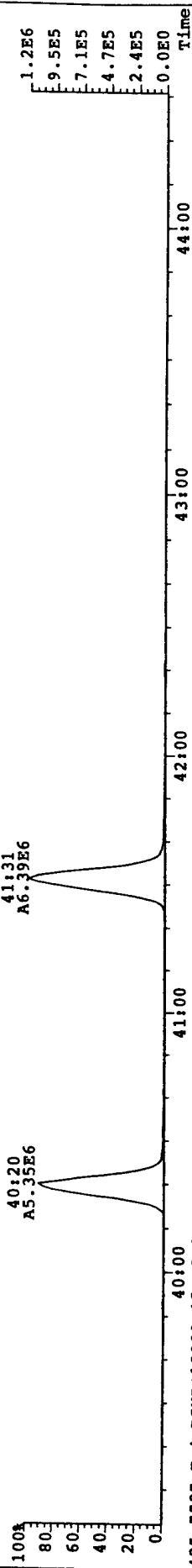


380.9760 F:3 Expt: OCDD



File: 010214PI Acq: 14-FEB-2001 11:05:47 GC EX+ Voltage SIR Autospec-UltimaE

Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5  
423.7767 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 413

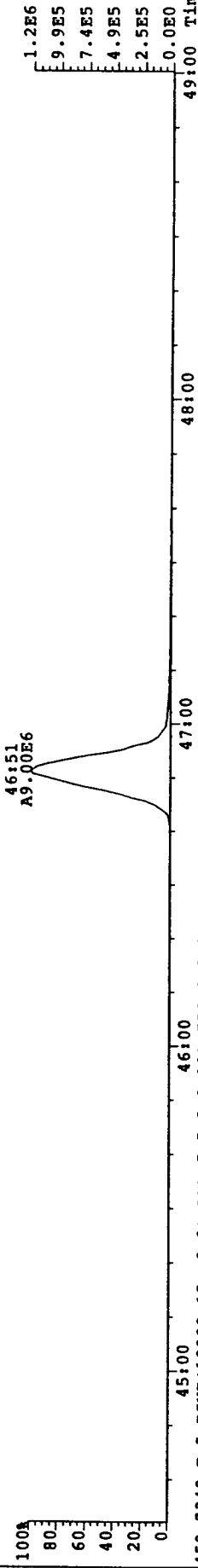




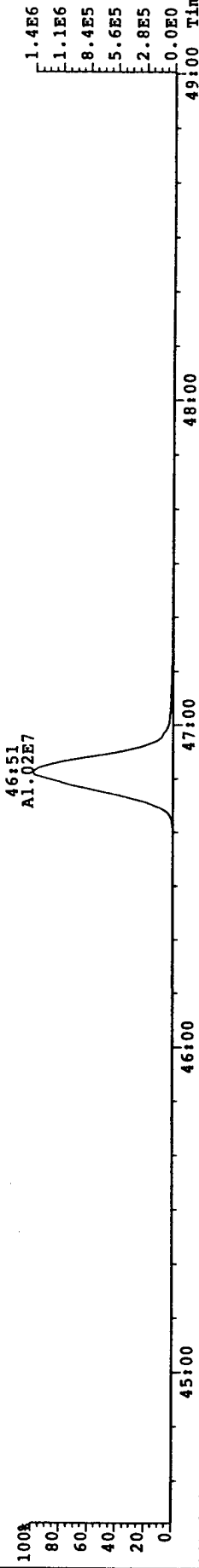
File: U0214PI Acq: 14-FEB-2001 11:05:47 GC E1+ Voltage SR Autospec-UltimaE

Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

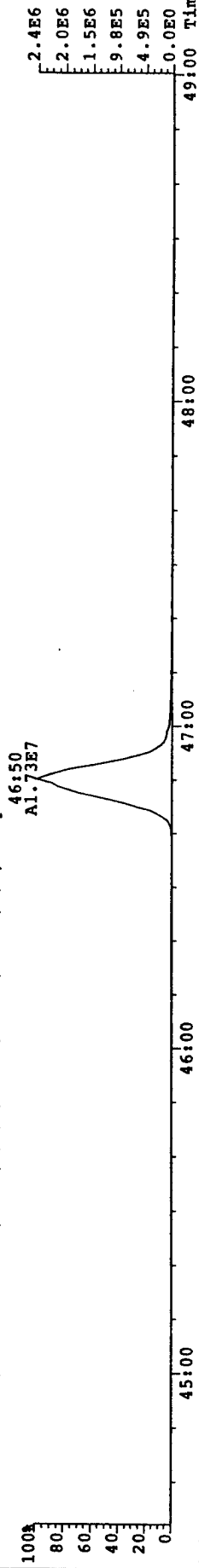
457.7377 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 437



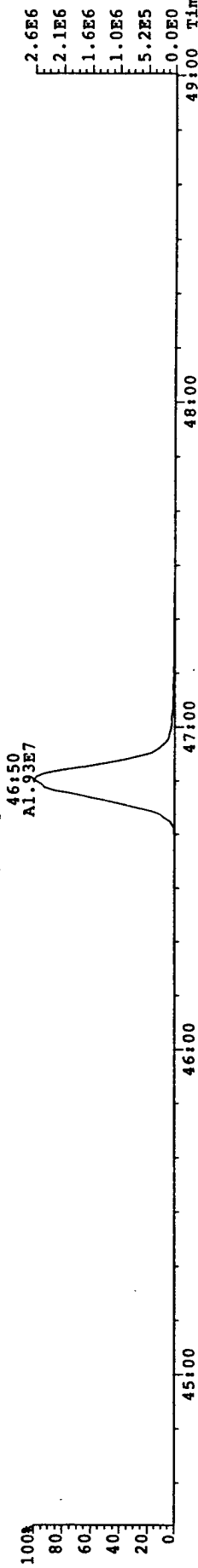
459.7348 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 191



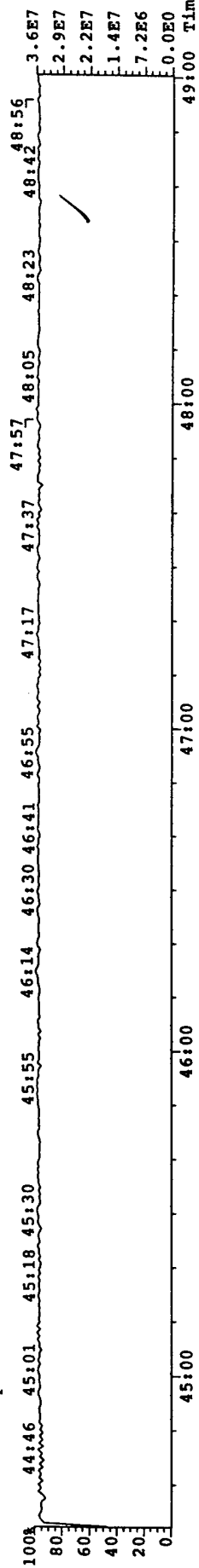
469.7780 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 152



471.7750 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 139



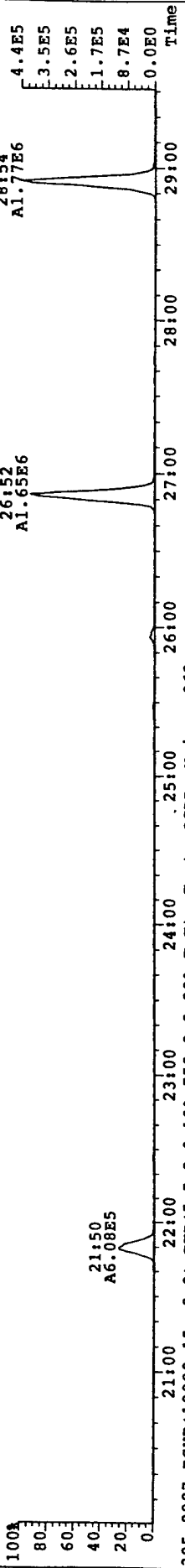
454.9728 F:5 Expt: OCDD



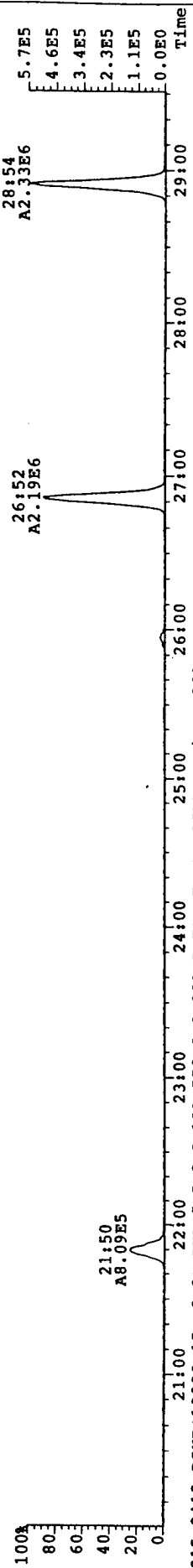
File: 010214PI Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-Ultima

Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

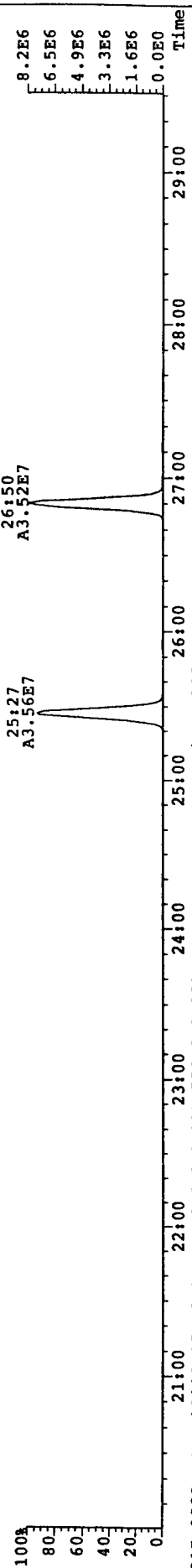
303.9016 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 168



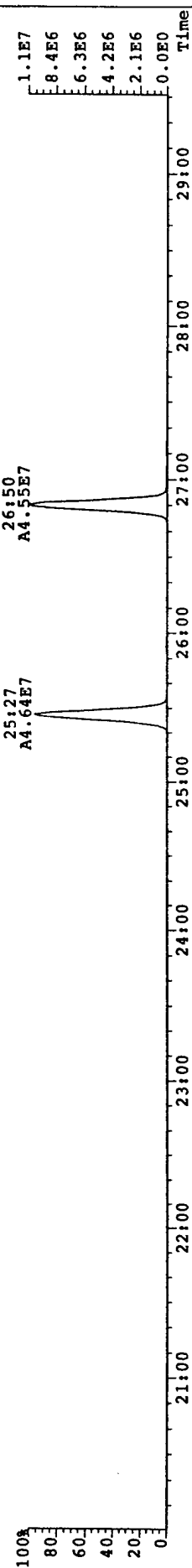
305.8987 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 362



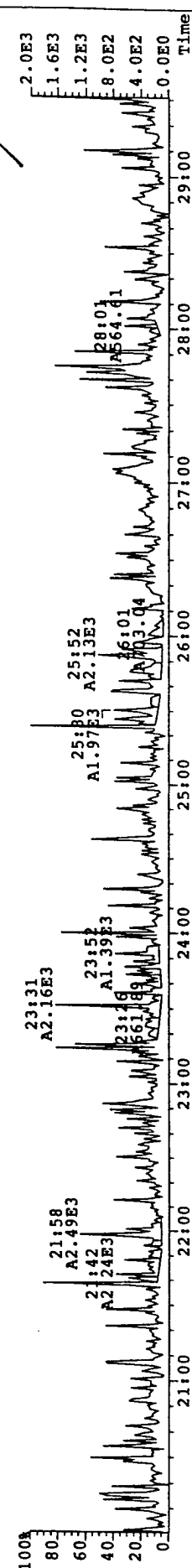
315.9419 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 369



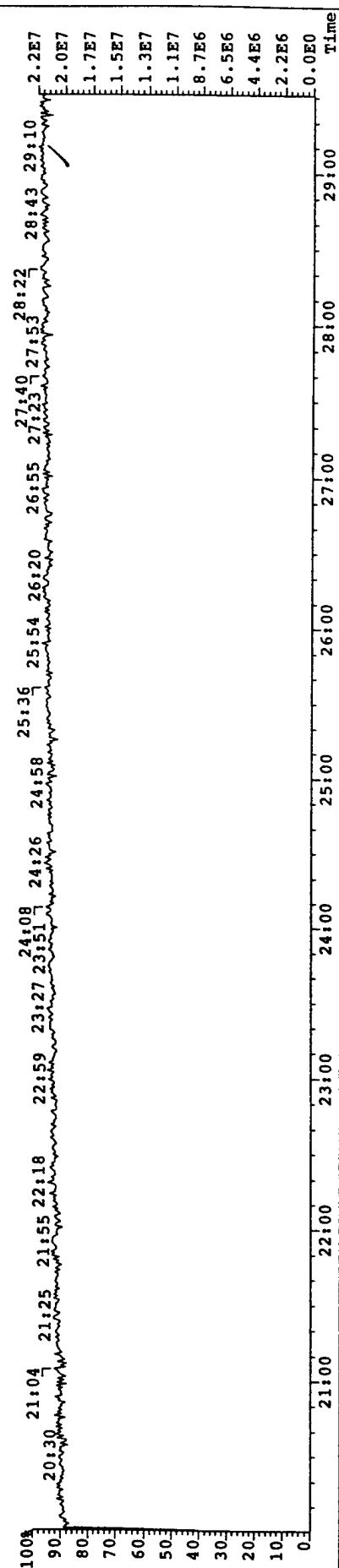
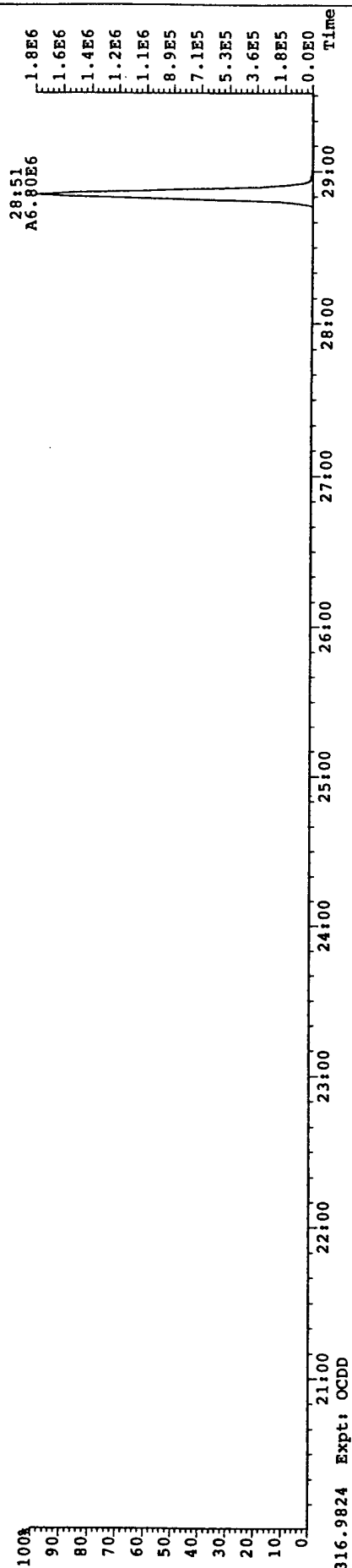
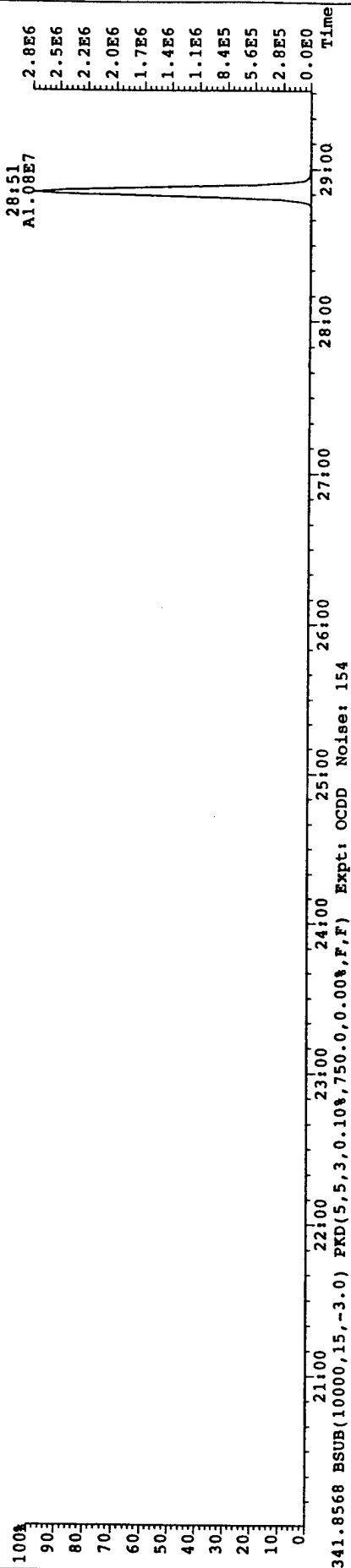
317.9389 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 966



375.8364 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 71



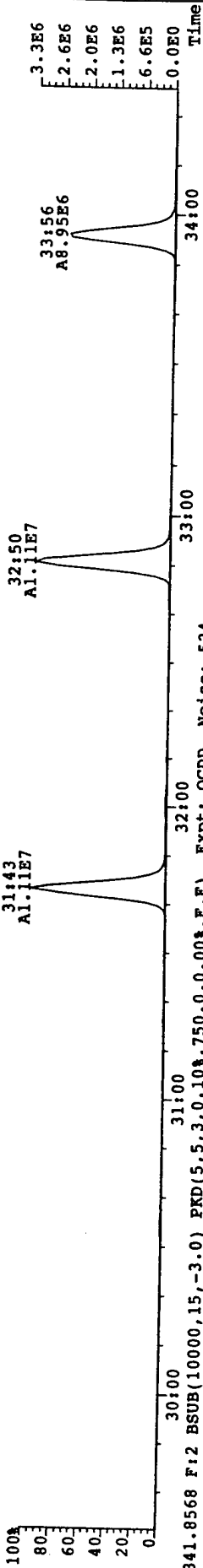
File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EI+ Voltage SIR Autospec-UltimaE  
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5  
339.8597 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 67



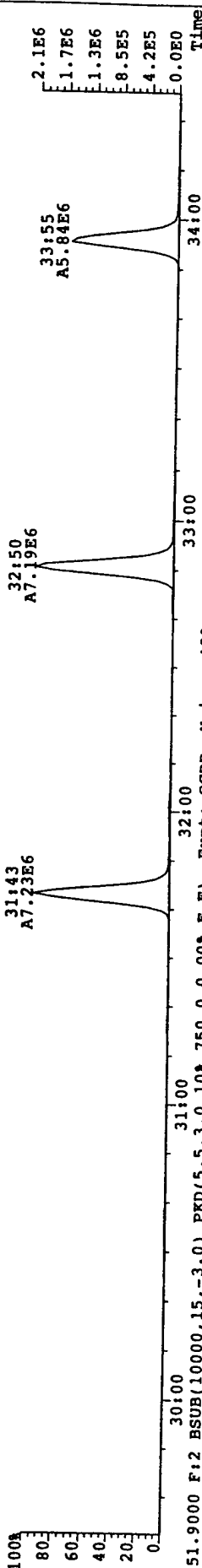
File: 010214PI Acq: 14-FEB-2001 11:05:47 GC RT+ Voltage SIR Autospec-UltimaE

Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

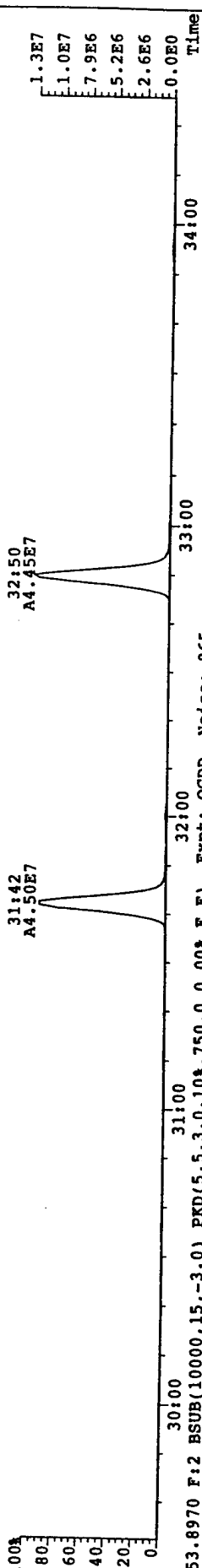
339.8597 F12 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 468



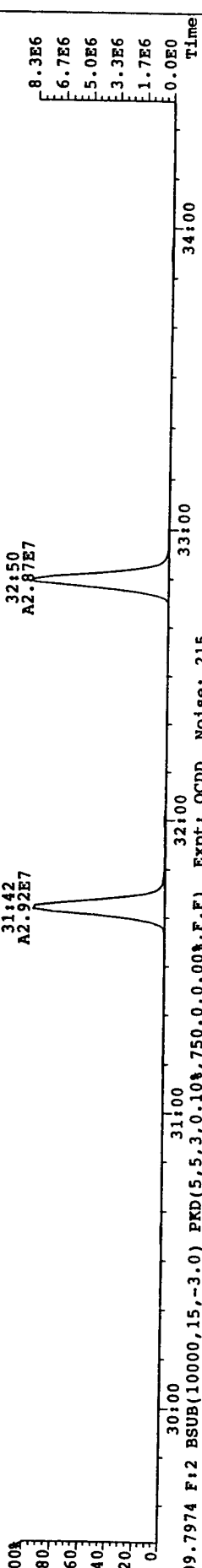
341.8568 F12 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 524



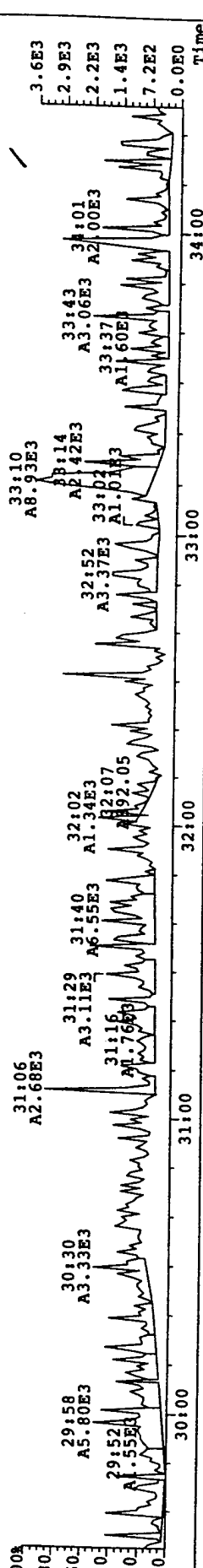
351.9000 F12 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 439



353.8970 F12 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 865



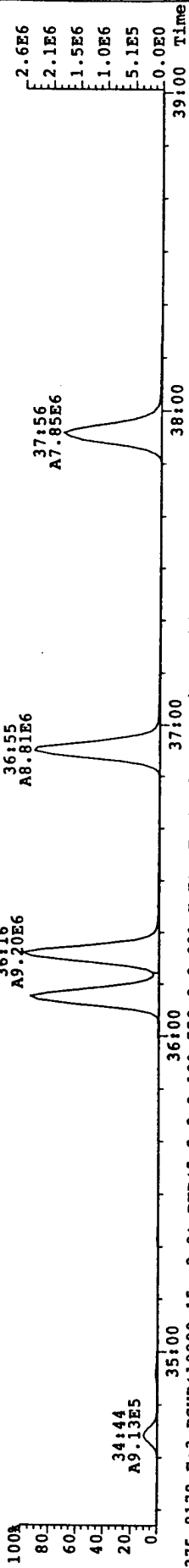
409.7974 F12 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 215



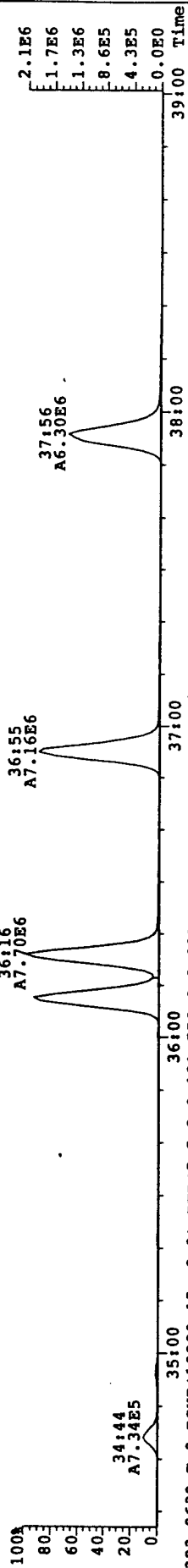
File: 010214P1 Acq: 14-FEB-2001 11:05:47 GC EX+ Voltage SIR Autospec-Uitmaa

Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

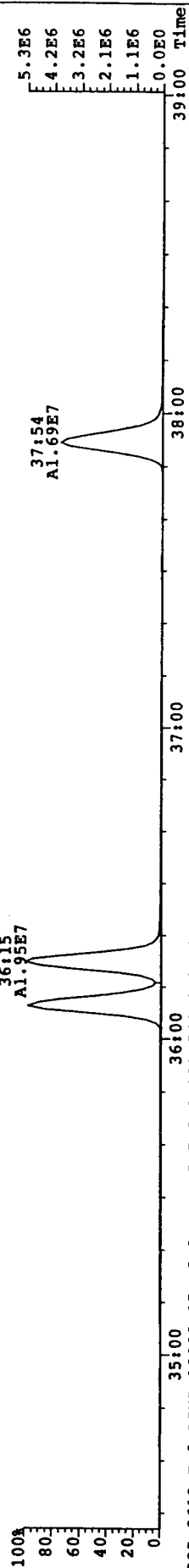
373.8207 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 569



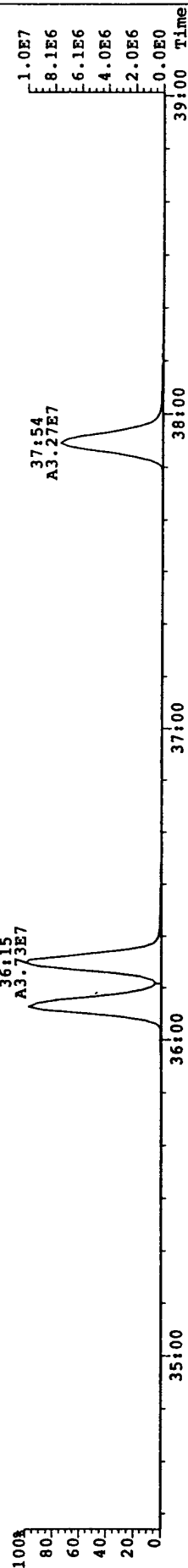
375.8178 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 396



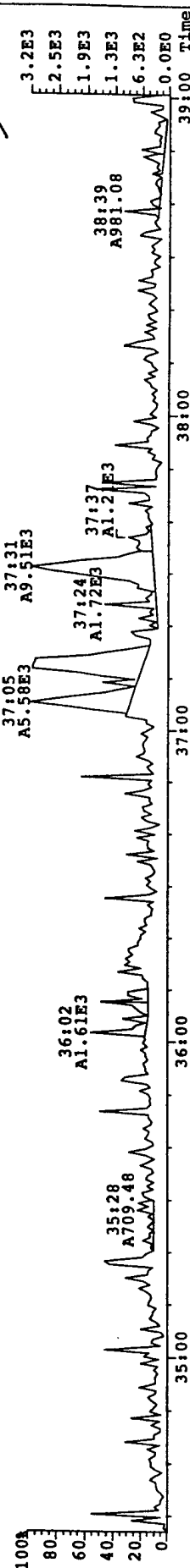
383.8639 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 3213



385.8610 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1709

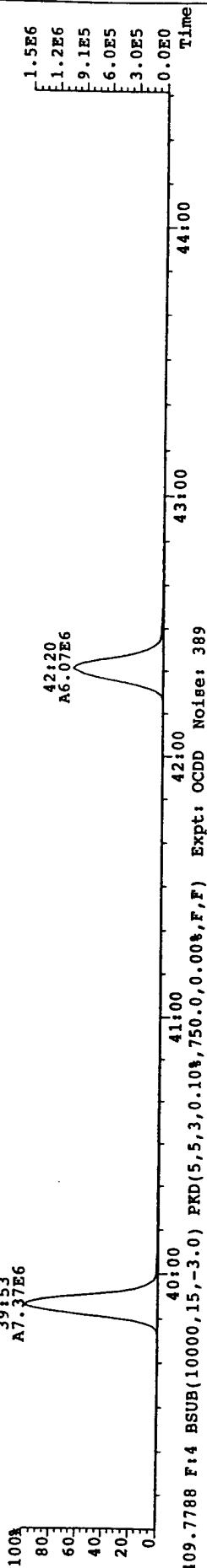


445.7555 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 129

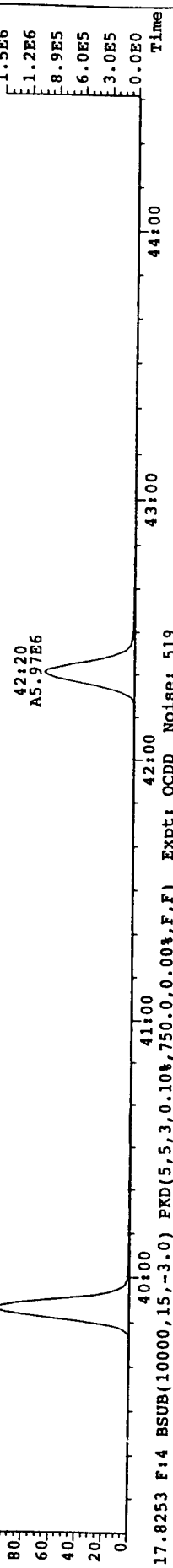


File: 010214PI Acq: 14-FEB-2001 11:05147 GC E1+ Voltage 51V Autospec-UltimaE

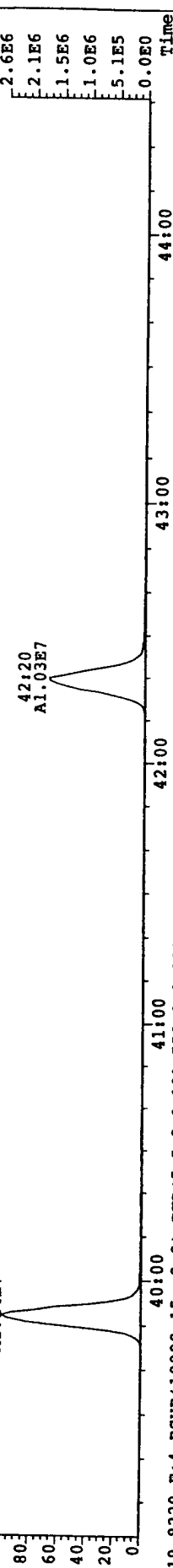
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5  
407.7818 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 376



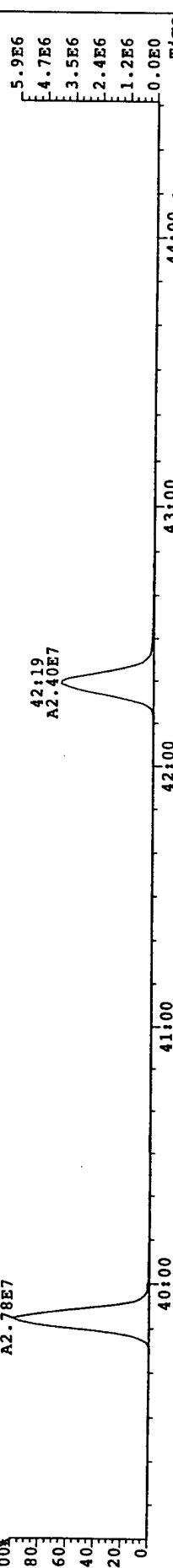
409.7788 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 389



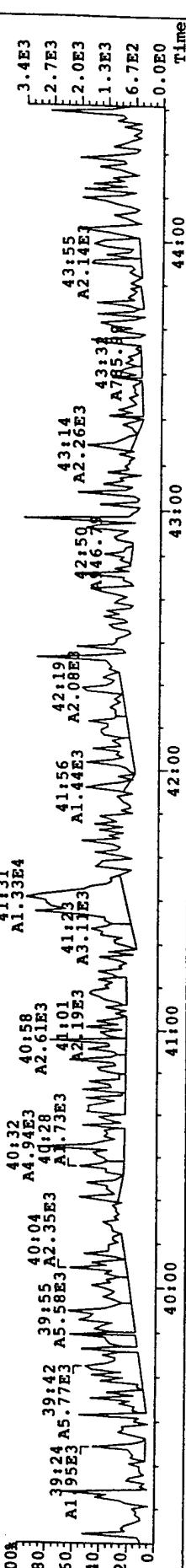
417.8253 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 519



419.8220 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 849

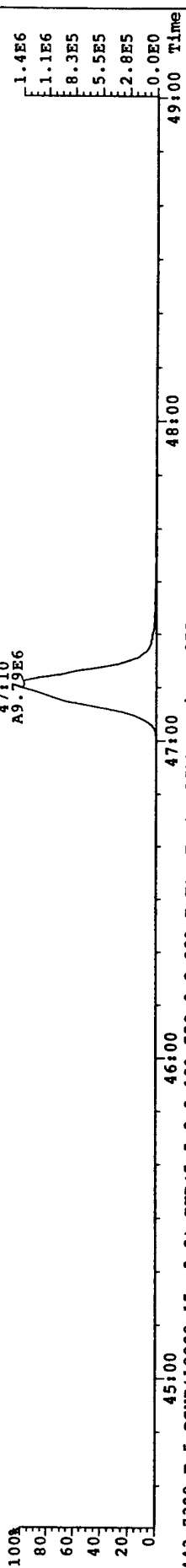


479.7165 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 313

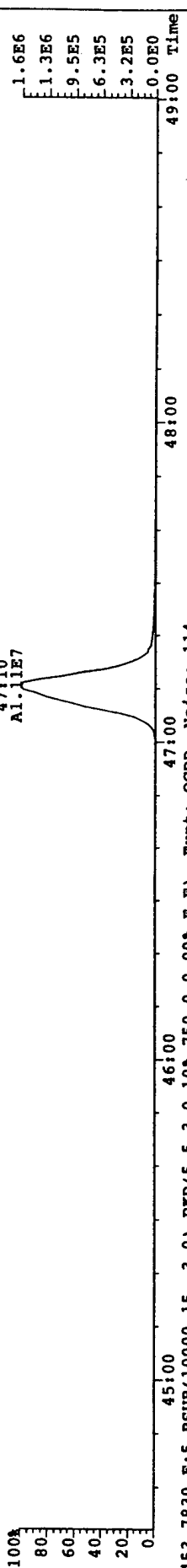


File: 010214PI Acq: 14-FEB-2001 11:05:47 GC E1+ Voltage SIR Autospec-UltimaE

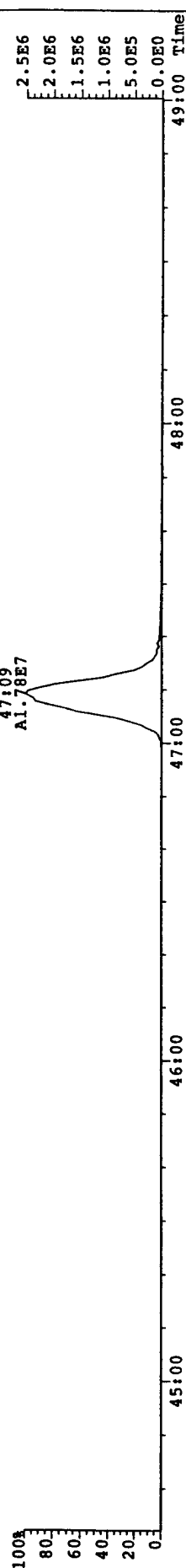
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5  
441.7428 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 181  
47:10  
A9.79E6



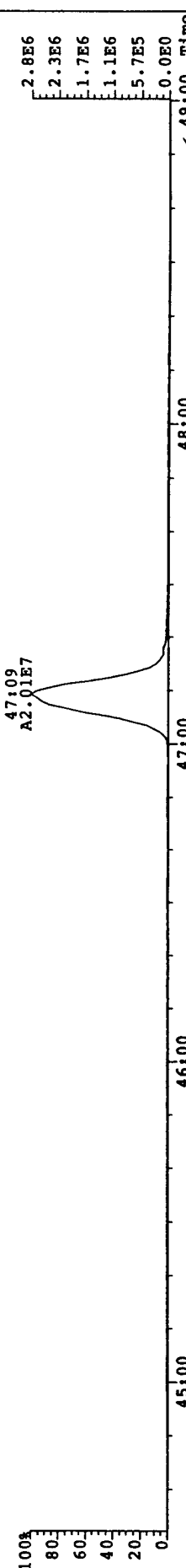
443.7398 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 273  
47:10  
A1.11E7



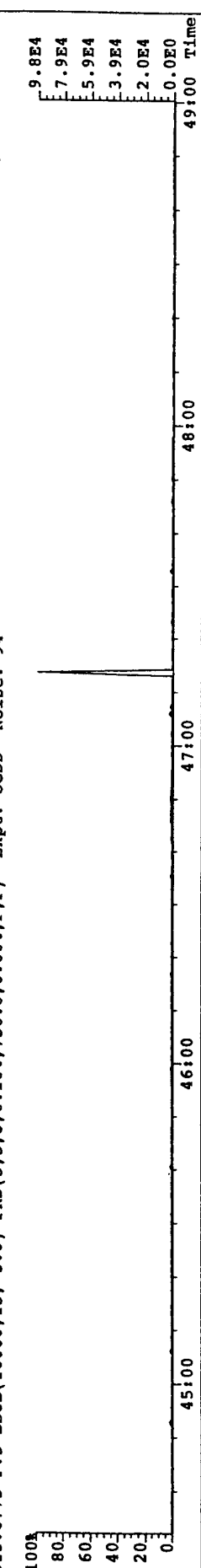
453.7830 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 114  
47:09  
A1.78E7



455.7801 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1887  
47:09  
A2.01E7



513.6775 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 94



## PCDD/PCDF CALIBRATION VERIFICATION

## Alta Analytical Perspectives

Reviewer: CE  
Date: 24 Feb 01

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010214P1 S#7 Analysis Date: 14-FEB-01 Time: 16:16:11

| NATIVE ANALYTES     | M/Z'S<br>FORMING<br>RATIO | ION<br>ABUND.<br>RATIO | QC<br>LIMITS | Pass | CONC.<br>FOUND | CONC.<br>RANGE<br>(ng/mL) |
|---------------------|---------------------------|------------------------|--------------|------|----------------|---------------------------|
|                     |                           |                        |              |      |                |                           |
| 2,3,7,8-TCDD        | M/M+2                     | 0.78                   | 0.65-0.89    | Y    | 5.20 ✓         | 3.75 - 6.25               |
| 1,2,3,7,8-PeCDD     | M+2/M+4                   | 1.52                   | 1.32-1.78    | Y    | 26.07 ✓        | 18.75-31.25               |
| 1,2,3,4,7,8-HxCDD   | M+2/M+4                   | 1.25                   | 1.05-1.43    | Y    | 25.54 ✓        | 18.75-31.25               |
| 1,2,3,6,7,8-HxCDD   | M+2/M+4                   | 1.27                   | 1.05-1.43    | Y    | 25.48 ✓        | 18.75-31.25               |
| 1,2,3,7,8,9-HxCDD   | M+2/M+4                   | 1.21                   | 1.05-1.43    | Y    | 25.82 ✓        | 18.75-31.25               |
| 1,2,3,4,6,7,8-HpCDD | M+2/M+4                   | 1.03                   | 0.88-1.20    | Y    | 24.53 ✓        | 18.75-31.25               |
| OCDD                | M+2/M+4                   | 0.88                   | 0.76-1.02    | Y    | 50.91 ✓        | 37 - 65                   |
| 2,3,7,8-TCDF        | M/M+2                     | 0.76                   | 0.65-0.89    | Y    | 4.50 ✓         | 3.75 - 6.25               |
| 1,2,3,7,8-PeCDF     | M+2/M+4                   | 1.53                   | 1.32-1.78    | Y    | 23.69 ✓        | 18.75-31.25               |
| 2,3,4,7,8-PeCDF     | M+2/M+4                   | 1.52                   | 1.32-1.78    | Y    | 23.63 ✓        | 18.75-31.25               |
| 1,2,3,4,7,8-HxCDF   | M+2/M+4                   | 1.22                   | 1.05-1.43    | Y    | 24.61 ✓        | 18.75-31.25               |
| 1,2,3,6,7,8-HxCDF   | M+2/M+4                   | 1.22                   | 1.05-1.43    | Y    | 24.34 ✓        | 18.75-31.25               |
| 2,3,4,6,7,8-HxCDF   | M+2/M+4                   | 1.21                   | 1.05-1.43    | Y    | 24.75 ✓        | 18.75-31.25               |
| 1,2,3,7,8,9-HxCDF   | M+2/M+4                   | 1.22                   | 1.05-1.43    | Y    | 24.73 ✓        | 18.75-31.25               |
| 1,2,3,4,6,7,8-HpCDF | M+2/M+4                   | 1.02                   | 0.88-1.20    | Y    | 23.58 ✓        | 18.75-31.25               |
| 1,2,3,4,7,8,9-HpCDF | M+2/M+4                   | 1.01                   | 0.88-1.20    | Y    | 23.65 ✓        | 18.75-31.25               |
| OCDF                | M+2/M+4                   | 0.88                   | 0.76-1.02    | Y    | 47.75 ✓        | 35 - 65                   |

Analyst: GAG  
Date: 20 Feb 01



## PCDD/PCDF CALIBRATION VERIFICATION

## Alta Analytical Perspectives

Reviewer: CEDate: 24 Feb 01

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010214P1 S#7 Analysis Date: 14-FEB-01 Time: 16:16:11

| Labeled Compounds       | M/Z'S<br>FORMING<br>RATIO | ION<br>ABUND.<br>RATIO | QC<br>LIMITS | Pass | CONC.<br>FOUND | CONC.<br>RANGE<br>(ng/mL) |
|-------------------------|---------------------------|------------------------|--------------|------|----------------|---------------------------|
|                         |                           |                        |              |      |                |                           |
| 13C-2,3,7,8-TCDD        | M/M+2                     | 0.79                   | 0.65-0.89    | Y    | 95.8 ✓         | 70.0 - 130.0              |
| 13C-1,2,3,7,8-PeCDD     | M+2/M+4                   | 1.55                   | 1.32-1.78    | Y    | 99.7 ✓         | 70.0 - 130.0              |
| 13C-1,2,3,6,7,8-HxCDD   | M+2/M+4                   | 1.26                   | 1.05-1.43    | Y    | 91.9 ✓         | 70.0 - 130.0              |
| 13C-1,2,3,4,6,7,8-HpCDD | M+2/M+4                   | 1.04                   | 0.88-1.20    | Y    | 94.5 ✓         | 70.0 - 130.0              |
| 13C-OCDD                | M+2/M+4                   | 0.90                   | 0.76-1.02    | Y    | 95.8 ✓         | 70.0 - 130.0              |
| 13C-2,3,7,8-TCDF        | M/M+2                     | 0.77                   | 0.65-0.89    | Y    | 92.1 ✓         | 70.0 - 130.0              |
| 13C-1,2,3,7,8-PeCDF     | M+2/M+4                   | 1.55                   | 1.32-1.78    | Y    | 92.4 ✓         | 70.0 - 130.0              |
| 13C-1,2,3,6,7,8-HxCDF   | M/M+2                     | 0.52                   | 0.43-0.59    | Y    | 80.4 ✓         | 70.0 - 130.0              |
| 13C-1,2,3,4,6,7,8-HpCDF | M/M+2                     | 0.44                   | 0.37-0.51    | Y    | 82.3 ✓         | 70.0 - 130.0              |
| 13C-OCDF                | M+2/M+4                   | 0.89                   | 0.76-1.02    | Y    | 89.4 ✓         | 70.0 - 130.0              |
| 37Cl-2,3,7,8-TCDD       |                           |                        |              |      | 102.4 ✓        | 75.0 - 125.0              |
| 13C-2,3,4,7,8-PeCDD     | M+2/M+4                   | 1.56                   | 1.32-1.78    | Y    | 103.1 ✓        | 75.0 - 125.0              |
| 13C-1,2,3,4,7,8-HxCDD   | M+2/M+4                   | 1.25                   | 1.05-1.43    | Y    | 105.1 ✓        | 75.0 - 125.0              |
| 13C-1,2,3,4,7,8-HxCDF   | M/M+2                     | 0.51                   | 0.43-0.59    | Y    | 106.5 ✓        | 75.0 - 125.0              |
| 13C-1,2,3,4,7,8,9-HpCDF | M/M+2                     | 0.44                   | 0.37-0.51    | Y    | 105.2 ✓        | 75.0 - 125.0              |
| 13C-1,2,3,7,8,9-HxCDF   | M/M+2                     | 0.51                   | 0.43-0.59    | Y    | 88.0 ✓         | 75.0 - 125.0              |

Analyst: GAGDate: 20 Feb 01

Client ID: DB5 CPM / M23 CS3  
Lab ID: CS3RCFilename: 010214P1  
GC Column ID: db-5Acq: 14-FEB-01 16:16:11  
Ical: MM1\_M23\_0, wt/vol: 1.000ConCal: 010214P1-  
EndCal: 010214P1-

Page 7 of 7

| Name                | Resp     | RA     | RRF  | RT    | Conc | Qualif. | CDE | noise | Fac | DL     |
|---------------------|----------|--------|------|-------|------|---------|-----|-------|-----|--------|
| 2,3,7,8-TCDD        | 4.10e+06 | 0.78 Y | 1.26 | 27:44 | 5.20 |         |     | 793   | 2.5 | 0.0176 |
| 1,2,3,7,8-PeCDF     | 1.40e+07 | 1.52 Y | 1.01 | 33:11 | 26.1 |         |     | 726   | 2.5 | 0.0319 |
| 1,2,3,4,7,8-HxCDD   | 1.24e+07 | 1.25 Y | 1.14 | 37:06 | 25.5 |         |     | 1945  | 2.5 | 0.0879 |
| 1,2,3,6,7,8-HxCDD   | 1.12e+07 | 1.27 Y | 1.02 | 37:13 | 25.5 |         |     | 1945  | 2.5 | 0.0979 |
| 1,2,3,7,8,9-HxCDD   | 1.26e+07 | 1.21 Y | 1.14 | 37:31 | 25.8 |         |     | 1945  | 2.5 | 0.0876 |
| 1,2,3,4,6,7,8-HpCDD | 1.18e+07 | 1.03 Y | 1.13 | 41:30 | 24.5 |         |     | 2277  | 2.5 | 0.152  |
| OCDD                | 1.83e+07 | 0.88 Y | 1.03 | 46:50 | 50.9 |         |     | 827   | 2.5 | 0.0913 |
| 2,3,7,8-TCDF        | 3.57e+06 | 0.76 Y | 1.05 | 26:51 | 4.50 |         |     | 1398  | 2.5 | 0.0329 |
| 1,2,3,7,8-PeCDF     | 1.69e+07 | 1.53 Y | 1.04 | 31:43 | 23.7 |         |     | 1286  | 2.5 | 0.0401 |
| 2,3,4,7,8-PeCDF     | 1.71e+07 | 1.52 Y | 1.05 | 32:50 | 23.6 |         |     | 1286  | 2.5 | 0.0395 |
| 1,2,3,4,7,8-HxCDF   | 1.43e+07 | 1.22 Y | 1.13 | 36:07 | 24.6 |         |     | 3321  | 2.5 | 0.0818 |
| 1,2,3,6,7,8-HxCDF   | 1.55e+07 | 1.22 Y | 1.24 | 36:15 | 24.3 |         |     | 3321  | 2.5 | 0.0748 |
| 2,3,4,6,7,8-HxCDF   | 1.48e+07 | 1.21 Y | 1.16 | 36:55 | 24.7 |         |     | 3321  | 2.5 | 0.0795 |
| 1,2,3,7,8,9-HxCDF   | 1.29e+07 | 1.22 Y | 1.02 | 37:55 | 24.7 |         |     | 3321  | 2.5 | 0.0909 |
| 1,2,3,4,6,7,8-HpCDF | 1.35e+07 | 1.02 Y | 1.54 | 39:52 | 23.6 |         |     | 3009  | 2.5 | 0.0948 |
| 1,2,3,4,7,8,9-HpCDF | 1.14e+07 | 1.01 Y | 1.30 | 42:20 | 23.6 |         |     | 3009  | 2.5 | 0.113  |
| OCDF                | 1.98e+07 | 0.88 Y | 1.15 | 47:09 | 47.8 |         |     | 1658  | 2.5 | 0.144  |

|                       |          |        |      |       |      |  |  |      |     |        |
|-----------------------|----------|--------|------|-------|------|--|--|------|-----|--------|
| Total Tetra-Dioxins   | 1.64e+07 | 0.77 Y | 1.26 | 23:50 | 20.8 |  |  | 793  | 2.5 | 0.0176 |
| Total Penta-Dioxins   | 3.71e+07 | 1.54 Y | 1.01 | 30:39 | 69.0 |  |  | 726  | 2.5 | 0.0319 |
| Total Hexa-Dioxins    | 3.75e+07 | 1.31 Y | 1.10 | 35:23 | 79.6 |  |  | 1945 | 2.5 | 0.0909 |
| Total Hepta-Dioxins   | 2.18e+07 | 1.01 Y | 1.13 | 40:19 | 45.3 |  |  | 2277 | 2.5 | 0.152  |
| Total Tetra-Furans    | 9.06e+06 | 0.77 Y | 1.05 | 21:50 | 11.4 |  |  | 1398 | 2.5 | 0.0329 |
| 1st Fnc. Penta-Furans | 1.66e+07 | 1.58 Y | 1.05 | 28:51 | 23.1 |  |  | 2814 | 2.5 | 0.0872 |
| Total Penta-Furans    | 4.81e+07 | 1.53 Y | 1.05 | 31:43 | 66.9 |  |  | 1286 | 2.5 | 0.0398 |
| PeCDF Totals:         |          |        |      |       | 90.0 |  |  |      |     |        |
| Total Hexa-Furans     | 5.94e+07 | 1.22 Y | 1.14 | 34:44 | 102  |  |  | 3321 | 2.5 | 0.0813 |
| Total Hepta-Furans    | 2.49e+07 | 1.02 Y | 1.42 | 39:52 | 47.3 |  |  | 3009 | 2.5 | 0.103  |

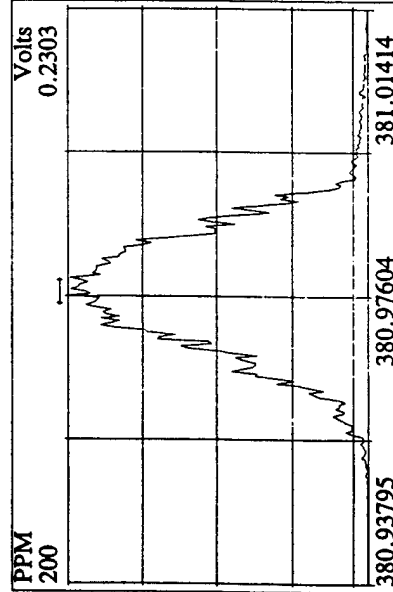
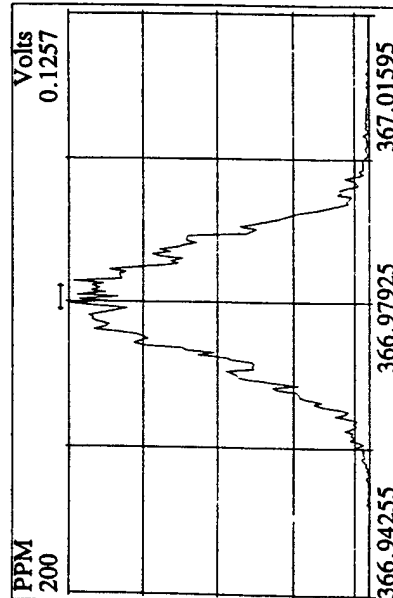
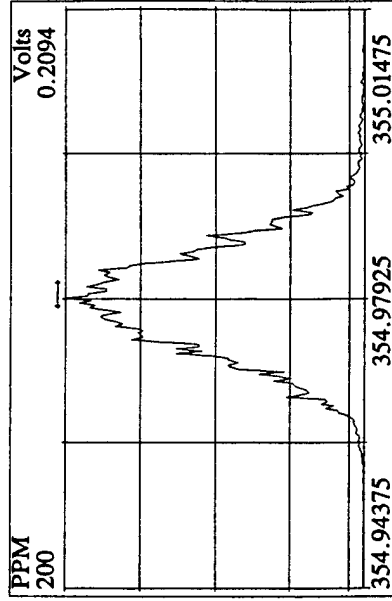
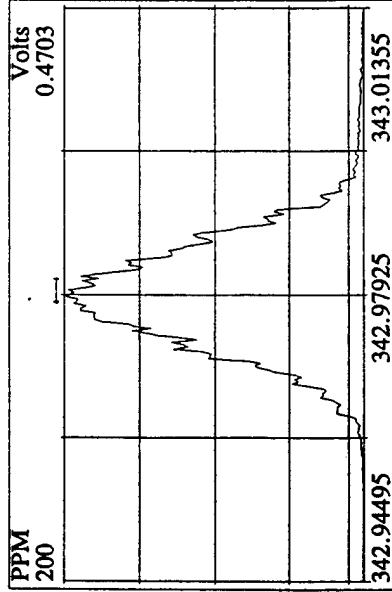
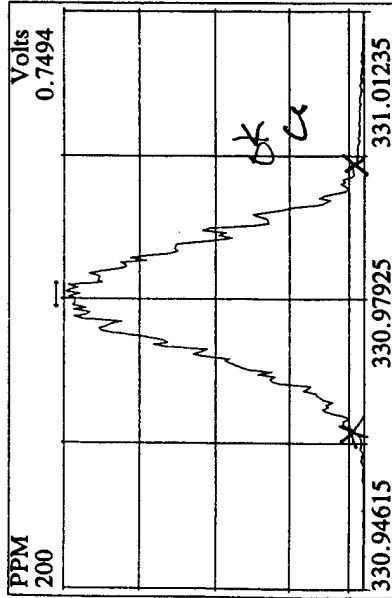
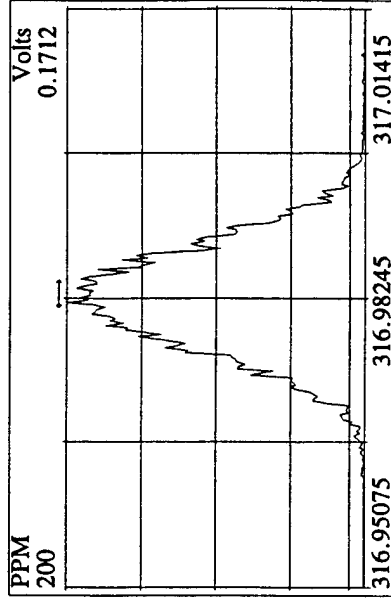
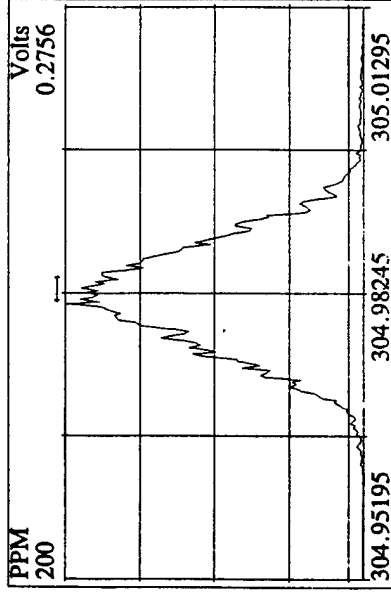
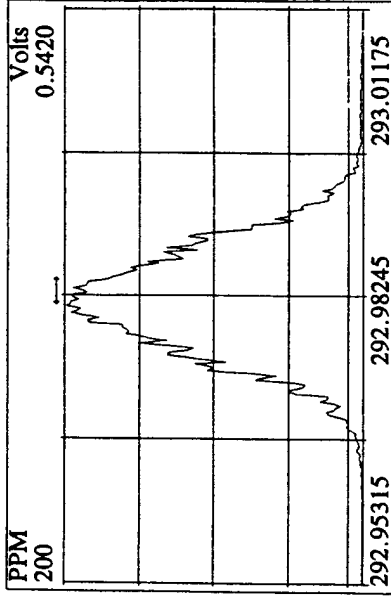
|    |                         |          |        |      |       |      |  |     |      |  |
|----|-------------------------|----------|--------|------|-------|------|--|-----|------|--|
| IS | 13C-2,3,7,8-TCDD        | 6.26e+07 | 0.79 Y | 1.13 | 27:43 | 95.8 |  | Rec | 95.8 |  |
| IS | 13C-1,2,3,7,8-PeCDD     | 5.32e+07 | 1.55 Y | 0.93 | 33:10 | 99.7 |  |     | 99.7 |  |
| IS | 13C-1,2,3,6,7,8-HxCDD   | 4.28e+07 | 1.26 Y | 0.93 | 37:12 | 91.9 |  |     | 91.9 |  |
| IS | 13C-1,2,3,4,6,7,8-HpCDD | 4.27e+07 | 1.04 Y | 0.91 | 41:29 | 94.5 |  |     | 94.5 |  |
| IS | 13C-OCDD                | 3.50e+07 | 0.90 Y | 0.73 | 46:49 | 95.8 |  |     | 95.8 |  |
| IS | 13C-2,3,7,8-TCDF        | 7.58e+07 | 0.77 Y | 1.06 | 26:49 | 92.1 |  |     | 92.1 |  |
| IS | 13C-1,2,3,7,8-PeCDF     | 6.88e+07 | 1.55 Y | 0.96 | 31:42 | 92.4 |  |     | 92.4 |  |
| IS | 13C-1,2,3,6,7,8-HxCDF   | 5.14e+07 | 0.52 Y | 1.28 | 36:14 | 80.4 |  |     | 80.4 |  |
| IS | 13C-1,2,3,4,6,7,8-HpCDF | 3.70e+07 | 0.44 Y | 0.90 | 39:51 | 82.3 |  |     | 82.3 |  |
| IS | 13C-OCDF                | 3.62e+07 | 0.89 Y | 0.81 | 47:08 | 89.4 |  |     | 89.4 |  |

|       |                         |          |        |      |       |      |  |  |  |  |
|-------|-------------------------|----------|--------|------|-------|------|--|--|--|--|
| RS/RT | 13C-1,2,3,4-TCDD        | 5.76e+07 | 0.80 Y | 1.00 | 27:03 | 100  |  |  |  |  |
| RS    | 13C-1,2,3,4-TCDF        | 7.76e+07 | 0.76 Y | 1.00 | 25:26 | 100  |  |  |  |  |
| RS/RT | 13C-1,2,3,7,8,9-HxCDD   | 4.99e+07 | 1.24 Y | 1.00 | 37:30 | 100  |  |  |  |  |
| PS    | 37Cl-2,3,7,8-TCDD       | 3.30e+07 |        | 0.51 | 27:44 | 102  |  |  |  |  |
| PS    | 13C-2,3,4,7,8-PeCDD     | 6.90e+07 | 1.56 Y | 0.97 | 32:49 | 103  |  |  |  |  |
| PS    | 13C-1,2,3,4,7,8-HxCDD   | 4.15e+07 | 1.25 Y | 0.92 | 37:05 | 105  |  |  |  |  |
| PS    | 13C-1,2,3,4,7,8-HxCDF   | 4.98e+07 | 0.51 Y | 0.91 | 36:06 | 106  |  |  |  |  |
| PS    | 13C-1,2,3,4,7,8,9-HpCDD | 3.33e+07 | 0.44 Y | 0.85 | 42:19 | 105  |  |  |  |  |
| AS    | 13C-1,2,3,7,8,9-HxCDF   | 4.69e+07 | 0.51 Y | 1.07 | 37:54 | 88.0 |  |  |  |  |

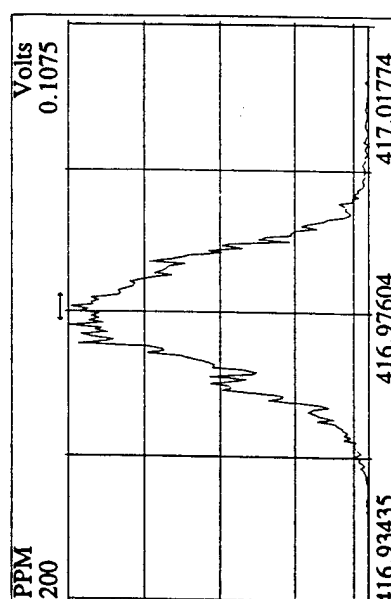
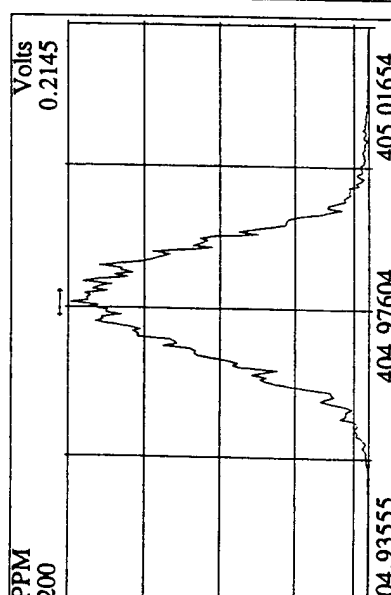
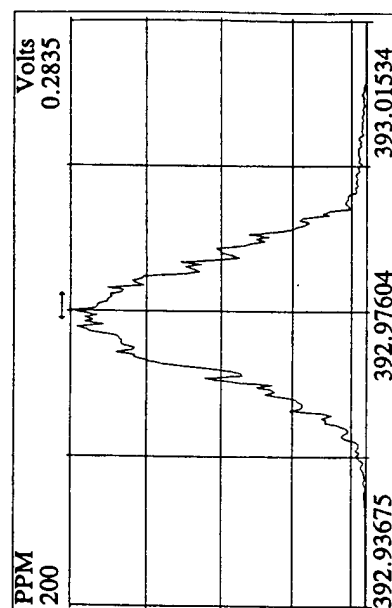
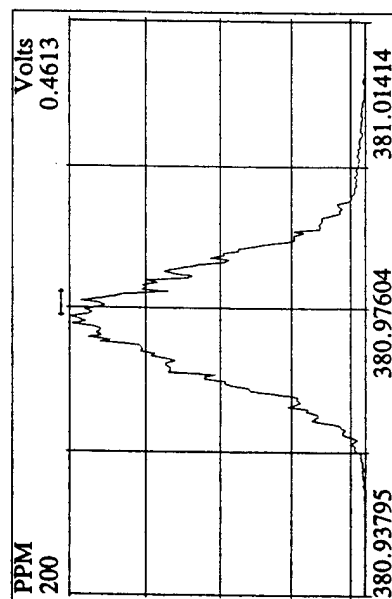
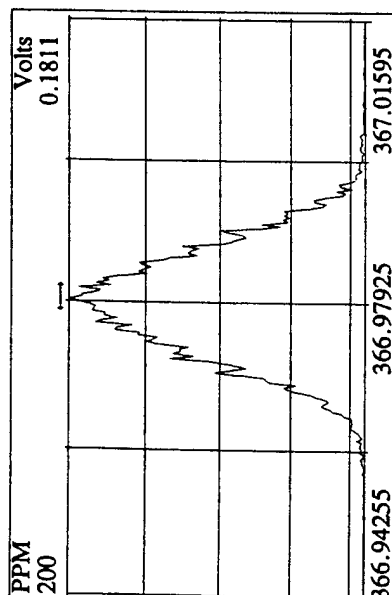
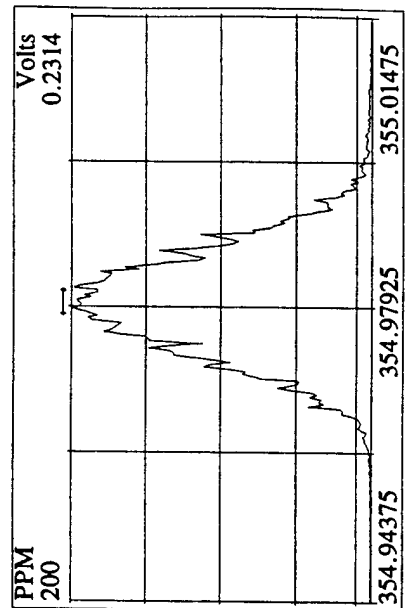
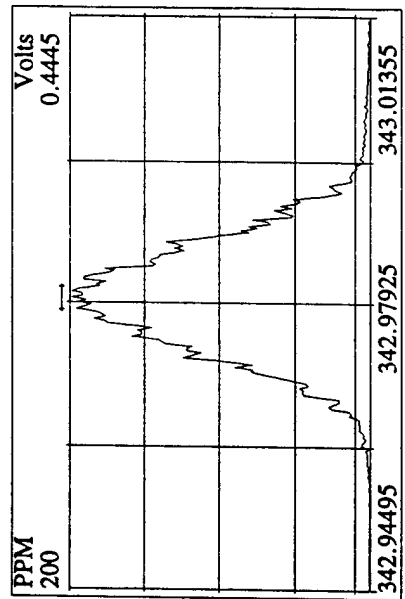
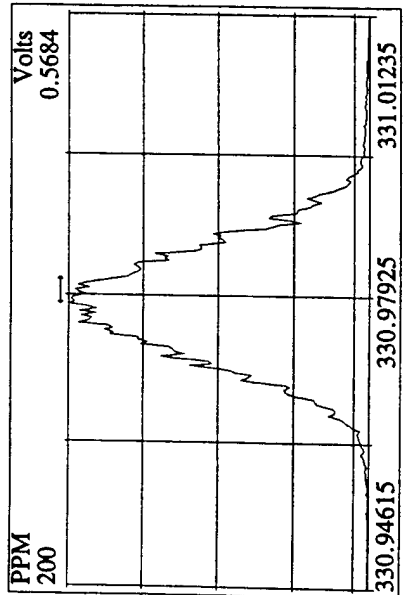
Analyst: GAG

