REI

RESOURCE ENGINEERING

February 4, 1985

001065

Mr. Don Porter
Environmental Protection Agency
First International Bldg.
1201 Elm Street
Dallas, TX 75270

Re: French Ltd. Water Well

Dear Don:

Please find attached information relative to activites in addressing the old French water well found at the French Ltd. site. As you know, the well was in poor shape, and we attempted to develop it and obtain some useful data from it.

The attached information describes our attempt to clean it up and the data that was obtained from one obtained sample . The data reflects the water quality when the well was first cleaned out. Subsequent attempts to obtain a sample were fruitless.

Resource Engineering recommends that the well be completely closed by pulling the steel casing and completely cementing the hole. It appears that the outside of the casing could act as a conduit for migration of contaminants into the aquifer below the Beaumont Clay Formation. Please advise either Hazel Hoffman of the task force or myself if you concur with this recommendation.

3000 Richmond Avenue, Houston, Texas 77098 • (713) 520-8900

000069

Thank you for your assistance in this matter.

Very truly yours,

RESOURCE ENGINEERING

Jacoby A. Scher
Project Manager

JAS/bw

cc: Mr. Alex Anjanow - TDWR
Mrs. Hazel Hoffman, Chairman French Ltd. Task Force

Attachments

001066

RESOURCE ENGINEERING

22 January, 1985

French Limited Task Group
c/o ARCO Chemical Co.
1200 Milam
Houston, TX 77001

Attention: Ms. Hazel Hoffman

Report of chemical analysis of grab samples taken December 12, 1984 from old supply well.

Parameter	Concentration Measured, mg/l
Arsenic	<0.05
Barium	<1.0
Cadmium	<0.01
Chromium	<0.01
Lead	<0.01
Mercury	<0.002
Selenium	<0.02
Silver	<0.01
Copper	<0.01
Manganese	0.35
Nickel	<0.01
Zinc	3.20
Molybdenum	<1.0
Iron	0.93
Total Organic Halogens	0.208

LAB NO. 6037 cont.

3000 Richmond Avenue, Houston, Texas 77098 • (713) 520-9900

001067

REI

LAB NO. 6037 cont.

Parameter	Concentration Measured, mg/l
Total Organic Carbon	67.0
Total Fixed Solids	195.0
Volatile Solids	50.0
Total Residue	245.0
Chloride	63.0
Sulfate	26.0
Oil and Grease	6.0

Very truly yours,

RESOURCE ENGINEERING

Bo Blankfield
Laboratory Director

BB/vs

LAB NO. 6037
REI PROJ. NO. 275-06

001063

Summary of Activities Performed on French Ltd. Supply Well No. LJ-65-08-806

Wednesday, 11/28/84- Work was begun on cleanup of French Ltd. Supply Well No. LJ-65-08-806. A waterwell drilling rig was set up over the well in order to drill out any obstructions that may be lodged in the casing. A metal obstruction was immediately encountered at 6 feet below grade. Attempts to drill through the obstruction failed.

Thursday, 11/29/84- A decision was made to cut the casing off below obstruction level. A trench was dug next to the well and it was discovered that the obstruction was due to the well casing itself; it was severely bent. The steel casing was cut off and replaced with 4 inch PVC. The PVC was attached and sealed to the casing with cement.

Friday, 11/30/84- Cleanup resumed smoothly until 35 feet below grade another metal object was encountered. After three hours of drilling, workers were only able to advance 3 inches.

RESOURCE ENGINEERING

22 January, 1985

French Ltd.
REI Project No. 275-06

Attention:

Report of chemical analysis of grab sample taken December 12, 1984 from old supply well.

Parameter	Concentration Measured, mg/l
Arsenic	<0.05
Barium	<1.0
Cadmium	<0.01
Chromium	<0.01
Lead	<0.01
Mercury	<0.002
Selenium	<0.02
Silver	<0.01
Copper	<0.01
Manganese	0.35
Nickel	<0.01
Zinc	3.20
Molybdenum	<1.0
Iron	0.93
Total Organic Halogens	0.208

LAB NO. 6037 cont.

001070

3000 Richmond Avenue, Houston, Texas 77098 • (713) 520-9900

REI

LAB NO. 6037 cont.

Parameter	Concentration Measured, mg/l
Total Organic Carbon	67.0
Total Fixed Solids	195.0
Volatile Solids	50.0
Total Residue	245.0
Chloride	63.0
Sulfate	26.0
Oil and Grease	6.0

Very truly yours,

RESOURCE ENGINEERING

Bo Blankfield

Bo Blankfield
Laboratory Director

BB/vs

LAB NO. 6037
REI PROJ. NO. 275-06

001071

CLIENT FRENCH LTD

PROJECT NO. 225-06

SAMPLED BY D. VALLANCE

DATE SAMPLED 12-12-84

E RECEIVED

DATE COMPLETED

RESOURCE ENGINEERING INC.

LAB NO. 6037

RESULTS TO C. SCHEER

PROJECT MANAGER C. SCHEER

ANALYTICAL COST 425.00

MILEAGE COST

HOURS RATE COST

SUBTOTAL

DISCOUNT

TOTAL COST $ 425.00

SAMPLE DESCRIPTION / PARAMETER	old sample MW#3	new well								
ARSENIC	<0.005	mg/L								
BARIUM	<1.0									
CADMIUM	<0.01									
CHROMIUM	<0.01									
LEAD	<0.01									
MERCURY	<0.0002									
SELENIUM	<0.002									
SILVER	<0.01									
COPPER	<0.01									
MANGANESE	0.35									
NICKEL	<0.01									
ZINC	3.20									
MOLYBDENUM	<1.0									
TOX Total Organic Halogens	0.208									
TOC " " "	67.0	V								
TFS Total Fixed Solids	19.5									
VSS VSolids Volatile	50									
CHLORIDE	63	mg/L								
SULFATE	26.0	mg/L								
O&G	6.0	mg/L								
Fe	0.93	mg/L								
TS Total Solids	275									
TESTED BY	GM/BB		001072							
ANALYSIS COST										

it was concluded that the metal obstruction was most likely the drop pipe of the submersible pump. A steel rod was droped down-hole in an effort to tag bottom. Workers were able to lower rod to 200 feet. It was determined that the top of the submersible pump sits at 200 feet below surface. The drilling rig was taken off site.

Wednesday, 12/5/84- A service rig was set up over the well to try to pull out the drop pipe and submersible pump. Six attempts were made to pull the pump and drop pipe. Five tons of lifting force was ultimately applied to the assembly but drop pipe and pump would not move.

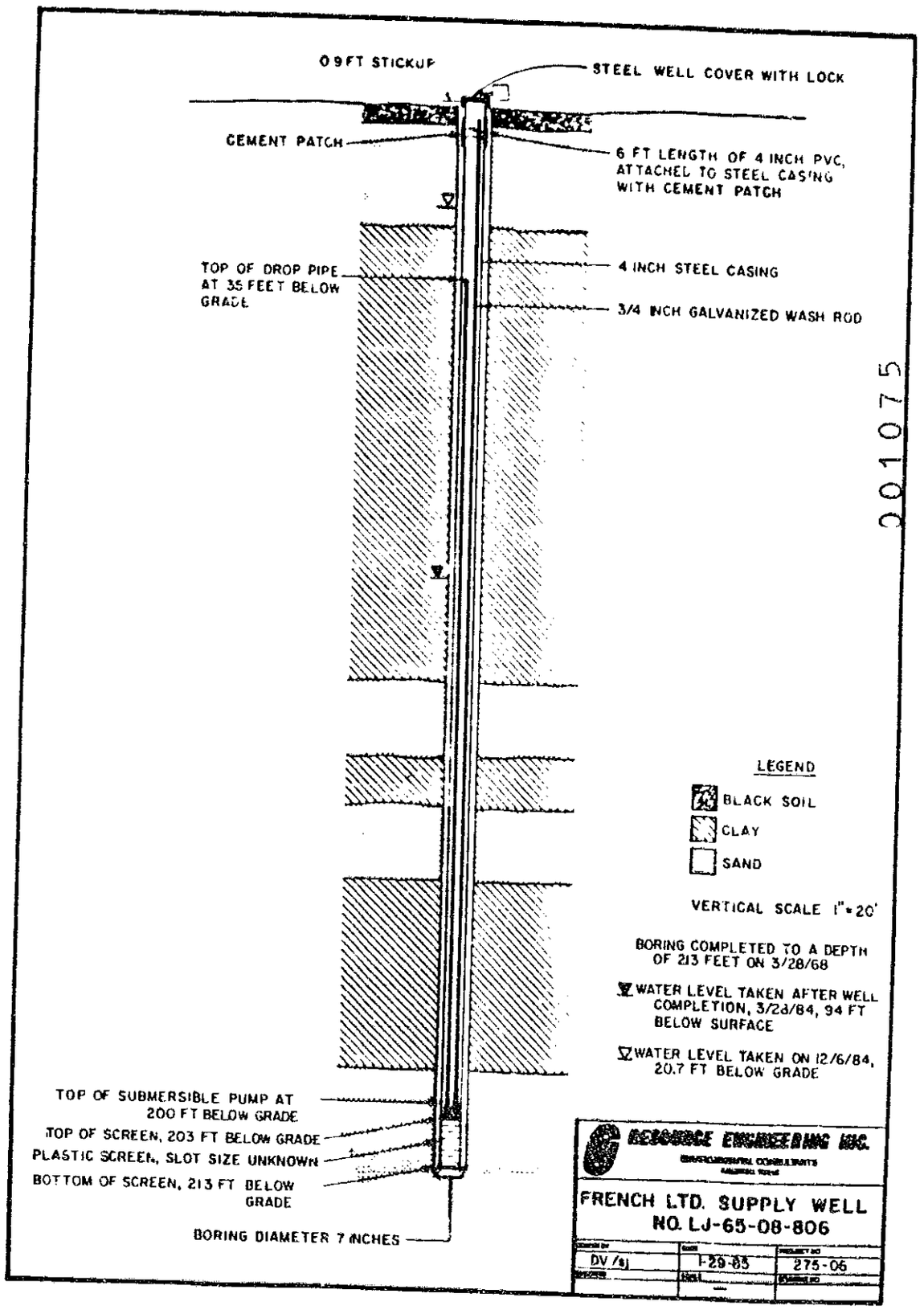
Thursday, 12/6/84- A 3/4 inch wash rod was set to the top of the pump. This rod will be used for sampling purposes. The well casing was cut off close to ground surface (0.9 ft. stickup) in case a drilling rig should have to set up over it again. A protective steel cover was installed over the well casing and secured with a padlock.

Wednesday, 12/12/84- Sampling of the well was attempted. Before purging the well, an initial set of water samples was bailed and collected by REI and a TDWR representative. After sampling was completed, a special well cover was installed. This well cover directed the water rising from the well during

purging, through a hose which ran to the lagoon. Purging the well was accomplished by directing compressed air through the 3/4 inch wash rod. After approximately 1.5 well volumes of water had been removed, the well appeared to stop accepting the compressed air. It was believed that the wash rod became clogged, thus restricting the air. Bailing the well for sampling was then attempted; however, the bailer could not be dropped lower than 60 feet; the water level was at 88 feet.

Tuesday, 12/18/84- Another attempt was made to purge and sample the well; However, wash rod was still restricting air. Water level is at 76 feet below grade and cannot be reached by bailer.

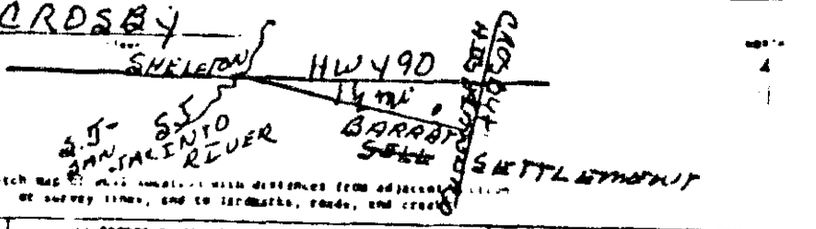
Wednesday, 1/9/85- Water level is at 5.31 feet below grade.


0.9FT STICKUP
STEEL WELL COVER WITH LOCK
CEMENT PATCH
6 FT LENGTH OF 4 INCH PVC, ATTACHED TO STEEL CASING WITH CEMENT PATCH
TOP OF DROP PIPE AT 35 FEET BELOW GRADE
4 INCH STEEL CASING
3/4 INCH GALVANIZED WASH ROD
LEGEND
BLACK SOIL
CLAY
SAND
VERTICAL SCALE 1"=20'
BORING COMPLETED TO A DEPTH OF 213 FEET ON 3/28/68
WATER LEVEL TAKEN AFTER WELL COMPLETION, 3/28/84, 94 FT BELOW SURFACE
WATER LEVEL TAKEN ON 12/6/84, 20.7 FT BELOW GRADE
TOP OF SUBMERSIBLE PUMP AT 200 FT BELOW GRADE
TOP OF SCREEN, 203 FT BELOW GRADE
PLASTIC SCREEN, SLOT SIZE UNKNOWN
BOTTOM OF SCREEN, 213 FT BELOW GRADE
BORING DIAMETER 7 INCHES
RESOURCE ENGINEERING INC.
FRENCH LTD. SUPPLY WELL
NO. LJ-65-08-806
DV/sj
1-29-85
275-06

201075

1) OWNER
Person having well drilled: FRENCH LTD of Houston INC. Address: 11023 TELEPHONE RD TX
Landowner: FRENCH LTD of Houston INC Address: 11023 TELEPHONE RD HOUSTON TX

2) LOCATION
County: HARRIS League: Abstract No.
NW¼ NE¼ SW¼ SE¼ of Section Block No. Survey
Miles to 1½ mi E direction from CROSBY



Sketch map of well location with distances from adjacent roads or survey lines, and to landmarks, roads, and creeks

3) TYPE OF WORK (Check)
New well ✓ Deepening ☐
Reconditioning ☐ Plugging ☐

4) PROPOSED USE (Check)
Domestic ☐ Industrial ☐ Municipal ☐
Irrigation ☐ Test Well ☐ Other ☐

5) TYPE OF DRIVE (Check)
Rotary ✓ Driven ☐ Dug ☐
Cable ☐ Jetted ☐ Bored

6) WELL LOG:
Diameter of hole 7 in. Depth drilled 213 ft. Depth of completed well 213 ft. Date drilled 3-28-
All measurements made from ft. above ground level.

From (Ft.)	To (Ft.)	Description and color of formation materials
0	3	BLACK LAND
3	24	SAND
24	115	CLAY
115	130	SAND
130	140	CLAY
140	155	SAND
155	193	CLAY
193	213	SALT+PEPPER SAND

From (Ft.)	To (Ft.)	Description and color of formation material

(Use reverse side if necessary)

7) COMPLETION (Check)
Straight wall: ✓ Gravel packed ☐ Other ☐
Under reamed ☐ Open hole ☐

8) WATER LEVEL:
Static level 94 ft. below land surface Date
Artesian pressure lbs. per square inch Date

9) CASING:
Type old ☐ New ✓ Steel ☐ Plastic ☐ Other ☐
Cemented from ft. to ft.

Diameter (inches)	Setting From (Ft.)	Setting To (Ft.)	Gauge
4"	0	203	MED.

10) SCREEN:
Type PLASTIC SCREEN
Perforated ☐ Slotted ☐

Diameter (inches)	Setting From (Ft.)	Setting To (Ft.)	Slot size

11) WELL TESTS
Was a pump test made? ☐ Yes ✓ No If yes by whom?
8gal Amin pump
Yield: gpm with ft. drawdown after hrs
Bailer test gpm with ft. drawdown after hrs
Artesian flow gpm Date
Temperature of water
Was a chemical analysis made? ☐ Yes ✓ No
Did any strata contain undesirable water? ☐ Yes ✓ No
Type of water? depth of strata

12) PUMP DATA:
Manufacturer's Name
Type H.P.
Designed pumping rate gpm ☐ gph ☐
Type power unit
Depth to bowls, cylinder, jet, etc., below land surface.

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief.

Name J.W. CREAK (Type or Print)
Water Well Drillers Registration No 617
Address P.O. Box 92 HWY 90 LIBERTY TEXAS

001076

001076

Technical Report

for

RESOURCE ENGINEERING

ATTENTION: CHRIS ITIN

3000 RICHMOND AVENUE

HOUSTON, TX 77098

001077

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G4116	RESOURCE ENGINEERING	RES27506	WFR1	841212		

June D. Schaper/For

Denis C K. Lin, Ph.D.

Vice President
Research and Operations

TABLE OF CONTENTS

001078

Introduction

This report contains the analytical results on your water sample, WFRI 84/12/12. 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 strict, 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, December 3, 1979. 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). 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.

Qualitative Analysis

The GC/MS identification of compounds which are not included in the normal compound list for a given method is reported in a Quantative Results Table. Each sample fraction is reported on an individual Quantative Results Table. Wherever possible these compounds are reported with their molecular weight, empirical formula, and CAS number. The retention time and scan number is also provided to match the spectra included in the report appendices.

001079

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 4, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Volatile Compounds – GC/MS Analysis Data (QR01)

Cham of Custody Data Required for ETC Data Management Summary Reports

FTC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G4116	RESOURCE ENGINEERING	RES27506	WFR1	841212		

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spik		
		Sample Concen. ug/l	MDL ug/l A	First ug/l	Second ug/l	Blank Data ug/l	Concen. Added ug/l	% Recov	Unspiked Sample ug/l	Concen Added ug/l	% Recov
1V	Acrolein	ND	100	ND	ND	ND	1600	85	ND	1600	54
2V	Acrylonitrile	ND	100	ND	ND	ND	160	121	ND	160	115
3V	Benzene	12	10	17	18	ND	36	101	1	36	91
4V	bis(Chloromethyl)ether	ND	10	ND	ND	ND	0	-	ND	0	-
5V	Bromoform	ND	10	ND	ND	ND	36	106	ND	36	94
6V	Carbon tetrachloride	ND	10	ND	ND	ND	36	105	ND	36	87
7V	Chlorobenzene	ND	10	ND	ND	ND	36	103	ND	36	91
8V	Chlorodibromomethane	ND	10	ND	ND	ND	36	105	ND	36	97
9V	Chloroethane	BMDL	10	ND	ND	ND	36	98	ND	36	90
10V	2-Chloroethylvinyl ether	ND	10	ND	ND	ND	36	168B	ND	36	155B
11V	Chloroform	ND	10	ND	ND	ND	36	106	ND	36	97
12V	Dichlorobromomethane	ND	10	ND	ND	ND	36	107	ND	36	98
13V	Dichlorodifluoromethane	ND	10	ND	ND	ND	36	66	ND	36	47C
14V	1,1-Dichloroethane	ND	10	22	22	ND	36	108	ND	36	99
15V	1,2-Dichloroethane	ND	10	ND	ND	ND	36	109	28	36	77
16V	1,1-Dichloroethylene	ND	10	8	8	ND	36	103	ND	36	88
17V	1,2-Dichloropropane	ND	10	ND	ND	ND	36	107	ND	36	94
18V	cis-1,3-Dichloropropylene	ND	10	ND	ND	ND	36	104	ND	36	89
19V	Ethylbenzene	ND	10	ND	ND	ND	36	105	ND	36	90
20V	Methyl bromide	ND	10	ND	ND	ND	36	104	ND	36	86
21V	Methyl chloride	ND	10	ND	ND	ND	36	85	ND	36	72
22V	Methylene chloride	BMDL	10	10	7	BMDL	36	102	ND	36	111
23V	1,1,2,2-Tetrachloroethane	ND	10	ND	ND	ND	36	107	ND	36	100
24V	Tetrachloroethylene	BMDL	10	ND	ND	ND	36	102	ND	36	88
25V	Toluene	13	10	ND	ND	BMDL	36	94	ND	36	82
26V	1,2-Trans-dichloroethylene	ND	10	3650	4495	ND	36	106	ND	36	90
27V	1,1,1-Trichloroethane	ND	10	ND	ND	BMDL	36	86	ND	36	87
28V	1,1,2-Trichloroethane	ND	10	ND	ND	ND	36	106	ND	36	100
29V	Trichloroethylene	10	10	114	112	ND	36	107	ND	36	89
30V	Trichlorofluoromethane	BMDL	10	ND	ND	ND	36	101	ND	36	92
31V	Vinyl chloride	ND	10	121	115	ND	36	86	ND	36	75
18V	trans-1,3-Dichloropropylene	ND	10	ND	ND	ND	36	101	ND	36	88

A EPA published Method Detection Limit.

B Recovery normally variable using EPA Protocol Method 624.

C Recovery low due to sample matrix interference.

001080

001080

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 5, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Acid Compounds - GC/MS Analysis Data (QR02)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G4116	RESOURCE ENGINEERING	RES27506	WFR1	841212		

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/l	MDL ug/l *	First ug/l	Second ug/l	Blank Data ug/l	Concen. Added ug/l	% Recov	Unspiked Sample ug/l	Concen Added ug/l	% Recov
1A	2-Chlorophenol	ND	25	ND	ND	ND	150	82	ND	150	90
2A	2,4-Dichlorophenol	ND	25	ND	ND	ND	150	79	ND	150	83
3A	2,4-Dimethylphenol	ND	25	1	1	ND	150	88	ND	150	81
4A	4,6-Dinitro-o-cresol	ND	250	ND	ND	ND	250	90	ND	250	95
5A	2,4-Dinitrophenol	ND	250	ND	ND	ND	250	107	ND	250	118
6A	2-Nitrophenol	ND	25	5	4	ND	150	90	ND	150	73
7A	4-Nitrophenol	ND	25	ND	ND	ND	150	35•	ND	150	50•
8A	p-Chloro-m-cresol	ND	25	ND	ND	ND	150	114	ND	150	87
9A	Pentachlorophenol	BMDL	25	ND	ND	ND	150	82	ND	150	75
10A	Phenol	ND	25	45	42	ND	150	72	ND	150	85
11A	2,4,6-Trichlorophenol	ND	25	1	1	ND	150	97	ND	150	98

* EPA published Method Detection Limit.

• Recovery normally low using EPA Protocol Method 625.

