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DATE: May 30, 1986

TITLE: ANALYSIS OF LULING SAMPLES

AUTHORS: S. Gibson, S. Walker and R.W. Noble

ABSTRACT: Samples from Luling were received for the analysis of PCDOs, PCDFs, 2,3,7,8-TCDD, metals, acid and base/neutral extractables, pesticides and Aroclor formulations. This report gives the results of these analyses.

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MONS 220938

ANALYSIS REPORT

DATE: 22 May 1986 PROJECT NUMBER: 6405

LOG NUMBER: U-86-03-14-01 NOTEBOOK PAGE: 3353290

TO: L. Adams/ 1560

cc FILES/Mees
P. Sherman
R. Noble

Title: Analysis of Luling Samples

Procedure: See attached report

Abstract:
Samples from Luling were received for the analysis of PCDDs, PCDFs, 2,3,7,8-TCDD, metals, acid and base/neutral extractables, pesticides and Aroclor formulations. This report gives the results of these analyses.

Analysts: S. Gibson, S. Walker and R. W. Noble

ANALYST APPROVAL: Roy W. Noble
Roy W. Noble
Senior Research Chemist

MONS 220939

ANALYSIS REPORT FOR LULING SAMPLES

INTRODUCTION

Nine soils, two sediments and four wipe samples were received for selected analyses of polychlorinated dibenzo-p-dioxins (PCDDs), polychlorinated dibenzofurans (PCDFs), 2,3,7,8-tetrachloro dibenzo-p-dioxin (2,3,7,8-TCDD), selected metals, acid and base/neutral extractables, pesticides and Aroclor formulations. The metals, acid and base/neutral extractables, pesticides and Aroclor formulation analyses on samples #57 and #5 were performed by Environmental Testing and Certification Corporation (ETC) of Edison, NJ. The PCDD, PCDF and 2,3,7,8-TCDD analyses were performed in our laboratories. For internal purposes the samples were aseigned Log number U-86-03-14-01. For quality assurance in the analyses we performed MRC Method #07-QAQC-R3 was followed. Briefly this method requires that for every set of samples of the same matrix type a replicate sample, a low spiked sample, a high spiked sample and a method blank must be analyzed. The reports for the analyses performed by ETC are attached at the end of this report.

PREPARATION AND ANALYSIS

Soil and sediment samples of 10 g were weighed and spiked with appropriate internal standards. Wipes were spiked with carbon-13 labeled 2,3,7,8-TCDD prior to extraction. Then 15 mL of methanol (all solvents are Burdick and Jackson "distilled in glass" grade) and 150 mL of hexane are added. The samples are then shaken for 3 hours on a wrist action shaker and the hexane is decanted off. The hexane extracts were washed with 40 mL of concentrated sulfuric acid (untill clear), 20 mL of water and 40 mL of 1 N potassium hydroxide and 30 mL of water. The hexane was dried over sodium sulfate and concentrated to 3 mL.

The samples were then placed on the head of a mixed phase liquid chromatographic column consisting of (top to bottom) 2 g of silica, 4 g of silica plus 40% sulfuric acid, 1 g of silica, 2 g of silica plus 36% potassium hydroxide and 1 g of silica. The column was eluted with 50 mL of hexane which was subsequently concentrated to 3 mL. The hexane was then placed on the head of a column containing 2.5 g of Woelm basic alumina. This column was first eluted with 10 mL of 2% methylene chloride/hexane (v/v) mixture and this fraction discarded. An additional elution was made with 15 mL of a 50% methylene chloride/hexane (v/v) mixture to elute the PCDDs and PCDFs from the column.

For some of the samples it was necessary to conduct further cleanup using the EPA Option D technique in order to analyze for TCDDs. Option D involves placing the sample on top of a column containing 18% Carbopak C on Celite packed to a depth of 2 cm in

a 1.0 cm ID pipet. The column was then eluted with 1 mL of hexane, 1 mL of 1:1 cyclohexane/methylene chloride, 1 mL of 75:20:5 methylene chloride/methanol/benzene and finally 2 mL of toluene. The toluene fraction was collected to be concentrated.

All samples had 50 uL of dodecane containing tribromobiphenyl as an internal standard added to the eluant as a keeper and were then concentrated to 50 uL under a gentle stream of purified nitrogen and were submitted for GC/MS analysis. The GC/MS analysis was conducted on a Hewlett/Packard 5987 instrument. The mass spectrometer was operated in the selected ion monitoring mode analyzing for ions characteristic of the native (unlabeled) PCDDs, PCDFs and the internal standards.

RESULTS

The results of the analyses are given in Tables 1-5. Results are not corrected for recovery for the PCDD and PCDF analyses in Tables 1 and 3. Replicate analysis results for sample # 5 show a large variability due to the presence of shells in the sample causing homogeneity problems. Discussion with the customer determined that these results met their needs.

Table 1. PCDD RESULTS FOR SOIL AND SEDIMENT (in ppb)

Sample	Cl-4	Cl-5	Cl-6	Cl-7	Cl-8
Background	ND	ND	ND	0.4	1.2
Soil #5	600	0.7	3.3	1.5	3.1
Soil #5 R	7500	ND	2.2	5.3	8.9
Soil #13	0.9	ND	3.6	30	190
Soil #27	2.1	ND	ND	0.4	1.5
Soil #35	0.7	ND	0.7	1.5	21
Soil #39	0.8	ND	0.8	1.6	18
Soil #51	ND	ND	0.4	0.6	1.5
Soil #51 H	10.1	19.1	11.6	11.3	11.9
% recovery	107%	170%	103%	91%	109%
spike level	9.4	11.4	10.9	11.8	9.5
Soil #57	5.2	ND	1.4	0.8	1.4
Soil #59	4.8	ND	4.0	ND	0.2
Sediment #1	ND	ND	3.0	38	160
Sediment #1 L	1.1	1.2	3.5	29	104
% recovery	110%	100%	-a	-a	-a
spike level	1.0	1.2	1.1	1.2	1.0
Sediment #2	18	0.3	8.0	89	420
BLANK	ND	ND	ND	ND	ND
MDL	0.5	0.5	0.5	0.5	0.5

MDL method detection limit
ND none detected at method detection limit
R replicate sample
L,H low and high spiked samples
a spike recovery can not be calculated as sample is three times the spike level.

Table 2. REPEATED PCDD RESULTS FOR SEDIMENT # 2 (in ppb)

Sample	Cl-4	Cl-5	Cl-6	Cl-7	Cl-8
Sediment # 2	15	ND	20	127	1000
Sediment # 2 R	13	ND	22	156	1500
BLANK	ND	ND	ND	ND	ND
MDL	0.5	0.5	0.5	0.5	0.5

MDL method detection limit
ND none detected at method detection limit
R replicate sample

Table 3. PCDF RESULTS FOR SOIL AND SEDIMENT (in ppb)

Sample	Cl-4	Cl-5	Cl-6	Cl-7	Cl-8
Background	ND	ND	ND	ND	ND
Soil #5	3.9	1.4	3.8	0.9	0.8
Soil #5 R	4.9	3.5	5.4	1.2	1.1
Soil #13	0.2	2.8	4.2	0.9	2.4
Soil #27	ND	ND	ND	ND	ND
Soil #35	ND	ND	<0.9	0.4	0.9
Soil #39	ND	ND	<0.6	0.4	1.0
Soil #51	ND	ND	ND	ND	ND
Soil #51 H	5.0	25	32	8.1	33
% recovery	37%	84%	64%	76%	93%
spike level	13.6	29.4	49.7	10.7	35.3
Soil #57	ND	ND	ND	ND	ND
Soil #59	ND	ND	ND	ND	ND
Sediment #1	0.2	<1.6	<1.9	0.6	2.4
Sediment #1 L	0.7	4.7	4.3	1.0	5.3
% recovery	46%	100%	82%	90%	81%
spike level	1.0	1.2	1.1	1.2	1.0
Sediment #2	<0.6	<8.2	<22	1.9	5.5
BLANK	ND	ND	ND	ND	ND
MDL	0.5	0.5	0.5	0.5	0.5

MDL method detection limit
ND none detected at method detection limit
R replicate sample
L,H low and high spiked samples

Table 4. 2378-TCDD RESULTS FOR SOIL AND SEDIMENT (in ppb)

Sample	2378-TCDD	ppb Added
Background	ND	
Soil #5	510	
Soil #5 R	7000	
Soil #13	1.8	
Soil #27	1.6	
Soil #35	0.9	
Soil #39	0.7	
Soil #51	0.1	
Soil #51 H	8.2	9.4
Soil #57	5.2	
Soil #59	2.6	
Sediment #1	ND	
Sediment #1 L	1.0	1.0
Sediment #2	16.5	
BLANK	ND	
MDL	0.2	

MDL method detection limit
ND none detected at method detection limit
R replicate sample
L,H low and high spiked samples

Table 5. 2378-TCDD RESULTS FOR WIPES (in ng)

Sample	2378-TCDD	ng Added
Auger 1 Bit	ND	
Auger 1 Handle	ND	
Auger 2 Bit	3.4	
Auger 2 Handle	ND	
High Spike	44	48
Low Spike	4.3	4.8
Blank	ND	
MDL	0.3	

MDL method detection limit
ND none detected at method detection limit

ETC ENVIRONMENTAL TESTING and CERTIFICATION

Technical Report

for

MONSANTO COMPANY

800 N.LINDBERGH BLVD.

R3B

ST.LOUIS, MO 63167

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
L7194	MONSANTO COMPANY	MONCORPENG	5	860314		