Date: 20 Feb 01

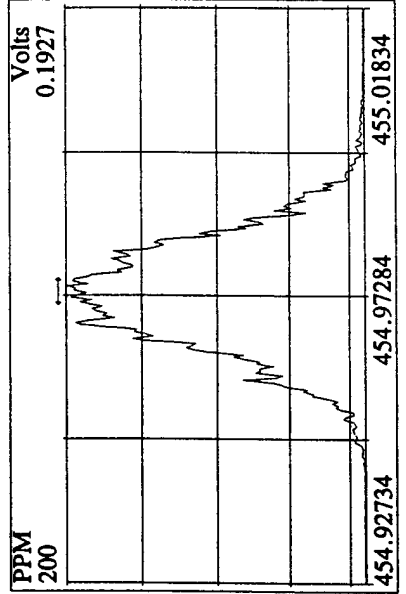
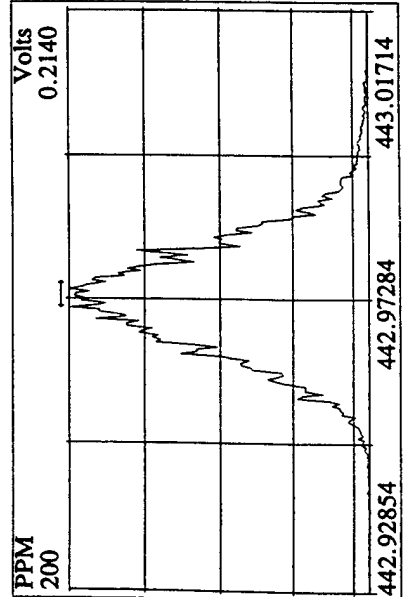
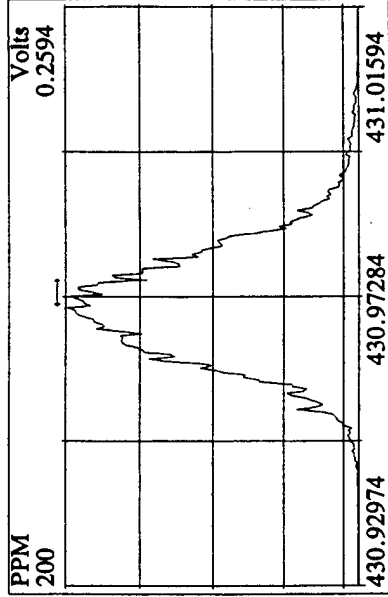
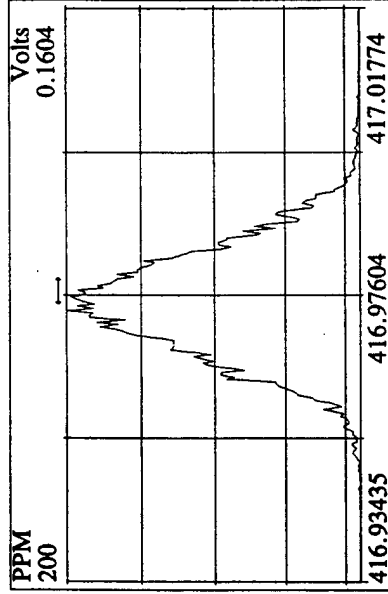
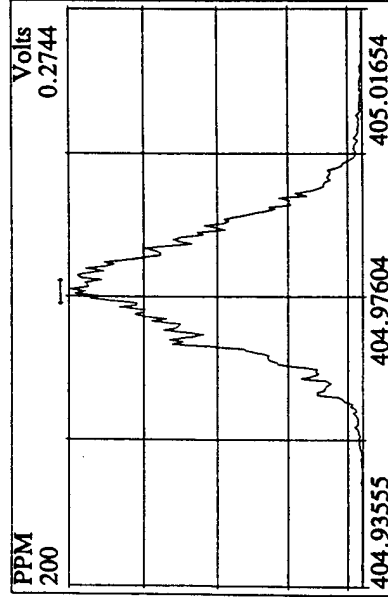
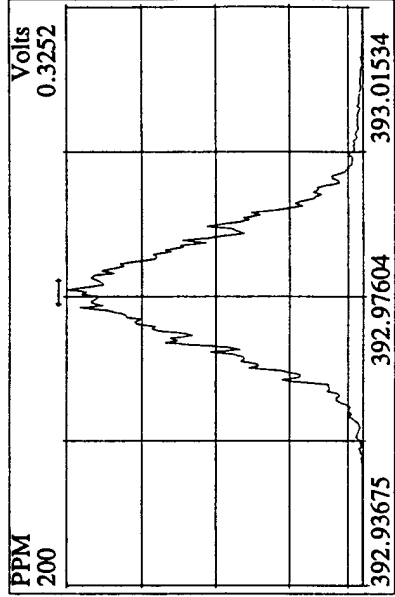
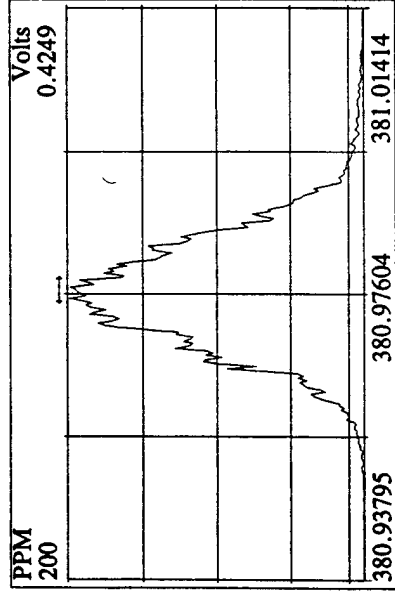
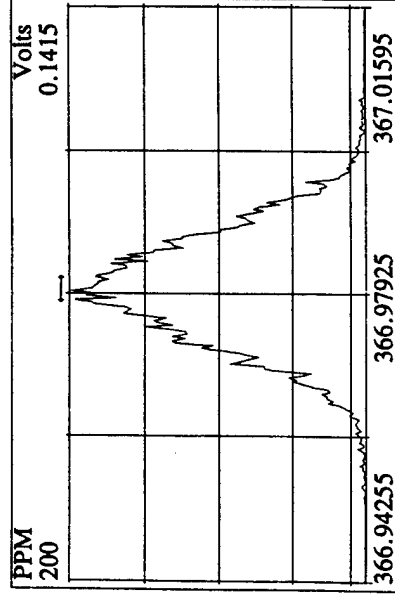
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Experiment:OCDD Function:1 Reference:PFK2



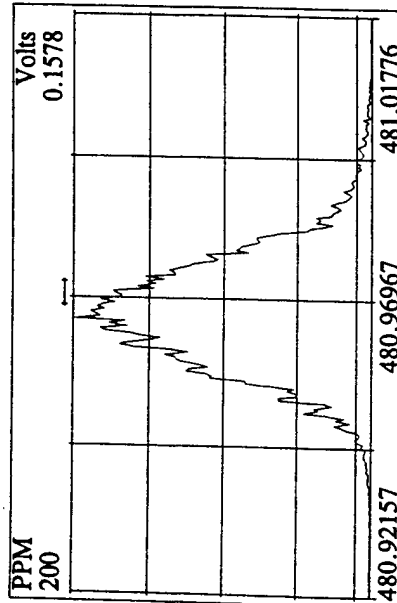
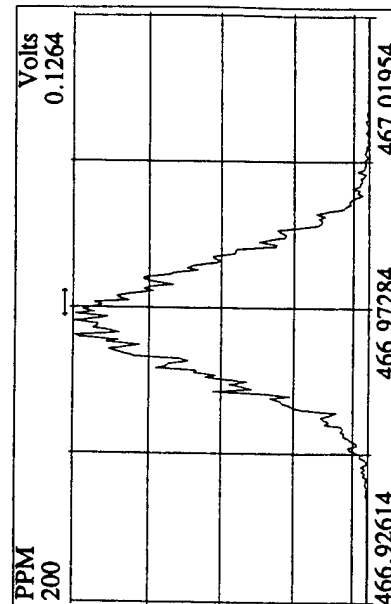
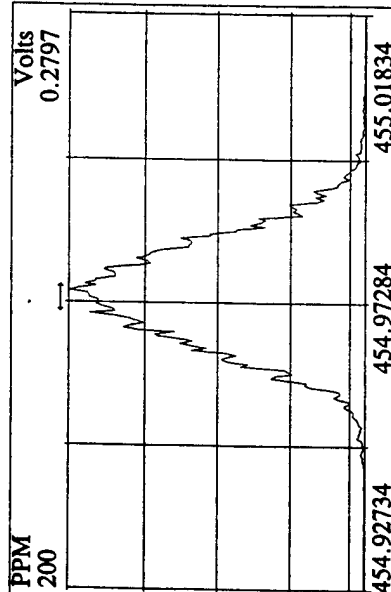
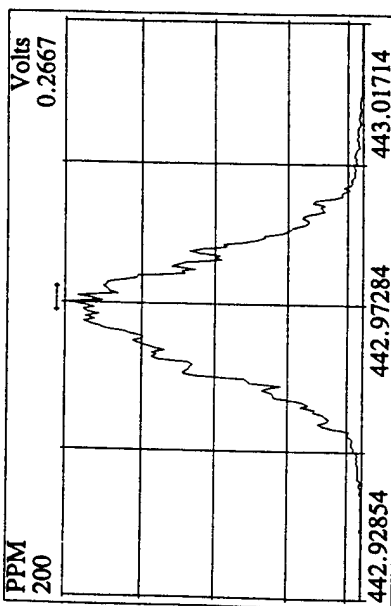
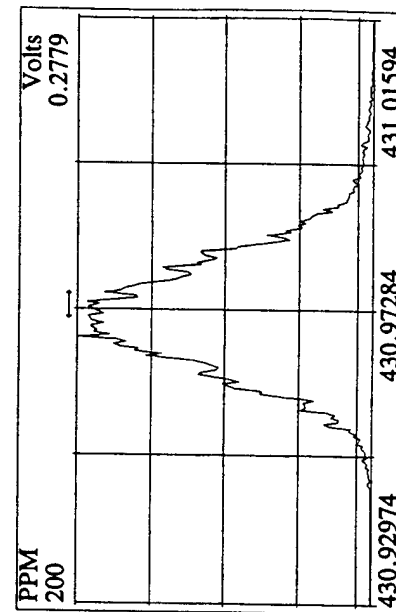
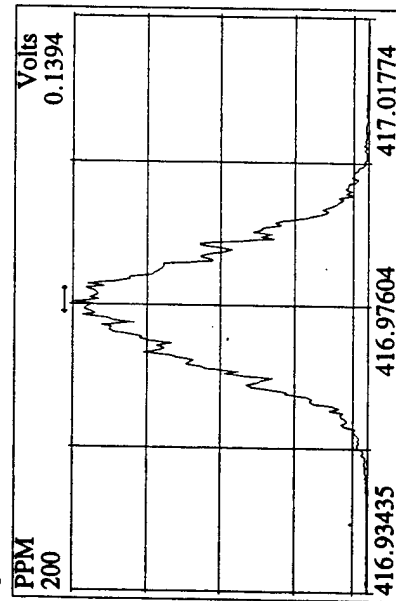
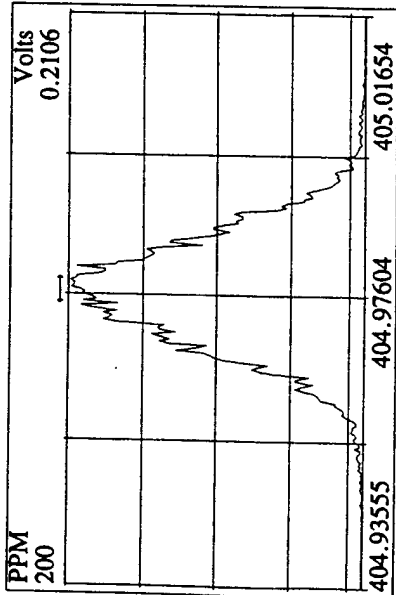
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Experiment: OCDD Function: 2 Reference: PFK2



Peak Locate Examination: 14-FEB-2001: 17:14 File: RES CHECK  
Experiment: OCDD Function: 3 Reference: PFK2



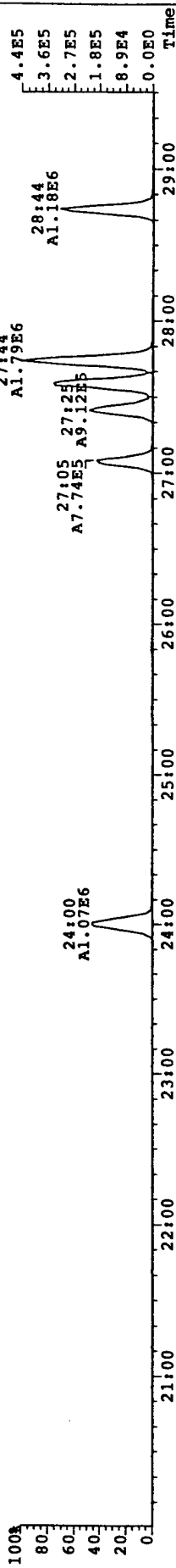
Peak Locate Examination: 14-FEB-2001: 17:15 File: RES CHECK  
 Experiment: OCDD Function: 4 Reference: PFK2



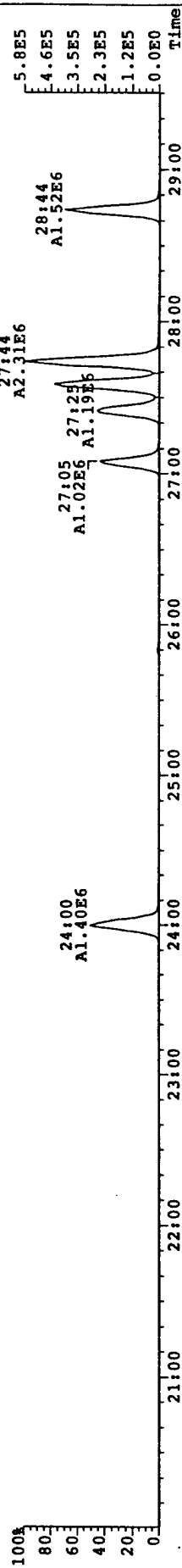
File: 010214PI Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage SIR Autospec-UltimaE

Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

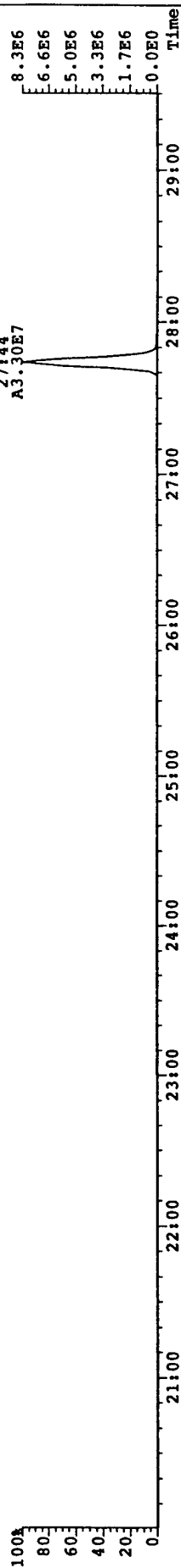
319.8965 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 190



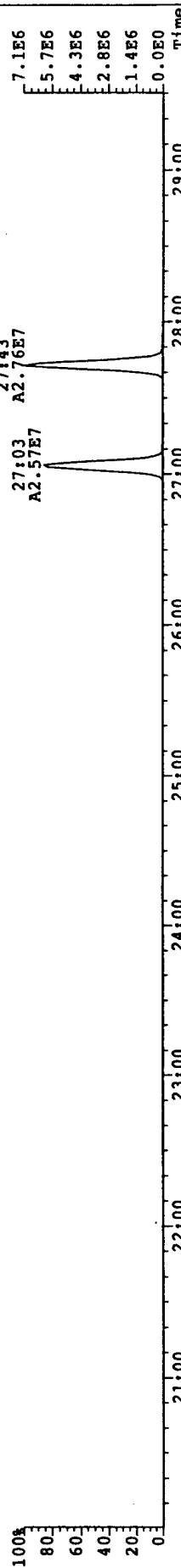
321.8936 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 96



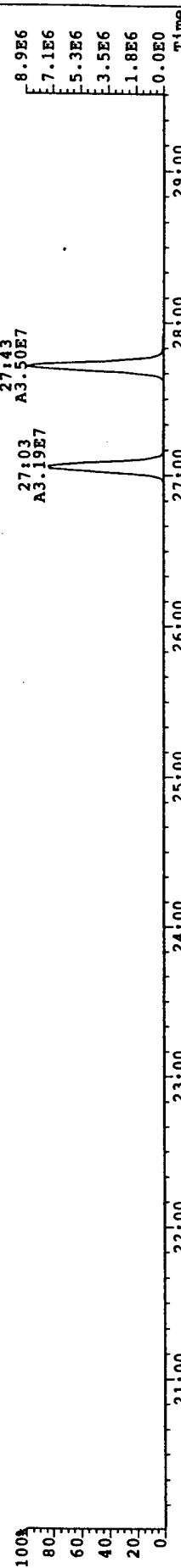
327.8850 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 128



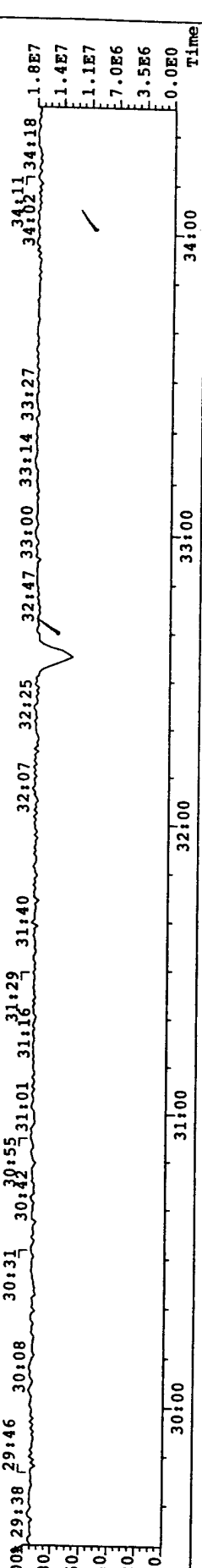
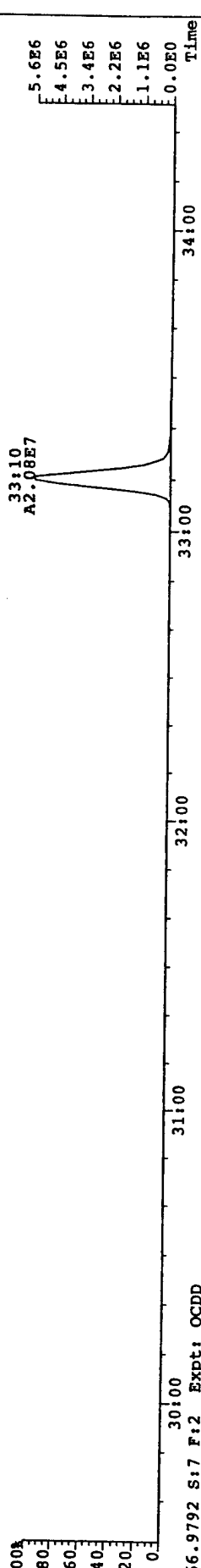
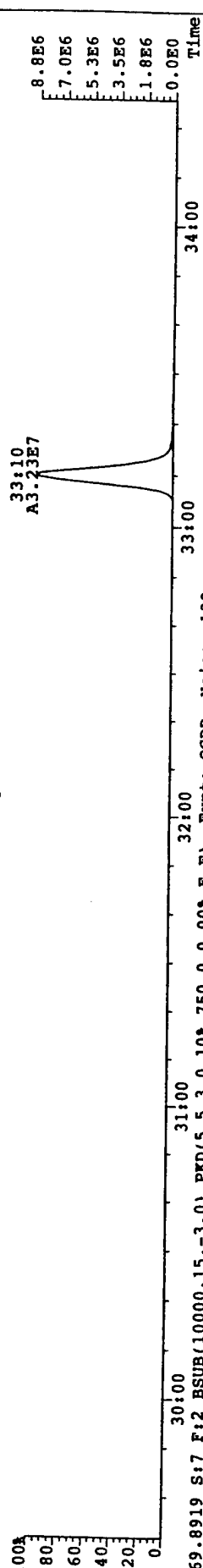
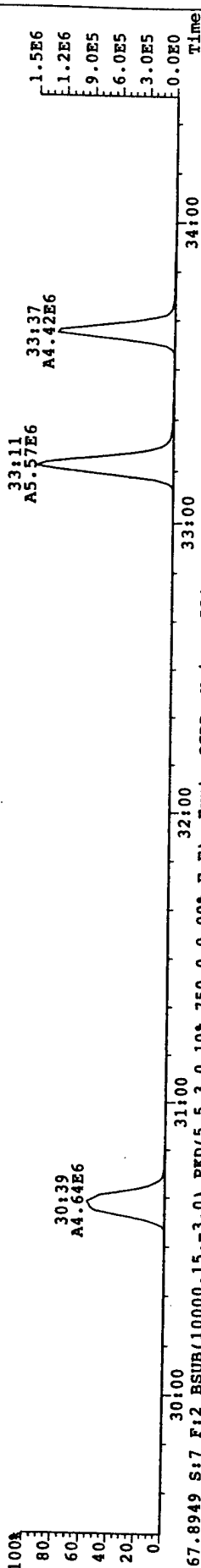
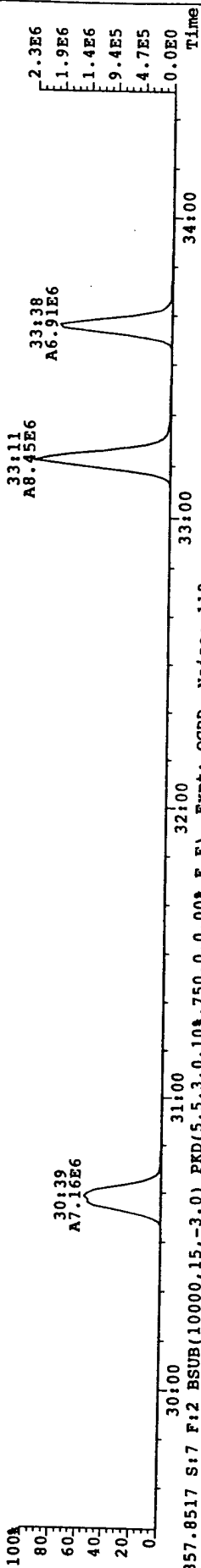
331.9368 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1129



333.9339 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 645



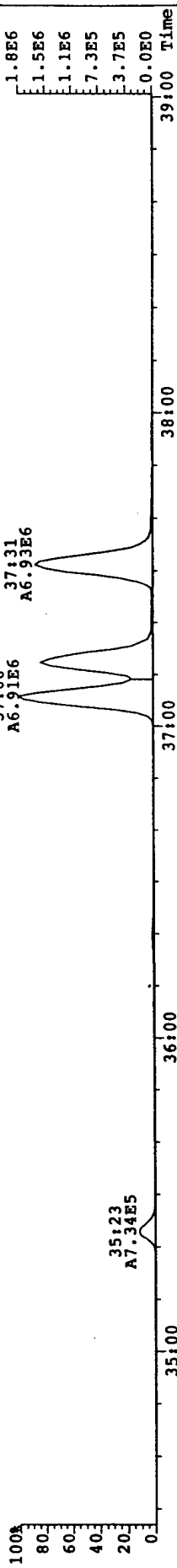
File: 010214PI Acq: 14-FEB-2001 16:16:11 GC E1+ Voltage SIR Autospec-UltimaE  
Sample# 7 Text: DB5 CPM / M23 CS3 Vial# 3 File Text: AAP DB5  
355.8546 S:7 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 283



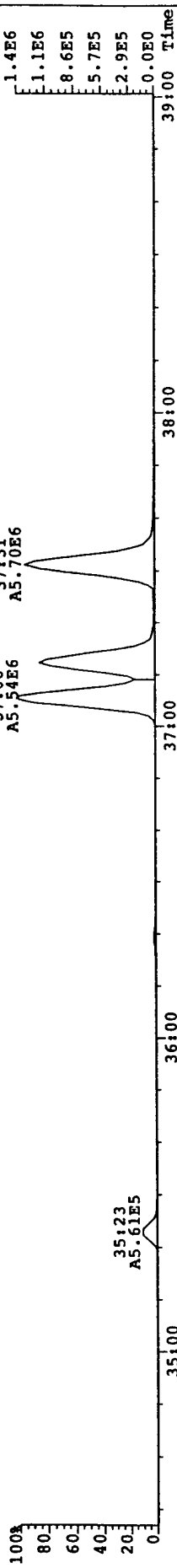


File: 010214PI Acq: 14-FEB-2001 16:16:11 GC RI+ Voltage SIR Autospec-UltimaE

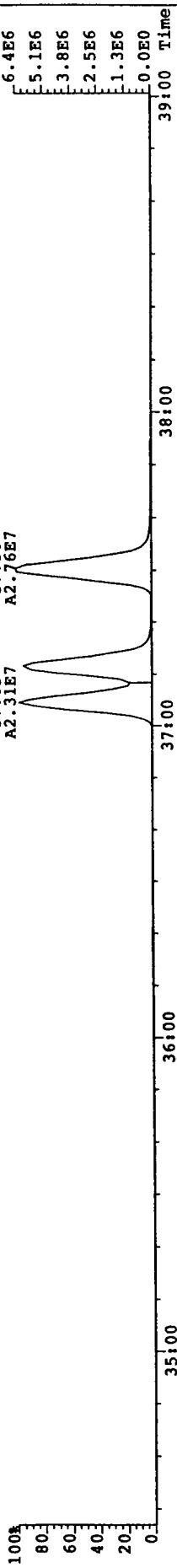
Sample# 7 Text: DB5 CFSM / M23 CS3 Vial# 3 File Text: AAP DB5  
389.8156 S:7 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 371



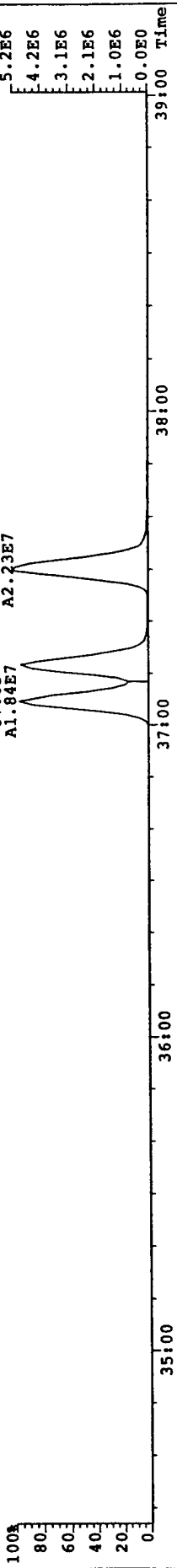
391.8127 S:7 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 304



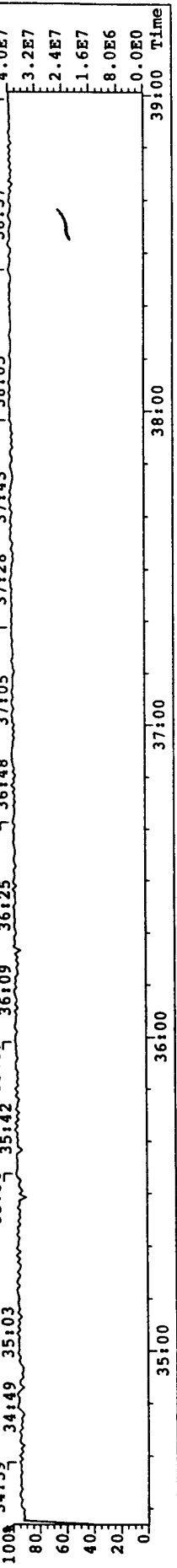
401.8559 S:7 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 254



403.8530 S:7 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 199



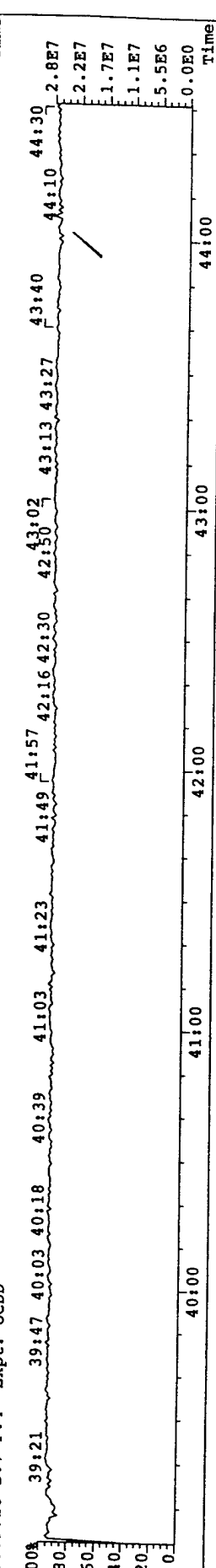
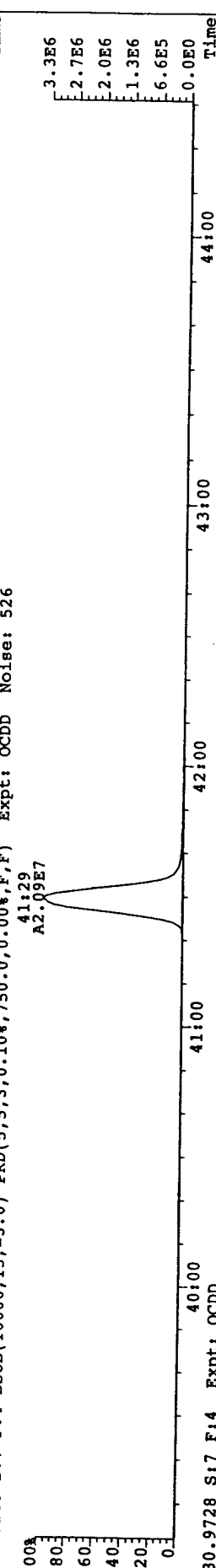
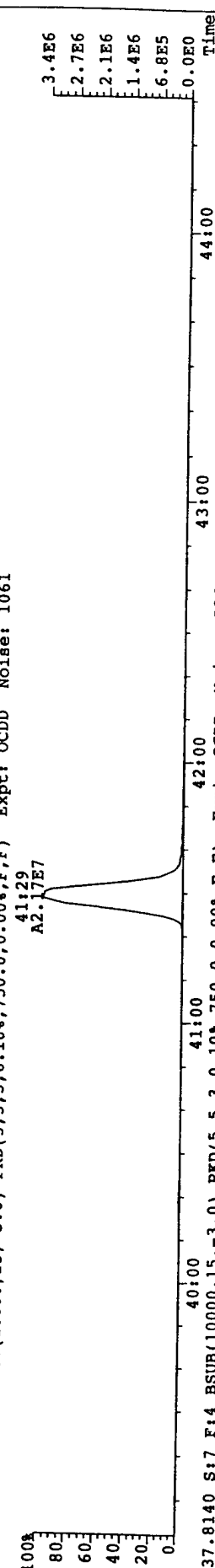
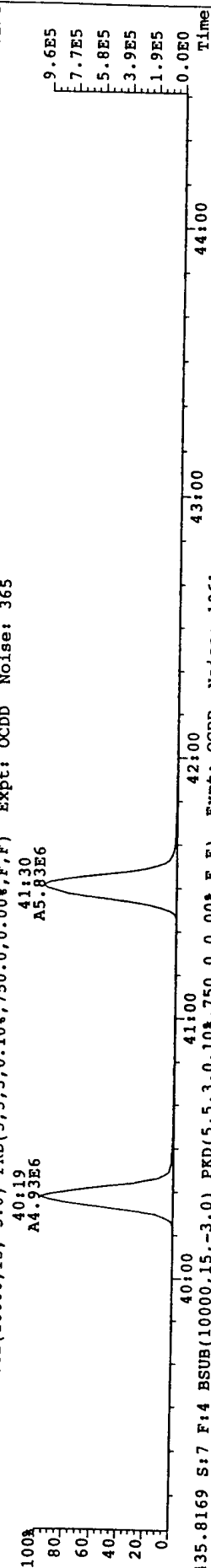
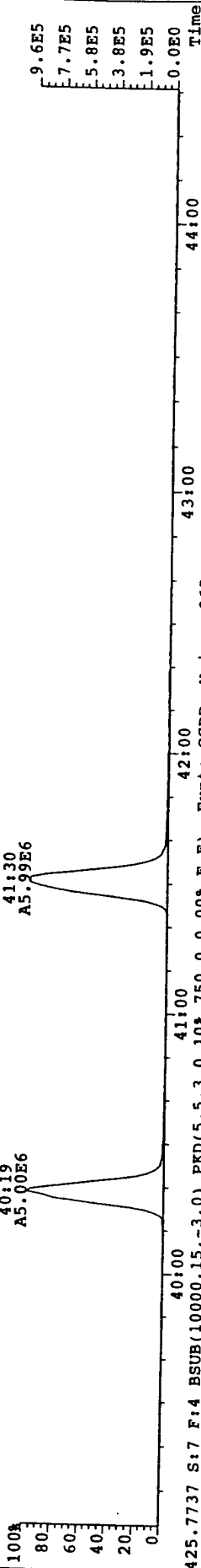
380.9760 S:7 F:3 Expt: OCDD



File: 010214PI Acq: 14-FEB-2001 16:16:11 GC E1+ Voltage SIR Autospec-UltimaE

Sample# 7 Text: DB5 CFSM / M23 CS3 Vial# 3 File Text: AAP DB5

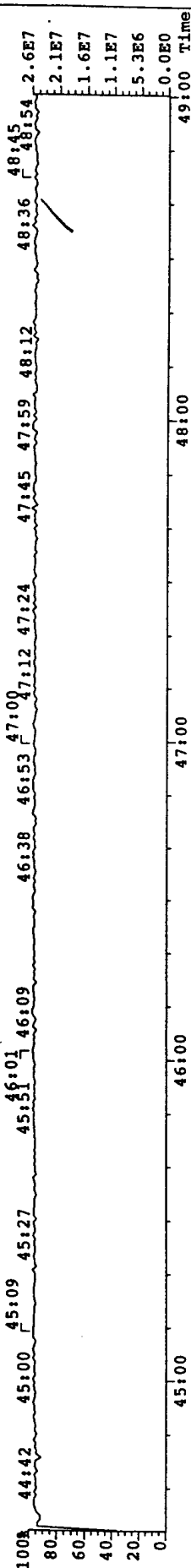
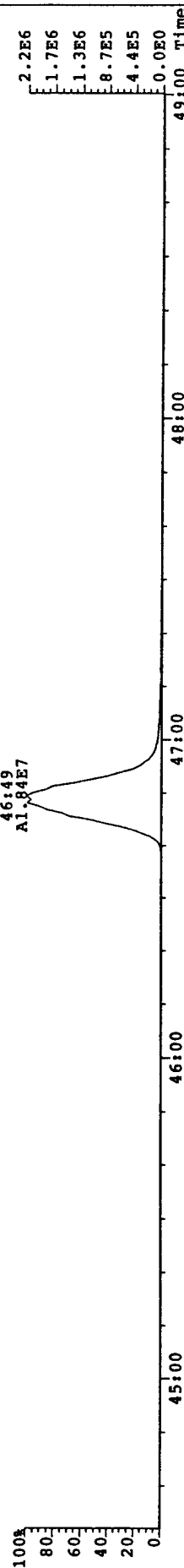
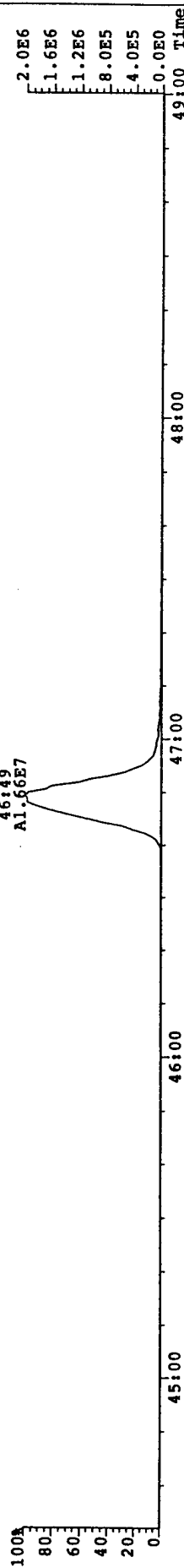
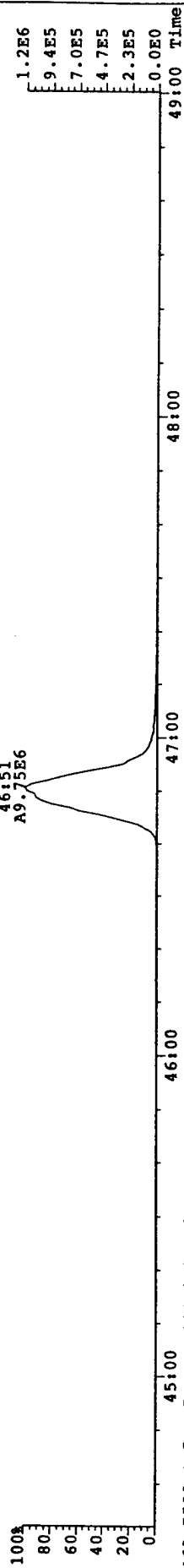
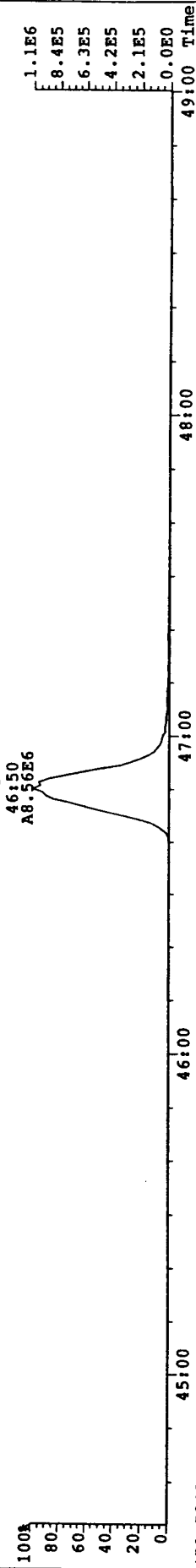
423.7767 S:7 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 387



File: 010214PI Acq: 14-FEB-2001 16:16:11 GC EIT Voltage SIR Autospec-Ultimate

Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

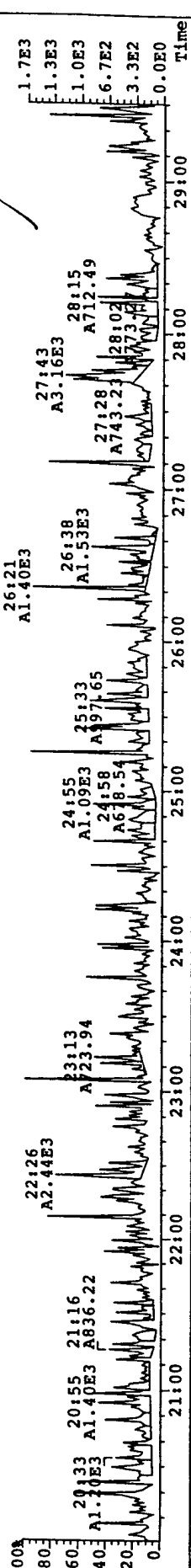
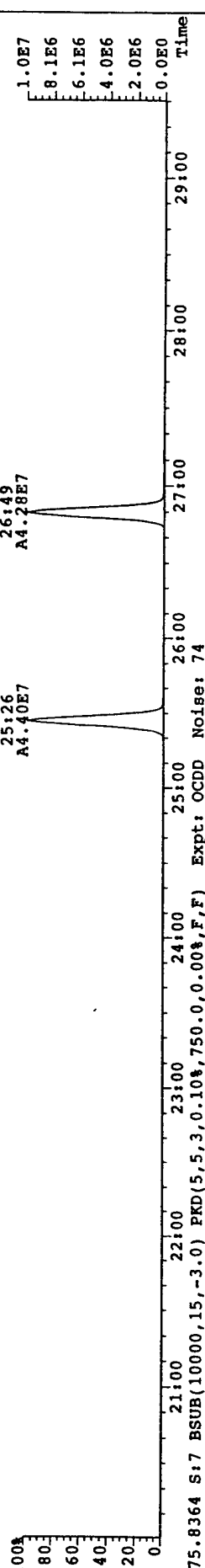
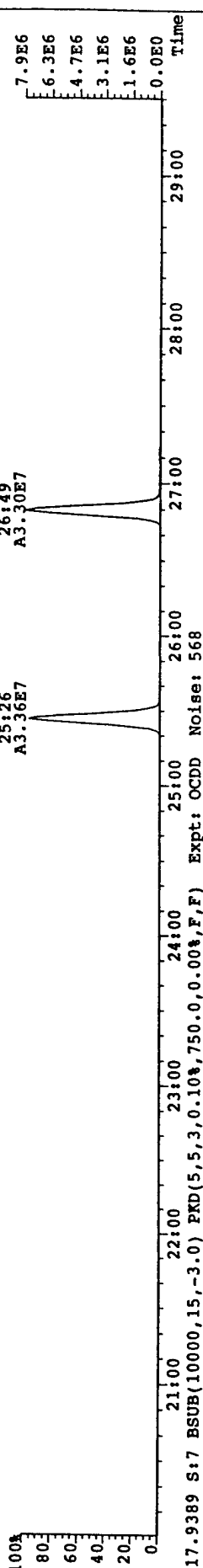
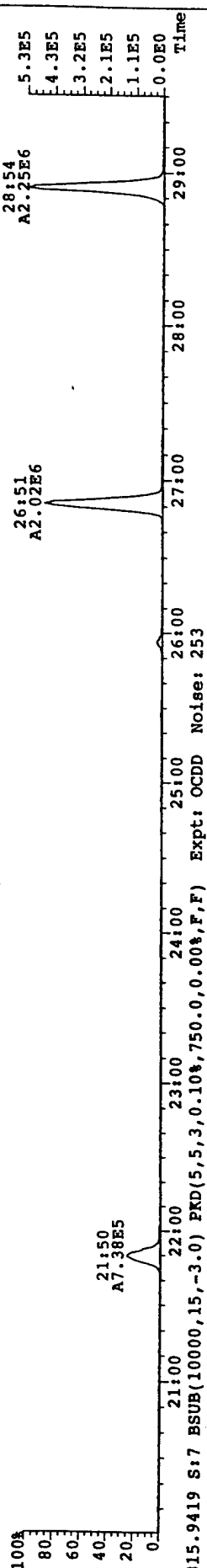
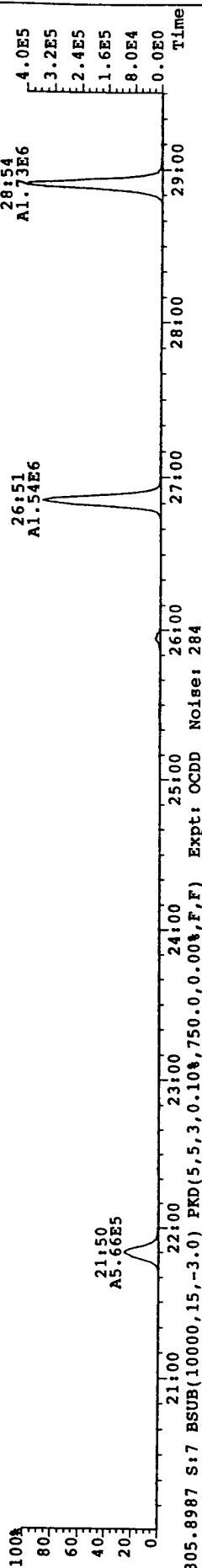
457.7377 S:7 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 312



File: 010214PI Acq: 14-FEB-2001 16:16:11 GC EX: Voltage SIR Autospec-UltimaE

Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

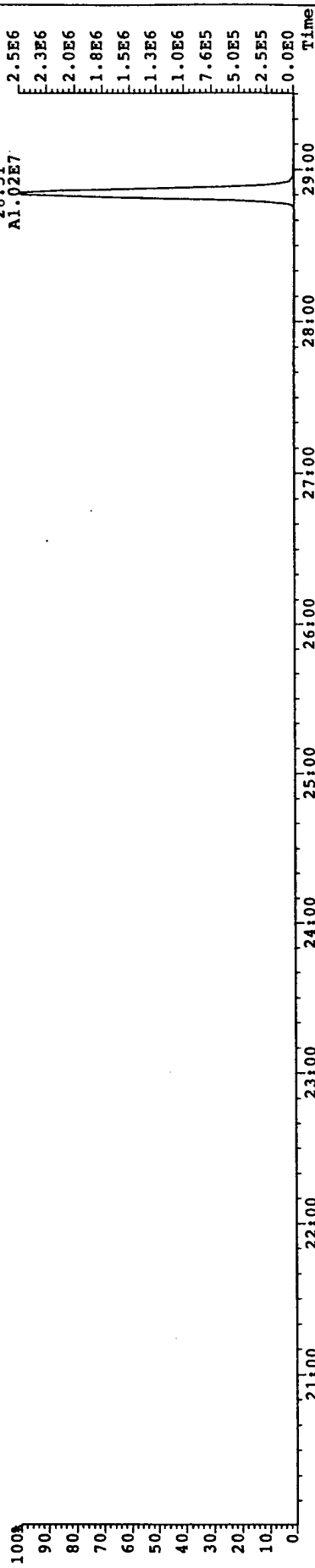
303.9016 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 157



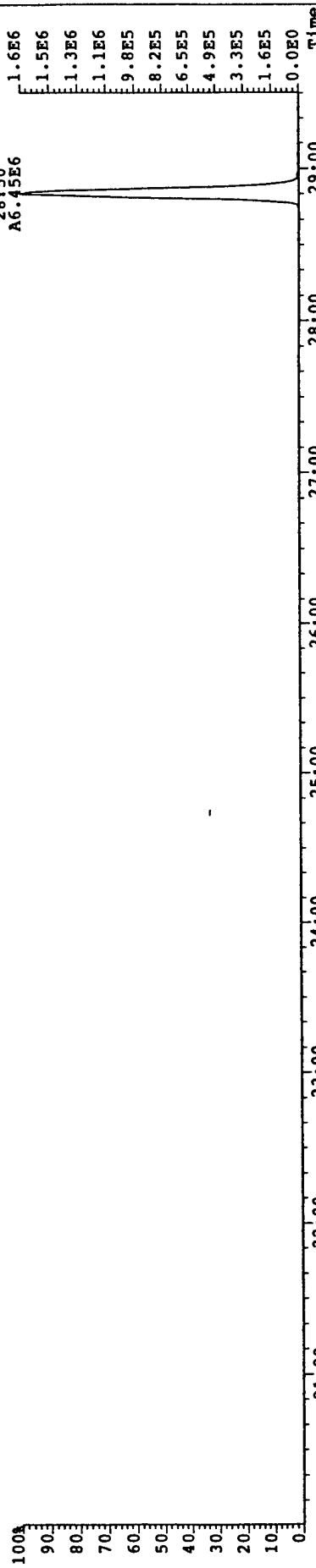
File: 010214PI Acq: 14-FEB-2001 16:16:11 GC EIT Voltage SIR Autospec-UltimaE

Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

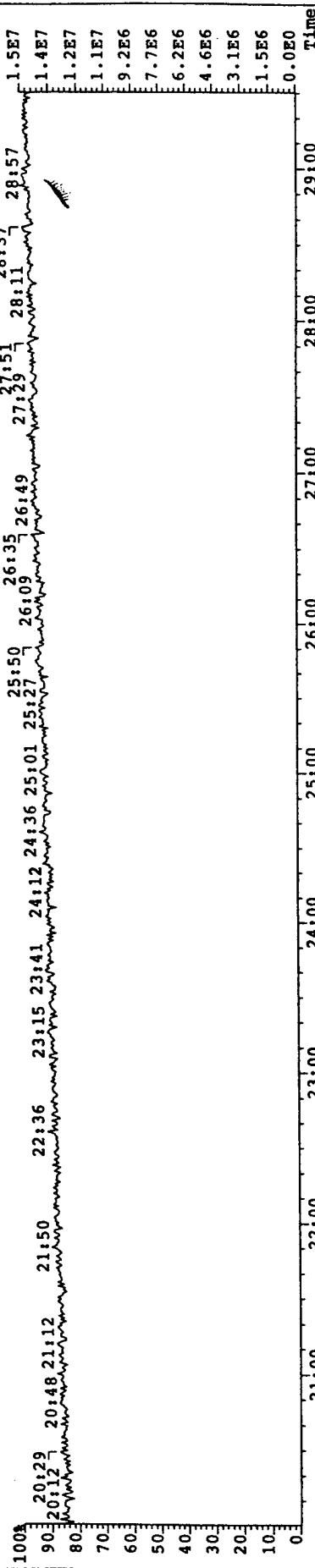
339.8597 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 71



341.8568 S:7 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 148



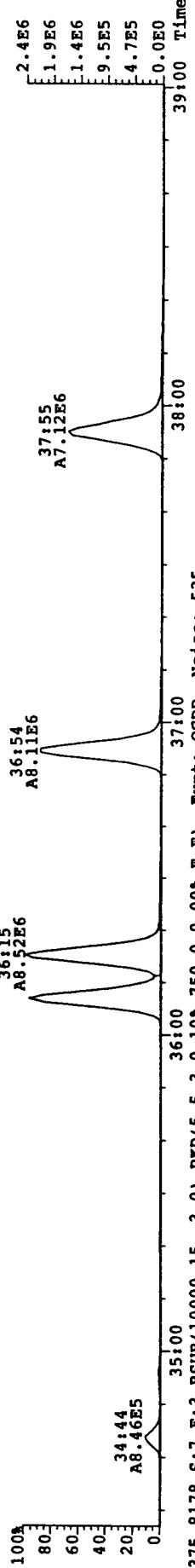
316.9824 S:7 Expt: OCDD



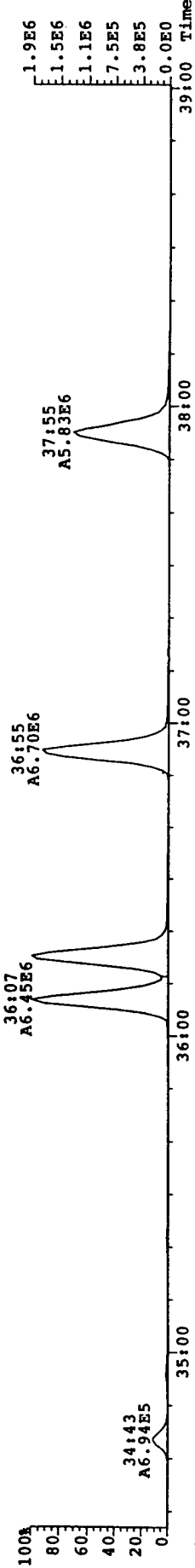


File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC EI+ Voltage 51V Autospec-Ultimate

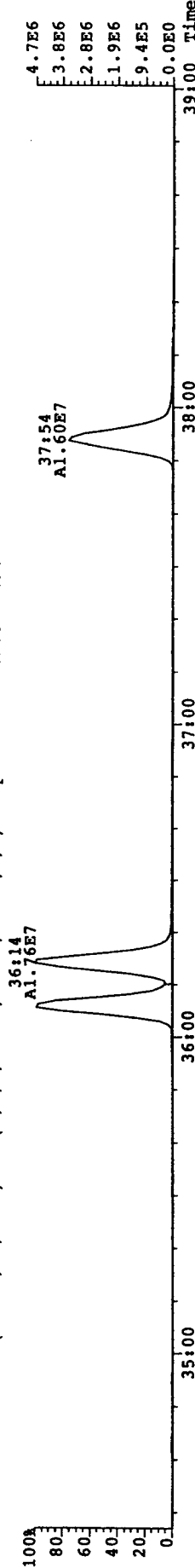
Sample# 7 Text: DB5 CPM / M23 CS3 Vial# 3 File Text: AAP DB5  
373.8207 S:7 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 468



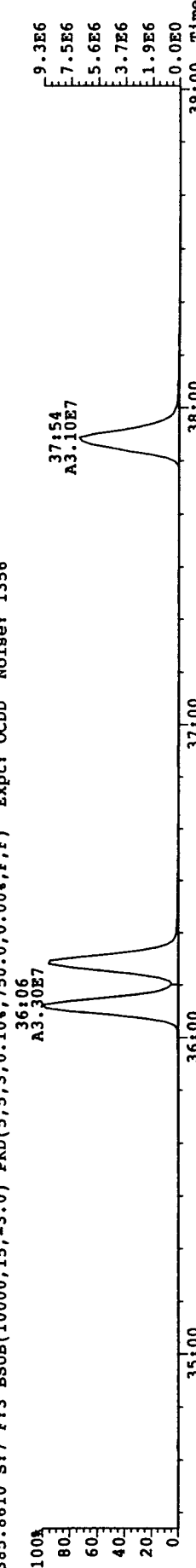
375.8178 S:7 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 535



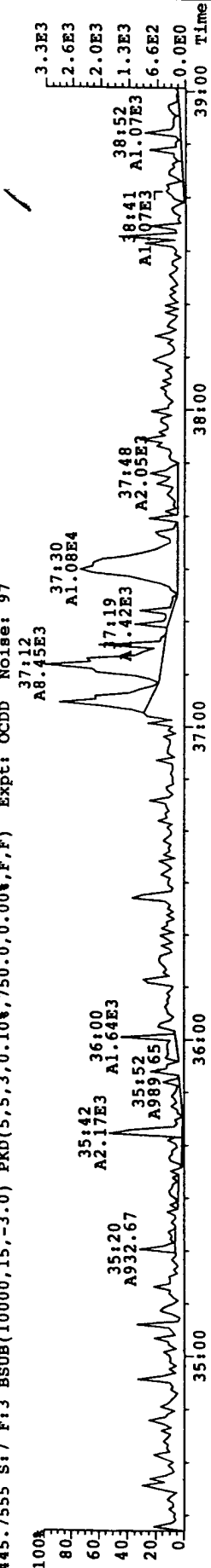
383.8639 S:7 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1492



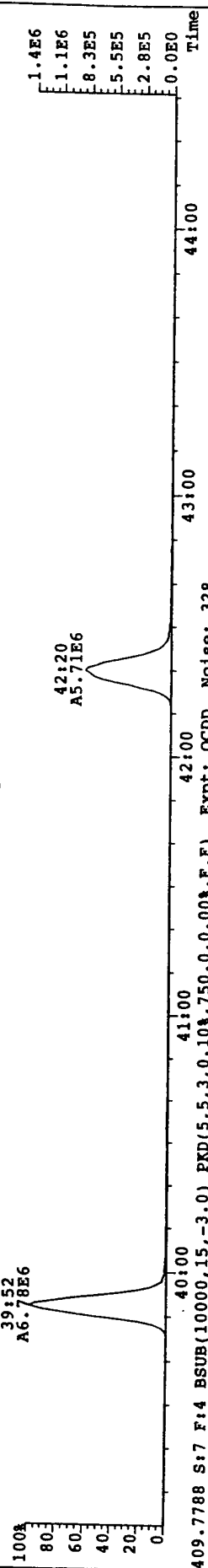
385.8610 S:7 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1356



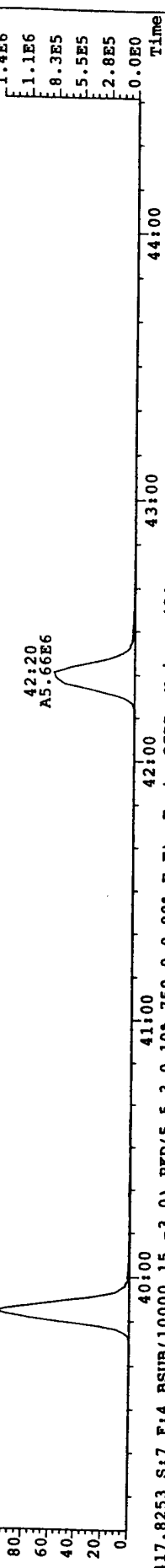
445.7555 S:7 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 97



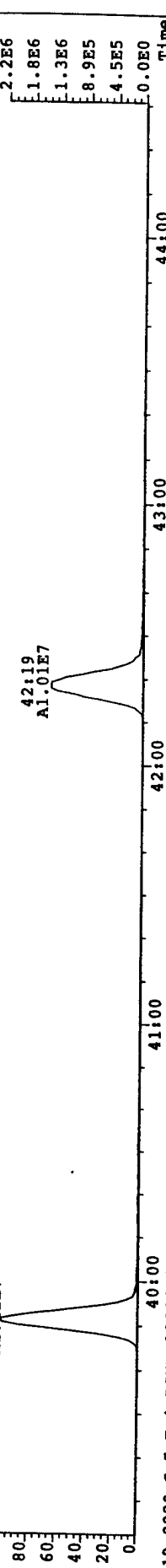
File: 010214P1 Acq: 14-FEB-2001 16:16:11 GC E14 Voltage SIR Autospec-Ultima  
Sample# 7 Text: DB5 CPM / M23 CS3 Vial# 3 File Text: AAP DB5  
407.7818 S:7 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 335



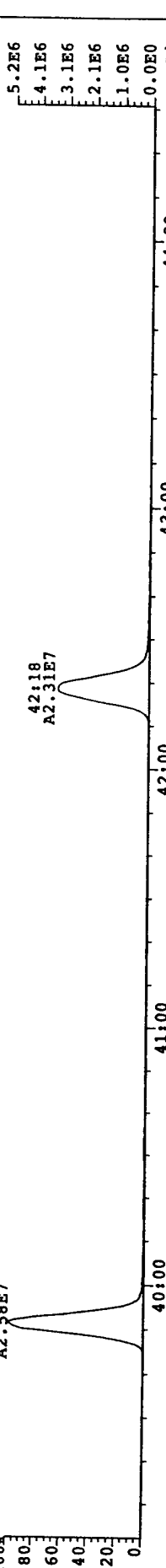
409.7788 S:7 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 328



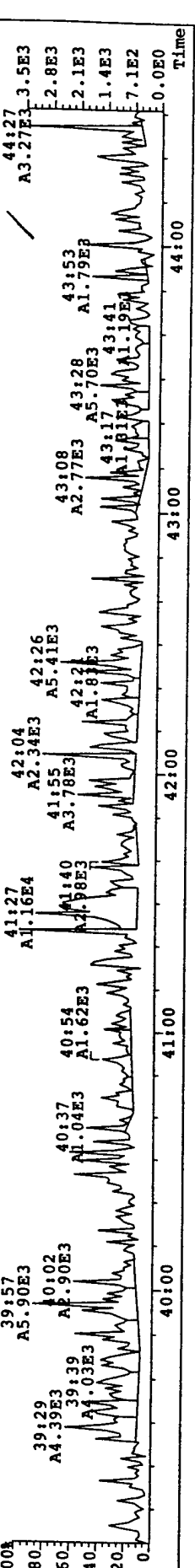
417.8253 S:7 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 424