001081

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 13 1985

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 Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G4116	RESOURCE ENGINEERING	RES27506	WFR1	841212		

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/l	MDL ug/l	First ug/l	Second ug/l	Blank Data ug/l	Concen. Added ug/l	% Recov	Unspiked Sample ug/l	Concen Added ug/l	% Recov
1B	Acenaphthene	ND	10	ND	ND	ND	100	90	ND	100	92
2B	Acenaphthylene	ND	10	ND	ND	ND	100	88	ND	100	93
3B	Anthracene	ND	10	ND	ND	ND	100	92	ND	100	92
4B	Benzidine	ND	10	ND	ND	ND	100	32*	ND	100	58*
5B	Benzo(a)anthracene	ND	10	ND	ND	ND	100	90	ND	100	90
6B	Benzo(a)pyrene	ND	10	ND	ND	ND	100	84	ND	100	92
7B	Benzo(b)fluoroanthene	ND	10	ND	ND	ND	100	79	ND	100	92
8B	Benzo(ghi)perylene	ND	10	ND	ND	ND	0	-	ND	0	-
9B	Benzo(k)fluoranthene	ND	10	ND	ND	ND	100	90	ND	100	87
10B	bis(2-Chloroethoxy)methane	ND	10	ND	ND	ND	100	88	ND	100	96
11B	bis(2-Chloroethyl) ether	ND	10	ND	ND	ND	100	88	ND	100	91
12B	bis(2-Chloroisopropyl)ether	ND	10	ND	ND	ND	100	89	ND	100	95
13B	bis(2-Ethylhexyl)phthalate	ND	10	ND	ND	ND	100	84	ND	100	94
14B	4-Bromophenyl phenyl ether	ND	10	ND	ND	ND	100	91	ND	100	84
15B	Butyl benzyl phthalate	ND	10	ND	ND	ND	100	80	ND	100	80
16B	2-Chloronaphthalene	ND	10	ND	ND	ND	100	84	ND	100	89
17B	4-Chlorophe l phenyl ether	ND	10	ND	ND	ND	100	89	ND	100	95
18B	Chrysene	ND	10	ND	ND	ND	100	90	ND	100	90
19B	Dibenzo(a,h)anthracene	ND	10	ND	ND	ND	0	-	ND	0	-
20B	1,2-Dichlorobenzene	ND	10	ND	ND	ND	100	82	ND	100	88
21B	1,3-Dichlorobenzene	ND	10	ND	ND	ND	100	75	ND	100	81
22B	1,4-Dichlorobenzene	ND	10	ND	ND	ND	100	80	ND	100	80
23B	3,3'-Dichlorobenzidine	ND	10	ND	ND	ND	100	55	ND	100	64
24B	Diethyl phthalate	ND	10	ND	ND	ND	100	9*	ND	100	15*
25B	Dimethyl phthalate	ND	10	ND	ND	ND	100	10*	ND	100	11*
26B	Di-n-butyl phthalate	ND	10	ND	ND	ND	100	69	ND	100	86
27B	2,4-Dinitrotoluene	ND	10	ND	ND	ND	100	102	ND	100	127
28B	2,6-Dinitrotoluene	ND	10	ND	ND	ND	100	112	ND	100	1[illegible]
29B	Di-n-octyl phthalate	ND	10	ND	ND	ND	100	75	ND	100	9[illegible]
30B	1,2-Diphenylhydrazine	ND	10	ND	ND	ND	100	91	ND	100	101
31B	Fluoranthene	ND	10	ND	ND	ND	100	78	ND	100	95
32B	Fluorene	ND	10	ND	ND	ND	100	86	ND	100	93

001082

001082

JAN 13, 1985

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 Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G4116	RESOURCE ENGINEERING	RES27506	WFR1	841212		

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/l	MDL ug/l A	First ug/l	Second ug/l	Blank Data ug/l	Concen. Added ug/l	% Recov	Unspiked Sample ug/l	Concen Added ug/l	% Recov
33B	Hexachlorobenzene	ND	10	ND	ND	ND	100	93	ND	100	85
34B	Hexachlorobutadiene	ND	10	ND	ND	ND	100	64	ND	100	72
35B	Hexachlorocyclopentadiene	ND	10	ND	ND	ND	0	-	ND	0	-
36B	Hexachloroethane	ND	10	ND	ND	ND	100	60	ND	100	70
37B	Indeno(1,2,3-c,d)pyrene	ND	10	ND	ND	ND	0	-	ND	0	-
38B	Isophorone	ND	10	ND	ND	ND	100	96	ND	100	100
39B	Naphthalene	BMDL	10	ND	ND	ND	100	85	ND	100	89
40B	Nitrobenzene	ND	10	ND	ND	ND	100	91	ND	100	93
41B	N-Nitrosodimethylamine	ND	10	ND	ND	ND	0	-	ND	0	-
42B	N-Nitrosodi-n-propylamine	ND	10	ND	ND	ND	100	95	ND	100	97
43B	N-Nitrosodiphenylamine	ND	10	ND	ND	ND	100	92	ND	100	106
44B	Phenanthrene	ND	10	ND	ND	ND	100	90	ND	100	91
45B	Pyrene	ND	10	ND	ND	ND	100	78	ND	100	95
46B	1,2,4-Trichlorobenzene	ND	10	ND	ND	ND	100	135C	ND	100	191C

A EPA published Method Detection Limit.

B Recovery normally low using EPA Protocol Method 625.

C Recovery normally variable using EPA Protocol Method 625.

001083

ETC ENVIRONMENTAL TESTING and CERTIFICATION

JAN 13, 1985

TABLE 1: QUANTITATIVE RESULTS and QUALITY ASSURANCE DATA

Pesticide/PCB Compounds - GC/MS Analysis Data (QR04)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G4115	RESOURCE ENGINEERING	RES27506	WFR1	841212		

NPDES Number	Compound	Results		QC Replicate		QC Blank and Spiked Blank			QC Matrix Spike		
		Sample Concen. ug/l	MDL ug/l a	First ug/l	Second ug/l	Blank Data ug/l	Concen. Added ug/l	% Recov a	Unspiked Sample ug/l	Concen Added ug/l	% Recov a
1P	Aldrin	ND	10	ND	ND	ND	100	84	ND	100	49
2P	Alpha-BHC	ND	10	ND	ND	ND	100	17	ND	100	35
3P	Beta-BHC	ND	10	ND	ND	ND	100	68	ND	100	81
4P	Gamma-BHC	ND	10	ND	ND	ND	100	20	ND	100	41
5P	Delta-BHC	ND	10	ND	ND	ND	100	27	ND	100	14
6P	Chlordane	ND	10	ND	ND	ND	200	38	ND	200	67
7P	4,4'-DDT	ND	10	ND	ND	ND	100	79	ND	100	41
8P	4,4'-DDE	ND	10	ND	ND	ND	100	88	ND	100	39
9P	4,4'-DDD	ND	10	ND	ND	ND	100	94	ND	100	62
10P	Dieldrin	ND	10	ND	ND	ND	100	94	ND	100	76
11P	Endosulfan I	ND	10	ND	ND	ND	100	24	ND	100	25
12P	Endosulfan II	ND	10	ND	ND	ND	100	26	ND	100	21
13P	Endosulfan sulfate	ND	10	ND	ND	ND	100	54	ND	100	64
14P	Endrin	ND	10	ND	ND	ND	100	22	ND	100	74
15P	Endrin aldehyde	ND	10	ND	ND	ND	100	38	ND	100	20
16P	Heptachlor	ND	10	ND	ND	ND	100	87	ND	100	63
17P	Heptachlor epoxide	ND	10	ND	ND	ND	100	88	ND	100	77
18P	PCB-1242	ND	10	ND	ND	ND	0	-	ND	0	-
19P	PCB-1254	ND	10	ND	ND	ND	0	-	ND	0	-
20P	PCB-1221	ND	10	ND	ND	ND	0	-	ND	0	-
21P	PCB-1232	ND	10	ND	ND	ND	0	-	ND	0	-
22P	PCB-1248	ND	10	ND	ND	ND	0	-	ND	0	-
23P	PCB-1260	ND	10	ND	ND	ND	100	30	ND	100	41
24P	PCB-1016	ND	10	ND	ND	ND	0	-	ND	0	-
25P	Toxaphene	ND	10	ND	ND	ND	0	-	ND	0	-

a EPA published Method Detection Limit.

b Recovery normally variable using EPA Protocol Method 625.

001084

001084

January 13, 1985

TABLE 1: QUALITATIVE RESULTS

Tentatively Identified Organic Compounds - GC/MS Analysis Data - Volatile Fraction (QR06)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G4116	RESOURCE ENGINEERING	RES27506	WFR1	841212		

Compound Name	Data			Identifiers				
	Scan Number	Retention Time (Min)	M W	CAS Number	Empirical Formula	Estim Concen. ug/l		
1 None identified	119	5 68	-	-	-	-		
2 None identified	162	7.34	-	-	-	-		
3 None identified	185	8.24	-	-	-	-		
4 1-Propene, 1-methoxy	223	9.71	72	7319166	C_4H_8O	2588		
5 None identified	238	10.29	-	-	-	-		
6 2-Butanone (MEK)	277	11.80	72	78933	C_4H_8O	2225		
7 None identified	299	12.66	-	-	-	-		
8 None identified	309	13.04	-	-	-	-		
9 2H-Pyran, tetrahydro-3-methyl	460	18.90	100	26093630	$C_6H_{12}O$	5 4		
10 Unknown peak	473	19.40	-	-	-	214		
11 Unknown peak	491	20.10	-	-	-	8		
12 Benzene-ethyl-	639	25.83	106	100414	C_8H_{10}	10		

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ETC ENVIRONMENTAL TESTING and CERTIFICATION

January 7, 1985

TABLE 1: QUALITATIVE RESULTS

Tentatively Identified Organic Compounds – GC/MS Analysis Data – Acid Fraction (QR07)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G4116	RESOURCE ENGINEERING	RES27506	WFR1	121284		

Compound Name	Data			Identifiers				
	Scan Number	Retention Time (Min)	M.W.	CAS Number	Empirical Formula	Estim. Concen. ug/l		
1 2-Hexen-1-ol	45	3.9	100	928949	$C_6H_{12}O$	28		
2 None identified	151	-	-	-				

001086

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ETC ENVIRONMENTAL TESTING and CERTIFICATION

January 13, 1985

TABLE 1: QUALITATIVE RESULTS

Tentatively Identified Organic Compounds - GC/MS Analysis Data - Base/Neutral Fraction (QR08)

Chain of Custody Data Required for ETC Data Management Summary Reports

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours
G4116	RESOURCE ENGINEERING	RES27506	WFR1	841212		

Compound Name	Data			Identifiers		
	Scan Number	Retention Time (Min)	M.W.	CAS Number	Empirical Formula	Estimated Concen. ug/l
1 Methyl-benzene	13	2 96	92	108883	C_7H_8	9
2 Unknown	71	3 99	-	-	-	47
3 2-Hexen-1-ol	92	4.36	100	928949	$C_6H_{12}O$	171
4 Cyclohexanol	95	4 42	100	108930	$C_6H_{12}O$	11
5 2-Cyclohexen-1-one	130	5 04	96	930687	C_6H_8O	11
6 none identified	418	10 14	-	-	-	10

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ETC ENVIRONMENTAL TESTING and CERTIFICATION

January 12, 1985

TABLE 2: METHOD PERFORMANCE DATA

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ETC ENVIRONMENTAL TESTING and CERTIFICATION

January 12, 1985

TABLE 2: METHOD PERFORMANCE DATA

Surrogate Recovery Water- GC/MS Data (QR20)

Chain of Custody Data Required for ETC Data Management Summary Reports

G4116

ETC Sample No.	Company	Facility	Sample Point	Date	Time	Elapsed Hours

Compound	Amount Added ug	% Recovery	Control Limits *	
			Lower	Upper
VOLATILE FRACTION				
Toluene-D8	250	106	86	119
Bromofluorobenzene	250	105	85	121
1,2-Dichloroethane-D4	250	88	77	120
ACID FRACTION				
Phenol-D5	100	30	15	103
2-Fluorophenol	100	66	23	121
2,4,6-Tribromophenol	100	81	10	130
BASE/NEUTRAL FRACTION				
Nitrobenzene-D5	50	72	41	120
2-Fluorobiphenyl	50	80	44	119
Terphenyl-D14	50	63	33	128

* IFB EPA Control Limits.

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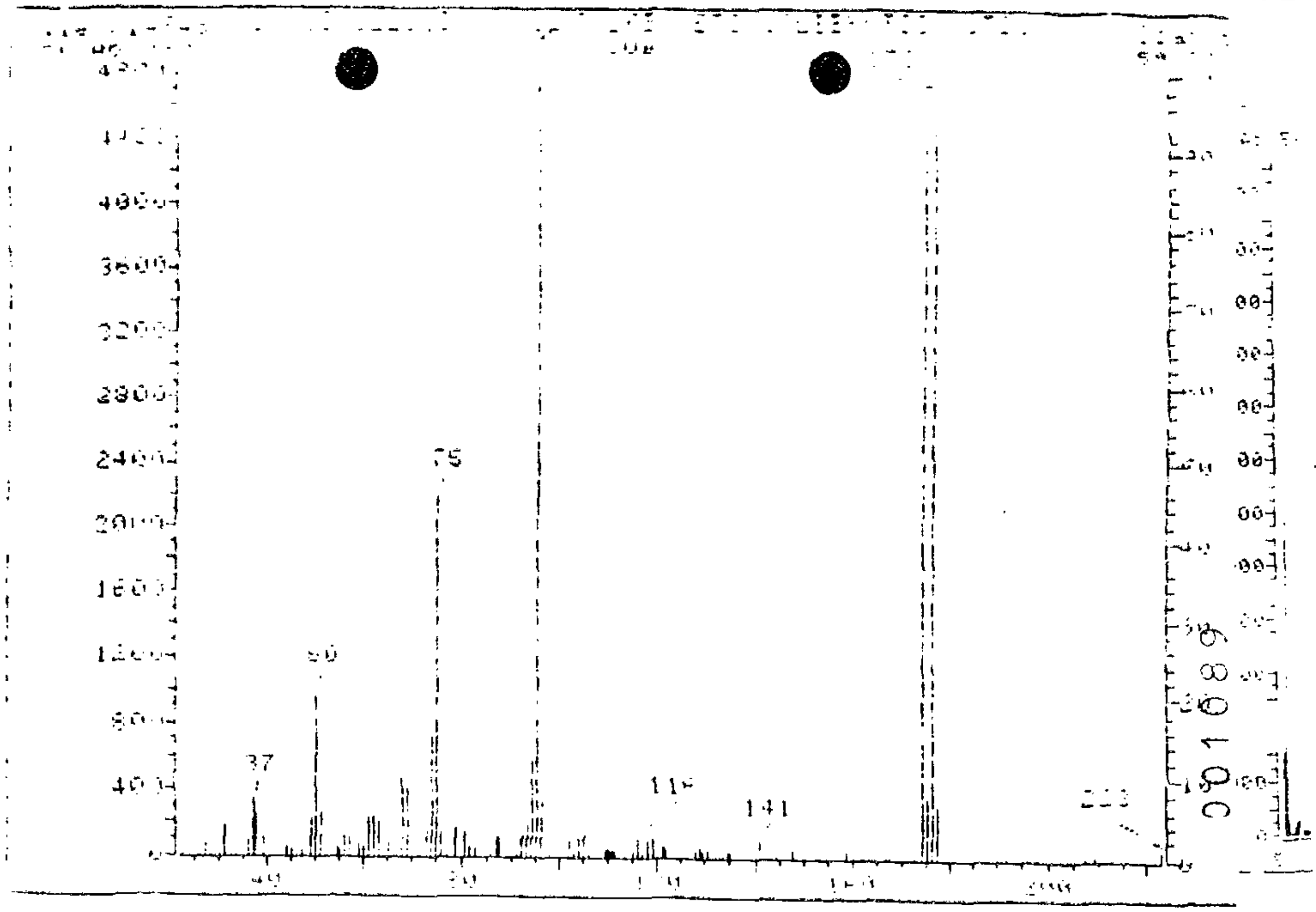
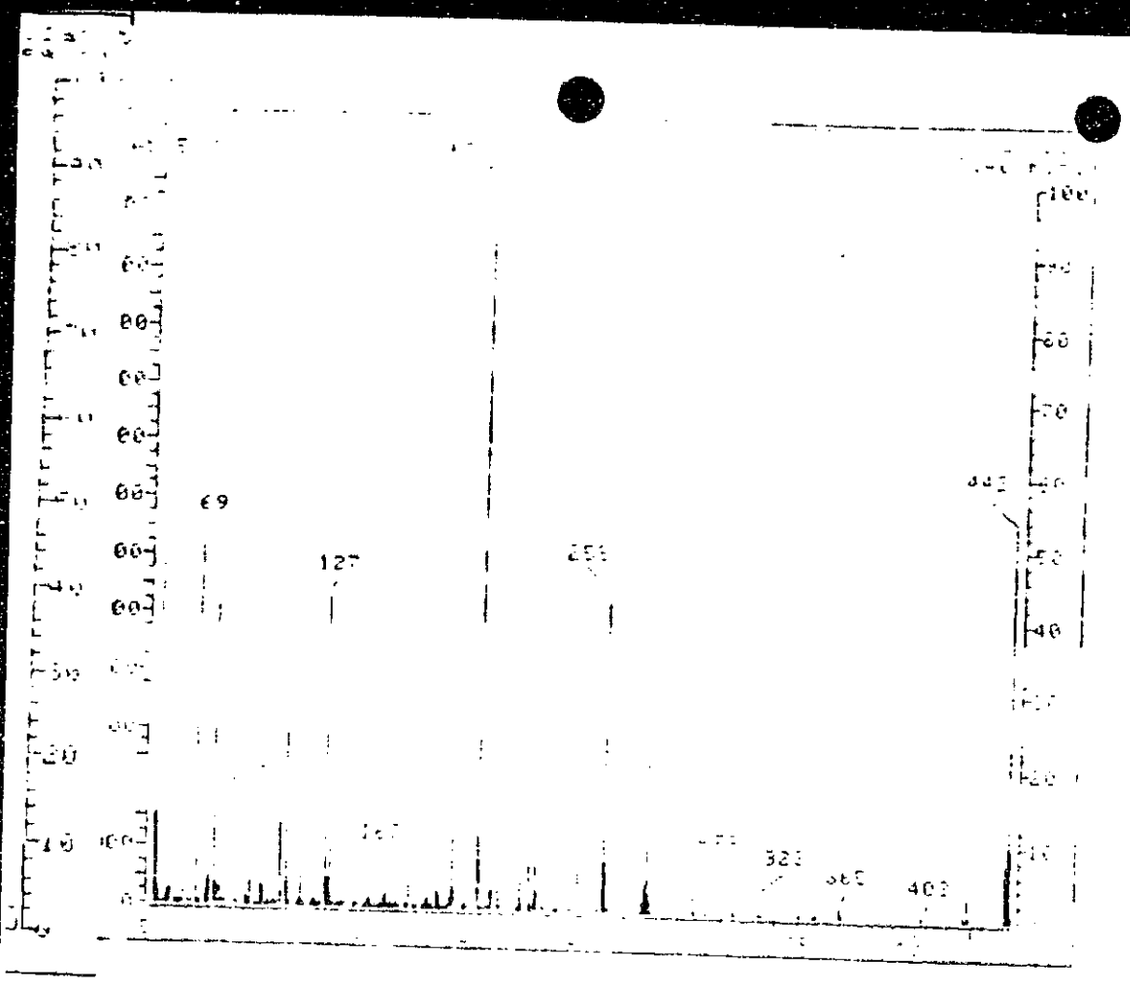


TABLE [illegible] METHOD PERFORMANCE DATA (BFB[illegible])

[illegible] Tuning [illegible] Bromofluorobenzene (BFB) for Volatile Analysis

m/e	Ion Abundance Criteria	% Relative Abundance Base Peak	% Relative Abundance Appropriate Peak	[illegible]
[illegible]	[illegible] of mass 95	[illegible]	[illegible]	OK
[illegible]	[illegible]% of mass 95	[illegible]	[illegible]	OK
95	Base peak, 100% relative abundance	100.00	100.00	OK
96	5-9% of mass 95	[illegible]	[illegible]	OK
173	Less than 1% of mass 95	0.00	0.00	OK
174	Greater than 50% of mass 95	[illegible]	[illegible]	OK
175	5-9% of mass 174	[illegible] 97	8.[illegible]	OK
176	95-101% of mass 174	[illegible]	100.1[illegible]	OK
177	5-9% of mass 176	[illegible] 56	[illegible]	OK

Injection Date: 12/26/84 Analyst: J. Martin
Injection Time: 06:20 Reference: [illegible] AO
Run No: [illegible]546 QC Batch: QV 2649
Spectrum No: 56 Samples: G1891, G4220-G4224, G4116, G1879, G1892, G1905, G1909



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...BFB PERFORMANCE DATA (DFTPP)

	% Relative Abundance	
	Base Peak	Acceptable Range
Less than 30% of mass 198	46.2	46.2
Base peak, 100% relative abundance	100.0	100.0
5-9% of mass 198	6.66	6.66
10-30% of mass 198	21.22	21.22
Less than mass 443	7.09	78.16
Greater than 40% of mass 443	9.79	18.32

Injection Date: [illegible]

Run No: F6271

Spectrum #: 275

Analyst: Tom Mascuso
Patricia Cleary

QC Batch: QA2525

Samples: G2806, G3682, G3215, G4116, G0668, G0669, G0672, G0673, G1654

KB

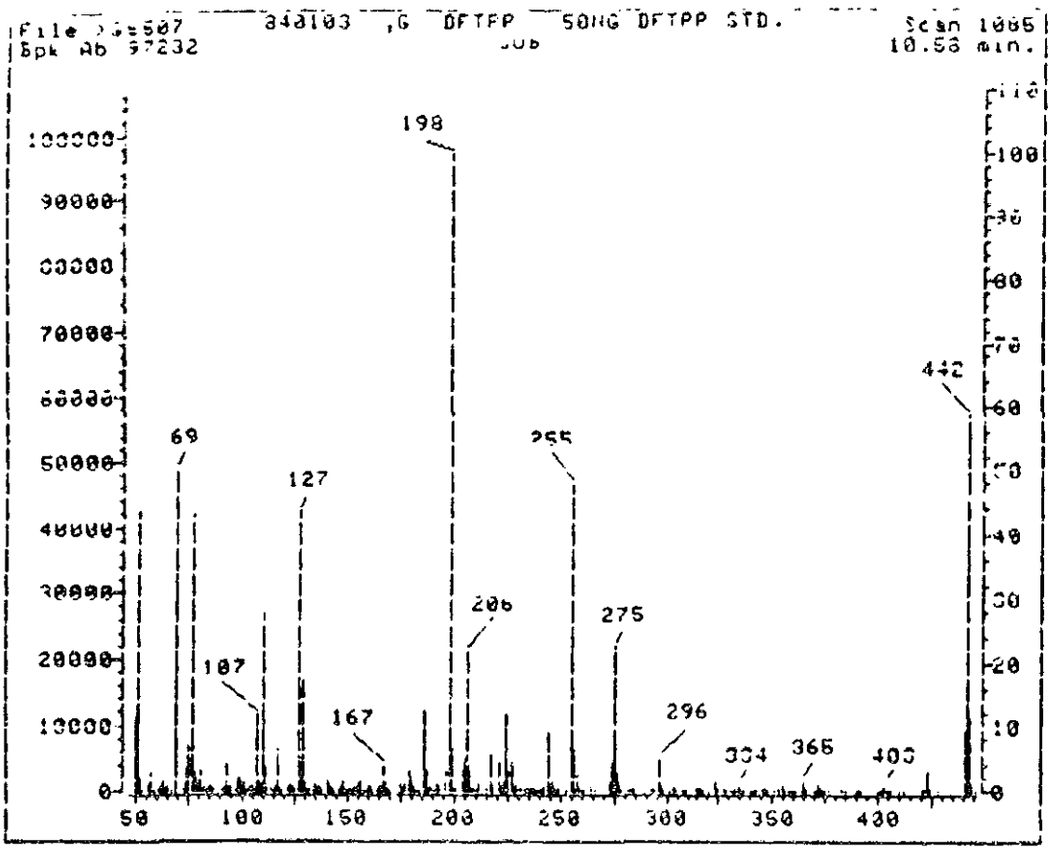

TABLE 2: METHOD PERFORMANCE DATA (WR23)

GC/MS Tuning Data - Decafluorotriphenylphospine (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	43.63	43.63	Ok
68	Less than 2% of mass 69	0.00	0.00	Ok
69	(reference only)	50.39	50.39	Ok
70	Less than 2% of mass 69	0.00	0.00	Ok
127	40-60% of mass 198	43.63	43.63	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	6.62	6.62	Ok
275	10-30% of mass 198	22.45	22.45	Ok
365	Greater than 1% of mass 198	2.06	2.06	Ok
441	Less than mass 443	9.68	83.91	Ok
442	Greater than 40% of mass 198	98.67	98.67	Ok
443	17-23% of mass 442	11.53	19.65	Ok

Injection Date: 01/03/89 Analyst: [signature]
Injection Time: 17:49 Processor: [signature]
Run No: >G6507 GC Batch: GB2525
Spectrum No: 1085 Samples: G0669, G0672, G0673, G1654, F9
G1019, F9625, F9626, G3692, G32
G4116, G0668

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 electronic library. After review, the identifications are included in a separate tabulation and labeled "tentatively identified".