John J Fitzgerald
Vice President
Research and Operations

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MONS 220947

ETC ENVIRONMENTAL TESTING and CERTIFICATION

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MONS 220948

Introduction

This report contains the analytical results on your soil sample, S 86/03/14 It is designed to include comprehensive data from the entire analytical process in order to satisfy the needs of various levels of review

The results obtained from your sample are presented in tabular format immediately following this introduction. Quality assurance data is tabulated along with the appropriate sample results for verification Depending on the analyses ordered, the quality assurance data may include results from blank, spiked blank, spiked sample (i.e matrix spike) and replicate sample as well as results from surrogate compound analyses Quality assurance data for verification of proper instrument performance is also included where appropriate The report appendices include the chain of custody record for your sample and, where appropriate the gas chromatograms and mass spectra

The procedures used in the analysis of the sample are described in this report s methodology section All analytical procedures within our laboratory are performed within a strictly enforced Quality Assurance Protocol A description of this Protocol is included in the report

Results

Sample results, and associated quality assurance data, are always tabulated in one or more of this report's Quantitative Results Tables The format of each table varies with the class of analysis

Priority Pollutants

The priority pollutant compounds and elements are listed with their NPDES (National Pollution Discharge Elimination System) numbers, and the Method Detection Limit (MDL) published in the Federal Register When a compound or element is present below its published MDL it is reported as BMDL (Below Method Detection Limit). When a compound or element is not present at any detectable concentrations it is reported as ND (Not Detected) MDL's for non-aqueous matrices are based on USEPA published MDL's but are adjusted as per sample weight Matrix spike and replicate analyses, where included, were performed on samples randomly chosen within each quality assurance batch and are therefore not necessarily spikes and replicates of this report's sample Surrogate compound recovery data and instrument calibration data are included in the Method Performance Data Tables

ETC ENVIRONMENTAL TESTING and CERTIFICATION

APR 1 1986
QA4747

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Acid Compounds - GC/MS Analysis Data (QRO2)

Chain of Custody Data Required for ETC Data Management Summary Reports

L7194 MONSANTO COMPANY MONSANTO EN 5 860314

ETC Sample No. | Company | Facility | Sample Matrix | Date | Time | Elapsed Hours

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen Added ug/kg	% Recov	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
1A	2 Chlorophenol	[illegible]	110	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	84
2A	2 4-Dichlorophenol	2810	[illegible]	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	88
3A	2 4 Dimethylphenol	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	73
4A	4 6 Dinitro-o-cresol	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	48
5A	2 4-Dinitrophenol	[illegible]	1400	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	36
6A	2-Nitrophenol	[illegible]	120	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	84
7A	4-Nitrophenol	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	85
8A	p-Chloro-m-cresol	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	92
9A	Pentachlorophenol	12[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	81
10A	Phenol	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	80
11A	2 4,6-Trichlorophenol	16000	[illegible]	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	86

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ETC ENVIRONMENTAL TESTING and CERTIFICATION

APR 4 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (OR03)

Chain of Custody Data Required for ETC Data Management Summary Reports

L7194 MONSANTO COMPANY MONCORPENE 6 860314

ETC Sample No. | Company | Facility | Sample Point | Date | Time | Extract Units

NPDES Number	Compound	Results: Sample Concen. ug/kg	Results: MDL ug/kg	QC Replicate: First ug/kg	QC Replicate: Second ug/kg	QC Blank and Spiked Blank: Blank Data ug/kg	QC Blank and Spiked Blank: Concen Added ug/kg	QC Blank and Spiked Blank: % Recov	QC Matrix Spike: Unspiked Sample ug/kg	QC Matrix Spike: Concen Added ug/kg	QC Matrix Spike: % Recov
10	Acenaphthene	BD	63	BD	BD	BD	0	-	BD	3200	77
20	Acenaphthylene	BD	120	BD	BD	BD	0	-	BD	3200	74
30	Anthracene	BD	63	BD	BD	BD	0	-	BD	3200	77
40	Benzidine	BD	1500	BD	BD	BD	0	-	BD	3200	0.
50	Benzo(a)anthracene	BD	260	BD	BD	BD	0	-	BD	3200	77
60	Benzo(a)pyrene	BD	83	BD	BD	BD	0	-	BD	3200	76
70	Benzo(b)fluoranthene	BD	330	BD	BD	BD	0	-	BD	3200	79
80	Benzo(ghi)perylene	BD	140	BD	BD	BD	0	-	BD	0	-
90	Benzo(k)fluoranthene	BD	120	BD	BD	BD	0	-	BD	0	-
100	bis(2-Chloroalkoxy)methane	BD	180	BD	BD	BD	0	-	BD	3200	73
110	bis(2-Chloroethyl) ether	BD	190	BD	BD	BD	0	-	BD	3200	78
120	bis(2-Chloroisopropyl)ether	BD	190	BD	BD	BD	0	-	BD	3200	86
130	bis(2-Ethylhexyl)phthalate	BD	330	BD	BD	852	0	-	BD	3200	78
140	4 Bromophenyl phenyl ether	BD	63	BD	BD	BD	0	-	BD	3200	96
150	Butyl benzyl phthalate	BD	330	BD	BD	BD	0	-	BD	3200	72
160	2-Chloronaphthalene	BD	63	BD	BD	BD	0	-	BD	3200	100
170	4-Chlorophenyl phenyl ether	BD	140	BD	BD	BD	0	-	BD	3200	88
180	Chrysene	BD	63	BD	BD	BD	0	-	BD	3200	78
190	Dibenzo(a,h)anthracene	BD	330	BD	BD	BD	0	-	BD	0	-
200	1,2-Dichlorobenzene	265	63	BD	BD	BD	0	-	BD	3200	77
210	1,3-Dichlorobenzene	BD	63	BD	BD	BD	0	-	BD	3200	75
220	1,4-Dichlorobenzene	BD	140	BD	BD	BD	0	-	BD	3200	77
230	3,3'-Dichlorobenzidine	BD	650	BD	BD	BD	0	-	BD	3200	0.
240	Diethyl phthalate	BD	330	BD	BD	BD	0	-	BD	3200	76
250	Dimethyl phthalate	BD	330	BD	BD	BD	0	-	BD	3200	67
260	Di-n-butyl phthalate	BD	330	BD	BD	BD	0	-	BD	3200	84
270	2,4-Dinitrotoluene	BD	190	BD	BD	BD	0	-	BD	3200	61
280	2,6-Dinitrotoluene	BD	63	BD	BD	BD	0	-	BD	3200	64
290	Di-n-octyl phthalate	BD	330	BD	BD	BD	0	-	BD	3200	80
300	1,2-Diphenylhydrazine	BD	330	BD	BD	BD	0	-	BD	3200	82
310	Fluoranthene	BD	63	13	8	BD	0	-	BD	3200	103
320	Fluorene	BD	63	BD	BD	BD	0	-	BD	3200	76

MONS 220951

ETC ENVIRONMENTAL TESTING and CERTIFICATION

APR 4 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

BASE/NEUTRAL COMPOUNDS - GC/MS ANALYSIS DATA (QR03)

Chain of Custody Data Required for ETC Data Management Summary Report

ETC Sample No	Company	Facility	Sample Point	Date	Time	Bioassay Number
L7184	MONSANTO COMPANY	MONCORPENG 6		860314		

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen ug/kg	MDL ug/kg	First ug/kg	Second ug/kg	Blank Data ug/kg	Concen Added ug/kg	R Meter	Unspiked Sample ug/kg	Concen Added ug/kg	% Recov
33B	Hexachlorobenzene	[illegible]	63	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	68
34B	Hexachlorobutadiene	[illegible]	38	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	79
35B	Hexachlorocyclopentadiene	[illegible]	320	[illegible]	[illegible]	[illegible]	0	-	[illegible]	0	-
36B	Hexachloroethane	[illegible]	63	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	79
37B	Indeno(1 2 3-c d)pyrene	[illegible]	160	[illegible]	[illegible]	[illegible]	0	-	[illegible]	0	-
38B	Isophorone	[illegible]	73	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	81
39B	Naphthalene	[illegible]	63	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	77
40B	Nitrobenzene	[illegible]	63	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	76
41B	N-Nitrosodimethylamine	[illegible]	330	[illegible]	[illegible]	[illegible]	0	-	[illegible]	0	-
42B	N-Nitrosodi-n-propylamine	[illegible]	330	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	85
43B	N Nitrosodiphenylamine	[illegible]	63	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	66
44B	Phenanthrene	[illegible]	180	[illegible]	[illegible]	[illegible]	0	-	[illegible]	3200	82
45B	Pyrene	[illegible]	63	85	87	[illegible]	0	-	37	3200	96
46B	1 2 4-Trichlorobenzene	[illegible]	63	85	42	[illegible]	0	-	85	3200	77

MONS 220952

ETC ENVIRONMENTAL TESTING and CERTIFICATION

MAY 1 1986

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Priority Pollutant Metals - Analysis Data (QRO5)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No	Company	Facility	Sample Point	Date	Time	Signpost Hours
L7194	MONSANTO COMPANY	MONCORPENG	5	860314		