419.8220 S:7 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 733

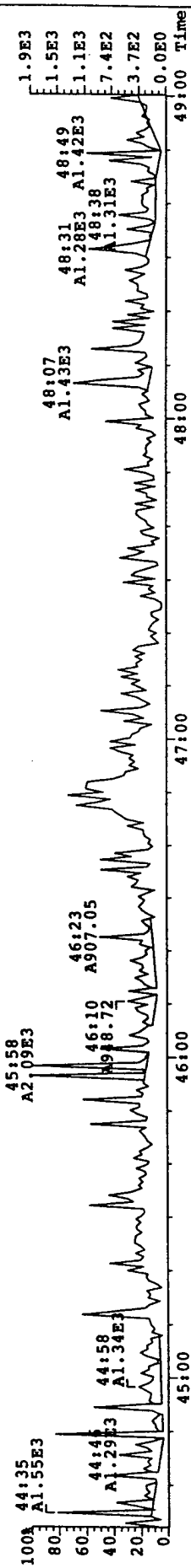
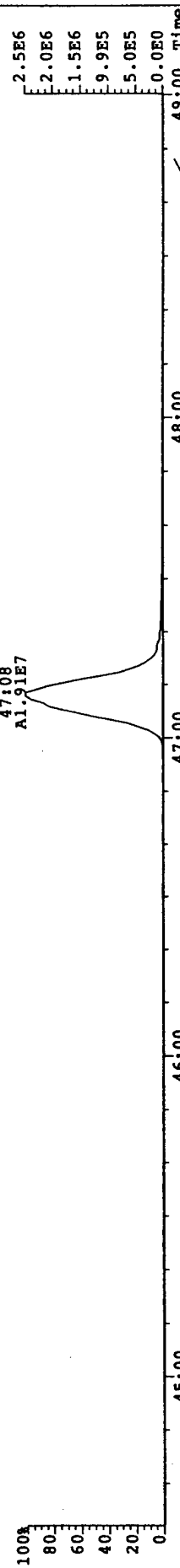
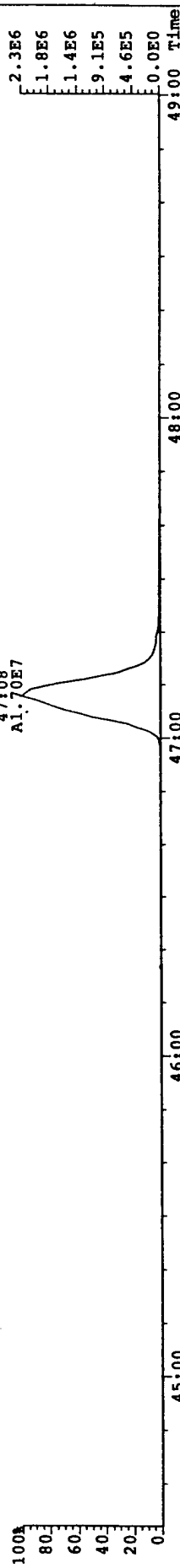
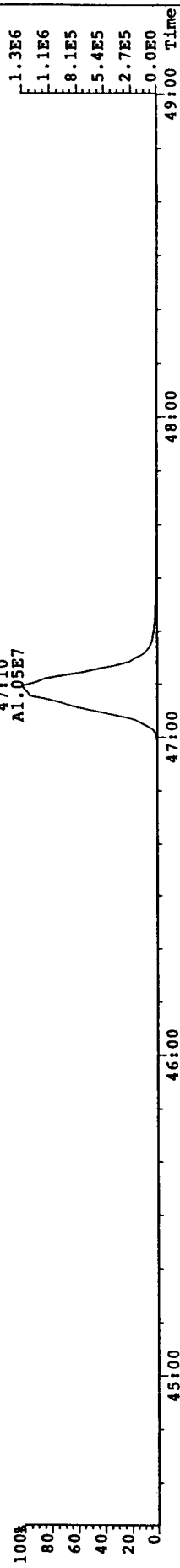
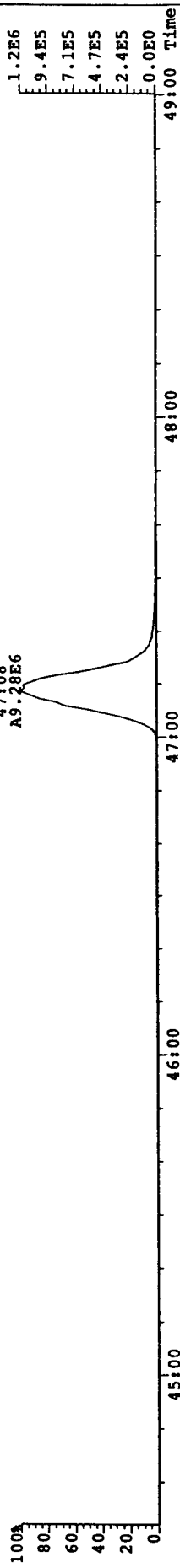


479.7165 S:7 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 234





File: 010214PI Acq: 14-FEB-2001 16:16:11 GC EX+ Voltage 51V Autospec-UltimaE  
Sample# 7 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5  
441.7428 S:7 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 114



## PCDD/PCDF CALIBRATION VERIFICATION

## Alta Analytical Perspectives

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010223P1 S#1 Analysis Date: 23-FEB-01 Time: 11:17:52

Reviewer: ceDate: 24 Feb 01

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| NATIVE ANALYTES     | M/Z'S<br>FORMING<br>RATIO | ION<br>ABUND.<br>RATIO | QC<br>LIMITS | Pass | CONC.<br>FOUND | CONC.<br>RANGE<br>(ng/mL) |
|---------------------|---------------------------|------------------------|--------------|------|----------------|---------------------------|
|                     |                           |                        |              |      |                |                           |
| 2,3,7,8-TCDD        | M/M+2                     | 0.79                   | 0.65-0.89    | Y    | 5.81✓          | 3.75 - 6.25               |
| 1,2,3,7,8-PeCDD     | M+2/M+4                   | 1.58                   | 1.32-1.78    | Y    | 27.34✓         | 18.75-31.25               |
| 1,2,3,4,7,8-HxCDD   | M+2/M+4                   | 1.24                   | 1.05-1.43    | Y    | 26.17✓         | 18.75-31.25               |
| 1,2,3,6,7,8-HxCDD   | M+2/M+4                   | 1.26                   | 1.05-1.43    | Y    | 26.81✓         | 18.75-31.25               |
| 1,2,3,7,8,9-HxCDD   | M+2/M+4                   | 1.26                   | 1.05-1.43    | Y    | 26.29✓         | 18.75-31.25               |
| 1,2,3,4,6,7,8-HpCDD | M+2/M+4                   | 1.03                   | 0.88-1.20    | Y    | 25.50✓         | 18.75-31.25               |
| OCDD                | M+2/M+4                   | 0.89                   | 0.76-1.02    | Y    | 53.07✓         | 37 - 65                   |
| 2,3,7,8-TCDF        | M/M+2                     | 0.75                   | 0.65-0.89    | Y    | 4.88✓          | 3.75 - 6.25               |
| 1,2,3,7,8-PeCDF     | M+2/M+4                   | 1.52                   | 1.32-1.78    | Y    | 24.99✓         | 18.75-31.25               |
| 2,3,4,7,8-PeCDF     | M+2/M+4                   | 1.53                   | 1.32-1.78    | Y    | 25.04✓         | 18.75-31.25               |
| 1,2,3,4,7,8-HxCDF   | M+2/M+4                   | 1.21                   | 1.05-1.43    | Y    | 24.01✓         | 18.75-31.25               |
| 1,2,3,6,7,8-HxCDF   | M+2/M+4                   | 1.24                   | 1.05-1.43    | Y    | 24.29✓         | 18.75-31.25               |
| 2,3,4,6,7,8-HxCDF   | M+2/M+4                   | 1.20                   | 1.05-1.43    | Y    | 23.46✓         | 18.75-31.25               |
| 1,2,3,7,8,9-HxCDF   | M+2/M+4                   | 1.23                   | 1.05-1.43    | Y    | 23.49✓         | 18.75-31.25               |
| 1,2,3,4,6,7,8-HpCDF | M+2/M+4                   | 1.02                   | 0.88-1.20    | Y    | 23.60✓         | 18.75-31.25               |
| 1,2,3,4,7,8,9-HpCDF | M+2/M+4                   | 1.02                   | 0.88-1.20    | Y    | 22.37✓         | 18.75-31.25               |
| OCDF                | M+2/M+4                   | 0.87                   | 0.76-1.02    | Y    | 49.37✓         | 35 - 65                   |

Analyst: GAHDate: 23 Feb 01

## PCDD/PCDF CALIBRATION VERIFICATION

## Alta Analytical Perspectives

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010223PI S#1 Analysis Date: 23-FEB-01 Time: 11:17:52

Reviewer: CeDate: 24 Feb 01

| Labeled Compounds       | M/Z's<br>Forming<br>Ratio | ION<br>Abund.<br>Ratio | QC<br>Limits | Pass | Conc.<br>Found | Conc.<br>Range<br>(ng/mL) |
|-------------------------|---------------------------|------------------------|--------------|------|----------------|---------------------------|
|                         |                           |                        |              |      |                |                           |
| 13C-2,3,7,8-TCDD        | M/M+2                     | 0.80                   | 0.65-0.89    | Y    | 91.5 ✓         | 70.0 - 130.0              |
| 13C-1,2,3,7,8-PeCDD     | M+2/M+4                   | 1.57                   | 1.32-1.78    | Y    | 94.7 ✓         | 70.0 - 130.0              |
| 13C-1,2,3,6,7,8-HxCDD   | M+2/M+4                   | 1.20                   | 1.05-1.43    | Y    | 96.1 ✓         | 70.0 - 130.0              |
| 13C-1,2,3,4,6,7,8-HpCDD | M+2/M+4                   | 1.05                   | 0.88-1.20    | Y    | 89.9 ✓         | 70.0 - 130.0              |
| 13C-OCDD                | M+2/M+4                   | 0.90                   | 0.76-1.02    | Y    | 82.3 ✓         | 70.0 - 130.0              |
| 13C-2,3,7,8-TCDF        | M/M+2                     | 0.79                   | 0.65-0.89    | Y    | 90.0 ✓         | 70.0 - 130.0              |
| 13C-1,2,3,7,8-PeCDF     | M+2/M+4                   | 1.58                   | 1.32-1.78    | Y    | 84.6 ✓         | 70.0 - 130.0              |
| 13C-1,2,3,6,7,8-HxCDF   | M/M+2                     | 0.52                   | 0.43-0.59    | Y    | 96.1 ✓         | 70.0 - 130.0              |
| 13C-1,2,3,4,6,7,8-HpCDF | M/M+2                     | 0.43                   | 0.37-0.51    | Y    | 87.2 ✓         | 70.0 - 130.0              |
| 13C-OCDF                | M+2/M+4                   | 0.84                   | 0.76-1.02    | Y    | 81.8 ✓         | 70.0 - 130.0              |
| 37Cl-2,3,7,8-TCDD       |                           |                        |              |      | 108.0 ✓        | 75.0 - 125.0              |
| 13C-2,3,4,7,8-PeCDD     | M+2/M+4                   | 1.58                   | 1.32-1.78    | Y    | 104.8 ✓        | 75.0 - 125.0              |
| 13C-1,2,3,4,7,8-HxCDD   | M+2/M+4                   | 1.31                   | 1.05-1.43    | Y    | 100.9 ✓        | 75.0 - 125.0              |
| 13C-1,2,3,4,7,8-HxCDF   | M/M+2                     | 0.52                   | 0.43-0.59    | Y    | 102.2 ✓        | 75.0 - 125.0              |
| 13C-1,2,3,4,7,8,9-HpCDF | M/M+2                     | 0.43                   | 0.37-0.51    | Y    | 96.1 ✓         | 75.0 - 125.0              |
| 13C-1,2,3,7,8,9-HxCDF   | M/M+2                     | 0.53                   | 0.43-0.59    | Y    | 96.0 ✓         | 75.0 - 125.0              |

Analyst: CAGDate: 24 Feb 01

**Reviewer:**

Date: 24 Feb 01

Analyst: GAG

24 Feb 01

|                       |                         |          |      |      |       |       |        |     |        |        |
|-----------------------|-------------------------|----------|------|------|-------|-------|--------|-----|--------|--------|
| Total Tetra-Dioxins   | 1.49e+07                | 0.77     | Y    | 1.26 | 21:16 | 23.3  | 1252   | 2.5 | 0.0365 | EMPC   |
| Total Penta-Dioxins   | 3.16e+07                | 1.56     | Y    | 1.01 | 30:33 | 72.8  | 120888 | 2.5 | 7.34   | 23.5   |
| Total Hexa-Dioxins    | 3.06e+07                | 1.25     | Y    | 1.10 | 35:19 | 82.7  | 2240   | 2.5 | 0.130  | 73.1   |
| Total Hepta-Dioxins   | 1.64e+07                | 1.02     | Y    | 1.13 | 40:13 | 47.6  | 2394   | 2.5 | 0.193  | 83.2   |
| Total Tetra-Furans    | 9.06e+06                | 0.84     | Y    | 1.05 | 20:13 | 12.0  | 2421   | 2.5 | 0.0638 | 48.2   |
| 1st Fnc. Penta-Furans | 1.31e+07                | 1.64     | Y    | 1.05 | 28:45 | 20.5  | 2687   | 2.5 | 0.102  | 12.5   |
| Total Penta-Furans    | 4.49e+07                | 1.52     | Y    | 1.05 | 31:37 | 70.3  | 6785   | 2.5 | 0.257  | 20.5   |
| PeCDF Totals:         |                         |          |      |      |       |       |        |     |        |        |
| Total Hexa-Furans     | 5.17e+07                | 1.19     | Y    | 1.14 | 34:39 | 90.8  | 1783   | 2.5 | 0.0505 | 91.1   |
| Total Hepta-Furans    | 1.95e+07                | 1.02     | Y    | 1.42 | 39:47 | 46.3  | 2071   | 2.5 | 0.0870 | 98.9   |
|                       |                         |          |      |      |       |       |        |     |        | 46.9   |
| IS                    | 13C-2,3,7,8-TCDD        | 5.08e+07 | 0.80 | Y    | 1.13  | 27:37 |        |     |        | Rec    |
| IS                    | 13C-1,2,3,7,8-PeCDD     | 4.29e+07 | 1.57 | Y    | 0.93  | 33:06 |        |     |        | 91.5   |
| IS                    | 13C-1,2,3,6,7,8-HxCDD   | 3.36e+07 | 1.20 | Y    | 0.93  | 37:07 |        |     |        | 94.7   |
| IS                    | 13C-1,2,3,4,6,7,8-HpCDD | 3.05e+07 | 1.05 | Y    | 0.91  | 41:24 |        |     |        | 96.1   |
| IS                    | 13C-OCDD                | 2.26e+07 | 0.90 | Y    | 0.73  | 46:42 |        |     |        | 89.9   |
| IS                    | 13C-2,3,7,8-TCDF        | 7.20e+07 | 0.79 | Y    | 1.06  | 26:43 |        |     |        | 82.3   |
| IS                    | 13C-1,2,3,7,8-PeCDF     | 6.11e+07 | 0.58 | Y    | 0.96  | 31:36 |        |     |        | 90.0   |
| IS                    | 13C-1,2,3,6,7,8-HxCDF   | 4.62e+07 | 0.52 | Y    | 1.28  | 36:10 |        |     |        | 84.6   |
| IS                    | 13C-1,2,3,4,6,7,8-HpCDF | 2.95e+07 | 0.43 | Y    | 0.90  | 39:46 |        |     |        | 96.1   |
| IS                    | 13C-OCDF                | 2.49e+07 | 0.84 | Y    | 0.81  | 47:01 |        |     |        | 87.2   |
| IS                    |                         |          |      |      |       |       |        |     |        | 81.8   |
| RS/RT                 | 13C-1,2,3,4-TCDD        | 4.89e+07 | 0.81 | Y    | 1.00  | 26:57 |        |     |        |        |
| RS                    | 13C-1,2,3,4-TCDF        | 7.54e+07 | 0.77 | Y    | 1.00  | 25:20 |        |     |        | -      |
| RS/RT                 | 13C-1,2,3,7,8,9-HxCDD   | 3.75e+07 | 1.26 | Y    | 1.00  | 37:26 |        |     |        | -      |
| RS                    | 37Cl-2,3,7,8-TCDD       | 2.82e+07 |      |      | 0.51  | 27:38 |        |     |        | Analys |
| S                     | 13C-2,3,4,7,8-PeCDF     | 6.24e+07 | 1.58 | Y    | 0.97  | 32:44 |        |     |        | 108    |
| S                     | 13C-1,2,3,4,7,8-HxCDD   | 3.13e+07 | 1.31 | Y    | 0.92  | 37:00 |        |     |        | 105    |
| S                     | 13C-1,2,3,4,7,8-HxCDF   | 4.30e+07 | 0.52 | Y    | 0.91  | 36:02 |        |     |        | 101    |
| S                     | 13C-1,2,3,4,7,8,9-HpCDF | 2.42e+07 | 0.43 | Y    | 0.85  | 42:13 |        |     |        | 102    |
| S                     | 13C-1,2,3,7,8,9-HxCDF   | 3.85e+07 | 0.53 | Y    | 1.07  | 37:50 |        |     |        | 96.1   |
| S                     |                         |          |      |      |       |       |        |     |        | 96.0   |

## FORM 5

## PCDD/PCDF RT WINDOW AND ISOMER SPECIFICITY STANDARDS

Lab Name: Alta Analytical Perspectives Episode No.:

Contract No.:

SAS No.:

Instrument ID: MM-1

Initial Calibration Date: 10/5/00

RT Window Data Filename: 010223P1 S#1 Analysis Date: 23-FEB-01 Time: 11:17:52

DB-5 IS Data Filename: 010223P1 S#1 Analysis Date: 23-FEB-01 Time: 11:17:52

DB\_225 IS Data Filename:

Analysis Date:

Time:

Reviewer: ceDate: 24 Feb 01

## DB-5 RT WINDOW DEFINING STANDARDS RESULTS

| ISOMERS                 | ABSOLUTE<br>RT | ISOMERS                 | ABSOLUTE<br>RT |
|-------------------------|----------------|-------------------------|----------------|
| 1,3,6,8-TCDD (F)        | 23:52 ✓        | 1,3,6,8-TCDF (F)        | 21:41 ✓        |
| 1,2,8,9-TCDD (L)        | 28:38 ✓        | 1,2,8,9-TCDF (L)        | 28:48 ✓        |
| 1,2,4,7,9-PeCDD (F)     | 30:33 ✓        | 1,3,4,6,8-PeCDF (F)     | 28:45 ✓        |
| 1,2,3,8,9-PeCDD (L)     | 33:33 ✓        | 1,2,3,8,9-PeCDF (L)     | 33:51 ✓        |
| 1,2,4,6,7,9-HxCDD (F)   | 35:19 ✓        | 1,2,3,4,6,8-HxCDF (F)   | 34:39 ✓        |
| 1,2,3,7,8,9-HxCDD (L)   | 37:27 ✓        | 1,2,3,7,8,9-HxCDF (L)   | 37:51 ✓        |
| 1,2,3,4,6,7,9-HpCDD (F) | 40:13 ✓        | 1,2,3,4,6,7,8-HpCDF (F) | 39:47 ✓        |
| 1,2,3,4,6,7,8-HpCDD (L) | 41:25 ✓        | 1,2,3,4,7,8,9-HpCDF (L) | 42:14 ✓        |

(F) = First eluting isomer (DB-5); (L) = Last eluting isomer (DB-5).

## ISOMER SPECIFICITY (IS) TEST STANDARD RESULTS

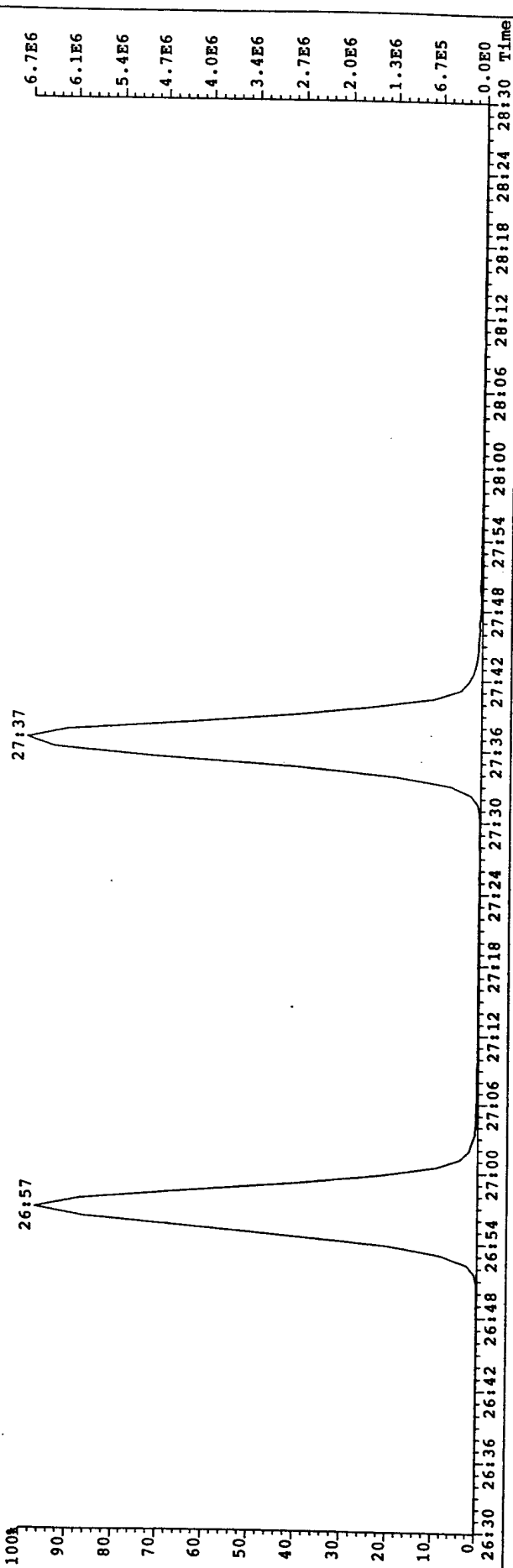
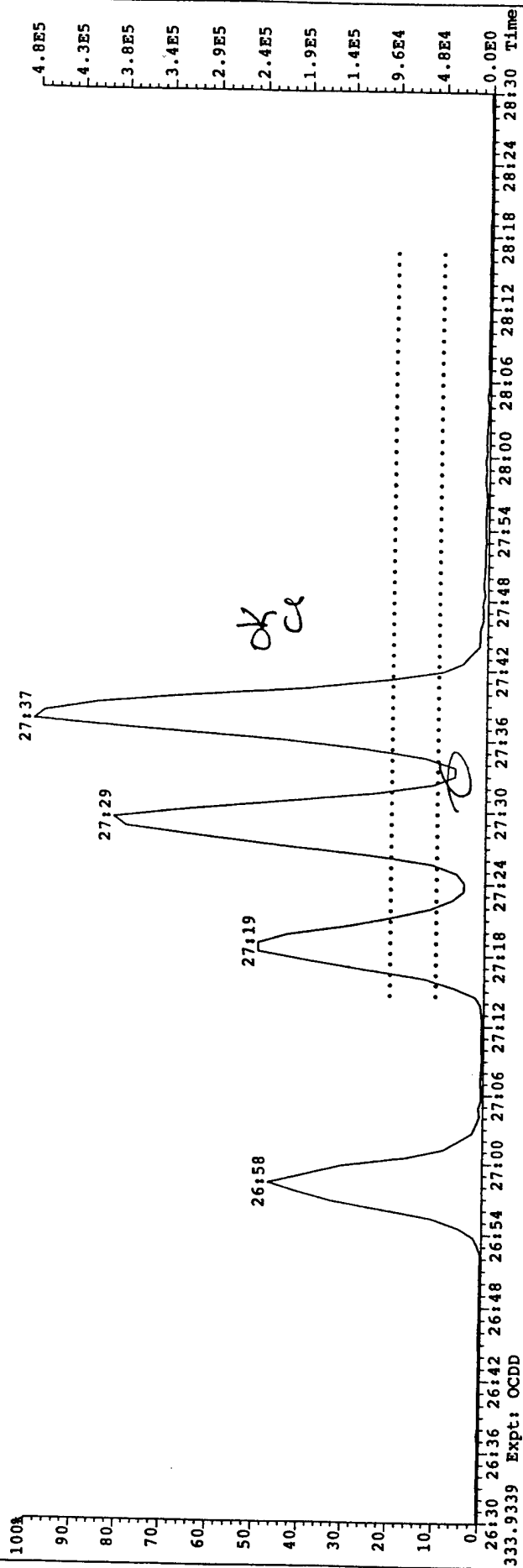
\* VALLEY HEIGHT  
BETWEEN  
COMPARED PEAKS (1)

&lt;25%

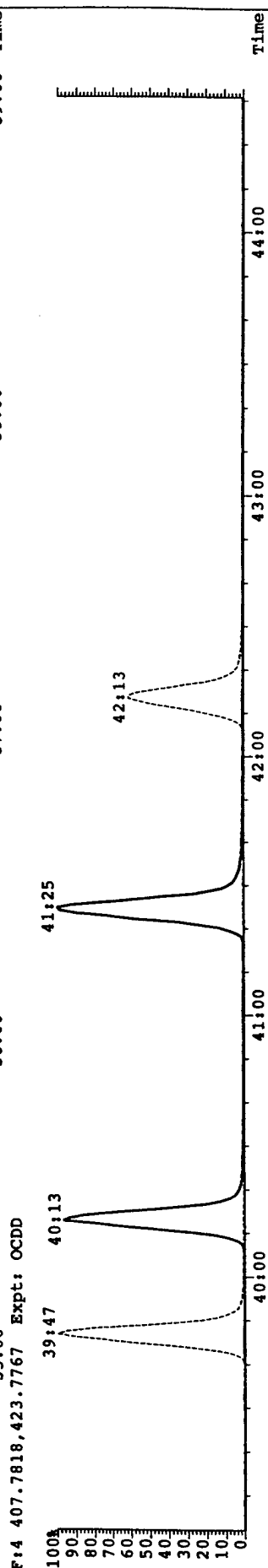
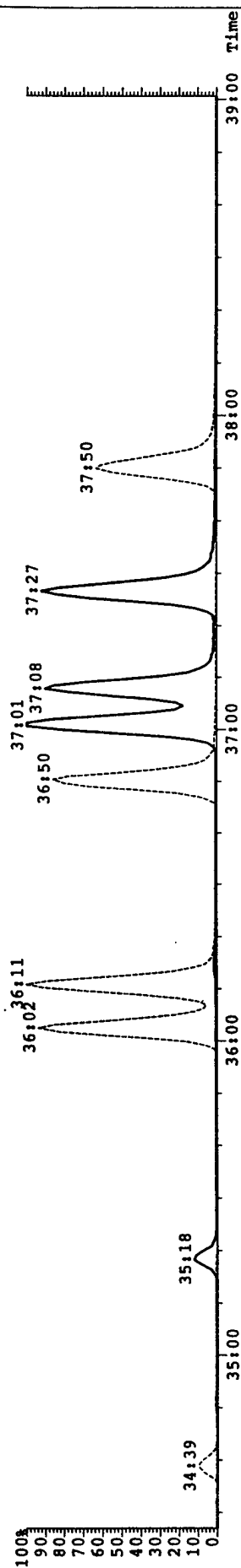
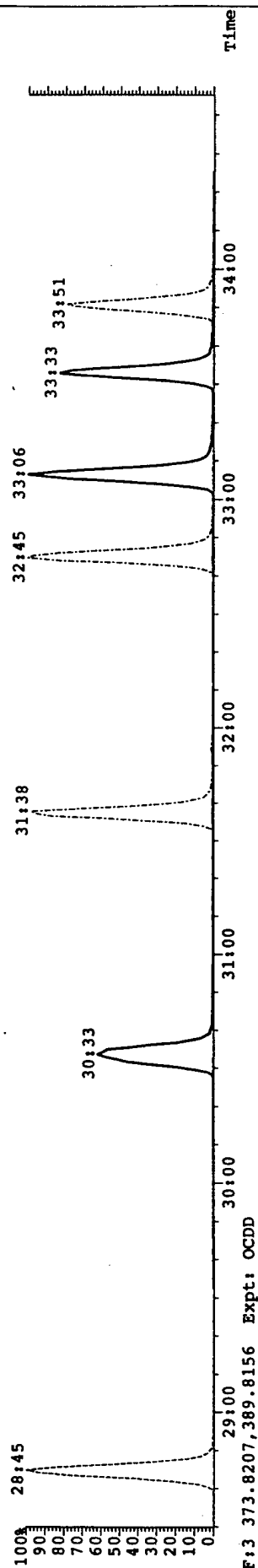
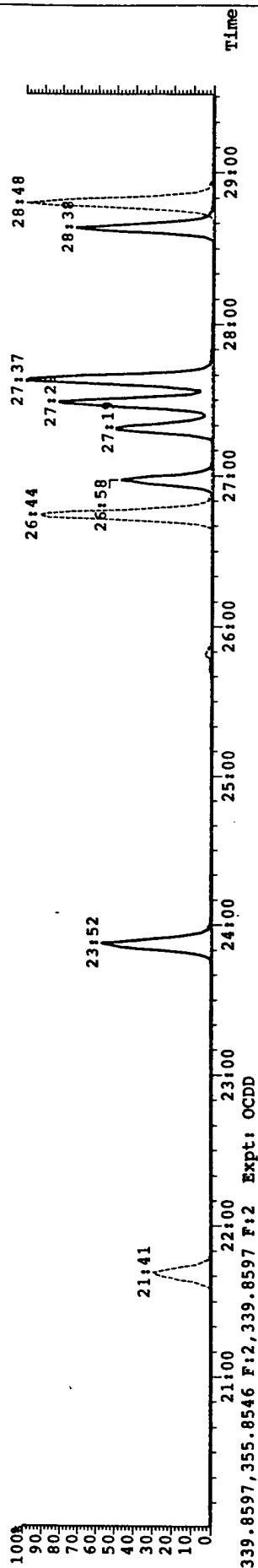
Analyst: \_\_\_\_\_

Date: \_\_\_\_\_

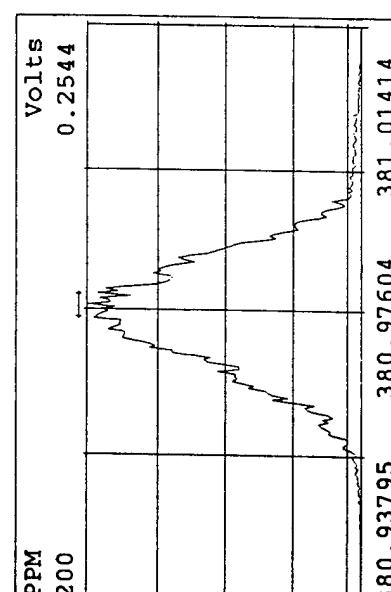
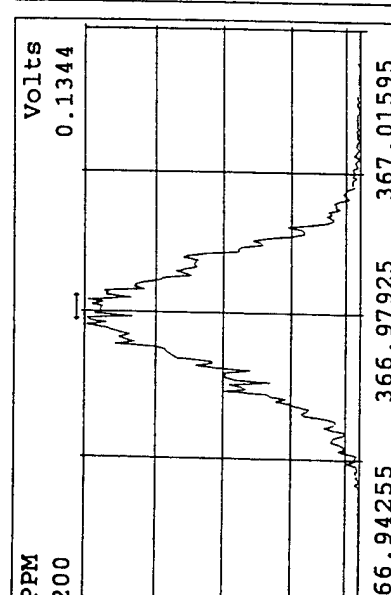
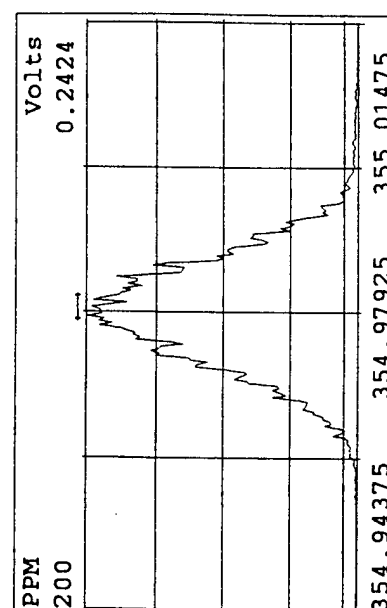
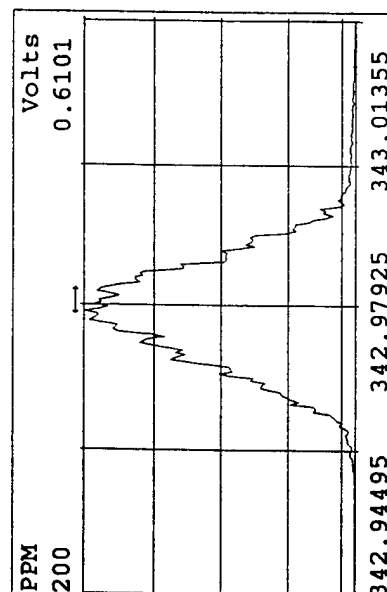
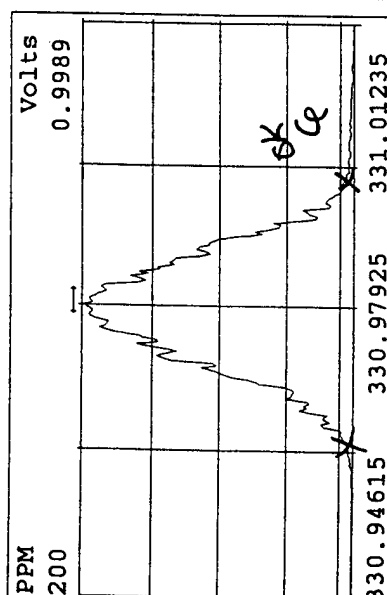
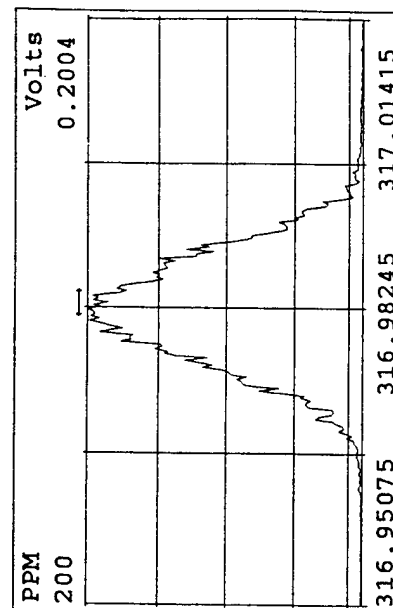
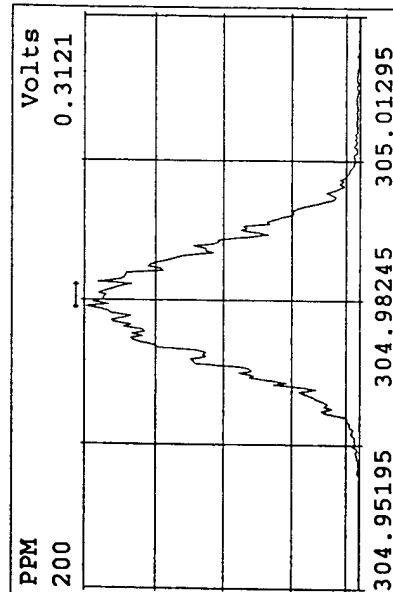
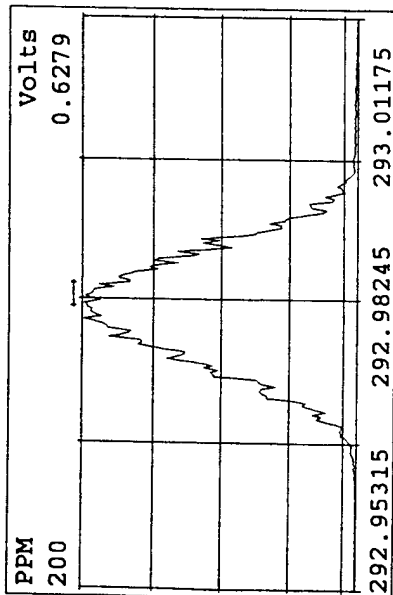
File: 010223P1 ACq: 23-FEB-2001 11:17:52 GC EIT Voltage SIR Autospec-UltimaE  
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5  
321.8936 Expt: OCDD



File: 010223PI Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-Ultimate  
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5  
305.8987,321.8936 Expt: OCDD

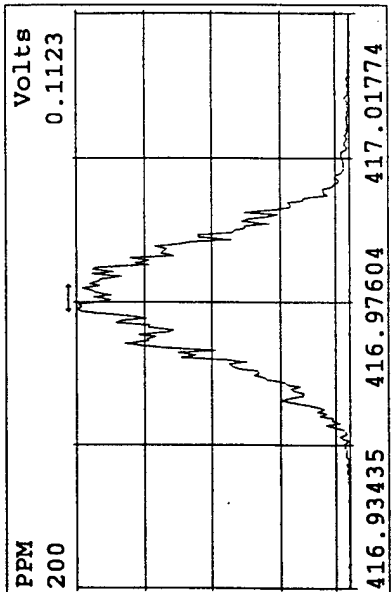
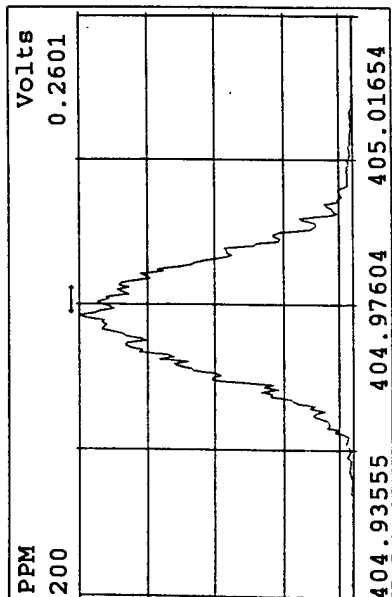
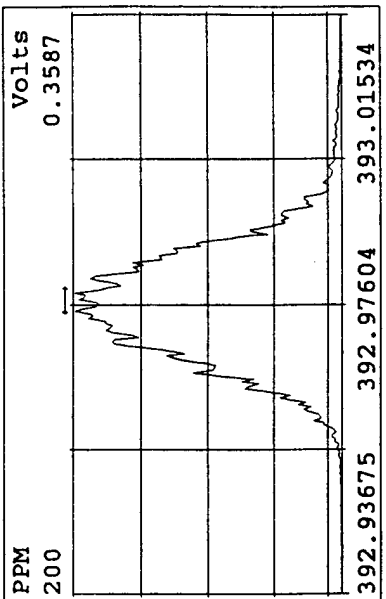
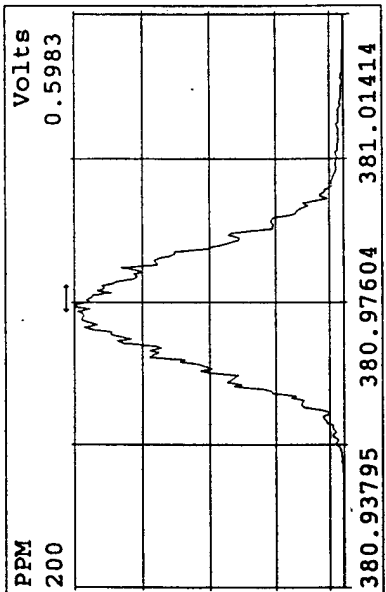
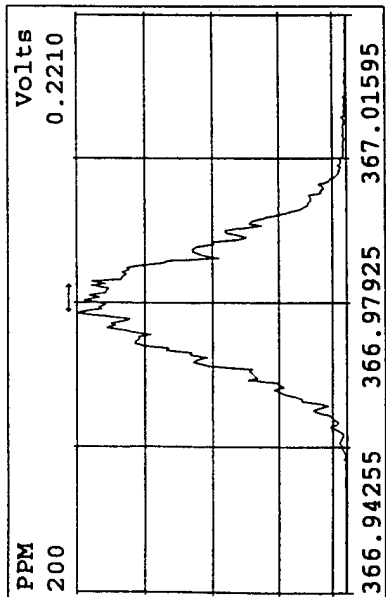
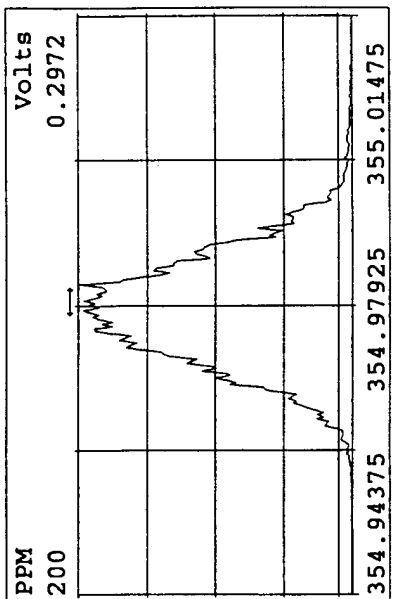
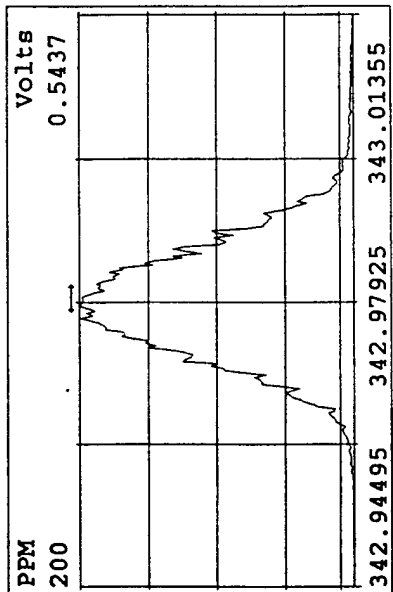
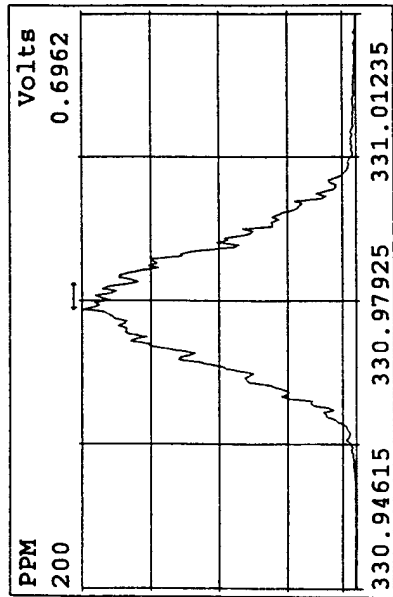


Peak Locate Examination: 23-FEB-2001:11:15 File: 010223P1  
Experiment: OCDD Function: 1 Reference: PK2

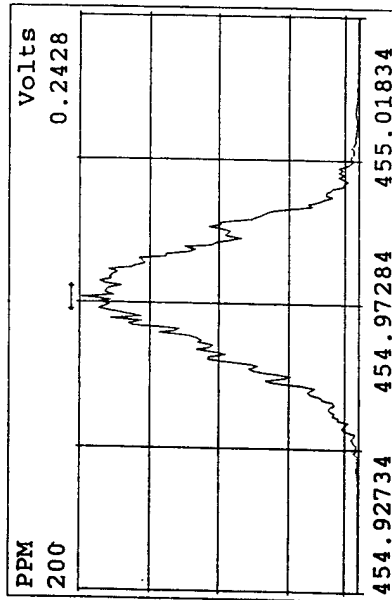
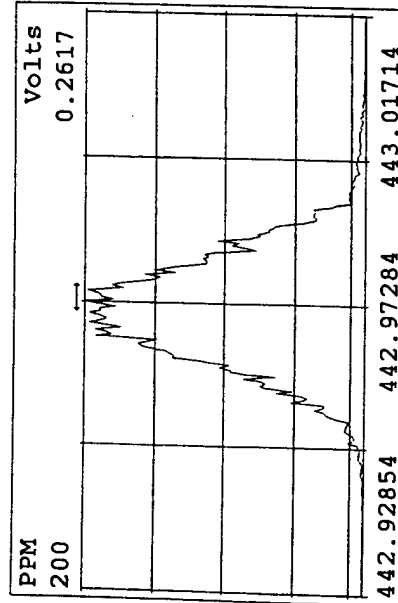
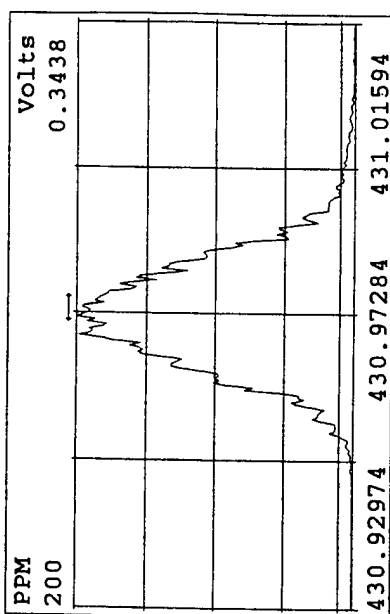
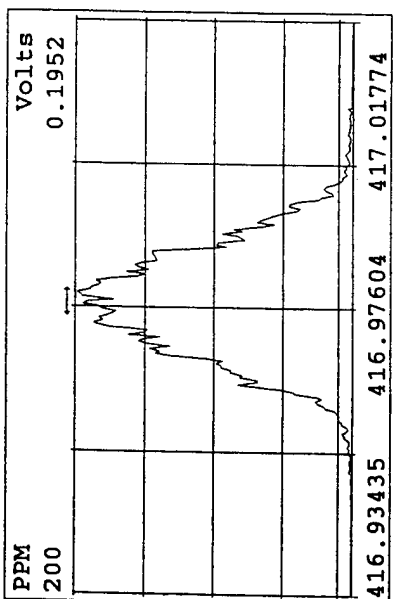
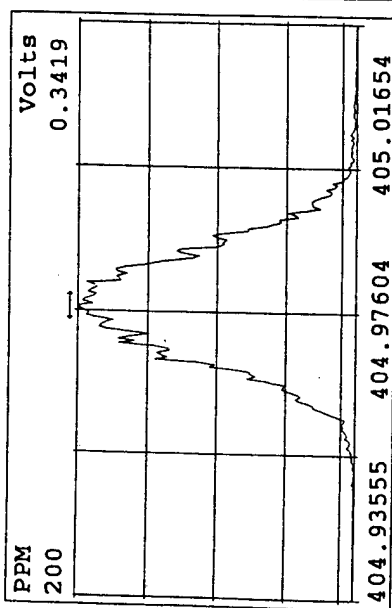
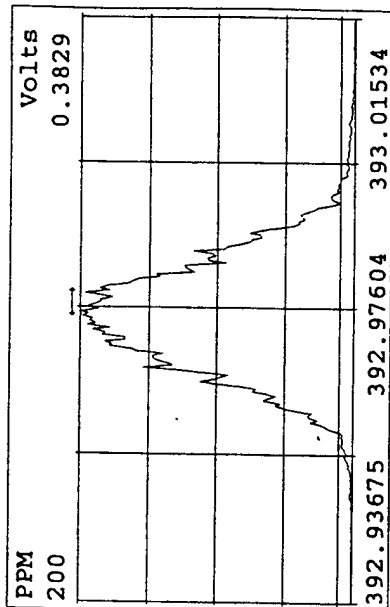
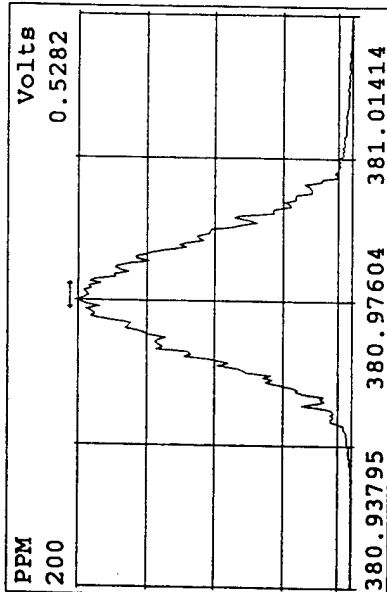
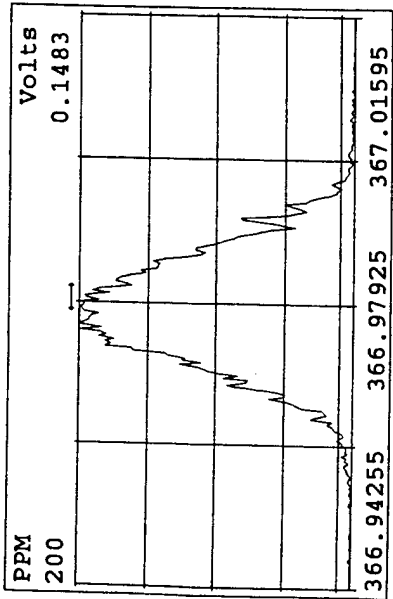




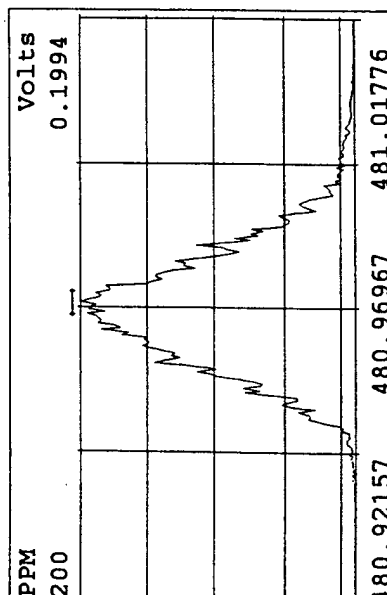
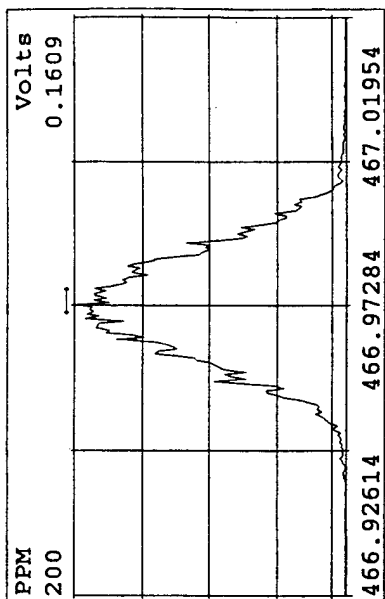
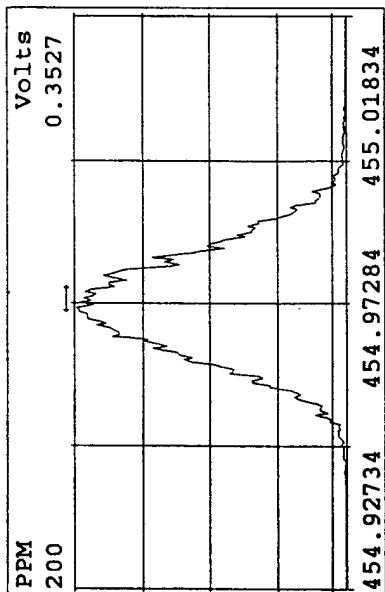
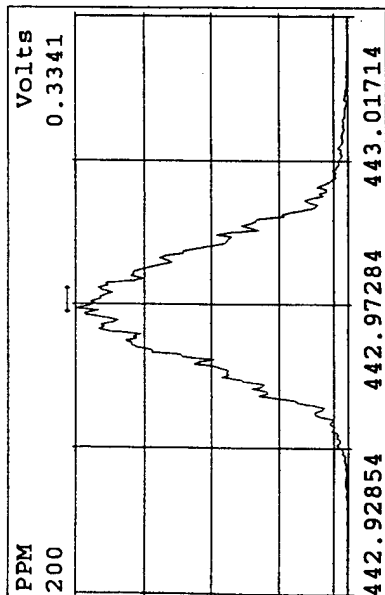
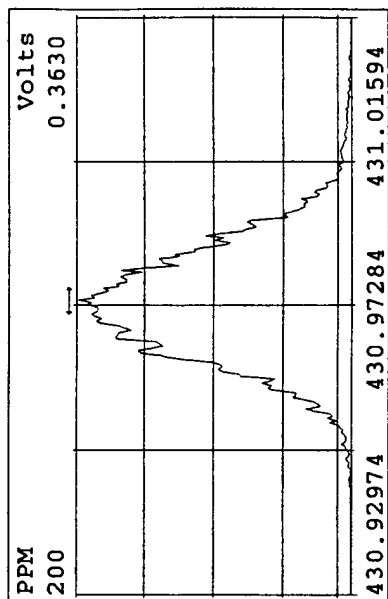
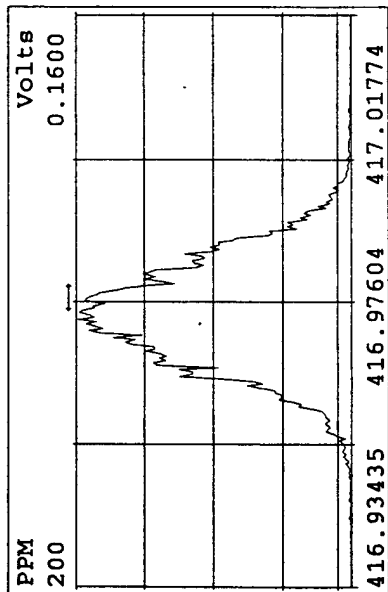
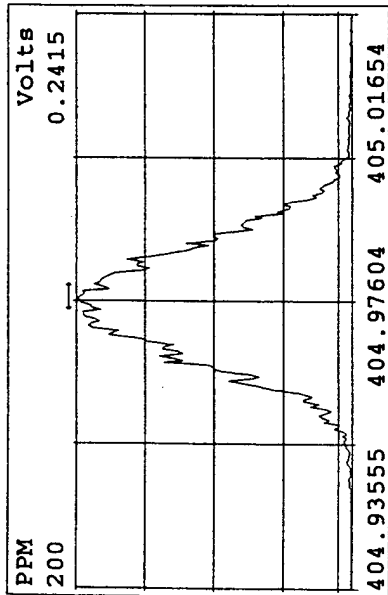
Peak Locate Examination: 23-FEB-2001:11:16 File: 010223P1  
Experiment: OCDD Function: 2 Reference: PFK2



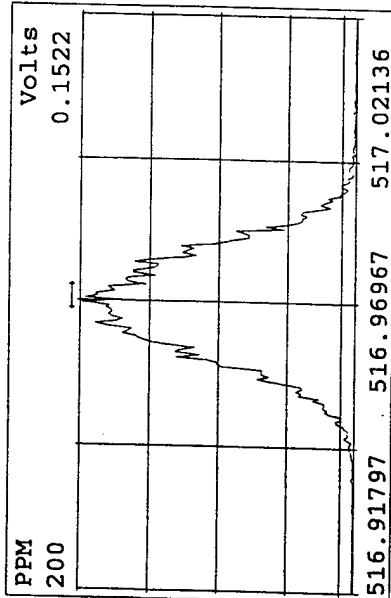
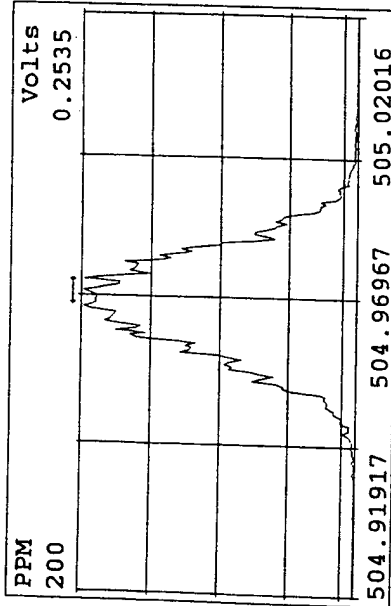
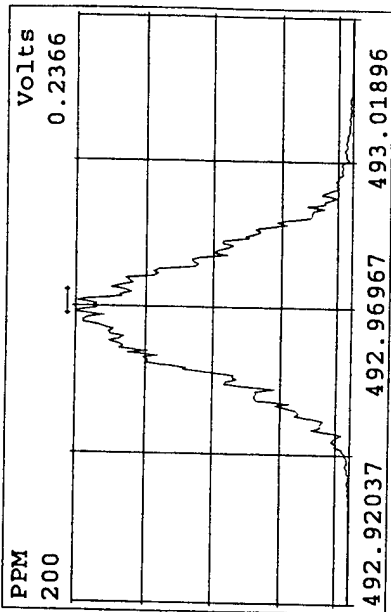
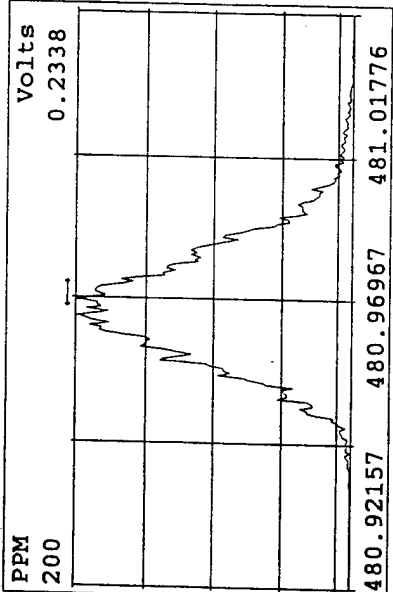
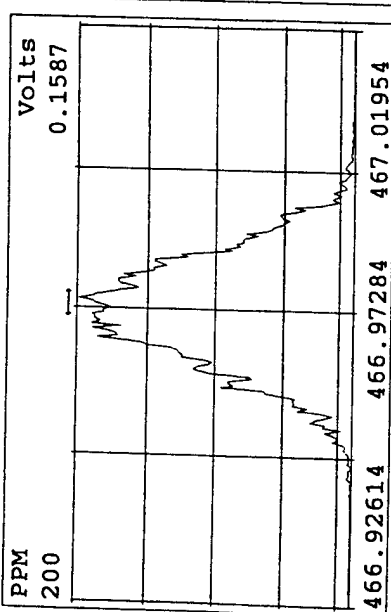
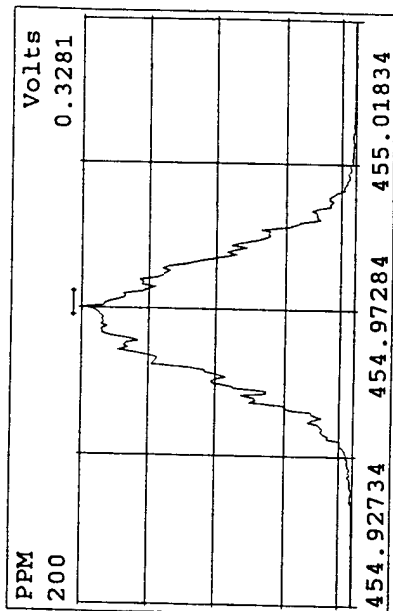
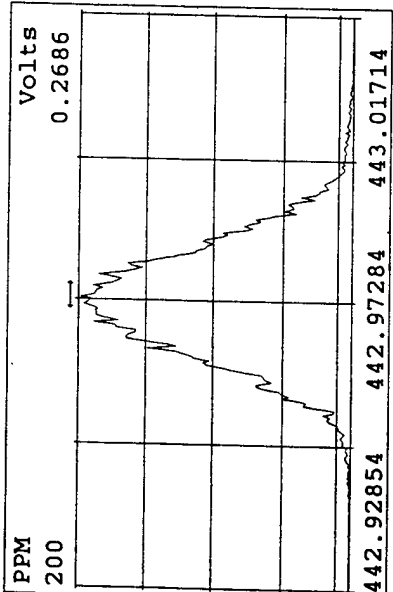
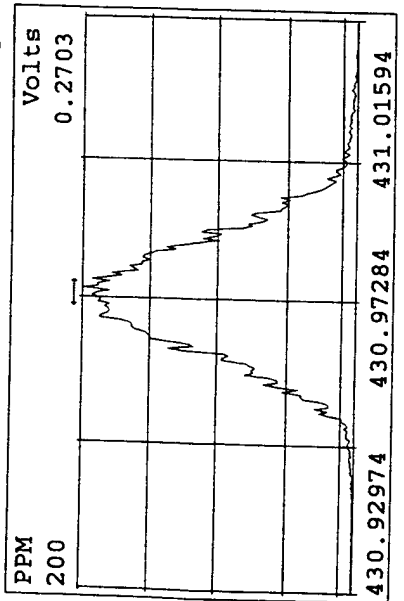
Peak Locate Examination: 23-FEB-2001:11:16 File: 010223P1  
Experiment: OCDD Function: 3 Reference: PFK2



Peak Locate Examination: 23-FEB-2001:11:16 File: 010223P1  
Experiment: OCDD Function: 4 Reference: PFK2



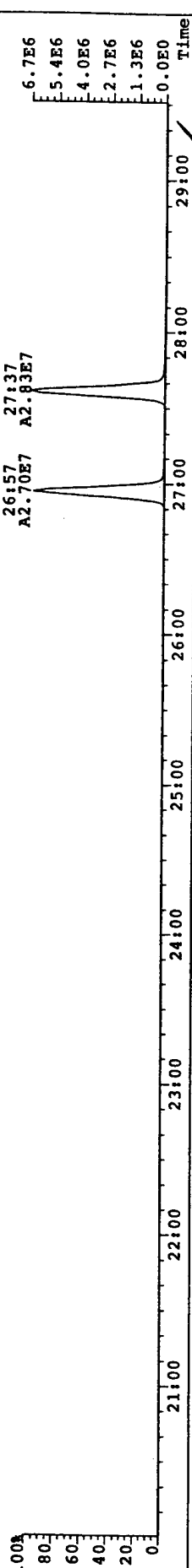
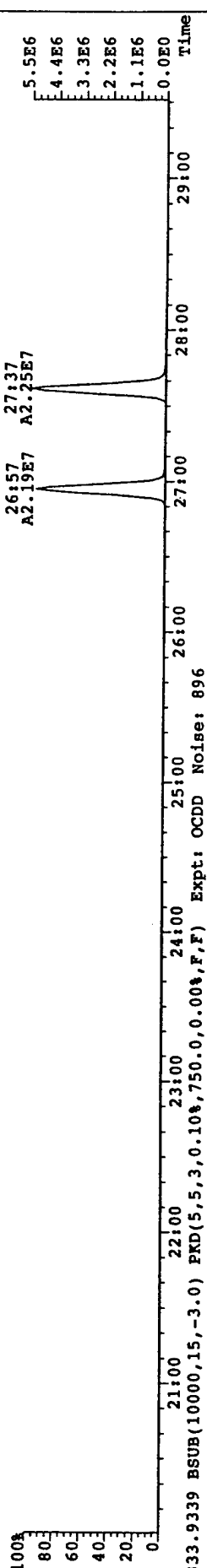
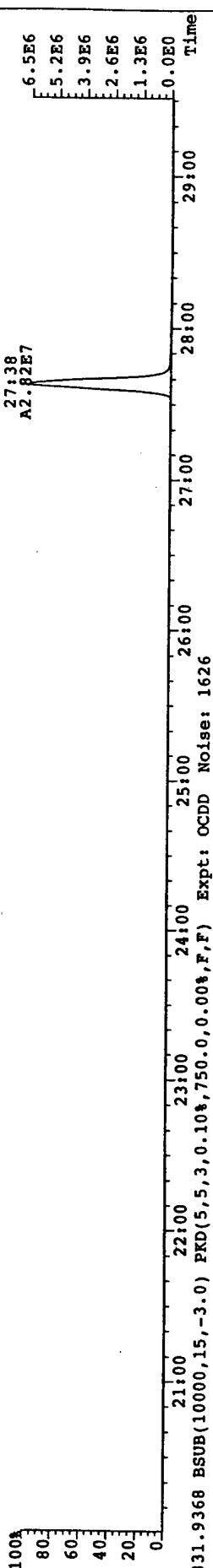
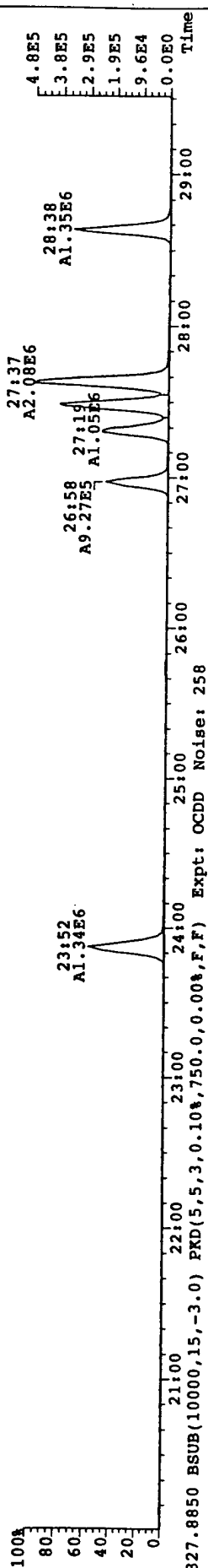
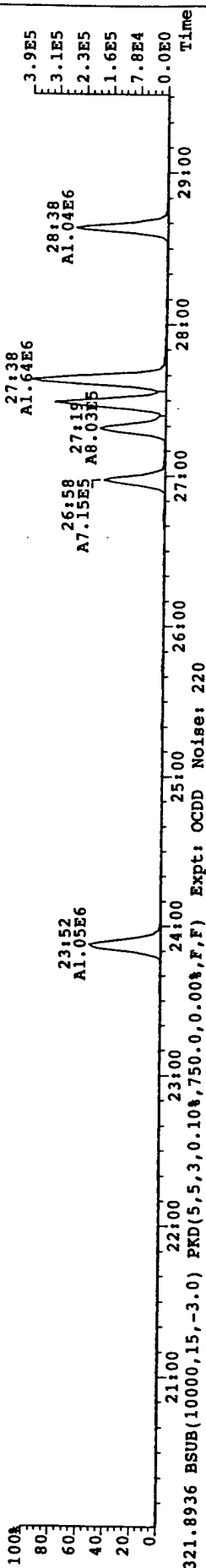
Peak Locate Examination: 23-FEB-2001:11:17 File: 010223P1  
Experiment: OCDD Function: 5 Reference: PFK2