Volatile Priority Pollutant Compounds

For the analysis of volatile priority pollutants, EPA Method 624 (Federal Register, December 3, 1979, page 69532) was used. The method can be summarized as follows: Methylene chloride is added to [illegible] temperature. The purgeable volatile organic compounds are transferred from the aqueous phase to the vapor phase. The vapor is swept through a sorbent column where the organic components are trapped. After the purge cycle is complete, the sorbent column is heated and backflushed with helium to desorb the organic purgeables onto a gas chromatographic column. The gas chromatograph is temperature programmed to separate the purgeable mixture. The separated purgeable components are then identified and quantitated using a computerized mass spectrometer.

Acid, Base/Neutral and Pesticide Priority Pollutant Compounds

For the analysis of the Acid, Base/Neutral and Pesticide priority pollutants in an aqueous sample matrix, EPA Method 625 (Federal Register, December 3, 1979, page 69540) was used. The method can be summarized as follows: A measured volume of sample, approximately 1 liter, is adjusted to pH [illegible] and extracted with methylene chloride. The pH of the sample is adjusted to a value less than 2 and extracted with an aliquot of fresh methylene chloride. A separatory funnel or continuous extractor is used to perform the extractions. The two extracts are dried and concentrated to a 1 ml final volume. Each extract is injected into a GC/MS instrument that has been configured for the correct fraction.

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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, pp. 69532-69559);
- "Manual of Analytical Methods for the Analysis of Pesticides in Humans and Environmental Samples," EPA 600/8-80-038, June 1980; and
- "Determination of 2,3,7,8-TCDD in Soil and Sediment" EPA, Region VII, Kansas City, September 1983

Organic Analysis Multimedia, Multi Concentration-IFB WA84-A267

- 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 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.

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- Three surrogate compounds are added to each sample in the batch for Base/Neutral 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 20 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 anayises;
- 2 Replicate spikes;
- 2 Replicate independent reference standards;
- 10 Calibration standards (processed using the sample preparation 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 20 samples) consists of analyzing one blank, one spiked blank, one duplicate and spiked sample every 20 samples, and an unknown 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.

001096

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 320/322 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 1.0 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 subcontractor 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.

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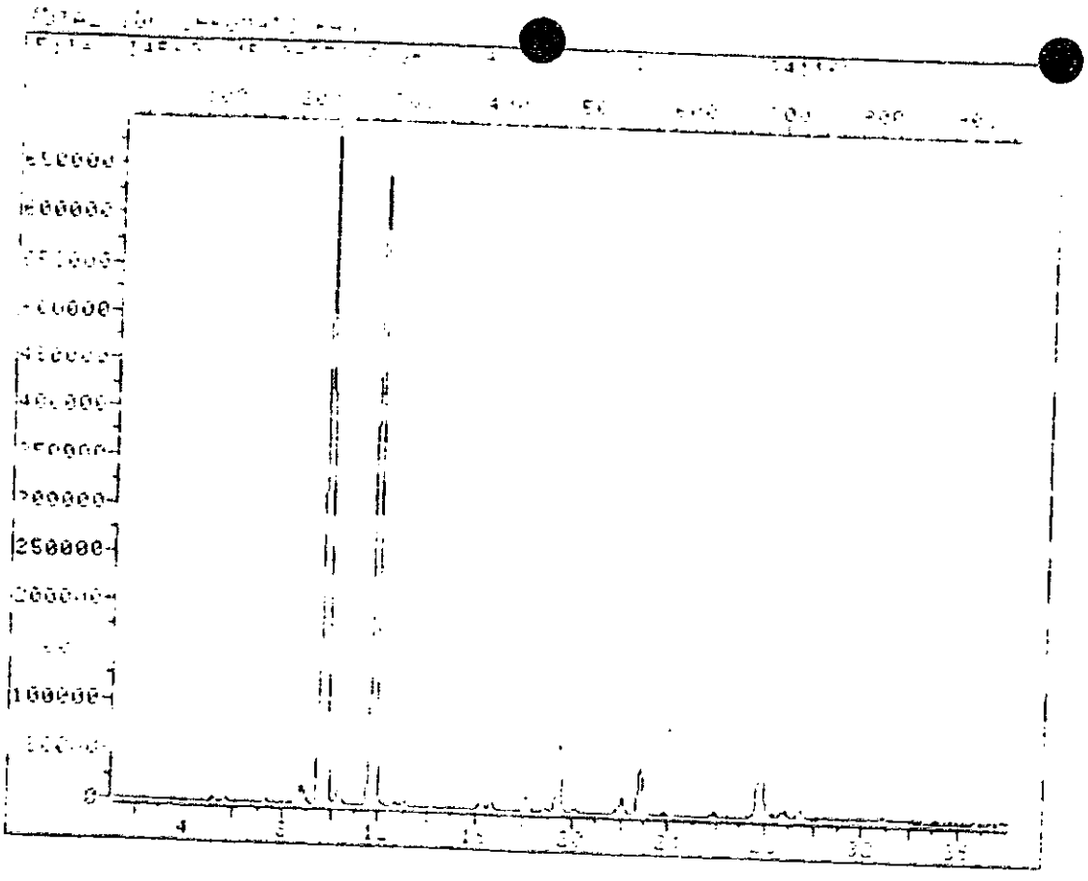
Appendix A

Mass Spectral Data
for
Quantitated Compounds

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

2) A mass spectrum and a reference spectrum for each priority pollutant compound detected in the sample



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Last [illegible]

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[illegible]

[illegible]

File: [illegible]	[illegible]
: 84122[illegible]	Injected at: 84122[illegible]
: [illegible]	[illegible] Factor: [illegible]

[illegible]: [illegible]
[illegible]e: IDFILE, PURGEABLE PRIORITY POLLUTANTS, [illegible]
Calibration, 84122[illegible]

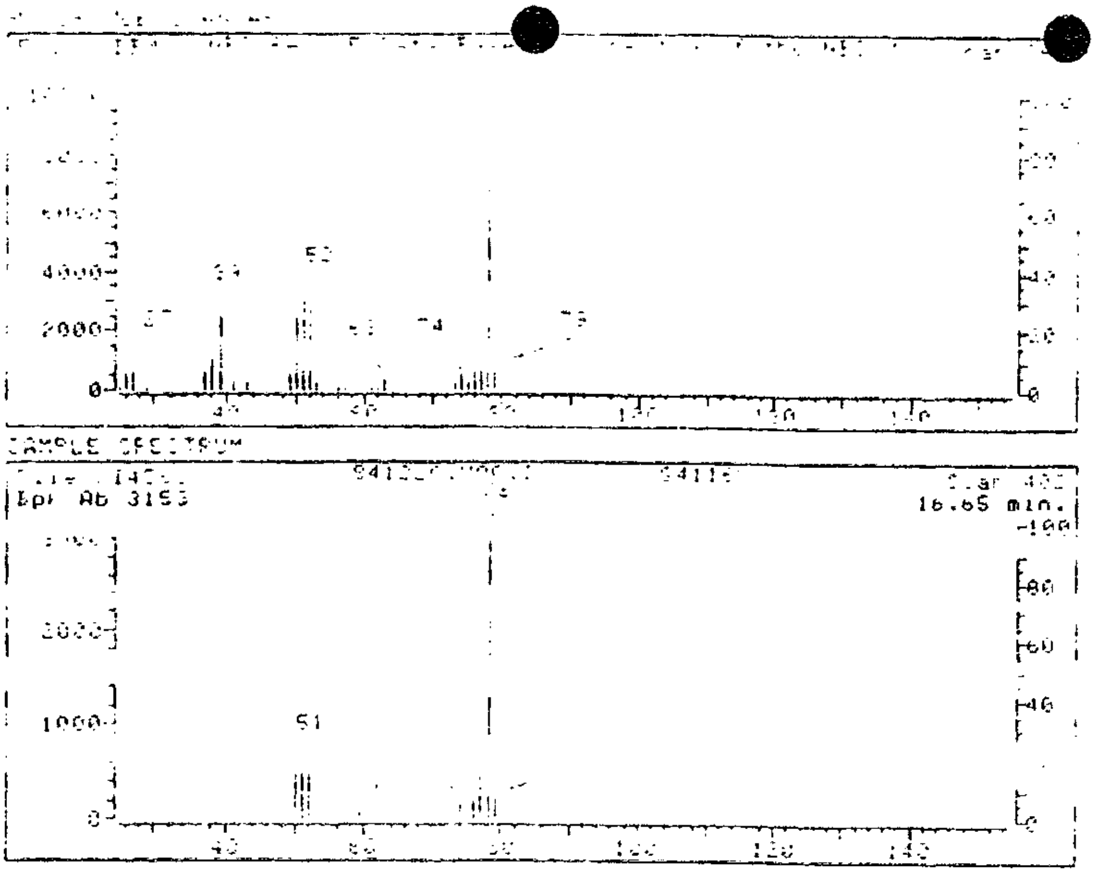
Compound	R.T.	Scan#	Area	Conc	Units
*2-Bromo-1-chloropropane	10.12	440	38356	200.00	NG
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	NG
Carbon tetrachloride	12.97	307	865	~~3.79~~	~~NG~~
[illegible]	[illegible]	[illegible]	[illegible]	~~[illegible]~~	
Chloroethane	7.26	[illegible]	[illegible]	1.59	NG
[illegible]	[illegible]	[illegible]	[illegible]	~~[illegible]~~	
1,2-Dichloroethane	11.9[illegible]	280	2724	~~12.27~~	~~NG~~
1,1-Dichloroethylene	[illegible]	18[illegible]	[illegible]	~~[illegible]~~	~~NG~~
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	
Tetrachloroethylene	21.8[illegible]	[illegible]	428[illegible]	22.3[illegible]	NG
Toluene	22.7[illegible]	56[illegible]	33197	[illegible]	NG
1,2-Trans-dichloroethylene	[illegible]	241	174[illegible]	~~[illegible]~~	
1,1,1-Trichloroethane	[illegible]	[illegible]	[illegible]	~~[illegible]~~	
Trichloroethene	[illegible]	[illegible]	[illegible]	[illegible]	NG
Trichlorofluoromethane	[illegible]	[illegible]	[illegible]	[illegible]	NG
meta-xylene	[illegible]	[illegible]	[illegible]	[illegible]	NG
meta-xylene	[illegible]	[illegible]	1[illegible]4[illegible]	~~[illegible]~~	
ortho- and para-xylenes	[illegible]	[illegible]	[illegible]	[illegible]	
1,2-Dichloroethane-D4	[illegible]	[illegible]	1[illegible]	[illegible]	NG
Toluene-D8	[illegible].31	861	114[illegible]	264.[illegible]	NG
[illegible]-Bromofluorobenzene	[illegible]	[illegible]	[illegible]	[illegible]	NG
*1,4-Dichlorobutane	[illegible]	[illegible]	[illegible]41[illegible]	[illegible]	[illegible]

-26=20

-11=66

[illegible]

001100



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Misc: [illegible]

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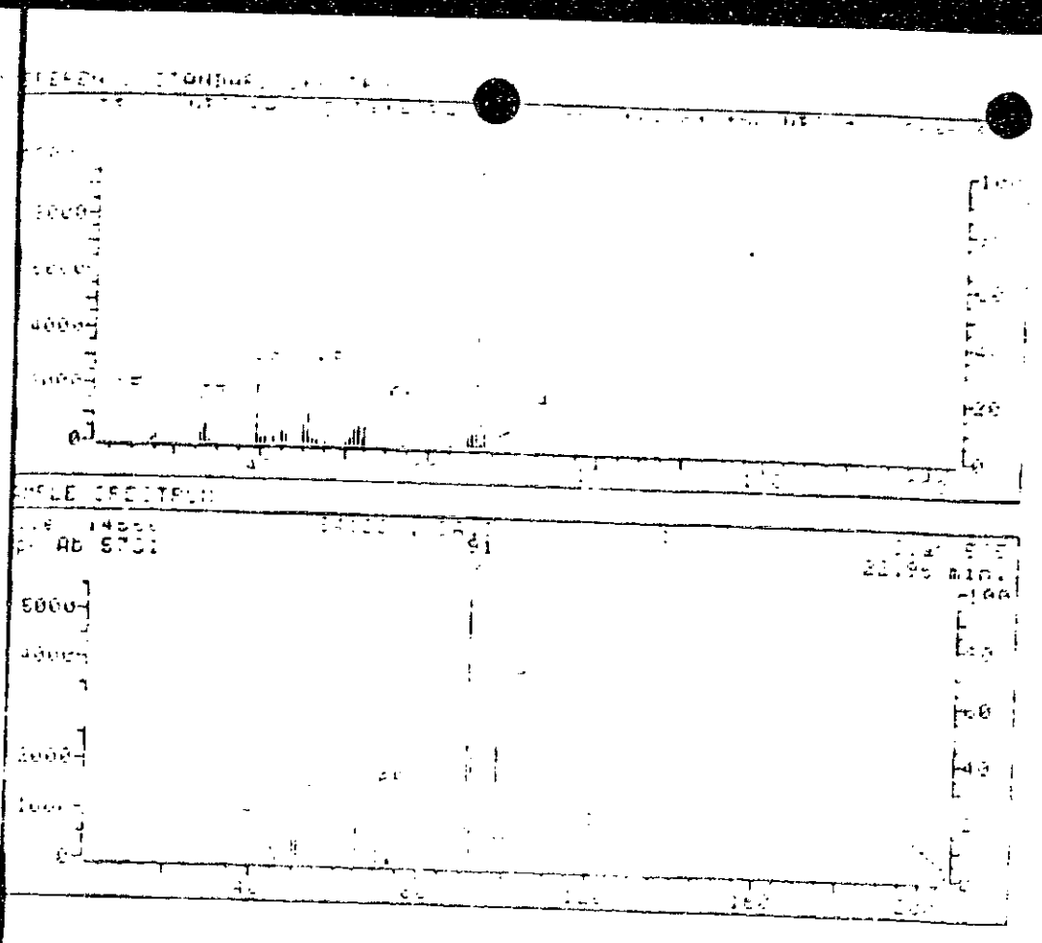
Area: [illegible]
Concentration: [illegible]



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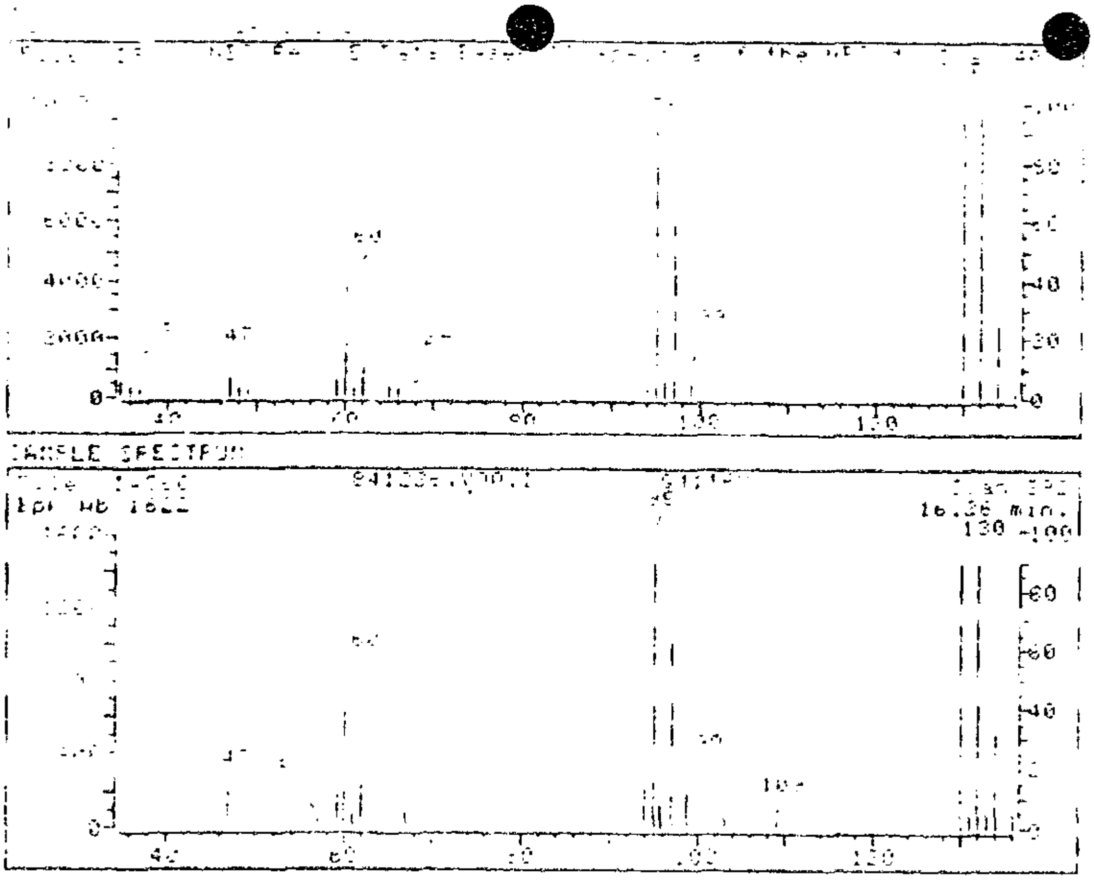
Misc: Gallic

Compound [illegible]
Std [illegible]
Retention Time: [illegible]
Area [illegible]
Concentration: [illegible]

001102

001102



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Misc: 84110[illegible]

Compound Name: [illegible]
Scan Number: 39[illegible]
Retention Time: 16.2[illegible] min.
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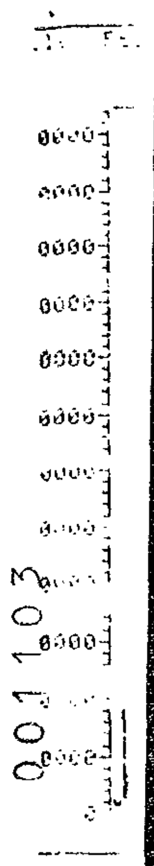
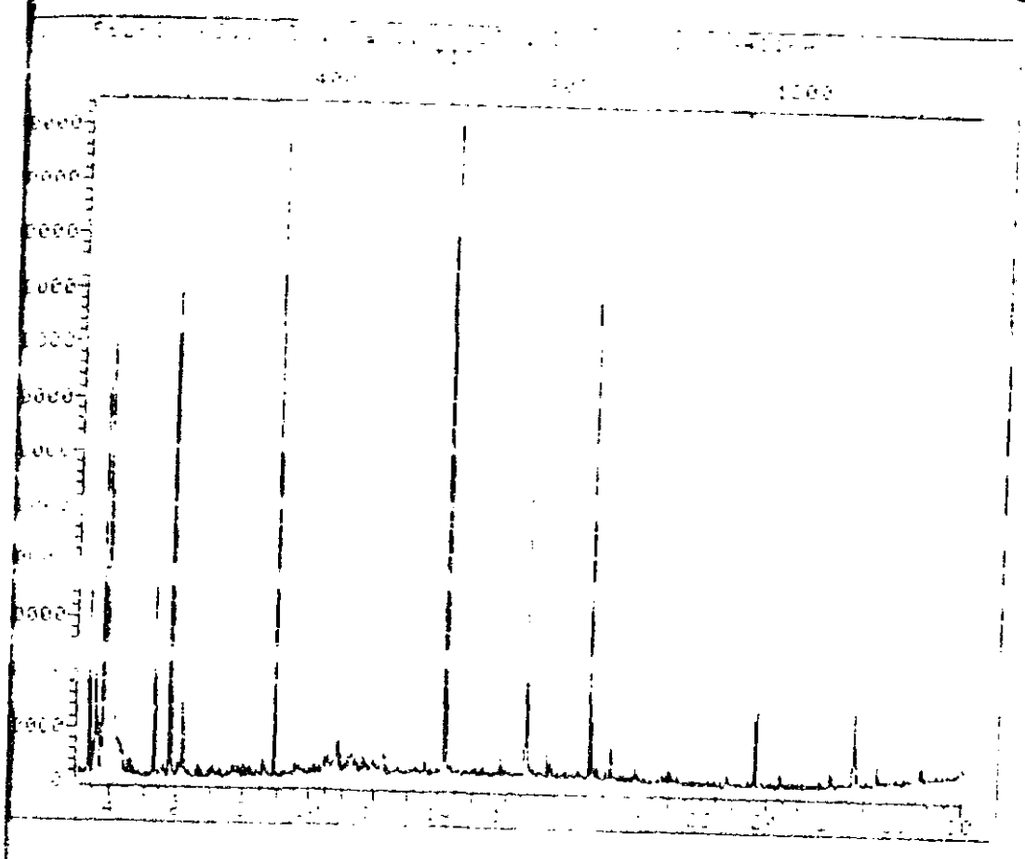
Concentration: 51.4[illegible] ng