NPDES number	Compound	Results Sample Concen ug/kg	Results MDL ug/kg								
1M	Antimony	ND	14000								
2M	Arsenic	5000	1000								
3M	Beryllium	460	150								
4M	Cadmium	BMDL	450								
5M	Chromium	25000	1900								
6M	Copper	27000	2500								
7M	Lead	32000	6200								
8M	Mercury	700	100								
9M	Nickel	21000	1000								
10M	Selenium	ND	600								
11M	Silver	ND	1000								
12M	Thallium	ND	500								
13M	Zinc	159000	760								
	Calcium	102000000	12000								
	Iron	13400000	17000								
	Aluminum	6940000	13000								
	Manganese	411000	480								
	Barium	110000	590								
	Cobalt	4500	6100								
	Magnesium	3960000	8200								
	Sodium	375000	22000								
	Tin	BMDL	6500								
	Vanadium	17000	2300								
	Potassium	1340000	4000								

MONS 220953

ETC ENVIRONMENTAL TESTING and CERTIFICATION

APR 2 1986

TABLE 2: METHOD PERFORMANCE DATA
Surrogate Recovery Soil - GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample ID	Company	Facility	Sample Point	Date	Time	Signpost Matrix
L7194	MONSANTO COMPANY	NONCORPEND 5		86031		0

Compound	Amount added µg	% Recovery	Control Limits R	
			Lower	Upper
VOLATILE FRACTION				
Toluene-D8	*	*	50	160
p-Bromofluorobenzene	*	*	50	160
1,2-Dichloroethane-D4	*	*	50	160
ACID FRACTION				
Phenol-D5	100	86	20	140
2-Fluorophenol	100	90	20	100
2,4,6-Tribromophenol	100	100	10	100
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	76	20	100
2-Fluorobiphenyl	50	62	20	100
Terphenyl-D10	50	49	20	150

MONS 220954

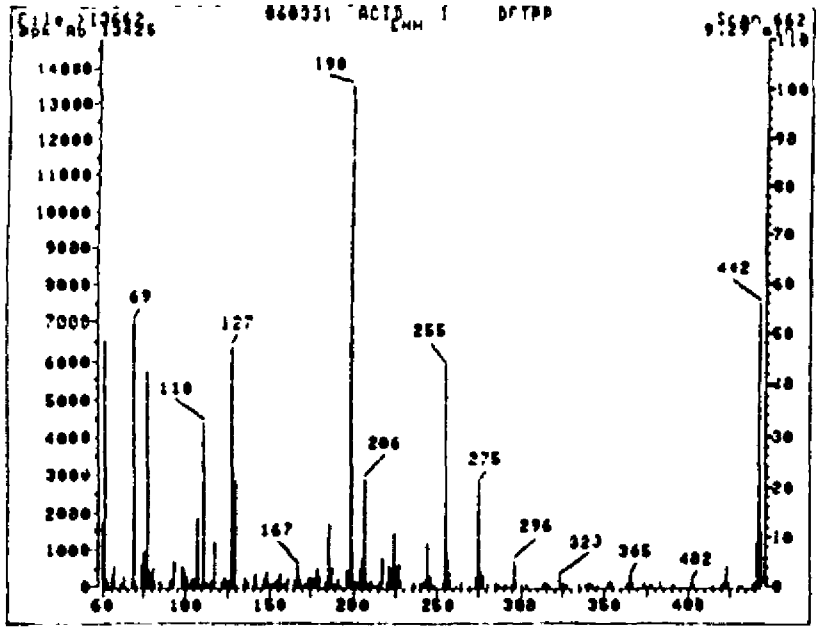


TABLE 2: METHOD PERFORMANCE DATA (QR22)

GC/MS Tuning Date - Decafluorotriphenylphospine (DFTPP) for Acids Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	48.32	48.32	Ok
68	Less than 2% of mass 69	.95	1.81	Ok
69	(reference only)	52.22	52.22	Ok
70	Less than 2% of mass 69	.23	.43	Ok
127	40-60% of mass 198	47.25	47.25	Ok
197	Less than 1% of mass 198	0.00	0.00	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	6.94	6.94	Ok
275	10-30% of mass 198	20.47	20.47	Ok
365	Greater than 1% of mass 198	2.33	2.33	Ok
441	0-100% of mass 443	9.10	82.74	Ok
442	Greater than 40% of mass 198	55.89	55.89	Ok
443	17-23% of mass 442	10.99	19.67	Ok

Injection Date: 03/31/86 Analyst: J. Wendell
Injection Time: 14:59 Processor: Susan C. Gulizia
Run No: >13662 QC Batch: QA 4247
Spectrum No: 662 Samples: L7195, L4249, L7194, L4248, L4314, L4315, L4321, L4322

4/1/86

MONS 220955

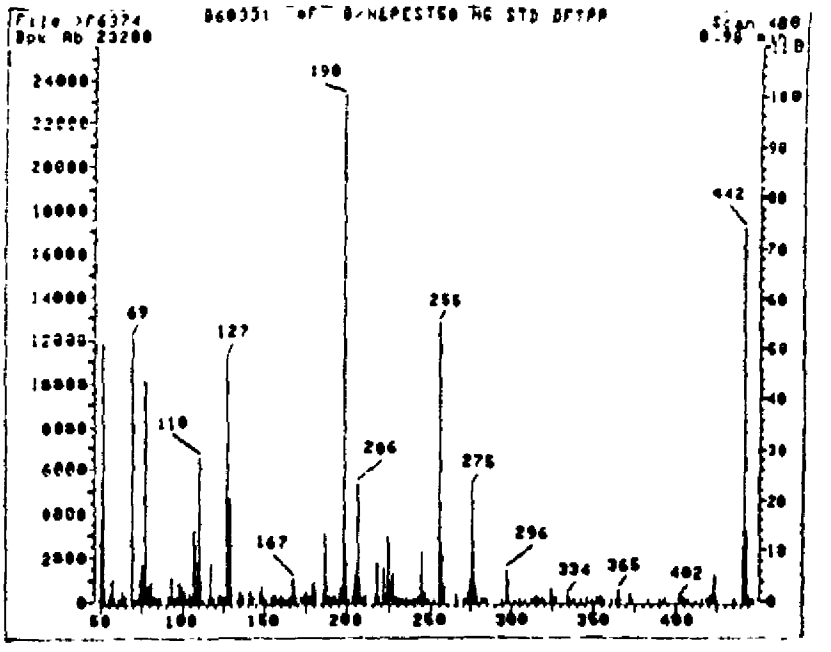


TABLE 2: METHOD PERFORMANCE DATA (QR23)

GC/MS Tuning Data - Decafluorotriphenylphosphine (DFTPP) for Base/Neutral Analysis

m/z	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	Status
51	30-60% of mass 198	50.74	50.74	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	52.21	52.21	Ok
70	Less than 2% of mass 69	.26	.50	Ok
127	40-60% of mass 198	48.40	48.40	Ok
197	Less than 1% of mass 198	0.00	0.00	Ok
198	Base peak, 100% relative abundance	100.00	100.00	Ok
199	5-9% of mass 198	7.32	7.32	Ok
275	10-30% of mass 198	22.40	22.40	Ok
365	Greater than 1% of mass 198	2.43	2.43	Ok
441	0-100% of mass 443	10.56	76.75	Ok
442	Greater than 40% of mass 198	74.07	74.07	Ok
443	17-23% of mass 442	13.75	18.57	Ok

Injection Date: 04/01/86
Injection Time: 00141
Run No: >F6374
Spectrum No: 400

Analyst: Fred Munson
Processor: Sonia Espinosa
QC Batch: QB4747
Samples: L4248-L4249, L7194-L7195, L6314-L6315, L6321-L6322.

4/3/86

MONS 220956

Methodology
for
GC/MS Analysis of Priority Pollutant Compounds

The methods employed in the GC/MS analysis for priority pollutants are established EPA methods. Rigid compliance with the instrument parameters and performance criteria of the published methods was achieved. In some cases the precise amounts of sample used and the sample handling procedures vary with the complexity of the sample matrix. Qualitative identification of the priority pollutants was performed using the relative retention times, the relative abundance of three characteristic ions and the abundance ratios. The entire mass spectrum was reviewed to confirm each identification. Quantitative analysis of detected compounds was performed by using a response factor generated by a major characteristic ion of the specific compound and an internal standard.

Compounds, in addition to those on the priority pollutant list, were identified through a computer-aided search of the NBS-EPA spectra library. After review the identifications are included in a separate tabulation and labelled "tentatively identified".

Acid Base/Neutral and Pesticide Priority Pollutant Compounds

For the analysis of the Acid, Base/Neutral and Pesticide priority pollutants in a soil matrix a modification of EPA Method 625 was used. The method can be summarized as follows. A 30 gm semi-wet soil sample is soxhlet extracted with a 1:1 mixture of acetone and hexane. The acetone is thermally stripped. The remaining hexane extract is diluted to 200 ml with methylene chloride and twice extracted with an aqueous NaOH solution followed by an extraction with deionized water. The methylene chloride extract is dried and concentrated to a 1 ml final volume. This concentrate is injected into a GC/MS instrument configured for the analysis of Base/Neutral priority pollutant compounds. The remaining aqueous extracts are combined and the pH adjusted to a value less than 2. The aqueous phase is serially extracted with 3 aliquots of methylene chloride. The methylene chloride extracts are dried, concentrated to a 1 ml final volume. The concentrate is injected into a GC/MS instrument configured for the analysis of acid extractable priority pollutant compounds.