File: 010223PI Acq: 23-FEB-2001 11:17:52 GC EIT Voltage STR Autospec-Ultimate

Sample# 1 Text: DBS CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

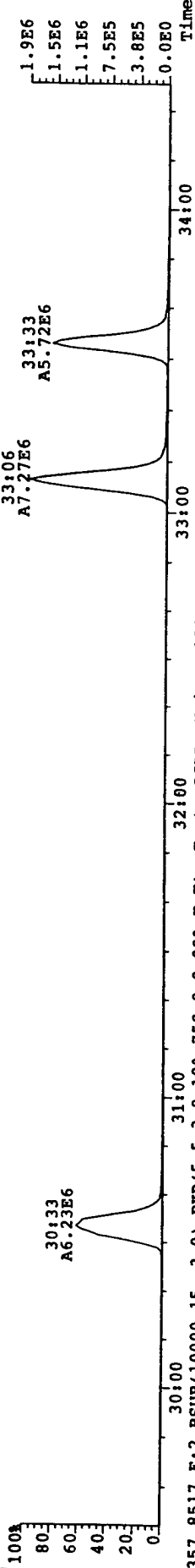
319.8965 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 284



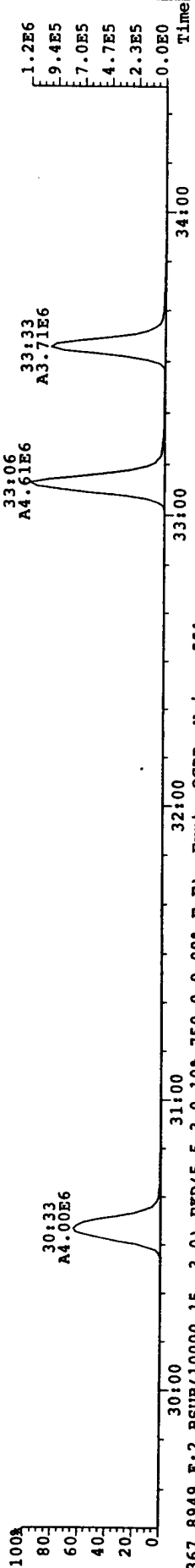
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage: 50V Autospec-UltimaE

Sample# 1 Text: DB5 CPM / M23 CS3 Vial# 3 File Text: MAP DB5

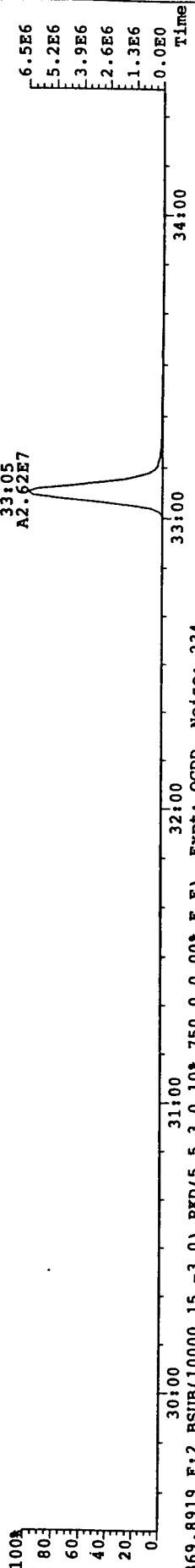
355.8546 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 463



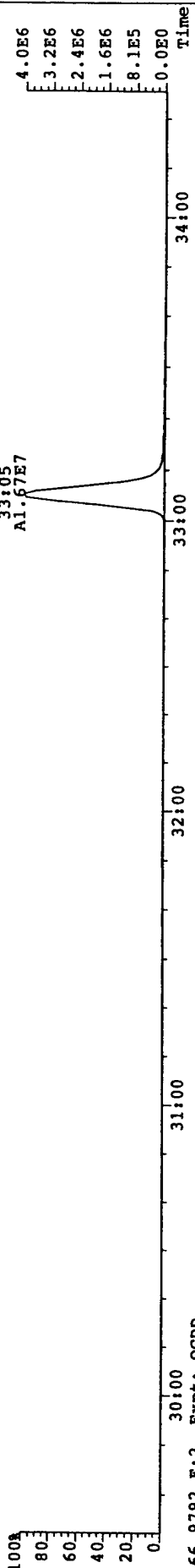
357.8517 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 184



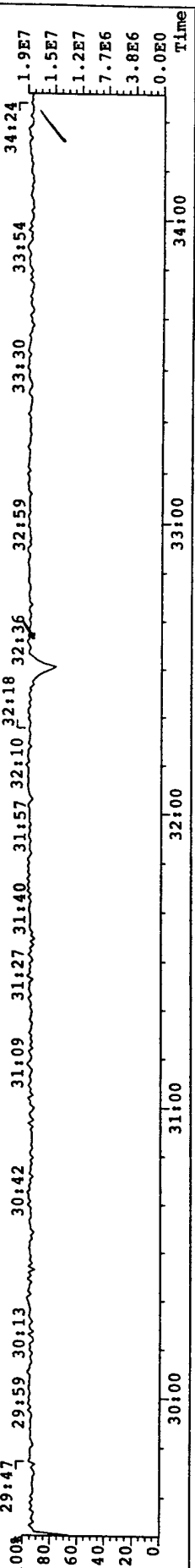
367.8949 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 551



369.8919 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 234



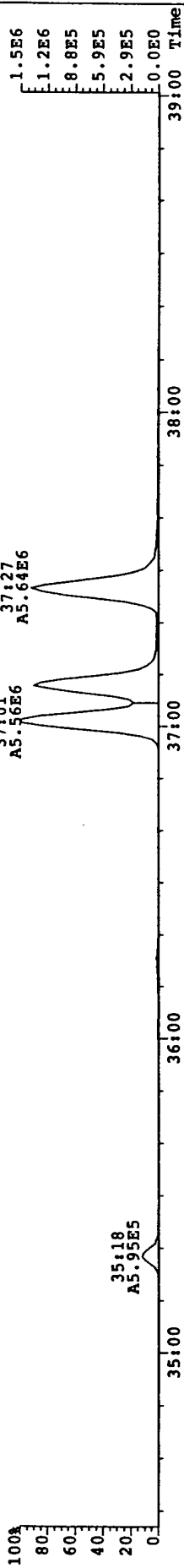
366.9792 F:2 Expt: OCDD



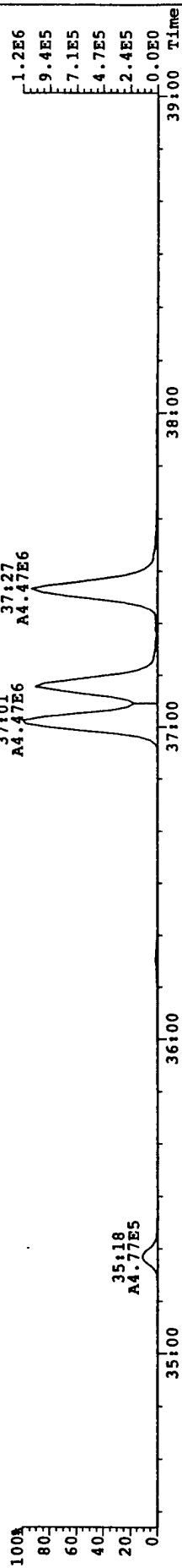
File: 010223PI AGQ: 23-FEB-2001 11:17:52 GC FI+ Voltage SIR Autospec-UltimaE

Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

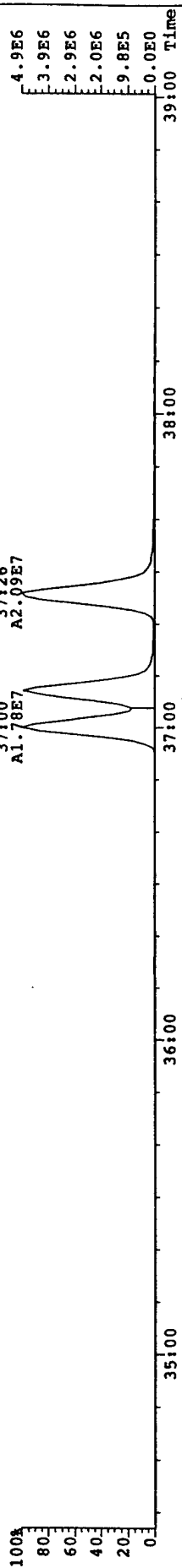
389.8156 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 445



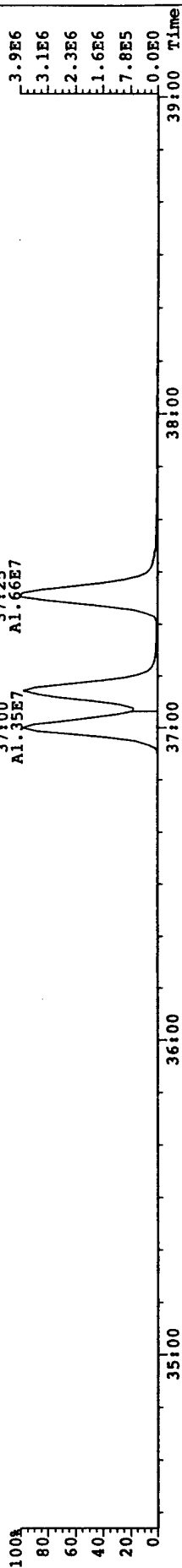
391.8127 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 312



401.8559 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 423

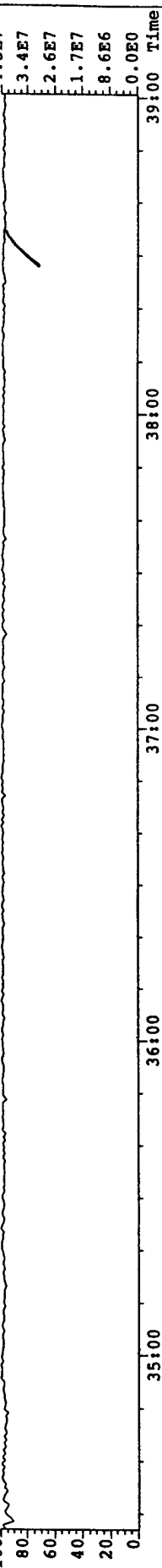


403.8530 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 280

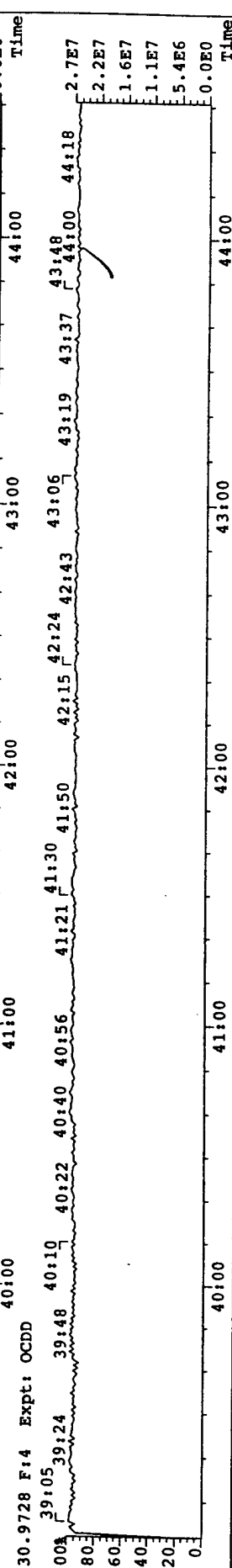
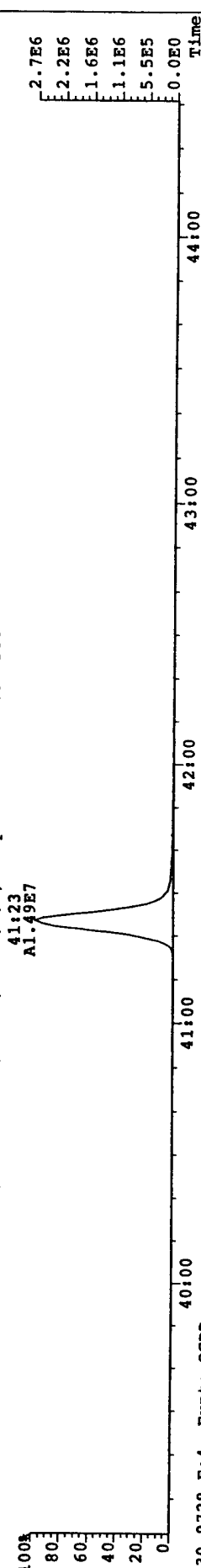
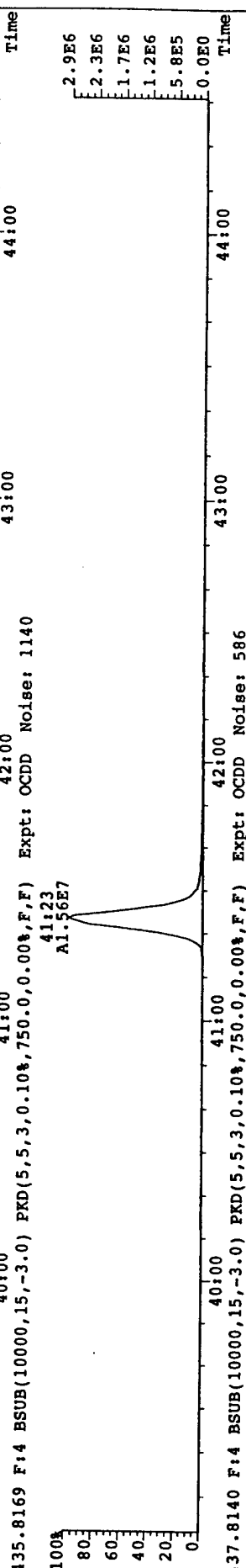
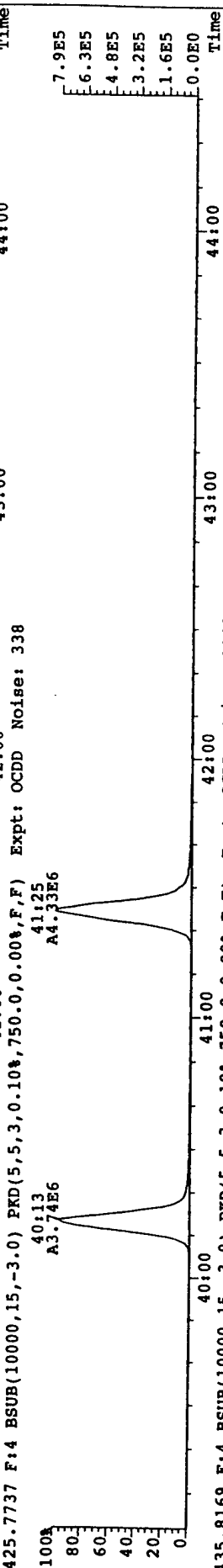
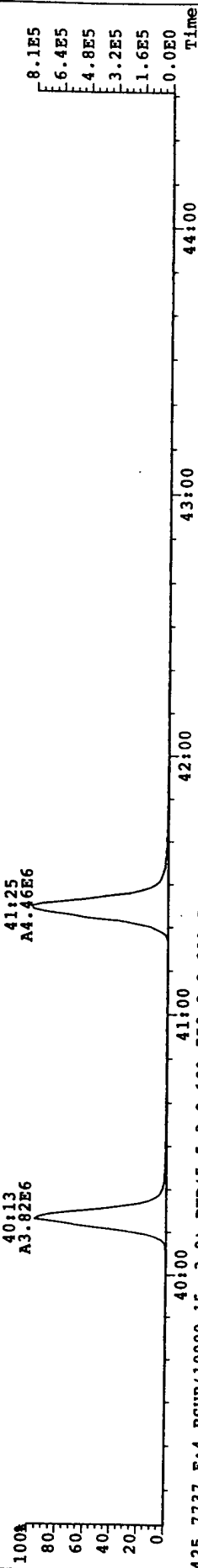


380.9760 F:3 Expt: OCDD

100% 34:39 34:56 35:06 35:24 35:31 35:56 36:08 36:18 36:41 37:06 37:14 37:23 37:33 37:57 38:16 38:30 38:46



File: 010223PI Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE  
Sample# 1 Text: DB5 CFSM / M23 CS3 Vial# 3 File Text: AAP DB5  
423.7767 F:4 BSUB(10000,15,-3.0) PRD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 362

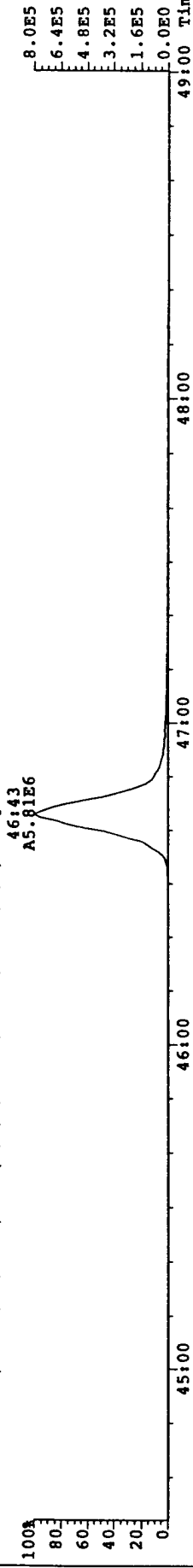




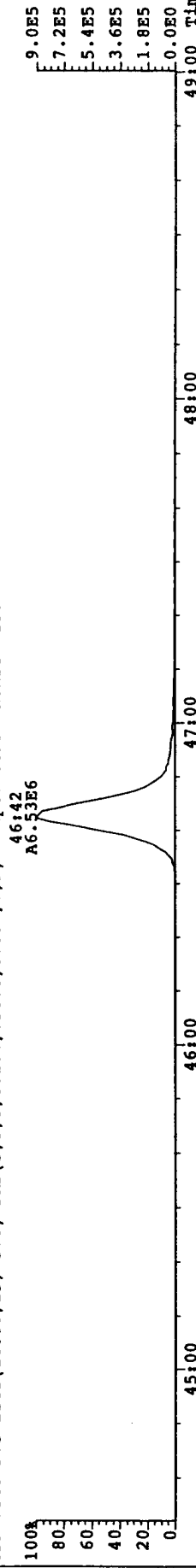
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EIT Voltage SIR Autospec-UltimaE

Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

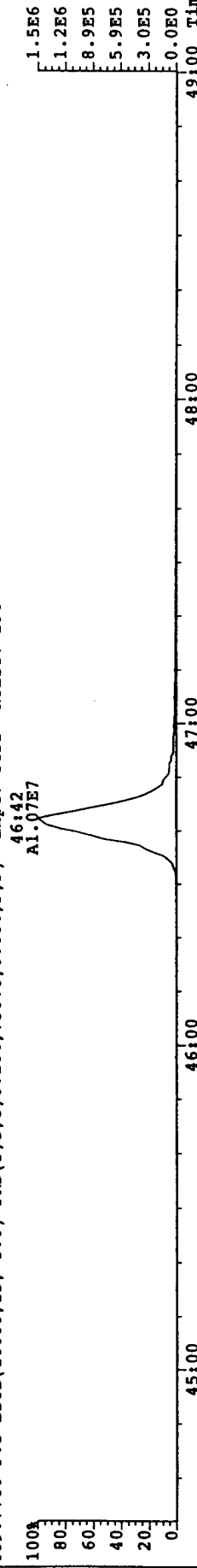
457.7377 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 281



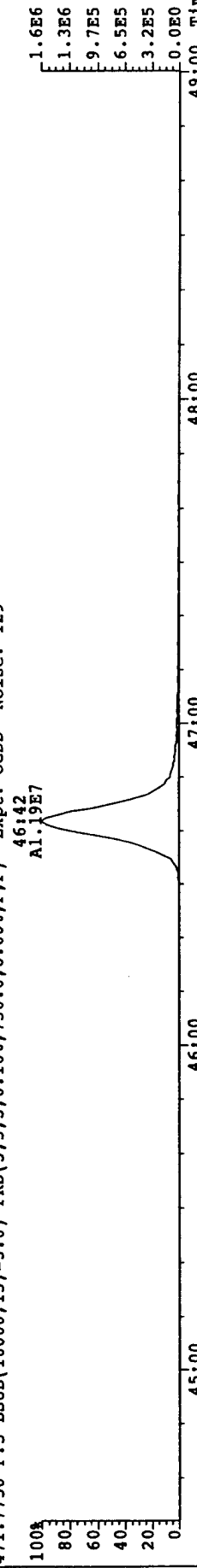
459.7348 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 130



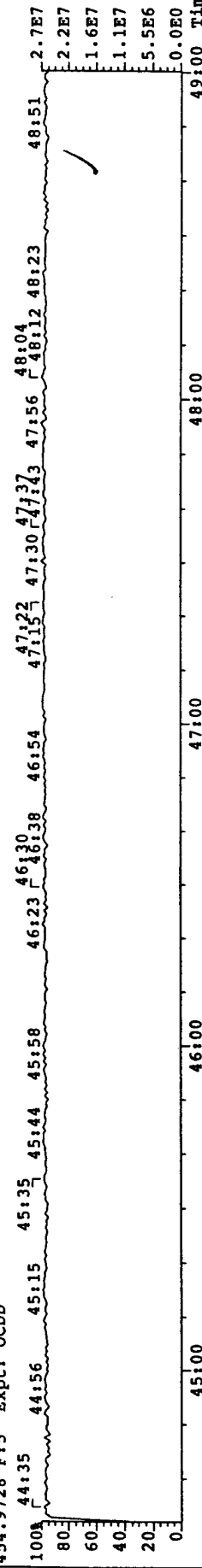
459.7780 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 290



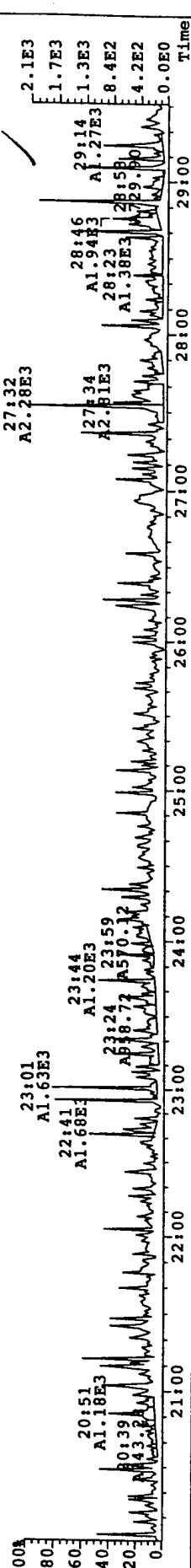
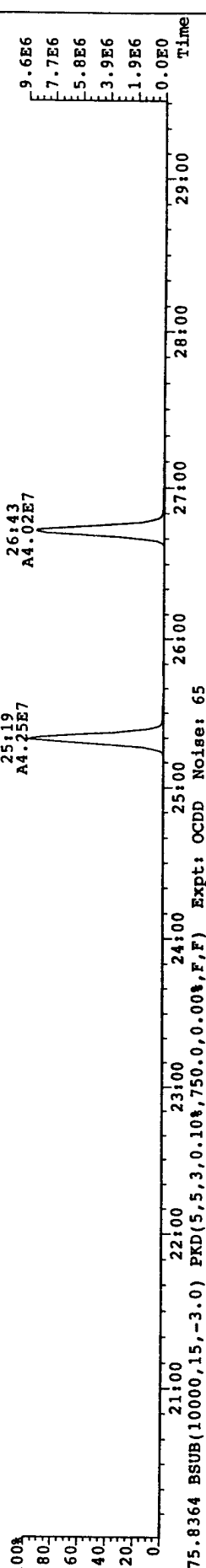
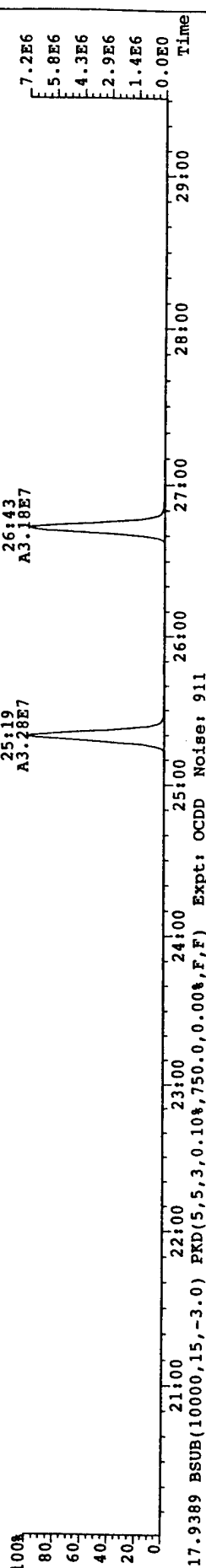
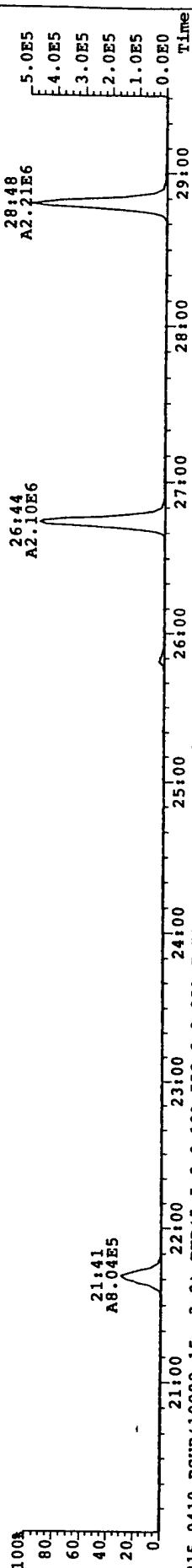
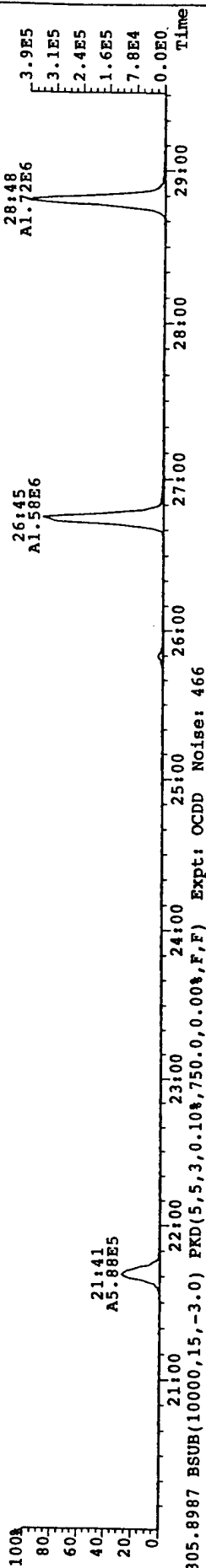
471.7750 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 129



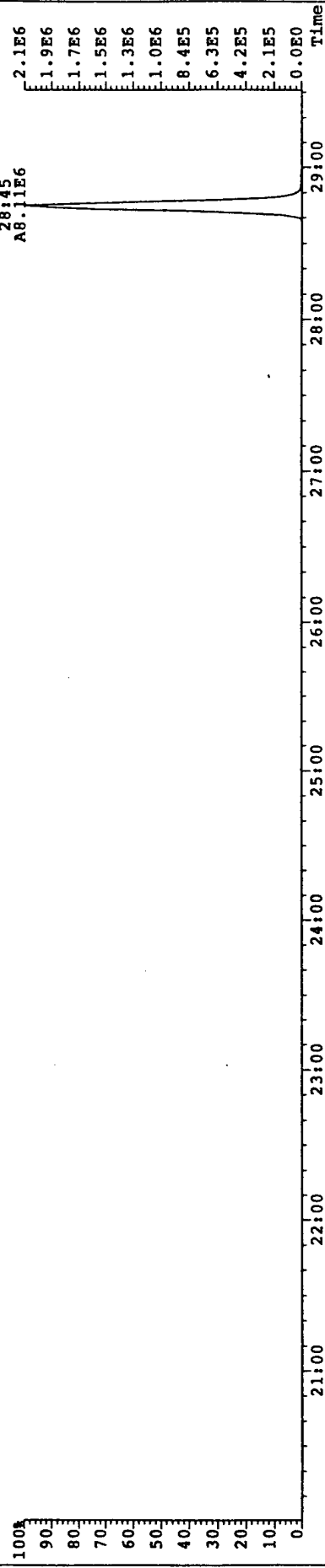
454.9728 F:5 Expt: OCDD



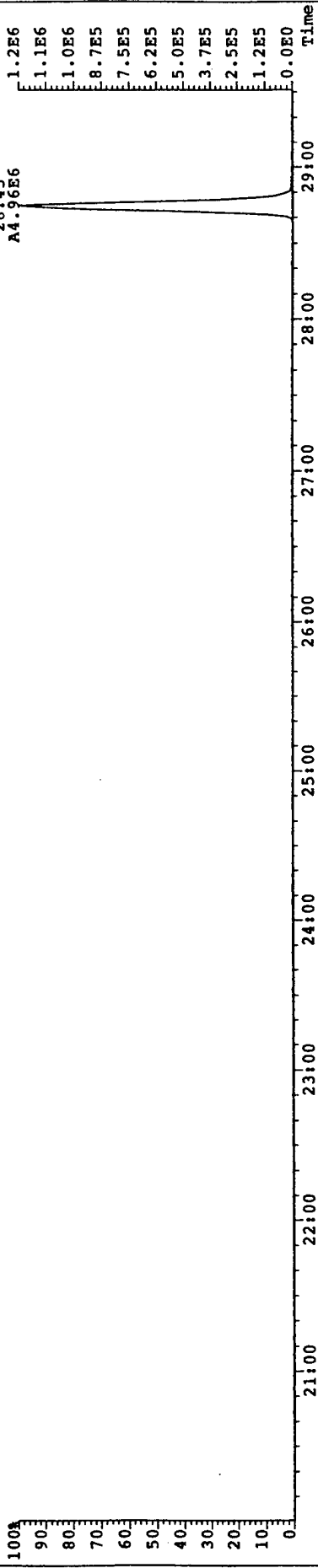
303.9016 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 200



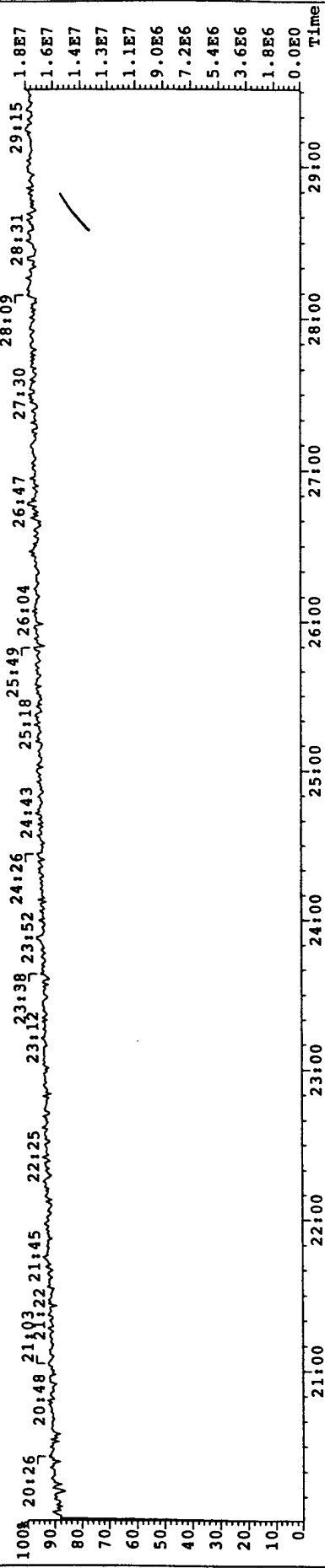
File: 010223P1 Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE  
Sample# 1 Text: DB5 CPM / M23 CS3 Vial# 3 File Text: AAP DB5  
339.8597 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 80



341.8568 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 191



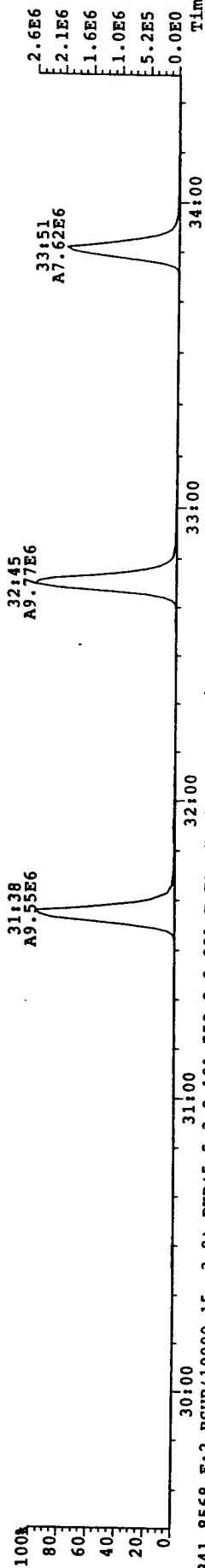
316.9824 Expt: OCDD



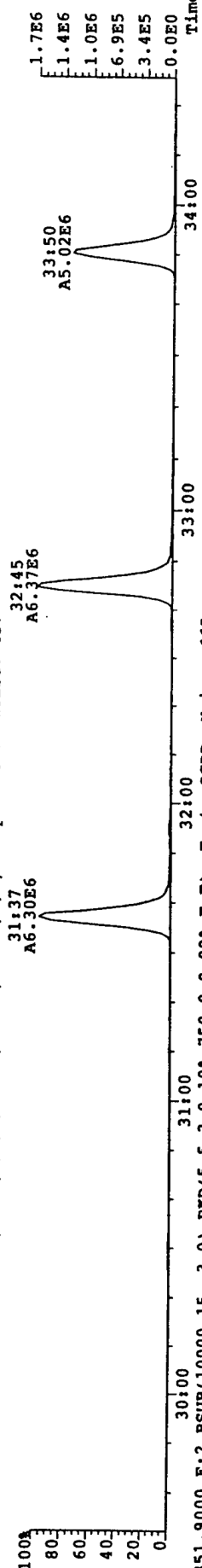
File: U10223P1 Acq: 23-FEB-2001 11:17:52 GC EIT Voltage SIR Autospec-UltimaE

Sample# 1 Text: DB5 CPM / M23 CS3 Vial# 3 File Text: AAP DB5

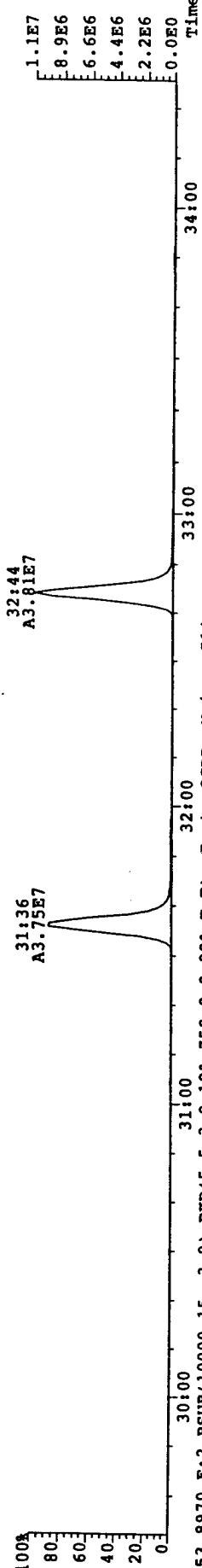
339.8597 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 507



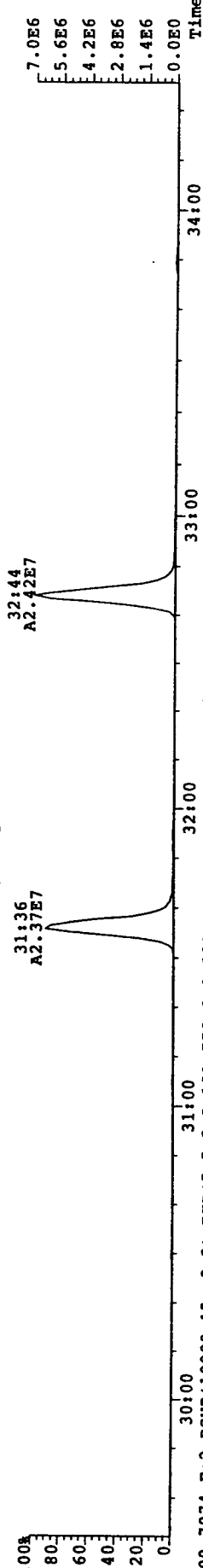
341.8568 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 457



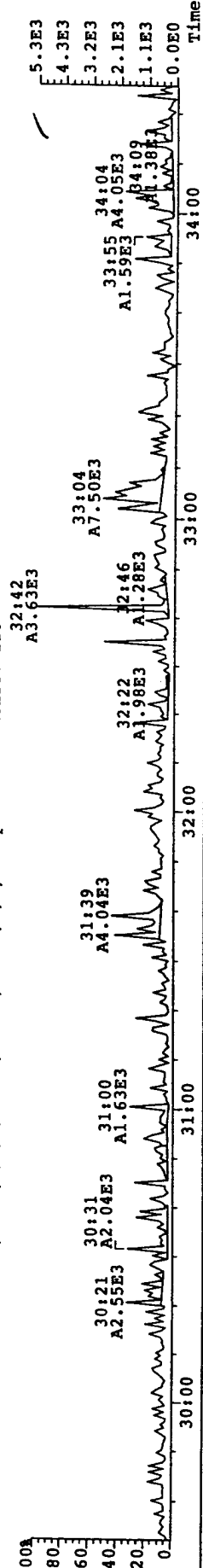
351.9000 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 665



353.8970 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 714

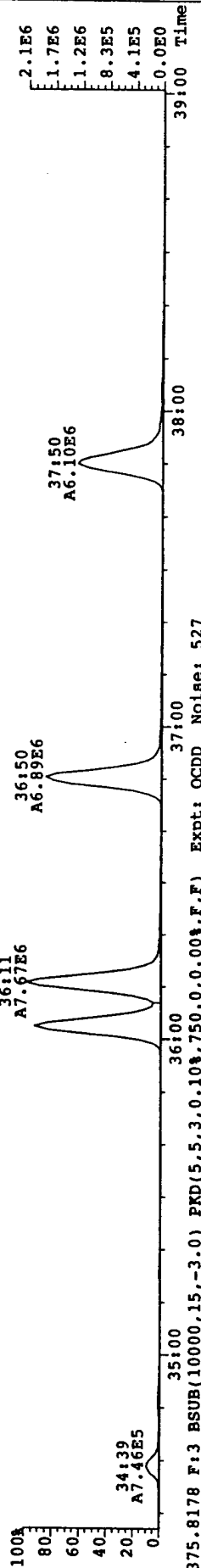


409.7974 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 116

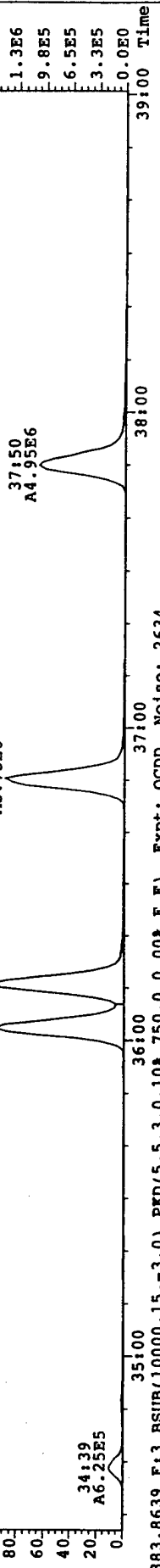


File: 010223PI Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE

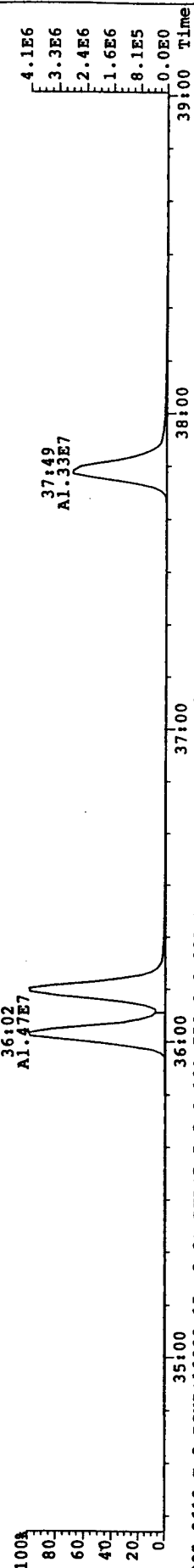
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5  
373.8207 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 572



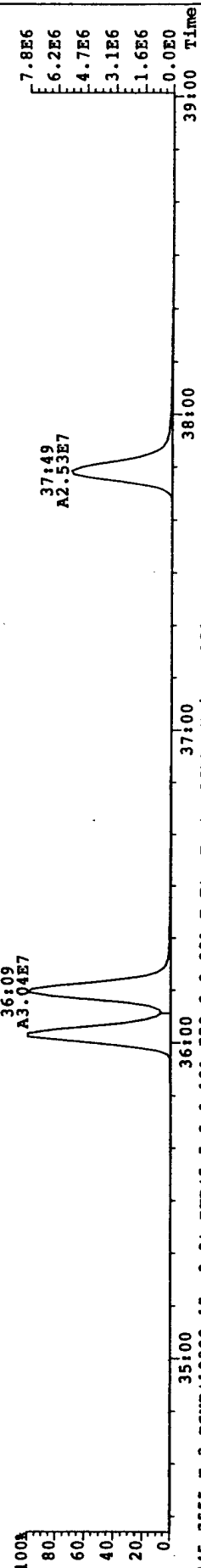
375.8178 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 527



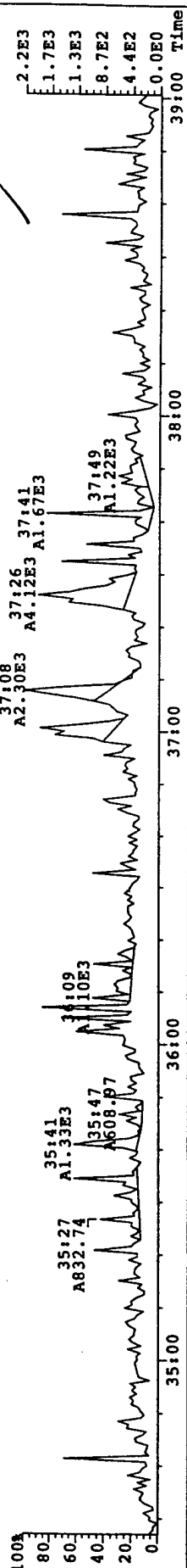
383.8639 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 2634



385.8610 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 2331

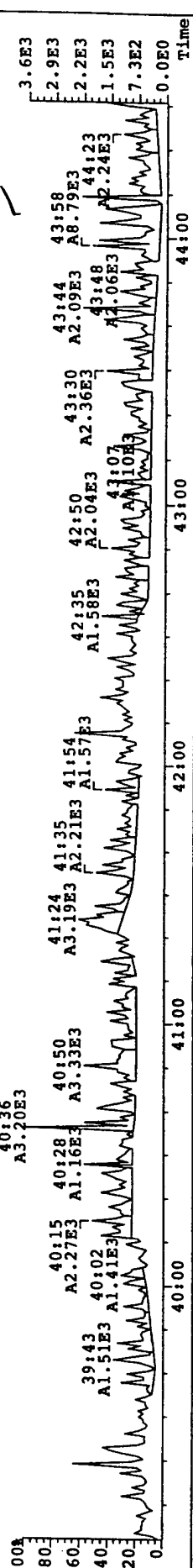
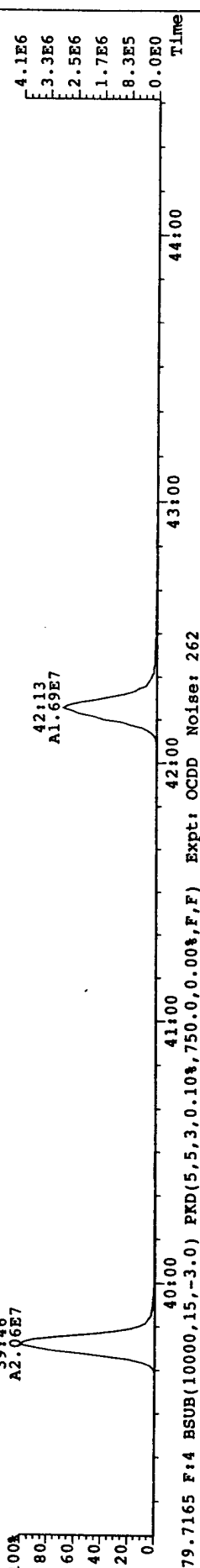
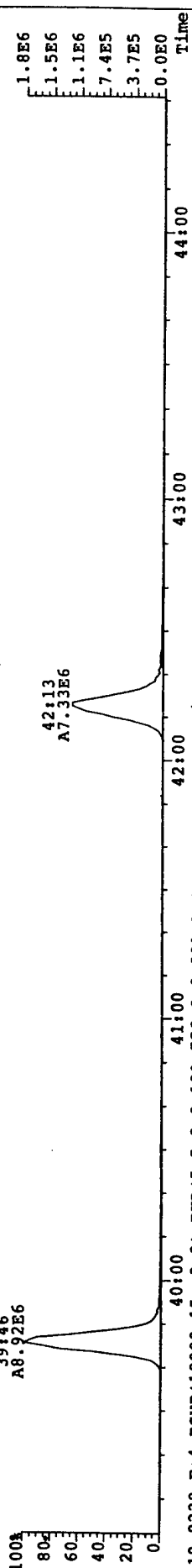
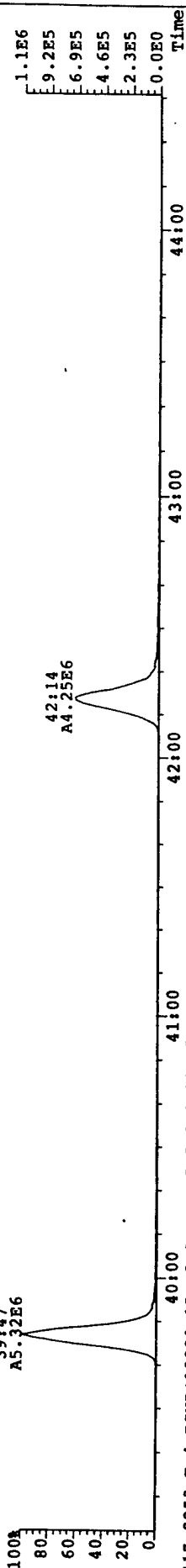
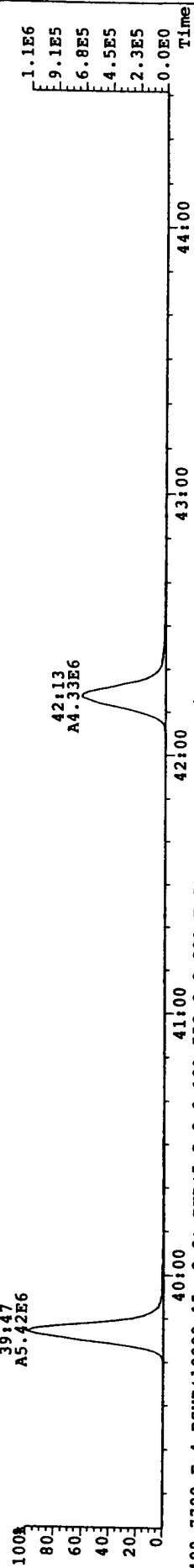


445.7555 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 121



File: 010223PI Acq: 23-FEB-2001 11:17:52 GC E1+ Voltage SIR Autospec-UltimaE

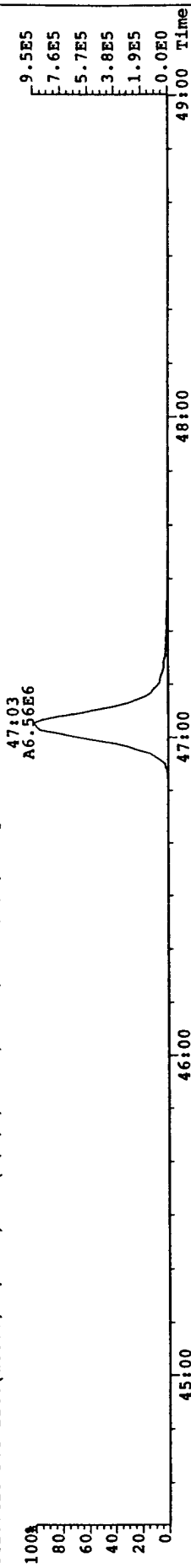
Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5  
407.7818 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 322



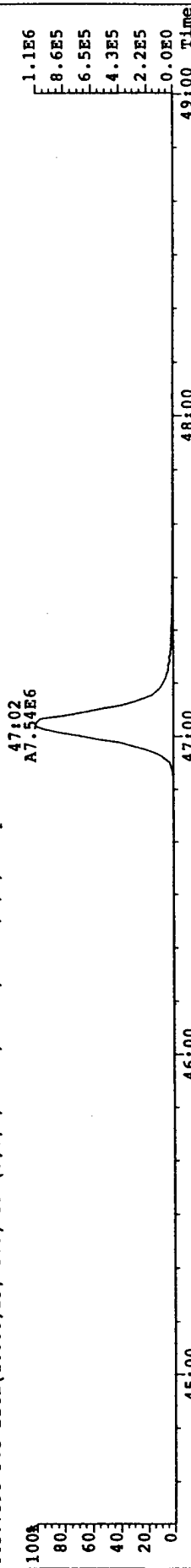
File: 010223PI Acq: 23-FEB-2001 11:17:52 GC EI+ Voltage SIR Autospec-UltimaE

Sample# 1 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

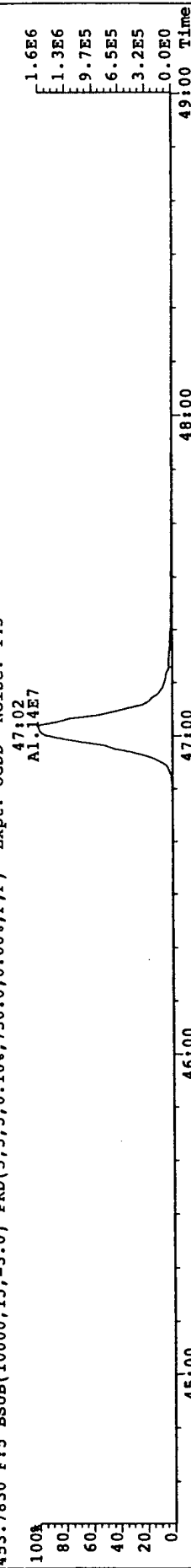
441.7428 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 126



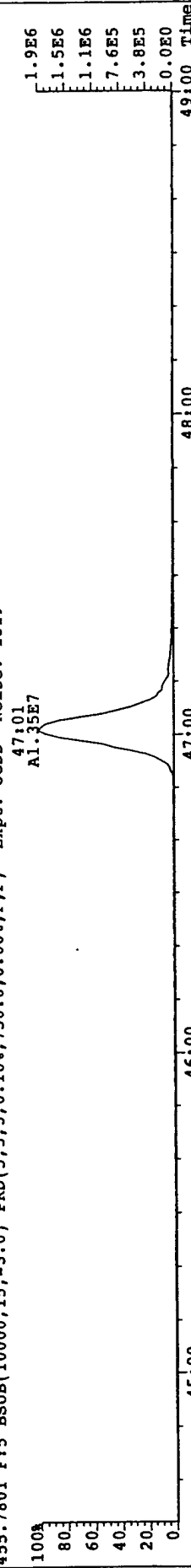
443.7398 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 221



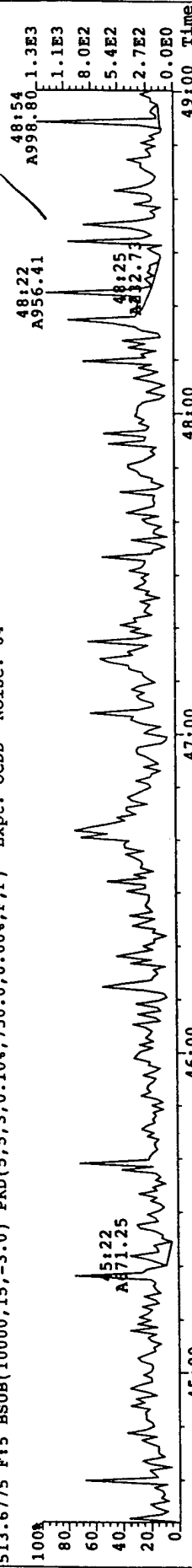
453.7830 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 145



455.7801 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1319



513.6775 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 84



## PCDD/PCDF CALIBRATION VERIFICATION

## Alta Analytical Perspectives

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010223P1 S#4 Analysis Date: 23-FEB-01 Time: 13:52:50

Reviewer: CEDate: 24 Feb 01

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| NATIVE ANALYTES     | M/Z'S<br>FORMING<br>RATIO | ION<br>ABUND.<br>RATIO | QC<br>LIMITS | Pass | CONC.<br>FOUND | CONC.<br>RANGE<br>(ng/mL) |
|---------------------|---------------------------|------------------------|--------------|------|----------------|---------------------------|
| 2,3,7,8-TCDD        | M/M+2                     | 0.77                   | 0.65-0.89    | Y    | 5.72 ✓         | 3.75 - 6.25               |
| 1,2,3,7,8-PeCDD     | M+2/M+4                   | 1.56                   | 1.32-1.78    | Y    | 27.30 ✓        | 18.75-31.25               |
| 1,2,3,4,7,8-HxCDD   | M+2/M+4                   | 1.25                   | 1.05-1.43    | Y    | 25.77 ✓        | 18.75-31.25               |
| 1,2,3,6,7,8-HxCDD   | M+2/M+4                   | 1.26                   | 1.05-1.43    | Y    | 26.57 ✓        | 18.75-31.25               |
| 1,2,3,7,8,9-HxCDD   | M+2/M+4                   | 1.24                   | 1.05-1.43    | Y    | 26.94 ✓        | 18.75-31.25               |
| 1,2,3,4,6,7,8-HpCDD | M+2/M+4                   | 1.03                   | 0.88-1.20    | Y    | 25.31 ✓        | 18.75-31.25               |
| OCDD                | M+2/M+4                   | 0.88                   | 0.76-1.02    | Y    | 52.15 ✓        | 37 - 65                   |
| 2,3,7,8-TCDF        | M/M+2                     | 0.74                   | 0.65-0.89    | Y    | 4.75 ✓         | 3.75 - 6.25               |
| 1,2,3,7,8-PeCDF     | M+2/M+4                   | 1.54                   | 1.32-1.78    | Y    | 25.15 ✓        | 18.75-31.25               |
| 2,3,4,7,8-PeCDF     | M+2/M+4                   | 1.52                   | 1.32-1.78    | Y    | 25.03 ✓        | 18.75-31.25               |
| 1,2,3,4,7,8-HxCDF   | M+2/M+4                   | 1.23                   | 1.05-1.43    | Y    | 24.69 ✓        | 18.75-31.25               |
| 1,2,3,6,7,8-HxCDF   | M+2/M+4                   | 1.22                   | 1.05-1.43    | Y    | 24.52 ✓        | 18.75-31.25               |
| 2,3,4,6,7,8-HxCDF   | M+2/M+4                   | 1.22                   | 1.05-1.43    | Y    | 24.09 ✓        | 18.75-31.25               |
| 1,2,3,7,8,9-HxCDF   | M+2/M+4                   | 1.22                   | 1.05-1.43    | Y    | 24.33 ✓        | 18.75-31.25               |
| 1,2,3,4,6,7,8-HpCDF | M+2/M+4                   | 1.02                   | 0.88-1.20    | Y    | 24.26 ✓        | 18.75-31.25               |
| 1,2,3,4,7,8,9-HpCDF | M+2/M+4                   | 1.02                   | 0.88-1.20    | Y    | 23.32 ✓        | 18.75-31.25               |
| OCDF                | M+2/M+4                   | 0.89                   | 0.76-1.02    | Y    | 49.06 ✓        | 35 - 65                   |

Analyst: GAEDate: 23 Feb 01



## PCDD/PCDF CALIBRATION VERIFICATION

## Alta Analytical Perspectives

Initial Calibration Date: 10/05/00

Instrument ID: MM-1 GC Column ID: DB-5

VER Data Filename: 010223P1 S#4 Analysis Date: 23-FEB-01 Time: 13:52:50

Reviewer: CLDate: 24 Feb 01Analyst: GAGDate: 24 Feb 01

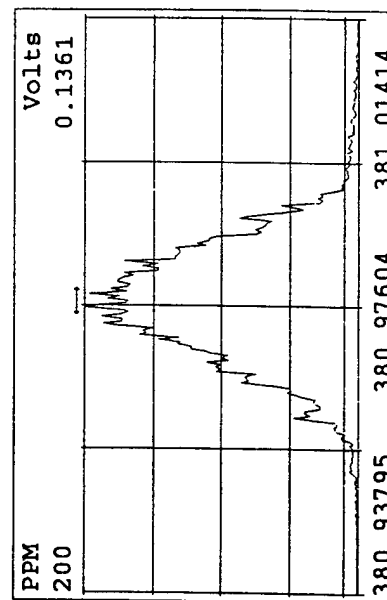
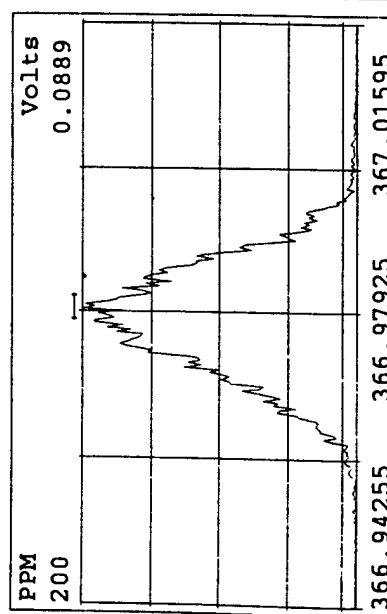
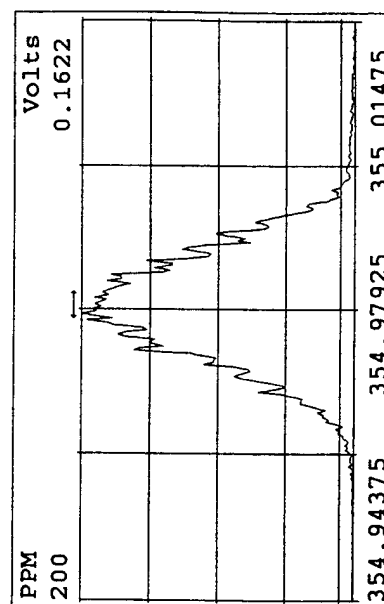
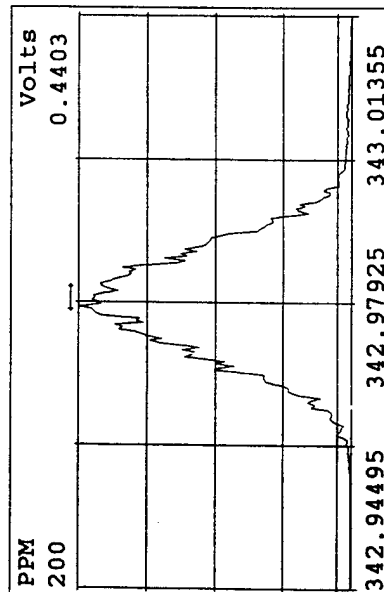
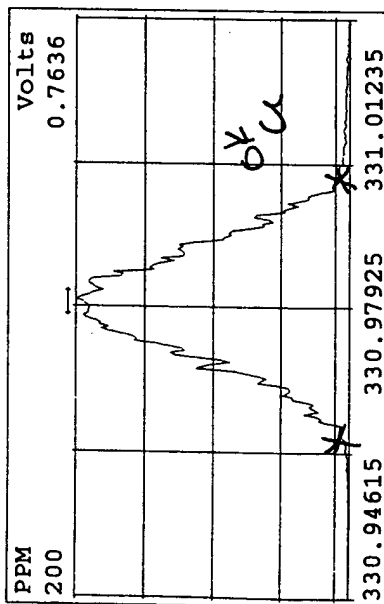
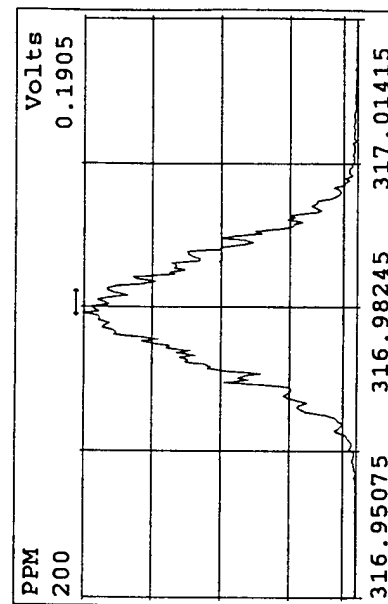
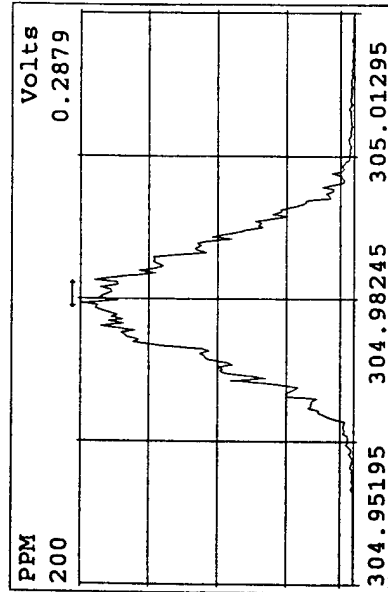
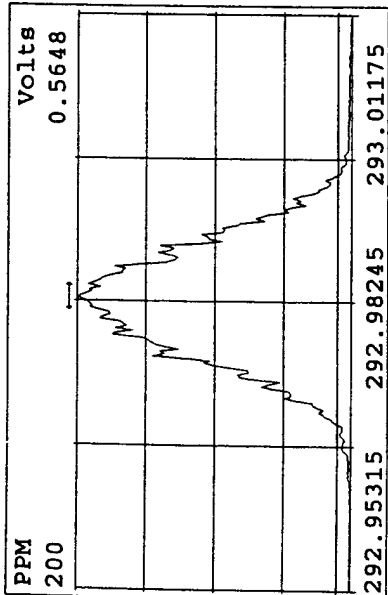
| Labeled Compounds         |                        |              |      |                |                           |  |  |
|---------------------------|------------------------|--------------|------|----------------|---------------------------|--|--|
| M/Z'S<br>FORMING<br>RATIO | ION<br>ABUND.<br>RATIO | QC<br>LIMITS | Pass | CONC.<br>FOUND | CONC.<br>RANGE<br>(ng/mL) |  |  |
| 13C-2,3,7,8-TCDD          | M/M+2                  | 0.65-0.89    | Y    | 95.0 ✓         | 70.0 - 130.0              |  |  |
| 13C-1,2,3,7,8-PeCDD       | M+2/M+4                | 1.32-1.78    | Y    | 103.9 ✓        | 70.0 - 130.0              |  |  |
| 13C-1,2,3,6,7,8-HxCDD     | M+2/M+4                | 1.05-1.43    | Y    | 92.4 ✓         | 70.0 - 130.0              |  |  |
| 13C-1,2,3,4,6,7,8-HpCDD   | M+2/M+4                | 0.88-1.20    | Y    | 90.4 ✓         | 70.0 - 130.0              |  |  |
| 13C-OCDD                  | M+2/M+4                | 0.76-1.02    | Y    | 86.6 ✓         | 70.0 - 130.0              |  |  |
| 13C-2,3,7,8-TCDF          | M/M+2                  | 0.65-0.89    | Y    | 93.0 ✓         | 70.0 - 130.0              |  |  |
| 13C-1,2,3,7,8-PeCDF       | M+2/M+4                | 1.32-1.78    | Y    | 90.3 ✓         | 70.0 - 130.0              |  |  |
| 13C-1,2,3,6,7,8-HxCDF     | M/M+2                  | 0.43-0.59    | Y    | 87.7 ✓         | 70.0 - 130.0              |  |  |
| 13C-1,2,3,4,6,7,8-HpCDF   | M/M+2                  | 0.37-0.51    | Y    | 82.1 ✓         | 70.0 - 130.0              |  |  |
| 13C-OCDF                  | M+2/M+4                | 0.76-1.02    | Y    | 82.4 ✓         | 70.0 - 130.0              |  |  |
|                           |                        |              |      |                |                           |  |  |
| 37Cl-2,3,7,8-TCDD         |                        |              |      | 107.3 ✓        | 75.0 - 125.0              |  |  |
| 13C-2,3,4,7,8-PeCDD       | M+2/M+4                | 1.32-1.78    | Y    | 104.8 ✓        | 75.0 - 125.0              |  |  |
| 13C-1,2,3,4,7,8-HxCDD     | M+2/M+4                | 1.05-1.43    | Y    | 102.4 ✓        | 75.0 - 125.0              |  |  |
| 13C-1,2,3,4,7,8-HpCDD     | M/M+2                  | 0.43-0.59    | Y    | 105.0 ✓        | 75.0 - 125.0              |  |  |
| 13C-1,2,3,4,7,8,9-HpCDD   | M/M+2                  | 0.37-0.51    | Y    | 100.7 ✓        | 75.0 - 125.0              |  |  |
|                           |                        |              |      |                |                           |  |  |
| 13C-1,2,3,7,8,9-HxCDF     | M/M+2                  | 0.43-0.59    | Y    | 90.8 ✓         | 75.0 - 125.0              |  |  |