001103



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Title: [illegible]

Operator ID: [illegible]
Start Time: [illegible]

001104

001104

Data File: F6[illegible]
[illegible]: 841231. [illegible]
[illegible]

F 366BF

[illegible] Dilution Factor: [illegible]

[illegible]

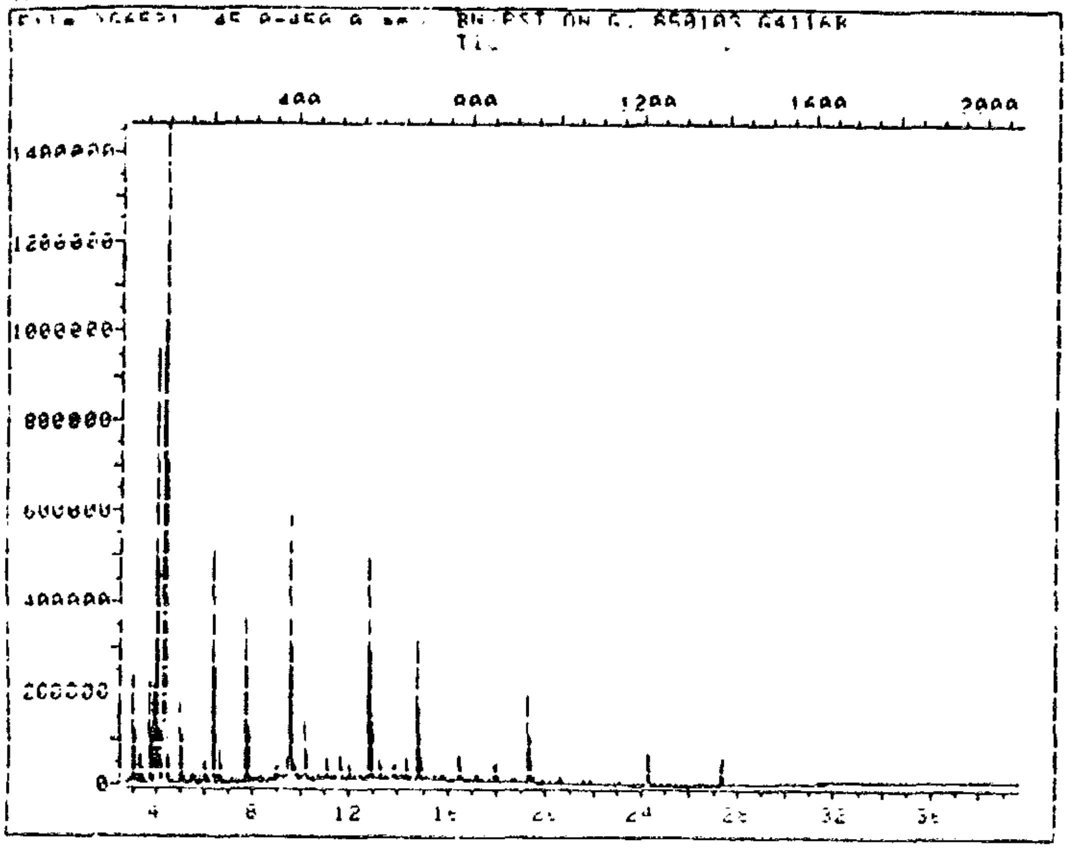
ID File: [illegible]ACID
Title: ACID IDFILE [illegible]
Last Calibration: 841231 12:01

	Compound	R.T.	Scan#	Area	Conc	Units
1)	*d4-1,4-Dichlorobenzene	5.74	150	224432	40.00	UG/ML
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
3)	2-Fluorophenol	3.7[illegible]	41	803[illegible]	[illegible]	UG/ML
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
6)	Phenol-D5	5.26	123	136695	[illegible]	UG/ML
[illegible]	Phenol-D5	[illegible]	1[illegible]1	1[illegible]	.[illegible]	[illegible]
[illegible]	*d8-Naphthalene	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
8)	2,4-Dichlorophenol	7.87	269	203	.05	UG/ML
9)	2,4-Dimethylphenol	8.25	292	389	.18	UG/ML
11)	p-Chloro-m-cresol	1[illegible].27	459	624	.17	UG/ML
12)	*d10-Acenaphthalene	14.13	619	331127	[illegible]	UG/ML
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
18)	2,4,6-Tribromophenol	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
19)	Pentachlorophenol	[illegible]	[illegible]	1384	[illegible]	UG/ML
20)	M-CHLOROPHENOL [illegible]	[illegible]	769	339	.0[illegible]	UG/ML

* Compound is ISTD

001105

TOTAL ION CHROMATOGRAM



Data File: [illegible]

Name: BN/PST [illegible]

Misc: G41165

BIL#14

Id File: GENP

Title: B/N+PEST ID FILE ....#6,11 [illegible]

Last Calibration: 850104 22:45

Operator ID: [illegible]

Quant Time: 850105 02:06

001106

Data File: [illegible] Dilution Factor: 1.00
Name: BN/Pest QA 6, 850103
Misc: Gallon BIL#14

ID File: GENP
Title: B/N+PEST ID FILE 06,11/30/84,WWC
Last Calibration: 850104 22:49

	Compound	R.T.	Scan#	Area	Conc	Units
1)	*d4-1,4-Dichlorobenzene	6.31	202	339017	40.00	UG/ML
2)	N-Nitrosodimethylamine	3.23	28	2367	[illegible]	UG/ML
2)	N-Nitrosodimethylamine	4.01	72	1012	[illegible]	UG/ML
2)	N-Nitrosodimethylamine	4.12	78	1590	[illegible]	UG/ML
2)	N-Nitrosodimethylamine	4.36	92	2341	[illegible]	
4)	1,3-Dichlorobenzene	6.35	204	2279	[illegible]	UG/ML
5)	1,4-Dichlorobenzene	6.35	204	2279	[illegible]	UG/ML
6)	1,2-Dichlorobenzene	6.35	204	2279	[illegible]	UG/ML
7)	Nitrobenzene-d5	7.70	268	266263	[illegible]	
7)	Nitrobenzene-d5	8.03	299	1133	[illegible]	UG/ML
7)	Nitrobenzene-d5	8.35	317	1289	[illegible]	UG/ML
8)	bis(2-Chloroisopropyl)ether	6.01	185	4891	[illegible]	UG/ML
8)	bis(2-Chloroisopropyl)ether	6.33	203	9286	[illegible]	UG/ML
8)	bis(2-Chloroisopropyl)ether	6.53	214	3727	[illegible]	UG/ML
8)	bis(2-Chloroisopropyl)ether	8.07	301	4044	[illegible]	UG/ML
9)	*d8-Naphthalene	9.51	382	633373	40.00	UG/ML
10)	2-Fluorobiphenyl	12.84	570	371318	[illegible]	UG/ML
11)	1-Fluoronaphthalene	9.49	381	803	[illegible]	UG/ML
11)	1-Fluoronaphthalene	10.13	417	1666	[illegible]	UG/ML
12)	N-Nitrosodi-n-propylamine	7.70	280	38571	[illegible]	UG/ML
14)	Nitrobenzene	[illegible]	[illegible]	[illegible]	[illegible]	
14)	Nitrobenzene	8.32	315	1691	[illegible]	UG/ML
14)	Nitrobenzene	8.46	323	782	[illegible]	UG/ML
14)	Nitrobenzene	8.99	353	224	[illegible]	UG/ML
15)	Isophorone	7.15	249	4122	[illegible]	UG/ML
15)	Isophorone	8.35	317	1285	[illegible]	UG/ML
18)	Naphthalene	8.17	307	2211	[illegible]	UG/ML
18)	Naphthalene	9.15	361	800	[illegible]	UG/ML
18)	Naphthalene	9.56	385	62322	4.37	UG/ML
18)	Naphthalene	10.06	413	496	[illegible]	UG/ML
20)	*d10-Acenaphthalene	14.78	679	211009	40.00	UG/ML
23)	Dimethyl phthalate	13.49	604	485	[illegible]	UG/ML
23)	Dimethyl phthalate	14.55	666	505	[illegible]	UG/ML
23)	Dimethyl phthalate	14.80	680	39283	[illegible]	UG/ML
23)	Dimethyl phthalate	15.24	705	714	[illegible]	UG/ML
24)	Acenaphthylene	14.32	653	70	[illegible]	UG/ML
24)	Acenaphthylene	15.00	691	508	[illegible]	UG/ML
24)	Acenaphthylene	15.21	731	223	[illegible]	UG/ML
25)	2,6-Dinitrotoluene	14.59	666	2059	[illegible]	UG/ML
25)	2,6-Dinitrotoluene	14.78	679	26941	[illegible]	UG/ML
25)	2,6-Dinitrotoluene	15.00	691	844	[illegible]	UG/ML
25)	2,6-Dinitrotoluene	15.19	702	792	[illegible]	UG/ML
26)	Acenaphthene	13.52	608	1681	[illegible]	UG/ML
26)	Acenaphthene	13.77	623	2515	[illegible]	UG/ML
26)	Acenaphthene	14.89	685	1711	[illegible]	UG/ML
26)	Acenaphthene	16.12	754	1753	[illegible]	UG/ML

* Con

	Compound	R.T.	Scan#	Area	Conc	Units
)	2,4-Dinitrotoluene	14.55	666	2039	2.52	UG/ML
)	2,4-Dinitrotoluene	14.76	676	26941	3.44	UG/ML
)	2,4-Dinitrotoluene	16.49	773	2562	3.16	UG/ML
)	2,4-Dinitrotoluene	16.76	790	1789	2.21	UG/ML
)	Diethyl phthalate	16.92	797	1967	.26	UG/ML
)	Fluorene	16.45	773	1626	.28	UG/ML
)	N-Nitrosodiphenylamine	16.45	773	424	.08	UG/ML
)	N-Nitrosodiphenylamine	16.72	788	836	.28	UG/ML
)	N-Nitrosodiphenylamine	16.82	861	766	.26	UG/ML
)	*d,0-Phenanthrene	19.24	930	225430	40.00	UG/ML
)	Phenanthrene	19.31	934	1839	.33	UG/ML
)	Anthracene	19.31	934	1839	.21	UG/ML
)	Di-n-butyl phthalate	21.50	1057	10513	1.80	UG/ML
)	Benzidine	24.26	1213	709	1.40	UG/ML
)	Alpha-BHC	17.02	805	1249	1.41	UG/ML
)	Alpha-BHC	17.39	826	724	.82	UG/ML
)	Alpha-BHC	18.15	870	925	1.00	UG/ML
)	Alpha-BHC	18.29	874	1022	1.15	UG/ML
)	Beta-BHC	18.16	870	925	1.00	UG/ML
)	Beta-BHC	18.29	874	1022	2.26	UG/ML
)	Beta-BHC	19.03	918	314	.28	UG/ML
)	Beta-BHC	19.24	958	269	.60	UG/ML
)	Gamma-BHC	18.16	870	925	1.00	UG/ML
)	Gamma-BHC	18.29	874	1022	1.40	UG/ML
)	Gamma-BHC	19.03	918	314	.43	UG/ML
)	Gamma-BHC	19.24	958	269	.32	UG/ML
)	Delta-BHC	18.29	874	1022	1.41	UG/ML
)	Delta-BHC	19.03	918	314	.52	UG/ML
)	Delta-BHC	19.24	958	269	.44	UG/ML
)	*d,2-Chrysene	27.32	1386	57235	40.00	UG/ML
)	Dieldrin	23.02	1143	414	.32	UG/ML
)	Dieldrin	23.21	1154	362	.50	UG/ML
)	Dieldrin	24.26	1213	310	.44	UG/ML
)	Dieldrin	25.29	1271	265	.37	UG/ML
)	Endrin	24.26	1213	247	2.63	UG/ML
)	Endrin	24.63	1234	230	2.45	UG/ML
)	Endrin	25.20	1266	180	1.92	UG/ML
)	Endrin aldehyde	24.26	1213	247	.95	UG/ML
)	Endrin aldehyde	24.63	1234	230	.89	UG/ML
)	Endrin aldehyde	26.46	1337	233	.89	UG/ML
)	Endrin aldehyde	26.78	1355	284	1.09	UG/ML
)	4,4'-DDT	27.32	1386	2616	4.01	UG/ML
)	Terphenyl-D14	24.26	1213	60879	31.77	UG/ML
)	Butyl benzyl phthalate	26.00	1311	183	.15	UG/ML
)	Butyl benzyl phthalate	27.16	1377	272	.22	UG/ML
)	bis(2-Ethylhexyl)phthalate	27.91	1419	3507	2.10	UG/ML
)	Di-n-octyl phthalate	29.70	1520	2214	.97	UG/ML

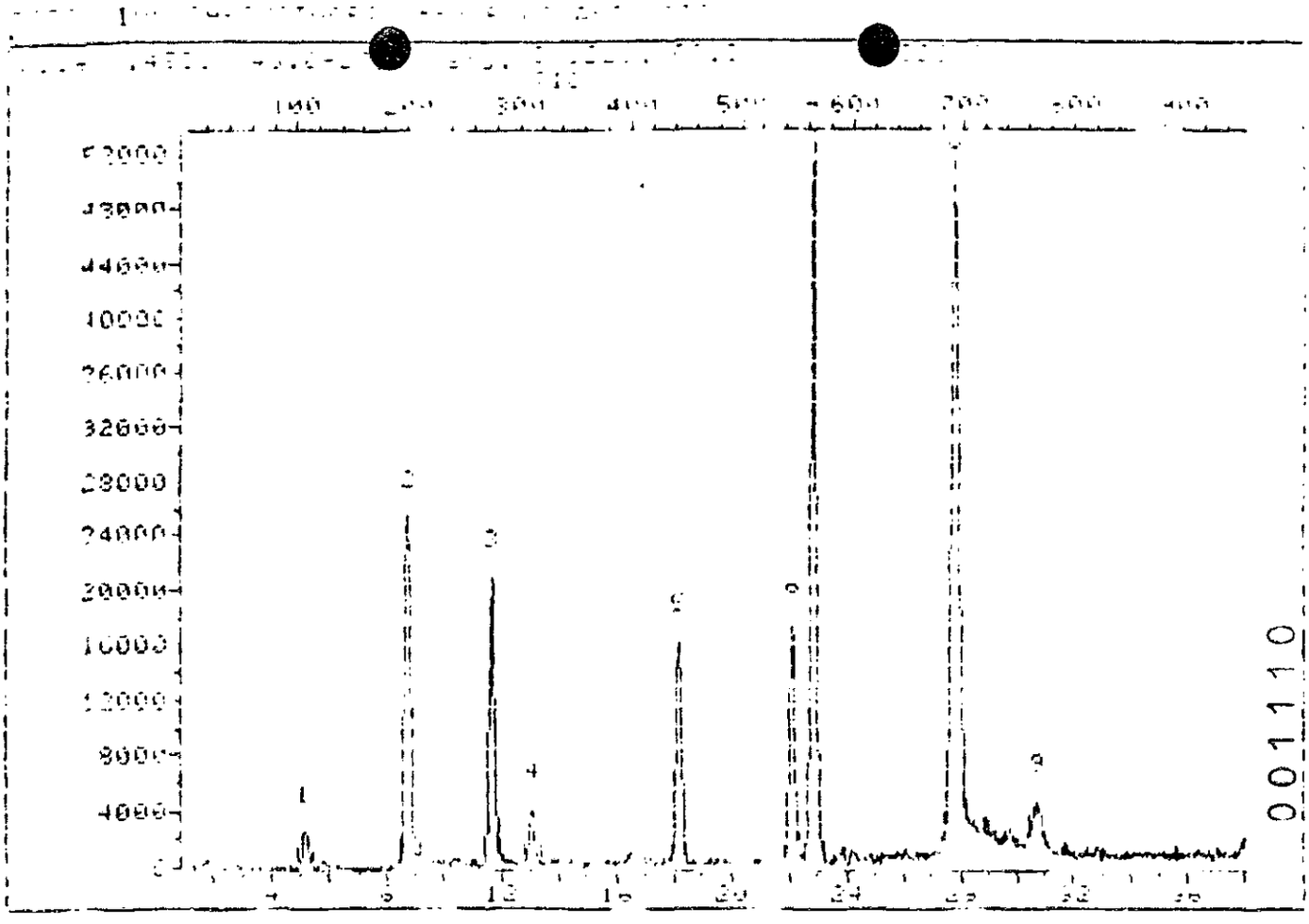
* Compound is ISTD

001108

001108

Appendix C1

GC/MS Subsidiary Data



Data File
Name
Misc Data

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[illegible]

[illegible]

Final [illegible]

[illegible] FILE: [illegible]

Last Calibration: [illegible]

	Compound	R.T.	Scan#	Area	Conc	Units
1	*Bromochloromethane	[illegible]	[illegible]	[illegible]	250.[illegible]	[illegible]
[illegible]	Carbon tetrachloride	[illegible]	703	254	~~[illegible]~~	
[illegible]	Carbon tetrachloride	[illegible]		[illegible]	~~[illegible]~~	
3	Chlorobenzene	24.14	796	1213	~~[illegible] NG~~	
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2	Toluene	23.[illegible]	[illegible]	[illegible]	[illegible]	NG
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	1,2-Dichloroethane-D4	[illegible]	377	21711	250.00	NG
[illegible]	Toluene-D8	[illegible]	[illegible]	[illegible]	251.30	NG
[illegible]	4-Bromofluorobenzene	[illegible]	[illegible]	[illegible]	[illegible]	NG
[illegible]	*1,4-Dichlorobenzene	[illegible]	[illegible]	[illegible]	250.00	NG

* Compound is ISTD

001111

Data Search

1.

2.

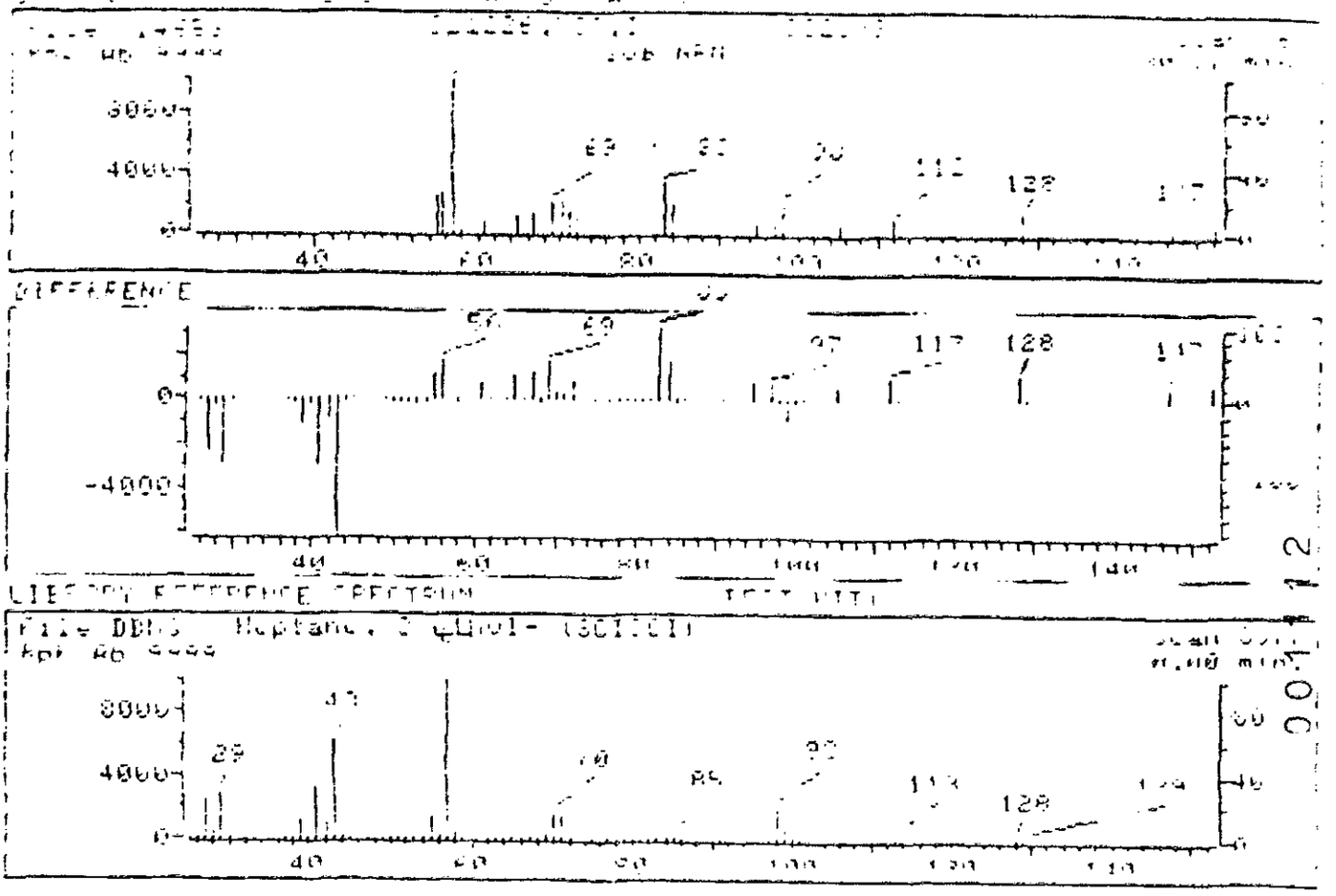
3.

1.

2.

3.