ETC ENVIRONMENTAL TESTING and CERTIFICATION

Methodology for Analysis of Metals

AQUEOUS

The determination of metals in aqueous samples is performed according to the methods published by EPA in "Methods for Chemical Analysis of Water and Wastes" EPA-600/4-79-020 March 1983 and the Federal Register, October 26 1983 Arsenic selenium and thallium are determined by furnace AA, silver, aluminum barium beryllium boron, cadmium, calcium chromium copper cobalt, iron, magnesium, manganese, molybdenum nickel lead sodium, antimony tin, titanium, vanadium, and zinc are determined by ICP emission spectrometry, except where lower levels of detection are required in these cases (e.g. lead in groundwater monitoring samples) furnace AA is used All furnace AA parameters are run by method of standard additions The determination of mercury is performed by cold vapor AA

EP TOXICITY

The determination of metals in aqueous EP Toxicity leachates is performed according to the methods published by EPA in "Test Methods for Evaluating Solid Waste" EPA SW-846 revised April 1984 and the Federal Register, Oct 26 1983 1979 Silver, arsenic barium, cadmium chromium lead and selenium are determined by ICP emission spectrometry Mercury is determined using cold vapor AA For leachates that are organic in nature, the analyses are performed according to the methods described under *OIL/SLUDGE* below

SOIL/SEDIMENT

The determination of silver, beryllium, cadmium, chromium copper, nickel, antimony, lead and zinc in sediment samples is performed according to methods published by EPA in "Interim Methods for the Sampling and Analysis of Priority Pollutants in Sediments and Fish Tissue" EPA 600/4-81-055, October 1980 Mercury is determined according to the sediment method published by EPA in "Method for Chemical Analysis of Water and Wastes", EPA 600/4-79-020 March 1983 Arsenic, selenium and thallium are determined by furnace AA using nitric acid in a closed decomposition vessel for sample digestion

OIL/SLUDGE

The determination of silver, aluminum, boron, barium, beryllium, calcium cadmium copper, chromium cobalt iron, magnesium, manganese, molybdenum, sodium, nickel lead, antimony tin titanium, vanadium, and zinc in sludge/petroleum-based samples is performed by ICP emission spectrometry using a magnesium nitrate dry ashing digestion technique Arsenic, selenium and thallium are determined by furnace AA using nitric acid in a closed decomposition vessel for sample digestion Mercury is determined by cold vapor AA using the same digestion technique

MONS 220958

ETC ENVIRONMENTAL TESTING and CERTIFICATION

Summary of
Quality Assurance/Quality Control Procedures (QA/QC)

ETC bases its quality assurance protocols on the following government guidelines

"Handbook for Analytical Quality Control in Water and Wastewater Laboratories", EPA-600/4-79-019, March 1979,

National Enforcement Investigation Center Policies, and Procedures manual, EPA-330/9/79/001-R October 1979,

the recommended guidelines for EPA Methods 624 and 625 (Federal Register December 3 1979 updated on October 26, 1984),

"Manual of Analytical Methods for the Analysis of Pesticides in Humans and Environmental Samples," EPA 600/8-80-038, June 1980,

"Determination of 2,3 7,8-TCDD in Soil and Sediment" EPA, Region VII, Kansas City, September 1983,

Organic Analysis Multi-media, Multi Concentration-IFB WA84-A267, and

Dioxin Analysis Soil/Sediment Matrix, Multi-Concentration, Selected Ion Monitoring with Jar Extration Procedure-IFB WA84-A002

However, we have modified our protocols to provide a higher level of QA/QC than the guidelines require For example, we analyze a higher than required number of quality control samples and we pay especially careful attention to the certification of the "reference standard" compounds we use in analysis Below are listed the key QA/QC elements for the methods we used

Analysis of Volatile Organic Compounds by Gas Chromatography/Mass Spectrometry

- Each batch of 13 samples consists of 9 customer samples (at a maximum) one blank sample, one spiked blank, one spiked sample and one replicate sample This amounts to a 30% quality control factor
- Three surrogate compounds are added to each sample in the batch of 13
- A blind quality control sample is introduced to the laboratory for analysis on a weekly basis
- Each GC/MS is checked and retuned, if necessary, at the beginning of each day to ensure that its performance on bromofluorobenzene (BFB) meets the EPA criteria
- A calibration curve for quantitation is prepared using a mixture of Volatile Organic Priority Pollutant "standards" at a minimum of 3 different concentrations and using a mixture of 3 internal standards at a constant concentration
- The calibration curve is verified with a mixture of priority pollutant standards every day If the response factors vary greater than 25%, the instrument must be recalibrated

Analysis of Organic Compounds Extracted in Acid or Base/Neutral Solutions by Gas Chromatography/Mass Spectrometry

- Each batch of 20 samples consists of 16 customer samples (at a maximum) one blank sample one spiked blank (for water matrices) one sample spiked with the priority pollutant standard mixture and a duplicate customer sample This amounts to a 20% quality control factor

MONS 220959

- Three surrogate compounds are added to each sample in the batch for Base/Neutra analysis
- Three surrogate compounds are added to each sample in the batch for Acid analysis
- A blind quality control sample is introduced to the laboratory for analysis on a weekly basis
- Each GC/MS is checked and retuned if necessary, at the beginning of each day to ensure that its performance on decafluorotriphenylphosphine (DFTPP) meets the EPA criteria
- A calibration curve for quantitation is prepared using a mixture of standards composed of either the Organic Acid or Base/Neutral Extractable Compounds at a minimum of 3 concentrations and using five internal standards for quantitation

Analysis of Metals

All Samples

- New standards are prepared for each batch of samples
- Normal calibration is performed using a blank sample and four standards that have been through the sample preparation procedure. A regression analysis is used to construct the calibration curve
- All EP Toxicity samples and all samples determined by furnace atomic absorption are calculated by the "method of additions"
- For each sample analysis that requires the use of the "method of additions" technique a three point calibration is performed using U.S. EPA "Methods for Chemical Analysis of Water and Wastes, 1979". Results are obtained using linear regression analysis. Any regression with a coefficient of correlation below 0.990 is considered suspect necessitating review of calibration data or sample re-analysis
- In constructing the normal calibration curves the lowest concentration levels we use are values greater than or equal to 5 times the Instrumental Detection Limit (IDL)
- All calibration standards are analyzed in duplicate, at a minimum
- Independent reference standards are used to check the accuracy of calibration standards
- A check standard is analyzed every ten samples to validate the normal calibration curve
- One customer sample out of every ten is analyzed in triplicate

Homogeneous Samples (except for Mercury analysis)

Samples are analyzed in batches of 30 or less. For batches in which the sample matrices are homogeneous, the QC program is a minimum of 25% and consists of analyzing

- 3 sets of triplicate analyses
- 2 Replicate spikes
- 1 Independent reference standard,
- 4 Calibration standards (processed using the sample preparation method)
- 4 Calibration standards (without sample preparation), and
- 1 Reagent Blank

Heterogeneous Samples (except for Mercury analysis)

Samples are analyzed in batches of 30 or less. For batches in which the sample matrices are heterogeneous, the QC program is a minimum of 35% and consists of analyzing

- 3 sets of triplicate analyses
- 2 Replicate spikes,
- 1 Replicate independent reference standards,
- 4 Calibration standards (processed using the sample preparation method),
- 1 Procedural Blank,
- 4 Calibration standards (without sample preparation), and
- 1 Reagent Blank

Analysis of Mercury

To analyze samples for mercury we group them by matrix in batches of 30 or less. Our QC program is a minimum of 30% and consists of analyzing

- each of the 30 customer samples in duplicate,
- 3 sets of triplicate anaylsas,
- 2 Replicate spikes,
- 2 Replicate independant reference standards,
- 10 Calibration standards (processed using the sample preperation method), and
- 2 Procedural Blanks

Analysis of Pesticides, Herbicides and PCB's by Gas Chromatography

Pesticide, herbicide and PCB samples are grouped in batches of 16 customer samples or less according to the type of analysis to be performed. The QC program for each of these three types of analyses is a minimum of 20% and consists of analyzing

- 1 procedural blank sample(a reagent blank is analyzed in the case of non-water matrices),
- 1 spiked blank sample (the spiked blank is eliminated in the case of non-water matrices),
- 1 replicate sample,
- 1 replicate spiked sample, and
- 1 known refernece QC sample for at least each 100 samples analyzed

The instrument is calibrated each run with three standards, and checked every 10 samples

Analysis of Cyanides, Phenols, Fluoride, Chloride, Nitrate and Nitrite

- All parameters are analyzed using a Technicon Autoanalyzer II GT
- 3 calibration standards are analyzed at the beginning and end of each batch

- Each batch (up to 80 samples) consists of analyzing one blank one spiked blank one duplicate and spiked sample every 20 samples, and an EPA known reference sample

Analysis of Total Organic Carbon (TOC)

TOC samples are analyzed on a daily basis with the number of samples analyzed per day dependent on the request for duplicate or quadruplicate analyses. The quality control program is designed to maintain the appropriate amount of QC and consists of the following elements

- Daily instrument calibration
- One blank
- Standard recalibration every 10 samples
- Spiked samples at a low and high level
- Every sample is run in duplicate at a minimum

Analysis of Total Organic Halide (TOX)

- Blank reagent water for absolute carbon background must contain less than 5 ug/l of halide (as chloride)
- Using a trichlorophenol standard, the mean adsorption efficiency must be within +/- 15% of the standard value
- Calibration standards are run every 10 samples.
- Every sample is run in duplicate at a minimum