Client ID: DB5 CFSM / M23 CS3      Filename: 010223P1      S: 4      Acq: 23-FEB-01 13:52:50      ConCal: 010223P1-      Page 10 of 10  
 Lab ID: CS3RC      GC Column ID: db-5      ICal: MM1\_M23\_0,      wt/vol: 1.000      EndCal: 010223P1-

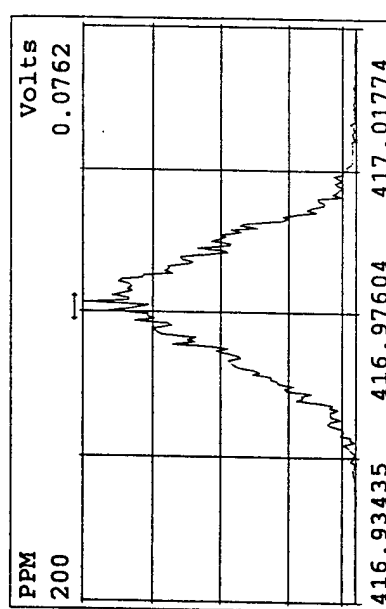
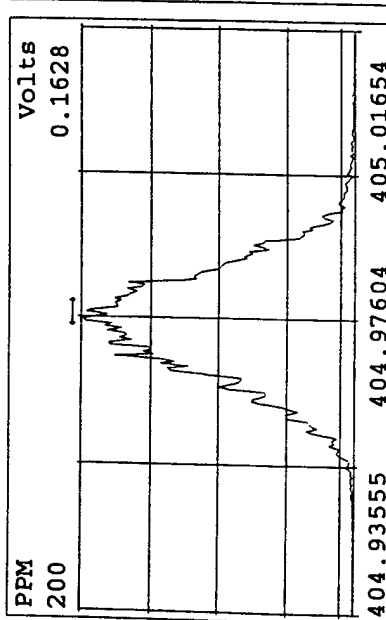
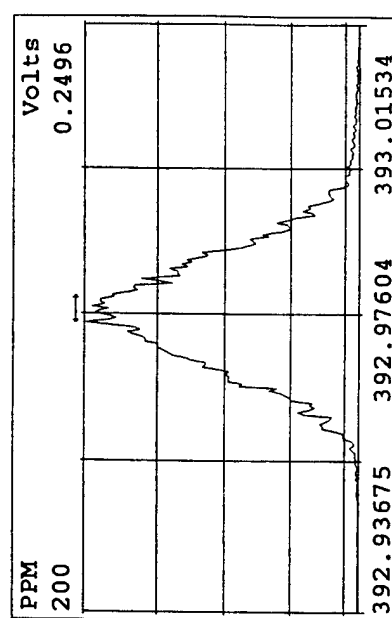
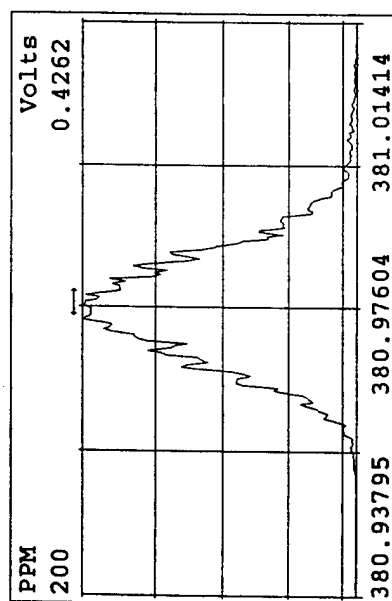
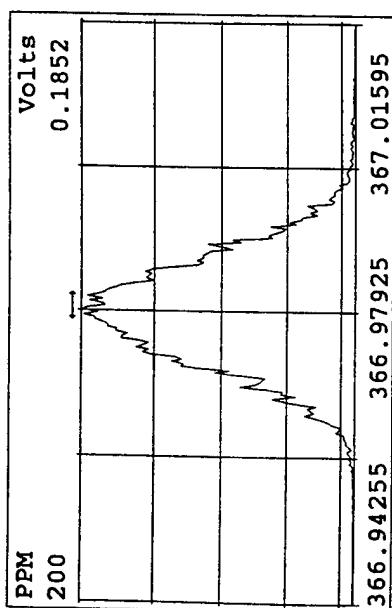
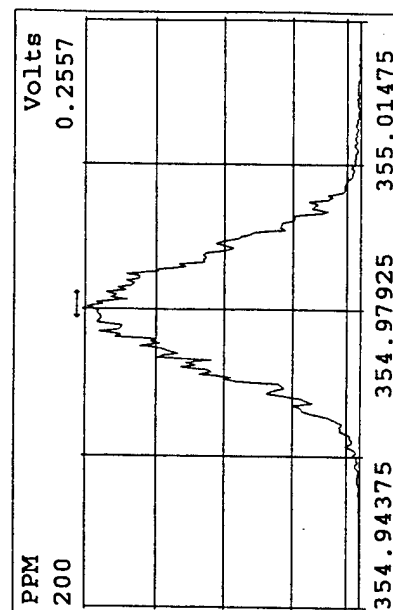
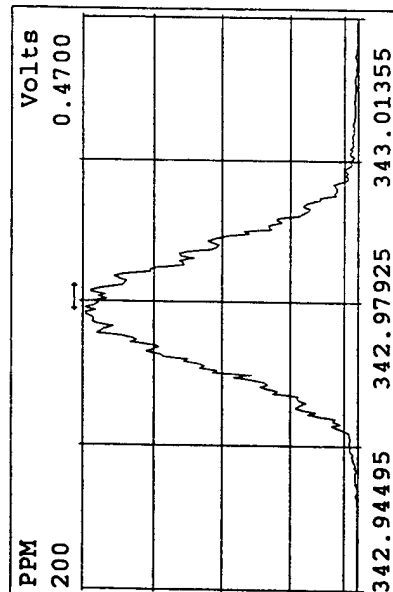
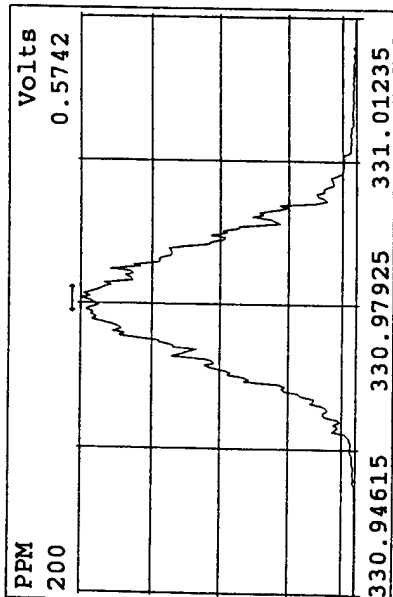
| Name                  | Resp                    | RA       | RRF    | RT    | Conc | Qualif. | CDE | noise        | Fac | DL     |
|-----------------------|-------------------------|----------|--------|-------|------|---------|-----|--------------|-----|--------|
| 2,3,7,8-TCDD          | 4.69e+06                | 0.77 Y   | 1.26   | 27:38 | 5.72 |         |     | 858          | 2.5 | 0.0191 |
| 1,2,3,7,8-PeCDF       | 1.60e+07                | 1.56 Y   | 1.01   | 33:06 | 27.3 |         |     | 311763       | 2.5 | 12.4   |
| 1,2,3,4,7,8-HxCDD     | 1.43e+07                | 1.25 Y   | 1.14   | 37:00 | 25.8 |         |     | 2428         | 2.5 | 0.101  |
| 1,2,3,6,7,8-HxCDD     | 1.32e+07                | 1.26 Y   | 1.02   | 37:07 | 26.6 |         |     | 2428         | 2.5 | 0.112  |
| 1,2,3,7,8,9-HxCDD     | 1.50e+07                | 1.24 Y   | 1.14   | 37:26 | 26.9 |         |     | 2428         | 2.5 | 0.101  |
| 1,2,3,4,6,7,8-HpCDD   | 1.32e+07                | 1.03 Y   | 1.13   | 41:23 | 25.3 |         |     | 2494         | 2.5 | 0.157  |
| OCDD                  | 1.92e+07                | 0.88 Y   | 1.03   | 46:41 | 52.1 |         |     | 850          | 2.5 | 0.0960 |
| 2,3,7,8-TCDF          | 4.36e+06                | 0.74 Y   | 1.05   | 26:44 | 4.75 |         |     | 1265         | 2.5 | 0.0266 |
| 1,2,3,7,8-PeCDF       | 2.01e+07                | 1.54 Y   | 1.04   | 31:37 | 25.2 |         |     | 8276         | 2.5 | 0.252  |
| 2,3,4,7,8-PeCDF       | 2.03e+07                | 1.52 Y   | 1.05   | 32:44 | 25.0 |         |     | 8276         | 2.5 | 0.248  |
| 1,2,3,4,7,8-HxCDF     | 1.77e+07                | 1.23 Y   | 1.13   | 36:01 | 24.7 |         |     | 3215         | 2.5 | 0.0651 |
| 1,2,3,6,7,8-HxCDF     | 1.92e+07                | 1.22 Y   | 1.24   | 36:10 | 24.5 |         |     | 3215         | 2.5 | 0.0595 |
| 2,3,4,6,7,8-HxCDF     | 1.78e+07                | 1.22 Y   | 1.16   | 36:49 | 24.1 |         |     | 3215         | 2.5 | 0.0633 |
| 1,2,3,7,8,9-HxCDF     | 1.57e+07                | 1.22 Y   | 1.02   | 37:49 | 24.3 |         |     | 3215         | 2.5 | 0.0724 |
| 1,2,3,4,6,7,8-HpCDF   | 1.56e+07                | 1.02 Y   | 1.54   | 39:46 | 24.3 |         |     | 3299         | 2.5 | 0.101  |
| 1,2,3,4,7,8-HpCDF     | 1.27e+07                | 1.02 Y   | 1.30   | 42:12 | 23.3 |         |     | 3299         | 2.5 | 0.120  |
| OCDF                  | 2.12e+07                | 0.89 Y   | 1.15   | 47:01 | 49.1 |         |     | 1780         | 2.5 | 0.160  |
| Total Tetra-Dioxins   | 1.86e+07                | 0.77 Y   | 1.26   | 23:52 | 22.6 |         |     | 858          | 2.5 | 0.0191 |
| Total Penta-Dioxins   | 4.20e+07                | 1.56 Y   | 1.01   | 30:33 | 71.5 |         |     | 311763       | 2.5 | 12.4   |
| Total Hexa-Dioxins    | 4.40e+07                | 1.24 Y   | 1.10   | 35:18 | 82.2 |         |     | 2428         | 2.5 | 0.104  |
| Total Hepta-Dioxins   | 2.44e+07                | 1.03 Y   | 1.13   | 40:12 | 46.8 |         |     | 2494         | 2.5 | 0.157  |
| Total Tetra-Furans    | 1.10e+07                | 0.72 Y   | 1.05   | 21:10 | 12.0 |         |     | 1265         | 2.5 | 0.0266 |
| 1st Fnc. Penta-Furans | 1.65e+07                | 1.62 Y   | 1.05   | 28:44 | 20.5 |         |     | 4541         | 2.5 | 0.137  |
| Total Penta-Furans    | 5.74e+07                | 1.54 Y   | 1.05   | 31:37 | 71.4 |         |     | 8276         | 2.5 | 0.250  |
| PeCDF Totals:         |                         |          |        |       | 91.9 |         |     |              |     |        |
| Total Hexa-Furans     | 7.24e+07                | 1.26 Y   | 1.14   | 34:38 | 100  |         |     | 3215         | 2.5 | 0.0647 |
| Total Hepta-Furans    | 2.83e+07                | 1.02 Y   | 1.42   | 39:46 | 47.6 |         |     | 3299         | 2.5 | 0.109  |
| IS                    | 13C-2,3,7,8-TCDD        | 0.79 Y   | 1.13   | 27:36 | 95.0 |         |     | Rec          |     |        |
| IS                    | 13C-1,2,3,7,8-PeCDD     | 1.56 Y   | 0.93   | 33:04 | 104  |         |     | 95.0         |     |        |
| IS                    | 13C-1,2,3,6,7,8-HxCDD   | 1.25 Y   | 0.93   | 37:06 | 92.4 |         |     | 104          |     |        |
| IS                    | 13C-1,2,3,4,6,7,8-HpCDD | 1.05 Y   | 0.91   | 41:22 | 90.4 |         |     | 92.4         |     |        |
| IS                    | 13C-OCDD                | 0.89 Y   | 0.73   | 46:40 | 86.6 |         |     | 90.4         |     |        |
| IS                    | 13C-2,3,7,8-TCDF        | 0.79 Y   | 1.06   | 26:43 | 93.0 |         |     | 86.6         |     |        |
| IS                    | 13C-1,2,3,7,8-PeCDF     | 1.59 Y   | 0.96   | 31:36 | 90.3 |         |     | 93.0         |     |        |
| IS                    | 13C-1,2,3,6,7,8-HxCDF   | 0.52 Y   | 1.28   | 36:09 | 87.7 |         |     | 90.3         |     |        |
| IS                    | 13C-1,2,3,4,6,7,8-HpCDF | 0.45 Y   | 0.90   | 39:45 | 82.1 |         |     | 87.7         |     |        |
| IS                    | 13C-OCDF                | 0.88 Y   | 0.81   | 47:00 | 82.4 |         |     | 82.1         |     |        |
| RS/RT                 | 13C-1,2,3,4-TCDD        | 0.82 Y   | 1.00   | 26:56 | 100  |         |     | 82.4         |     |        |
| RS                    | 13C-1,2,3,4-TCDF        | 0.77 Y   | 1.00   | 25:19 | 100  |         |     |              |     |        |
| RS/RT                 | 13C-1,2,3,7,8,9-HxCDD   | 1.27 Y   | 1.00   | 37:25 | 100  |         |     |              |     |        |
| PS                    | 37Cl-2,3,7,8-TCDD       |          | 0.51   | 27:38 | 107  |         |     | Analyst: SAC |     |        |
| PS                    | 13C-2,3,4,7,8-PeCDD     | 1.56 Y   | 0.97   | 32:43 | 105  |         |     | 107          |     |        |
| PS                    | 13C-1,2,3,4,7,8-HxCDD   | 1.26 Y   | 0.92   | 36:59 | 102  |         |     | 105          |     |        |
| PS                    | 13C-1,2,3,4,7,8-HxCDF   | 0.52 Y   | 0.91   | 36:00 | 105  |         |     | 102          |     |        |
| PS                    | 13C-1,2,3,4,7,8,9-HpCDD | 3.59e+07 | 0.44 Y | 42:11 | 101  |         |     | 105          |     |        |
| AS                    | 13C-1,2,3,7,8,9-HxCDF   | 5.47e+07 | 0.52 Y | 37:49 | 90.8 |         |     | 101          |     |        |

Reviewer: ce  
 Date: 24 Feb 01

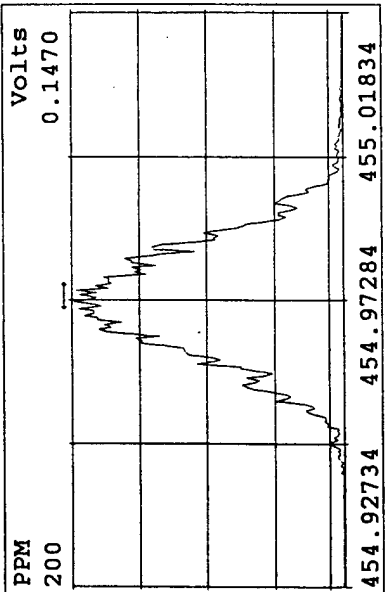
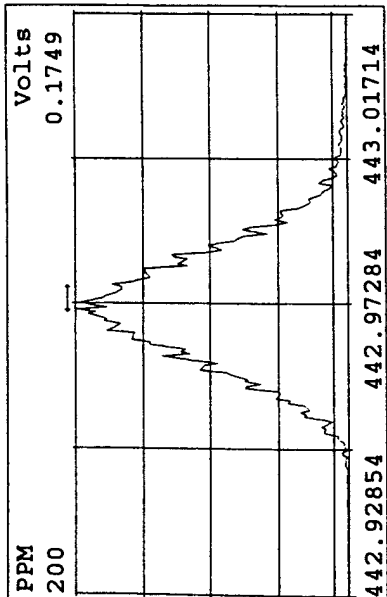
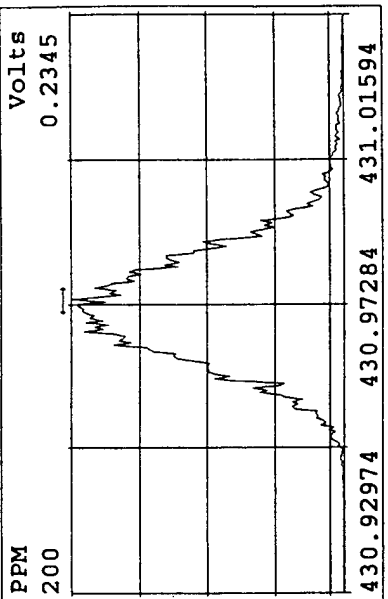
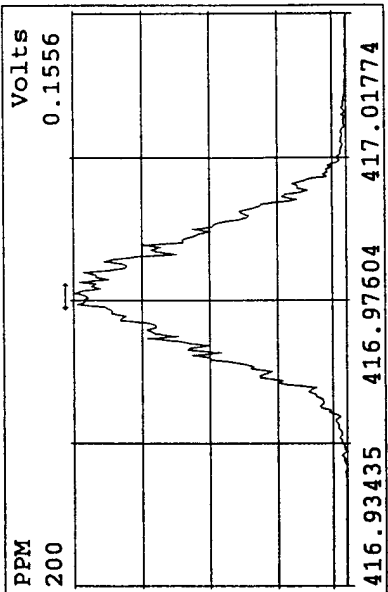
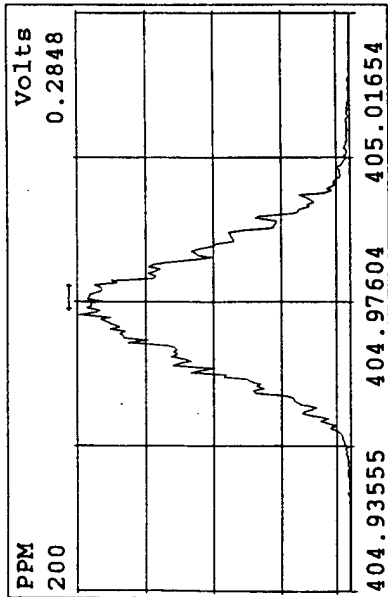
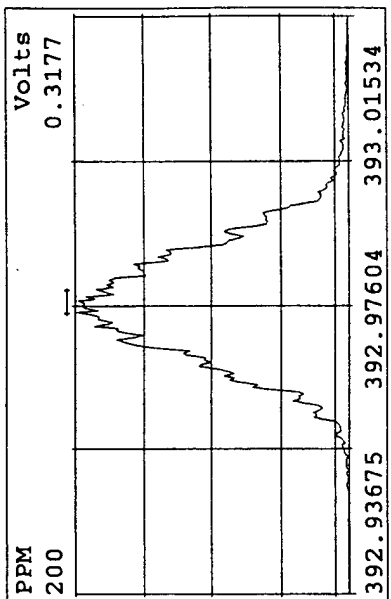
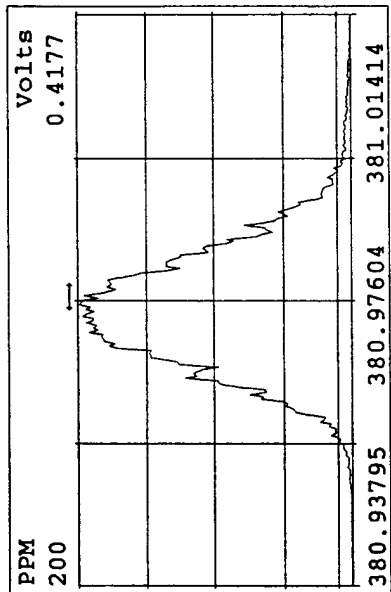
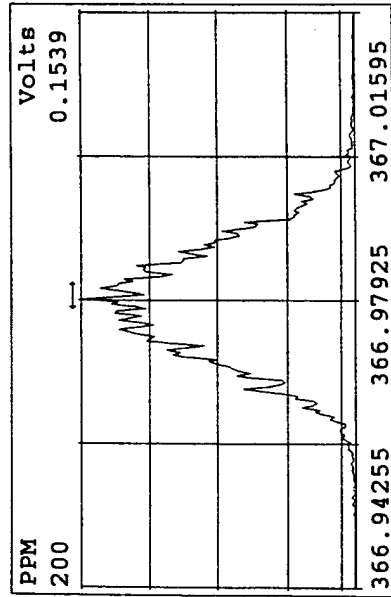
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Experiment: OCDD Function: 1 Reference: PFK2



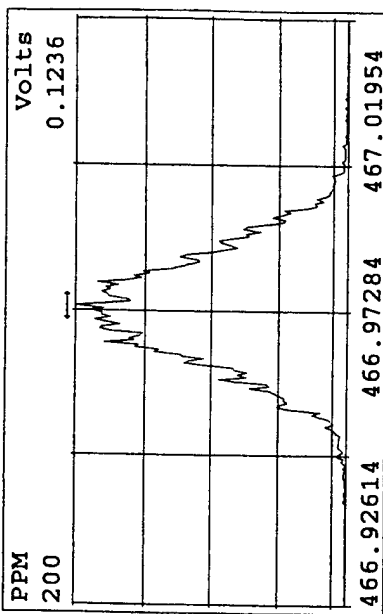
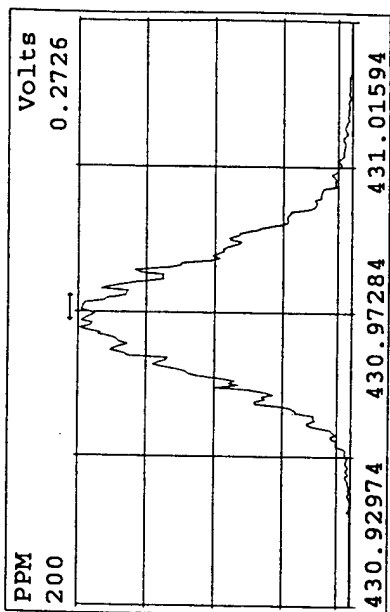
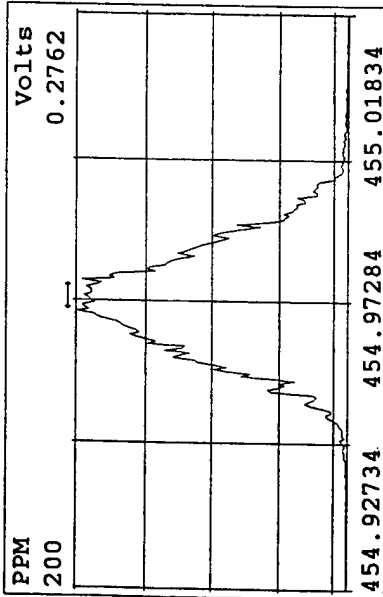
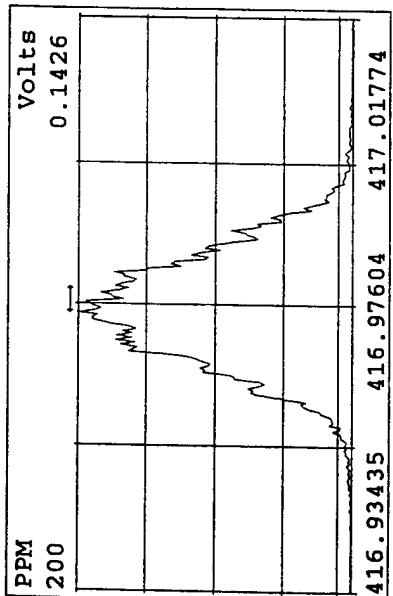
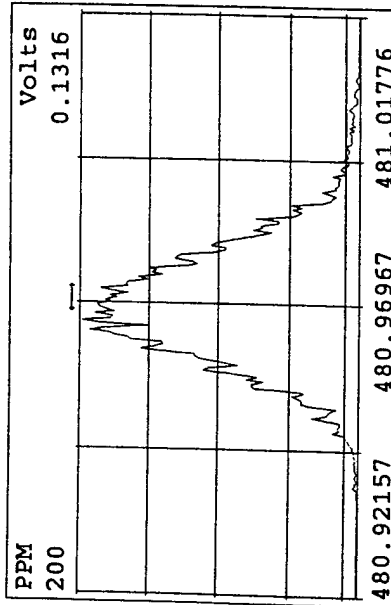
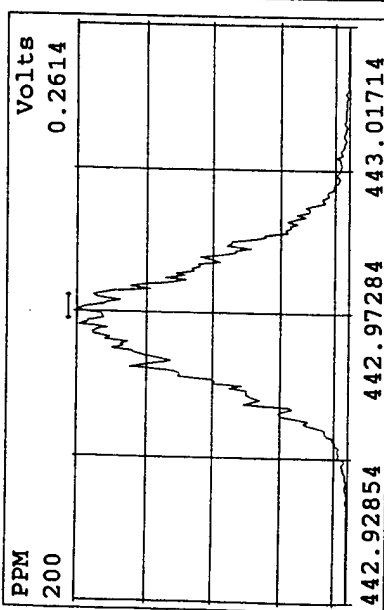
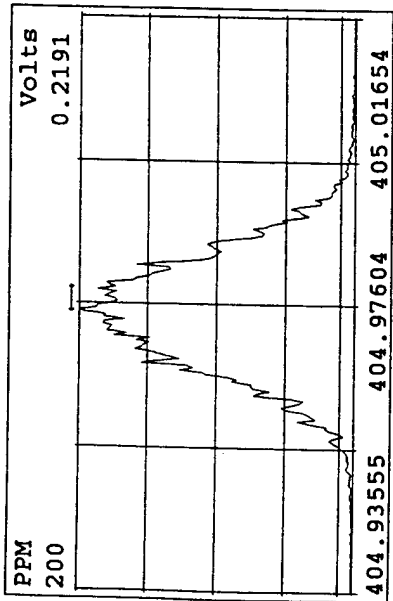
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Experiment:OCDD Function:2 Reference:PFK2



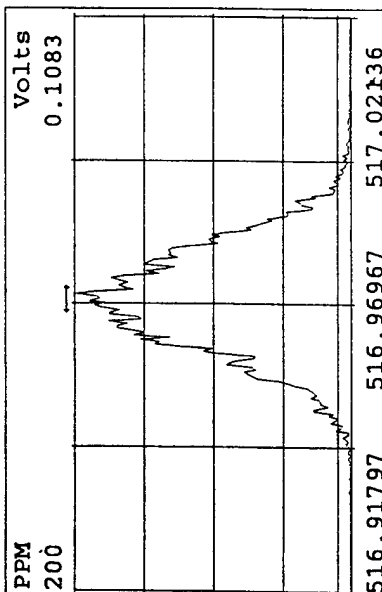
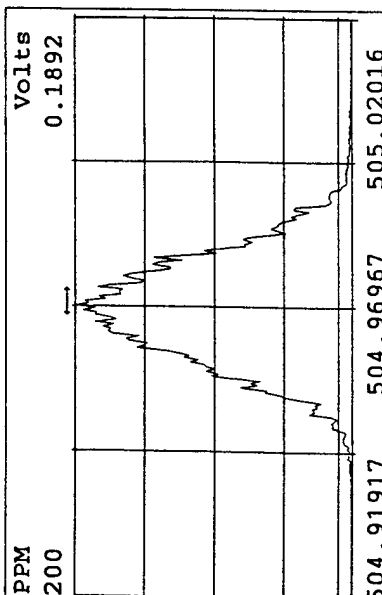
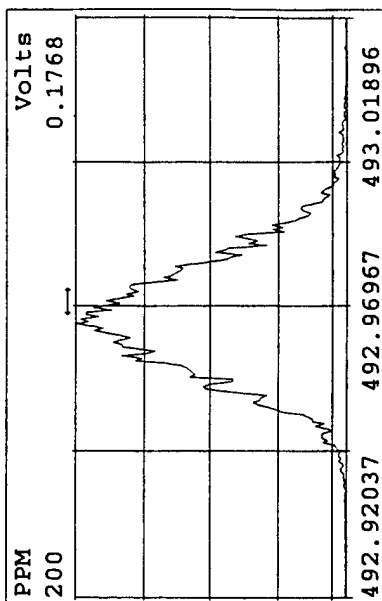
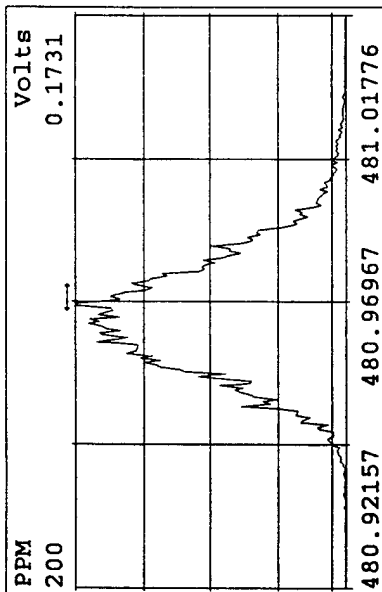
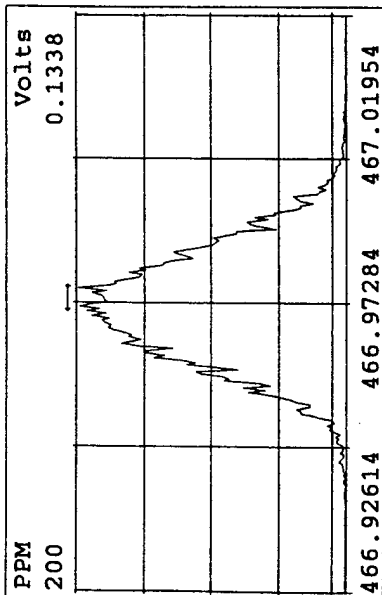
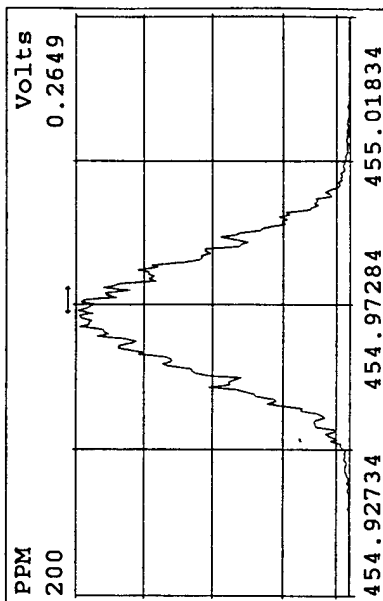
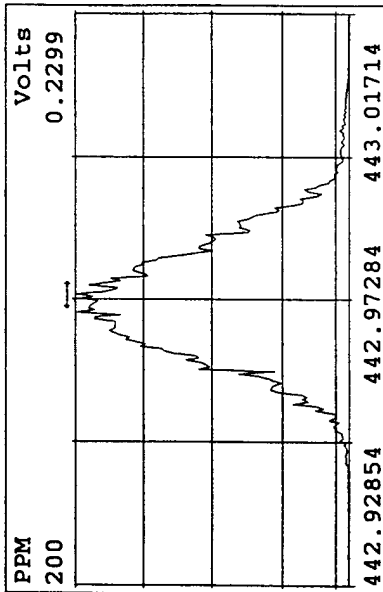
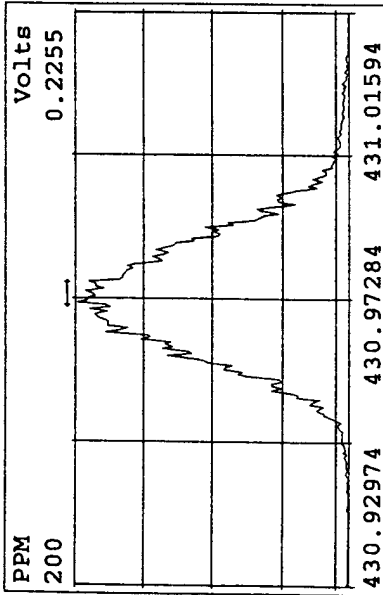
Peak Locate Examination: 23-FEB-2001:15:00 File: RES\_CHECK  
Experiment: OCDD Function: 3 Reference: PFK2



Peak Locate Examination: 23-FEB-2001:15:00 File: RES\_CHECK  
Experiment: OCDD Function: 4 Reference: PFK2



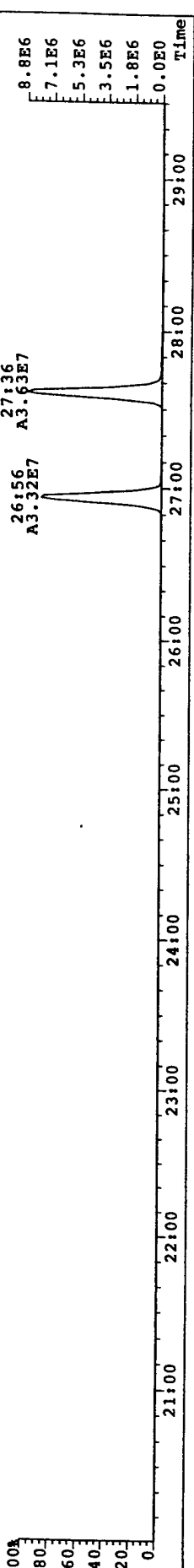
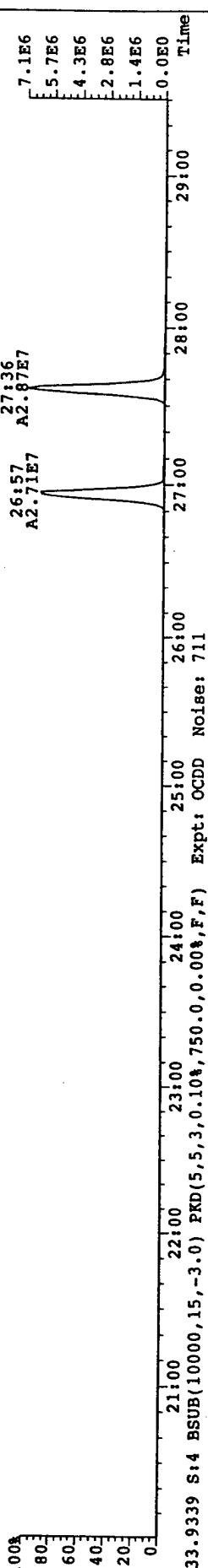
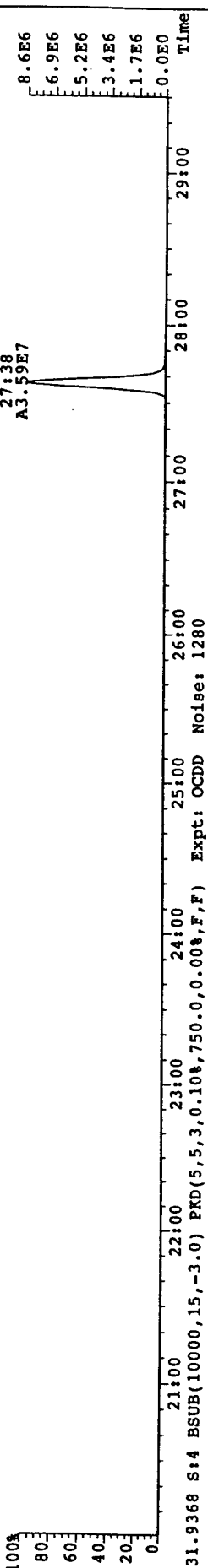
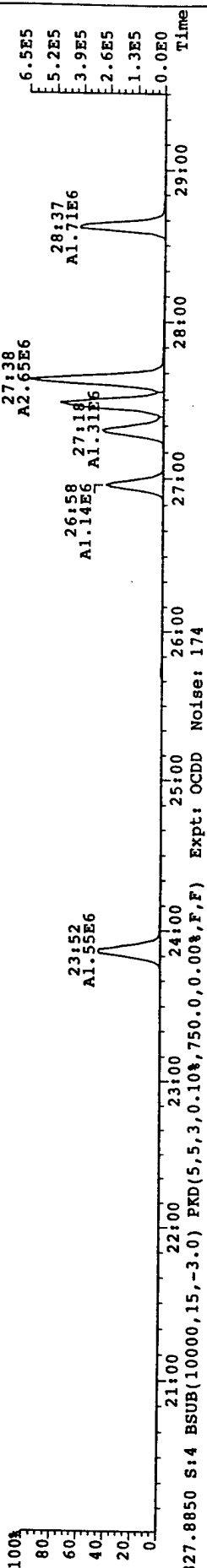
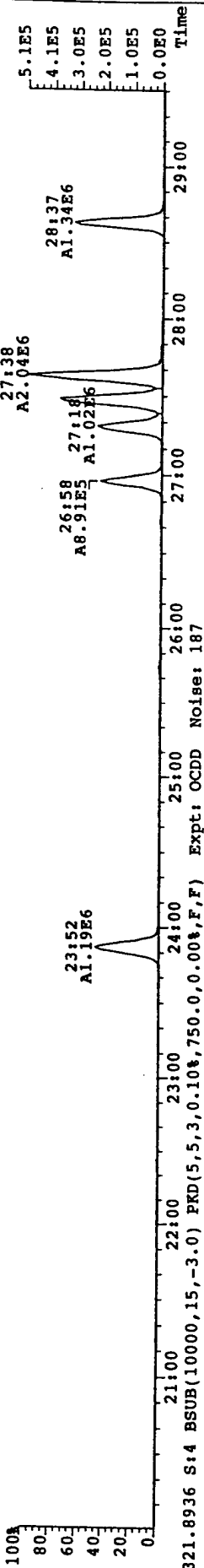
Peak Locate Examination: 23-FEB-2001:15:01 File: RES\_CHECK  
Experiment: OCDD Function: 5 Reference: PFK2



File: 010223P1 Acq: 23-FEB-2001 13:52:15 GC EIT Voltage SW Autospec-UltimaE

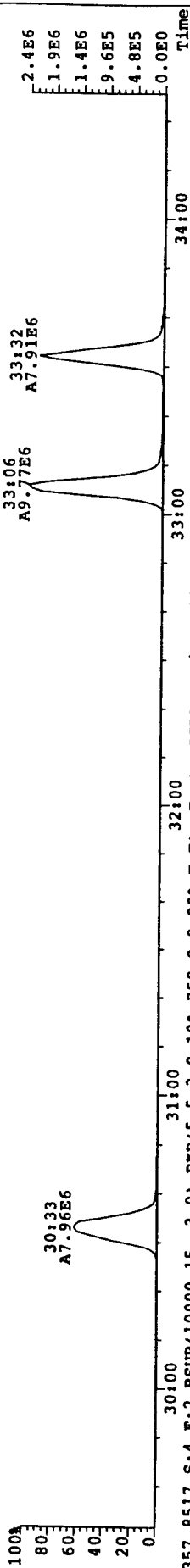
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

319.8965 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 219

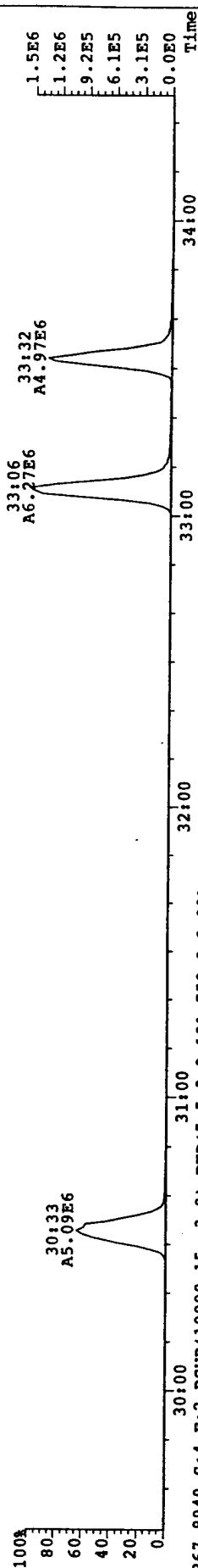




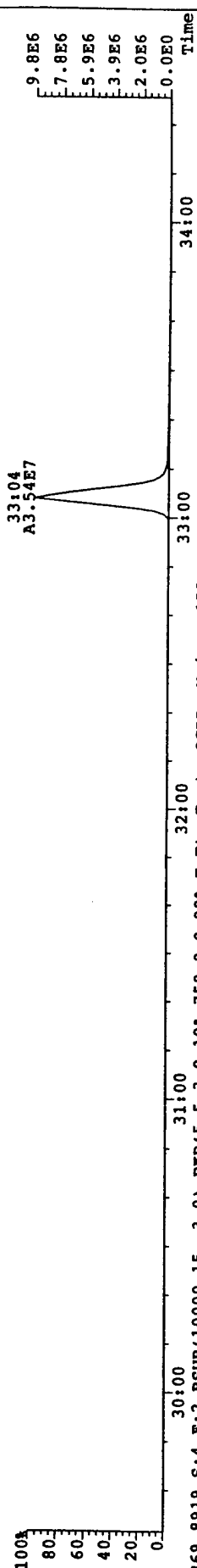
File: 010223PI Acq: 23-FEB-2001 13:52:50 GC ET+ Voltage SIX Autospec-UltimaE  
Sample# 4 Text: DB5 CPM / M23 CS3 Vial# 3 File Text: AAP DB5  
355.8546 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 579



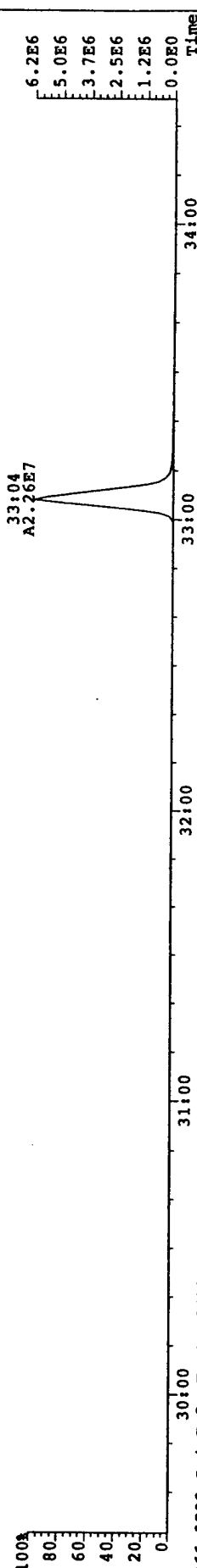
357.8517 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 223



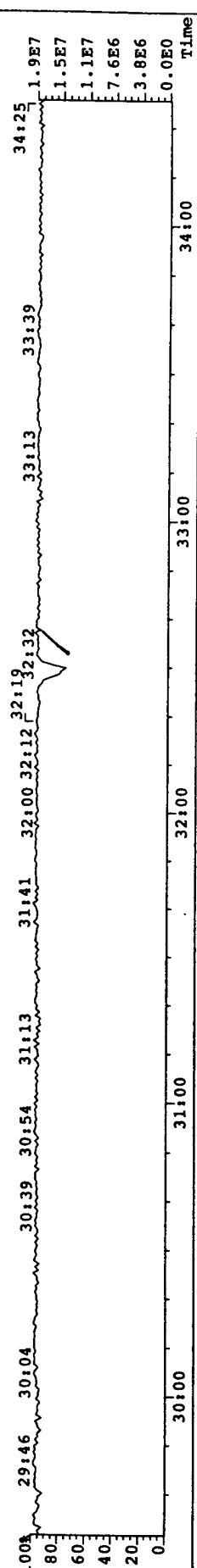
367.8949 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 319



369.8919 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 159



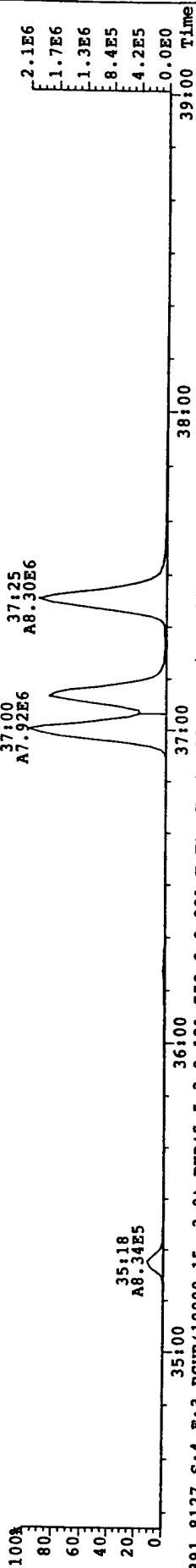
366.9792 S:4 F:2 Expt: OCDD



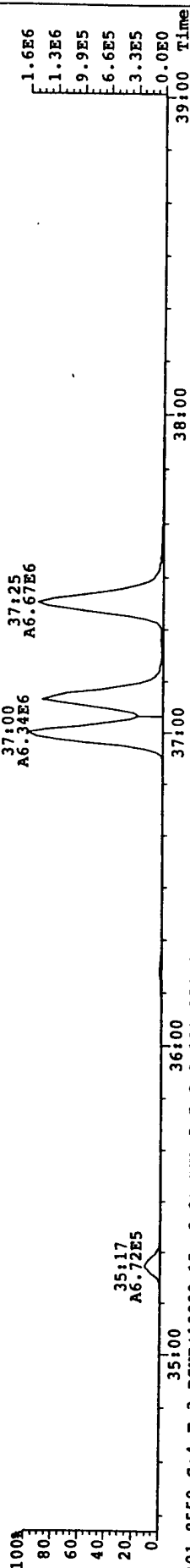
File: 010223PI ACQ: 23-FEB-2001 13:52:50 GC E1+ Voltage S1X Autospec-Ultimate

Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

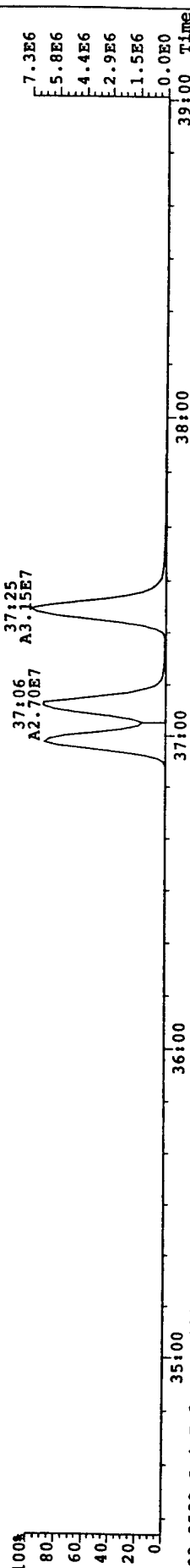
389.8156 S:4 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 504



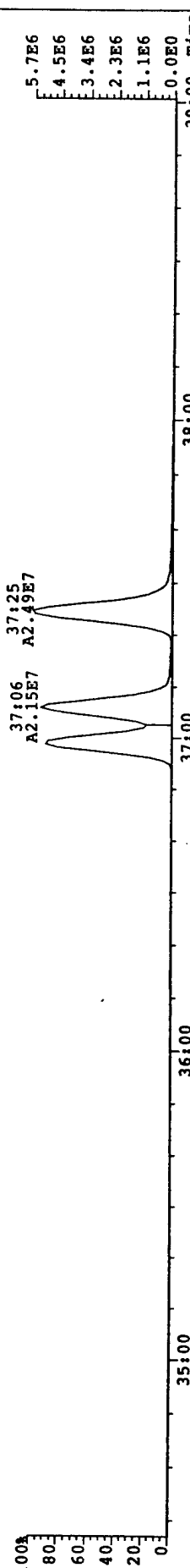
391.8127 S:4 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 443



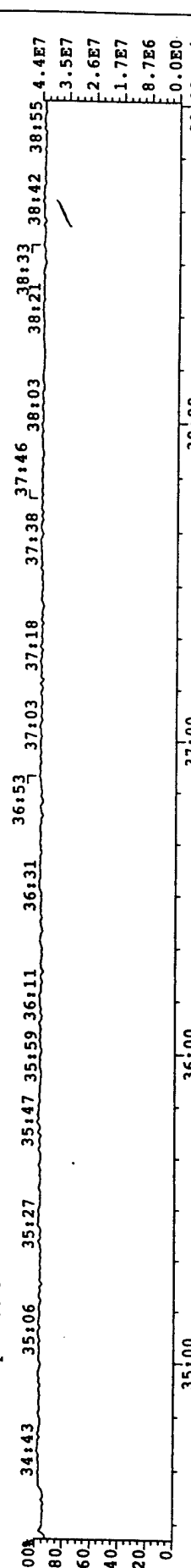
401.8559 S:4 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 752



403.8530 S:4 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 318



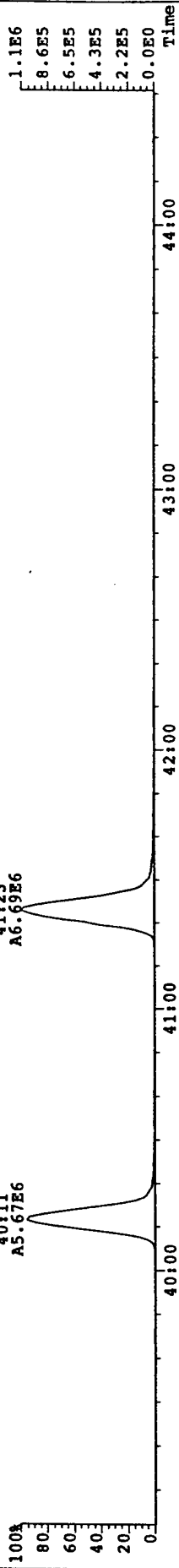
380.9760 S:4 F:3 Expt: OCDD



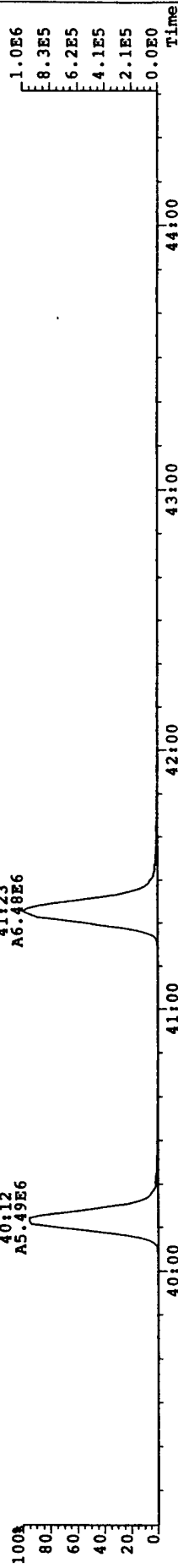
File: 010223PI Acq: 23-FEB-2001 13:52:50 GC EX+ VOLTAGE SR Autospec-UltimaE

Sample# 4 Text: DB5 CFSM / M23 CS3 Vial# 3 File Text: AAP DB5

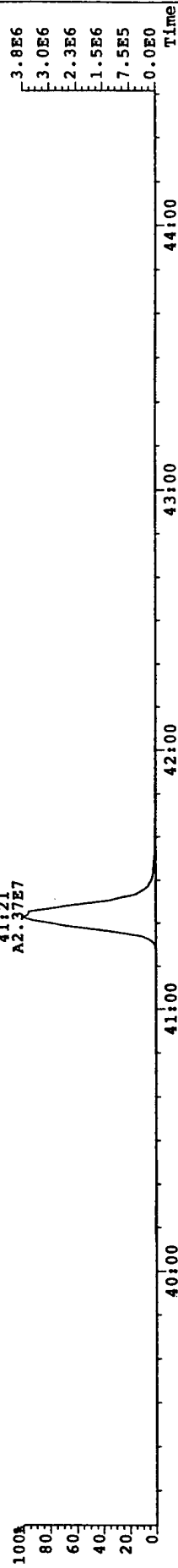
423.7767 S:4 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 442



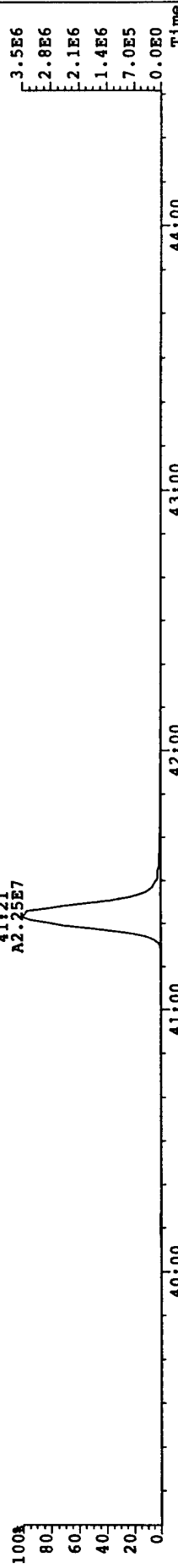
425.7737 S:4 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 454



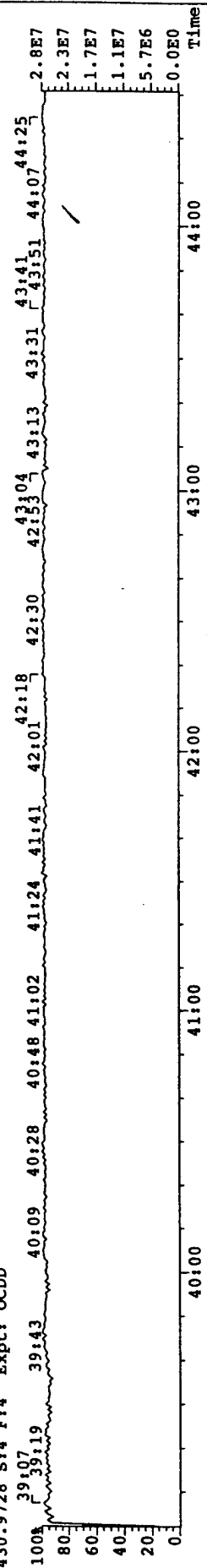
435.8169 S:4 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1332

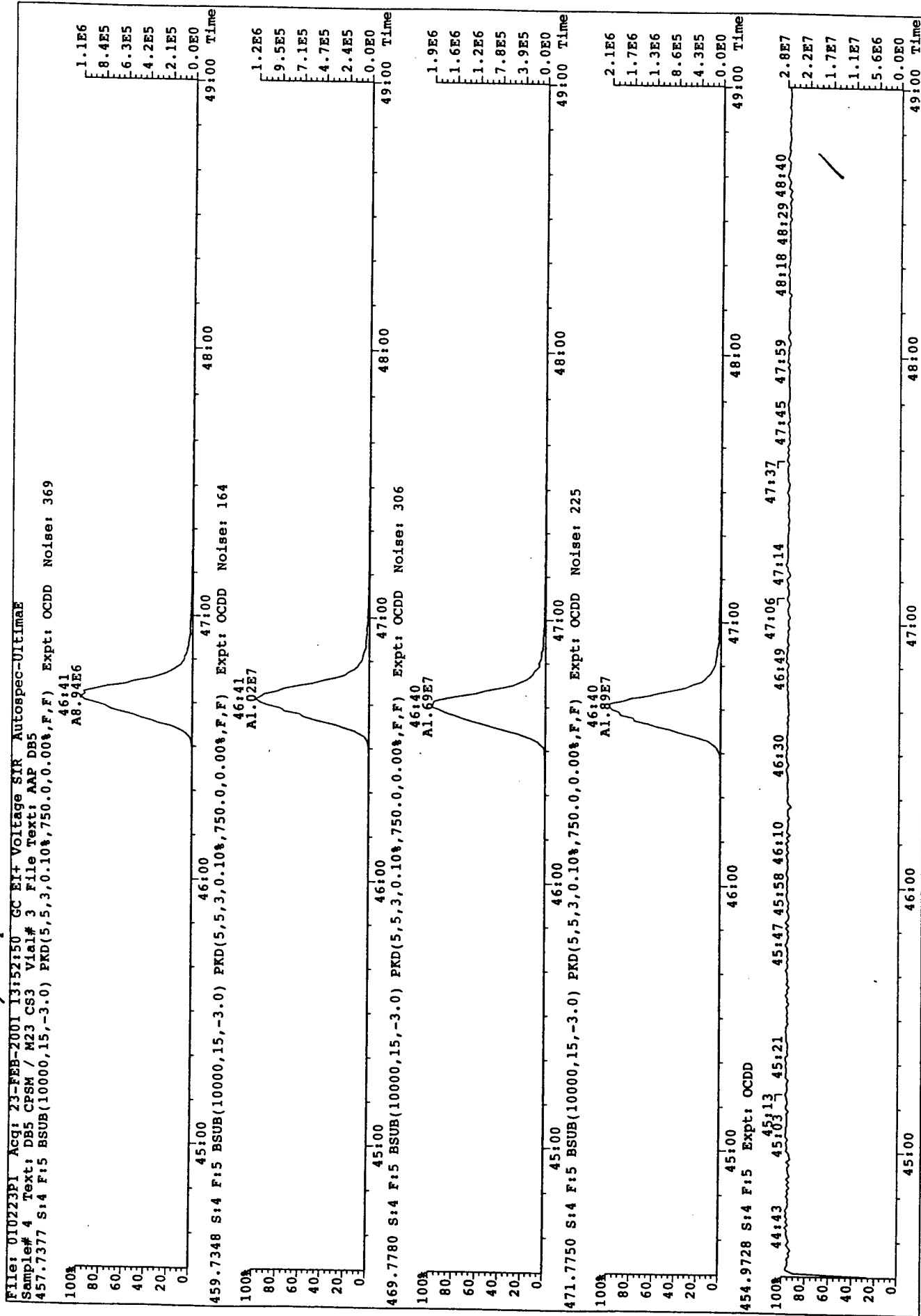


437.8140 S:4 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 984



430.9728 S:4 F:4 Expt: OCDD

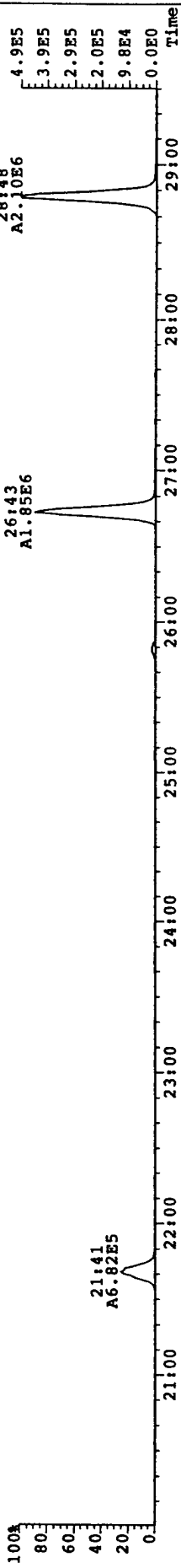




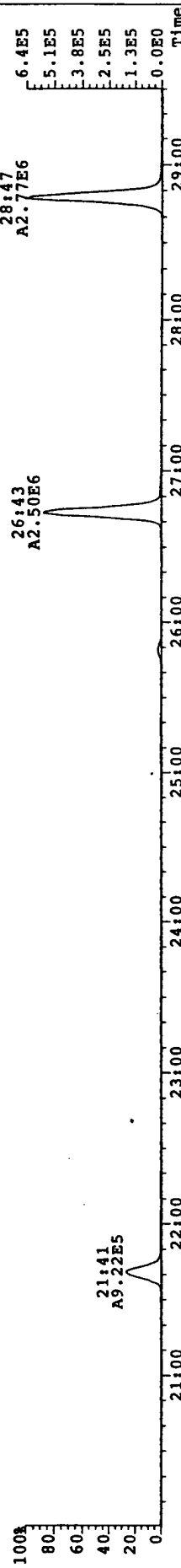
File: 010223PI Acq: 23-FEB-2001 13:52:50 GC EX+ Voltage SIR Autospec-UltimaE

Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5

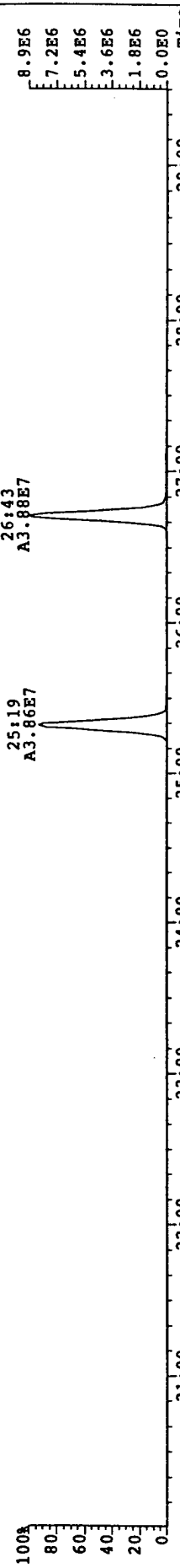
303.9016 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 195