001111



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RT [illegible] 30.77
Scan [illegible]
Area [illegible]
Semi-quantitative Conc [illegible] ng

Data File [illegible] Scan Number [illegible]
Search Speed 2 Fitting option 3 Number of ion ranges searched [illegible]

1	Heptane, 3-ethyl- (8CI,9CI)	[illegible]
2	4-Pentenal, 2-ethyl- (8CI,9CI)	112 C7H12O
3	3-Undecene, 6-methyl- (E)- (9CI)	[illegible]

	Prob	Conf	K	dK	[illegible]	Fit
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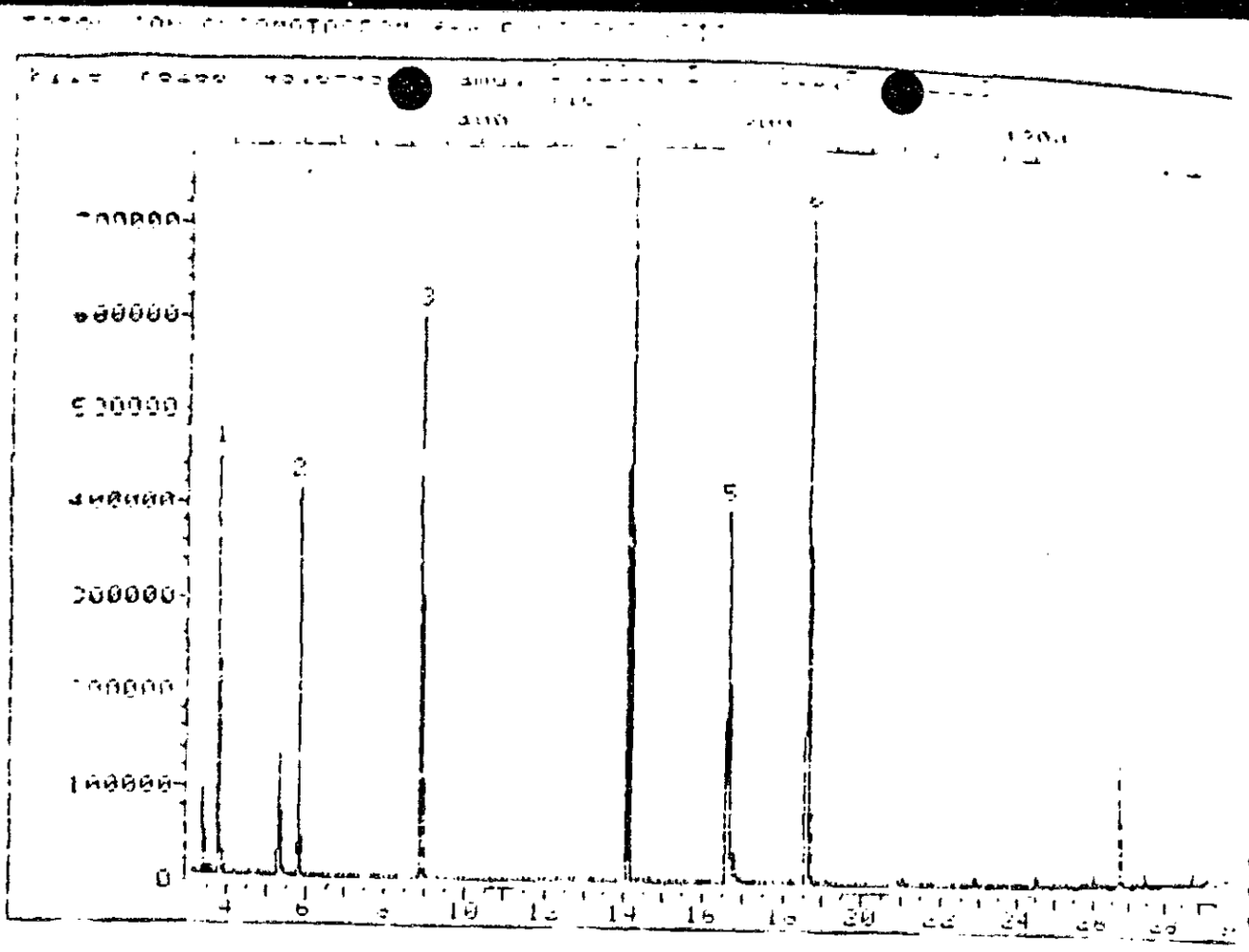
2	[illegible]	5204508	30	76	1	0
3	26	24430527	39	48	2	0


1
2
3
5
6
0
4
6
8
10
12
14
16
18
20
22
24

[illegible]

Injected at: [illegible]
Dilution Factor: [illegible]

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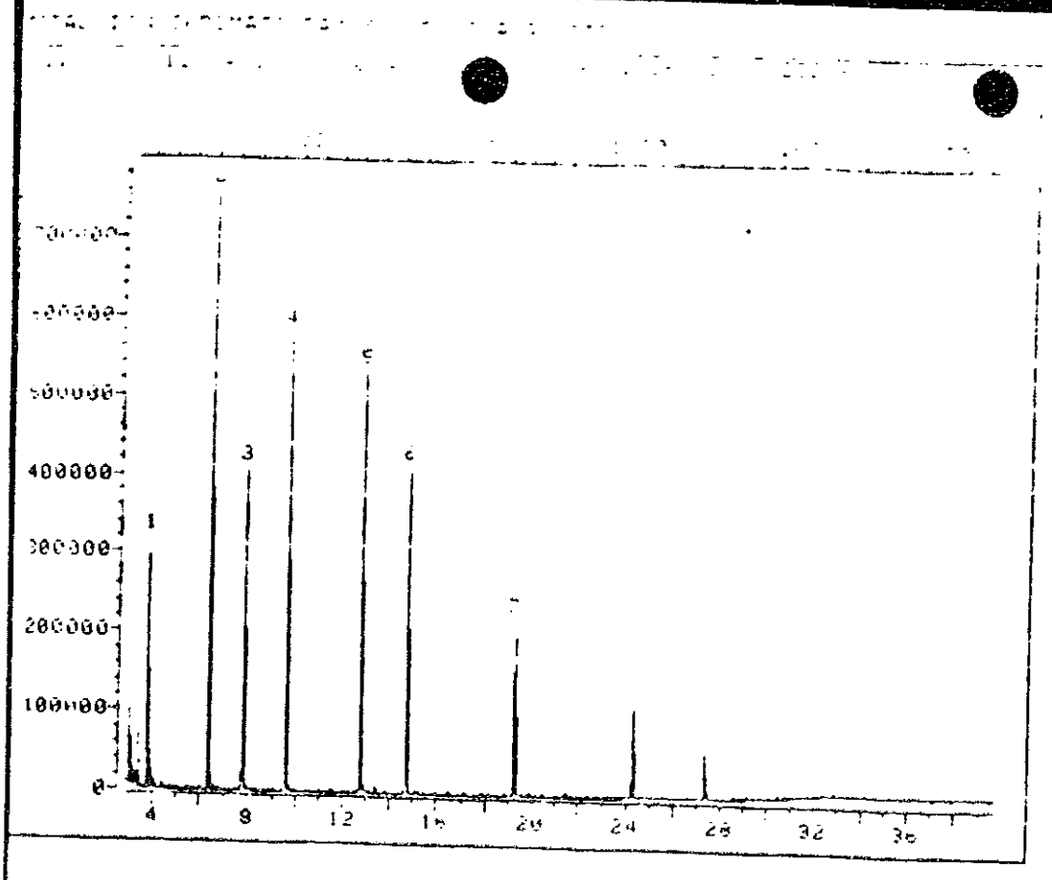
[illegible]

[illegible]le: [illegible]
[illegible]: ACID IDFILE. F
Calibration: [illegible] 31 [illegible]:01

F366BC

Compound	R.T.	Scan#	Area	Conc	Units
d4-1,4-Dichlorobenzene	5.80	193	201100	40.00	UG/ML
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
2-Fluorophenol	4.01	57	[illegible]	[illegible]	[illegible]
Phenol	6.10	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	3[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]		
Phenol-D6	[illegible]	[illegible]	956	[illegible]	[illegible]
d8-Naphthalene	8.90	32[illegible]	[illegible]	40.00	UG/ML
d10-Acenaphthalene	[illegible]	[illegible]	[illegible]	4[illegible]	UG/ML
d10-Phenanthrene	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

[illegible]



Data File: >Ge512::U3
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Misc Data: 0[illegible]6

001115

BTL# 5

Operator ID: [illegible] Quant Rev: 2 Quant Time: [illegible]
Injected at: [illegible]
Data File: 2G6512::U3 Dilution Factor: 1.00
Name: BN/PST UN G, 850103
Misc: GC25298 BTL# 2

ID File: GBNP
Title: B/N+PEST ID FILE .....#G,11/30/84,WWC
Last Calibration: 850104 22:45

	Compound	R.T.	Scan#	Area	Conc	Units	* C
1)	*d4-1,4-Dichlorobenzene	6.31	199	388523	40.00	UG/ML	
2)	N-Nitrosodimethylamine	2.76	10	783	.74	UG/ML	
2)	N-Nitrosodimethylamine	4.36	89	828	.36	UG/ML	
3)	bis(2-Chloroethyl) ether	5.92	177	386	.06	UG/ML	
4)	1,3-Dichlorobenzene	6.77	225	925	.13	UG/ML	
5)	1,4-Dichlorobenzene	6.77	225	925	.12	UG/ML	
6)	1,2-Dichlorobenzene	6.77	225	925	.14	UG/ML	
7)	Nitrobenzene-d5	7.69	277	275761	65.40	UG/ML	S
8)	bis(2-Chloroisopropyl)ether	5.60	159	586	.08	UG/ML	
8)	bis(2-Chloroisopropyl)ether	6.31	199	10041	10.34	UG/ML	
8)	bis(2-Chloroisopropyl)ether	7.41	261	670	.09	UG/ML	
8)	bis(2-Chloroisopropyl)ether	7.69	277	1321	1.90	UG/ML	
9)	*d8-Naphthalene	9.48	378	733278	40.00	UG/ML	
10)	2-Fluorobiphenyl	12.77	564	401287	36.87	UG/ML	
12)	N-Nitrosodi-n-propylamine	7.69	277	39832	8.83	UG/ML	
17)	1,2,4-Trichlorobenzene	9.41	374	598	.10	UG/ML	
18)	Naphthalene	9.53	381	1974	.12	UG/ML	
19)	Hexachlorobutadiene	10.10	403	223	.09	UG/ML	
20)	*d10-Acenaphthalene	14.70	673	257602	40.00	UG/ML	
23)	Dimethyl phthalate	14.70	673	43560	6.87	UG/ML	
25)	2,6-Dinitrotoluene	14.45	659	454	.43	UG/ML	
25)	2,6-Dinitrotoluene	14.70	673	30040	28.89	UG/ML	
26)	Acenaphthene	14.80	679	497	.07	UG/ML	
27)	2,4-Dinitrotoluene	14.45	659	454	.48	UG/ML	
27)	2,4-Dinitrotoluene	14.70	673	30040	32.92	UG/ML	
33)	*d10-Phenanthrene	19.17	926	240928	40.00	UG/ML	
38)	Di-n-butyl phthalate	21.47	1056	7207	1.16	UG/ML	
40)	Benzidine	24.24	1212	1340	2.47	UG/ML	
48)	*d12-Chrysene	27.28	1384	96189	40.00	UG/ML	
53)	Dieldrin	24.24	1212	567	.91	UG/ML	
54)	Endrin	23.44	1167	749	6.87	UG/ML	
54)	Endrin	25.12	1262	470	4.34	UG/ML	
54)	Endrin	25.97	1310	554	5.00	UG/ML	
54)	Endrin	26.24	1325	438	4.62	UG/ML	
57)	Endrin aldehyde	25.12	1262	470	1.83	UG/ML	
57)	Endrin aldehyde	25.97	1310	554	2.16	UG/ML	
57)	Endrin aldehyde	26.24	1325	438	1.71	UG/ML	
57)	Endrin aldehyde	26.66	1349	741	2.89	UG/ML	
58)	4,4'-DDT	27.28	1384	2407	4.51	UG/ML	
61)	Terphenyl-D14	24.22	1211	105429	56.04	UG/ML	
62)	Butyl benzyl phthalate	25.99	1311	229	.19	UG/ML	
66)	bis(2-Ethylhexyl)phthalate	27.87	1417	1160	.71	UG/ML	
68)	Benzo(b)fluoroanthene	31.36	1614	416	.31	UG/ML	
68)	Benzo(b)fluoroanthene	31.41	1617	261	.19	UG/ML	
69)	Benzo(k)fluoranthene	31.36	1614	416	.33	UG/ML	
69)	Benzo(k)fluoranthene	31.41	1617	261	.21	UG/ML	

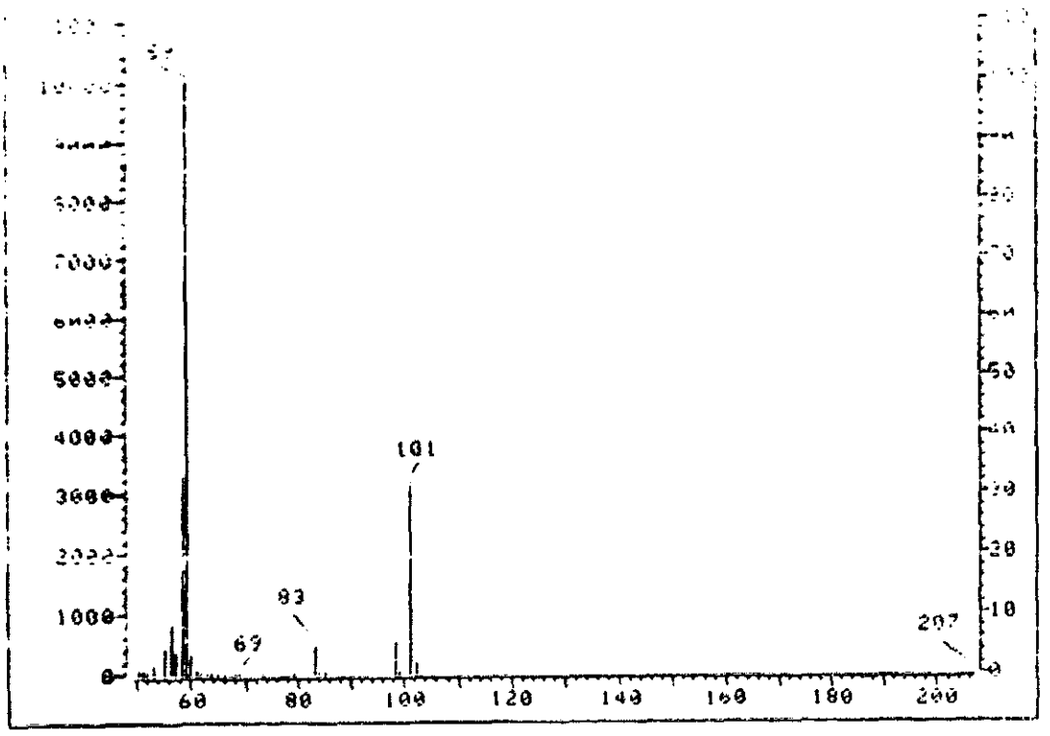
001116

	Compound	R.T.	Scan#	Area	Conc	Units
U	Benzo(a)pyrene	31.36	1614	416	.~~3~~ ~~UG~~	ML
U	Benzo(a)pyrene	31.41	1617	261	.23	UG/ML
	Indeno(1,2,3-c,d)pyrene	34.52	1792	1716	2.12	UG/ML
	Indeno(1,2,3-c,d)pyrene	35.31	1837	1748	2.16	UG/ML
	Dibenzo(a,h)anthracene	34.59	1796	1295	1.83	UG/ML
	Benzo(ghi)perylene	34.52	1792	1716	2.57	UG/ML
	Benzo(ghi)perylene	35.31	1837	1748	~~2.62~~	~~UG/ML~~

* Compound is ISTD

001117

001117



Data File: >Go512::U3
Name: BN/PST ON G, 85 103
Misc Data: QC25256
RT (min): 3.74
Scan: 54
Area: 402122
Semi-quantitative Conc: 10.74 UG/ML

No PBM hits for this scan.

BTL# F

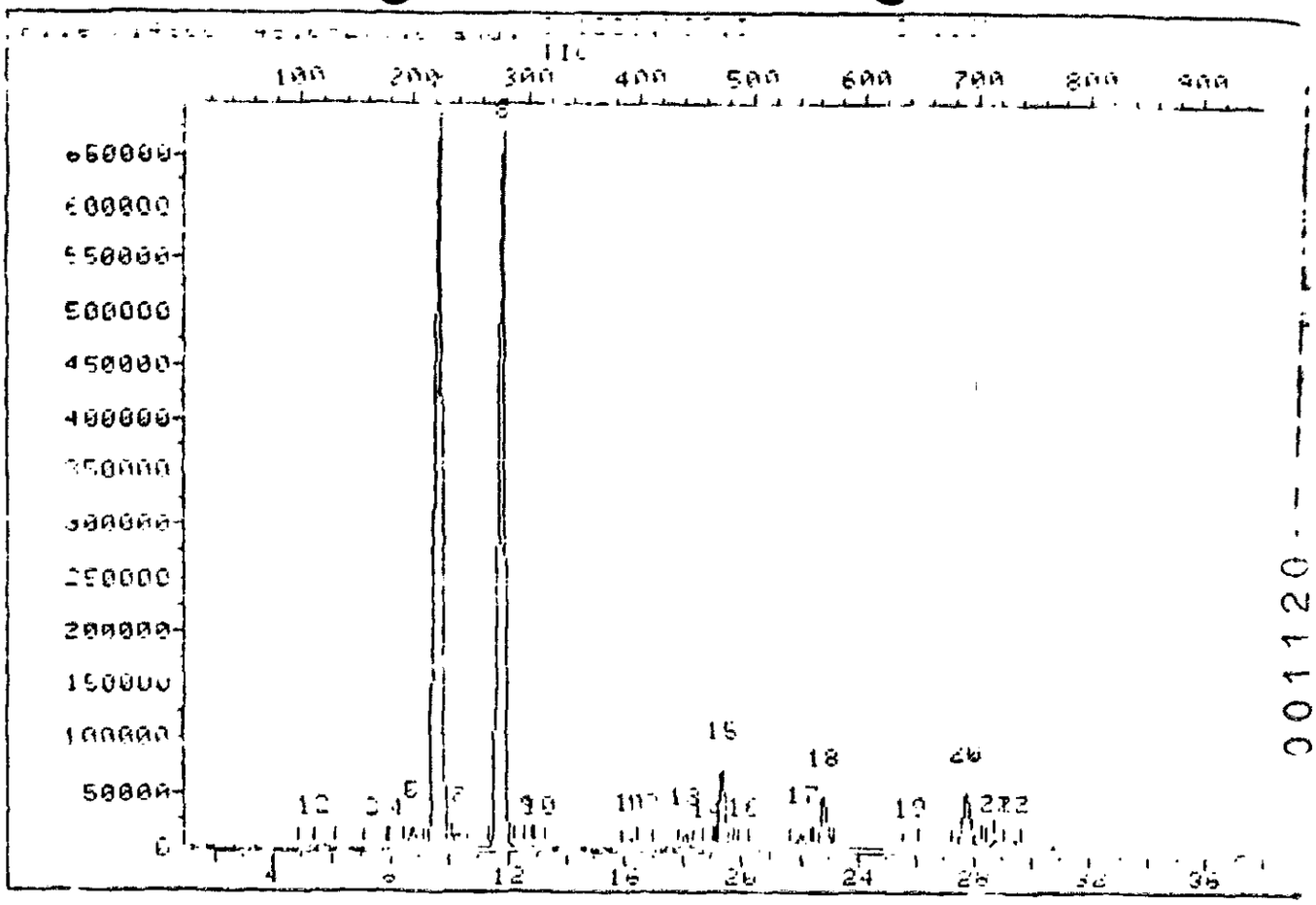
001118

001118

Appendix C

Mass Spectral Data
for
Tentatively Identified Compounds

1. For each tentatively identified compound a mass spectrum of the detected compound, a reference mass spectrum for that compound and a plot of the spectral differences are provided



001120

Data File
Name: 011226,D0A.T
Misc Data: D41160

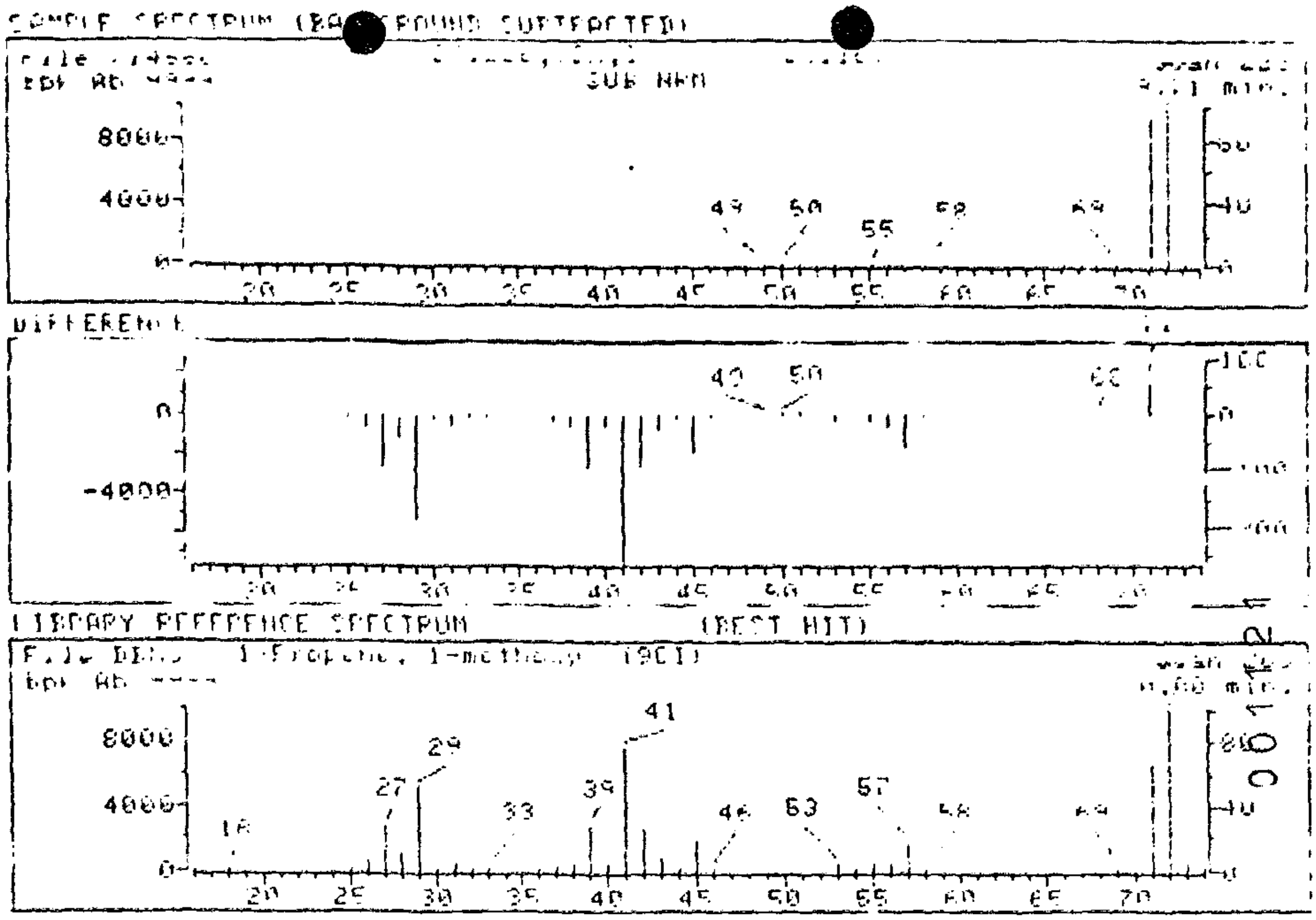
Data P
Search

1. 1-

P-

1 -

001120

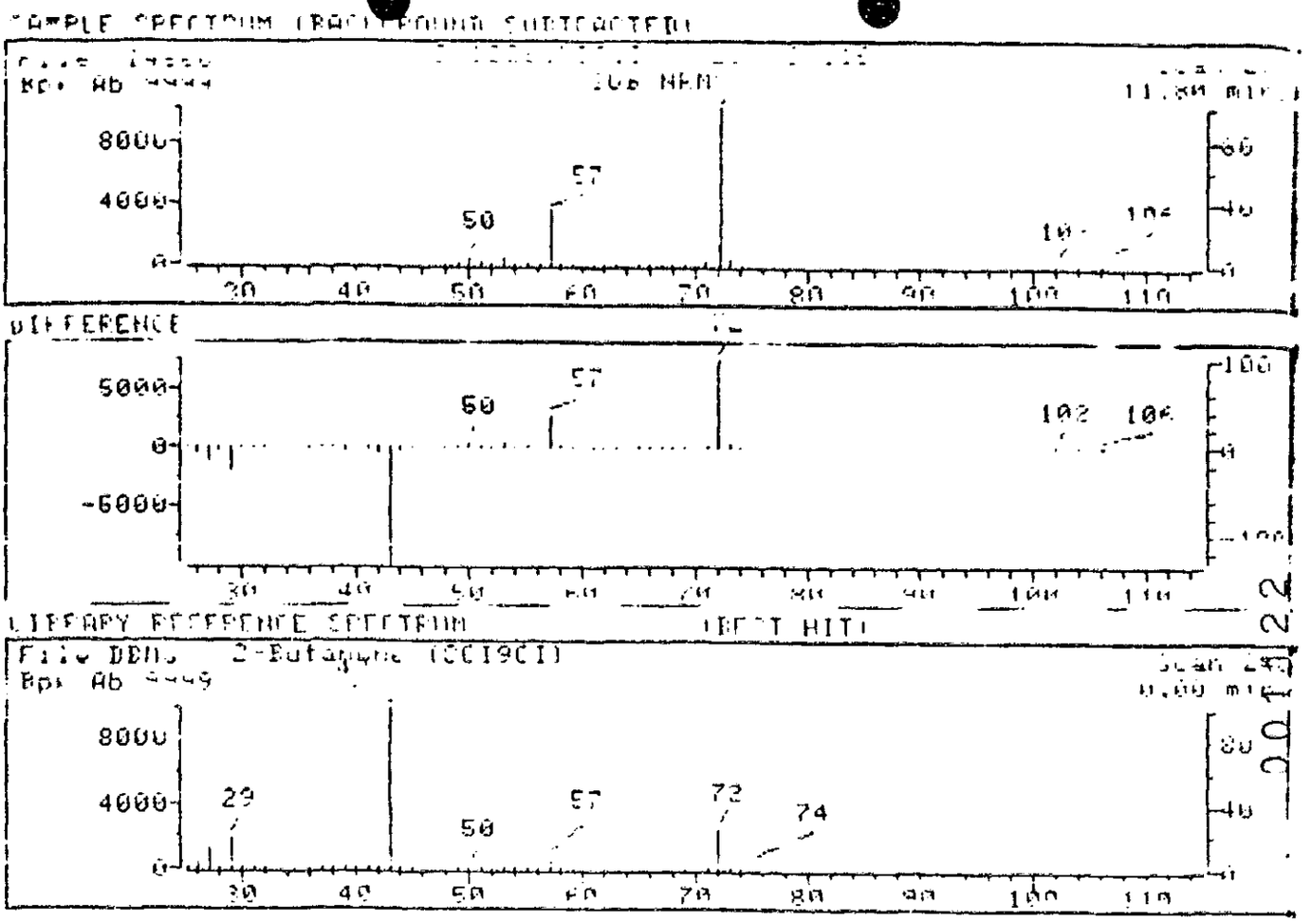


Data File: >I4560 [illegible]
Name: 041??4.006 1
Misc Data: I4560
RT (min) 9.?1
Scan [illegible]
Area: 502634?
Semi-quantitative Conc [illegible] NG

Data File >I4560 Scan Number [illegible]
Search Speed 2 Titling option 5 Number of ion ranges searched [illegible]

1. 1-Propene, 1-methoxy- (9CI) 72 C4H8O

Prob.	Cas#	K	dK	#Flg	Tilt
1 70	?7319?76	23	?4	2	0



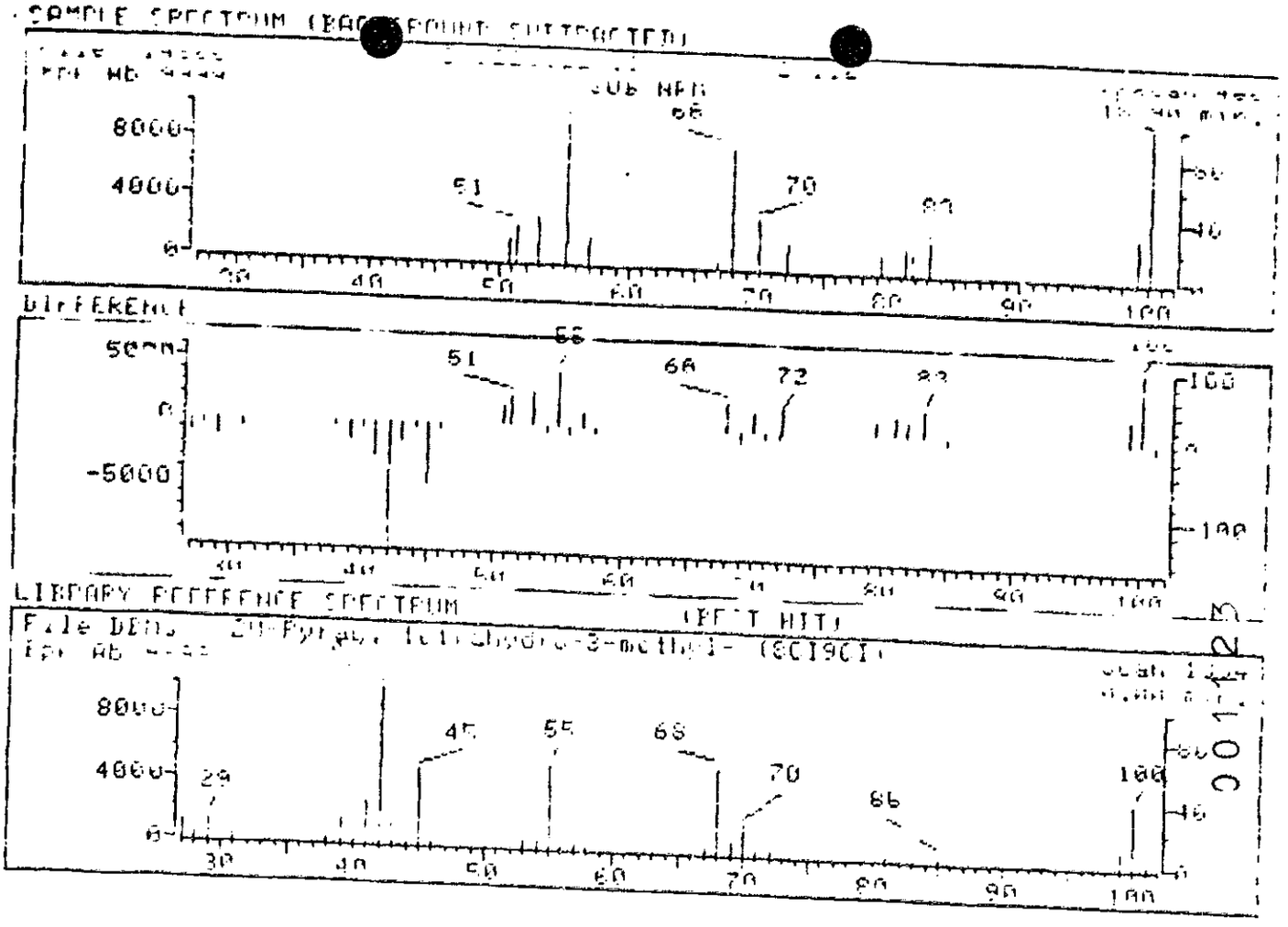
Data File:)14560 (1)
Name: 041226,V0A,T
Misc Data: C1116V
RT (min): 11.80
Scan: 2??
Area: 4321481
Semi-quantitative Conc: 11124.94 NG

Data File:)14560 Scan Number 2?? Data
Search Speed: 2 Titling option: C Number of ion ranges searched Sear

1.	2-Butanone (CCI9CI)	?? C4H8O	1.
2.	Acetaldehyde, methylhydrazone (CCI9CI)	?? C3H8N2	2.
3	Formaldehyde, dimethylhydrazone (CCI9CI)	?? C3H8N2	

	Prob.	Conf	K	di		Tilt
1.	60	70933	23	46	0	0
2.	60	1?167236	20	74	?	0
3.	52	2035894	23	53	1	0

1.
2.

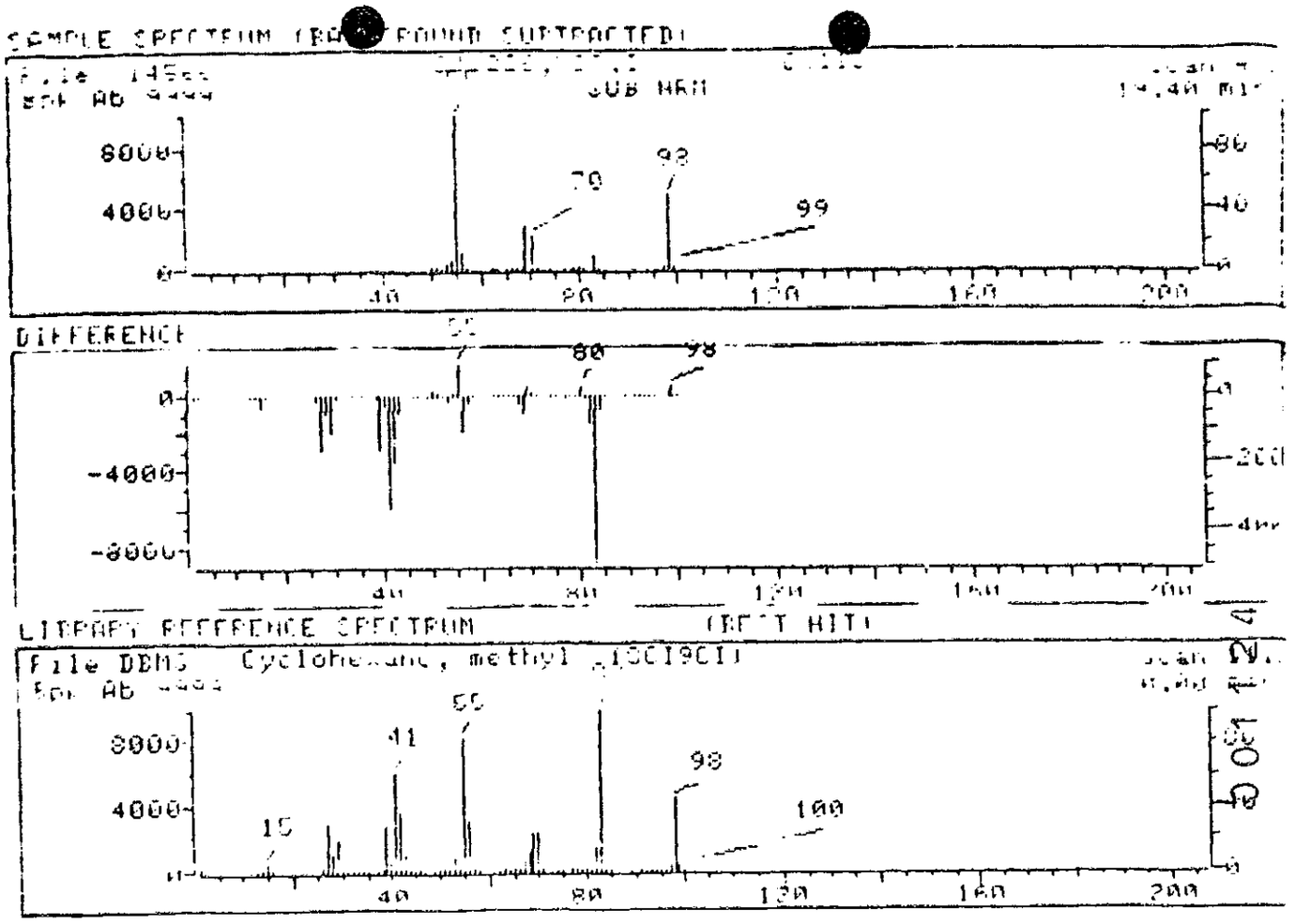


Data File:
Name:
Misc Data:
RT (min) 18.90
Scan
Area: 10460
Semi-quantitative Data:

Data File:)T4540 Scan Number 440
Search Speed 2 Titling option C Number of 100 ranges searched

1 2H-Pyran, tetrahydro-3-methyl (8CI9CI) 100 C6H12O
2. 2-Butenoic acid, 2-methyl- (9CI) 100 C5H8O2

	Prob.	Cas#	M	dK	#Eq	Tilt
1.	27	26093630	20	82	2	0
2	24	13201462	24	84	3	0

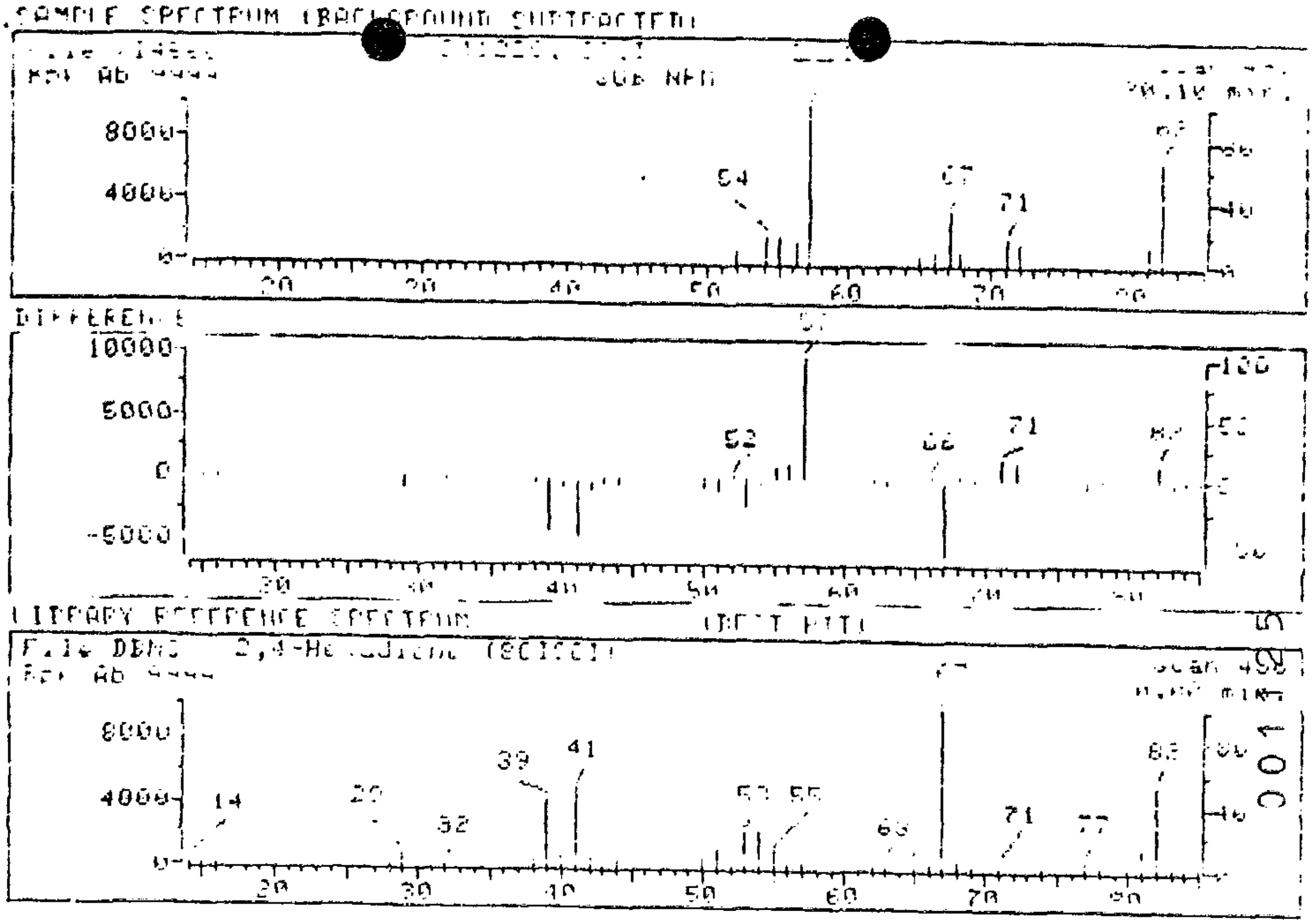


Name 841224,UOA,1
Misc Data [illegible]
RT (min) 19 40
Scan [illegible]
Area [illegible]
Semi-quantitative Conc [illegible] NG

Data File)14560 Scan Number 473 Da
Search Speed 2 Titling option S Number of ion ranges searched Sea

1.	Cyclohexane, methyl (8CI9CI)	98 C7H14	1
2.	2-Pentene, 2,3-dimethyl- (8CI9CI)	98 C7H14	
3.	3-Hexene, 3-methyl-, (E)- (8CI9CI)	98 C7H14	

	Peak	Conc*	R	dk	Mtq	Tilt	1
1.	70	108872	26	77	3	0	
2.	52	10524375	33	68	2	0	
3.	52	3899363	25	73	3	0	

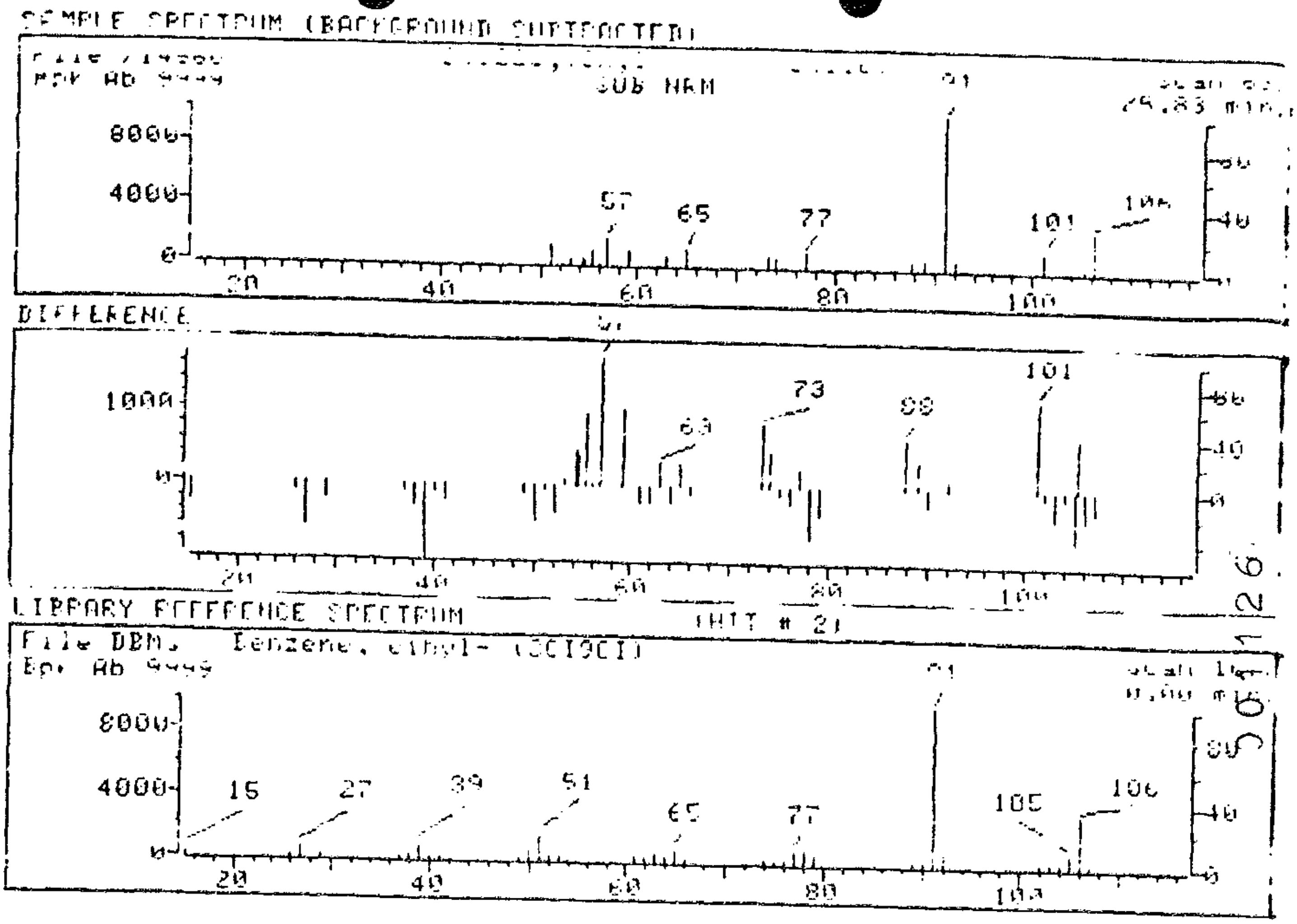


Name: 041026,006
Misc Data: CA316
RT (min) 20.10
Scan: 491
Area: 1556
Semi-quantitative Conc 40.03 NG

Data File >14560 Scan Number: 491
Search Speed 2 Titling option 5 Number of ion ranges searched

1. 2,4-Hexadiene (BCI?CI) C6H10

Prob.	Cas#	K	dE	#Flg	Tilt
1 20	592461			3	0



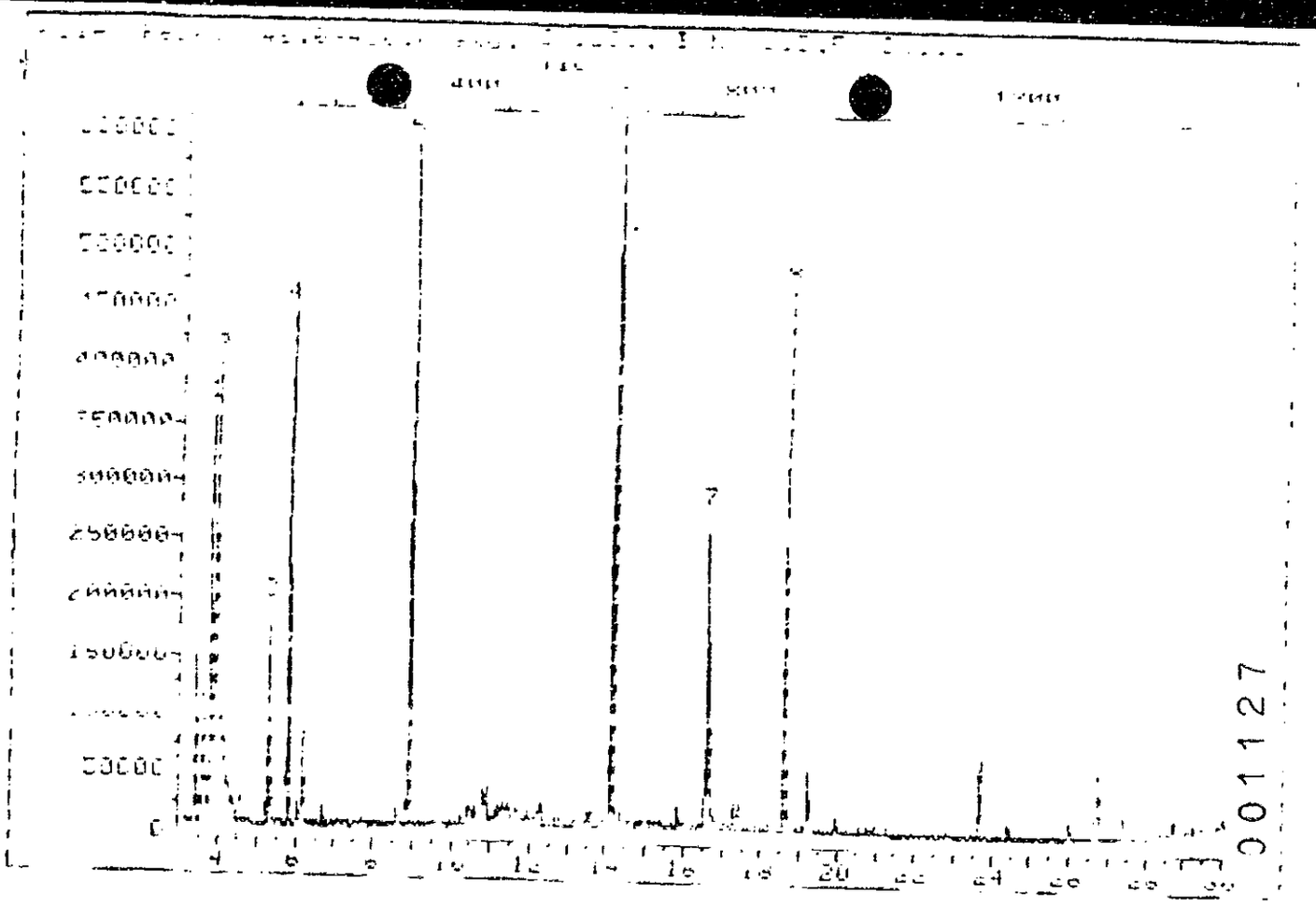
Data File >I4560 ::H
Name 041226,VOA,?
Misc Dat. 04116V
RT (min) 25 83
Scan: 430
Area: 20064
Semi-quantitative Conc 51 66 NG

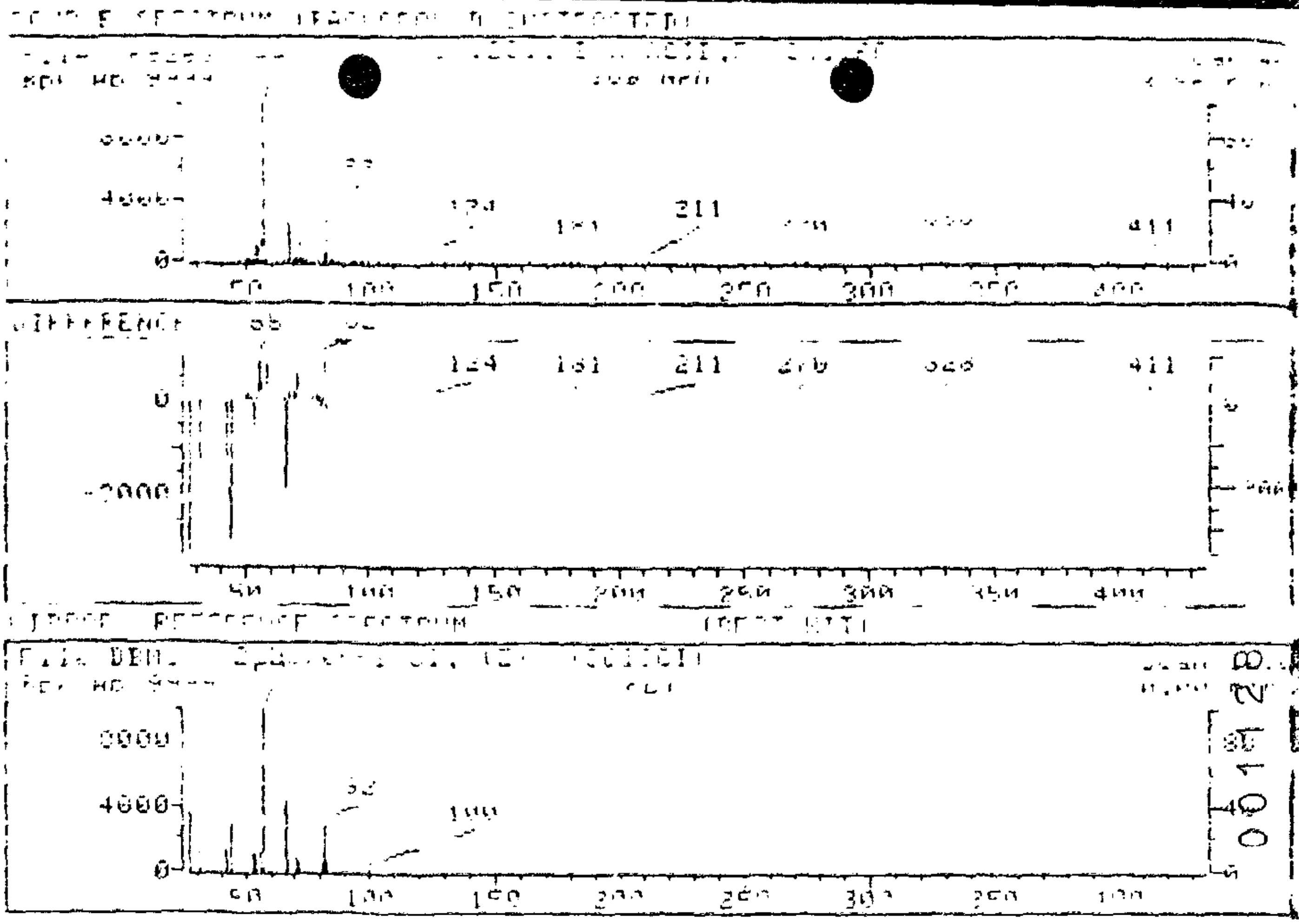
Data File >I4560 Scan Number 430
Search Speed: 2 Titling option: S Number of ion ranges searched :

1. Benzene, 1,2 dimethyl- (9CI) 106 C8H10
2. Benzene, ethyl- (8CI9CI) 106 C8H10

	Prob.	Cas#	K	dK	#Flg	Tilt
1.	49	95476	41	51	2	0
2.	47	100414	3?	47	2	0

501126


0011127

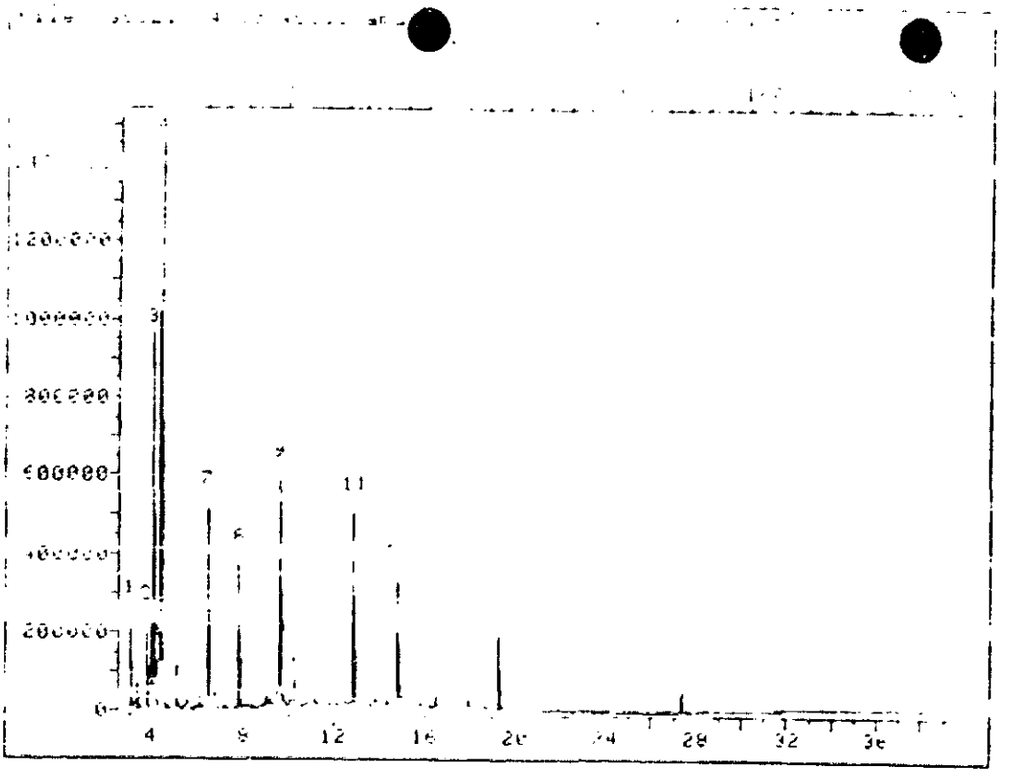


Data File [illegible]
Name: 941231 [illegible]
[illegible]
RT [illegible]
Scan [illegible]
Area [illegible]
Semi-quantitation [illegible] UG/ML

Data File [illegible]F1263 Scan Number [illegible]
Search Speed [illegible] Tilt [illegible] option [illegible] Number of top [illegible]

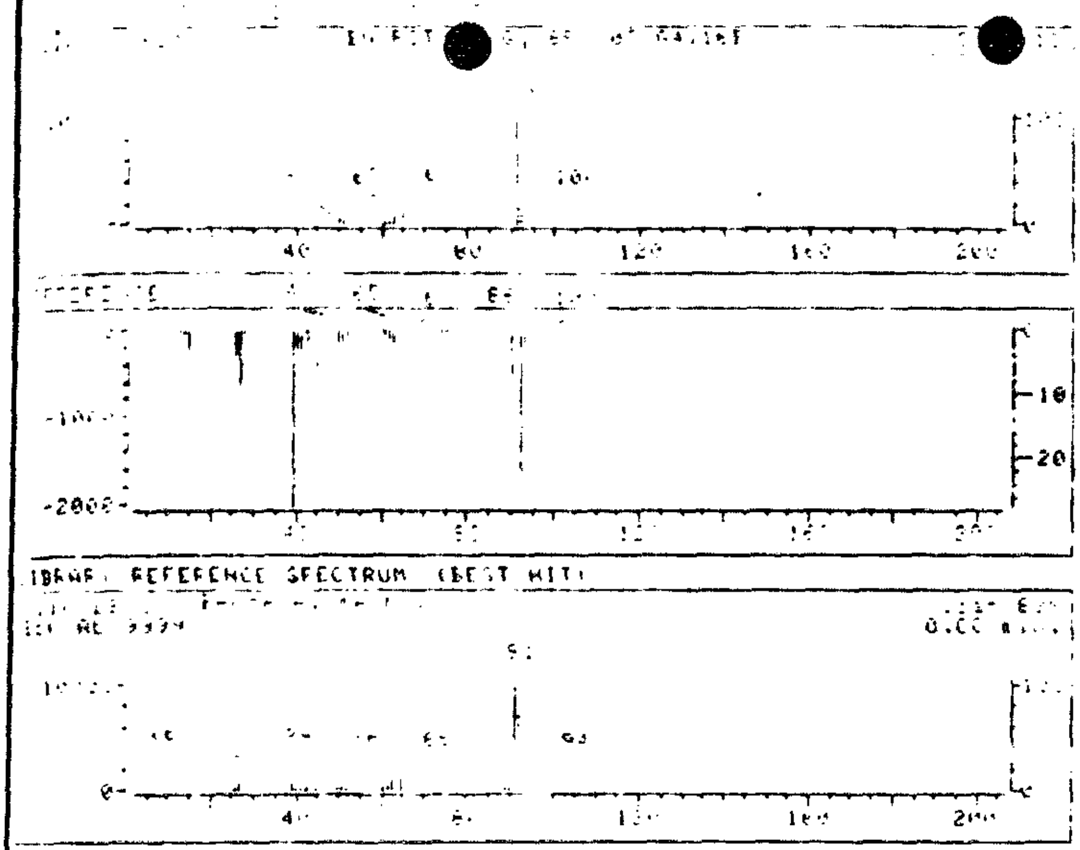
1. [illegible] Hexen-1-ol [illegible] 100 C6H12O
2. Cyclohexanol (OCIPOC) 100 C6H12O
3. Pentane, 2,4-dimethyl (OCIPOC) 100 [illegible]

Prob	Ref#	K	dK	#Flg	Tilt
1. 40	[illegible]	[illegible]	[illegible]	2	0
2. 4[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	0
3. 25	100007	23	61	3	0



Data File: [illegible]
Name: [illegible]
Misc Data: [illegible]

001129



Data File: [illegible]
Name: [illegible]
Misc Data: [illegible]
RT (min): [illegible]

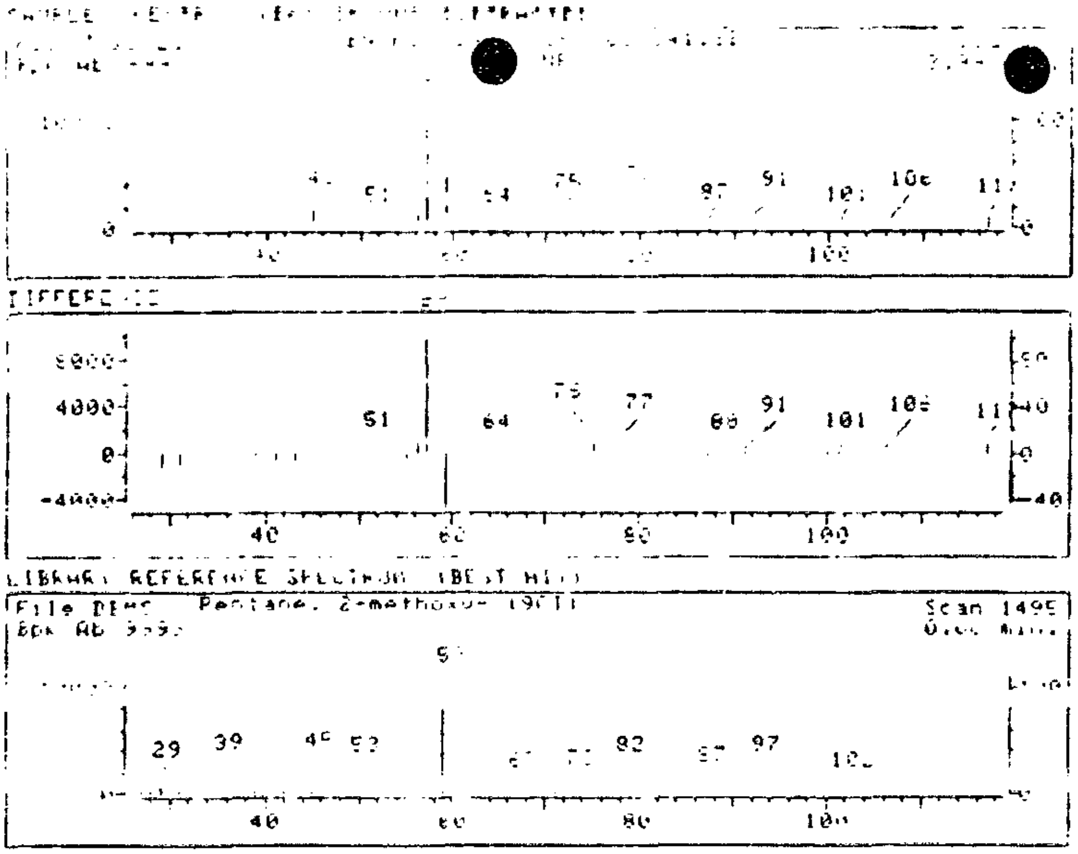
[illegible] Conc: [illegible]

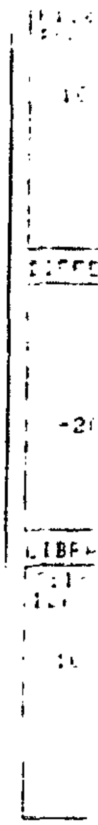
Data File: [illegible] Scan Number: 17

1. Benzene, methyl- [illegible] 92 [illegible]
2. Benzene, [illegible]
3. Benzene, (4-bromobutyl)- (8C [illegible]) 212 [illegible]

	Prob.	CAS#	[illegible]	[illegible]	# lg	Tilt
1.	94	108883	76	14	1	0
2.	6[illegible]	1446[illegible]	51	[illegible]	0	-2
3.	36	136[illegible]	44	5[illegible]	0	-2

001130





001131

Data File: >G6321...3
Name: BN PFT ... G, SF 107
Misc Data: G41 ...B
RT (min): 3.9
Scan: 71

Semi-quantitative ...

Data File: >G6321 Scan Number: 71
Search Speed: 2 Tilting ... 3 Number of ... searched: ...

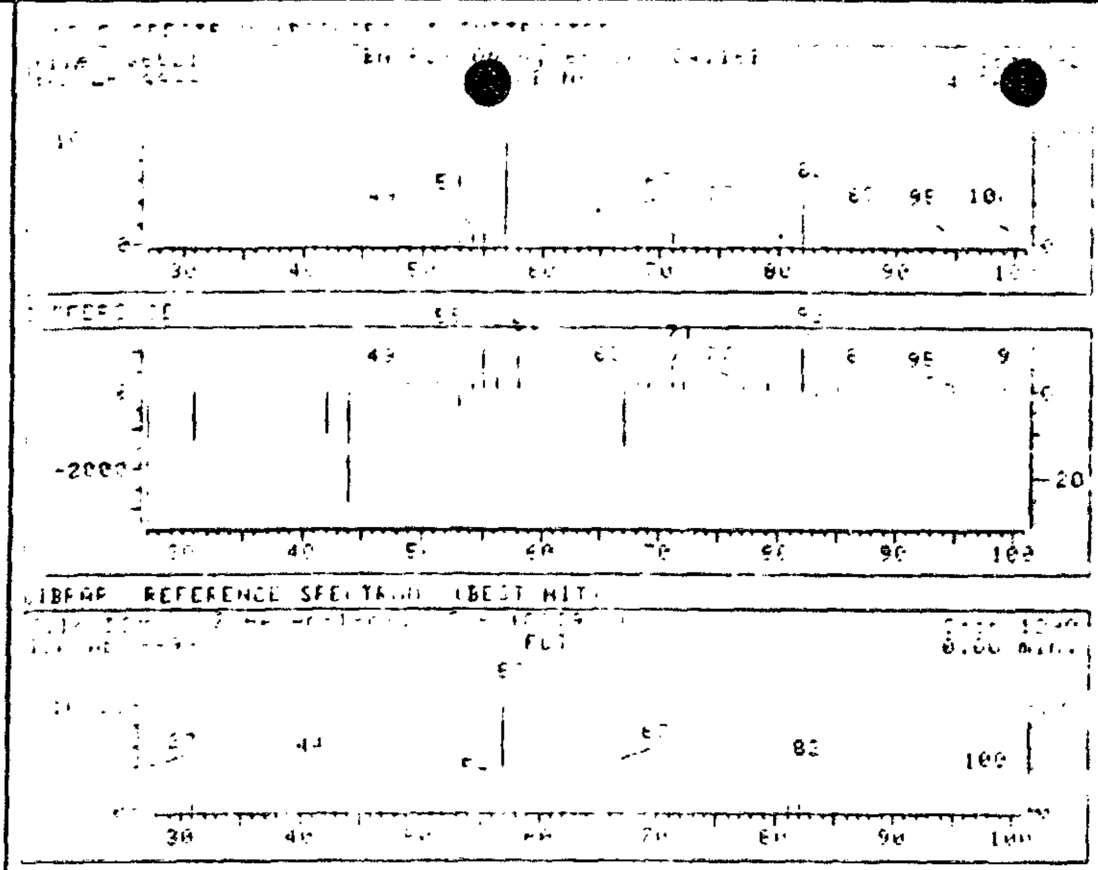
1. Pentane, 2-methoxy- (9CI) 102 C6H14O

Prob. Cas# ... ...g Tilt

1. 11 6795886 ... 53 2 0

1.
2.
3.

1.
2.
3.



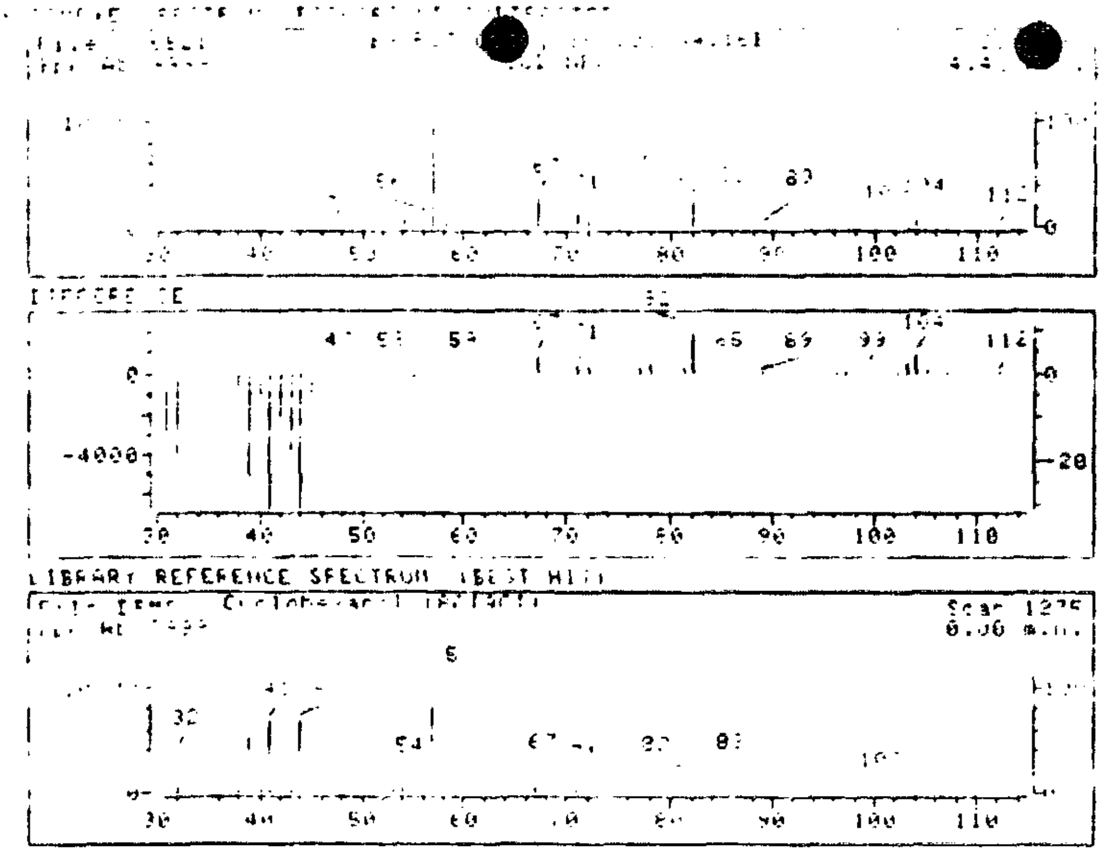
Data File:
Misc Data: G4116
RT (min):
Semi-quantitative Conc:

ta File: ›GeF21 Scan Number: 92

1. 2-Hexen-1-ol, (Z)- (BC1PC1) 100 ToH
2.
3. Aziridine, 1-methyl- (BC1PC1) 97 C3H7N

	Prob.	Cas#			#Fig	Tilt
1.	48	928949	36	62	1	0
2.	33	[illegible]	36	[illegible]	1	6
3.	29	1072442	[illegible]	56	0	0

001132



Data File: >Ge521::03
Name: [illegible]
Misc Data: Ge [illegible]
RT (min): 4.42
Scan: 95

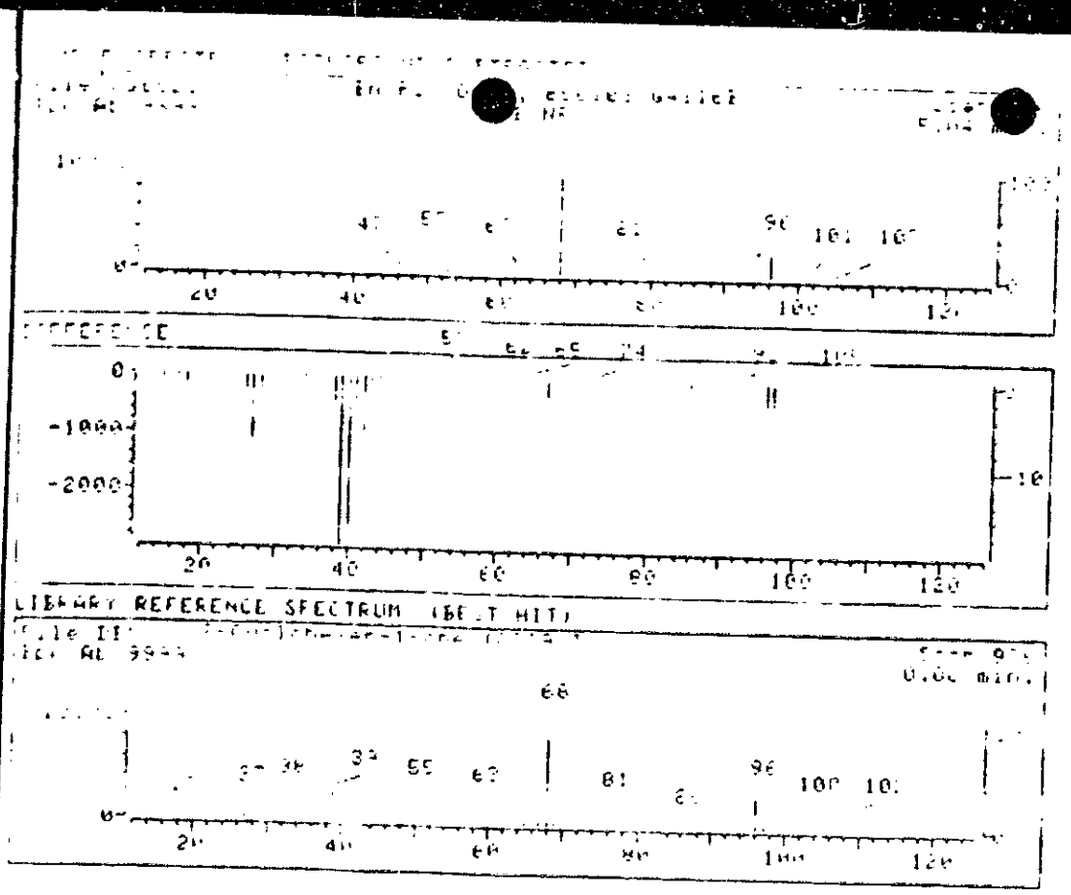
Semi-quantitative Conc: [illegible]43 Ug/ML

Data File: >Ge521 Scan Number: 95
Search Speed: 2 Tilting [illegible] Number of ion ranges searched: [illegible]

1. Cyclohexanol (6719?1) 100 C6H12O
2. [illegible]
3. Aziridine, 1-methyl- [illegible] 57 C3H7N

	Prob.	Cas#	[illegible]	[illegible]	#Flg	Tilt
1.	51	108930	35	67	0	0
2.	35	47[illegible]52	23	61	3	0
3.	32	1072442	25	55	0	0

001133



Data File: [illegible]

Misc Data: [illegible]

RT (min): [illegible]

Scan: 170

Semi-quantitative Conc: [illegible] UG ML

Data File: [illegible] Scan Number: 130

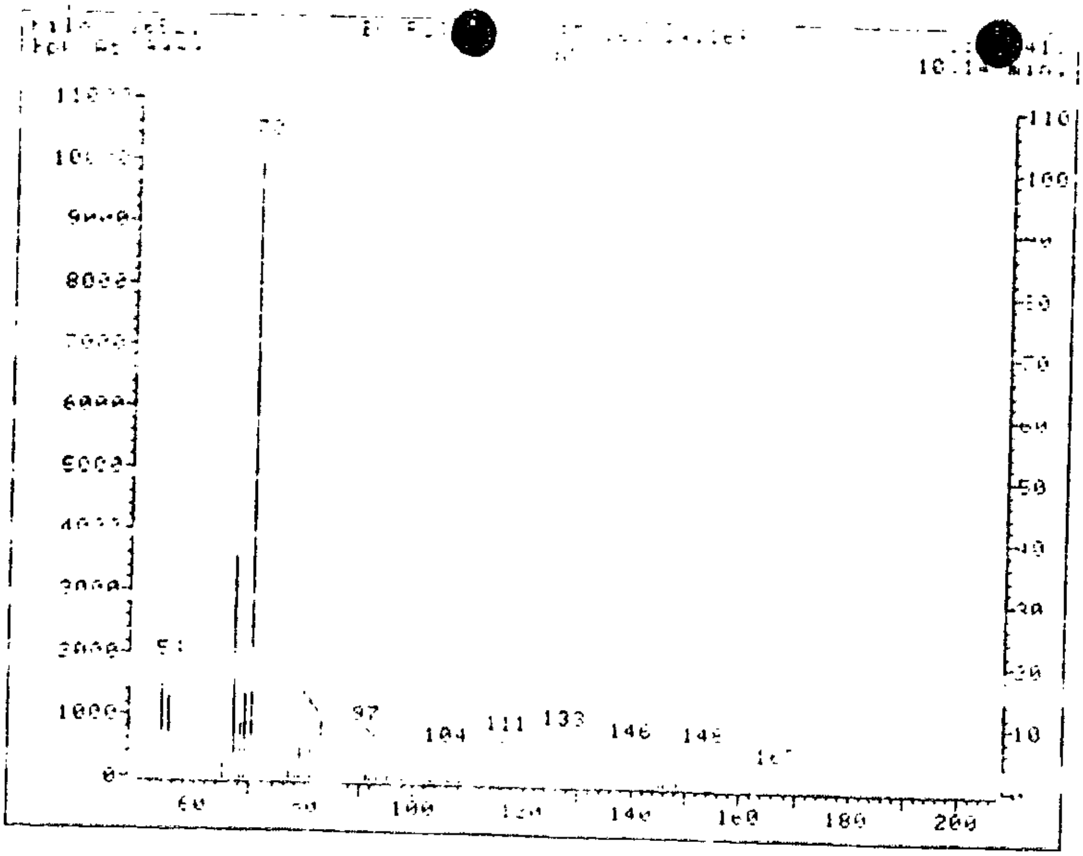
[illegible] Number of ion ranges [illegible]

1. 2-Fluorotheren-1-one [illegible]

	Prob.	Case		dl	+ lg	Tilt
1.	63	97.687	44	41	2	0

001134

001134



Data File: >GcS21::D[illegible]
Name: [illegible]
Misc Data: G[illegible]
RT (min): 10.14
Scan: 41F
Semi-quantitative Conc: 14.21 UG ML

No [illegible] hits for this [illegible]

001135

Appendix E

Chain-of Custody Forms

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

2) An in-house sample Chain-of Custody form is included for the period the sample was in ETC's possession.

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

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

CHAIN OF CUSTODY FORM (CCF)

Seal Date 6/26/84
Sealed By J. Trotter

6416 (circled)

SHIPMENT

Company	Resource Engineering
Facility/Site	11 Greenway Plaza
Address	Houston, Tx 77406
Attn	Coby Sher
Phone	( ) -

SAMPLE IDENTIFICATION

Facility/Site Code: RES1 1275016

Source Codes

Well	(W)	River/Stream	(R)	Surface Impoundment	(I)	Lake/Ocean	(L)
Soil	(S)	Bottom Sediment	(B)	Pretreatment Facility	(P)	Treatment Facility	(T)
Outfall	(O)	Generation Point	(G)	Leachate Collection Sys	(C)	Other	(X)

	Source Code (from above)	Your Sample Point ID	Start Date (mo/day/yr)	Start Time (2400 hr. clock)	Elapsed hours (composite)
	W	FR-1	12/12/84		
Example	W	101J263P	05/15/81	09:30	1 3

SAMPLE CONTENTS

Sample Bottle		Condition	Sample Bottle	Condition
E9445	$E_1 - E_4$	✓	ETC # changed to 6416 per request of Ellen V.	0
E9445	$V_1 - V_2$	✓		0
T9445	Tb_1	✓ hdsp		

40
5

CHAIN OF CUSTODY CHRONICLE

1. Shuttle Opened By (print): DEAN GORE Date: 6/29/84 Time: 8:30 AM
Signature: W D Gore Jr. Seal #: 0018125 Intact: YES

I have received these materials in good condition from the above person.
2. Name: Derrick Vallance Signature: D. Vallance
Date: 12/12/84 Time: 10:00 Remarks:

I have received these materials in good condition from the above person.
3. Name: S.C. Itin Signature: S.C. Itin
Date: 12-14-84 Time: 3:00 PM Remarks:

I have received these materials in good condition from the above person.
4. Name: Signature:
Date: Time: Remarks:

5. Shuttle Sealed By (print): S.C. Itin Date: 12-14-84 Time: 3:15 PM
Signature: S.C. Itin Seal #: 0018126

ETC USE ONLY Opened By: Jacob Date: 12-17-84 Time: 9:30
Seal #: 18126 Condition: ok

ETC Form CCF 6/1/83

001137

ETC ENVIRONMENTAL TESTING and CERTIFICATION

E9445
ETC Sample No.

SAMPLE POINT INFORMATION FORM (CC2)

FIELD MEASUREMENT DATA

Select up to 3 parameters to be recorded by entering the appropriate code letter in the first space for each of the 3 data entry fields provided. Enter the actual measurement data (in the units specified) for the three parameters you have selected.

PARAMETERS		ACTUAL (left justify)	EXAMPLE
Flow (CFS)	A		C 2.5
Volume (Gal)	B		F 5.0
Sample Depth (Ft)	C		G 1103
Depth to Water (Ft)	D		
Discharge Rate (GPM)	E		
Depth to Bottom (Ft)	F		
Event Time (2400-Hr Clock)	G		
Depth to Screen (Ft)	H		

FIELD TEST DATA

DO (Mg/L) _____ Sample Temp. (°C) _____

pH _____ (Single Measurement) _____ (2nd of Quadruplicate) _____ (3rd of Quadruplicate) _____ (4th of Quadruplicate)

Specific Conductance (uMHOS/CM) _____ (Single Measurement) _____ (2nd of Quadruplicate) _____ (3rd of Quadruplicate) _____ (4th of Quadruplicate)

THE FOLLOWING DATA IS FOR YOUR RECORDS ONLY

SAMPLING METHOD (choose one)

AIR-LIFT PUMP ( )
AUGER ( )
BAILER ( )
BOTTLE ( )
COLIWASA ( )
DIPPER ( )
KEMMERER ( )
NISKIN ( )
PERISTALTIC PUMP ( )
PETERSEN ( )
PISTON PUMP ( )
SCOOP/SHOVEL ( )
SQUEEZE PUMP ( )
SUBMERSIBLE PUMP ( )
SUCTION LIFT PUMP ( )
SYRINGE ( )
THIEF ( )
TRIER ( )
VEMMEYER ( )
OTHER _____

SAMPLE TYPE (choose one)

GRAB ( ) COMPOSITE ( ) OTHER ( )

_____ _____
_____ _____
(describe) (describe)

WEATHER SAMPLE DESCRIPTION (e.g., color, odor)

_____ _____
_____ _____
_____ _____
(describe) (describe)

Form Prepared By: _____ Employer: _____
name (print)

ETC Form CC2 6/1/82

001138

X-MS Analysis Custody Log

DATE 84.226 SHIFT 12/avl
FRACTION VOA
INSTRUMENT I
SEQUENCE FILE J
METHOD FILE VOAI
IDFILE VOA3
ANALYST [illegible]
Supervisor [illegible]
BATCH #'s QV26491

STANDARD	PPM	NO.	VOL
QBFB	50	8103	1
ISTD	40	9140	5
SURR	25	8989	10
ABC	18	~~8942~~ 9163	10

(PLEASE INITIAL)

CURRENT CSUS STATUS		STANDARDS UPDATED	
ICQ	SJ	DATE	[illegible]
DIP	SJ	BY	

V1, V2 Report 2

NAME	DATA FILE	UL INJ	[illegible]	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLU Y/N
QBFB	7I4546				I00130		
QC26491V	7I4547				NG	5.3 mol [illegible]	
QC26491VS	7I4548				CP	10 UL ABC	
QC26491V	7I4551				NG		
QC26491V	7I4552						
QC26491V	7I4553				OK 361CQ		
G1891VS	7I4554	5ml		4	OK R	10 UL ABC	
G1891V	7I4555	5ml		5	OK S		
G4242V	7I4556			2	T	Rerun 1:25	
G4242VR	7I4557			3	U	Rerun 1:25	
G4243V	7I4558			4	OK V		
G4244V	7I4559			5	OK W		
G4116V	7I4560			6	OK X	1:41	
G1879V	7I4561			7	OK 362AA		
G1892V	7I4562			8	OK B		
G1905V	7I4563			9	OK C		
G1409V	7I4564	V		10	OK D		
G4242V	7I4565		1:25	4	OK		
G4242VR	7I4566		1:25	5	OK		

Rev 11-12-84

Sample Number	Log Link	Sample Vol (ml)	BN	ACID		
F9625	7216	810	1.0			
F9626	↓	980	1.0			
G1019	7884	1000	1.0			
F8475	7075	930	1.0			
G2866	7442	1000		1.0		
G3682	7601	995	1.0	5.0		
G3215	7603	1000	1.0	1.0		
G4116	7600	935	1.0	1.0		
G0668	7631	970	1.0	1.0		
G0669		1000	1.0	1.0		
G0672		1000	1.0	1.0		
G0673	↓	970	1.0	1.0		
G1654	7615	1000	1.0	1.0		
QC 2525		1000	1.0	1.0		
QC 2525 S		1000	1.0	1.0		
G0669 S		1000	1.0	1.0		
G1654 R		985	1.0	1.0		

QC Batch # 2525

Analysis PP/TOTAL REPEATS CMPD/BN ; CMPD/ACID

Matrix H_2O

Turnaround ASAP

Date Start 12/27/84

BN ______

ACID ______

Extraction Method:

Sep. Funnel ______

Continuous ______

Other ______

COMMENTS:

REPEATS:

SAMPLE #	FRACTION	GC #	COMMENT
F9625 / F9626	BN ↓	2416 ↓	low surr.
G1019	BN	2419	no surr rec.
F8475	BN	2433	special cmpds not added for repeat
G2866	ACID	2462	low surr

* 9 cpds @ 150 ug/ml
2 cpds @ 250 ug/ml

** 16 cpd. @ 100 ug/ml
chlor @ 200 ug/ml

Spike/Surr. Verified: S McArthur 12/27/84

FRACTION	SPIKE Amt (ml)	SPIKE Conc.	SPIKE Lot #	SURROGATES Amt (ml)	SURROGATES Conc.	SURROGATES Lot #
BN	1.0	100 ug/ml	9209			
ACID	1.0	*	9013			
PEST	1.0	**	9502			
Other AR 1260	1.0	100 ug/ml	9262			
CMPD/ACID (3 cmpd/ppm)	1.0	150 ug/ml	9379			
CMPD/BN	1.0	9 @ 100 ug/ml, 1 @ 300 ug/ml	9163			
GERAHTY & MILLER BN SPIKE						
[illegible]				1.0	[illegible]	9496

Set-up: ______ BN Conc. [signature] 12/27

Supervisor: ______ ACID Conc. Dave E Kolen 12/27/84

001140

GC-MS Analysis Log

DATE 84123 SHIFT

FRACTION BN + Acids

INSTRUMENT E

SEQUENCE FILE JM

METHOD FILE BNPE/ACIDE

IDFILE FBNP/FACID

ANALYST

SUPERVISOR

BATCH #'S QAB2508

QA2525 QA2506

(PLEASE INITIAL)

CURRENT CBUS STATUS		STANDARDS UPDATED	
A	JM	DATE	
B	BG	BY	

12-31 UPDATED

DFTPP	25	9295	
Acid Calib 1	60	9010	
Acid Calib 2	100	9011	
Acid Calib 3	300	9012	
BN Calib 1	60	9526	
BN Calib 2	100	9527	
BN Calib 3	200	9528	
M-Chlorophenol	60	9382	
M-Chlorophenol	100	9381	
M-Chlorophenol	200	9380	

NAME	DATA FILE	UL INJ	#	DIL	TAPE #	SPECIALS (WRITE N-TYPE)
DFTPP	7F6239				I 00431	
BN Calib # 3	7F6240		1			
BN Calib # 2	41		2			
BN Calib # 1	42		3			
Acid Calib 3	43		4			
Acid Calib 2	44		5			
Acid Calib 1	45		6			
QC2508AB	46		7			
F9154AB	47		8			
F9155AB	48		9			
F9156AB	49		10			Cheap company (wat...)
F9157AB	50		11			wants only computer printout
F9149AB	51		12			as report
F9150AB	52		13			Srch BN+15
F9148AB	53		14			
Acid Calib 2	54		15			
300ppm M-chlorophenol	55		16			
100 " "	56		17			
60 " "	57		18			
QC2525AS	58		19			
G0669AS	59		20			
QC2525A	60		21			
G1654AR	61		22			
G1654A	62		23			
G4116A	63		24			

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001141

DATE 841230 SHIFT
REACTION BAT ACIDS
INSTRUMENT TM
SEQUENCE FILE
METHOD FILE BN2/FAC1D
DFILE
ANALYST
SUPERVISOR
BATCH #'S

(PLEASE INITIAL)

CURRENT SUB STATUS	STANDARDS UPDATES
A	DAYS
B	BY

NAME	DATA FILE	UL INJ	TUNE	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLOT Y/N
G-0672A	7F6264		25				Y
G-3215A	65		26				Y
G-0673A	66		27				Y
G-0669A	67		28				Y
G-0668A	68		29				Y
G-2866A	69		30				
G-3682A	70		31				
DFTPP	71		32				
Calib STD 2	72		33				
BC2506AS	73		34				
G-3370AS	74		35				Y
BC2506A	75		36				
G-1755A	76		37				Y
G-3370A	77		38				
G-3369A	78		39				
G-3369AR	79		40				
G-1754A	80		41				
BFB174A	81		42				
G-0675A	82		43				
G-0671A	83		44				
G-1805A	84		45				
G-3216A	85		46				
G-1806A	86		47				
G-4663A	87		48				

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Analysis Custody Log

... 03 SHIFT	
...TION	BN-LB
...UMBER	C
...NCE FILE	TA
...D FILE	BNDG
...LE	BND
...YST	[illegible]
...VISOR	
...N #'s	2513 2525

(PLEASE INITIAL)

...EN/OTHERS	STANDARDS UPDATED
[illegible]	DATE
	BY

STANDA...			
DFTPP	25	9534	2ul
Calib 1	6	9526	1ul
Calib 2	10	9527	
Calib 3	200	9528	
Calib 4	150	9529	

NAME	DATA FILE	UL INJ	AUTO #	DIL	TAPE #	SPECIALS (WRITE A-TYPE)	PLUS Y/N
DFTPP	766507	2ul					
Calib 1	766508		1				
Calib 2	766509		2				
Calib 3	766510		3				
Calib 4	766511		4				
QC2525B	766512		5			BN+1	Y
QC2525BS	766513		6				Y
G0669 BS	766514		7				
G9625B	766515		8				
F9626B	766516		9				
G1019B	766517		10				
F8975B	766518		11				
G3682B	766519		12				
G3215B	766520		13				
G4116B	766521		14				Y
G0668B	766522		15				Y
DFTPP	766523		16				Y
Calib 2	766524		17				
G0669B	766525		18				Y
G0672B	766526		19	1:3			Y
G0673B	766527		20				Y
G1654B	766528		21				
G1654BR	766529		22				
30 Bapd/Bpm	766530						
60 NOU "	766531						
300 "	766532						

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