Analysis of 2,3,7,8-TCDD (Dioxin) by GC/MS (SIM)

- Each sample is dosed with a known quantity of $^{13}C_{12}$-2,3,7,8-TCDD as internal standard and $^{37}Cl_4$-TCDD as surogate standard. The action limits for surrogate standard results is +/- 40% of the true value. Samples showing surrogate standard results outside of these limits are reextracted and reanalyzed
- Two laboratory "method blanks" are run along with each set of 24 or fewer samples. The method blank is also dosed with the internal standard and surrrogate standard
- At least one per set of 24 samples is run in duplicate to determine intralaboratory precision
- Qualitative Requirements. The following are met in order to confirm the presence of native 2,3,7,8-TCDD

  a. Isomer specificity must be demonstrated initially and verified once per 8-hour work shift. The verification consists of injecting a mixture containing TCDD isomers which elute close to 2,3,7,8-TCDD. The 2,3,7,8-TCDD must be separated from interferring isomers, with no more than 25% valley relative to the 2,3,7,8-TCDD peak.

  b. The 320/322 ratio is within the range of 0.67 to 0.87.

  c. Ions 320, 322, and 257 are all present and maximize together the signal to mean noise ratio must be 2.5 to 1 or better for all 3 ions.

  d. The retention time is equal (within 3 seconds) the retention time for the isotopically labeled 2,3,7,8-TCDD.

  e. At least one of the positives can be confirmed by obtaining partial scan spectra from mass 150 to mass 350. The partial scan guidelines are as follows.

. the 320/324 ratio should be 1.58 +/- 0.16

the 257/259 ratio should be 1.03 +/- 0.10

the 194/196 ratio should be 1.54 +/- 0.15

- One sample is spiked with native 2,3,7,8-TCDD at a level of 10 PPB (for soil) for each set of 24 or fewer samples
- In cases where no native 2,3,7,8-TCDD is detected, the actual detection limit is estimated and reported based on a signal to noise ratio of 2.5 to 1 at ions 320 and 322
- For each sample, the internal standard is present with at least a 10 to 1 signal to noise ratio for both mass 332 and mass 334. Also, the internal standard 332/334 ratio must be within the range of 0.67 to 0.87

Subcontractor QA/QC

Each subcontractoer is required to maintain an appropriate level of quality control. To insure this, each subcontractor is required to submit to ETC the quality control data for all analyses it performs. This data is kept on file at ETC. In general, the amount of quality control required is one duplicate sample with one spiked sample for every ten analyses.

Chain-of-Custody

The chain-of-custody procedure is part of our quality assurance protocol. We believe our chain-of-custody record fully complies with the legal requirements of federal, state and local government agencies and of the courts of law. The record covers

- labeling of sample bottles, packing the Sample Shuttle and transferring the Shuttle under seal to the custody of a shipper,
- outgoing shipping manifests,
- the chain-of-custody form completed by the person(s) breaking the Shuttle seal taking the sample, resealing the Shuttle and transferring custody to a shipper,
- incoming shipping manifests,
- breaking the Shuttle's reseal,
- storing each labeled sample bottle in a secured area,
- disposition of each sample to an analyst or technician, and
- the use of the sample in each bottle in a testing procedure appropriate to the intended purpose of the sample.

The records show for each link in this process

- the person with custody, and
- the time and date each person accepted or relinquished custody.

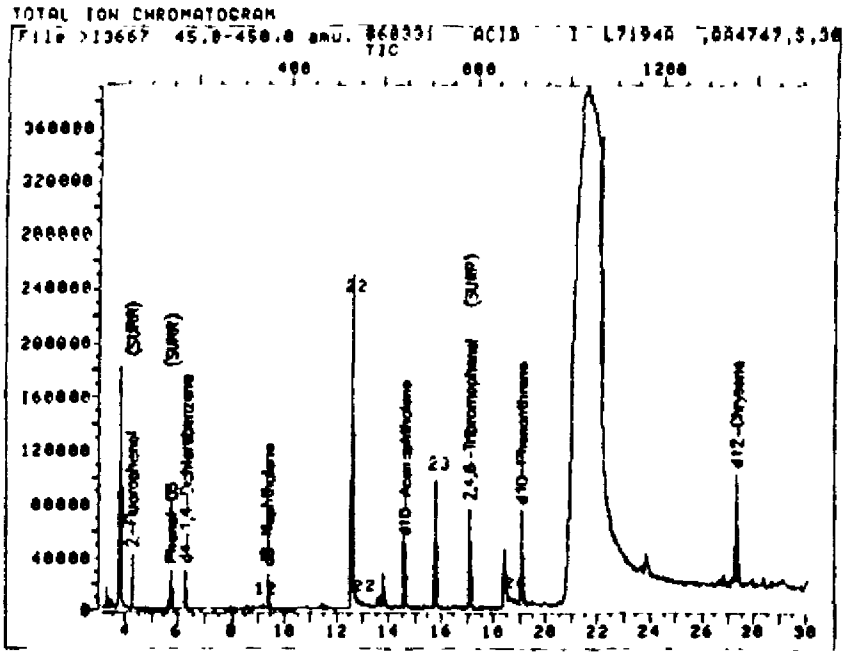
Appendix A

Mass Spectral Data for Quantitated Compounds

1) A total ion chromatogram for each sample analyzed by a GC/MS instrument

2) A Quant report used by the analyst to determine qualitative and quantitative results of the compounds present

3) A mass spectrum and a reference spectrum for each priority pollutent compound detected in the sample



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Title: PP/ACID IDFILE
Last Calibration: 860331 14:52

Operator ID: JH2180
Quant Time: 860331 21:36
Injected at: 860331 21:03

QUANT REPORT

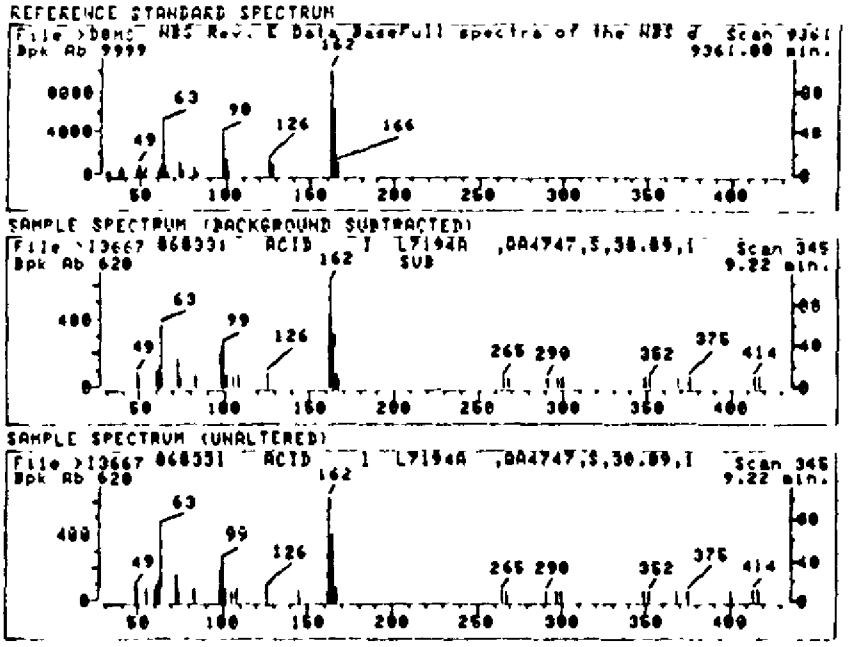
Operator ID: JH2180 Quant Rev: 5 Quant Time: 860331 21:36
Output File: ^I3667::AQ Injected at: 860331 21:03
Data File: >I3667::U7 Dilution Factor: 1.00
Name: 860331 ACID I
Misc: L7194A ,QA4747,S,30.09,1 BTL#12

ID File: IACID::US
Title: PP/ACID IDFILE
Last Calibration: 860331 14:52

	Compound		R.T.	Scan	Area	Conc	Units	Q
1)	*d4-1,4-Dichlorobenzene		6.27	179	12846	40.00	UG/ML	9
3)	2-Fluorophenol	(SURR)	4.19	62	21599	90.20	UG/ML	
8)	Phenol-D5	(SURR)	5.72	148	24474	86.32	UG/ML	
11)	*d8-Naphthalene		9.38	354	28886	40.00	UG/ML	
12)	2,4-Dichlorophenol		9.22	345	1723	8.51	UG/ML	
17)	*d10-Acenaphthalene		14.62	649	20642	40.00	UG/ML	
22)	2,4,6-Trichlorophenol		12.60	535	115838	509.95	UG/ML	9
23)	2,4,6-Trichlorophenol		12.98	567	1797	7.91	UG/ML	
29)	2,3,4,6-Tetrachlorophenol		15.80	715	25954	167.31	UG/ML	
24)	*d10-Phenanthrene		19.07	899	80950	40.00	UG/ML	
25)	2,4,6-Tribromophenol	(SURR)	17.06	786	22399	99.76	UG/ML	
26)	Pentachlorophenol		18.79	883	984	3.67	UG/ML	
28)	*d12-Chrysene		27.34	1362	92208	40.00	UG/ML	

* Compound is ISTD

MONS 220966



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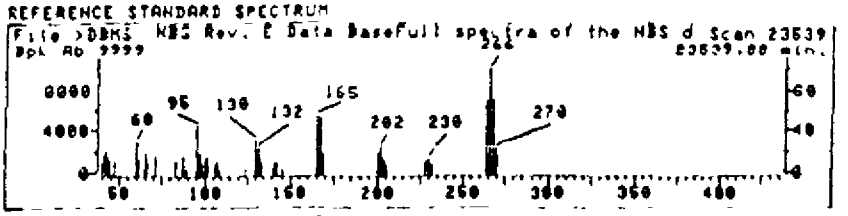
Injected at: 860331 21:03

Compound No: 12
Compound Name: 2,4-Dichlorophenol
Scan Number: 345
Retention Time: 9.22 min.
Area: 1723
Concentration: 8.51 UG/ML
q-value: 90

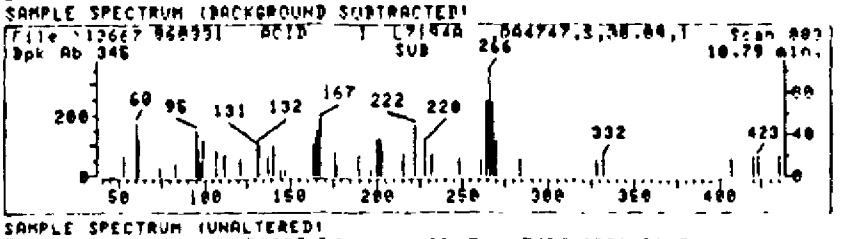
BIL812

MONS 220967

REFERENCE STANDARD SPECTRUM



SAMPLE SPECTRUM (BACKGROUND SUBTRACTED)



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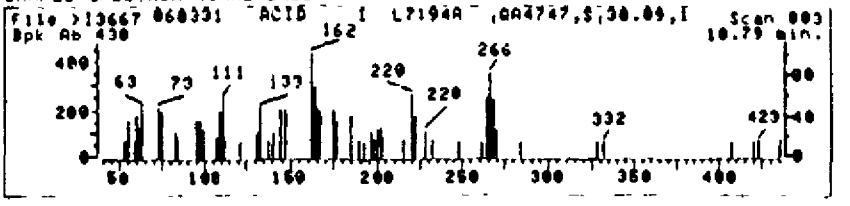

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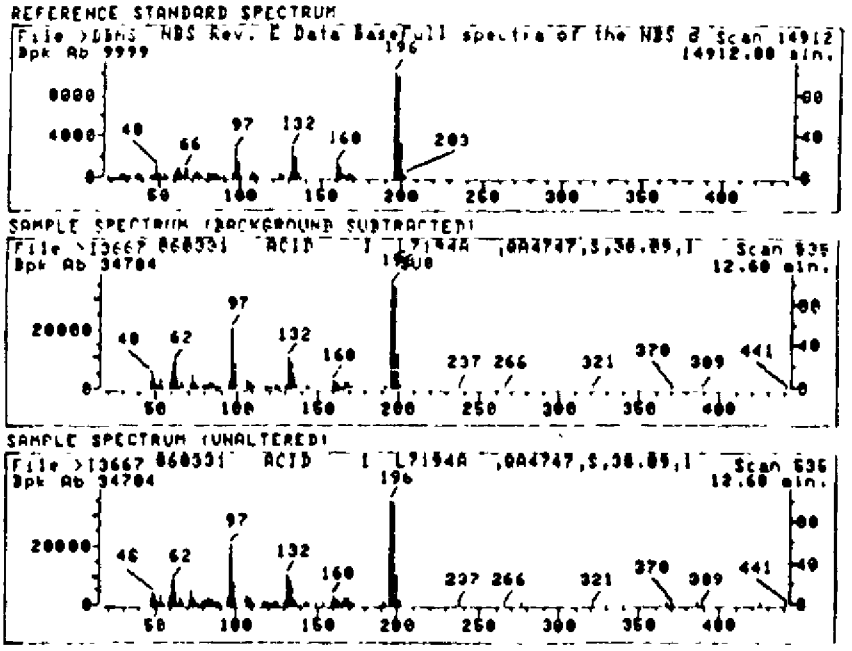
Injected at: 860331 21:03

Compound No: 26
Compound Name: Pentachlorophenol
Scan Number: 883
Retention Time: 10.79 min.
Area: 984
Concentration: 3.67 UG/ML
q-value: 89



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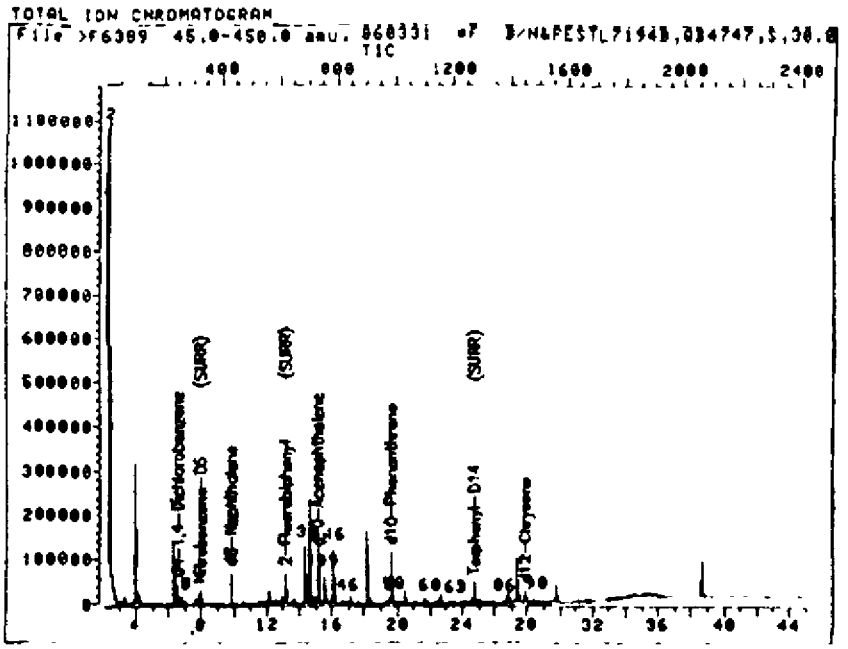
Quant Time: 860331 21:36
Injected at: 860331 21:03

Compound No: 22
Compound Name: 2,4,6-Trichlorophenol
Scan Number: 535
Retention Time: 12.60 min.
Area: 115838
Concentration: 509.95 UG/ML
q-value: 97

B1L812



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Misc: L7194B,QB4747,5,30.09,1

BTL#23

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Last Calibration: 860401 12:03

Operator ID: RA0157
Quant Time: 860401 19:32
Injected at: 860401 18:44

MONS 220970

QUANT REPORT

Operator ID: RA0157 Quant Rev: 5 Quant Time: 860401 19:32
Output File: ^F6389::AQ Injected at: 860401 18:44
Data File: >F6389::U2 Dilution Factor: 1.00
Name: 860331 &F B/N&PEST
Misc: L7194B,QB4747,S,30.09,1 BTL#23

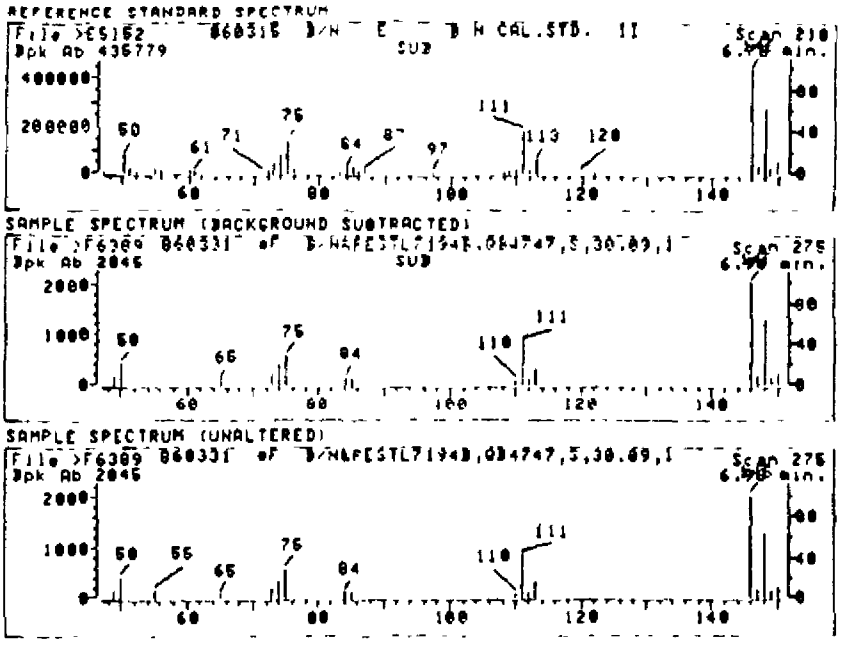
ID File: FBNP::US
Title: B/N+PEST ID FILE .... FOR F 850326
Last Calibration: 860401 12:03

	Compound		R.T.	Scan#	Area	Conc	Units	q
1)	*d4-1,4-Dichlorobenzene		6.50	249	19112	40.00	UG/ML	97
2)	N-Nitrosodimethylamine		2.27	10	3043	9.28	UG/ML	100
7)	1,3-Dichlorobenzene		6.96	275	5071	7.89	UG/ML	96
8)	1,4-Dichlorobenzene		6.96	275	5071	7.69	UG/ML	96
9)	1,2-Dichlorobenzene		6.96	275	5071	7.98	UG/ML	95
12)	Nitrobenzene-D5	(SURR)	7.92	329	25944	37.90	UG/ML	87
18)	*d8-Naphthalene		9.76	433	84812	40.00	UG/ML	93
19)	2-Fluorobiphenyl	(SURR)	13.13	623	63515	31.10	UG/ML	98
33)	*d10-Acenaphthalene		15.08	733	49813	40.00	UG/ML	96
39)	Dimethyl phthalate		14.30	689	61432	27.06	UG/ML	63
39)	Dimethyl phthalate		15.54	759	3990	1.76	UG/ML	66
41)	2,6-Dinitrotoluene		15.08	733	6658	11.79	UG/ML	68
41)	2,6-Dinitrotoluene		15.54	759	2480	4.25	UG/ML	46
45)	2,4-Dinitrotoluene		16.04	787	20652	24.74	UG/ML	55
46)	Diethyl phthalate		16.82	831	1236	.53	UG/ML	89
54)	*d10-Phenanthrene		19.59	987	145557	40.00	UG/ML	96
58)	Phenanthrene		19.66	991	2431	.73	UG/ML	96
59)	Anthracene		19.66	991	2431	.71	UG/ML	93
60)	Di-n-butyl phthalate		21.87	1116	7194	2.00	UG/ML	95
61)	Fluoranthene		23.36	1200	2953	1.63	UG/ML	95
67)	Pyrene		23.36	1200	2953	1.76	UG/ML	95
72)	*d12-Chrysene		27.84	1452	33477	40.00	UG/ML	100
84)	Terphenyl-D14	(SURR)	24.70	1275	49962	24.51	UG/ML	91
86)	Butyl benzyl phthalate		26.45	1374	1765	2.91	UG/ML	88
90)	bis(2-Ethylhexyl)phthalate		28.42	1485	6247	8.75	UG/ML	98

* Compound is ISTD

SLC 4-2-86

MONS 220971



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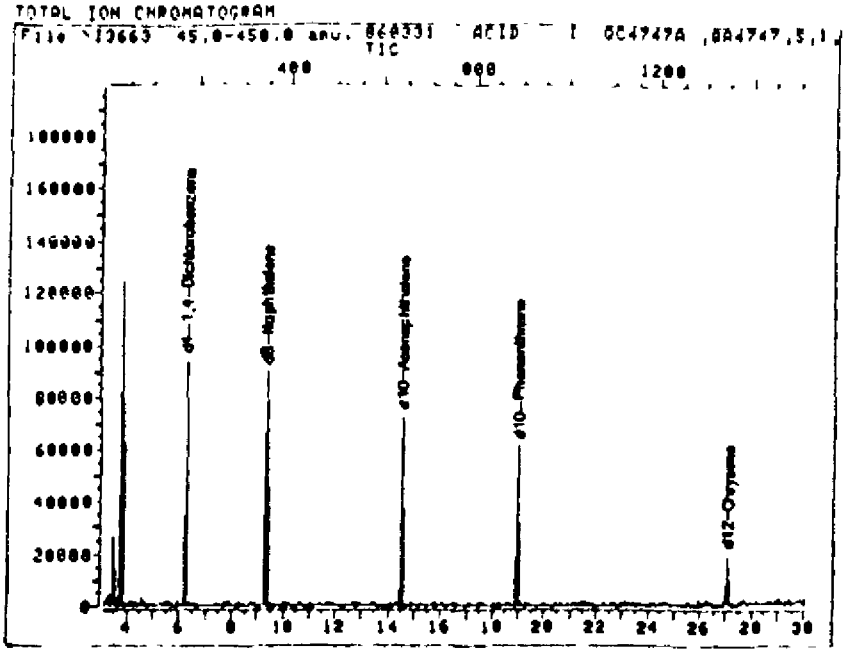
Injected at: 860401 18:44

Compound No: 9
Compound Name: 1,2-Dichlorobenzene
Scan Number: 275
Retention Time: 6.96 min.
Area: 5071
Concentration: 7.98 UG/ML
q-value: 95

Appendix C1

GC/MS Subsidiary Data



Data File: >I3663::U7
Name: 860331 ACID I
Misc: QC4747A ,QA4747,S,1,1

Id File: !ACID::US
Title: PP/ACID IDFILE
Last Calibration: 860331 14:52

Operator ID: JH2180
Quant Time: 860331 16:52
Injected at: 860331 16:19

BILE #

QUANT REPORT

Operator ID: JH2180 Quant Rev: 9 Quant Time: 860331 16:52
Output File: ^13663::AQ Injected at: 860331 16:19
Data File: >13663::U7 Dilution Factor: 1.00
Name: 860331 ACID I
Misc: QC4747A ,QA4747,S,1,1 BTL# 8

ID File: IACID::US
Title: PP/ACID IQFILE
Last Calibration: 860331 14:52

	Compound	R.T.	Scan#	Area	Conc	Units
1)	*d4-1,4-Dichlorobenzene	6.17	175	39403	40.00	UG/ML
11)	*d8-Naphthalene	9.26	349	90499	40.00	UG/ML
17)	*d10-Acenaphthalene	14.46	642	34953	40.00	UG/ML
24)	*d10-Phenanthrene	18.92	893	60065	40.00	UG/ML
28)	*d12-Chrysene	27.02	1349	18515	40.00	UG/ML

* Compound is ISTD

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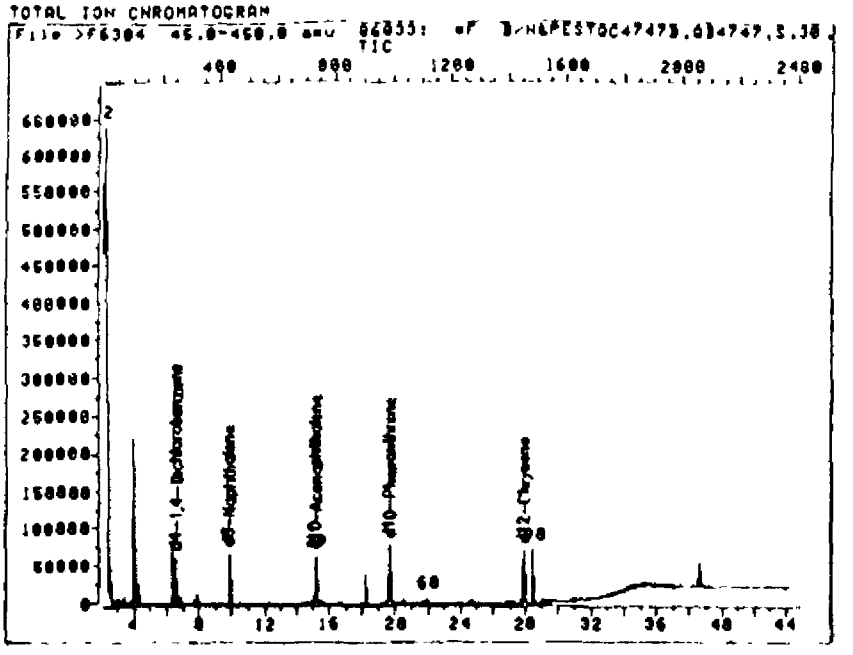

Data File: >F6384::U2
Name: 860331 #F B/N&PEST
Misc: QC4747B,QB4747,S,30,1 BTL#18

Id File: FBNP::US
Title: B/N+PEST ID FILE .... FOR F 850326
Last Calibration: 860401 02:06

Operator ID: KV0786
Quant Time: 860401 09:56
Injected at: 860401 09:08

MONS 220976

QUANT REPORT

Operator ID: KV0786 Quant Rev: 5 Quant Time: 860401 09:5e
Output File: ^F6384::AQ Injected at: 860401 09:08
Data File: >F6384::U2 Dilution Factor: 1.00
Name: 860331 #F B/N&PEST
Misc: QC4747B,QB4747,S,30,1 BTL#18

ID File: FBNP::US
Title: B/N+PEST ID FILE .... FOR F 850326
Last Calibration: 860401 02:06

	Compound	R.T.	Scan#	Area	Conc	Units	q
1)	*d4-1,4-Dichlorobenzene	6.53	249	24624	40.00	UG/ML	9
2)	N-Nitrosodimethylamine	~~2.29~~	~~10~~	~~4420~~	~~10.46~~	~~UG/ML~~	10
18)	*d8-Naphthalene	9.77	432	89791	40.00	UG/ML	9
33)	*d10-Acenaphthalene	15.08	732	41534	40.00	UG/ML	9
39)	Dimethyl phthalate	~~15.80~~	~~732~~	~~11917~~	~~6.30~~	~~UG/ML~~	6
54)	*d10-Phenanthrene	19.58	986	119392	40.00	UG/ML	9
60)	Di-n-butyl phthalate	21.89	1116	9574	3.24	UG/ML	9
72)	*d12-Chrysene	27.82	1451	98321	40.00	UG/ML	10
90)	bis(2-Ethylhexyl)phthalate	28.41	1484	53616	25.56	UG/ML	9

no PCBs found.

* Compound is ISTD

MONS 220977

Appendix E

Chain-of Custody Forms

1) A field Chain-of-Custody form (CC1) is included for all samples shipped by ETC shuttle

2) An in-house sample Chain-of Custody form is included for all samples not shipped by ETC shuttle

3) Any additional Chain-of-Custody material provided by a client or by a client's sampling agent is also included.

4) A subcontractor's Chain-of-Custody form is included for any analytical work not performed within ETC's laboratory.

5) Analysis and Extraction Custody forms are included for the period the sample was in ETC's possession

ETC ENVIRONMENTAL TESTING and CERTIFICATION

CHAIN OF CUSTODY

Company: Mearsalt Job No.

Address

Attention:

Sample Description:

CUSTOMER ID	DESCRIPTION	ETC #
Sample # 5	2 - 500ml (non ETC)	L7194
Sample # 57	↓	L7195

Sample(s) Relinquished by: Ram International

Time: 1:15 Date: 3/21/86

Sample(s) Received by: [illegible]

Time: 1:15 Date: 3/21/86

594 RARITAN CENTER PARKWAY • EDISON, NJ 08837 (201) 225-5800

MONS 220979

CHAIN OF CUSTODY RECORD

MRC JOB NUMBER _ 6405

P. O CONTRACT NUMBER _RQ140514X

PLANT NAME OR CODE _

CUSTOMER REPRESENTATIVE _

MRC CONTRACT MANAGER _Ray W Nolte

MRC TEAM LEADER _ Ray W Nolte

(Specific information on samples is available on attached "Sample Identification Log")

Signatures		Date	Time	Remarks
Team Leader Verification of Collected Samples: Ray W. Nolte		3/14/84	1000	
Relinquished by: Ray W. Nolte	Received by:	3/17/84	0900	Relinquished for shipment to ETC
Relinquished by:	Received by:			
Logged-in-by:				
Received for Analysis by:				
Method of Shipment: Air Express		Number of Containers: 1		

Special Instructions (Sample preservation, security, delivery to, etc.)

Sample #5 (2 bottles)

Sample #57 (2 bottles

MONS 220980

ETC ENVIRONMENTAL TESTING and CERTIFICATION

LABORATORY CHRONICLE: Sample Preparation Departn

	Sample Number	Log Link	Sample Weight (gm)	Extract Vol (ml) BN	Extract Vol (ml) ACID	Comments
†	L4248	13976	30.50	1.0	1.0	PP/[illegible] SECH BN+A
†	L4249	↓	30.33	1.0	1.0	↓ ↓
	L7194	14156	30.09	1.0	1.0	PP/ON PP/ACID
	L7195	↓	31.99	1.0	1.0	↓
☆	L6314	14137	30.00	5.0	5.0	FORP/ACID FORP/BN SPECS
	L6315		30.16	1.0	1.0	
☆	L6321		31.50	5.0	5.0	
☆	L6322	↓	31.52	5.0	5.0	↓
	QC 4747		—	1.0	1.0	
	L4248	S	30.51	1.0	1.0	
	L4249	R	31.13	1.0	1.0	

QC Batch # 4747

Analysis 3-27 (See comments)

Matrix soil

Turnaround Normal

Date 3/26/86

Extraction Method

Sep Funnel

Continuous

Soxhlet ✓

Other

COMMENTS

† L4248/49 – Refer to QC 4720 – samples redone on this batch [illegible] to label mixup.

Log 14137: SPECSP- These are soil samp[illegible]

☆ L6314, L6321, L63[illegible] had bad bad emul[illegible] in The BN Fracti[illegible] Recovery may be ef[illegible] JB

QC UPD [illegible]

FRACTION	SPIKE Amt (ml)	Conc µg/ml	Lot #
BN	1.0	100	12685
ACID	1.0	100	12,346
Aroclor 1260	1.0	100	12,649
AJT	1.0	100/200	12830
FORP/BN	1.0	100	12526
FORP/ACID	1.0	100	12,522
Semi-VOA			

SURROGATE Amt. (ml)	Conc. µg/ml	Lot #
1.0	BN: 50 ACID: 100	1284[illegible]

Set-up: Pamela y Williams 3.27.86

BN Conc.: [illegible] 3-19-?

Acid Conc.: [illegible] 3/27/86

UPD/Supervisor: [illegible] 3/31/

Spike/Surr. Verified: [illegible] 3/27/[illegible]

ETC FORM 8110

HONS 220981

ETC ENVIRONMENTAL TESTING AND CERTIFICATION

LABORATORY CHRONICLE GC-MS Department

DATE 3/31/96 SHIFT
FRACTION Acid
INSTRUMENT I
TUNE FILE MFI60
SEQUENCE FILE JAI, JHI
METHOD FILE Acid
ID FILE IA
ANALYST(S) J
SUPERVISOR
BATCH #'s QC4747

(PLEASE INITIAL)

CURRENT CSOS STATUS		STANDARDS UPDATED	
ACQ		DATE	3/31
WIP		BY	J

STANDARD	CONC PPM	LOT NO	LOT VOL
DFTPP	25		1
Int Std	400		
Acid Cal Std I	60	12577	
Acid Cal Std II	100	12576	
Acid Cal Std III	300	12879	
FDRP/Acid I	60	12575	
FDRP/Acid II	100	12574	
FDRP/Acid III	300	12573	

NAME	DATA FILE	ML INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A TYPE)	PLUS Y/N
DFTPP	I3655	2	1		I00437		
Acid cal std III	I3656		1				
Acid cal std II	I3657		2				
Acid cal std I	I3658		3				
FDRP/Acid I; 100ppm	I3659		4				
FDRP/Acid II; 150ppm	I3660		5				
FDRP/Acid III; 450ppm	I3661		6				
DFTPP	I3662		7				
QC4747A	I3663		8			SA	Y
L7195A	I3664		9				
L4249A	I3665		10			SA	Y
L4249AR	I3666		11				
L7194A	I3667		12				
L4248AS	I3668		13				
L4248A	I3669		14			SA	Y
L6314A	I3670		15				
L6315A	I3671		16				
L6321A	I3672		17				
L6322A	I3673		18				

ETC FORM 4102

MONS 220982

ETC ENVIRONMENTAL TESTING AND CERTIFICATION

LABORATORY CHRONICLE: GC-MS Department

DATE 4/21/86 SHIFT
FRACTION B/N
INSTRUMENT F
TUNE FILE MTFC61
SEQUENCE FILE KV31
METHOD FILE BNPF 1A1.M
ID FILE
ANALYST(S)
SUPERVISOR
BATCH #'s (GB 4723, pack) (time)
GB4747

(PLEASE INITIAL)

CURRENT CSOS STATUS		STANDARDS UPDATED	
ACO / WIP		DATE / BY	4/1/86

STANDARD	CONC PPM	LOT NO	LOT VOL
Pest IV	150	12751	
3 in III	200	12950	
2 in II	120	13086	
B/N I	60	12906	
Carbaryl	300	12587	
Carbaryl	100	12582	
Carbaryl	60	13020	
DFTPP	25	12602	
Ind std	400	13576 (1 vial)	

NAME	DATA FILE	WL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A TYPE)	PLUS Y/N
DFTPP - 50NG std	>F6366				I00437		
Carbaryl std 300ppm	>F6367		1				
Carbaryl std, 100ppm	>F6368		2				
Carbaryl std - 60ppm	>F6369		3				
B/N cal std II, 120ppm	>F6370		4				
B/N cal std, I, 60ppm	>F6371		5				
B/N cal std III, 200ppm	>F6372		6				
B/N cal std IV, 150ppm	>F6373		7				
DFTPP - 50NG std	>F6374		8			DC	
L3281B	>F6375		9			GB4723 DCBS:R	
L6781B	>F6376		10			RBS:R 11/82	
L6317B	>F6377		11				
L6314B	>F6378		12				
L6120B	>F6379		13				
L5813B	>F6380		14			RBL:R	
L5109B	>F6381		15				
L5110B	>F6382		16				
DCM	>F6383		17				
GC4747B	>F6384		18			RBS:E SB	Y
L4219B	>F6385		19			SB	Y
L4349BR	>F6386		20				
DFTPP - 50NG std	>F6387		21				
B/N cal std V, 10ppm	>F6388		22			AF1260	
L7194B	>F6389		23				
L7195B	>F6390		24				

ETC FORM 4107

MONS 220983

ETC ENVIRONMENTAL TESTING AND CERTIFICATION

LABORATORY CHRONICLE: GC-MS Department

DATE 4/1/96 SHIFT
FRACTION SV
INSTRUMENT F
TUNE FILE
SEQUENCE FILE
METHOD FILE
ID FILE
ANALYST(S)
SUPERVISOR
BATCH #'s SBV722 (pm 1)
QX4247

(PLEASE INITIAL)

CURRENT CSOS STATUS		STANDARDS UPDATED	
ACO		DATE	
WIP		BY	

STANDARD	CONC PPM	LOT NO.	LOT VOL

NAME	DATA FILE	uL INJ	ALS #	DIL	TAPE #	SPECIALS (WRITE A TYPE)		PLUS Y/N
L4248BS	>F6391		25			AF/26		
L4248B	>F6392		26			PCB&CF	SB	Y
L6314B	>F6393		27					
L6315B	>F6394		28					
L6321B	>F6395		29					
L6322B	>F6396		30					

MONS 220984

ETC ENVIRONMENTAL TESTING and CERTIFICATION

LL 14156

LABORATORY CHRONICLE: Metals Department

Samples L7194 , L7195

	Chemist	Date
Hg Prep	Ellen C McRae	4/24/86
AA/ICAP Prep	Joan Komarek	4/22/86

Lab Supervisor Lidya Wiaworski Date 4/25/86

ETC FORM 5101

MONS 220985