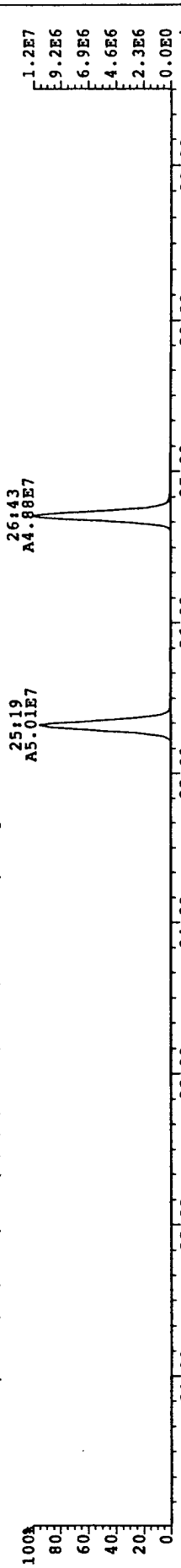
305.8987 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 382



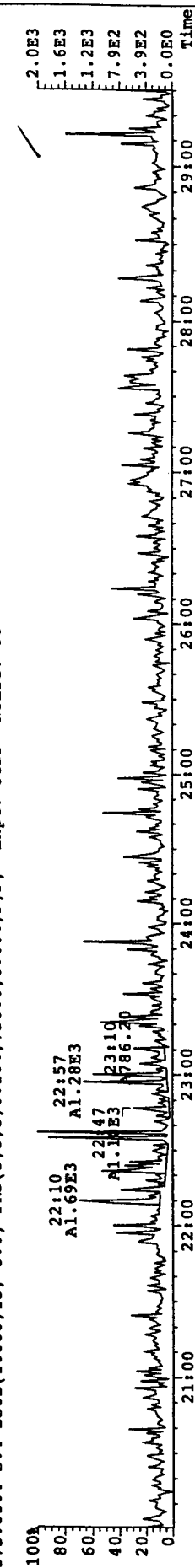
315.9419 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 537



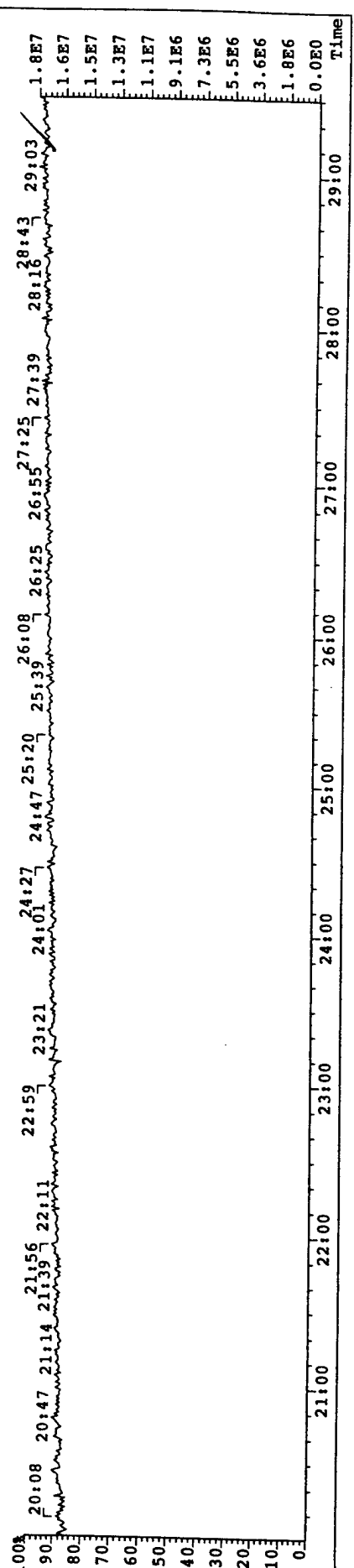
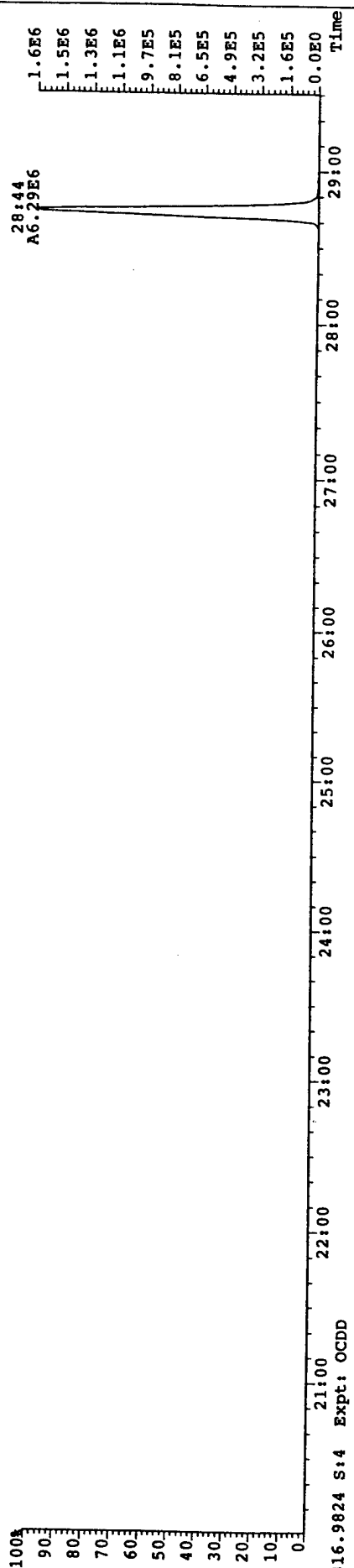
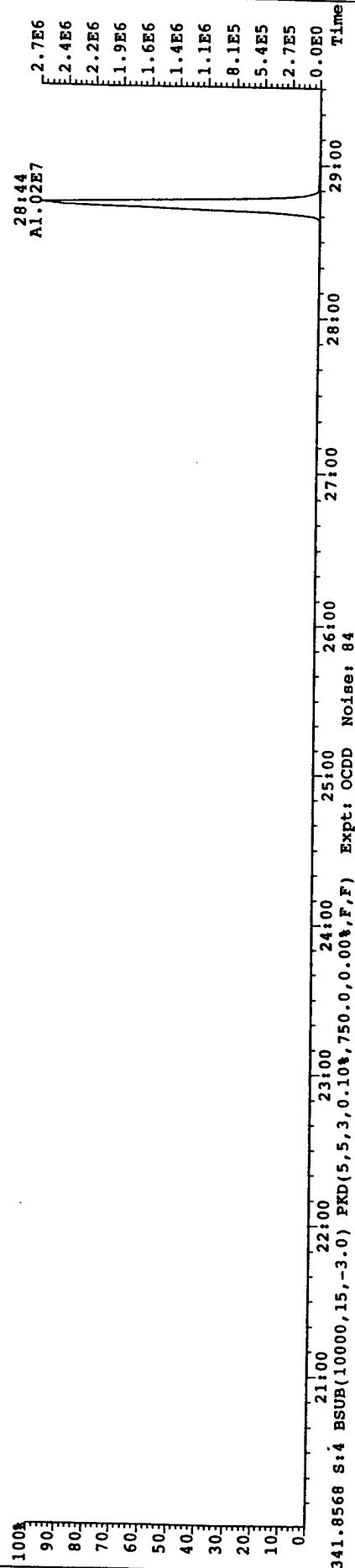
317.9389 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 657



375.8364 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 66



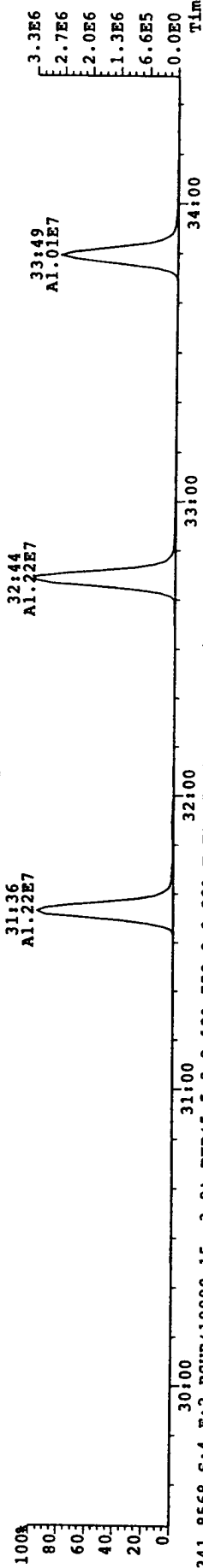
File: 010223P1 Acq: 23-FEB-2001 13:52:50 GC EIT Voltage SW Autospec-UIEmaE  
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5  
339.8597 S:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 63



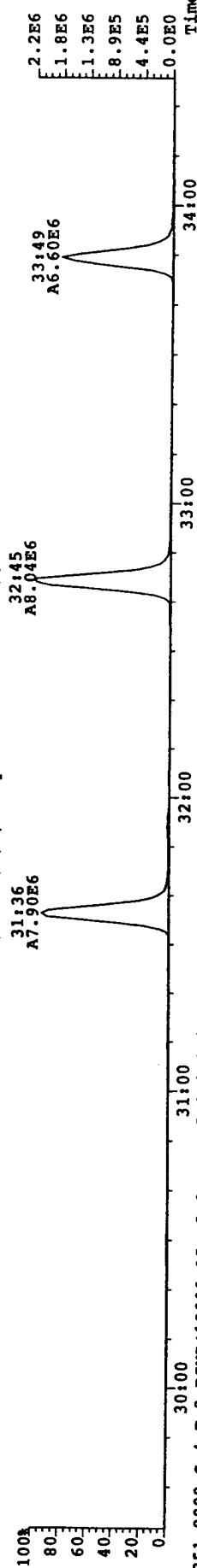
File: 010723PI Acq: 23-FEB-2001 13:52:50 GC EI+ Voltage SIR Autospec-UltimaE

Sample# 4 Text: DB5 CPM / M23 CS3 Vial# 3 File Text: AAP DB5

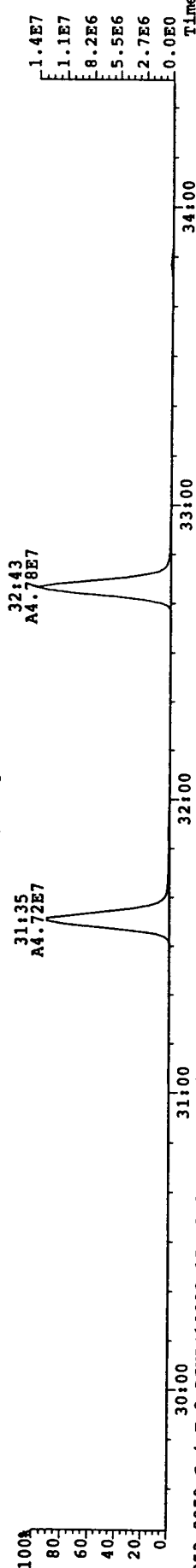
339.8597 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 582



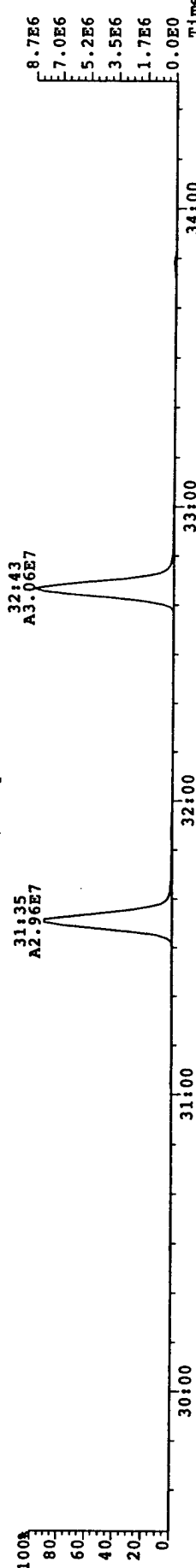
341.8568 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 513



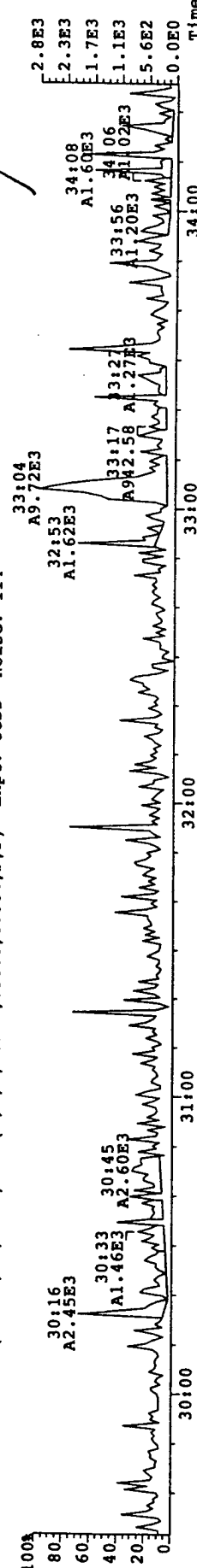
351.9000 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 352



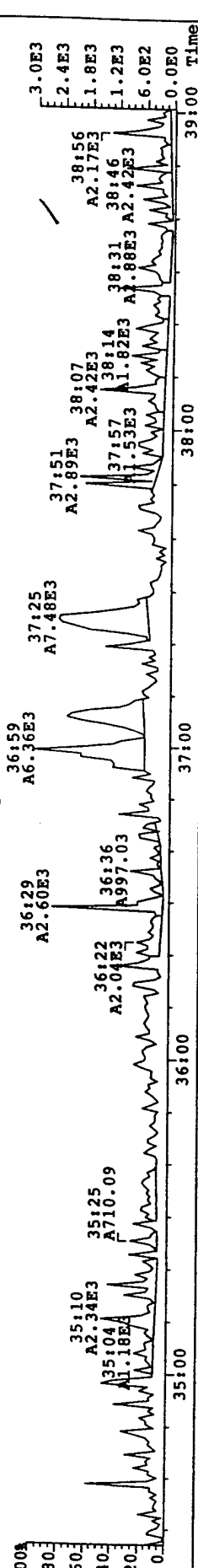
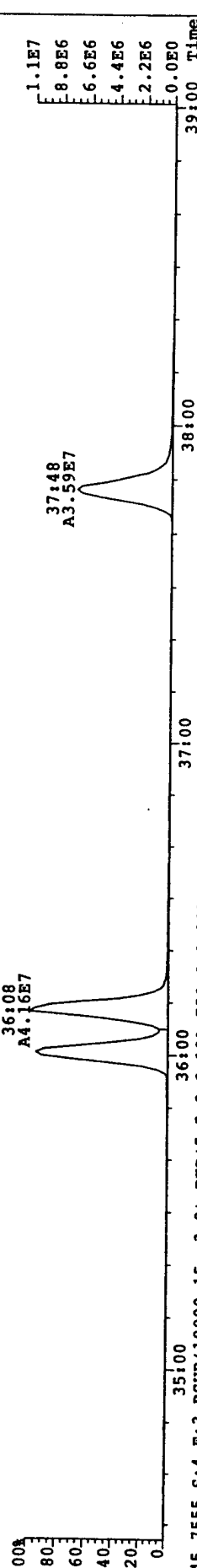
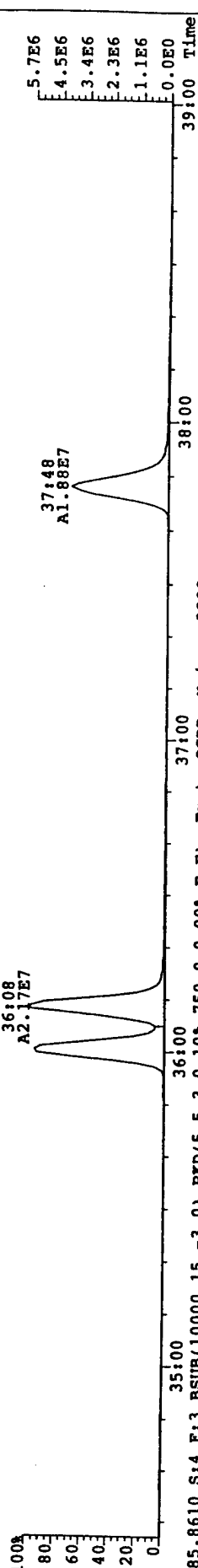
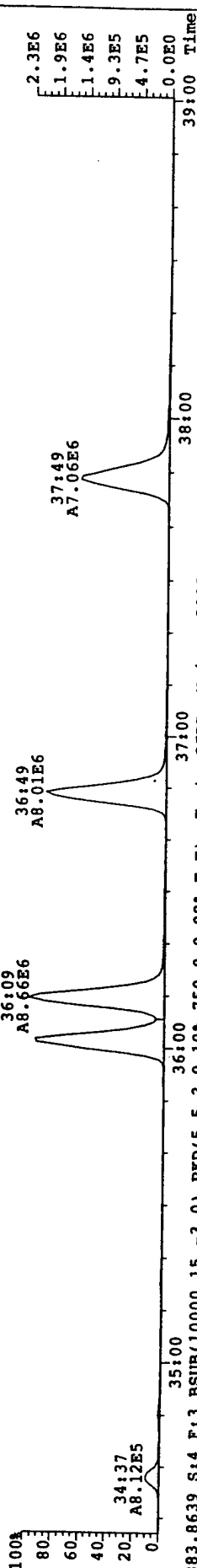
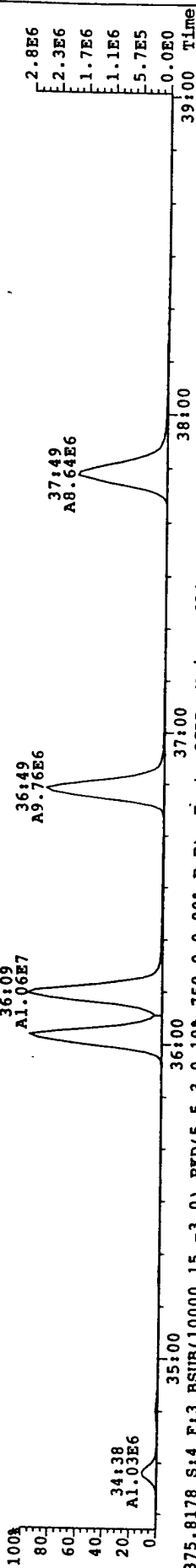
353.8970 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 864



409.7974 S:4 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 114



File: 010223PI Acq: 23-FEB-2001 13:52:50 GC FID Voltage SIR Autospec-UltimaE  
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5  
373.8207 S:4 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 913

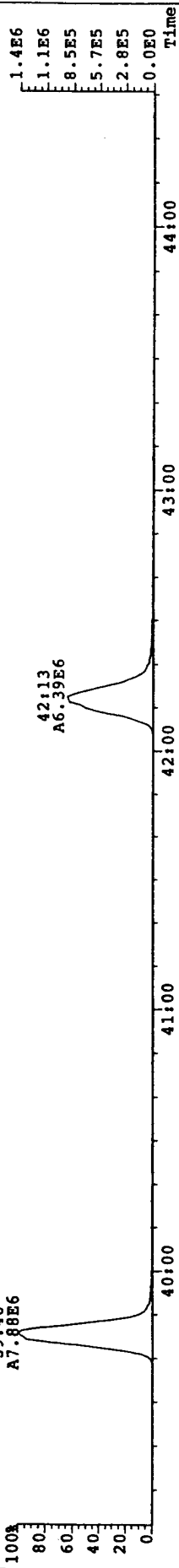




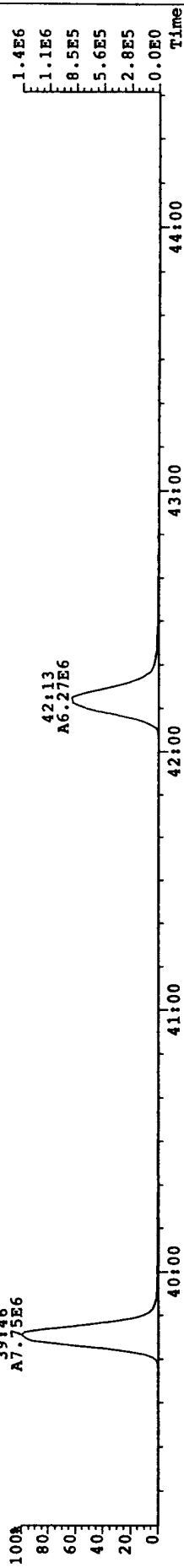
File: 010223PI Acq: 23-FEB-2001 13:52:50 GC E1+ Voltage SIR Autospec-ULTimaE

Sample# 4 Text: DB5 CPM / M23 CS3 Vial# 3 File Text: AAP DB5

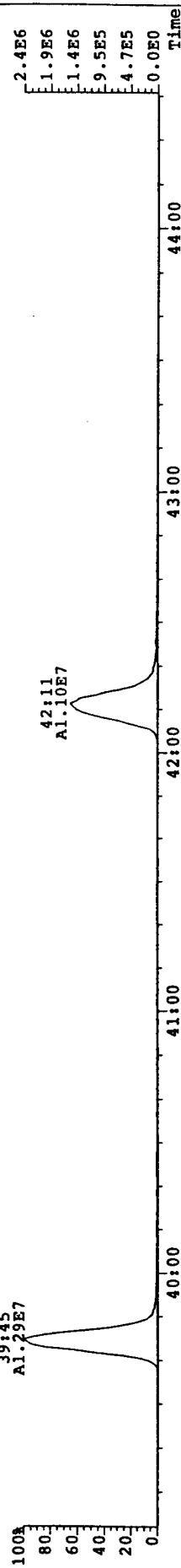
407.7818 S:4 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 416



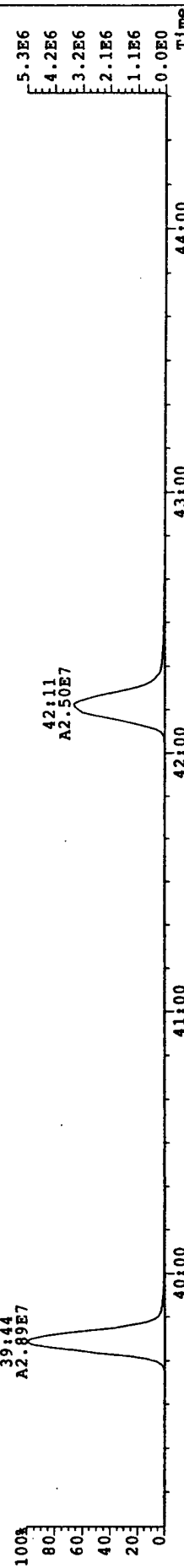
409.7788 S:4 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 450



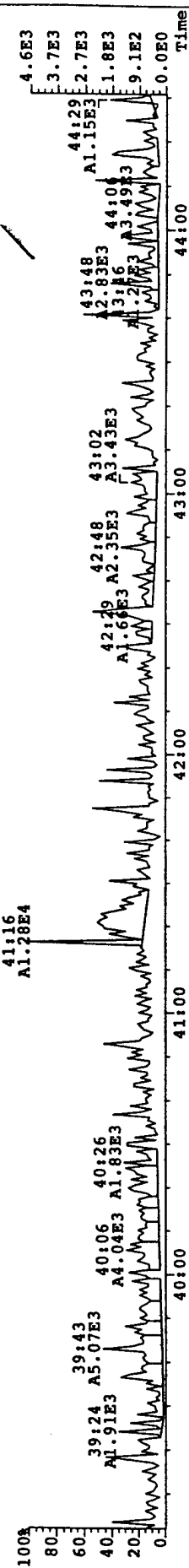
417.8253 S:4 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 672



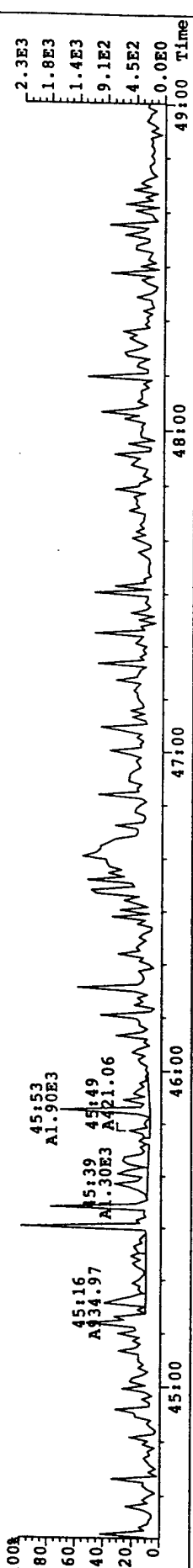
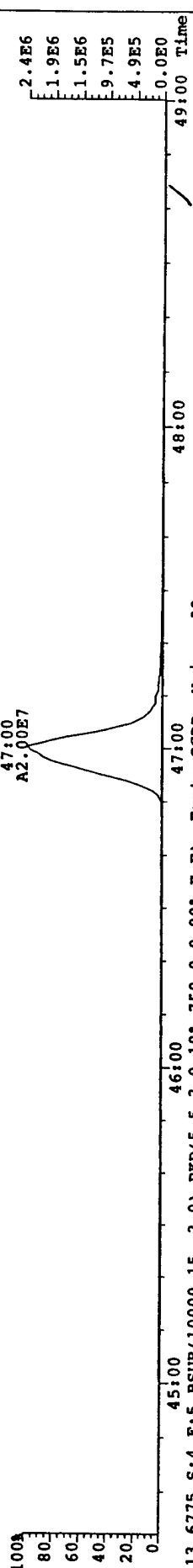
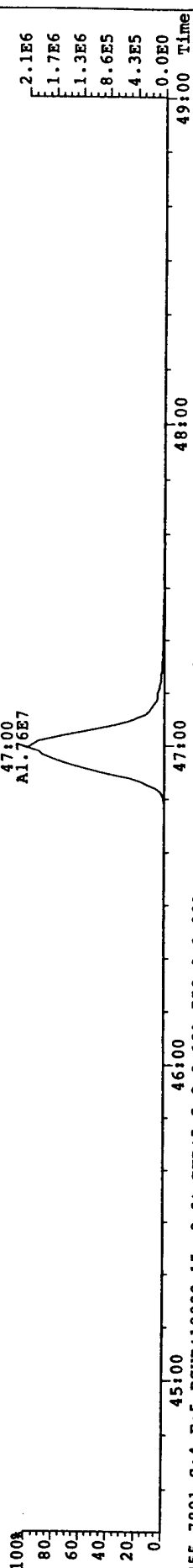
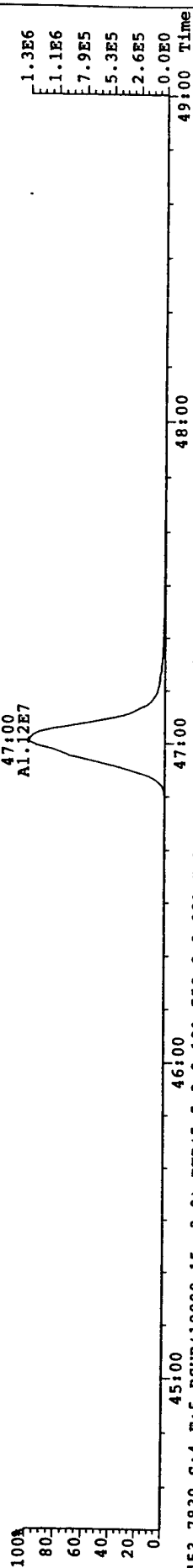
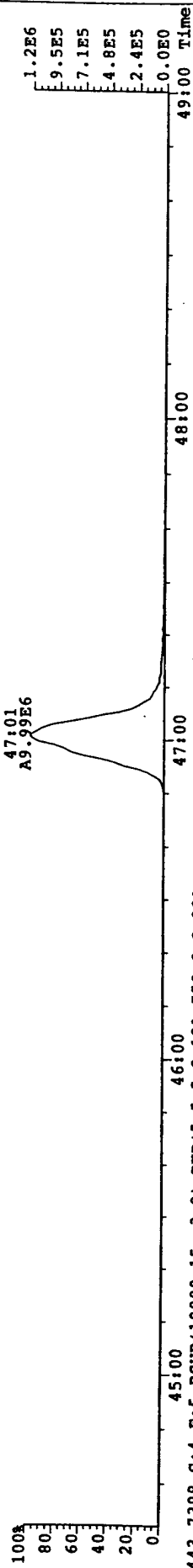
419.8220 S:4 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 961



479.7165 S:4 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 205



File: 010223PI Acq: 23-FEB-2001 13:52:50 GC E1+ Voltage SIR Autospec-UltimaE  
Sample# 4 Text: DB5 CPSM / M23 CS3 Vial# 3 File Text: AAP DB5  
441.7428 S:4 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 138





ALTA ANALYTICAL PERSPECTIVES

## **PART 4D**

# **SYSTEM PERFORMANCE**

**“INITIAL CALIBRATION”**

DOCUMENTATION FOR THE ANALYSIS  
OF

POLYCHLORINATED DIBENZO-*P*-DIOXINS & DIBENZOFURANS

## Initial Calibration RRF Summary (ICAL) Alta Analytical Perspectives

Page 1 of 1

Run: 001005P1

Analyte: m23mm1\_cal

Inst. ID. MM-1

Cal: mm1\_m23\_000919

Data filename: 001005P1

Samp# 3 0.25  
Samp# 4 0.50  
Samp# 5 1.0  
Samp# 6 5.0  
Samp# 7 50  
Samp# 8 100  
Samp# 9 500

| Name                    | Mean RRF | RRSD   | RRF#1 | RRF#2 | RRF#3 | RRF#4 | RRF#5 | RRF#6 | RRF#7 |
|-------------------------|----------|--------|-------|-------|-------|-------|-------|-------|-------|
| 2,3,7,8-TCDD            | 1.26     | 2.04 % | 1.30  | 1.21  | 1.25  | 1.27  | 1.27  | 1.27  | 1.26  |
| 1,2,3,7,8-PeCDF         | 1.01     | 5.08 % | 0.98  | 0.93  | 0.99  | 1.06  | 1.06  | 1.01  | 1.06  |
| 1,2,3,4,7,8-HxCDD       | 1.14     | 5.15 % | 1.08  | 1.08  | 1.12  | 1.19  | 1.21  | 1.10  | 1.20  |
| 1,2,3,6,7,8-HxCDD       | 1.02     | 4.04 % | 1.04  | 0.97  | 1.03  | 1.07  | 1.07  | 0.97  | 1.01  |
| 1,2,3,7,8,9-HxCDD       | 1.14     | 4.26 % | 1.11  | 1.10  | 1.12  | 1.21  | 1.20  | 1.09  | 1.16  |
| 1,2,3,4,6,7,8-HpCDD     | 1.13     | 5.87 % | 1.10  | 1.05  | 1.07  | 1.17  | 1.19  | 1.10  | 1.22  |
| OCDD                    | 1.03     | 5.02 % | 1.00  | 0.95  | 0.99  | 1.08  | 1.08  | 1.08  | 1.01  |
| 2,3,7,8-TCDF            | 1.05     | 7.26 % | 1.01  | 0.97  | 0.98  | 1.04  | 1.06  | 1.19  | 1.08  |
| 1,2,3,7,8-PeCDF         | 1.04     | 4.06 % | 1.02  | 0.98  | 1.01  | 1.09  | 1.09  | 1.01  | 1.06  |
| 2,3,4,7,8-PeCDF         | 1.05     | 4.68 % | 1.01  | 1.01  | 1.03  | 1.12  | 1.12  | 1.02  | 1.08  |
| 1,2,3,4,7,8-HxCDF       | 1.13     | 5.67 % | 1.11  | 1.05  | 1.13  | 1.20  | 1.20  | 1.05  | 1.17  |
| 1,2,3,6,7,8-HxCDF       | 1.24     | 4.10 % | 1.21  | 1.20  | 1.23  | 1.29  | 1.29  | 1.16  | 1.28  |
| 2,3,4,6,7,8-HxCDF       | 1.16     | 5.47 % | 1.16  | 1.11  | 1.15  | 1.24  | 1.25  | 1.08  | 1.17  |
| 1,2,3,7,8,9-HxCDF       | 1.02     | 5.76 % | 0.97  | 0.97  | 1.01  | 1.09  | 1.10  | 0.96  | 1.04  |
| 1,2,3,4,6,7,8-HpCDF     | 1.54     | 4.77 % | 1.49  | 1.45  | 1.51  | 1.63  | 1.63  | 1.50  | 1.58  |
| 1,2,3,4,7,8,9-HpCDF     | 1.30     | 6.39 % | 1.24  | 1.19  | 1.27  | 1.39  | 1.39  | 1.23  | 1.38  |
| OCDF                    | 1.15     | 4.37 % | 1.15  | 1.05  | 1.13  | 1.19  | 1.19  | 1.19  | 1.14  |
| 13C-2,3,7,8-TCDD        | 1.13     | 3.53 % | 1.12  | 1.13  | 1.12  | 1.07  | 1.19  | 1.18  | 1.13  |
| 13C-1,2,3,7,8-PeCDD     | 0.93     | 6.05 % | 0.90  | 0.90  | 0.88  | 0.86  | 0.96  | 0.99  | 1.00  |
| 13C-1,2,3,6,7,8-HxCDD   | 0.93     | 2.49 % | 0.95  | 0.94  | 0.93  | 0.89  | 0.95  | 0.95  | 0.92  |
| 13C-1,2,3,4,6,7,8-HpCDD | 0.91     | 4.58 % | 0.96  | 0.88  | 0.94  | 0.86  | 0.93  | 0.91  | 0.85  |
| 13C-OCDD                | 0.73     | 4.88 % | 0.77  | 0.71  | 0.75  | 0.68  | 0.74  | 0.71  | 0.77  |
| 13C-2,3,7,8-TCDF        | 1.06     | 3.69 % | 1.05  | 1.11  | 1.04  | 1.01  | 1.08  | 1.11  | 1.03  |
| 13C-1,2,3,7,8-PeCDF     | 0.96     | 6.91 % | 0.90  | 0.97  | 0.89  | 0.91  | 0.96  | 1.08  | 1.00  |
| 13C-1,2,3,6,7,8-HxCDF   | 1.28     | 3.33 % | 1.31  | 1.31  | 1.28  | 1.21  | 1.30  | 1.33  | 1.24  |
| 13C-1,2,3,4,6,7,8-HpCDF | 0.90     | 4.81 % | 0.96  | 0.90  | 0.94  | 0.85  | 0.92  | 0.90  | 0.85  |
| 13C-OCDF                | 0.81     | 4.90 % | 0.84  | 0.78  | 0.83  | 0.74  | 0.83  | 0.81  | 0.85  |
| 13C-1,2,3,4-TCDD        | 1.00     | 0.00 % | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| 13C-1,2,3,4-TCDF        | 1.00     | 0.00 % | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| 13C-1,2,3,7,8,9-HxCDD   | 1.00     | 0.00 % | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  |
| 37Cl-2,3,7,8-TCDD       | 0.51     | 1.94 % | 0.50  | 0.51  | 0.51  | 0.52  | 0.50  | 0.52  | 0.53  |
| 13C-2,3,4,7,8-PeCDF     | 0.97     | 2.54 % | 0.96  | 0.98  | 0.99  | 1.01  | 0.99  | 0.96  | 0.93  |
| 13C-1,2,3,4,7,8-HxCDD   | 0.92     | 1.53 % | 0.90  | 0.93  | 0.93  | 0.93  | 0.93  | 0.93  | 0.90  |
| 13C-1,2,3,4,7,8-HxCDF   | 0.91     | 2.76 % | 0.92  | 0.91  | 0.92  | 0.94  | 0.92  | 0.88  | 0.87  |
| 13C-1,2,3,4,7,8,9-HpCDD | 0.85     | 2.09 % | 0.85  | 0.83  | 0.85  | 0.89  | 0.86  | 0.86  | 0.85  |
| 13C-1,2,3,7,8,9-HpCDF   | 1.07     | 3.11 % | 1.08  | 1.08  | 1.09  | 1.06  | 1.10  | 1.06  | 1.00  |

METHODS

23 / 1094

ICAL

919 STANDARDS

05 OCT 2000

OK

J. F. 23 Oct 2000



ALTA ANALYTICAL PERSPECTIVES

## **PART 4E**

# **SYSTEM PERFORMANCE**

## **“ON-GOING PRECISION & ACCURACY”**

DOCUMENTATION FOR THE ANALYSIS  
OF  
POLYCHLORINATED DIBENZO-*P*-DIOXINS & DIBENZOFURANS

EPA METHOD 23 / TO9A / 428

PCDD/PCDF ONGOING PRECISION AND RECOVERY (OPR)

## Alta Analytical Perspectives

Matrix (MM5/PUF):

OPR Data Filename: 010214PI-2

Reviewer: ce

Ext. Date:

Shift:

Analysis Date: 14-FEB-01 Time: 11:57:29

Date: 24 Feb 01

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT.

# 275-OPR-23.TIF

## NATIVE ANALYTES

|                     | SPIKE<br>CONC.<br>(ng/mL) | CONC.<br>FOUND<br>(ng/mL) | OPR CONC.<br>LIMITS<br>(ng/mL) |
|---------------------|---------------------------|---------------------------|--------------------------------|
| 2,3,7,8-TCDD        | 5.0                       | 4.94 ✓                    | 3.75 - 6.25                    |
| 1,2,3,7,8-PeCDD     | 25                        | 24.9 ✓                    | 18.8 - 31.2                    |
| 1,2,3,4,7,8-HxCDD   | 25                        | 25.4 ✓                    | 18.8 - 31.2                    |
| 1,2,3,6,7,8-HxCDD   | 25                        | 24.5 ✓                    | 18.8 - 31.2                    |
| 1,2,3,7,8,9-HxCDD   | 25                        | 24.3 ✓                    | 18.8 - 31.2                    |
| 1,2,3,4,6,7,8-HpCDD | 25                        | 23.0 ✓                    | 18.8 - 31.2                    |
| OCDD                | 50                        | 47.9 ✓                    | 37.5 - 62.5                    |
| 2,3,7,8-TCDF        | 5.0                       | 4.23 ✓                    | 3.75 - 6.25                    |
| 1,2,3,7,8-PeCDF     | 25                        | 22.2 ✓                    | 18.8 - 31.2                    |
| 2,3,4,7,8-PeCDF     | 25                        | 22.2 ✓                    | 18.8 - 31.2                    |
| 1,2,3,4,7,8-HxCDF   | 25                        | 22.5 ✓                    | 18.8 - 31.2                    |
| 1,2,3,6,7,8-HxCDF   | 25                        | 23.9 ✓                    | 18.8 - 31.2                    |
| 2,3,4,6,7,8-HxCDF   | 25                        | 23.1 ✓                    | 18.8 - 31.2                    |
| 1,2,3,7,8,9-HxCDF   | 25                        | 23.1 ✓                    | 18.8 - 31.2                    |
| 1,2,3,4,6,7,8-HpCDF | 25                        | 22.3 ✓                    | 18.8 - 31.2                    |
| 1,2,3,4,7,8,9-HpCDF | 25                        | 20.9 ✓                    | 18.8 - 31.2                    |
| OCDF                | 50                        | 44.4 ✓                    | 37.5 - 62.5                    |

Analyst: GAGDate: 23 Feb 01

EPA METHOD 23 / TO9A / 428

## PCDD/PCDF ONGOING PRECISION AND RECOVERY (OPR)

## Alta Analytical Perspectives

Matrix (MM5/PUF): OPR Data Filename: 010214P1-2  
Ext. Date: Shift: Analysis Date: 14-FEB-01 Time: 11:57:29  
Reviewer: cr  
Date: 24 Feb 01

ALL CONCENTRATIONS REPORTED ON THIS FORM ARE CONCENTRATIONS IN EXTRACT.

## LABELED COMPOUNDS

|                         | SPIKE<br>CONC.<br>(ng/mL) | CONC.<br>FOUND<br>(ng/mL) | OPR CONC.<br>LIMITS<br>(ng/mL) |
|-------------------------|---------------------------|---------------------------|--------------------------------|
| 13C-2,3,7,8-TCDD        | 200                       | 201 ✓                     | 80.0 - 260                     |
| 13C-1,2,3,7,8-PeCDD     | 200                       | 214 ✓                     | 80.0 - 260                     |
| 13C-1,2,3,6,7,8-HxCDD   | 200                       | 198 ✓                     | 80.0 - 260                     |
| 13C-1,2,3,4,6,7,8-HpCDD | 200                       | 199 ✓                     | 80.0 - 260                     |
| 13C-OCDD                | 200                       | 183 ✓                     | 80.0 - 260                     |
| 13C-2,3,7,8-TCDF        | 200                       | 196 ✓                     | 80.0 - 260                     |
| 13C-1,2,3,7,8-PeCDF     | 200                       | 202 ✓                     | 80.0 - 260                     |
| 13C-1,2,3,6,7,8-HxCDF   | 200                       | 179 ✓                     | 80.0 - 260                     |
| 13C-1,2,3,4,6,7,8-HpCDF | 200                       | 180 ✓                     | 80.0 - 260                     |
| 13C-OCDF                | 200                       | 178 ✓                     | 80.0 - 260                     |

Analyst: GAGDate: 24 Feb 01

Client ID: 0\_275\_OPR001  
Lab ID: 0\_275\_OPR001

Filename: 010214P1

GC Column ID: db-5

Acq: 14-FEB-01 11:57:29

ConCal: 010214P1-  
EndCal: 010214P1-

Page 2 of 2

Reviewer: CE  
Date: 24 Feb 01

| Name                  | Resp                    | RA       | RRF    | RT    | Conc  | Qualif. | CDE | noise  | Fac | DL     |
|-----------------------|-------------------------|----------|--------|-------|-------|---------|-----|--------|-----|--------|
| 2,3,7,8-TCDD          | 2.09e+06                | 0.80 Y   | 1.26   | 27:44 | 4.94  |         |     | 908    | 2.5 | 0.0392 |
| 1,2,3,7,8-PeCDD       | 7.32e+06                | 1.56 Y   | 1.01   | 33:12 | 24.9  |         |     | 566    | 2.5 | 0.0451 |
| 1,2,3,4,7,8-HxCDD     | 6.80e+06                | 1.26 Y   | 1.14   | 37:06 | 25.4  |         |     | 2774   | 2.5 | 0.222  |
| 1,2,3,6,7,8-HxCDD     | 5.90e+06                | 1.26 Y   | 1.02   | 37:13 | 24.5  |         |     | 2774   | 2.5 | 0.227  |
| 1,2,3,7,8,9-HxCDD     | 6.53e+06                | 1.26 Y   | 1.14   | 37:32 | 24.3  |         |     | 2774   | 2.5 | 0.221  |
| 1,2,3,4,6,7,8-HpCDD   | 5.96e+06                | 1.00 Y   | 1.13   | 41:31 | 23.0  |         |     | 2433   | 2.5 | 0.270  |
| OCDD                  | 8.43e+06                | 0.87 Y   | 1.03   | 46:51 | 47.9  |         |     | 898    | 2.5 | 0.179  |
| 2,3,7,8-TCDF          | 1.85e+06                | 0.75 Y   | 1.05   | 26:51 | 4.23  |         |     | 1519   | 2.5 | 0.0642 |
| 1,2,3,7,8-PeCDF       | 8.96e+06                | 1.54 Y   | 1.04   | 31:43 | 22.2  |         |     | 1090   | 2.5 | 0.0615 |
| 2,3,4,7,8-PeCDF       | 9.10e+06                | 1.54 Y   | 1.05   | 32:51 | 22.2  |         |     | 1090   | 2.5 | 0.0605 |
| 1,2,3,4,7,8-HxCDF     | 7.46e+06                | 1.22 Y   | 1.13   | 36:07 | 22.5  |         |     | 2199   | 2.5 | 0.0882 |
| 1,2,3,6,7,8-HxCDF     | 8.67e+06                | 1.23 Y   | 1.24   | 36:16 | 23.9  |         |     | 2199   | 2.5 | 0.0806 |
| 2,3,4,6,7,8-HxCDF     | 7.88e+06                | 1.22 Y   | 1.16   | 36:55 | 23.1  |         |     | 2199   | 2.5 | 0.0857 |
| 1,2,3,7,8,9-HxCDF     | 6.89e+06                | 1.20 Y   | 1.02   | 37:56 | 23.1  |         |     | 2199   | 2.5 | 0.0980 |
| 1,2,3,4,6,7,8-HpCDF   | 7.10e+06                | 1.03 Y   | 1.54   | 39:53 | 22.3  |         |     | 1801   | 2.5 | 0.101  |
| 1,2,3,4,7,8,9-HpCDF   | 5.63e+06                | 1.02 Y   | 1.30   | 42:20 | 20.9  |         |     | 1801   | 2.5 | 0.120  |
| OCDF                  | 9.38e+06                | 0.89 Y   | 1.15   | 47:10 | 44.4  |         |     | 2019   | 2.5 | 0.308  |
| Total Tetra-Dioxins   | 2.09e+06                | 0.87 Y   | 1.26   | 21:51 | 4.95  |         |     | 908    | 2.5 | 0.0392 |
| Total Penta-Dioxins   | 7.32e+06                | 1.56 Y   | 1.01   | 33:12 | 24.9  |         |     | 566    | 2.5 | 0.0451 |
| Total Hexa-Dioxins    | 1.92e+07                | 1.26 Y   | 1.10   | 37:06 | 74.1  |         |     | 2774   | 2.5 | 0.229  |
| Total Hepta-Dioxins   | 6.09e+06                | 0.90 Y   | 1.13   | 40:20 | 23.5  |         |     | 2433   | 2.5 | 0.270  |
| Total Tetra-Furans    | 1.89e+06                | 0.78 Y   | 1.05   | 25:28 | 4.32  |         |     | 1519   | 2.5 | 0.0642 |
| 1st Fnc. Penta-Furans | *                       | * n      | 1.05   | NotF  | *     |         |     | 1802   | 2.5 | 0.101  |
| Total Penta-Furans    | 1.84e+07                | 1.70 Y   | 1.05   | 30:35 | 45.3  |         |     | 1090   | 2.5 | 0.0610 |
| PeCDF Totals:         |                         |          |        |       | 45.3  |         |     |        |     |        |
| Total Hexa-Furans     | 3.09e+07                | 1.22 Y   | 1.14   | 36:07 | 92.7  |         |     | 2199   | 2.5 | 0.0876 |
| Total Hepta-Furans    | 1.28e+07                | 1.03 Y   | 1.42   | 39:53 | 43.3  |         |     | 1801   | 2.5 | 0.110  |
| IS                    | 13C-2,3,7,8-TCDD        | 6.69e+07 | 0.79 Y | 1.13  | 27:43 | 201     |     | Rec    |     |        |
| IS                    | 13C-1,2,3,7,8-PeCDD     | 5.81e+07 | 1.54 Y | 0.93  | 33:10 | 214     |     | 101    |     |        |
| IS                    | 13C-1,2,3,6,7,8-HxCDD   | 4.71e+07 | 1.25 Y | 0.93  | 37:12 | 198     |     | 107    |     |        |
| IS                    | 13C-1,2,3,4,6,7,8-HpCDD | 4.59e+07 | 1.06 Y | 0.91  | 41:30 | 199     |     | 99.0   |     |        |
| IS                    | 13C-OCDD                | 3.43e+07 | 0.90 Y | 0.73  | 46:50 | 183     |     | 99.5   |     |        |
| IS                    | 13C-2,3,7,8-TCDF        | 8.34e+07 | 0.78 Y | 1.06  | 26:49 | 196     |     | 91.7   |     |        |
| IS                    | 13C-1,2,3,7,8-PeCDF     | 7.77e+07 | 1.56 Y | 0.96  | 31:42 | 202     |     | 98.1   |     |        |
| IS                    | 13C-1,2,3,6,7,8-HxCDF   | 5.86e+07 | 0.51 Y | 1.28  | 36:15 | 179     |     | 101    |     |        |
| IS                    | 13C-1,2,3,4,6,7,8-HpCDF | 4.14e+07 | 0.44 Y | 0.90  | 39:52 | 180     |     | 89.7   |     |        |
| IS                    | 13C-OCDF                | 3.68e+07 | 0.88 Y | 0.81  | 47:09 | 178     |     | 90.0   |     |        |
| RS/RT                 | 13C-1,2,3,4-TCDD        | 5.87e+07 | 0.79 Y | 1.00  | 27:03 | 200     |     | 89.2   |     |        |
| RS                    | 13C-1,2,3,4-TCDF        | 8.02e+07 | 0.77 Y | 1.00  | 25:27 | 200     |     |        |     |        |
| RS/RT                 | 13C-1,2,3,7,8,9-HxCDD   | 5.10e+07 | 1.25 Y | 1.00  | 37:31 | 200     |     |        |     |        |
| PS                    | 37Cl-2,3,7,8-TCDD       | 2.31e+04 | 0.51   | 27:44 | 0.134 |         |     | 0.0672 |     |        |
| PS                    | 13C-2,3,4,7,8-PeCDD     | *        | * n    | NotF  | *     |         |     | *      |     |        |
| PS                    | 13C-1,2,3,4,7,8-HxCDD   | *        | * n    | NotF  | *     |         |     | *      |     |        |
| PS                    | 13C-1,2,3,4,7,8-HxCDF   | 1.38e+05 | 0.46 Y | 0.91  | 36:06 | 0.517   |     | 0.259  |     |        |
| PS                    | 13C-1,2,3,4,7,8,9-HpCDD | 1.35e+05 | 0.44 Y | 0.85  | 42:20 | 0.765   |     | 0.383  |     |        |
| AS                    | 13C-1,2,3,7,8,9-HxCDF   | 4.96e+07 | 0.51 Y | 1.07  | 37:54 | 182     |     | 91.0   |     |        |

Analyst: CHG

0.0672

Date: 24 Feb 01

0.259

0.383

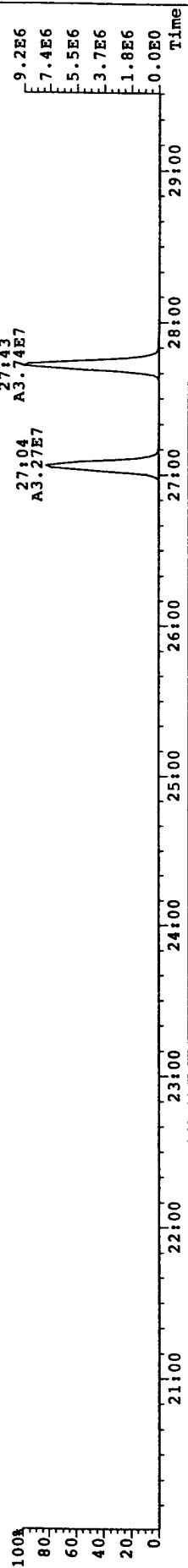
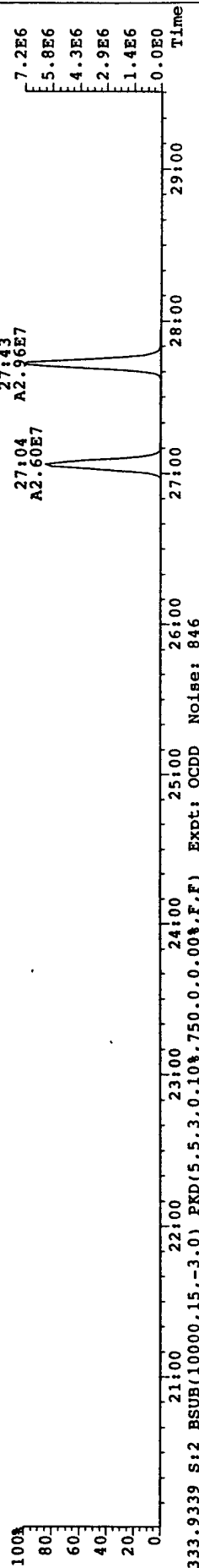
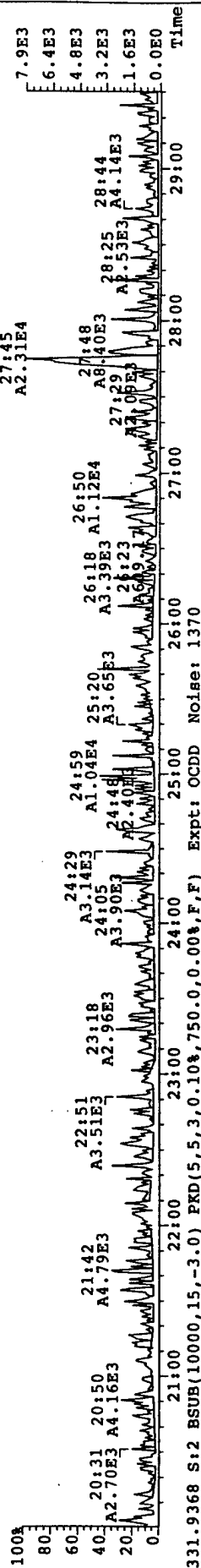
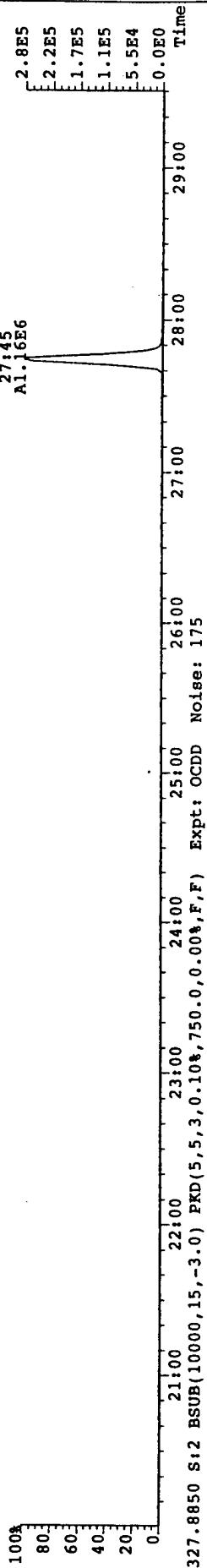
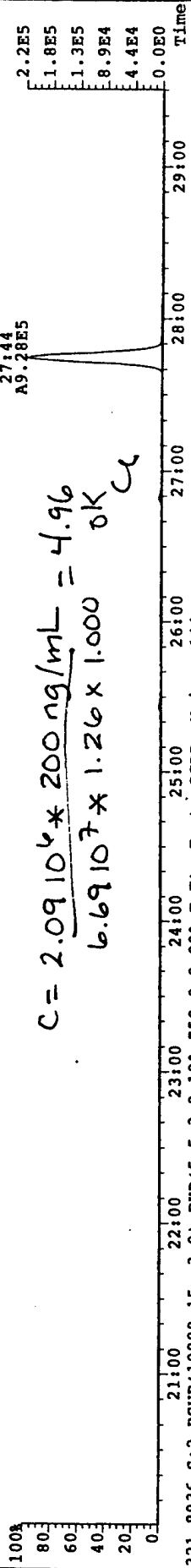
91.0



File: 010214PI Acq: 14-FEB-2001 11:57:29 GC E1+ Voltage SIR Autospec-UltimaE

Sample# 2 Text: 0.275 OPR001 Vial# 76 File Text: AAP DB5

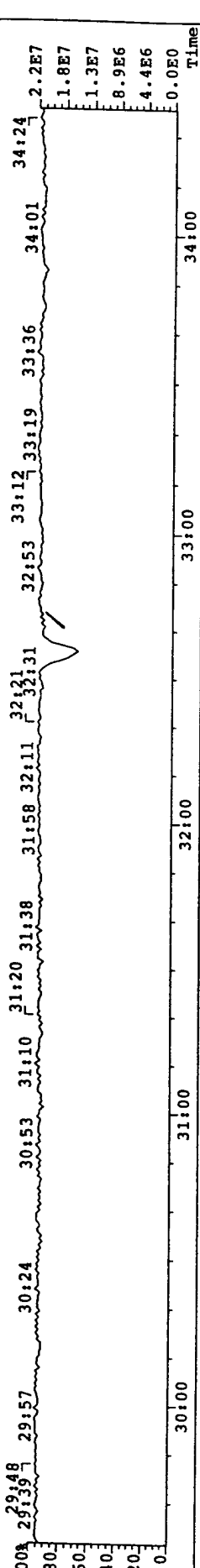
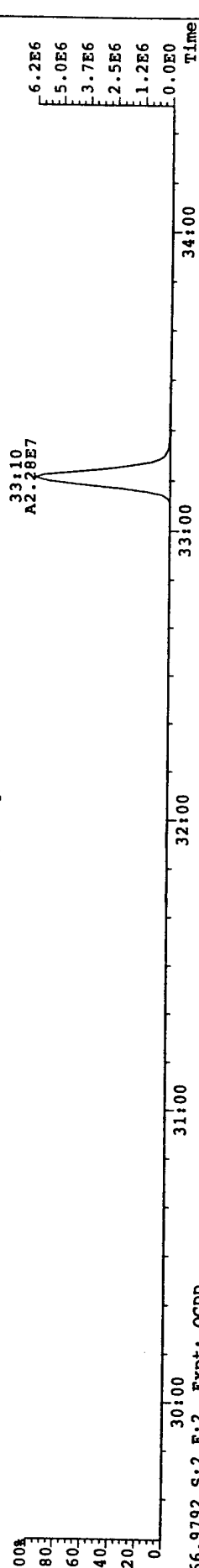
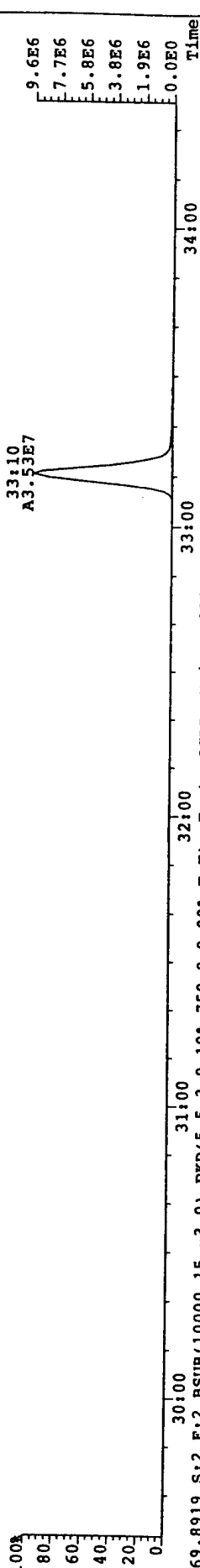
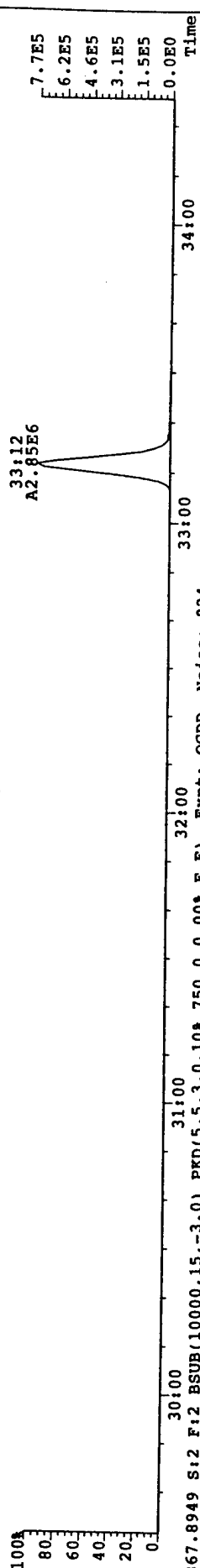
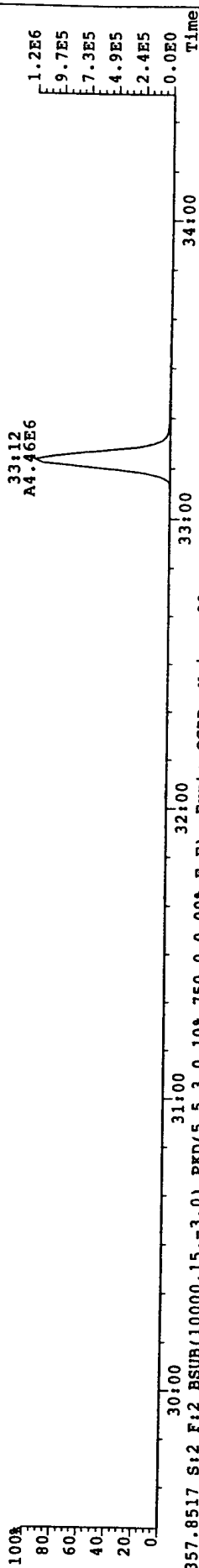
319.8965 S:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 224



File: 010214PI Acq: 14-FEB-2001 11:57:29 GC EIT Voltage SIR Autospec-UltimaE

Sample# 2 Text: 0.275.0PR001 Vial# 76 File Text: AAP DB5

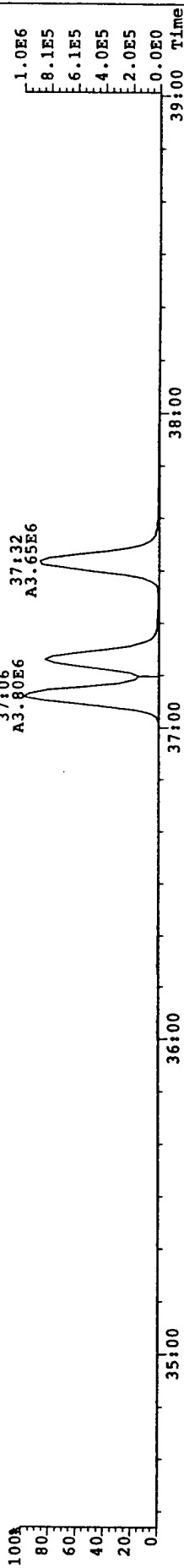
355.8546 S:2 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 252



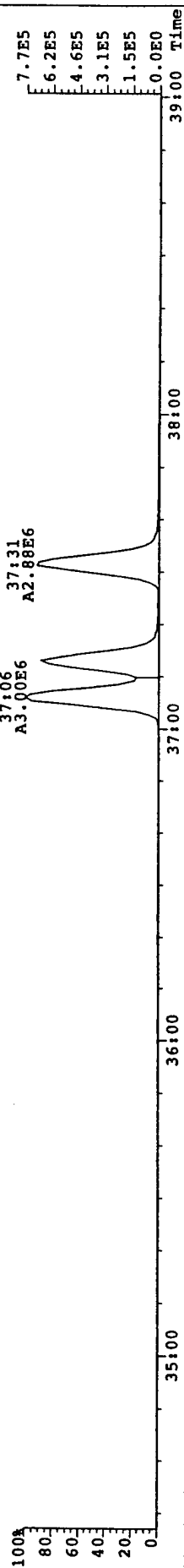
File: 010214PI Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE

Sample# 2 Text: 0\_275\_OPR001 Vial# 76 File Text: AAP DBS

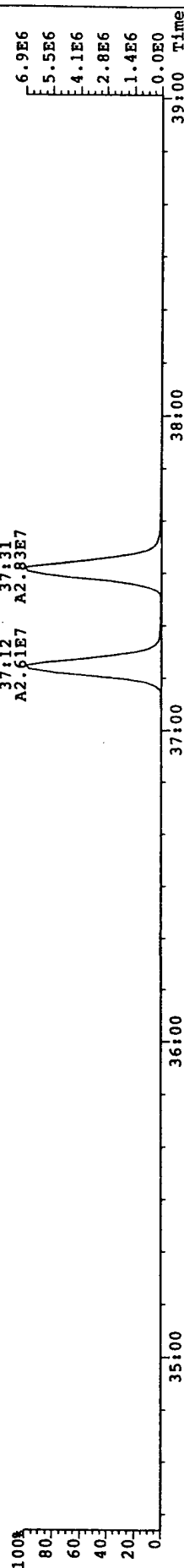
389.8156 S:2 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 375



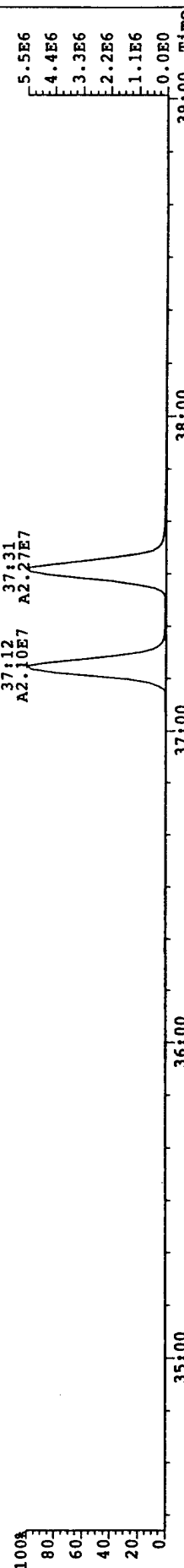
391.8127 S:2 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 314



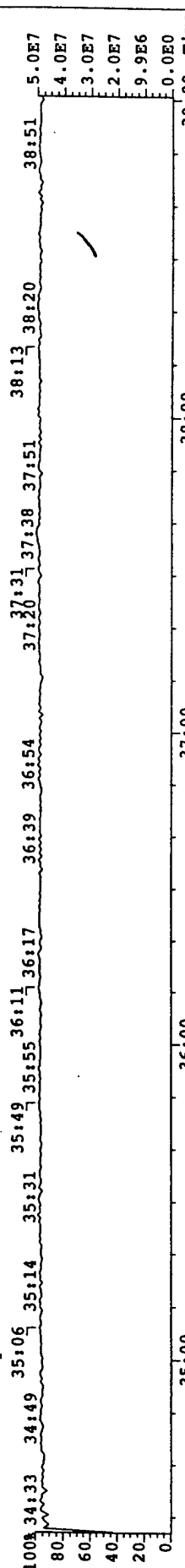
401.8559 S:2 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 400



403.8530 S:2 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 272



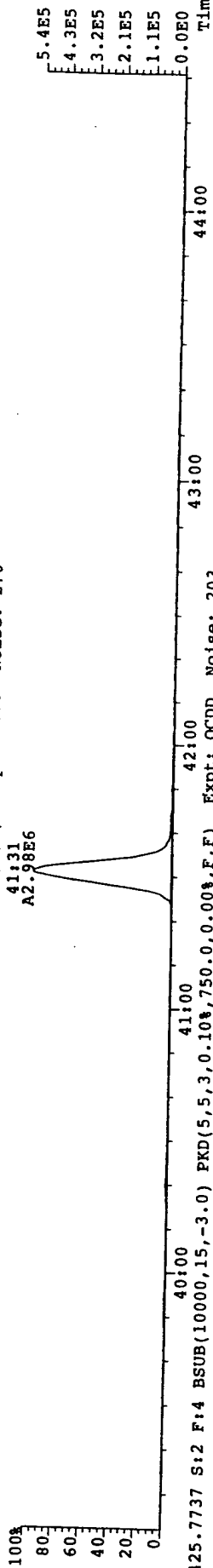
380.9760 S:2 F:3 Expt: OCDD



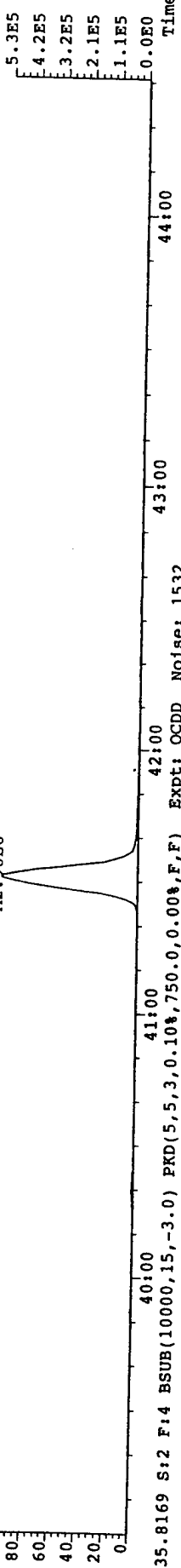
File: 010214PI Acq: 14-FEB-2001 11:57:29 GC Ex: Voltage SIR Autospec-UltimaE

Sample# 2 Text: 0.275.0PR001 Vial# 76 File Text: AAP DB5

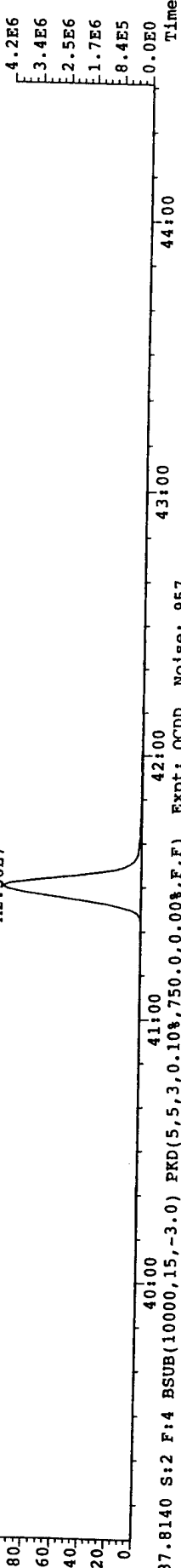
423.7767 S:2 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 270



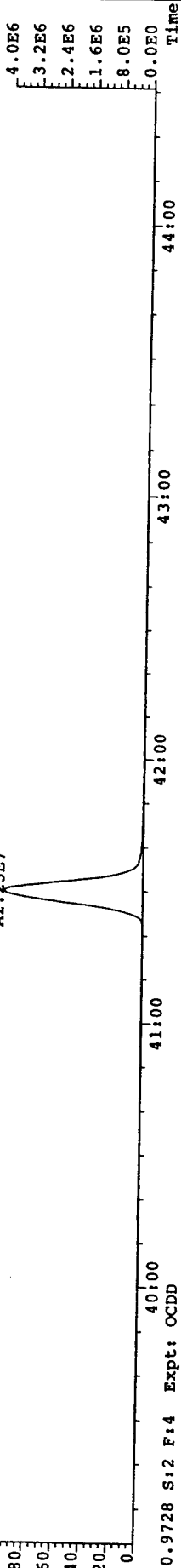
435.8169 S:2 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1532



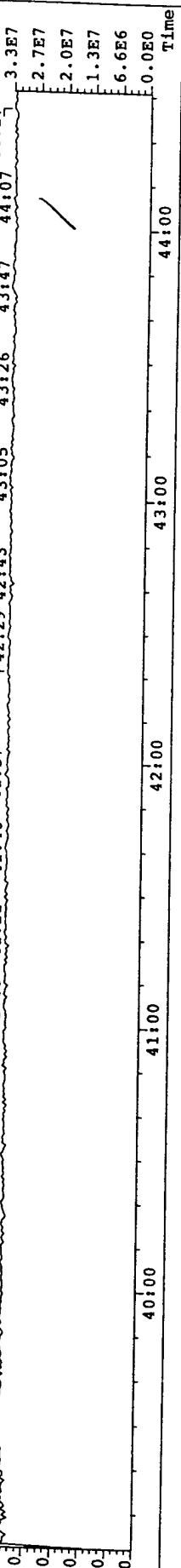
437.8140 S:2 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 957



430.9728 S:2 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 270



423.7767 S:2 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 270

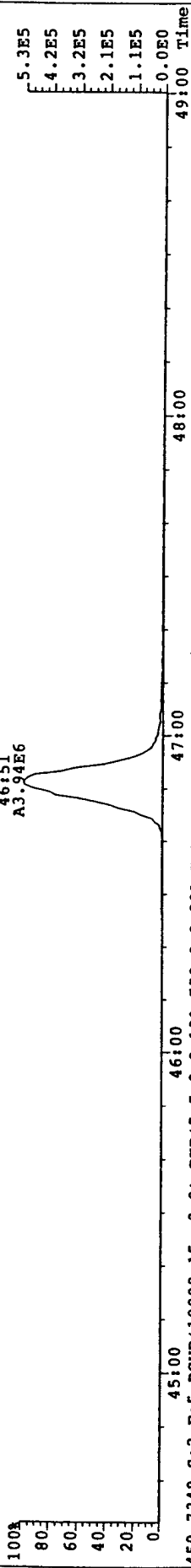


File: 010214PI Acq: 14-FEB-2001 11:57:29 GC E1+ Voltage SIR Autospec-UltimaE

Sample# 2 Text: 0.275 OPR001 Vial# 76 File Text: AAP DB5

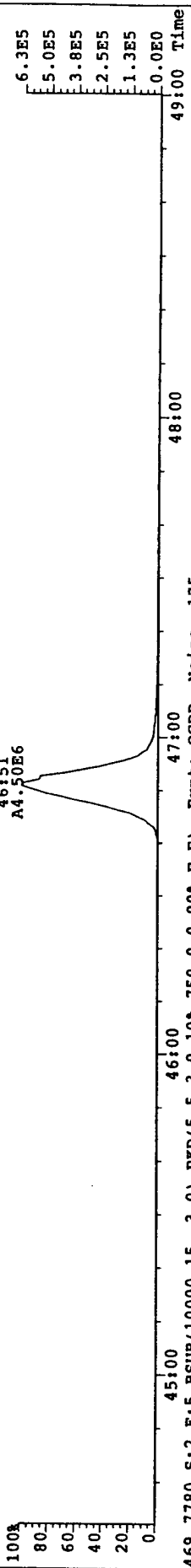
457.7377 S:2 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 273

46:51  
A3.94E6



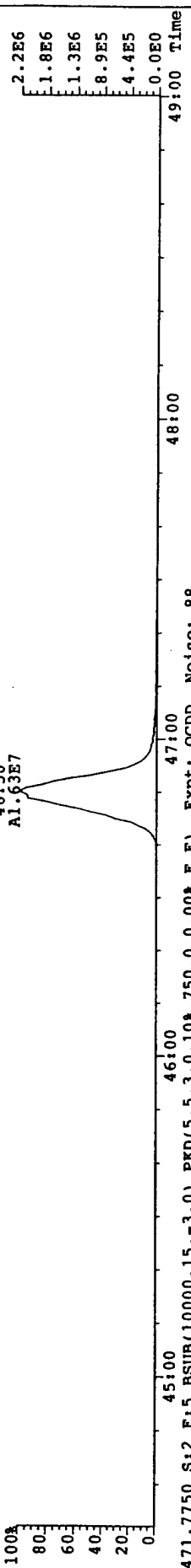
459.7348 S:2 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 137

46:51  
A4.50E6



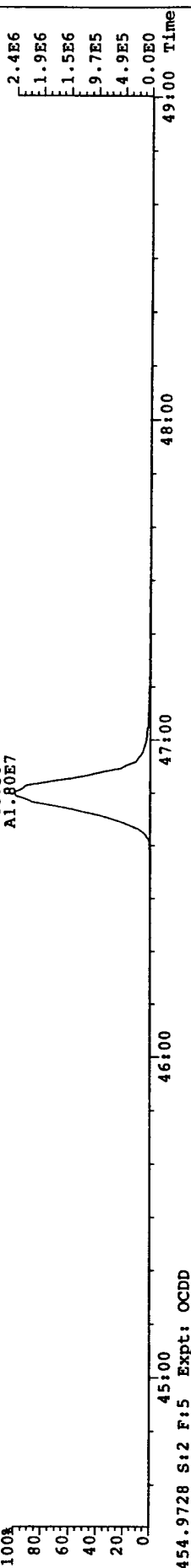
469.7780 S:2 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 175

46:50  
A1.63E7



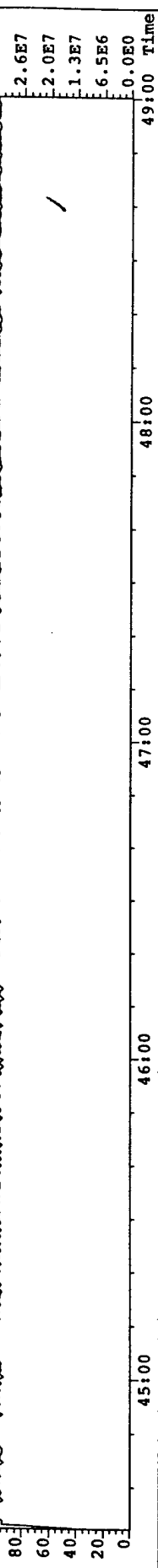
471.7750 S:2 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 88

46:50  
A1.80E7

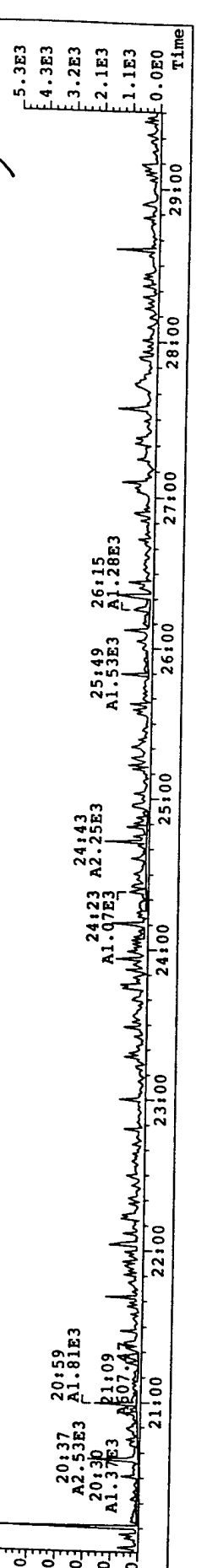
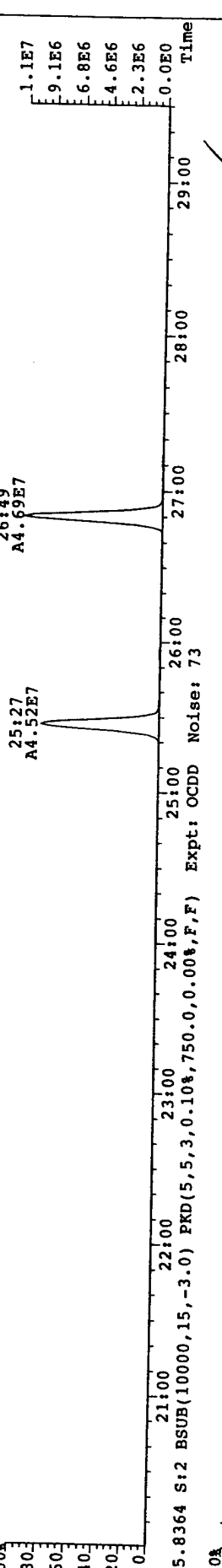
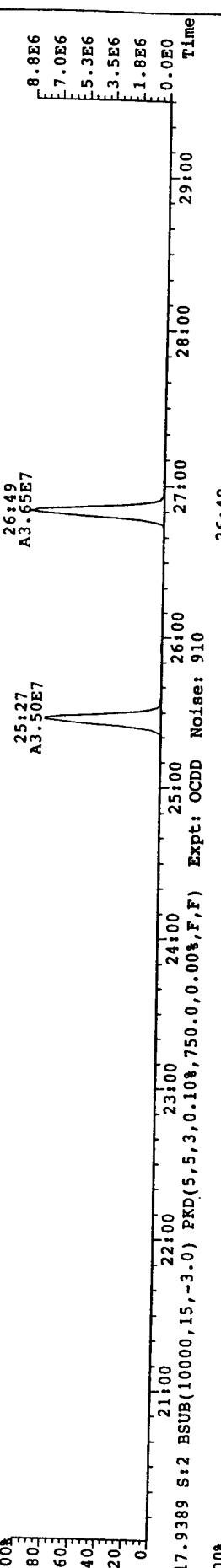
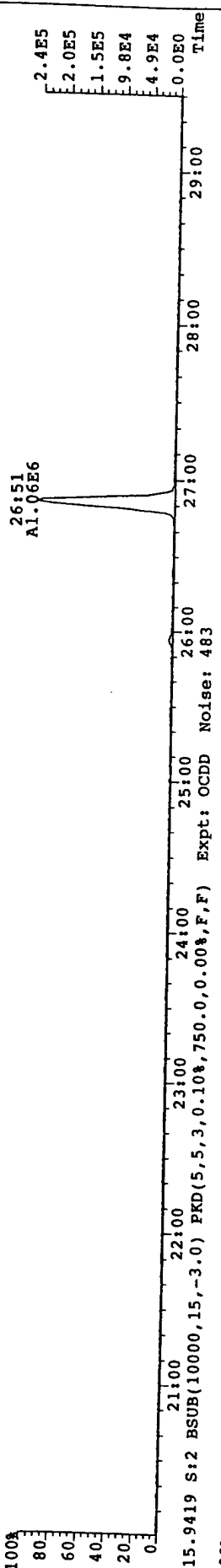
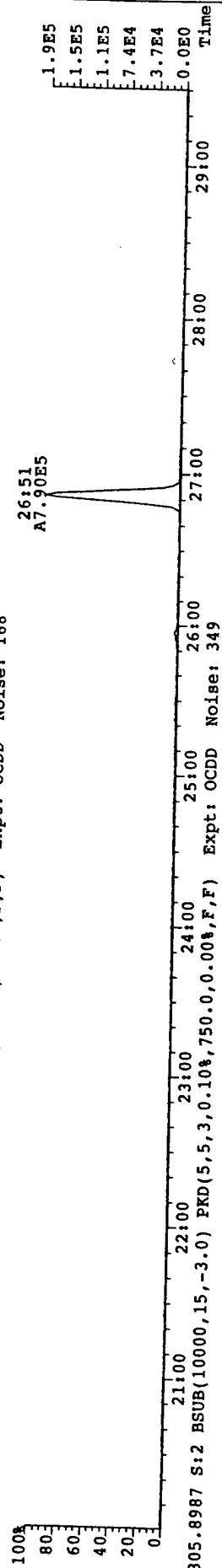


454.9728 S:2 F:5 Expt: OCDD

44:34 44:48 45:11 45:32 46:17 46:41 46:59 47:20 47:39 47:56 48:05 48:22 48:32 48:44 48:56



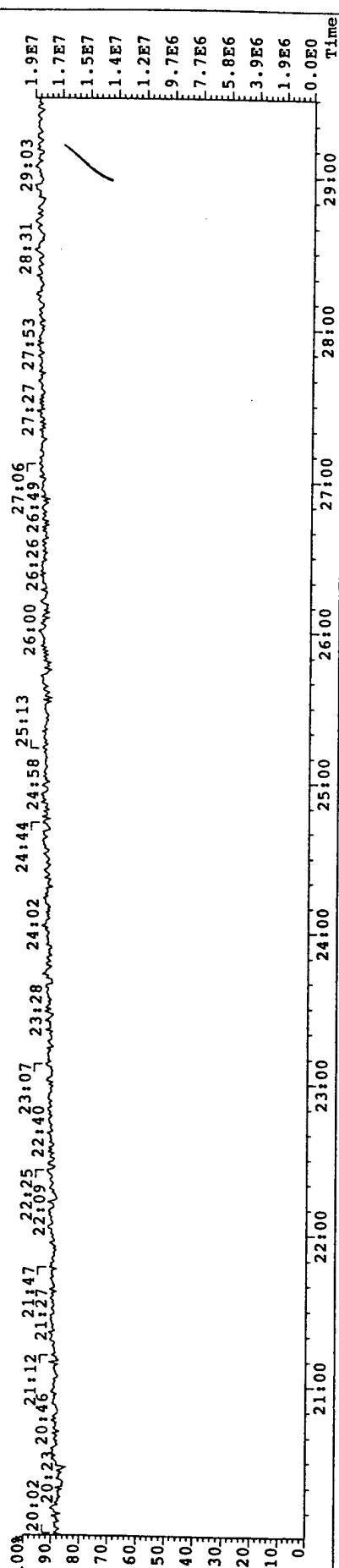
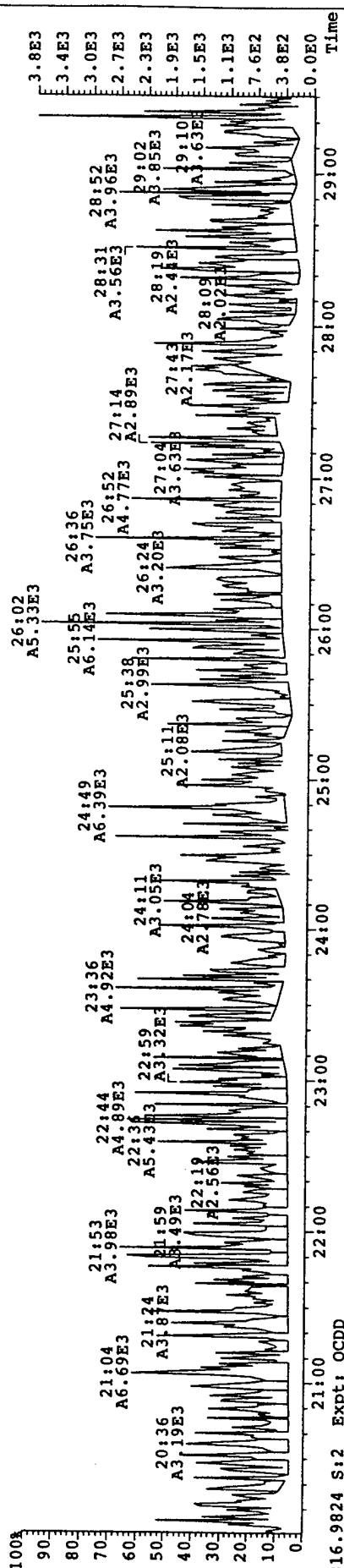
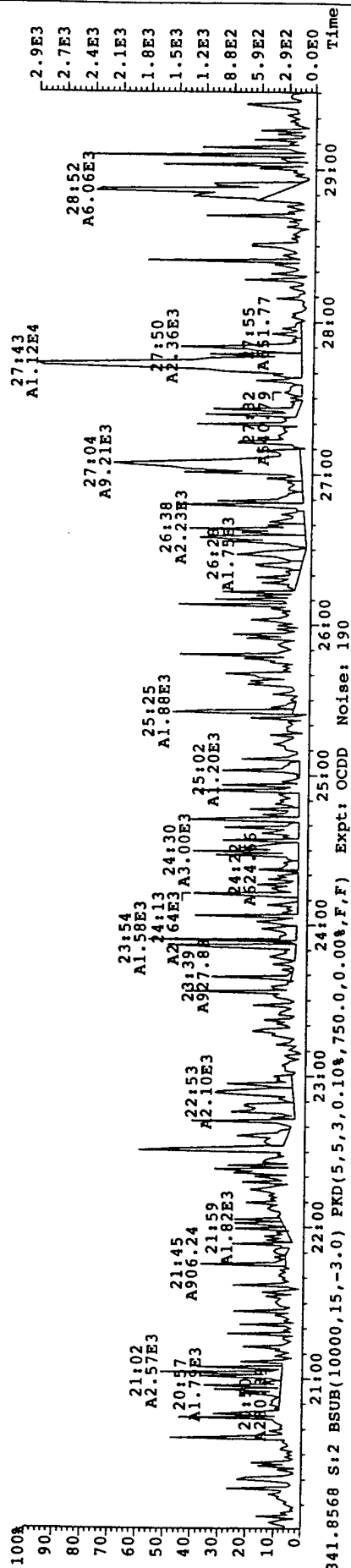
File: 010214PI Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-Ultimate  
Sample# 2 Text: 0.275\_OPR001 Vial# 76 File Text: AAP DBS  
303.9016 S:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 168



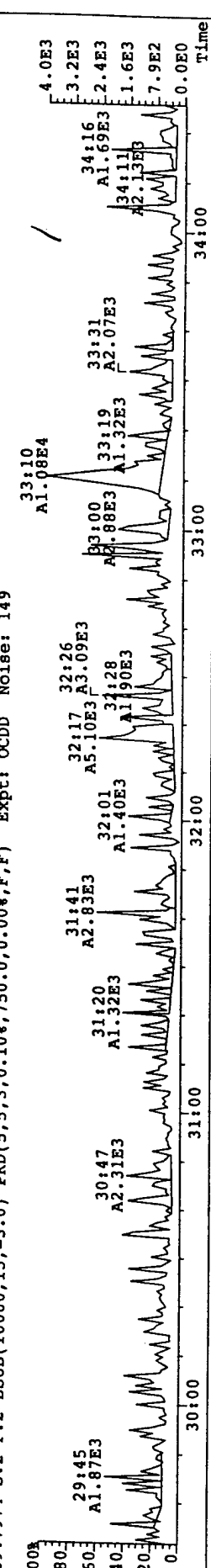
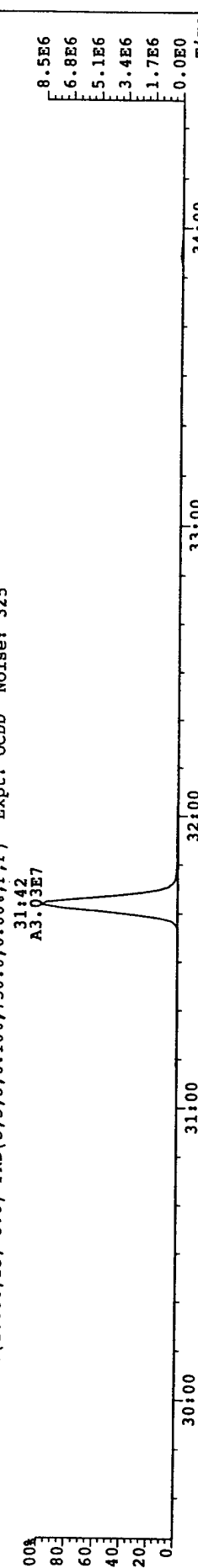
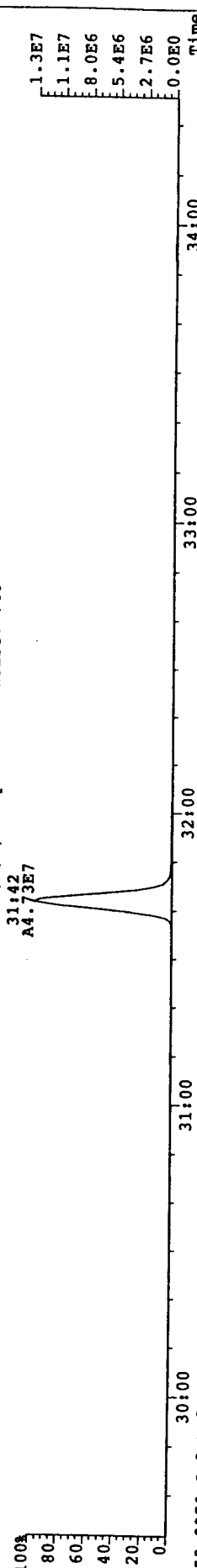
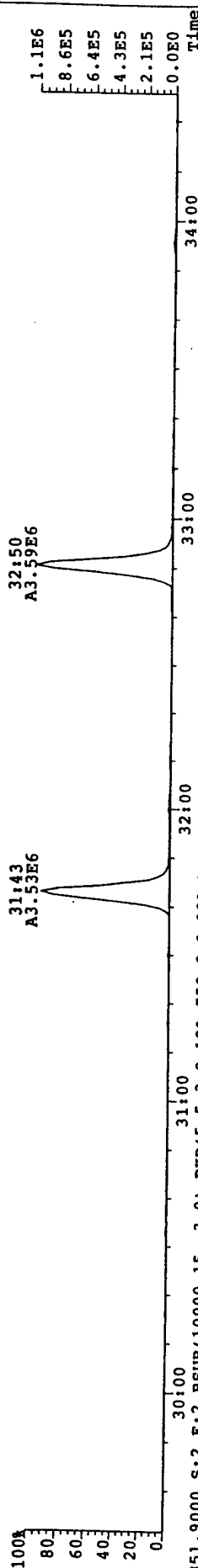
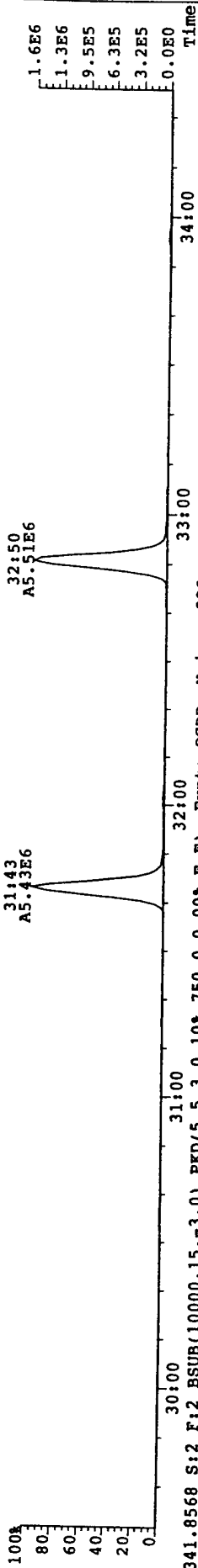
File: 010214PI Acq: 14-FEB-2001 11:57:29 GC EI+ Voltage SIR Autospec-UltimaE

Sample# 2 Text: 0\_275\_OPR001 Vial# 76 File Text: AAP DB5

339.8597 S:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 74



File: 010214PI Acq: 14-FEB-2001 11:57:29 GC E1+ Voltage SIR Autospec-UltimaE  
Sample# 2 Text: 0.275 OPR001 Vial# 76 File Text: AAP DB5  
339.8597 S:2 F:2 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 209

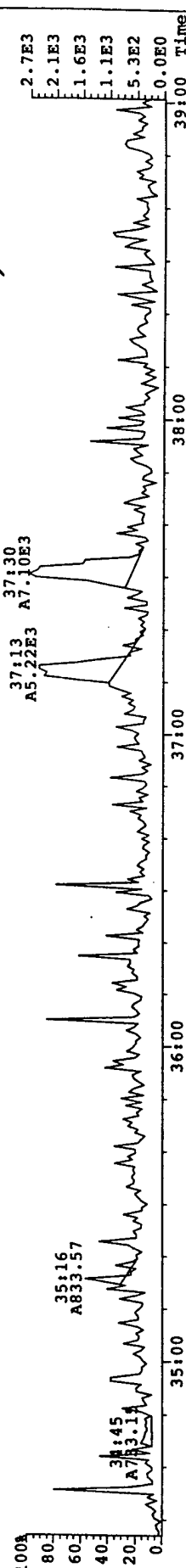
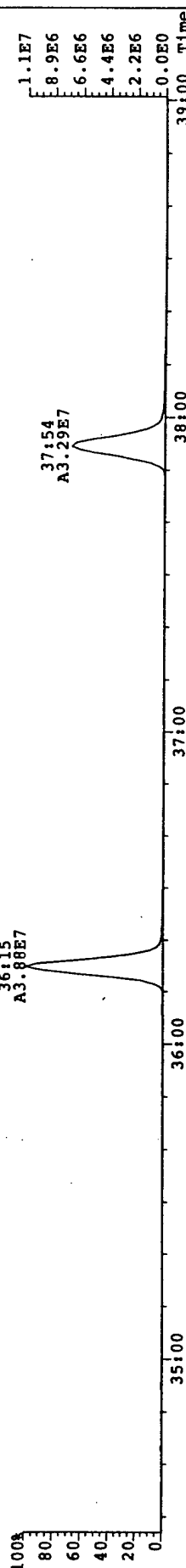
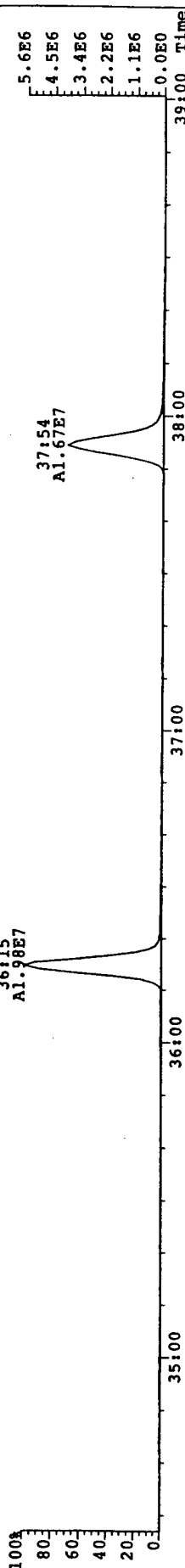
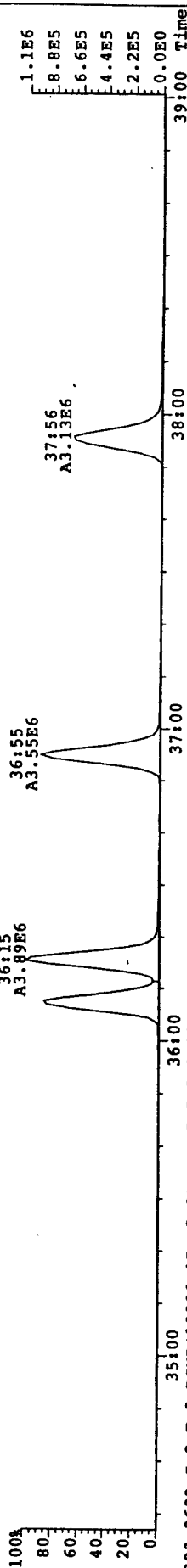
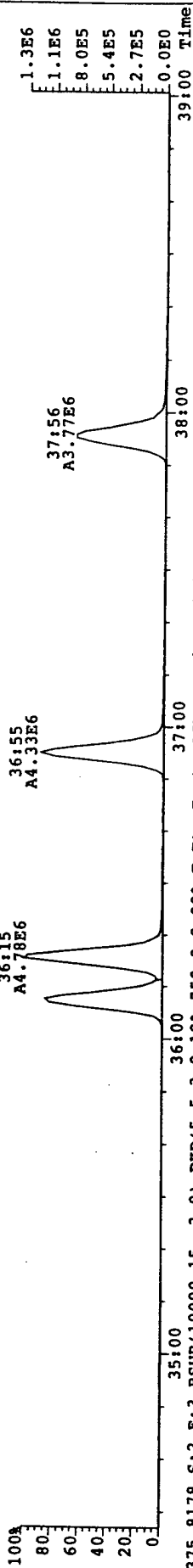




File: 010214PI Acq: 14-FEB-2001 11:57:29 GC F1+ Voltage SIR Autospec-Ultimate

Sample# 2 Text: 0 275 OPR001 Vial# 76 File Text: AAP DB5

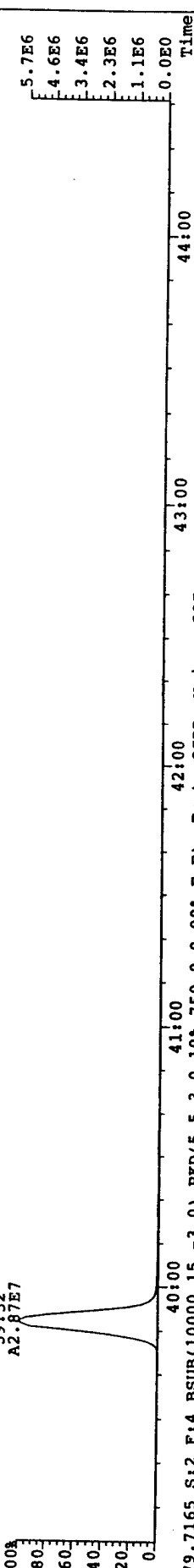
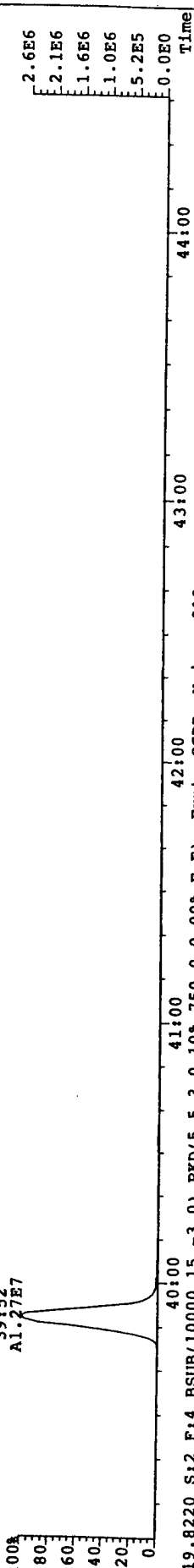
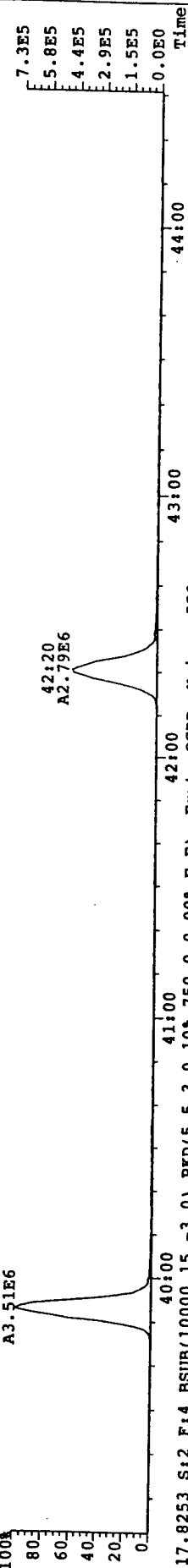
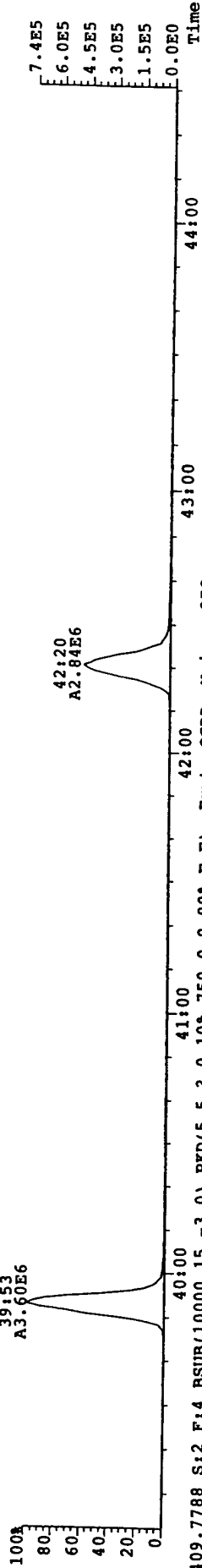
373.8207 S:2 F:3 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 301



File: 010214PI Acq: 14-FEB-2001 11:57129 GC E1+ Voltage SIR Autospec-UltimaE

Sample# 2 Text: 0.275 OPR001 Vial# 76 File Text: AAP DBS

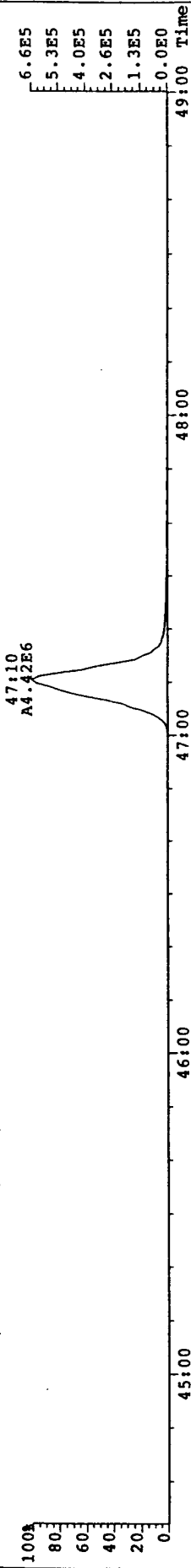
407.7818 S:2 F:4 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 370



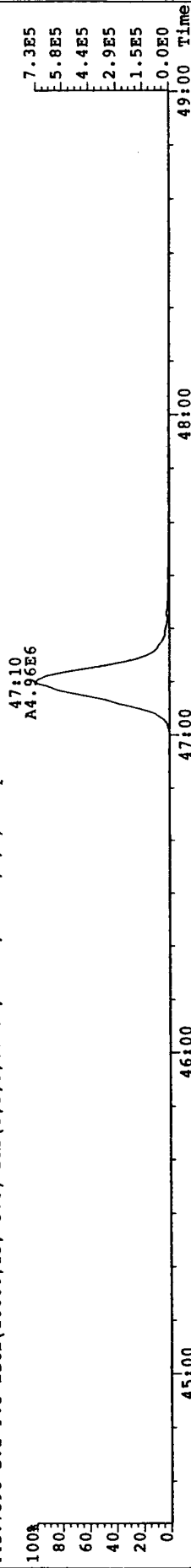
File: 010214PI Acq: 14-FEB-2001 11:57:29 GC EIT+ Voltage SIR Autospec-UltimaE

Sample# 2 Text: 0 275 OPR001 Vial# 76 File Text: AAP DB5

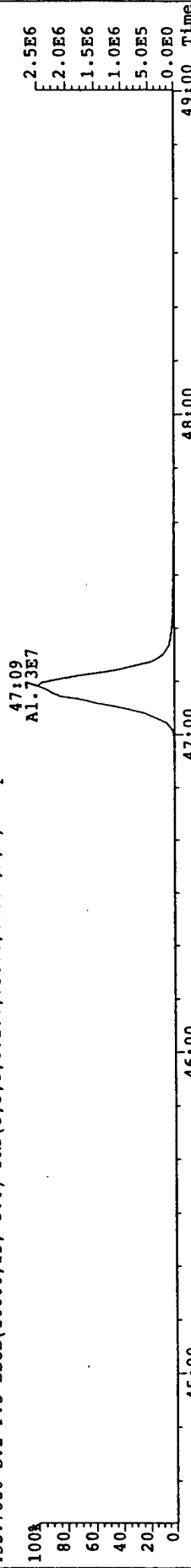
441.7428 S:2 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 125



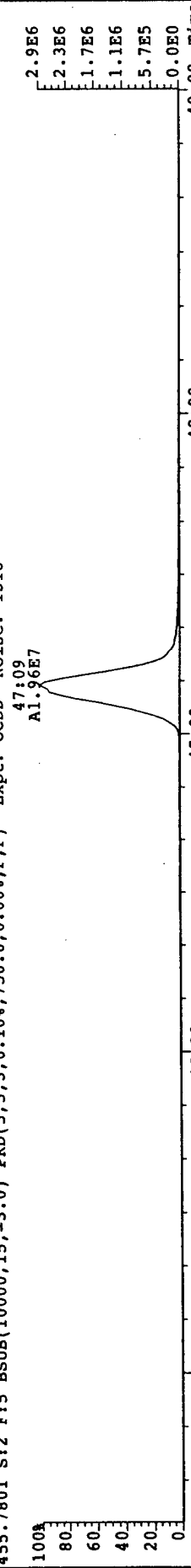
443.7398 S:2 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 279



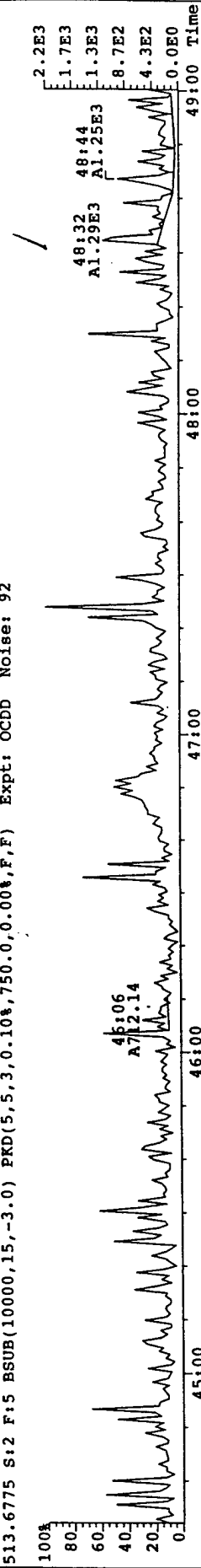
453.7830 S:2 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 198



455.7801 S:2 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 1318



513.6775 S:2 F:5 BSUB(10000,15,-3.0) PKD(5,5,3,0.10%,750.0,0.00%,F,F) Expt: OCDD Noise: 92



**APPENDIX D**  
**CALCULATIONS**

**Summary of Stack Gas Parameters and Test Results**  
**Malcolm Grow Medical Center - Andrews AFB, MD**  
**US EPA Test Method 29 - Multiple Metals**  
**Page 1 of 2**

|                        | <i><b>RUN NUMBER</b></i>                                | <i><b>M29-1</b></i>     | <i><b>M29-2</b></i>     | <i><b>M29-3</b></i>     |                       |
|------------------------|---------------------------------------------------------|-------------------------|-------------------------|-------------------------|-----------------------|
|                        | <i><b>RUN DATE</b></i>                                  | <i><b>2/2/01</b></i>    | <i><b>2/2/01</b></i>    | <i><b>2/2/01</b></i>    | <i><b>Average</b></i> |
|                        | <i><b>RUN TIME</b></i>                                  | <i><b>0945-1050</b></i> | <i><b>1230-1335</b></i> | <i><b>1405-1510</b></i> |                       |
| <b>MEASURED DATA</b>   |                                                         |                         |                         |                         |                       |
| $\gamma$               | Meter Box Correction Factor                             | 0.995                   | 0.995                   | 0.995                   | 0.995                 |
| $\Delta H$             | Avg Meter Orifice Pressure, in. H <sub>2</sub>          | 1.71                    | 1.69                    | 1.74                    | 1.71                  |
| $P_{bar}$              | Barometric Pressure, inches Hg                          | 29.90                   | 29.90                   | 29.90                   | 29.90                 |
| $V_m$                  | Sample Volume, ft <sup>3</sup>                          | 43.850                  | 42.030                  | 46.450                  | 44.110                |
| $T_m$                  | Average Meter Temperature, °F                           | 102                     | 103                     | 103                     | 103                   |
| $P_{static}$           | Stack Static Pressure, inches H <sub>2</sub> O          | 0.15                    | 0.2                     | 0.15                    | 0.15                  |
| $T_s$                  | Average Stack Temperature, °F                           | 171                     | 172                     | 172                     | 172                   |
| $V_{lc}$               | Condensate Collected, ml                                | 354.9                   | 339.1                   | 356.4                   | 350.1                 |
| CO <sub>2</sub>        | Carbon Dioxide content, % by volu                       | 6.3                     | 7.2                     | 6.0                     | 6.5                   |
| O <sub>2</sub>         | Oxygen content, % by volume                             | 11.6                    | 11.9                    | 12.3                    | 11.9                  |
| N <sub>2</sub>         | Nitrogen content, % by volume                           | 82.1                    | 80.9                    | 81.7                    | 81.6                  |
| $C_p$                  | Pitot Tube Coefficient                                  | 0.84                    | 0.84                    | 0.84                    | 0.84                  |
| $\Delta p^{1/2}$       | Average Square Root $\Delta p$ , (in. H <sub>2</sub> O) | 0.5844                  | 0.5811                  | 0.5893                  | 0.5849                |
| $\Theta$               | Sample Run Duration, minutes                            | 60                      | 60                      | 60                      | 60                    |
| $D_n$                  | Nozzle Diameter, inches                                 | 0.310                   | 0.310                   | 0.310                   | 0.310                 |
| <b>CALCULATED DATA</b> |                                                         |                         |                         |                         |                       |
| $A_n$                  | Nozzle Area, ft <sup>2</sup>                            | 0.000524                | 0.000524                | 0.000524                | 0.000524              |
| $V_{m(std)}$           | Standard Meter Volume, ft <sup>3</sup>                  | 41.144                  | 39.309                  | 43.496                  | 41.316                |
| $V_{m(std)}$           | Standard Meter Volume, m <sup>3</sup>                   | 1.165                   | 1.113                   | 1.232                   | 1.170                 |
| $Q_m$                  | Average Sampling Rate, dscfm                            | 0.686                   | 0.655                   | 0.725                   | 0.689                 |
| $P_s$                  | Stack Pressure, inches Hg                               | 29.91                   | 29.91                   | 29.91                   | 29.91                 |
| $B_{ws}$               | Moisture, % by volume                                   | 28.9                    | 28.9                    | 27.8                    | 28.5                  |
| $B_{ws(sat)}$          | Moisture (at saturation), % by volu                     | 42.0                    | 42.3                    | 42.1                    | 42.1                  |
| $V_{wstd}$             | Standard Water Vapor Volume, ft <sup>3</sup>            | 16.705                  | 15.961                  | 16.776                  | 16.481                |
| $1-B_{ws}$             | Dry Mole Fraction                                       | 0.711                   | 0.711                   | 0.722                   | 0.715                 |
| $M_d$                  | Molecular Weight (d.b.), lb/lb•mole                     | 29.47                   | 29.63                   | 29.45                   | 29.52                 |
| $M_s$                  | Molecular Weight (w.b.), lb/lb•mole                     | 26.16                   | 26.27                   | 26.26                   | 26.23                 |
| $V_s$                  | Stack Gas Velocity, ft/s                                | 37.7                    | 37.4                    | 37.9                    | 37.7                  |
| $A$                    | Stack Area, ft <sup>2</sup>                             | 1.289                   | 1.289                   | 1.289                   | 1.289                 |
| $Q_a$                  | Stack Gas Volumetric flow, acfm                         | 2,916                   | 2,894                   | 2,934                   | 2,915                 |
| $Q_s$                  | Stack Gas Volumetric flow, dscfm                        | 1,733                   | 1,719                   | 1,769                   | 1,740                 |
| $Q_s$                  | Stack Gas Volumetric flow, dscmm                        | 49.1                    | 48.7                    | 50.1                    | 49.3                  |
| $I$                    | Isokinetic Sampling Ratio, %                            | 97.3                    | 93.7                    | 100.8                   | 97.3                  |

**Summary of Stack Gas Parameters and Test Results**

**Malcolm Grow Medical Center - Andrews AFB, MD**

**US EPA Test Method 29 - Multiple Metals**

**Page 2 of 2**

| <b>RUN NUMBER</b>                   |                                            | <b>M29-1</b>     | <b>M29-2</b>     | <b>M29-3</b>     |                |
|-------------------------------------|--------------------------------------------|------------------|------------------|------------------|----------------|
| <b>RUN DATE</b>                     |                                            | <b>2/2/01</b>    | <b>2/2/01</b>    | <b>2/2/01</b>    | <b>Average</b> |
| <b>RUN TIME</b>                     |                                            | <b>0945-1050</b> | <b>1230-1335</b> | <b>1405-1510</b> |                |
| <b>EMISSIONS DATA</b>               |                                            |                  |                  |                  |                |
| <u><b>Particulate Matter</b></u>    |                                            |                  |                  |                  |                |
| PM                                  | Target Catch, g                            | 0.0063           | 0.0750           | 0.0711           | 0.0508         |
| C <sub>PM</sub>                     | Concentration, gr/dscf                     | 0.00236          | 0.0294           | 0.0252           | 0.0190         |
| C <sub>PM</sub> @ 7% O <sub>2</sub> | Concentration, gr/dscf @ 7% O <sub>2</sub> | 0.0035           | 0.0455           | 0.0408           | 0.0299         |
| C <sub>PM</sub>                     | Concentration, mg/dscm                     | 5.41             | 67.4             | 57.7             | 43.5           |
| C <sub>PM</sub> @ 7% O <sub>2</sub> | Concentration, mg/dscm @ 7% O <sub>2</sub> | 8.08             | 104.1            | 93.3             | 68.5           |
| E <sub>PM</sub>                     | Emission Rate, lb/hr                       | 0.0351           | 0.434            | 0.383            | 0.284          |
| E <sub>PM</sub>                     | Emission Rate, kg/hr                       | 0.0159           | 0.197            | 0.174            | 0.129          |
| <u><b>Cadmium</b></u>               |                                            |                  |                  |                  |                |
| Cd                                  | Target Catch, µg                           | 3.55             | 6.7              | 6.33             | 5.51           |
| C <sub>Cd</sub>                     | Concentration, mg/dscm                     | 0.00305          | 0.00598          | 0.00514          | 0.00472        |
| C <sub>Cd</sub> @ 7% O <sub>2</sub> | Concentration, mg/dscm @ 7% O <sub>2</sub> | 0.00455          | 0.00924          | 0.00831          | 0.00737        |
| E <sub>Cd</sub>                     | Emission Rate, g/hr                        | 0.00897          | 0.0175           | 0.0154           | 0.0140         |
| <u><b>Lead</b></u>                  |                                            |                  |                  |                  |                |
| Pb                                  | Target Catch, µg                           | 434.1            | 554              | 481.2            | 489.9          |
| C <sub>Pb</sub>                     | Concentration, mg/dscm                     | 0.373            | 0.498            | 0.391            | 0.420          |
| C <sub>Pb</sub> @ 7% O <sub>2</sub> | Concentration, mg/dscm @ 7% O <sub>2</sub> | 0.557            | 0.769            | 0.631            | 0.653          |
| E <sub>Pb</sub>                     | Emission Rate, g/hr                        | 1.10             | 1.45             | 1.17             | 1.24           |
| <u><b>Mercury</b></u>               |                                            |                  |                  |                  |                |
| Hg                                  | Target Catch, µg                           | 73.0             | 4.41             | 0.55             | 25.99          |
| C <sub>Hg</sub>                     | Concentration, mg/dscm                     | 0.0627           | 0.00396          | 0.000447         | 0.0224         |
| C <sub>Hg</sub> @ 7% O <sub>2</sub> | Concentration, mg/dscm @ 7% O <sub>2</sub> | 0.094            | 0.00612          | 0.000722         | 0.0335         |
| E <sub>Hg</sub>                     | Emission Rate, g/hr                        | 0.184            | 0.0116           | 0.00134          | 0.0658         |

**Summary of Stack Gas Parameters and Test Results**  
**Malcolm Grow Medical Center - Andrews AFB, MD**  
**US EPA Test Method 23 - PCDD / PCDF**  
**Medical Waste Incinerator Stack**  
**Page 1 of 6**

| <i>RUN NUMBER</i> |                                                             | <i>M-23-1</i>    | <i>M-23-2</i>    | <i>M-23-3</i>    |                |
|-------------------|-------------------------------------------------------------|------------------|------------------|------------------|----------------|
| <i>RUN DATE</i>   |                                                             | <i>1/31/01</i>   | <i>1/31/01</i>   | <i>2/1/01</i>    | <i>Average</i> |
| <i>RUN TIME</i>   |                                                             | <i>1026-1450</i> | <i>1610-2040</i> | <i>0910-1330</i> |                |
| MEASURED DATA     |                                                             |                  |                  |                  |                |
| $\gamma$          | Meter Box Correction Factor                                 | 0.995            | 0.995            | 0.995            | 0.995          |
| $\Delta H$        | Avg Meter Orifice Pressure, in. H <sub>2</sub> O            | 1.57             | 1.785            | 1.751            | 1.701          |
| $P_{bar}$         | Barometric Pressure, inches Hg                              | 29.90            | 29.90            | 29.90            | 29.90          |
| $V_m$             | Sample Volume, ft <sup>3</sup>                              | 172.731          | 182.040          | 180.182          | 178.318        |
| $T_m$             | Average Meter Temperature, °F                               | 90               | 105              | 100              | 98             |
| $P_{static}$      | Stack Static Pressure, inches H <sub>2</sub> O              | 0.15             | 0.15             | 0.2              | 0.15           |
| $T_s$             | Average Stack Temperature, °F                               | 171              | 172              | 172              | 172            |
| $V_{lc}$          | Condensate Collected, ml                                    | 1390.2           | 1256.9           | 1315.4           | 1320.8         |
| CO <sub>2</sub>   | Carbon Dioxide content, % by volu                           | 6.0              | 5.9              | 5.4              | 5.8            |
| O <sub>2</sub>    | Oxygen content, % by volume                                 | 11.4             | 12.1             | 10.8             | 11.4           |
| N <sub>2</sub>    | Nitrogen content, % by volume                               | 82.6             | 82.0             | 83.8             | 82.8           |
| $C_p$             | Pitot Tube Coefficient                                      | 0.84             | 0.84             | 0.84             | 0.84           |
| $\Delta p^{1/2}$  | Average Square Root Dp, (in. H <sub>2</sub> O) <sup>1</sup> | 0.5945           | 0.5783           | 0.5919           | 0.5882         |
| $\Theta$          | Sample Run Duration, minutes                                | 240              | 240              | 240              | 240            |
| $D_n$             | Nozzle Diameter, inches                                     | 0.310            | 0.310            | 0.310            | 0.310          |
| CALCULATED DATA   |                                                             |                  |                  |                  |                |
| $A_n$             | Nozzle Area, ft <sup>2</sup>                                | 0.00052          | 0.00052          | 0.00052          | 0.00052        |
| $V_{m(std)}$      | Standard Meter Volume, dscf                                 | 165.499          | 169.914          | 169.629          | 168.347        |
| $V_{m(std)}$      | Standard Meter Volume, dscm                                 | 4.686            | 4.811            | 4.803            | 4.767          |
| $P_s$             | Stack Pressure, inches Hg                                   | 29.91            | 29.91            | 29.91            | 29.91          |
| $B_{ws}$          | Moisture, % by volume                                       | 28.3             | 25.8             | 26.7             | 27.0           |
| $B_{ws(sat)}$     | Moisture (at saturation), % by volu                         | 41.9             | 42.4             | 42.4             | 42.2           |
| $V_{wstd}$        | Standard Water Vapor Volume, ft <sup>3</sup>                | 65.437           | 59.162           | 61.916           | 62.172         |
| $1-B_{ws}$        | Dry Mole Fraction                                           | 0.717            | 0.742            | 0.733            | 0.730          |
| $M_d$             | Molecular Weight (d.b.), lb/lb•mole                         | 29.42            | 29.43            | 29.30            | 29.38          |
| $M_s$             | Molecular Weight (w.b.), lb/lb•mole                         | 26.18            | 26.48            | 26.28            | 26.31          |
| $V_s$             | Stack Gas Velocity, ft/s                                    | 38.3             | 37.1             | 38.1             | 37.8           |
| $A$               | Stack Area, ft <sup>2</sup>                                 | 1.289            | 1.289            | 1.289            | 1.289          |
| $Q_a$             | Stack Gas Volumetric flow, acfm                             | 2,965            | 2,869            | 2,947            | 2,927          |
| $Q_s$             | Stack Gas Volumetric flow, dscfm                            | 1,776            | 1,777            | 1,803            | 1,785          |
| $Q_{s(cmm)}$      | Stack Gas Volumetric flow, dscmm                            | 50.3             | 50.3             | 51.1             | 50.6           |
| $I$               | Isokinetic Sampling Ratio, %                                | 95.5             | 98.0             | 96.4             | 96.6           |

**Summary of Stack Gas Parameters and Test Results**  
**Malcolm Grow Medical Center - Andrews AFB, MD**  
**US EPA Test Method 23 - PCDD / PCDF**  
**Baghouse Inlet**  
**Page 2 of 6**

| <i>RUN NUMBER</i>   | <i>M-23-1</i>                     | <i>M-23-2</i>    | <i>M-23-3</i>    |                        |
|---------------------|-----------------------------------|------------------|------------------|------------------------|
| <i>RUN DATE</i>     | <i>36922</i>                      | <i>36922</i>     | <i>36923</i>     | <i>Average</i>         |
| <i>RUN TIME</i>     | <i>1026-1450</i>                  | <i>1610-2040</i> | <i>0910-1330</i> |                        |
| EMISSIONS DATA      |                                   |                  |                  |                        |
| DIOXINS:            |                                   |                  |                  |                        |
| <u>2378 TCDD</u>    |                                   |                  |                  |                        |
| (ng)                | Catch, ng                         | (0.000792)       | 0.000945         | (0.000580) (0.000315)  |
| (ng/dscm)           | Concentration, ng/dscm, as measur | (0.000169)       | 0.000196         | (0.000121) (0.0000655) |
| (µg/hr)             | Emission Rate, µg/hr              | (0.000510)       | 0.000593         | (0.000370) (0.000198)  |
| <u>Total TCDD</u>   |                                   |                  |                  |                        |
| (ng)                | Catch, ng                         | 0.0173           | 0.013            | 0.00393 0.01141        |
| (ng/dscm)           | Concentration, ng/dscm, as measur | 0.00369          | 0.00270          | 0.000818 0.00240       |
| (µg/hr)             | Emission Rate, µg/hr              | 0.0111           | 0.00816          | 0.00251 0.00727        |
| <u>12378 PeCDD</u>  |                                   |                  |                  |                        |
| (ng)                | Catch, ng                         | {0.00174}        | 0.00244          | (0.001630) (0.00139)   |
| (ng/dscm)           | Concentration, ng/dscm, as measur | {0.000371}       | 0.000507         | (0.000339) (0.000293)  |
| (µg/hr)             | Emission Rate, µg/hr              | {0.00112}        | 0.00153          | (0.00104) (0.000884)   |
| <u>Total PeCDD</u>  |                                   |                  |                  |                        |
| (ng)                | Catch, ng                         | 0.0413           | 0.0313           | 0.0188 0.0305          |
| (ng/dscm)           | Concentration, ng/dscm, as measur | 0.00881          | 0.00651          | 0.00391 0.00641        |
| (µg/hr)             | Emission Rate, µg/hr              | 0.0266           | 0.0196           | 0.0120 0.0194          |
| <u>123478 HxCDD</u> |                                   |                  |                  |                        |
| (ng)                | Catch, ng                         | 0.00456          | {0.00196}        | 0.00254 {0.00302}      |
| (ng/dscm)           | Concentration, ng/dscm, as measur | 0.000973         | {0.000407}       | 0.000529 {0.000636}    |
| (µg/hr)             | Emission Rate, µg/hr              | 0.00294          | {0.00123}        | 0.00162 {0.00193}      |
| <u>123678 HxCDD</u> |                                   |                  |                  |                        |
| (ng)                | Catch, ng                         | 0.00758          | {0.00504}        | 0.00463 {0.00575}      |
| (ng/dscm)           | Concentration, ng/dscm, as measur | 0.00162          | {0.00105}        | 0.000964 {0.00121}     |
| (µg/hr)             | Emission Rate, µg/hr              | 0.00488          | {0.00316}        | 0.00295 {0.00367}      |

( ) Not Detected. Value shown is the detection limit. ND values are used as zero (0) in totals and averages.

{ } Estimated Maximum Possible Concentration. EMPC values ARE included in totals and averages.



Summary of Stack Gas Parameters and Test Results  
 Malcolm Grow Medical Center - Andrews AFB, MD  
 US EPA Test Method 23 - PCDD / PCDF  
 Baghouse Inlet  
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| RUN NUMBER                |                                   | M-23-1    | M-23-2    | M-23-3     |            |
|---------------------------|-----------------------------------|-----------|-----------|------------|------------|
| RUN DATE                  |                                   | 36922     | 36922     | 36923      | Average    |
| RUN TIME                  |                                   | 1026-1450 | 1610-2040 | 0910-1330  |            |
| EMISSIONS DATA -Continued |                                   |           |           |            |            |
| DIOXINS - Continued       |                                   |           |           |            |            |
| <u>123789 HxCDD</u>       |                                   |           |           |            |            |
| (ng)                      | Catch, ng                         | 0.00464   | 0.00276   | {0.00225}  | {0.00322}  |
| (ng/dscm)                 | Concentration, ng/dscm, as measur | 0.000990  | 0.000574  | {0.000468} | {0.000677} |
| (µg/hr)                   | Emission Rate, µg/hr              | 0.00299   | 0.00173   | {0.00144}  | {0.00205}  |
| <u>Total HxCDD</u>        |                                   |           |           |            |            |
| (ng)                      | Catch, ng                         | 0.0682    | 0.0429    | 0.0389     | 0.0500     |
| (ng/dscm)                 | Concentration, ng/dscm, as measur | 0.0146    | 0.00892   | 0.00810    | 0.0105     |
| (µg/hr)                   | Emission Rate, µg/hr              | 0.0439    | 0.0269    | 0.0248     | 0.0319     |
| <u>1234678 HpCDD</u>      |                                   |           |           |            |            |
| (ng)                      | Catch, ng                         | 0.0273    | 0.0215    | 0.0205     | 0.0231     |
| (ng/dscm)                 | Concentration, ng/dscm, as measur | 0.00583   | 0.00447   | 0.00427    | 0.00485    |
| (µg/hr)                   | Emission Rate, µg/hr              | 0.0176    | 0.0135    | 0.0131     | 0.0147     |
| <u>Total HpCDD</u>        |                                   |           |           |            |            |
| (ng)                      | Catch, ng                         | 0.0556    | 0.0444    | 0.0415     | 0.0472     |
| (ng/dscm)                 | Concentration, ng/dscm, as measur | 0.01186   | 0.00923   | 0.00864    | 0.00991    |
| (µg/hr)                   | Emission Rate, µg/hr              | 0.0358    | 0.0279    | 0.0265     | 0.0300     |
| <u>12346789 OCDD</u>      |                                   |           |           |            |            |
| (ng)                      | Catch, ng                         | 0.0744    | 0.0571    | 0.0633     | 0.0649     |
| (ng/dscm)                 | Concentration, ng/dscm, as measur | 0.0159    | 0.0119    | 0.0132     | 0.0136     |
| (µg/hr)                   | Emission Rate, µg/hr              | 0.0479    | 0.0358    | 0.0404     | 0.0414     |
| <u>Total PCDD</u>         |                                   |           |           |            |            |
| (ng)                      | Catch, ng                         | 0.2568    | 0.1887    | 0.16643    | 0.2040     |
| (ng/dscm)                 | Concentration, ng/dscm, as measur | 0.0548    | 0.0392    | 0.0346     | 0.0429     |
| (µg/hr)                   | Emission Rate, µg/hr              | 0.165     | 0.118     | 0.106      | 0.130      |

( ) Not Detected. Value shown is the detection limit. ND values are used as zero (0) in totals and averages.  
 {} Estimated Maximum Possible Concentration. EMPC values ARE included in totals and averages.

Summary of Stack Gas Parameters and Test Results  
 Malcolm Grow Medical Center - Andrews AFB, MD  
 US EPA Test Method 23 - PCDD / PCDF  
 Baghouse Inlet  
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| <i>RUN NUMBER</i>                           | <i>M-23-1</i>    | <i>I-M23-2</i> | <i>I-M23-3</i> |                |
|---------------------------------------------|------------------|----------------|----------------|----------------|
| <i>RUN DATE</i>                             | <i>36922</i>     | <i>I-M23-2</i> | <i>I-M23-3</i> | <i>Average</i> |
| <i>RUN TIME</i>                             | <i>1026-1450</i> | <i>I-M23-2</i> | <i>I-M23-3</i> |                |
| EMISSIONS DATA - Continued                  |                  |                |                |                |
| FURANS                                      |                  |                |                |                |
| <u>2378 TCDF</u>                            |                  |                |                |                |
| (ng) Catch, ng                              | 0.0113           | 0.00877        | 0.00739        | 0.00915        |
| (ng/dscm) Concentration, ng/dscm, as measur | 0.00241          | 0.00182        | 0.00154        | 0.00192        |
| (µg/hr) Emission Rate, µg/hr                | 0.00727          | 0.00550        | 0.00471        | 0.00583        |
| <u>Total TCDF</u>                           |                  |                |                |                |
| (ng) Catch, ng                              | 0.345            | 0.265          | 0.205          | 0.272          |
| (ng/dscm) Concentration, ng/dscm, as measur | 0.0736           | 0.0551         | 0.0427         | 0.0571         |
| (µg/hr) Emission Rate, µg/hr                | 0.222            | 0.166          | 0.131          | 0.173          |
| <u>12378 PeCDF</u>                          |                  |                |                |                |
| (ng) Catch, ng                              | 0.0209           | 0.0152         | 0.0116         | 0.0159         |
| (ng/dscm) Concentration, ng/dscm, as measur | 0.00446          | 0.00316        | 0.00241        | 0.00334        |
| (µg/hr) Emission Rate, µg/hr                | 0.0135           | 0.00954        | 0.00740        | 0.0101         |
| <u>23478 PeCDF</u>                          |                  |                |                |                |
| (ng) Catch, ng                              | 0.0466           | 0.0361         | 0.0265         | 0.0364         |
| (ng/dscm) Concentration, ng/dscm, as measur | 0.00994          | 0.00750        | 0.00552        | 0.00765        |
| (µg/hr) Emission Rate, µg/hr                | 0.0300           | 0.0227         | 0.0169         | 0.0232         |
| <u>Total PeCDF</u>                          |                  |                |                |                |
| (ng) Catch, ng                              | 0.451            | 0.354          | 0.277          | 0.3607         |
| (ng/dscm) Concentration, ng/dscm, as measur | 0.0962           | 0.0736         | 0.0577         | 0.07583        |
| (µg/hr) Emission Rate, µg/hr                | 0.290            | 0.222          | 0.177          | 0.2297         |
| <u>123478 HxCDF</u>                         |                  |                |                |                |
| (ng) Catch, ng                              | 0.0489           | 0.04           | 0.0289         | 0.0393         |
| (ng/dscm) Concentration, ng/dscm, as measur | 0.0104           | 0.00831        | 0.00602        | 0.00825        |
| (µg/hr) Emission Rate, µg/hr                | 0.0315           | 0.0251         | 0.0184         | 0.0250         |

() Not Detected. Value shown is the detection limit. ND values are used as zero (0) in totals and averages.

{ } Estimated Maximum Possible Concentration. EMPC values ARE included in totals and averages.

Summary of Stack Gas Parameters and Test Results  
 Malcolm Grow Medical Center - Andrews AFB, MD  
 US EPA Test Method 23 - PCDD / PCDF  
 Baghouse Inlet  
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| <i>RUN NUMBER</i> | <i>M-23-1</i>    | <i>M-23-2</i>    | <i>M-23-3</i>    |                |
|-------------------|------------------|------------------|------------------|----------------|
| <i>RUN DATE</i>   | <i>36922</i>     | <i>36922</i>     | <i>36923</i>     | <i>Average</i> |
| <i>RUN TIME</i>   | <i>1026-1450</i> | <i>1610-2040</i> | <i>0910-1330</i> |                |

EMISSIONS DATA - Continued

Furans - Continued

123678 HxCDF

|           |                                   |          |        |         |         |
|-----------|-----------------------------------|----------|--------|---------|---------|
| (ng)      | Catch, ng                         | 0.0546   | 0.0457 | 0.0355  | 0.0453  |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.011651 | 0.009  | 0.00739 | 0.00951 |
| (µg/hr)   | Emission Rate, µg/hr              | 0.03515  | 0.03   | 0.023   | 0.0288  |

234678 HxCDF

|           |                                   |        |        |        |        |
|-----------|-----------------------------------|--------|--------|--------|--------|
| (ng)      | Catch, ng                         | 0.0873 | 0.0737 | 0.0602 | 0.0737 |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.0186 | 0.0153 | 0.0125 | 0.0155 |
| (µg/hr)   | Emission Rate, µg/hr              | 0.0562 | 0.0463 | 0.0384 | 0.0470 |

123789 HxCDF

|           |                                   |         |         |         |         |
|-----------|-----------------------------------|---------|---------|---------|---------|
| (ng)      | Catch, ng                         | 0.0137  | 0.0111  | 0.00899 | 0.0113  |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.00292 | 0.00231 | 0.00187 | 0.00237 |
| (µg/hr)   | Emission Rate, µg/hr              | 0.00882 | 0.00697 | 0.00573 | 0.00717 |

Total HxCDF

|           |                                   |       |        |        |        |
|-----------|-----------------------------------|-------|--------|--------|--------|
| (ng)      | Catch, ng                         | 0.517 | 0.441  | 0.345  | 0.434  |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.110 | 0.0917 | 0.0718 | 0.0913 |
| (µg/hr)   | Emission Rate, µg/hr              | 0.333 | 0.277  | 0.220  | 0.277  |

1234678 HpCDF

|           |                                   |        |        |        |        |
|-----------|-----------------------------------|--------|--------|--------|--------|
| (ng)      | Catch, ng                         | 0.234  | 0.208  | 0.172  | 0.205  |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.0499 | 0.0432 | 0.0358 | 0.0430 |
| (µg/hr)   | Emission Rate, µg/hr              | 0.151  | 0.131  | 0.110  | 0.130  |

1234789 HpCDF

|           |                                   |         |         |         |         |
|-----------|-----------------------------------|---------|---------|---------|---------|
| (ng)      | Catch, ng                         | 0.0265  | 0.0222  | 0.0188  | 0.0225  |
| (ng/dscm) | Concentration, ng/dscm, as measur | 0.00565 | 0.00461 | 0.00391 | 0.00473 |
| (µg/hr)   | Emission Rate, µg/hr              | 0.0171  | 0.0139  | 0.0120  | 0.0143  |

- ( ) Not Detected. Value shown is the detection limit. ND values are used as zero (0) in totals and averages.  
 {} Estimated Maximum Possible Concentration. EMPC values ARE included in totals and averages.

**Summary of Stack Gas Parameters and Test Results**  
**Malcolm Grow Medical Center - Andrews AFB, MD**  
**US EPA Test Method 23 - PCDD / PCDF**  
**Baghouse Inlet**  
**Page 6 of 6**

| <i>RUN NUMBER</i>          | <i>M-23-1</i>                     | <i>M-23-2</i>    | <i>M-23-3</i>    |                |        |
|----------------------------|-----------------------------------|------------------|------------------|----------------|--------|
| <i>RUN DATE</i>            | <i>36922</i>                      | <i>36922</i>     | <i>36923</i>     | <i>Average</i> |        |
| <i>RUN TIME</i>            | <i>1026-1450</i>                  | <i>1610-2040</i> | <i>0910-1330</i> |                |        |
| EMISSIONS DATA - Continued |                                   |                  |                  |                |        |
| Furans - Continued         |                                   |                  |                  |                |        |
| <u>Total HpCDE</u>         |                                   |                  |                  |                |        |
| (ng)                       | Catch, ng                         | 0.37             | 0.328            | 0.274          | 0.324  |
| (ng/dscm)                  | Concentration, ng/dscm, as measur | 0.0790           | 0.0682           | 0.0570         | 0.0681 |
| (µg/hr)                    | Emission Rate, µg/hr              | 0.238            | 0.206            | 0.175          | 0.206  |
| <u>12346789 OCDE</u>       |                                   |                  |                  |                |        |
| (ng)                       | Catch, ng                         | 0.145            | 0.118            | 0.113          | 0.125  |
| (ng/dscm)                  | Concentration, ng/dscm, as measur | 0.0309           | 0.0245           | 0.0235         | 0.0263 |
| (µg/hr)                    | Emission Rate, µg/hr              | 0.0934           | 0.0741           | 0.0721         | 0.0798 |
| <u>Total PCDE</u>          |                                   |                  |                  |                |        |
| (ng)                       | Catch, ng                         | 1.828            | 1.506            | 1.214          | 1.516  |
| (ng/dscm)                  | Concentration, ng/dscm, as measur | 0.390            | 0.313            | 0.253          | 0.319  |
| (µg/hr)                    | Emission Rate, µg/hr              | 1.18             | 0.945            | 0.774          | 0.965  |
| <u>Total PCDD + PCDE</u>   |                                   |                  |                  |                |        |
| (ng)                       | Catch, ng                         | 2.085            | 1.695            | 1.380          | 1.720  |
| (ng/dscm)                  | Concentration, ng/dscm, as measur | 0.445            | 0.352            | 0.287          | 0.361  |
| (µg/hr)                    | Emission Rate, µg/hr              | 1.34             | 1.06             | 0.881          | 1.10   |

( ) Not Detected. Value shown is the detection limit. ND values are used as zero (0) in totals and averages.

{ } Estimated Maximum Possible Concentration. EMPC values ARE included in totals and averages.

**CDD/CDF Corrected Stack Gas Concentrations and 2378 TCDD Toxic Equivalent Concentrations**  
**Malcolm Grow Medical Center - Andrews AFB, MD**  
**US EPA Test Method 23 - CDD/CDF**  
**Medical Waste Incinerator Stack**

|                                    | CONCENTRATION<br>(ng/dscmm, adjusted to 7% O2) |                                |                               |            | 2378-TCDD<br><br>Toxic<br>Equivalent<br>Factor | 2378 TOXIC EQUIVALENCIES<br>(ng/dscmm, adjusted to 7% O2) |                                |                               |            |
|------------------------------------|------------------------------------------------|--------------------------------|-------------------------------|------------|------------------------------------------------|-----------------------------------------------------------|--------------------------------|-------------------------------|------------|
| RUN NUMBER<br>RUN DATE<br>RUN TIME | M-23-1<br>1/31/01<br>1026-1450                 | M-23-2<br>1/31/01<br>1610-2040 | M-23-3<br>2/1/01<br>0910-1330 | Average    |                                                | M-23-1<br>1/31/01<br>1026-1450                            | M-23-2<br>1/31/01<br>1610-2040 | M-23-3<br>2/1/01<br>0910-1330 | Average    |
| DIOXINS:                           |                                                |                                |                               |            |                                                |                                                           |                                |                               |            |
| 2378 TCDD                          | (0.000247)                                     | 0.000310                       | (0.000166)                    | (0.000096) | 1.000                                          | (0.000247)                                                | 0.000310                       | (0.000166)                    | (0.000096) |
| Total TCDD                         | 0.00540                                        | 0.00427                        | 0.00113                       | 0.00353    |                                                |                                                           |                                |                               |            |
| 12378 PeCDD                        | {0.000543}                                     | 0.000801                       | (0.000467)                    | (0.000430) | 0.500                                          | {0.000272}                                                | 0.000401                       | (0.000234)                    | (0.000215) |
| Total PeCDD                        | 0.0129                                         | 0.0103                         | 0.00539                       | 0.0094     |                                                |                                                           |                                |                               |            |
| 123478 HxCDD                       | 0.00142                                        | {0.000643}                     | 0.000728                      | {0.000934} | 0.100                                          | 0.000142                                                  | #####                          | 0.0000728                     | #####      |
| 123678 HxCDD                       | 0.00237                                        | {0.00165}                      | 0.0013                        | {0.00178}  | 0.100                                          | 0.000237                                                  | {0.000165}                     | 0.000133                      | {0.000178} |
| 123789 HxCDD                       | 0.00145                                        | 0.000906                       | {0.000645}                    | {0.000995} | 0.100                                          | 0.000145                                                  | 0.0000906                      | #####                         | #####      |
| Total HxCDD                        | 0.0213                                         | 0.0141                         | 0.0111                        | 0.0155     |                                                |                                                           |                                |                               |            |
| 1234678 HpCDD                      | 0.00852                                        | 0.00706                        | 0.00587                       | 0.00713    | 0.010                                          | 0.0000852                                                 | 0.0000706                      | 0.0000587                     | 0.0000713  |
| Total HpCDD                        | 0.0174                                         | 0.0146                         | 0.0119                        | 0.0146     |                                                |                                                           |                                |                               |            |
| 12346789 OCDD                      | 0.0232                                         | 0.0187                         | 0.0181                        | 0.0200     | 0.001                                          | 0.0000232                                                 | 0.0000187                      | 0.0000181                     | 0.0000200  |
| Total CDD                          | 0.0802                                         | 0.0619                         | 0.0477                        | 0.0630     |                                                | {0.000904}                                                | {0.00112}                      | {0.000347}                    | {0.000773} |
| FURANS:                            |                                                |                                |                               |            |                                                |                                                           |                                |                               |            |
| 2378 TCDF                          | 0.00353                                        | 0.00288                        | 0.00212                       | 0.00283    | 0.100                                          | 0.000353                                                  | 0.000288                       | 0.000212                      | 0.000283   |
| Total TCDF                         | 0.108                                          | 0.0870                         | 0.0587                        | 0.0839     |                                                |                                                           |                                |                               |            |
| 12378 PeCDF                        | 0.00653                                        | 0.00499                        | 0.00332                       | 0.00491    | 0.050                                          | 0.000326                                                  | 0.000250                       | 0.000166                      | 0.000246   |
| 23478 PeCDF                        | 0.0145                                         | 0.0119                         | 0.00759                       | 0.0112     | 0.500                                          | 0.00727                                                   | 0.00593                        | 0.00380                       | 0.00562    |
| Total PeCDF                        | 0.141                                          | 0.116                          | 0.0794                        | 0.111      |                                                |                                                           |                                |                               |            |
| 123478 HxCDF                       | 0.0153                                         | 0.0131                         | 0.0083                        | 0.0121     | 0.100                                          | 0.00153                                                   | 0.00131                        | 0.000828                      | 0.00121    |
| 123678 HxCDF                       | 0.0170                                         | 0.0150                         | 0.0102                        | 0.0140     | 0.100                                          | 0.00170                                                   | 0.00150                        | 0.00102                       | 0.00140    |
| 234678 HxCDF                       | 0.0273                                         | 0.0242                         | 0.0172                        | 0.0227     | 0.100                                          | 0.00273                                                   | 0.00242                        | 0.00172                       | 0.00227    |
| 123789 HxCDF                       | 0.00428                                        | 0.00364                        | 0.00258                       | 0.00348    | 0.100                                          | 0.000428                                                  | 0.000364                       | 0.000258                      | 0.000348   |
| Total HxCDF                        | 0.161                                          | 0.145                          | 0.0988                        | 0.134      |                                                |                                                           |                                |                               |            |
| 1234678 HpCDF                      | 0.0731                                         | 0.0683                         | 0.0493                        | 0.0631     | 0.010                                          | 0.000731                                                  | 0.000683                       | 0.000493                      | 0.000631   |
| 1234789 HpCDF                      | 0.00827                                        | 0.00729                        | 0.00539                       | 0.00694    | 0.010                                          | 0.0000827                                                 | 0.0000729                      | 0.0000539                     | 0.0000694  |
| Total HpCDF                        | 0.116                                          | 0.108                          | 0.0785                        | 0.100      |                                                |                                                           |                                |                               |            |
| 12346789 OCDF                      | 0.0453                                         | 0.0387                         | 0.0324                        | 0.0387     | 0.001                                          | 0.0000453                                                 | 0.0000387                      | 0.0000324                     | 0.0000387  |
| Total CDF                          | 0.571                                          | 0.494                          | 0.348                         | 0.468      |                                                | 0.0152                                                    | 0.0129                         | 0.00858                       | 0.0121     |
| Total CDD + CDF                    | 0.651                                          | 0.556                          | 0.396                         | 0.531      |                                                | {0.0161}                                                  | {0.0140}                       | {0.00893}                     | {0.0130}   |

- ( ) Indicates value in parentheses is based on the Detection Limit (sample was Not Detected). A total or average value in parentheses means the value includes one or more zero (0) values used in place of the detection limit based value.
- { } Indicates the value is based on an EMPC value. The value is used as is in totals and averages.

# Summary of Stack Gas Parameters and Test Results

## Air Emissions Test

Malcolm Grow Medical Center - Andrews AFB, MD

US EPA Test Method 26 - HCl

Medical Waste Incinerator Stack

Page 1 of 1

| RUN NUMBER              |                                        | M26-1     | M26-3     | M26-4     | Average |
|-------------------------|----------------------------------------|-----------|-----------|-----------|---------|
| RUN DATE                |                                        | 1/31/01   | 2/1/01    | 2/2/01    |         |
| RUN TIME                |                                        | 1045-1145 | 0910-1010 | 0945-1045 |         |
| MEASURED DATA           |                                        |           |           |           |         |
| $\gamma$                | Meter Box Correction Factor            | 1.004     | 1.004     | 1.004     | 1.004   |
| $P_{bar}$               | Barometric Pressure, inches Hg         | 29.90     | 29.90     | 29.90     | 29.90   |
| $V_m$                   | Sample Volume, ft <sup>3</sup>         | 120.100   | 119.810   | 120.440   | 120.117 |
| $\Delta H$              | Avg Meter Orifice Pressure, in. H      | 2.20      | 2.20      | 2.20      | 2.20    |
| $T_m$                   | Average Meter Temperature, °F          | 89.6      | 109.3     | 90        | 96.2    |
| CO <sub>2</sub>         | Carbon Dioxide content, % by vol       | 5.8       | 6.1       | 6.3       | 6.1     |
| O <sub>2</sub>          | Oxygen content, % by volume            | 11.3      | 11.9      | 11.6      | 11.6    |
| $\Theta$                | Sample Run Duration, minutes           | 60        | 60        | 60        | 60      |
| CALCULATED DATA         |                                        |           |           |           |         |
| $V_{sc}$                | Standard Meter Volume, liters          | 116.347   | 112.056   | 116.659   | 115.021 |
| $V_{m(std)}$            | Standard Meter Volume, ft <sup>3</sup> | 4.109     | 3.957     | 4.120     | 4.062   |
| $V_{m(std)}$            | Standard Meter Volume, m <sup>3</sup>  | 0.116     | 0.112     | 0.117     | 0.115   |
| $Q_m$                   | Average Sampling Rate, lpm             | 1.94      | 1.87      | 1.94      | 1.92    |
| EMISSIONS DATA          |                                        |           |           |           |         |
| <u>Chlorides as HCl</u> |                                        |           |           |           |         |
|                         | Catch Mass, mg                         | 2.8       | 0.3       | 1.1       |         |
| $F_{wt}$                | Formula Weight, lb/lb-mol              | 36.47     | 36.47     | 36.47     |         |
| $C_{ppmvd}$             | Concentration, ppm by volume           | 15.9      | 1.77      | 6.22      | 7.95    |
| $C_{ppm7\%O_2}$         | Concentration, ppm by vol. at 7%       | 23.0      | 2.73      | 9.29      | 11.7    |

**APPENDIX E**  
**QA/QC DATA**

**Pacific Environmental Services**

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**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: 1/22/01  
P<sub>bar</sub>, in Hg 30.00

Calibrator: DDH

Meter Box (DGM) No.: RMB-15

Reference Meter Correction Factor: 1.0077 (10/5/97, 09/28/98, & 09/10/99)

|       |                      | Dry Gas Meter RMB-15          |         |       |                         |       |      |         |       |      |
|-------|----------------------|-------------------------------|---------|-------|-------------------------|-------|------|---------|-------|------|
| Trial | Trial Duration (min) | Gas Volume (ft <sup>3</sup> ) |         |       | Meter Temperatures (°F) |       |      |         |       |      |
|       |                      | Initial                       | Final   | Net   | Inlet                   |       |      | Outlet  |       |      |
|       |                      |                               |         |       | Initial                 | Final | Avg. | Initial | Final | Avg. |
| 1     | 15                   | 464.354                       | 470.464 | 6.110 | 72                      | 73    | 72.5 | 70      | 70    | 70   |
| 2     | 15                   | 470.464                       | 476.579 | 6.115 | 72                      | 73    | 72.5 | 70      | 70    | 70   |
| 3     | 15                   | 476.579                       | 482.679 | 6.100 | 72                      | 75    | 73.5 | 70      | 71    | 70.5 |

| Trial | Reference Meter               |         |       |                         |       |      | DGM Correction<br>Factor<br>$\gamma$ | Reference<br>Orifice Press<br>$\Delta H_{\text{or}}$ (in. H <sub>2</sub> O) |
|-------|-------------------------------|---------|-------|-------------------------|-------|------|--------------------------------------|-----------------------------------------------------------------------------|
|       | Gas Volume (ft <sup>3</sup> ) |         |       | Meter Temperatures (°F) |       |      |                                      |                                                                             |
|       | Initial                       | Final   | Net   | Initial                 | Final | Avg. |                                      |                                                                             |
| 1     | 567.537                       | 573.492 | 5.955 | 64                      | 64    | 64   | 0.995                                | 1.719                                                                       |
| 2     | 573.492                       | 579.425 | 5.933 | 64                      | 64    | 64   | 0.990                                | 1.732                                                                       |
| 3     | 579.425                       | 585.363 | 5.938 | 64                      | 64    | 64   | 0.995                                | 1.726                                                                       |

|       |                      | Dry Gas Meter RMB-15          |         |       |                         |       |      |         |       |      |
|-------|----------------------|-------------------------------|---------|-------|-------------------------|-------|------|---------|-------|------|
| Trial | Trial Duration (min) | Gas Volume (ft <sup>3</sup> ) |         |       | Meter Temperatures (°F) |       |      |         |       |      |
|       |                      | Initial                       | Final   | Net   | Inlet                   |       |      | Outlet  |       |      |
|       |                      |                               |         |       | Initial                 | Final | Avg. | Initial | Final | Avg. |
| 1     | 15                   | 499.123                       | 506.571 | 7.448 | 74                      | 74    | 74   | 72      | 72    | 72   |
| 2     | 15                   | 506.571                       | 514.037 | 7.466 | 74                      | 74    | 74   | 72      | 72    | 72   |
| 3     | 15                   | 514.037                       | 521.456 | 7.419 | 74                      | 75    | 74.5 | 72      | 71    | 71.5 |

| Trial | Reference Meter               |         |       |                         |       |      | DGM Correction<br>Factor<br>$\gamma$ | Reference<br>Orifice Press<br>$\Delta H_{\text{or}}$ (in. H <sub>2</sub> O) |
|-------|-------------------------------|---------|-------|-------------------------|-------|------|--------------------------------------|-----------------------------------------------------------------------------|
|       | Gas Volume (ft <sup>3</sup> ) |         |       | Meter Temperatures (°F) |       |      |                                      |                                                                             |
|       | Initial                       | Final   | Net   | Initial                 | Final | Avg. |                                      |                                                                             |
| 1     | 589.234                       | 596.489 | 7.255 | 64                      | 64    | 64   | 0.997                                | 1.733                                                                       |
| 2     | 596.489                       | 603.728 | 7.239 | 64                      | 64    | 64   | 0.992                                | 1.740                                                                       |
| 3     | 603.728                       | 610.967 | 7.239 | 64                      | 64    | 64   | 0.998                                | 1.740                                                                       |

|       |                      | Dry Gas Meter RMB-15          |         |       |                         |       |      |         |       |      |
|-------|----------------------|-------------------------------|---------|-------|-------------------------|-------|------|---------|-------|------|
| Trial | Trial Duration (min) | Gas Volume (ft <sup>3</sup> ) |         |       | Meter Temperatures (°F) |       |      |         |       |      |
|       |                      | Initial                       | Final   | Net   | Inlet                   |       |      | Outlet  |       |      |
|       |                      |                               |         |       | Initial                 | Final | Avg. | Initial | Final | Avg. |
| 1     | 10                   | 540.356                       | 546.014 | 5.658 | 74                      | 75    | 74.5 | 72      | 72    | 72   |
| 2     | 10                   | 546.014                       | 551.686 | 5.672 | 74                      | 75    | 74.5 | 72      | 72    | 72   |
| 3     | 10                   | 551.686                       | 557.344 | 5.658 | 74                      | 76    | 75   | 72      | 72    | 72   |

| Trial | Reference Meter               |         |       |                         |       |      | DGM Correction<br>Factor<br>$\gamma$ | Reference<br>Orifice Press<br>$\Delta H_{\text{or}}$ (in. H <sub>2</sub> O) |
|-------|-------------------------------|---------|-------|-------------------------|-------|------|--------------------------------------|-----------------------------------------------------------------------------|
|       | Gas Volume (ft <sup>3</sup> ) |         |       | Meter Temperatures (°F) |       |      |                                      |                                                                             |
|       | Initial                       | Final   | Net   | Initial                 | Final | Avg. |                                      |                                                                             |
| 1     | 621.021                       | 626.53  | 5.509 | 64                      | 64    | 64   | 0.996                                | 1.781                                                                       |
| 2     | 626.530                       | 632.000 | 5.470 | 64                      | 64    | 64   | 0.987                                | 1.806                                                                       |
| 3     | 632.000                       | 637.500 | 5.500 | 64                      | 64    | 64   | 0.995                                | 1.786                                                                       |




**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: 1/22/01 Calibrator: DDH Meter Box (DGM) No.: RMB-15  
P<sub>bar</sub> in Hg 30.00 Reference Meter Correction Factor: 1.0077 (10/5/97, 09/28/98, & 09/10/99)

| $\Delta H =$ 2.0 |                      | Dry Gas Meter RMB-15          |         |       |                         |       |      |         |       |      |
|------------------|----------------------|-------------------------------|---------|-------|-------------------------|-------|------|---------|-------|------|
| Trial            | Trial Duration (min) | Gas Volume (ft <sup>3</sup> ) |         |       | Meter Temperatures (°F) |       |      |         |       |      |
|                  |                      | Initial                       | Final   | Net   | Inlet                   |       |      | Outlet  |       |      |
|                  |                      |                               |         |       | Initial                 | Final | Avg. | Initial | Final | Avg. |
| 1                | 7                    | 568.937                       | 574.407 | 5.470 | 68                      | 67    | 67.5 | 67      | 67    | 67   |
| 2                | 7                    | 574.407                       | 579.882 | 5.475 | 68                      | 67    | 67.5 | 67      | 67    | 67   |
| 3                | 7                    | 579.882                       | 585.360 | 5.478 | 68                      | 67    | 67.5 | 67      | 67    | 67   |

| Trial | Reference Meter               |         |       |                         |       |      | DGM Correction<br>Factor<br>$\gamma$ | Reference<br>Orifice Press<br>$\Delta H_{\text{or}}$ (in. H <sub>2</sub> O) |
|-------|-------------------------------|---------|-------|-------------------------|-------|------|--------------------------------------|-----------------------------------------------------------------------------|
|       | Gas Volume (ft <sup>3</sup> ) |         |       | Meter Temperatures (°F) |       |      |                                      |                                                                             |
|       | Initial                       | Final   | Net   | Initial                 | Final | Avg. |                                      |                                                                             |
| 1     | 645.018                       | 650.368 | 5.350 | 64                      | 62    | 63   | 0.989                                | 1.869                                                                       |
| 2     | 650.368                       | 655.738 | 5.370 | 64                      | 62    | 63   | 0.992                                | 1.855                                                                       |
| 3     | 655.738                       | 661.113 | 5.375 | 64                      | 62    | 63   | 0.992                                | 1.852                                                                       |

| $\Delta H =$ 4.0 |                      | Dry Gas Meter RMB-15          |         |       |                         |       |      |         |       |      |
|------------------|----------------------|-------------------------------|---------|-------|-------------------------|-------|------|---------|-------|------|
| Trial            | Trial Duration (min) | Gas Volume (ft <sup>3</sup> ) |         |       | Meter Temperatures (°F) |       |      |         |       |      |
|                  |                      | Initial                       | Final   | Net   | Inlet                   |       |      | Outlet  |       |      |
|                  |                      |                               |         |       | Initial                 | Final | Avg. | Initial | Final | Avg. |
| 1                | 5                    | 600.198                       | 605.660 | 5.462 | 74                      | 74    | 74   | 72      | 73    | 72.5 |
| 2                | 5                    | 605.660                       | 611.129 | 5.469 | 74                      | 74    | 74   | 72      | 73    | 72.5 |
| 3                | 5                    | 611.129                       | 616.609 | 5.480 | 74                      | 73    | 73.5 | 72      | 73    | 72.5 |

| Trial | Reference Meter               |         |       |                         |       |      | DGM Correction<br>Factor<br>$\gamma$ | Reference<br>Orifice Press<br>$\Delta H_{\text{or}}$ (in. H <sub>2</sub> O) |
|-------|-------------------------------|---------|-------|-------------------------|-------|------|--------------------------------------|-----------------------------------------------------------------------------|
|       | Gas Volume (ft <sup>3</sup> ) |         |       | Meter Temperatures (°F) |       |      |                                      |                                                                             |
|       | Initial                       | Final   | Net   | Initial                 | Final | Avg. |                                      |                                                                             |
| 1     | 680.287                       | 685.679 | 5.392 | 64                      | 64    | 64   | 1.003                                | 1.873                                                                       |
| 2     | 685.679                       | 691.070 | 5.391 | 64                      | 64    | 64   | 1.001                                | 1.873                                                                       |
| 3     | 691.070                       | 696.461 | 5.391 | 64                      | 64    | 64   | 0.999                                | 1.874                                                                       |

**Calibration Results**

| $\Delta H$ | $\gamma$ | $\Delta H_{\text{or}}$ |
|------------|----------|------------------------|
| 0.50       | 0.993    | 1.73                   |
| 0.75       | 0.996    | 1.74                   |
| 1.0        | 0.992    | 1.79                   |
| 2.0        | 0.991    | 1.86                   |
| 4.0        | 1.001    | 1.87                   |

**Dry Gas Meter RMB-15 on 01/22/01**

Meter Box Calibration Factor **0.995**  
Meter Box Reference Orifice Pressure **1.80**



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### Posttest Dry Gas Meter Calibration Form (English Units)

Pretest Calibration Factor 0.995

System Vacuum Setting, (in Hg) 3

Reference Meter Correction Factor 1.0077 (10/5/97, 09/28/98, & 09/10/99)

Date: 2/8/01  $P_{bar}$  in Hg 29.90

Calibrator: D. Holzschuh

Meter Box No.: RMB-15

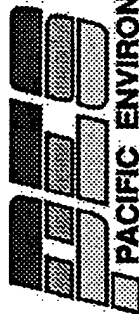
$\Delta H = 1.8$

Dry Gas Meter RMB-15

| Trial | Duration<br>(min) | Initial<br>(ft <sup>3</sup> ) | Final<br>(ft <sup>3</sup> ) | Net<br>(ft <sup>3</sup> ) | Initial, Inlet<br>(°F) | Final, Inlet<br>(°F) | Avg. Inlet<br>(°F) | Initial, Outlet<br>(°F) | Final, Outlet<br>(°F) | Avg. Outlet<br>(°F) |
|-------|-------------------|-------------------------------|-----------------------------|---------------------------|------------------------|----------------------|--------------------|-------------------------|-----------------------|---------------------|
| 1     | 10                | 998.189                       | 1005.909                    | 7.720                     | 76                     | 75                   | 75.5               | 76                      | 74                    | 75                  |
| 2     | 10                | 1005.909                      | 1013.604                    | 7.695                     | 76                     | 75                   | 75.5               | 76                      | 74                    | 75                  |
| 3     | 10                | 1013.604                      | 1021.302                    | 7.698                     | 76                     | 74                   | 75                 | 76                      | 74                    | 75                  |

| Trial | Reference Meter               |                             |                           |                 | Meter Box<br>Correction<br>Factor |              |
|-------|-------------------------------|-----------------------------|---------------------------|-----------------|-----------------------------------|--------------|
|       | Gas Volume                    |                             | Meter Temperature         |                 | $\gamma$                          |              |
|       | Initial<br>(ft <sup>3</sup> ) | Final<br>(ft <sup>3</sup> ) | Net<br>(ft <sup>3</sup> ) | Initial<br>(°F) | Final<br>(°F)                     | Avg.<br>(°F) |
| 1     | 945.198                       | 952.898                     | 7.700                     | 74              | 74                                | 74           |
| 2     | 952.898                       | 960.579                     | 7.681                     | 74              | 74                                | 74           |
| 3     | 960.579                       | 968.264                     | 7.685                     | 74              | 74                                | 74           |

**AVERAGE: 1.0034**  
**% Change: 0.84% PASS**



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### Vost Pretest Dry Gas Meter Calibration Form (English Units)

Pretest Calibration Factor 1.004

System Vacuum Setting, (in Hg) 3

Reference Meter Correction Factor N/A

Date: 06/08/00 P<sub>bar</sub>, in Hg 30.00

Calibrator: DDH

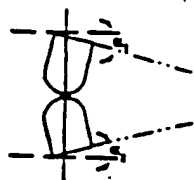
Meter Box No.: V-6

| Trial | Duration<br>(min) | Vost DGM, liters  |                 |               |     | Buck Meter, cc/min |     |     |     |
|-------|-------------------|-------------------|-----------------|---------------|-----|--------------------|-----|-----|-----|
|       |                   | Initial<br>Liters | Final<br>Liters | Net<br>Liters | CC  | CC                 | CC  | CC  | CC  |
| 1     | 10                | 0                 | 9.712           | 9.712         | 979 | 972                | 973 | 974 | 970 |
| 2     | 10                | 9.712             | 19.348          | 9.636         | 981 | 971                | 968 | 973 | 971 |
| 3     | 10                | 19.348            | 28.939          | 9.591         | 977 | 977                | 969 | 958 | 967 |

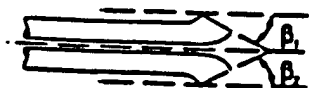
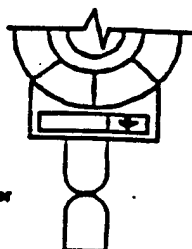
| Trial | CC  | Reference Meter |     |     |     | AVG<br>CC/min | Average<br>lpm | $\gamma$ |
|-------|-----|-----------------|-----|-----|-----|---------------|----------------|----------|
|       |     | CC              | CC  | CC  | CC  |               |                |          |
| 1     | 972 | 980             | 969 | 972 | 977 | 973.55        | 9.735          | 1.002    |
| 2     | 981 | 985             | 985 | 982 | 970 | 976.27        | 9.763          | 1.013    |
| 3     | 988 | 981             | 983 | 990 | 974 | 976.55        | 9.765          | 1.018    |

GAMMA  
% Change  
1.011

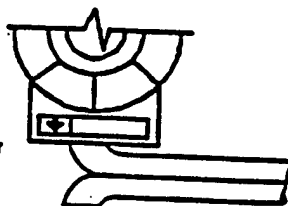
# CALIBRATION DATA SHEET 2 Type S Pitot Tube Inspection



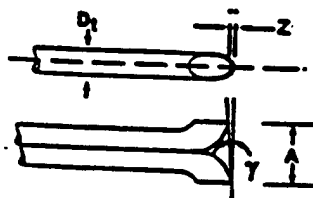
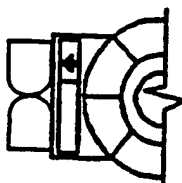
Degree indicating level position for determining  $\alpha_1$  and  $\alpha_2$ .



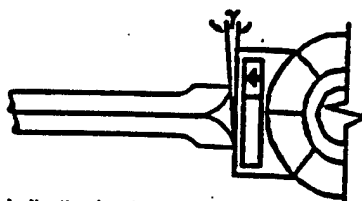
Degree indicating level position for determining  $\beta_1$  and  $\beta_2$ .



Degree indicating level position for determining  $\theta$ .



Degree indicating level position for determining  $\gamma$  then calculate  $Z$ .



|                                                         |      |
|---------------------------------------------------------|------|
| Level and Perpendicular?                                | YES  |
| Obstruction?                                            | NO   |
| Damaged?                                                | NO   |
| $\alpha_1$ ( $-10^\circ \leq \alpha_1 \leq +10^\circ$ ) | 0    |
| $\alpha_2$ ( $-10^\circ \leq \alpha_2 \leq +10^\circ$ ) | 1    |
| $\beta_1$ ( $-5^\circ \leq \beta_1 \leq +5^\circ$ )     | 0    |
| $\beta_2$ ( $-5^\circ \leq \beta_2 \leq +5^\circ$ )     | 1    |
| $\gamma$                                                | 0    |
| $\theta$                                                | 0    |
| $z = A \tan \gamma$ ( $\leq 0.125''$ )                  | 0    |
| $w = A \tan \theta$ ( $\leq 0.03125''$ )                | 0    |
| $D_1$ ( $3/16'' \leq D_1 \leq 3/8''$ )                  | 3/8  |
| A                                                       | .938 |
| $A/2D_1$ ( $1.05 \leq P_A/D_1 \leq 1.5$ )               | 1.25 |

## QA/QC Check

Completeness \_\_\_\_\_ Legibility \_\_\_\_\_ Accuracy \_\_\_\_\_ Specifications \_\_\_\_\_ Reasonableness \_\_\_\_\_

## Certification

I certify that the Type S pitot tube/probe ID# RP-19 meets or exceeds all specifications, criteria and/or applicable design features and is hereby assigned a pitot tube calibration factor  $C_p$  of 0.84.

Certified by: J. D. Brown 7-14-98  
Personnel (Signature/Date)

Team Leader (Signature/Date)

# TEMPERATURE SENSOR CALIBRATION FORM

Temperature Sensor No. RT-6 Sensor Type K TYPE Length 4'  
 Ambient Temp. °F 68 Barometric Pressure, "Hg 29.95  
 Reference Temp. Sensor: 68

| Date     | Ref. Point No. | Temp. Source             | Temp. °F    |             | Temp. Diff. % | Within Limits Y/N | Calibrated By |
|----------|----------------|--------------------------|-------------|-------------|---------------|-------------------|---------------|
|          |                |                          | Ref. Sensor | Test Sensor |               |                   |               |
| 02/11/01 | 1              | ICE H <sub>2</sub> O     | 32          | 32          | 0             | Y                 | DDH           |
|          | 2              | AMBIENT AIR              | 71          | 68          | -0.65         | Y                 | DDH           |
|          | 3              | Boiling H <sub>2</sub> O | 210         | 210         | 0             | Y                 | DDH           |
|          | 1              |                          |             |             |               |                   |               |
|          | 2              |                          |             |             |               |                   |               |
|          | 3              |                          |             |             |               |                   |               |
|          | 1              |                          |             |             |               |                   |               |
|          | 2              |                          |             |             |               |                   |               |
|          | 3              |                          |             |             |               |                   |               |
|          | 1              |                          |             |             |               |                   |               |
|          | 2              |                          |             |             |               |                   |               |
|          | 3              |                          |             |             |               |                   |               |
|          | 1              |                          |             |             |               |                   |               |
|          | 2              |                          |             |             |               |                   |               |
|          | 3              |                          |             |             |               |                   |               |
|          | 1              |                          |             |             |               |                   |               |
|          | 2              |                          |             |             |               |                   |               |
|          | 3              |                          |             |             |               |                   |               |

$$\% \text{ Temp. Diff} = \frac{(\text{Ref. Temp} + 460) - (\text{Test Temp.} + 460)}{(\text{Ref. Temp.} + 460)} \times 100 \leq 1.5 \%$$



# SPECTRA GASES INC.

3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811  
Shipped From: 80 Industrial Drive • Alpha, NJ 08865



## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE PROCEDURE #: G1

CUSTOMER: Pacific Env. Services Inc.  
SGI ORDER #: 147414  
ITEM#: 7  
P.O.#: 104-00-0061/62/63

CYLINDER #: CC88665  
CYLINDER PRES: 2000 PSIG  
CGA OUTLET: 350

CERTIFICATION DATE: 11/02/99  
EXPIRATION DATE: 11/02/2002

### CERTIFICATION HISTORY

| COMPONENT       | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|-----------------|---------------|--------------------|-------------------------|---------------------|
| Carbon Monoxide | 10/26/99      | 30.42 ppm          | 30.2 ppm                | +/- 1%              |
|                 | 11/02/99      | 30.09 ppm          |                         |                     |
|                 |               |                    |                         |                     |
|                 |               |                    |                         |                     |
|                 |               |                    |                         |                     |

BALANCE Nitrogen

PREVIOUS CERTIFICATION DATES: None

### REFERENCE STANDARDS

| COMPONENT       | SRM/NTRM#  | CYLINDER# | CONCENTRATION |
|-----------------|------------|-----------|---------------|
| Carbon Monoxide | NTRM-81679 | CC88366   | 97.4 ppm      |
|                 |            |           |               |
|                 |            |           |               |
|                 |            |           |               |

### INSTRUMENTATION

| COMPONENT       | MAKE/MODEL     | SERIAL #  | DETECTOR | CALIBRATION DATE(S) |
|-----------------|----------------|-----------|----------|---------------------|
| Carbon Monoxide | Horiba VIA-510 | 570423011 | NDIR     | 10/26/99            |
|                 |                |           |          |                     |
|                 |                |           |          |                     |
|                 |                |           |          |                     |

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.  
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: FRED PIKULA

DATE: 11/02/99



# SPECTRA GASES INC.

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## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE PROCEDURE #: G1

CUSTOMER: Pacific Env. Services Inc.  
SGI ORDER #: 147414  
ITEM#: 6  
P.O.#: 104-00-0061/62/63

CYLINDER #: CC88530  
CYLINDER PRES: 2000 PSIG  
CGA OUTLET: 350

CERTIFICATION DATE: 11/02/99  
EXPIRATION DATE: 11/02/2002

### CERTIFICATION HISTORY

| COMPONENT       | DATE OF<br>ASSAY | MEAN<br>CONCENTRATION | CERTIFIED<br>CONCENTRATION | ANALYTICAL<br>ACCURACY |
|-----------------|------------------|-----------------------|----------------------------|------------------------|
| Carbon Monoxide | 10/26/99         | 59.64 ppm             | 59.5 ppm                   | +/- 1%                 |
|                 | 11/02/99         | 59.31 ppm             |                            |                        |
|                 |                  |                       |                            |                        |
|                 |                  |                       |                            |                        |
|                 |                  |                       |                            |                        |

BALANCE Nitrogen

PREVIOUS CERTIFICATION DATES: None

### REFERENCE STANDARDS

| COMPONENT       | SRM/NTRM#  | CYLINDER# | CONCENTRATION |
|-----------------|------------|-----------|---------------|
| Carbon Monoxide | NTRM-81679 | CC88366   | 97.4 ppm      |
|                 |            |           |               |
|                 |            |           |               |
|                 |            |           |               |

### INSTRUMENTATION

| COMPONENT       | MAKE/MODEL     | SERIAL #  | DETECTOR | CALIBRATION<br>DATE(S) |
|-----------------|----------------|-----------|----------|------------------------|
| Carbon Monoxide | Horiba VIA-510 | 570423011 | NDIR     | 10/26/99               |
|                 |                |           |          |                        |
|                 |                |           |          |                        |
|                 |                |           |          |                        |

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.  
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

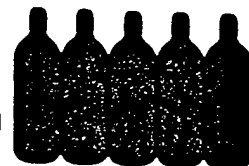
ANALYST: FRED PIKULA

DATE: 11/02/99



# SPECTRA GASES INC.

3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811  
Shipped From: 80 Industrial Drive • Alpha, NJ 08865



## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE

PROCEDURE #: G1

CUSTOMER: Pacific Env. Services Inc.  
SGI ORDER #: 147414  
ITEM#: 5  
P.O.#: 104-00-0061/62/63

CYLINDER #: CC88495  
CYLINDER PRES: 2000 PSIG  
CGA OUTLET: 350

CERTIFICATION DATE: 11/02/99  
EXPIRATION DATE: 11/02/2002

### CERTIFICATION HISTORY

| COMPONENT       | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|-----------------|---------------|--------------------|-------------------------|---------------------|
| Carbon Monoxide | 10/26/99      | 89.79 ppm          | 89.7 ppm                | +/- 1%              |
|                 | 11/02/99      | 89.60 ppm          |                         |                     |
|                 |               |                    |                         |                     |
|                 |               |                    |                         |                     |
|                 |               |                    |                         |                     |

BALANCE Nitrogen

PREVIOUS CERTIFICATION DATES: None

### REFERENCE STANDARDS

| COMPONENT       | SRM/NTRM#  | CYLINDER# | CONCENTRATION |
|-----------------|------------|-----------|---------------|
| Carbon Monoxide | NTRM-81679 | CC88366   | 97.4 ppm      |
|                 |            |           |               |
|                 |            |           |               |
|                 |            |           |               |

### INSTRUMENTATION

| COMPONENT       | MAKE/MODEL     | SERIAL #  | DETECTOR | CALIBRATION DATE(S) |
|-----------------|----------------|-----------|----------|---------------------|
| Carbon Monoxide | Horiba VIA-510 | 570423011 | NDIR     | 10/26/99            |
|                 |                |           |          |                     |
|                 |                |           |          |                     |
|                 |                |           |          |                     |

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.  
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: FP  
FRED PIKULA

DATE: 11/02/99





# SPECTRA GASES INC.

3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811  
Shipped From: 80 Industrial Drive • Alpha, NJ 08865



## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE PROCEDURE #: G1

CUSTOMER: Pacific Env. Services Inc.  
SGI ORDER #: 162038  
ITEM#: 3  
P.O.#: 104-01-0017

CYLINDER #: CC114216  
CYLINDER PRES: 2000 PSIG  
CGA OUTLET: 590

CERTIFICATION DATE: 12/28/2000  
EXPIRATION DATE: 12/28/2003

### CERTIFICATION HISTORY

| COMPONENT      | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|----------------|---------------|--------------------|-------------------------|---------------------|
| Oxygen         | 12/28/2000    | 12.53 %            | 12.53 %                 | +/- 1%              |
| Carbon Dioxide | 12/28/2000    | 10.04 %            | 10.04 %                 | +/- 1%              |
|                |               |                    |                         |                     |
|                |               |                    |                         |                     |

BALANCE Nitrogen

PREVIOUS CERTIFICATION DATES: None

### REFERENCE STANDARDS

| COMPONENT      | SRM/NTRM#   | CYLINDER# | CONCENTRATION |
|----------------|-------------|-----------|---------------|
| Oxygen         | NTRM-82659x | CC83908   | 22.8 %        |
| Carbon Dioxide | NTRM-82745x | CC79944   | 20.00 %       |
|                |             |           |               |
|                |             |           |               |

### INSTRUMENTATION

| COMPONENT      | MAKE/MODEL     | SERIAL #  | DETECTOR | CALIBRATION DATE(S) |
|----------------|----------------|-----------|----------|---------------------|
| Oxygen         | Horiba MPA-510 | 570694081 | PM       | 12/15/2000          |
| Carbon Dioxide | Horiba VIA-510 | 571417045 | NDIR     | 12/6/2000           |
|                |                |           |          |                     |
|                |                |           |          |                     |

THIS STANDARD IS NIST TRACEABLE. IT WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.  
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: FRED PIKULA

DATE: 12/28/2000



# SPECTRA GASES INC.

3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811  
Shipped From: 80 Industrial Drive • Alpha, NJ 08865



## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE PROCEDURE #: G2

CUSTOMER: Pacific Env. Services Inc.  
SGI ORDER #: 147409  
ITEM#: 5  
P.O.#: 104-00-0063/0064

CYLINDER #: CC91083  
CYLINDER PRES: 2000 PSIG  
CGA OUTLET: 590

CERTIFICATION DATE: 10/27/99  
EXPIRATION DATE: 10/27/2002

### CERTIFICATION HISTORY

| COMPONENT      | DATE OF ASSAY | MEAN CONCENTRATION | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|----------------|---------------|--------------------|-------------------------|---------------------|
| Oxygen         | 10/27/99      | 22.4 %             | 22.4 %                  | +/- 1%              |
| Carbon Dioxide | 10/27/99      | 22.4 %             | 22.4 %                  | +/- 1%              |
|                |               |                    |                         |                     |
|                |               |                    |                         |                     |

BALANCE

Nitrogen

PREVIOUS CERTIFICATION DATES: None

### REFERENCE STANDARDS

| COMPONENT      | SRM/NTRM#   | CYLINDER# | CONCENTRATION |
|----------------|-------------|-----------|---------------|
| Oxygen         | NTRM-82659X | CC83900   | 22.80 %       |
| Carbon Dioxide | NTRM-82745x | CC79944   | 20.00 %       |
|                |             |           |               |
|                |             |           |               |

### INSTRUMENTATION

| COMPONENT      | MAKE/MODEL     | SERIAL #  | DETECTOR | CALIBRATION DATE(S) |
|----------------|----------------|-----------|----------|---------------------|
| Oxygen         | Horiba MPA-510 | 570694081 | PM       | 10/26/99            |
| Carbon Dioxide | Horiba VIA-510 | 571417045 | NDIR     | 10/27/99            |
|                |                |           |          |                     |
|                |                |           |          |                     |

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.  
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST:

*Fred Pikula*  
FRED PIKULA

DATE: 10/27/99



# SPECTRA GASES INC.

3434 Route 22 West • Branchburg, NJ 08876 USA Tel.: (908) 252-9300 • (800) 932-0624 • Fax: (908) 252-0811  
Shipped From: 80 Industrial Drive • Alpha, NJ 08865



## CERTIFICATE OF ANALYSIS

## EPA PROTOCOL MIXTURE PROCEDURE #: G1

CUSTOMER: Cherokee Instruments Inc.  
SGI ORDER #: 156722  
ITEM#: 6  
P.O.#: 3818

CYLINDER #: CC55783  
CYLINDER PRES: 2000 PSIG  
CGA OUTLET: 660

CERTIFICATION DATE: 8/10/2000  
EXPIRATION DATE: 8/10/2002

### CERTIFICATION HISTORY

| COMPONENT      | DATE OF ASSAY         | MEAN CONCENTRATION     | CERTIFIED CONCENTRATION | ANALYTICAL ACCURACY |
|----------------|-----------------------|------------------------|-------------------------|---------------------|
| Sulfur Dioxide | 8/2/2000<br>8/10/2000 | 45.04 ppm<br>45.17 ppm | 45.1 ppm                | +/- 1%              |
|                |                       |                        |                         |                     |
|                |                       |                        |                         |                     |
|                |                       |                        |                         |                     |

BALANCE Nitrogen

PREVIOUS CERTIFICATION DATES: None

### REFERENCE STANDARDS

| COMPONENT      | SRM/NTRM#  | CYLINDER# | CONCENTRATION |
|----------------|------------|-----------|---------------|
| Sulfur Dioxide | NTRM-81694 | CC55796   | 96.0 ppm      |
|                |            |           |               |
|                |            |           |               |
|                |            |           |               |

### INSTRUMENTATION

| COMPONENT      | MAKE/MODEL     | SERIAL #  | DETECTOR | CALIBRATION DATE(S) |
|----------------|----------------|-----------|----------|---------------------|
| Sulfur Dioxide | Horiba VIA-510 | 851221093 | NDIR     | 7/28/2000           |
|                |                |           |          |                     |
|                |                |           |          |                     |
|                |                |           |          |                     |

THIS STANDARD WAS CERTIFIED ACCORDING TO THE EPA PROTOCOL PROCEDURES.  
DO NOT USE THIS STANDARD IF THE CYLINDER PRESSURE IS LESS THAN 150 PSIG.

ANALYST: FRED PIKULA

DATE: 8/10/2000

For Technical Information Call  
1-800-752-1597

**AIR  
PRODUCTS**

Air Products and Chemicals, Inc. • 12722 S. Wentworth Avenue, Chicago, IL 60628

ISO CERTIFICATION: 9002

# CERTIFICATE OF ANALYSIS: EPA PROTOCOL GAS STANDARD

PERFORMED ACCORDING TO EPA TRACEABILITY PROTOCOL FOR ASSAY AND CERTIFICATION OF GASEOUS CALIBRATION STANDARDS (PROCEDURE #G1)

**Customer:**

AIR PRODUCTS AND CHEMICALS, INC.

4822 INDUSTRY LANE

UDI BUSINESS PARK

DURHAM

NC 27709

Order No: CSS-190592-01

Batch No: 861-59105

PO:

Release:

Cylinder No:

Bar Code No:

Cylinder Pressure: 2000 psig

Certification Date: 06/26/1999

Expiration Date: 06/26/2001

EG9119904BAL

DWJ098

| CERTIFIED CONCENTRATION |                         | REFERENCE STANDARDS |               |                        | ANALYTICAL INSTRUMENTATION |               |                  |                         |
|-------------------------|-------------------------|---------------------|---------------|------------------------|----------------------------|---------------|------------------|-------------------------|
| Component               | Certified Concentration | Cylinder Number     | Standard Type | Standard Concentration | Instrument Make/Model      | Serial Number | Last Calibration | Measurement Principle   |
| SULFUR DIOXIDE          | 91.7 ±1.7 PPM           | SG91509688AL        | NTRN 81661X   | 169.7 PPM              | MORIBA VIA-510             | 85079208      | 05/18/99         | NON DISPERSIVE INFRARED |
| NITROGEN                |                         | Balance Gas         |               |                        |                            |               |                  |                         |

\* STANDARD SHOULD NOT BE USED BELOW 150 PSIG

Analyt:

(16921

*John L. Jones*  
John L. Jones

Approved By:

Richard Fry

No. 320-9702



# Scott Specialty Gases

1290 COMBERMERE STREET, TROY, MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

## RATA CLASS

### Dual-Analyzed Calibration Standard

## CERTIFICATE OF ACCURACY: EPA Protocol Gas

### Assay Laboratory

SCOTT SPECIALTY GASES  
1290 COMBERMERE STREET  
TROY, MI 48083

P.O. No.: 103-00-292  
Project No.: 05-70839-002

### Customer

PACIFIC ENVIRONMENTAL SERVICES, INC  
BRUCE SAVEN  
7209 E. KEMPER RD  
CINCINNATI OH 45249-1030

### ANALYTICAL INFORMATION

This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards; Procedure #G1; September, 1997.

Cylinder Number: ALMO31852 Certification Date: 12/14/00 Exp. Date: 12/13/2002  
Cylinder Pressure\*\*\*: 1900 PSIG

| COMPONENT                | CERTIFIED CONCENTRATION (Moles) |         | ANALYTICAL<br>ACCURACY** | TRACEABILITY         |
|--------------------------|---------------------------------|---------|--------------------------|----------------------|
| NITRIC OXIDE             | 254.13                          | PPM     | +/- 1%                   | Direct NIST and NMI  |
| NITROGEN - OXYGEN FREE   |                                 | BALANCE |                          |                      |
| TOTAL OXIDES OF NITROGEN | 254.9                           | PPM     |                          | Reference Value Only |

\*\*\* Do not use when cylinder pressure is below 150 psig.

\*\* Analytical accuracy is based on the requirements of EPA Protocol procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

### REFERENCE STANDARD

| TYPE/SRM NO. | EXPIRATION DATE | CYLINDER NUMBER | CONCENTRATION | COMPONENT    |
|--------------|-----------------|-----------------|---------------|--------------|
| NTRM 1687    | 3/01/03         | ALMO24630       | 1000. PPM     | NITRIC OXIDE |

### INSTRUMENTATION

| INSTRUMENT/MODEL/SERIAL# | DATE LAST CALIBRATED | ANALYTICAL PRINCIPLE |
|--------------------------|----------------------|----------------------|
| BECKMAN/951/010177       | 12/14/00             | CHEMILUMINESCENCE    |

### ANALYZER READINGS

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

Second Triad Analysis

Calibration Curve

#### NITRIC OXIDE

|                               |                   |               |
|-------------------------------|-------------------|---------------|
| Date: 12/06/00                | Response Unit: MV |               |
| Z1 = 0.00000                  | R1 = 100.0000     | T1 = 101.7000 |
| R2 = 100.0000                 | Z2 = 0.00000      | T2 = 101.9000 |
| Z3 = 0.00000                  | T3 = 101.8000     | R3 = 100.0000 |
| Avg. Concentration: 253.4 PPM |                   |               |

|                               |                   |               |
|-------------------------------|-------------------|---------------|
| Date: 12/14/00                | Response Unit: MV |               |
| Z1 = 0.00000                  | R1 = 100.0000     | T1 = 51.60000 |
| R2 = 100.0000                 | Z2 = 0.00000      | T2 = 51.60000 |
| Z3 = 0.00000                  | T3 = 51.50000     | R3 = 100.0000 |
| Avg. Concentration: 254.9 PPM |                   |               |

|                                                                              |                 |
|------------------------------------------------------------------------------|-----------------|
| Concentration = A + Bx + Cx <sup>2</sup> + Dx <sup>3</sup> + Ex <sup>4</sup> |                 |
| r = .999992785                                                               | 1686            |
| Constants:                                                                   | A = 1.220822425 |
| B = 10.000876060                                                             | C = 0           |
| D = 0                                                                        | E = 0           |

APPROVED BY:

## RATA CLASS


**Scott Specialty Gases**

1290 COMBERMERE STREET, TROY, MI 48083

Phone: 248-589-2950

Fax: 248-589-2134

*Dual-Analyzed Calibration Standard*
**CERTIFICATE OF ACCURACY: EPA Protocol Gas**
**Assay Laboratory**

 SCOTT SPECIALTY GASES  
 1290 COMBERMERE STREET  
 TROY, MI 48083

 P.O. No.: 103-00-292  
 Project No.: 05-70839-003

**Customer**

 PACIFIC ENVIRONMENTAL SERVICES, INC  
 BRUCE SAVEN  
 7209 E. KEMPER RD  
 CINCINNATI OH 45249-1030

**ANALYTICAL INFORMATION**

 This certification was performed according to EPA Traceability Protocol For Assay & Certification of Gaseous Calibration Standards:  
 Procedure #G1; September, 1997.

 Cylinder Number: AAL18927 Certification Date: 12/14/00 Exp. Date: 12/14/2002  
 Cylinder Pressure\*\*\*: 1900 PSIG

**ANALYTICAL**

| COMPONENT                | CERTIFIED CONCENTRATION (Moles) | ACCURACY** | TRACEABILITY         |
|--------------------------|---------------------------------|------------|----------------------|
| NITRIC OXIDE             | 472.4 PPM                       | +/- 1%     | Direct NIST and NMI  |
| NITROGEN - OXYGEN FREE   | BALANCE                         |            |                      |
| TOTAL OXIDES OF NITROGEN | 473.1 PPM                       |            | Reference Value Only |

\*\*\* Do not use when cylinder pressure is below 150 psig.

\*\* Analytical accuracy is based on the requirements of EPA Protocol procedure G1, September 1997.

Product certified as +/- 1% analytical accuracy is directly traceable to NIST or NMI standards.

**REFERENCE STANDARD**

| TYPE/SRM NO. | EXPIRATION DATE | CYLINDER NUMBER | CONCENTRATION | COMPONENT    |
|--------------|-----------------|-----------------|---------------|--------------|
| NTRM 1687    | 3/01/03         | ALM024530       | 1000. PPM     | NITRIC OXIDE |

**INSTRUMENTATION**

| INSTRUMENT/MODEL/SERIAL# | DATE LAST CALIBRATED | ANALYTICAL PRINCIPLE |
|--------------------------|----------------------|----------------------|
| BECKMAN/951/010177       | 12/14/00             | CHEMILUMINESCENCE    |

**ANALYZER READINGS**

(Z = Zero Gas R = Reference Gas T = Test Gas r = Correlation Coefficient)

First Triad Analysis

Second Triad Analysis

Calibration Curve

**NITRIC OXIDE**

|                               |                   |               |
|-------------------------------|-------------------|---------------|
| Date: 12/06/00                | Response Unit: MV |               |
| Z1 = 0.00000                  | R1 = 100.0000     | T1 = 47.00000 |
| R2 = 100.0000                 | Z2 = 0.00000      | T2 = 47.00000 |
| Z3 = 0.00000                  | T3 = 47.00000     | R3 = 100.0000 |
| Avg. Concentration: 472.1 PPM |                   |               |

|                               |                   |               |
|-------------------------------|-------------------|---------------|
| Date: 12/14/00                | Response Unit: MV |               |
| Z1 = 0.00000                  | R1 = 100.0000     | T1 = 47.00000 |
| R2 = 100.0000                 | Z2 = 0.00000      | T2 = 47.10000 |
| Z3 = 0.00000                  | T3 = 47.10000     | R3 = 100.0000 |
| Avg. Concentration: 472.8 PPM |                   |               |

|                                                                              |                 |
|------------------------------------------------------------------------------|-----------------|
| Concentration = A + Bx + Cx <sup>2</sup> + Dx <sup>3</sup> + Ex <sup>4</sup> |                 |
| r = .998992785                                                               | 1687            |
| Constants:                                                                   | A = 1.220822425 |
| B = 10.000076060                                                             | C = 0           |
| D = 0                                                                        | E = 0           |

APPROVED BY: