STANDARD
OPERATING
PROCEDURE

Subject or Title: Volatiles Screening Analysis by GC/FID		Page 1 of 24
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1. SCOPE AND APPLICATION

1.1 Volatiles screening analysis by GC/FID is done to establish the approximate concentration of the following analytes to determine a workable dilution for final analysis by GC/MS.

1.2 Analytes - The analytes that can be determined by this method are listed in Table 1.

1.3 Detection Limits - Since this procedure is a screen to determine approximate concentrations, detection limits do not apply.

1.4 Dynamic Range - Typical Dynamic Range for GC/FID analysis is $1x10^7$.

1.5 Approximate analytical time - 30 minutes per sample.

2. SUMMARY OF METHOD

2.1 Samples are extracted by liquid/liquid method using dodecane as an extraction solvent, or by mini extraction using Methanol as an extraction solvent. The extracts are then analyzed by GC/FID. The data is then evaluated to determine an applicable dilution for GC/MS detection limits.

TABLE 1. ANALYTES DETERMINED BY THIS METHOD

1,1-Dichloroethene	trans-1,3-dichloropropene
Methylene chloride	1,1,2-trichloroethane
trans-1,2-dichloroethene	Tetrachloroethene
1,1-Dichloroethane	2-Hexanone
2-Butanone	Chlorobenzene
Chloroform	Ethylbenzene

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1,1,1-Trichloroethane
Carbon tetrachloride
Benzene
Trichlorethene
1,2-Dichloropropane
m-Dichlorobenzene
2-Chloroethyl vinyl ether
cis-1,3-dichloropropene
4-Methyl-2-pentanone
m & p-Xylenes
o-xylene

Bromofluorobenzene (Int.Std.)
1,1,2,2-Tetrachloroethane

p-Dichlorobenzene
o-Dichlorobenzene
Toluene

3. SAFETY ISSUES

3.1 As in all use of organic solvents and reagents, concentrated acids must be separated from organics. In many instances, the above are incompatible.

3.2 Dodecane, one of the extraction solvents, and many of the compounds from the target compound list are suspect carcinogens. Methanol, the other extraction solvent, is a cumulative poison and causes blindness. The extraction analyst must wear gloves and a lab coat, as well as safety glasses in the extraction laboratory. The screening analyst must wear a lab coat and safety glasses in the GC laboratory.

4. SAMPLE CONTAINERS AND HOLDING TIMES.

4.1 Water samples for volatiles extraction typically come in 40 mL vials with cap and Teflon lined septa. Ideally, water samples have no headspace.

4.2 Soil, solid and waste samples should be provided in 7 oz. glass jars with minimal headspace. Samples requiring other tests should be subsampled into 7 oz. jars.

4.3 Sample holding times.

4.3.1 All samples to be screened by GC/FID for final analysis by MS must be extracted and analyzed within 48 hours of sample receipt.

5. APPARATUS

5.1 Hewlett Packard 5890 GC or equivalent

5.1.1 Supelco 11 mm LB2 septa or equivalent

5.1.2 Hewlett Packard frosted quartz 2 mm ID injection port liner or equivalent

5.1.3 J & W scientific fused silica megabore 30 M x 0.54 mm open tubular column with DB-624 liquid phase or equivalent

5.1.4 Hewlett Packard Flame Ionization Detector or equivalent

5.2 Hewlett Packard 7673A Autosampler or equivalent

5.3 Hewlett Packard 3392A Integrator or equivalent

5.4 Hewlett Packard 7673A Controller or equivalent

5.5 Nelson 3000 Series Chromatographic Data System or equivalent

5.6 Compaq PC or equivalent

5.7 Centrifuge

5.8 Rotary tumbler extractor

5.9 Wheaton 40 mL and 20 mL VOA vials with 24-400 solid caps or equivalent

6. STANDARDS AND REAGENTS

6.1 Reagent water - Carbon filtered (Organic-free) water (CF water)

6.2 Reagent grade Sodium Chloride

6.3 High purity Methanol (purge and trap grade)

6.4 High purity Dodecane spiked with Bromofluorobenzene (BFB) at 10 ppm, prepared by Standards Preparation staff.

6.5 Supelco Purgeable A Mix. Contents and concentration listed in Table 2.

6.6 Supelco Purgeable B Mix. Contents and concentration listed in Table 3.

6.7 GC-VOASCR-PURG-E prepared by RMAL Standards Preparation staff. Contents and concentrations are listed in Table 4.

6.8 MSS-VOA-SCS prepared by RMAL Standards Preparation staff (Table 5).

6.9 MSS-VOA-LCS prepared by RMAL Standards Preparation staff (Table 6).

TABLE 2. SUPELCO PURGEABLE A

200 µg/mL of following components in methanol:

Methylene Chloride	Trichloroethene
Trichlorofluoromethane	1,1,2-Trichloroethane
1,1-Dichloroethene	Dibromochloromethane
Chloroform	2-Chloroethylvinyl ether
Carbon tetrachloride	Tetrachloroethene
1,2-Dichloropropane	Chlorobenzene

TABLE 3. SUPELCO PURGEABLE B

200 µg/mL of following components in methanol (except as noted):

trans-1,2-dichloroethene	Benzene
1,2-Dichloroethane	
1,1,1-Trichloroethane	Bromoform
Bromodichloromethane	1,1,2,2-Tetrachloroethane
trans-1,3-dichloropropene*	Toluene
cis-1,3-dichloropropene*	Ethyl benzene

*400 µg/mL total dichloropropene, composed of:
38% trans-1,3-dichloropropene
62% cis-1,3-dichloropropene

TABLE 4. GCS - VOA PURG-E

2-Butanone	500 μg/mL
2-Hexanone	500 μg/mL
4-Methyl-2-pentanone	500 μg/mL
m-xylene	200 μg/mL
o-xylene	200 μg/mL
Chloroform	300 μg/mL

TABLE 5. MSS-VOA-SCS

25 μg/mL of following components in methanol

1,2-Dichloroethane-d4
4-Bromofluorobenzene (BFB)
Toluene-D8

TABLE 6. MSS-VOA-LCS

25 μg/mL of following components in methanol

1,1-Dichloroethene
Trichloroethene
Chlorobenzene
Toluene
Benzene

7. PROCEDURES

7.1 Preparation of glassware used

7.1.1 Prebaked 20 mL and 40 mL VOA vials

7.1.1.1 Bake vials in oven at 80°C for a minimum of one hour.

7.1.1.2 Cap vials immediately upon removing from oven.

7.1.2 Prebaked, presalted vials

7.1.2.1 Bake vials as in 7.1.1.1

7.1.2.2 Add ~10 grams NaCl to each vial upon removing from oven. Cap immediately.

7.2 Preparation of Reagent Blanks

7.2.1 Add 35 - 38 mL CF water to each of two prebaked, presalted vials. Note: exact volume is not important.

7.2.2 Add 1.0 mL BFB spiked Dodecane to each blank.

7.2.3 Extract with samples (section 7.4)

7.2.4 Carefully remove organic layer and transfer to a 2 mL crimp top autosampler vial. Cap tightly.

7.2.5 One set of two reagent blanks should be prepared with every set of samples.

7.3 Preparation of calibration standards.

7.3.1 Add 35 - 38 mL CF water to each of two prebaked presalted vials. Note: exact volume is not important.

7.3.2 Add 1.0 mL of BFB spiked Dodecane to each vial.

7.3.3 Using a 100 uL Hamilton syringe, add 50 uL each: Purgeable A, Purgeable B, and GC-VOASCR-PURG-E to each standard prepared.

7.3.4 Extract with samples.

7.3.5 Remove organic layer as in 7.2.4.

7.3.6 Two calibration standards are generally prepared, one for each column. For long runs (more than 25 extracts), however, four should be prepared; and a calibration update should be initiated in the middle of each run.

7.4 Extraction of water samples.

7.4.1 Helpful Hints

7.4.1.1 Keep in mind that at least one vial of sample is needed for final analysis by GC/MS. One entire vial is also needed for screening extraction. If only one vial exists, do not extract it. Contact the GC/MS VOA scheduler or supervisor to schedule a same day screen/analysis.

7.4.1.2 If the sample being extracted is non homogenous, shake it to insure homogeneity before use. If sample has an oil phase, consult LIMS special instructions or the client manager for sampling advise.

7.4.1.3 If an emulsion forms during extraction, centrifuge to force separation. When centrifuging 20 or 40 mL vials, do not operate the centrifuge above a setting of 4. Sample breakage will result. If centrifuging 2 mL crimp top vials, use highest setting. If emulsion is still present, transfer emulsified material into a 2 mL crimp top vial, cap and centrifuge at highest setting.

7.4.2 Extraction procedure

7.4.2.1 Transfer water sample designated for VOA screen analysis into a prebaked, presalted vial leaving 2 - 4 mL headspace. Discard remainder.

7.4.2.2 Add 1.0 mL BFB spiked Dodecane. Recap tightly.

7.4.2.3 Shake vigorously by hand for three minutes or place in a rotary extractor for a minimum of 20 minutes.

7.4.2.4 Carefully draw off the organic layer from the vial and transfer it to a 2 mL crimp top autosampler vial. Emulsion information in 7.4.1.3 applies here.

7.5 Low Level Extraction of Industrial and CLP Soils

7.5.1 Helpful hints

7.5.1.1 Emulsion information present in 7.4.1.3 is useful with this extraction also

7.5.1.2 If sample is non homogenous, mix with spatula to insure homogeneity before use.

7.5.2 Extraction procedure

7.5.2.1 Weigh 5 g ± 0.2g soil sample designated for screen analysis into a prebaked presalted vial. Record in screen book.

7.5.2.2 Fill vial to top (leave ~4 mL headspace) with CF water.

7.5.2.3 Add 1.0 mL BFB spiked Dodecane. Recap tightly.

7.5.2.4 Shake or tumble as in 7.4.2.3

7.5.2.5 Remove organic layers as in 7.4.2.4.

7.6 Medium Level extraction of Standard Product Soils and Wastes

7.6.1 Helpful Hints

7.6.1.1 Homogeneity information discussed in 7.5.1.2 applies here.

7.6.2 Extraction procedure

7.6.2.1 Weigh 5g ± 0.2g soil designated for screen analysis into a prebaked 20 mL vial. Record in log book.

7.6.2.2 Add 10 mL MeOH. Recap tightly.

7.6.2.3 Shake vigorously by hand or wrist action shaker for 2 minutes or tumble in a rotary extractor 8 minutes.

7.6.2.4 Centrifuge at setting #4 for 5 minutes to separate solid matter.

7.6.2.5 Carefully draw ~1 mL extract off the top, trying not to disturb the lower solid layer. Transfer to a 2 mL crimp top autosampler vial for screen analysis. Spike with BFB (Section 7.6.2.6) and cap tightly. Then transfer remainder of extract to two 2 mL screw top vials that have been labeled and taped. Fill both to the top, leaving as little headspace as possible. Cap tightly.

7.6.2.6 Spike aliquot designated for screen analysis with 0.010 mL of 1000 µg/mL BFB in Methanol using a 10 uL Hamilton Syringe. DO NOT spike aliquots designated for mass spec.

7.7 ML extraction of CLP soils

7.7.1 Helpful Hints

7.7.1.1 Homogeneity information discussed in 7.5.1.2 applies here.

7.7.2 Extraction procedure

7.7.2.1 Weigh 4 g± 0.2g soil designated for screen analysis into a prebaked 20 mL vial. Record in log book.

7.7.2.2 Follow steps 7.6.2.2 - 7.6.2.6

7.8 Extraction of oils

7.8.1 Oils are handled on a case by case basis, and special instructions should be consulted.

8. INSTRUMENTATION

8.1 Daily Maintenance

8.1.1 Change septa. See HP instrument manual for instructions

8.1.2 Check flows. Optimum flows are:
Helium 12 mL/min
Nitrogen 10 mL/min
Air 370 mL/min
Hydrogen 30 mL/min
Adjust if necessary

8.2 Monthly Maintenance

8.2.1 Lower injection port temperatures and detector temperatures to ambient.

8.2.2 Change injection port liners.

8.2.2.1 Remove autosampler towers.

8.2.2.2 Remove lower injection port nut.

8.2.2.3 Carefully remove injection port liner and replace with freshly silanized liner.

8.2.2.4 Reassemble

8.2.3 Silanizing injection port liners

8.2.3.1 Place dirty injection port liners in acid soak for 1 hour minimum. Remove.

8.2.3.2 Rinse first with cold water, then hot water, then liberally with acetone, hexane, CH_2Cl_2, and Methanol. Let dry thoroughly.

8.2.3.3 Soak injection port liners in a 10% solution of Hexamethyldisilazane in Hexane for a minimum of 8 hours. Remove, rinse with 200-300 mL Hexane, and let dry.

8.2.4 Cut the column

8.2.4.1 Remove fitting on injection port end of column.

8.2.4.2 Unwrap column one revolution and using a glass scorer, cut ~2 inches of column from injection port end. Inspect the cut end to be sure the cut was clean and square, leaving no jagged ends.

8.2.4.3 Replace the connecting nut and place a new 0.8 mm graphite/vespel ferrule on the end flush with the nut.

8.2.4.4 Using a ruler, measure 1 cm from the cut end of the column to the top of the nut thread. Mark the column under the nut so that when it is put in place in the injection port liner, the column amount measured extends up into the injection port liner. Turn the connecting fitting nut finger tight, then turn 3/4 to a full turn with a 3/16" wrench.

8.2.4.5 When cutting the detector end of the column, follow 8.2.4.1 - 8.2.4.3, applying to detector end.

8.2.4.6 When reconnecting detector end, feed column into detector as far as it will go, connect with nut, and withdraw 0.5 cm column out. Finish connection as in 8.2.4.4.

8.2.5 Visually inspect FIDs for contamination by removing housing. If dirty, remove parts and sonicate in applicable solvent. Reassemble.

8.2.6 Restore operating temperatures.

8.2.7 Helpful hints

8.2.7.1 If normal signals of 2 - 5 cannot be achieved after maintenance, bake oven at 260°C for 8 hours, or run ~20 solvent blanks overnight. This usually restores signal.

8.3 Analysis

8.3.1 GC conditions, temperatures and temperature programs are listed in table 7.

8.3.2 Integrator and 3392A report conditions are listed in Table 8.

8.3.3 7673A autosampler conditions are listed in Table 9.

8.3.4 Acquisition parameters for the Nelson data system are listed in Appendix A (Method Files).

8.3.5 INET Nelson analysis

8.3.5.1 Determine sample order for each column and log it on the instrument log (see Appendix B).

8.3.5.2 All runs should begin with an old standard (to prime the column) then the calibration must be entered into Nelson as AUTOCAL1RE for the system to update on that standard.

TABLE 7

Gas Chromatograph Operating Conditions

Initial oven temp.	35°C
Initial time	1 min.
Rate	5°C/min.
Final Temp.	100°C
Final Time	5 min.
Rate A	50°C/min.
Final Temp. A	270°C
Final Time	5 min.
Injector Temp.	245°C
Detector Temp.	260°C
Signal range	0
zero	0
Signal Atten.	0
Equib Time	1.00 min.
Purge Valve Time	turns on at 0.5 min.;turns off at end of run
Purge Vent Flow	5 mL/min.
He Flow (carrier gas)	12 mL/min.
H_2 Flow	30 mL/min.
Air Flow	370 mL/min.

TABLE 8

3392A/Integrator Conditions

WORKFILE ID: C
WORKFILE NAME:

RUN PRMTRS
ZERO = 10
ATT 2+ = 3
CHT SP = 0.0
PK WD = 0.04
THRSH = 3
AR REJ = 1000

RPRT OPTNS

2.	RF UNC PKS=	0.000E=00
3.	MUL FACTOR=	1.000E+00
4.	PK HEIGHT MODE	NO
5.	EXTEND RT	NO
6.	RPRT UNC PKS	NO

TIME TBL
EMPTY

CALIB TBL
EMPTY

7.	SUPPRESS RPRT	YES
8.	TRANSMIT RPRT	NO
9.	HOW RDY DELAY	NO
10.	AUTOMATE RUNS	YES
11.	SAMPLER PRMTRS	
12.	TRANSMIT PEAKS	NO
13.	TRANSMIT POINTS	NO
14.	SLICE WIDTH=	0.000E+00
15.	ID:	

16. ISTD AMT=
    SAMPLE AMT=
17. INSTR NETWORK CONFIG TBL
18. NEXT WORKFILE:
    RUNS/SUBSEQ:
19. TIME SCALE NO

TABLE 9

Autosampler Conditions

OP # 1 1 @

7673A SAMPLER,
 LOOP ADDRESS: 1

FRONT INJECTOR

INJ/BOTTLE	1 →	@
FIRST BOTTLE	1 →	@
LAST BOTTLE	50→	@
# OF SAMPLE WASHES	3 →	@
# OF PUMPS	5 →	@
VISCOSITY	0 →	@
VOLUME	1 →	@
# OF SOLVENT A WASHES	3 →	@
# OF SOLVENT B WASHES	3 →	@
PRIORITY SAMPLE <1=YES>	0 →	@
ON-COLUMN <1=YES>	0 →	@

REAR INJECTOR

INJ/BOTTLE	1 →	@
FIRST BOTTLE	51 →	@
LAST BOTTLE	100 →	@
# OF SAMPLE WASHES	3 →	@
# OF PUMPS	5 →	@
VISCOSITY	0 →	@
VOLUME	1 →	@
# OF SOLVENT A WASHES	3 →	@
# OF SOLVENT B WASHES	3 →	@
PRIORITY SAMPLE <1=YES>	0 →	@
ON-COLUMN <1=YES>	0 →	@

POSITION <1=FRONT, 2=REAR>
 INET CHANNEL 1 1 → @

@ = [enter]

8.3.5.3 Enter the correct header information in the sequence file for each column:
[F3] in Nelson main menu:
Generate or modify a sequence: step through to Sequence File Name and type [M:AMON] or [M:AMON2] or [M:ATUE] or [M:ATUE2], etc., according to the day of the week and whether it is the first or second sequence for the day. Type over over sample name and for each column and update data file name to select the present Julian date, the channel and the instrument designation.

e.g.	Sample name?	[A: B:]
	Method file name?	[M:AVOASCRN]
	Data file name?	[H:OI032]
	Amount injected? (0 to 9999999)	[1]
	Int. Std. amount? (0 to 9999999)	[1]
	Dilution factor? (0 to 9999999)	[1]
	Sample weight? (0 to 9999999)	[1]
	Data file name OA032 means:	channel O instrument I Julian date - Feb. 2 (i.e. the 32nd day of the year)

8.3.5.4 Helpful Hints

8.3.5.4.1 Note that this is a 2 channel acquisition on 1 interface. Therefore, only one sequence file is made, M:AMON, etc., which reflects both channels A: & B:.

8.3.5.4.2 If the sample name is the same for both A & B column (e.g. A: H_2O blank B: H_2O blank), then the sample name can be recorded only once and without a column designation.

e.g. Sample name? [H_2O blank]
etc.

8.3.5.5 After sequence information is complete:

[F9] stores it, [M:AMON], etc.

[F8] prints it

[F10] exits to main menu

8.3.5.6 Set samples into autosampler tray in corresponding order to sequence file stored in Nelson. See 8.3.5.2.

8.3.5.7 From Main Menu on Nelson, [0] to acquire data.

8.3.5.8 [F2] to download the sequence file, [M:AMON], etc. Enter correct information.

8.3.5.8.1 To download sequence information:

Type in correct interface number, interface 12 is used for the VOASCREEN analysis.

Type in correct starting cycle number.

Type yes if using a sequence file.

Type name of sequence file, [M:AMON], etc.

Enter Method file name: M:AVOASCRN, by doing this Nelsen will automatically use M:BVOASCRN for the second channel.

8.3.5.9 Be sure you return to AUTOSCAN mode.

8.3.6 Start the sequence (Refer to Table 7).

8.3.6.1 Type [OP#] [1] [1] on integrator.

8.3.6.2 Enter correct starting bottle number and step through the remaining front=1, back=51.

8.3.6.3 Hit the start button on the integrator.

8.3.6.4 Verify that Nelson system starts sampling (red light on) at injection time. It may be necessary to push Nelson start for first injection.

8.3.6.5 Visually verify that Nelson has begun acquiring data from interface 12.

9. DATA REDUCTION

9.1 Qualitative Identification

9.1.1 All identification is based on retention time. Internal standard (BFB) will reflect any fluctuations in retention time between runs.

9.1.2 Retention time windows for the first ten compounds (1,1-Dichloroethene through Benzene) are 5%. Windows for remaining compounds are 2.5%. Retention times are updated automatically with each daily calibration standard (Nelson AUTOCAL1RE).

9.2 Quantitative Determination/Dilution calculation

9.2.1 Introduction. VOA screening analysis establishes the approximate concentration of target analytes to determine a dilution which will place the highest concentration compound (target or non-target) at a level of 100 μg/L in the final run. Since the FID response is variable for the target compounds, the screening system is more effective for some classes of compounds than others.

9.2.1.1 System is effective for Benzene, Toluene, Xylenes, and most hydrocarbons (good responders).

9.2.1.2 System is moderately effective for chlorinated compounds (moderate responders).

9.2.1.3 System is poor for ketones and trihalomethanes (poor responders).

9.2.1.4 System is not effective for acetone (does not extract well).

9.2.1.5 Dilutions based on moderate and poor responders lead to overdiluted runs if identifications are not correct. In general, identifications for bromoform, dibromochloromethane, and bromodichloromethane are not correct; dilutions should not be based on these compounds.

9.2.1.6 The GC/MS analyst should evaluate one sample in a project at the recommended dilution. This can be useful to evaluate screening information for other samples in the project.

9.2.2 Low level water samples

9.2.2.1 The water/dodecane extraction uses a 40 to 1 extraction
The optimum sample size = 5 mL @ 100 µg/L which is equivalent to 4000 µg/L in the dodecane extract.

9.2.2.2 Examine the sample chromatogram. Find the highest concentration target compound (not present in the blank, >4000 µg/L in dodecane extract). Also examine the chromatogram for any aberrations or anything that might indicate a faulty injection.

9.2.2.3 Divide the concentration found in the extract into 20000; the result is equal to the recommended volume in 5.0 mL for GC/MS analysis. (example: 20000/4000=5.0 mL; 2000/8000=2.5 mL)

9.2.2.4 Unknowns are calculated using the response factor of m+p-xylene. If any unknown is greater than the highest concentration target, the dilution recommendation is based on the unknown using the same calculation as above.

9.2.2.5 If no targets or unknowns are >4000 ug/L in the dodecane extract, the recommended volume is 5.0 mL.

9.2.3 Low level soil samples

9.2.3.1 Use the same techniques and calculations as water samples, substituting g for mL in 9.2.2.3. and 9.2.2.5.

9.2.3.2 If screen indicates less than 0.5 g needed for industrial, or <1.0 g for CLP or AFIR, prepare a medium level extract. See Table 10.

9.2.4 Medium level soils/wastes

9.2.4.1 These extractions use 5 grams of soil in 10 mL of methanol (4 grams for CLP). The optimum sample size for GC/MS = 0.100 mL MeOH extract in 5 mL water (0.100 mL 5000 μg/L = 5.0 mL 100 μg/L)

9.2.4.2 Techniques and calculations are similar to water samples, except divide highest concentration target compound into 500. The result is equal to the recommended volume of extract to add to 5 mL of water for GC/MS analysis.
Example: 500/5000 = 0.100 mL;
500/10000 = 0.050 mL

TABLE 10

The following table lists minimum and maximum sample size for various VOA tests based on results of the screening.

TYPE	MATRIX	PREP	GC/MS MIN RUN	MAX RUN	COMMENTS	LIMS SCREENING TEST
EPA/CLP	H_2O	LL-40 mL	DILN	5.0 mL	If <0.1 mL serial dilute	P-624-VOASCR-RAS-A
	LL SOIL	LL-5g/40mL	1.0g	5.0g	If<1.0g go to ML prep	P-8240-VOASCR-RAS-S
	ML SOIL	ML-4g/10mL	DILN	100uL	If <5 uL serial dilute	
IND	H_2O	LL-40mL	DILN	5.0mL	If <0.1mL serial dilute	P-624-VOASCR-A
	LL SOIL	LL-5g/40mL	0.5g	5.0g	If<0.5g go to ML prep	P-8240-VOASCR-L-S
	ML SOIL	ML-5g/10mL	DILN	100uL	Standard Prod If <5ul, serial dilute	P-8240-VOASCR-S
	WASTE	ML-5g/10mL	DILN	100uL	If <5ul, serial dilute	P-8240-VOASCR-W
	TCLP	LL-40 mL	DILN	1.0 mL	May do oil& H_2O phase separately	P-8240-SCR-TCLP-L
AFIRP	SOIL	LL-5g/40mL	1.0g	5.0g	If <1.0g go to ML prep	P-8240-SCR-AFIR-S
		ML-5g/40mL	DILN	100uL	If <5 ul serial dilute	
MKE	H_2O	LL-40mL	DILN	5.0mL	If <0.1mL serial dilute	P-624-VOASCR-A

10. REPORTING REQUIREMENTS

10.1 Screening data is not entered into the LIMS system. However, screen LIMS tests must be completed and released on the same day that samples are extracted. This is important for medium level methanol extractions because the test completed date is equal to the preparation test for GC/MS VOA tests. If a sample is re-extracted at a later date, the screen test completed test must be changed to reflect the latest extraction date.

10.2 All data should be analyzed, reduced, and reviewed by the day after extraction. Data from each project analyzed is grouped into separate folders. Copies of the appropriate (column A or column B) standard, MeOH blank, and dodecane extract should be placed with each project folder. These folders are then placed in the VOA screening satellite file in the GC/MS lab.

11. REFERENCES

USEPA Contract Laboratory Program: Statement of Work for Organics Analysis. Multi-Media, Multi-Concentration. 10/86. Rev: 1/87, 2/87, 7/87

APPENDIX A.

Nelson Method Files

Method file name: M:AVOASCRN
Default Sample Name: VOA SCREENING
Operator: TAR Date-time: 01-
20-1989 17:20:14 version: 253

ACQUISITION PARAMETERS

SINGLE OR DUAL CHANNEL (1 OR 2)	1.00
RUN TIME (minutes)	19.00
END TIME FOR PLOTS (default=RUN TIME)	19.00
SOLVENT DELAY TIME (minutes)	0.00
PEAK DETECTION THRESHOLD (microv/sec)	1.00
Area Threshold	500.00
MINIMUM PEAK WIDTH (seconds)	5.00
TIME FOR ONE SAMPLE (seconds)	0.00
NUMBER OF REAL TIME CRT PAGES TO PLOT (0 TO 99)	5.00
REAL TIME PLOT FULL SCALE FOR CH.0 (millivolts)	50.00
REAL TIME FULL SCALE FOR CH.1 (millivolts)	50.00
HARD COPY REAL TIME PLOT	NO
AUTO ZERO REAL TIME PLOT	NO
Pre Version 4 method	NO
RECORD AREA TABLES ON DISK	YES
RECORD RAW DATA	YES
NUMBER OF CRT PAGES FOR REPLOT (1 TO 99)	5.00
VERTICAL SCALE FACTOR FOR REPLOT (units of largest peak)	0.00
OFFSET FOR THE REPLOT (millivolts)	0.00
PUT NAMES ON REPLOT?	YES
PRINT AREA PERCENT REPORT	NO
PRINT EXTERNAL STANDARD REPORT	YES
PRINT INTERNAL STANDARD REPORT	NO
FINAL REPORT AREA REJECT (microvolt-sec)	100.00
LINK TO USER PROGRAM	YES
FORCE DROP LINE INTEGRATION	NO
FORCE COMMON BASE LINE	NO
FULL SCALE RANGE FOR A.D.C. (3=1VOLT, 1=2VOLT, 0=10VOLT)	3.00
AREA REJECT FOR REFERENCE PEAKS?	%1000000000.00
% RET TIME WINDOW FOR REFERENCE PEAKS	5.00
RET TIME WINDOW IN SECONDS FOR REF. PEAKS	7.00
AREA OR PEAK HEIGHT QUANTITATION (0 OR 1)	0.00
PRINT GROUP REPORT	NO
NUMBER OF CALIBRATION LEVELS (1 TO 6)	1.00
LIST COMPONENTS NOT FOUND IN SAMPLE?	NO
INCLUDE UNKNOWN PEAKS IN REPORTS?	YES
UPDATE RESPONSE FACTORS WITH REPLACEMENT (0) OR AVERAGE (1)	0.00
DEFAULT DILUTION FACTOR	1.00
DEFAULT SAMPLE WEIGHT	1.00
DEFAULT AMOUNT INJECTED	1.00
DEFAULT AMOUNT OF INTERNAL STANDARD	1.00
PRINT GPC MW DISTRIBUTION	NO
PRINT SIMULATED DISTILLATION REPORT	NO

LT TO PROGRAM FORMFEED.EXE
S 1 RESULTS IN: D:00500.ATB
SAVE RAW DATA IN: D:00500.PTS
Response Factor for unknowns= 0.0000E+00
Component Units = ug/L

1 1,1,2-TRICHLOROETHANE Ret. Time = 1.19 min. Fit.type = 0
Ref. Comp.: 1,1,2-TRICHLOROETHANE Int Std: BF3 Window = 0.05:

[illegible]	[illegible]	AMOUNT	[illegible]	[illegible]

2 METHYLENE CHLORIDE Ret. Time = 1.44 min. Fit.type = 0
Ref. peak: METHYLENE CHLORIDE Int Std: BFB Window size: 3.0%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	17644	10000.00000000	0.56677087

3 12DICHLOROETHENE Ret. Time = 1.59 min. Fit.type = 0
Ref. peak: T12DICHLOROETHENE Int Std: BFB Window size: 3.0%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	34236	10000.00000000	0.29166412

4 11DICHLOROETHANE Ret. Time = 1.85 min. Fit.type = 0
Ref. peak: 11DICHLOROETHANE Int Std: BFB Window size: 2.0%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	70519	10000.00000000	0.14180480

5 2-BUTANONE Ret. Time = 2.28 min. Fit.type = 0
Ref. peak: 2-BUTANONE Int Std: BFB Window size: 3.0%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	7736	25000.00000000	3.23176960

6 CHLOROFORM Ret. Time = 2.52 min. Fit.type = 0
Ref. peak: CHLOROFORM Int Std: BFB Window size: 3.0%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	20078	25000.00000000	1.24515009

7 111TRICHLOROETHANE Ret. Time = 2.63 min. Fit.type = 0
Ref. peak: 111TRICHLOROETHANE Int Std: BFB Window size: 3.0%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	18004	10000.00000000	0.55544102

CARBON TET Ret. Time = 2.76 min. Fit.type = 0
Ref. peak: CARBON TET Int Std: BFB Window size: 3.0%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	4528	10000.00000000	2.20836140

9 BENZENE Ret. Time = 2.97 min. Fit.type = 0
Ref. peak: BENZENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	198106	8500.00000000	0.04290628

10 TRICHLOROETHENE Ret. Time = 3.66 min. Fit.type = 0
Ref. peak: TRICHLOROETHENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	64791	10000.00000000	0.15434207

11 12DICHLOROPROPANE Ret. Time = 3.93 min. Fit.type = 0
Ref. peak: 12DICHLOROPROPANE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	107444	10000.00000000	0.09307218

12 C13DICHLOROPROPENE Ret. Time = 4.97 min. Fit.type = 0
Ref. peak: C13DICHLOROPROPENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	48781	11000.00000000	0.22549920

13 4METHYL2PENTONE Ret. Time = 5.25 min. Fit.type = 0
Ref. peak: 4METHYL2PENTONE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	85134	25000.00000000	0.29365[illegible]4

14 TOLUENE Ret. Time = 5.41 min. Fit.type = 0
Ref. peak: TOLUENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
[illegible]	[illegible]	[illegible]	[illegible]

15 T12DICHLOROPROPENE Ret. Time = 5.91 min. Fit.type = 0
Ref. peak: T12DICHLOROPROPENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	34329	9000.00000000	0.26216862

16 112TRICHLOROETHANE Ret. Time = 6.20 min. Fit.type = 0
Ref. peak: 112TRICHLOROETHANE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	16479	10000.00000000	0.60684949

17 TETRACHLOROETHENE Ret. Time = 6.29 min. Fit.type = 0
Ref. peak: TETRACHLOROETHENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	16271	10000.00000000	0.61437300

18 2HEXANONE Ret. Time = 6.74 min. Fit.type = 0
Ref. peak: 2HEXANONE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	172573	25000.00000000	0.14486606

19 CHLOROBENZENE Ret. Time = 7.98 min. Fit.type = 0
Ref. peak: CHLOROBENZENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	225574	10000.00000000	0.04433131

20 ETHYLBENZENE Ret. Time = 8.29 min. Fit.type = 0
Ref. peak: ETHYLBENZENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	135721	10000.00000000	0.07368062

21 M&P XYLENES Ret. Time = 8.56 min. Fit.type = 0
Ref. peak: M&P XYLENES Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	146851	10000.00000000	0.06809614

22 O-XYLENE Ret. Time = 9.41 min. Fit.type = 0
Ref. peak: O-XYLENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	180100	10000.00000000	0.05552462

23 BFB Ret. Time = 10.67 min. Fit.type = 0
Ref. peak: BFB Int Std: BFB Window size: 5.0%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	90919	10000.00000000	0.10999818

24 1122TETRACLETHANE Ret. Time = 11.31 min. Fit.type = 0
Ref. peak: 1122TETRACLETHANE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	28678	10000.00000000	0.34869828

25 M-DICHLOROBENZENE Ret. Time = 13.37 min. Fit.type = 0
Ref. peak: M-DICHLOROBENZENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	82990	10000.00000000	0.12049652

26 P-DICHLOROBENZENE Ret. Time = 13.68 min. Fit.type = 0
Ref. peak: P-DICHLOROBENZENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	85492	20000.00000000	0.23394131

27 O-DICHLOROBENZENE Ret. Time = 14.78 min. Fit.type = 0
Ref. peak: O-DICHLOROBENZENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	[illegible]	10000.00000000	[illegible]

Seq	Time	Event	Description
1	0.00	1C	relay (Close/Open)
2	0.00	FBA	Force Baseline at All peak starts
3	0.01	1O	relay (Close/Open)

Method file name: M:BVOASCRN
Default Sample Name: VOA SCREENING
Operator: TAR Date-time: 01-
20-1989 17:25:06 version: 192

ACQUISITION PARAMETERS

SINGLE OR DUAL CHANNEL (1 OR 2)	2.00
RUN TIME (minutes)	19.00
END TIME FOR PLOTS (default=RUN TIME)	19.00
SOLVENT DELAY TIME (minutes)	0.00
PEAK DETECTION THRESHOLD (microv/sec)	1.00
Area Threshold	500.00
MINIMUM PEAK WIDTH (seconds)	5.00
TIME FOR ONE SAMPLE (seconds)	0.60
NUMBER OF REAL TIME CRT PAGES TO PLOT (0 TO 99)	5.00
REAL TIME PLOT FULL SCALE FOR CH.0 (millivolts)	50.00
REAL TIME FULL SCALE FOR CH.1 (millivolts)	50.00
HARD COPY REAL TIME PLOT	NO
AUTO ZERO REAL TIME PLOT	NO
Pre Version 4 method	NO
RECORD AREA TABLES ON DISK	YES
RECORD RAW DATA	YES
NUMBER OF CRT PAGES FOR REPLOT (1 TO 99)	5.00
VERTICAL SCALE FACTOR FOR REPLOT (units of largest peak)	0.00
OFFSET FOR THE REPLOT (millivolts)	0.00
PUT NAMES ON REPLOT?	YES
PRINT AREA PERCENT REPORT	NO
INT EXTERNAL STANDARD REPORT	YES
PRINT INTERNAL STANDARD REPORT	NO
FINAL REPORT AREA REJECT (microvolt-sec)	100.00
LINK TO USER PROGRAM	YES
FORCE DROP LINE INTEGRATION	NO
FORCE COMMON BASE LINE	NO
FULL SCALE RANGE FOR A.D.C. (3=1VOLT, 1=2VOLT, 0=10VOLT)	3.00
AREA REJECT FOR REFERENCE PEAKS?	%1000000000.00
% RET TIME WINDOW FOR REFERENCE PEAKS	5.00
RET TIME WINDOW IN SECONDS FOR REF. PEAKS	7.00
AREA OR PEAK HEIGHT QUANTITATION (0 OR 1)	0.00
PRINT GROUP REPORT	NO
NUMBER OF CALIBRATION LEVELS (1 TO 6)	1.00
LIST COMPONENTS NOT FOUND IN SAMPLE?	NO
INCLUDE UNKNOWN PEAKS IN REPORTS?	YES
UPDATE RESPONSE FACTORS WITH REPLACEMENT (0) OR AVERAGE (1)	0.00
DEFAULT DILUTION FACTOR	1.00
DEFAULT SAMPLE WEIGHT	1.00
DEFAULT AMOUNT INJECTED	1.00
DEFAULT AMOUNT OF INTERNAL STANDARD	1.00
PRINT GPC MW DISTRIBUTION	NO
PRINT SIMULATED DISTILLATION REPORT	NO

L TO PROGRAM FORMFEED.EXE
SAVE RESULTS IN: D:10500.ATB
SAVE RAW DATA IN: D:10500.FTB
Response Factor for unknowns= 0.0000E+00
Component Units = ug/L

1 TRICHLOROETHENE Ret. Time = 1.25 min. Fit.type = 0
Ref. peak: TRICHLOROETHENE Int Std: BFB Window = 5.0%

1	[illegible]	[illegible]	[illegible]	[illegible]

2 METHYLENE CHLORIDE Ret. Time = 1.53 min. Fit.type = 0
Ref. peak: METHYLENE CHLORIDE Int Std: BFB Window size: 5.0%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	1415	10000.00000000	7.06563000

3 12DICHLOROETHENE Ret. Time = 1.68 min. Fit.type = 0
Ref. peak: T12DICHLOROETHENE Int Std: BFB Window size: 5.0%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	44831	10000.00000000	0.22306173

4 11DICHLOROETHANE Ret. Time = 1.95 min. Fit.type = 0
Ref. peak: 11DICHLOROETHANE Int Std: BFB Window size: 5.0%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	44983	10000.00000000	0.22230497

5 2BUTANONE Ret. Time = 2.40 min. Fit.type = 0
Ref. peak: 2BUTANONE Int Std: BFB Window size: 5.0%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	11263	25000.00000000	2.21957450

6 CHLOROFORM Ret. Time = 2.66 min. Fit.type = 0
Ref. peak: CHLOROFORM Int Std: BFB Window size: 5.0%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	19750	25000.00000000	1.26583493

7 111TRICHLOROETHANE Ret. Time = 2.79 min. Fit.type = 0
Ref. peak: 111TRICHLOROETHANE Int Std: BFB Window size: 5.0%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	37026	10000.00000000	0.27008259

8 CARBON TET Ret. Time = 2.94 min. Fit.type = 0
Ref. peak: CARBON TET Int Std: BFB Window size: 5.0%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	2877	10000.00000000	3.47589370

9 BENZENE Ret. Time = 3.14 min. Fit.type = 0
Ref. peak: BENZENE Int Std: BFB Window size: 5.0%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	225876	8500.00000000	0.03763135

10 TRICHLOROETHENE Ret. Time = 3.87 min. Fit.type = 0
Ref. peak: TRICHLOROETHENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	46607	10000.00000000	0.21456078

11 12DICHLOROPROPANE Ret. Time = 4.14 min. Fit.type = 0
Ref. peak: 12DICHLOROPROPANE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	2563	10000.00000000	3.90211300

12 C13DICHLOROPROPENE Ret. Time = 5.21 min. Fit.type = 0
Ref. peak: C13DICHLOROPROPENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	84932	11000.00000000	0.12951542

13 4METHYL2PENTONE Ret. Time = 5.51 min. Fit.type = 0
Ref. peak: 4METHYL2PENTONE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	143065	25000.00000000	0.17474538

14 TOLUENE Ret. Time = 5.69 min. Fit.type = 0
Ref. peak: TOLUENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
[illegible]	[illegible]	[illegible]	[illegible]

15 T13DICHLOROPROPENE Ret. Time = 5.13 min. Fit.type = 0
Ref. peak: T13DICHLOROPROPENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	42516	9000.00000000	0.21168377

16 112TRICHLOROETHANE Ret. Time = 6.48 min. Fit.type = 0
Ref. peak: 112TRICHLOROETHANE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	19675	10000.00000000	0.50827056

17 TETRACHLOROETHENE Ret. Time = 6.60 min. Fit.type = 0
Ref. peak: TETRACHLOROETHENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	1316	10000.00000000	7.59894560

18 2HEXANONE Ret. Time = 7.02 min. Fit.type = 0
Ref. peak: 2HEXANONE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	192403	25000.00000000	0.12993894

19 CHLOROBENZENE Ret. Time = 8.32 min. Fit.type = 0
Ref. peak: CHLOROBENZENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	144909	10000.00000000	0.06900902

20 ETHYLBENZENE Ret. Time = 8.62 min. Fit.type = 0
Ref. peak: ETHYLBENZENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	183297	10000.00000000	0.05455636

21 M&P-XYLENES Ret. Time = 8.89 min. Fit.type = 0
Ref. peak: M&P-XYLENES Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	197585	10000.00000000	0.05061118

22 O-XYLENE Ret. Time = 9.76 min. Fit.type = 0
Ref. peak: O-XYLENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	219194	10000.00000000	0.04562177

23 BFB Ret. Time = 11.02 min. Fit.type = 0
Ref. peak: BFB Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	117387	10000.00000000	0.08518252

24 1122TETRACLETHANE Ret. Time = 11.64 min. Fit.type = 0
Ref. peak: 1122TETRACLETHANE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	39452	10000.00000000	0.25347212

25 M-DICHLOROBENZENE Ret. Time = 13.79 min. Fit.type = 0
Ref. peak: M-DICHLOROBENZENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	116255	10000.00000000	0.08601728

26 P-DICHLOROBENZENE Ret. Time = 14.10 min. Fit.type = 0
Ref. peak: P-DICHLOROBENZENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	118268	10000.00000000	0.08455251

27 O-DICHLOROBENZENE Ret. Time = 15.23 min. Fit.type = 0
Ref. peak: O-DICHLOROBENZENE Int Std: BFB Window size: 2.5%

LEVEL	AREA	AMOUNT	RATIO (amount/area)
1	132002	10000.00000000	0.07577288

1	0.00	1C	relay (Close/Open)
2	0.00	F3A	Force Baseline at All peak starts
3	0.01	1D	relay (Close/Open)

APPENDIX B

Nelson Sequence File
Instrument Log

SEQUENCE RECORDED IN M:AVOASCRN.SEQ

	SAMPLE NAME	METHOD NAME	DATA FILE	AMOUNT INJECTED	INT.STD. AMOUNT	DILUTION FACTOR	SAMPLE WEIGHT
1	OLD HSL	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
2	AUTOCAL1RE	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
3	C12 BLANK	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
4	MEOH BLANK	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
5	A:3314-1 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
6	A:3317-1 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
7	A:3313-2 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
8	A:3313-3 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
9	A:3313-4 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
10	A:3305-1 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
11	A:3305-2 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
12	A:3305-3 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
13	A:3304-1 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
14	A:CLLE B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
15	A:3308-1 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
16	A:3308-2 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
17	A:3308-3 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
18	A:3308-4 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
19	A:3308-5 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
20	A:3308-6 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
21	A:3308-11 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
22	A:3308-12 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
23	A:3308-13 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
24	A:3308-14 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000
25	A:3308-15 B:MEOH	M:AVOASCRN	0I013	1.0000	1.0000	1.00	1.000

Data completed 1/14/89

5

VOLATIL SCREEN

				GC CONDITIONS								DETECTOR			PURGE		
Carrier Gas	Col Type	Phase	Inj Temp	Init Temp	Init Time	Ramp Rate	Final Temp	Final Time	Flow cc/min	Press psig	Type	Atten	Range	Temp	On	Off	Analyst
	DB 824		250°	40° ~~100°~~	1 min ~~0 min~~	5°/min ~~80°/min~~	100° ~~260°~~	4.5 min ~~7.0 min~~	~10		FID			280°	0.5	25	

E: 1/13/89 COLUMN (A) OR B COMMENTS:

Sample Number	Matrix	Extract Amount	Solvent	Injected Volume	File Name	Sequence File	Comments	Init.
Old HSL				1 ul	OI013	M:AVOASCRN		DF
Autocal								
Cl2 Blk								
MeOH Blk								
3314-1	Waste		MeOH					
3313-1								
3313-2								
3313-3								
3313-4								
3305-1								
3305-2								
3305-3								
3304-1								
CLLE								
3308-1								
3308-2								

VOLATILE SCREEN

Carrier Gas	Col Type	Phase	Inj Temp	Init Temp	Init Time	Ramp Rate	Final Temp	Final Time	Flow cc/min	Press psig	DETECTOR Type	Atten	Range	Temp	PURGE On	Off	Analyst
				QC CONDITIONS													
	DB			40°	1 min	5°/min	100°	4.5 min									
	624		260°	~~100°	0 min	60°/min	200°	7.0 min~~	~10		FID			200°	0.5	25	

DATE: 1/13/89 COLUMN (A) OR B COMMENTS:

	Sample Number	Matrix	Extract Amount	Solvent	Injected Volume	File Name	Sequence File	Comments	Init.
7	3308-3	H_2O	40ml	CL2	1ul	0I013	M:AVOASCRN		DF
8	3308-4	↓	↓	↓	↓	↓	↓		↓
9	3308-5								
10	3308-6								
11	3308-11								
12	3308-12								
13	3308-13								
14	3308-14								
15	3308-15	↓	↓	↓	↓	↓	↓		↓
16									
17									
18									
19									
20									
21									
22									

VOLATIL SCREEN

				GC CONDITIONS							DETECTOR			PURGE		
Carrier Gas	Col Type	Phase	Inj Temp	Init Temp	Init Time	Ramp Rate	Final Temp	Final Time	Flow cc/min	Press psig	Type	Atten	Range	Temp	On	Off	Analyst
	DB 624		260°	40° ~~100°~~	1 min ~~0 min~~	5°/min ~~60°/min~~	100° ~~260°~~	4.5 min ~~7.0 min~~	~10		FID			260°	0.5	25	

ATE: 1/13/89 COLUMN A OR (B) COMMENTS:

Sample Number	Matrix	Extract Amount	Solvent	Injected Volume	File Name	Sequence File	Comments	Init.
Old HSL				1ul	1I013	M:BVOASCRN		DF
Autocal								
C12 Blk								
MeOH Blk		~~Mo~~	MeOH					

AUTOCAL1RE Processed: 01-13-1989 18:29:18, segment 2, cycle 2
Error, duplicate file name = D:1I0132.PTS
Er ~r, duplicate file name = D:0I0132.PTS
R/ DATA SAVED IN FILE D:0J0132.PTS Second Channel Stored in D:1J0132.PTS

***** EXTERNAL STANDARD TABLE *****

********** 01-13-1989 18:30:18 Version 4.1 **********
* Sample Name: AUTOCAL1RE Data File: D:0J0132 *
* Date: 01-13-1989 18:29:59 Method: M:AVOASCRN 01-12-1989 17:52:23 # 243*
* Interface: 0 Cycle#: 2 Operator DF Channel#: 0 Vial#: N.A. *
* Starting Peak Width: 5 Threshold: 1 Area Threshold: 500 *
****

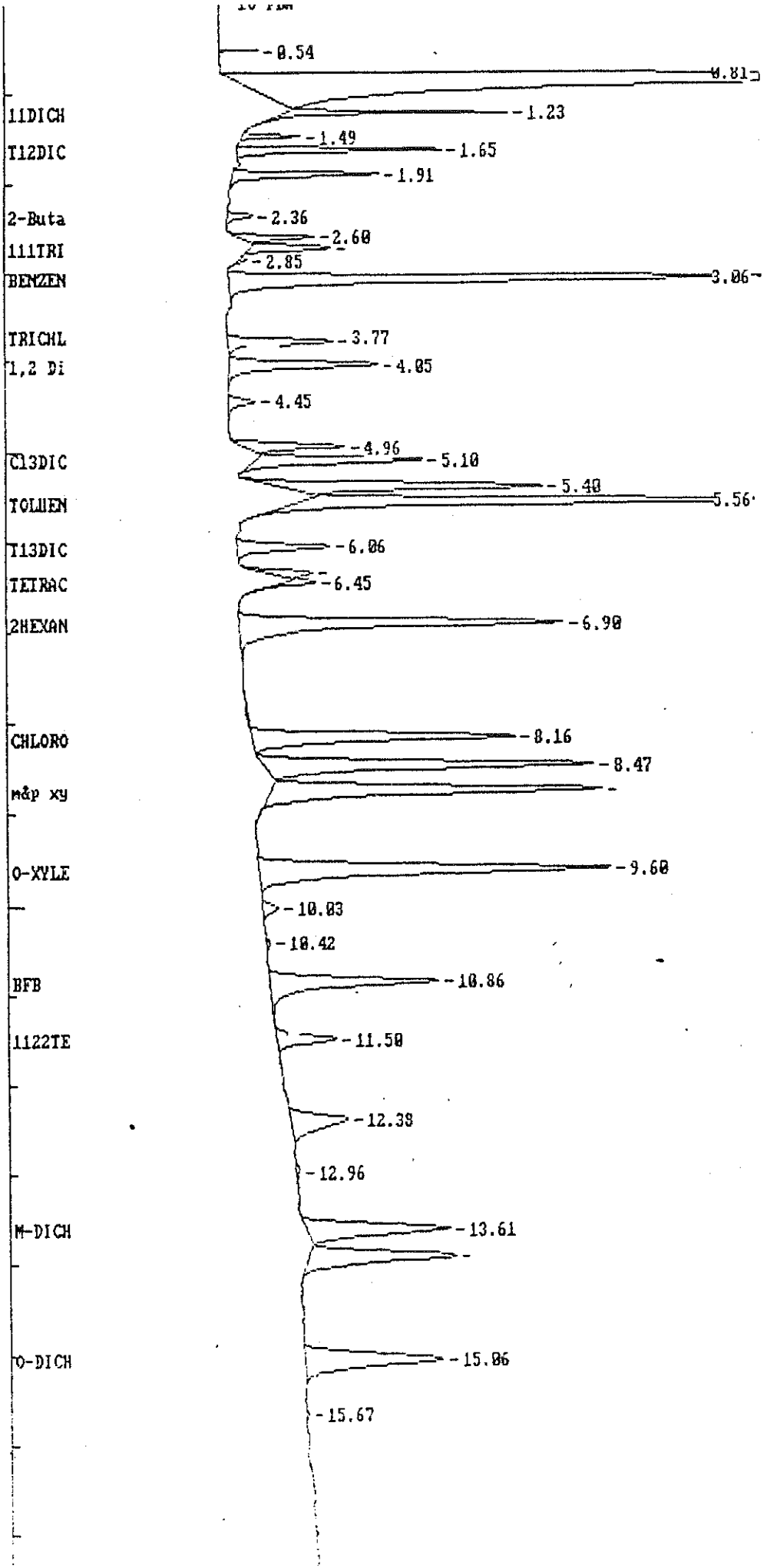
Starting Delay: 0.00 Ending retention time: 19.00
Area reject: 100 One sample per 0.602 sec.
Amount injected: 1.00 Dilution factor: 1.00
Sample Weight: 1.000000

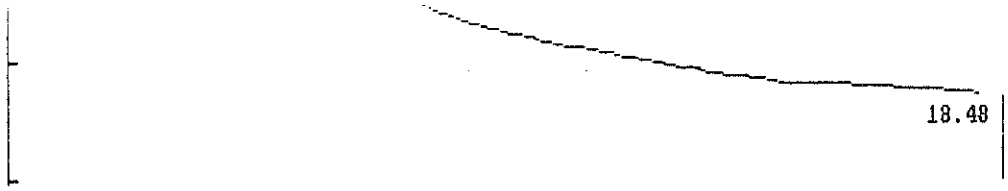
PEAK NUM	RET TIME	PEAK NAME	CONCENTRATION in ug/L	NORMALIZED CONC	AREA	HEIGHT	AREA/ HEIGHT	BL	REF PEAK	% DELTA RET TIME	CONC/AREA
1	0.54		0.0000	0.0000%	2375	2814	0.8	1			0.0000E+00
2	0.81		0.0000	0.0000%	2507134	984396	2.5	1			0.0000E+00
3	1.23	11DICHLOROETHENE	9704.6260	2.9706%	38609	16258	2.4	1	0	0	2.5135E-01
4	1.49	METHYLENE CHLORIDE	10490.0742	3.2111%	9677	4224	2.3	1	0	0	1.0840E+00
5	1.65	T12DICHLOROETHENE	9870.6455	3.0214%	38196	14806	2.6	1	0	0	2.5842E-01
6	1.91	11DICHLOROETHANE	9681.5332	3.0248%	36154	10586	3.4	1	0	0	2.7332E-01
7	2.36	2-Butanone	24895.4961	7.6206%	7242	1818	4.0	1	0	0	3.4375E+00
8	2.60	CHLOROFORM	27080.1113	8.2893%	16458	5169	3.2	1	0	-.3846	1.6454E+00
9	.72	111TRICHLOROETHANE	9301.9053	2.8474%	24561	6015	4.1	1	0	0	3.7872E-01
10	2.85	CARBON TET	8496.4053	2.6008%	2562	663	3.9	1	0	-.3508	3.3170E+00
11	3.06	BENZENE	7936.5835	2.4294%	197875	38520	5.1	1	0	-.3268	4.0109E-02
12	3.77	TRICHLOROETHENE	9436.8281	2.8887%	35725	7611	4.7	1	0	-.2652	2.6415E-01
13	4.05	1,2 Dichloropropan	9480.5850	2.9020%	58467	10724	5.5	1	0	0	1.6215E-01
14	4.45		0.0000	0.0000%	10096	1918	5.3	1			0.0000E+00
15	4.96		0.0000	0.0000%	30182	7042	4.3	1			0.0000E+00
16	5.10	C13DICHLOROPROPANE	10826.2451	3.3140%	61027	12248	5.0	1	0	-.1964	1.7740E-01
17	5.40	4METHYL2PENTONE	26478.1602	8.1051%	95483	18606	5.1	1	0	0	2.7731E-01
18	5.56	TOLUENE	9540.7842	2.9205%	173020	33912	5.1	1	0	-.1801	5.5143E-02
19	6.06	T13DICHLOROPROPANE	8448.8262	2.5862%	35085	6728	5.2	1	0	-.1652	2.4081E-01
20	6.35	112TRICHLOROETHANE	10534.0723	3.2245%	10580	2751	3.8	1	0	-.1577	9.9570E-01
21	6.45	TETRACHLOROETHENE	11386.0713	3.4853%	11082	2574	4.3	1	0	-.1552	1.0274E+00
22	6.90	2HEXANONE	22980.2148	7.0343%	153893	23428	6.6	1	0	-.1451	1.4933E-01
23	8.16	CHLOROBENZENE	8971.2695	2.7461%	115001	19070	6.0	1	0	-.1228	7.8010E-02
24	8.47	ETHYLBENZENE	9182.1621	2.8107%	151378	23762	6.4	1	0	-.1183	6.0657E-02
25	8.74	a&p xylene	8980.4590	2.7490%	158657	23902	6.6	1	0	-.1146	5.6603E-02
26	9.60	O-XYLENE	8869.9756	2.7151%	184238	25351	7.3	1	0	-.2085	4.8144E-02
27	10.03		0.0000	0.0000%	7101	1117	6.4	1			0.0000E+00
28	10.42		0.0000	0.0000%	1583	249	6.3	1			0.0000E+00
29	10.86	BFB	9841.3271	3.0125%	89442	12283	7.3	1	0	0	1.1003E-01
30	11.50	1122TETRACLETHANE	8951.3662	2.7401%	28913	4374	6.6	1	0	0	3.0959E-01
31	12.38		0.0000	0.0000%	43270	4189	10.3	1			0.0000E+00
32	12.96		0.0000	0.0000%	2008	279	7.2	1			0.0000E+00
33	13.61	M-DICHLOROBENZENE	8691.1768	2.6604%	85238	10408	8.2	1	0	0	1.0196E-01
34	13.91	P-DICHLOROBENZENE	17761.8926	5.4370%	88597	10856	8.3	1	0	0	2.0048E-01
35	.06	O-DICHLOROBENZENE	8667.2246	2.6531%	98749	10069	9.8	1	0	0	8.7770E-02
36	15.67		0.0000	0.0000%	621	149	4.2	1			0.0000E+00
37	16.48		0.0000	0.0000%	1729153	244692	7.1	1			0.0000E+00

TOTAL AMOUNT = 326626.0300

Areas, times, and heights stored in D:0J0132.PTS
Data file = D:1J0132.PTS Processed on 01-13-1989 at 18:31:26

Full Range: 50 millivolts





** ********** AUTOMATIC CALIBRATION UPDATE **********

Sample Name: AUTOCAL1RE
Operator: TAR Date Taken: 01-13-1989 18:29:59
Date: 01-13-1989 Time: 18:35:09
Interface: 0 Cycle: 2
Method: M:AVOASCRN Channel: 0
Vial: 0 Level 1
Today's Date: 01-13-1989 Time: 18:35:09
Start delay: 0.00
Area reject: 100.00 One sample per .6 sec.
Amount injected: 1.00 Std. Amt. Injected: 1.00

EXTERNAL STANDARD CALIBRATION

COMP NUM	NAME	OLD RET.TIME	MEASURED RET.TIME	NEW RET.TIME	OLD AREA	MEASURED AREA	NEW AREA
1	11DICHLOROETHENE	1.23	1.23	1.23	39784	38609	38609
2	METHYLENE CHLORIDE	1.49	1.49	1.49	9225	9677	9677
3	T12DICHLOROETHENE	1.65	1.65	1.65	38697	38196	38196
4	11DICHLOROETHANE	1.91	1.91	1.91	36587	36154	36154
5	2-Butanone	2.36	2.36	2.36	7273	7242	7242
6	CHLOROFORM	2.61	2.60	2.60	15194	16458	16458
7	111TRICHLOROETHANE	2.72	2.72	2.72	26405	24561	24561
8	CARBON TET	2.86	2.85	2.85	3015	2562	2562
	BENZENE	3.07	3.06	3.06	211922	197875	197875
10	TRICHLOROETHENE	3.78	3.77	3.77	37857	35725	35725
11	1,2 Dichloropropan	4.05	4.05	4.05	61670	58467	58467
12	C13DICHLOROPROPANE	5.11	5.10	5.10	62007	61027	61027
13	4METHYL2PENTONE	5.40	5.40	5.40	90153	95483	95483
14	TOLUENE	5.57	5.56	5.56	181348	173020	173020
15	T13DICHLOROPROPANE	6.07	6.06	6.06	37373	35085	35085
16	112TRICHLOROETHANE	6.36	6.35	6.35	10043	10580	10580
17	TETRACHLOROETHENE	6.46	6.45	6.45	9733	11082	11082
18	2HEXANONE	6.91	6.90	6.90	167419	153893	153893
19	CHLOROBENZENE	8.17	8.16	8.16	128188	115001	115001
20	ETHYLBENZENE	8.48	8.47	8.47	164861	151378	151378
21	m&p xylene	8.75	8.74	8.74	176669	158657	158657
22	O-XYLENE	9.62	9.60	9.60	207710	184238	184238
23	BFB	10.87	10.86	10.86	90885	89442	89442
24	1122TETRACLETHANE	11.51	11.50	11.50	32301	28913	28913
25	M-DICHLOROBENZENE	13.62	13.61	13.61	98074	85238	85238
26	P-DICHLOROBENZENE	13.92	13.91	13.91	99761	88597	88597
27	O-DICHLOROBENZENE	15.06	15.06	15.06	113934	98749	98749

All peaks were found.
Method M:AVOASCRN updated on disk. 01-13-1989 18:35:17 version: 244

C12 BLANK Processed: 01-13-1989 19:04:50, segment 3, cycle 3
RAW DATA SAVED IN FILE D:0I0133.PTS Second Channel Stored in D:1I0133.PTS

* *** EXTERNAL STANDARD TABLE *****

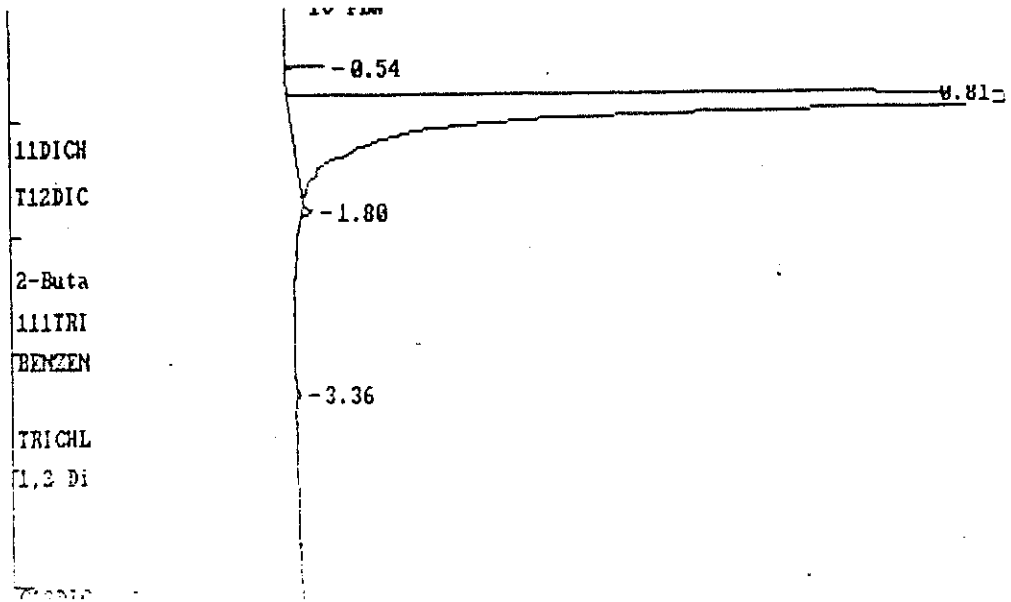
********** 01-13-1989 19:05:46 Version 4.1 **********
* Sample Name: C12 BLANK Data File: D:0I0133 *
* Date: 01-13-1989 19:05:29 Method: M:AVOASCRN 01-13-1989 18:35:17 # 244*
* Interface: 0 Cycle#: 3 Operator DF Channel#: 0 Vial#: N.A. *
* Starting Peak Width: 5 Threshold: 1 Area Threshold: 500 *
****

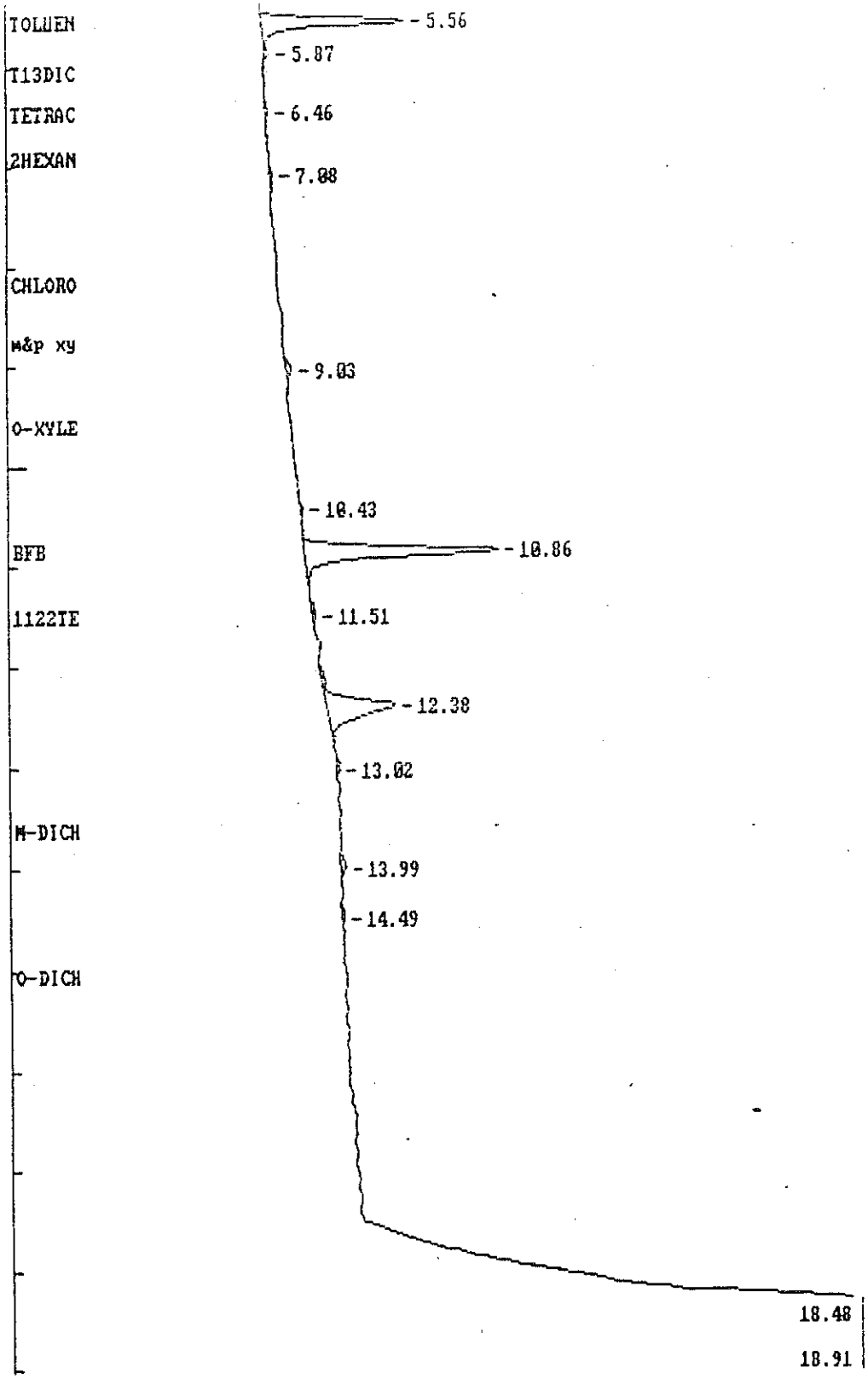
Starting Delay: 0.00 Ending retention time: 19.00
Area reject: 100 One sample per 0.602 sec.
Amount injected: 1.00 Dilution factor: 1.00
Sample Weight: 1.000000

PEAK NUM	RET TIME	PEAK NAME	CONCENTRATION in ug/L	NORMALIZED CONC	AREA	HEIGHT	AREA/ HEIGHT	BL	REF PEAK	% DELTA RET TIME	CONC/AREA
1	0.54		0.0000	0.0000%	1913	2208	0.9	1			0.0000E+00
2	0.81		0.0000	0.0000%	2560912	984852	2.6	1			0.0000E+00
3	1.80		0.0000	0.0000%	2165	622	3.5	1			0.0000E+00
4	3.36		0.0000	0.0000%	840	195	4.3	1			0.0000E+00
5	5.56	TOLUENE	3023.3623	20.3792%	52310	9126	5.7	1	0	0	5.7797E-02
6	5.87		0.0000	0.0000%	1478	291	5.1	1			0.0000E+00
7	6.46	TETRACHLOROETHENE	751.8060	5.0676%	833	145	5.8	1	0	.1555	9.0235E-01
8	7.08		0.0000	0.0000%	881	135	6.5	1			0.0000E+00
9	9.03		0.0000	0.0000%	2219	319	7.0	1			0.0000E+00
10	10.43		0.0000	0.0000%	741	154	4.8	1			0.0000E+00
1[illegible]	[illegible].86	BFB	9618.7461	64.8359%	86032	12466	6.9	1	0	0	1.1180E-01
12	11.51	1122TETRACLETHANE	708.5302	4.7759%	2049	183	11.2	1	0	0	3.4586E-01
13	12.38		0.0000	0.0000%	50116	4480	11.2	1			0.0000E+00
14	13.02		0.0000	0.0000%	1415	216	6.6	1			0.0000E+00
15	13.99	P-DICHLOROBENZENE	733.0903	4.9414%	3247	384	8.5	1	0	.5771	2.2574E-01
16	14.49		0.0000	0.0000%	1229	165	7.4	1			0.0000E+00
17	18.48		0.0000	0.0000%	1910207	266288	7.2	1			0.0000E+00
18	18.91		0.0000	0.0000%	4538246	48014	94.5	1			0.0000E+00

TOTAL AMOUNT = 14835.5342

Areas, times, and heights stored in: D:0I0133.ATB
Data File = D:0I0133.PTS Printed on 01-13-1989 at 19:06:35
Start time: 0.00 min. Stop time: 19.01 min. Offset: 0 mv.
Full Range: 50 millivolts




TOLUEN
T13DIC
TETRAC
2HEXAN
CHLORO
m&p xy
O-XYLE
BFB
1122TE
M-DICH
O-DICH
5.56
5.87
6.46
7.08
9.03
10.43
10.86
11.51
12.38
13.02
13.99
14.49
18.48
18.91

MEOH BLANK Processed: 01-13-1989 19:40:19, segment 4, cycle 4
RAW DATA SAVED IN FILE D:OI0134.FTS Second Channel Stored in D:1I0134.FTS

* *** EXTERNAL STANDARD TABLE *****

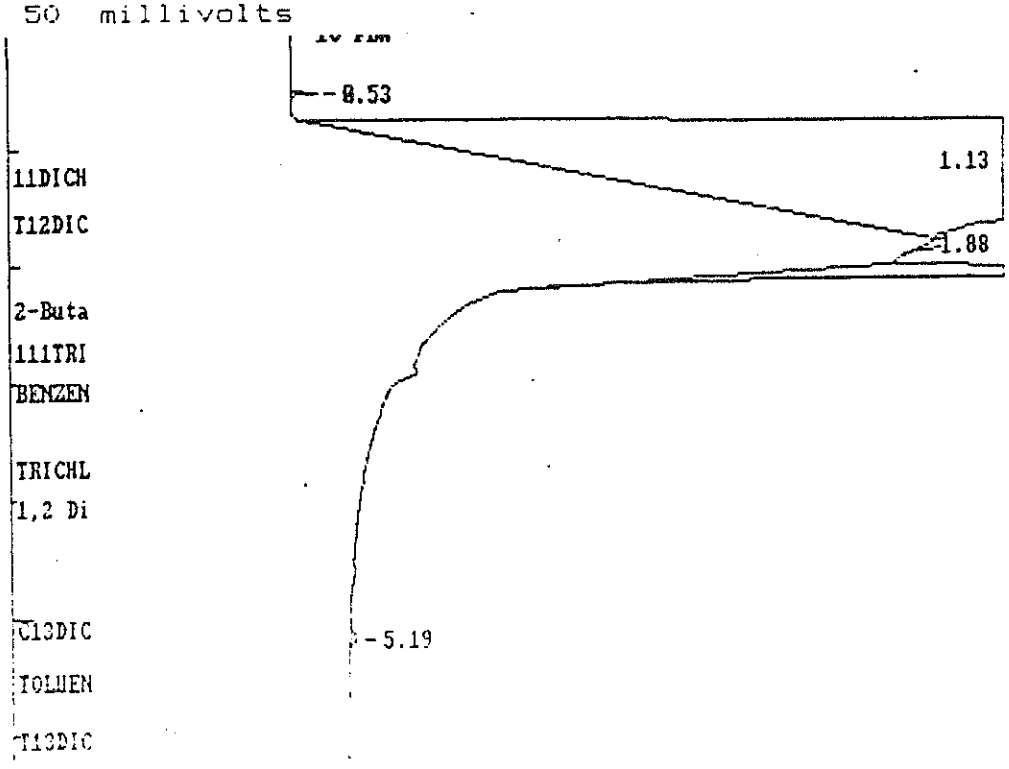
*** ********** 01-13-1989 19:41:15 Version 4.1 **********
* Sample Name: MEOH BLANK Data File: D:OI0134 *
* Date: 01-13-1989 19:40:59 Method: M:AVOASCRN 01-13-1989 18:35:17 # 244*
* Interface: 0 Cycle#: 4 Operator DF Channel#: 0 Vial#: N.A. *
* Starting Peak Width: 5 Threshold: 1 Area Threshold: 500 *
****

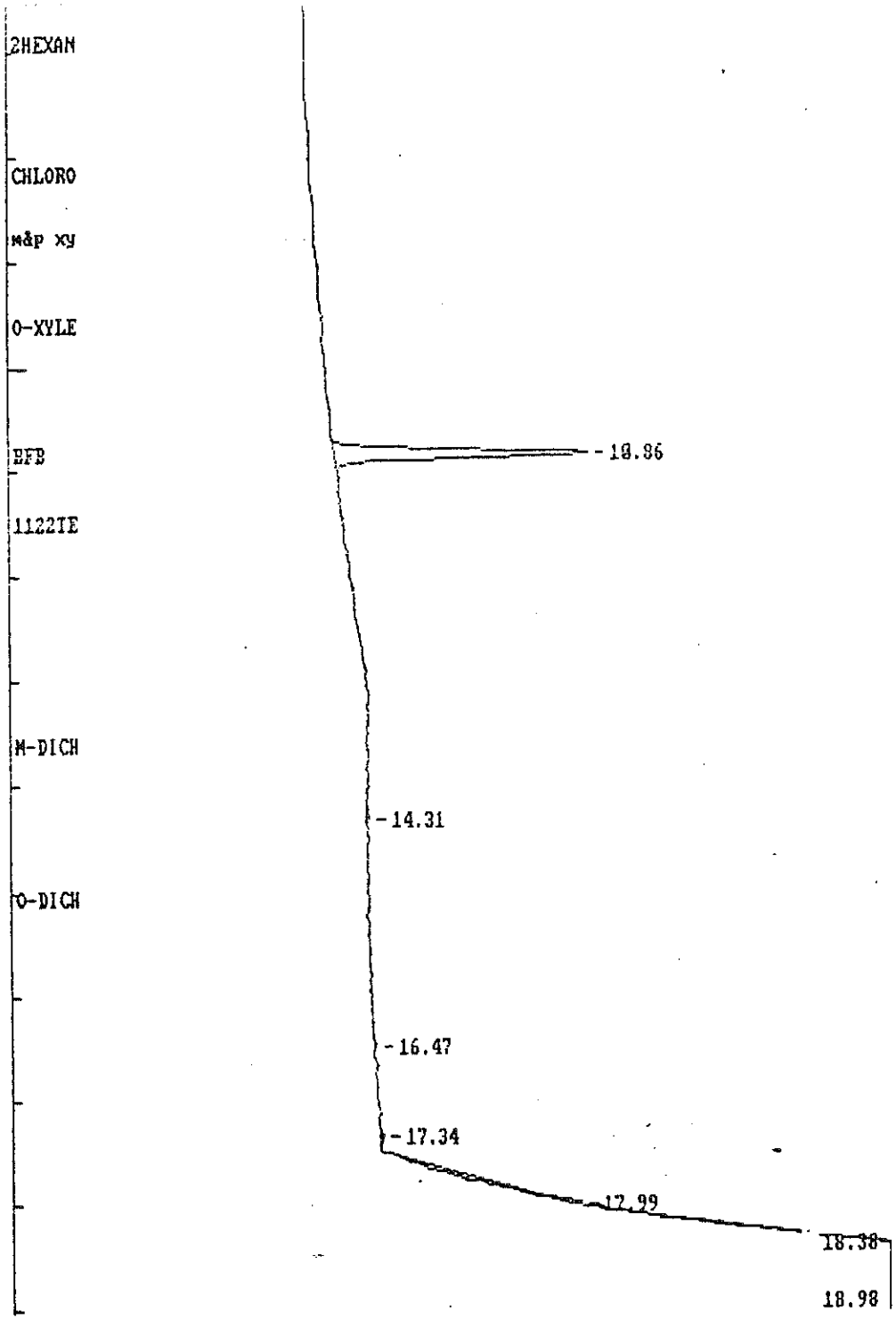
Starting Delay: 0.00 Ending retention time: 19.00
Area reject: 100 One sample per 0.602 sec.
Amount injected: 1.00 Dilution factor: 1.00
Sample Weight: 1.000000

PEAK NUM	RET TIME	PEAK NAME	CONCENTRATION in ug/L	NORMALIZED CONC	AREA	HEIGHT	AREA/ HEIGHT	HEIGHT BL	REF PEAK	% DELTA RET TIME	CONC/AREA
1	0.53		0.0000	0.0000%	1605	1368	1.2	1			0.0000E+00
2	1.13		0.0000	0.0000%	23868336	973115	24.5	1			0.0000E+00
3	1.88	11DICHLOROETHANE	2837.8513	21.1770%	10260	2831	3.6	1	0	-1.578	2.7660E-01
4	2.10		0.0000	0.0000%	399672	104360	3.8	1			0.0000E+00
5	5.19	C13DICHLOROPROPANE	443.7479	3.3114%	2462	378	6.5	1	0	1.771	1.8025E-01
6	10.86	BFB	10119.0303	75.5116%	90507	16000	5.7	1	0	0	1.1180E-01
7	14.31		0.0000	0.0000%	1429	196	7.3	1			0.0000E+00
8	16.47		0.0000	0.0000%	814	170	4.8	1			0.0000E+00
9	17.34		0.0000	0.0000%	1618	216	7.5	1			0.0000E+00
10	17.99		0.0000	0.0000%	15390	744	20.7	1			0.0000E+00
11	38		0.0000	0.0000%	11015	0	0.0	1			0.0000E+00
12	49		0.0000	0.0000%	1973	0	0.0	1			0.0000E+00
13	18.55		0.0000	0.0000%	2688	2413	1.1	1			0.0000E+00
14	18.98		0.0000	0.0000%	294315	99988	2.9	1			0.0000E+00

TOTAL AMOUNT = 13400.6289

Areas, times, and heights stored in: D:OI0134.ATB
Data File = D:OI0134.FTS Printed on 01-13-1989 at 19:41:56
Start time: 0.00 min. Stop time: 19.01 min. Offset: 0 mv.
Full Range: 50 millivolts




2HEXAN
CHLORO
m&p xy
O-XYLE
EFB
1122TE
M-DICH
O-DICH
-18.86
-14.31
-16.47
-17.34
17.99
18.38
18.98

ADDENDUM TO CWM Vickery GWMP QAPjP Appendix B-14
SOP Number: LM-RMA-1062
Title: Total Suspended Solids (TSS)

This addendum is specific to the Chemical Waste Management, Vickery, Ground Water Monitoring Plan QAPjP. Procedural changes or clarification statements presented herein are not applicable to Enseco SOPs for other projects, and are made here in response to an EPA letter dated March 17, 1992 to CWM containing comments (with additional attachment) regarding the CWM-Vickery GWMP QAPjP.

Section 9.1.3: Duplicate analyses are required for this specific project. Acceptance control limits are matrix sensitive, and will not be determined until actual samples of the project matrix are analyzed. Limits will be indicated in the raw data.

STANDARD
OPERATING
PROCEDURE

Subject or Title: Total Suspended Solids (TSS)

SOP No.: LM-RMA-1062

Revision No.: Original

Effective Date: March 13, 1989

Supersedes: None

1. Scope and Application

1.1 Analytes

This method is applicable to the determination of Total Suspended Solids (Nonfilterable Residue), defined as those solids retained by a glass fiber filter and dried at 103 105°C.

1.2 Detection Limit

The detection limit is 2 mg/L.

1.3 Applicable Matrices

This method is applicable to drinking, surface, and saline waters, domestic and industrial wastes.

1.4 Dynamic Range

The range extends from the detection limit to about 20,000 mg/L.

1.5 The approximate analytical time is 10 minutes per sample, not including drying time.

2. Summary of Method

A well-mixed aliquot of a sample is filtered through a glass fiber filter and dried at 103 to 105°C. The residue is determined gravimetrically.

Prepared by: Lindsay Breyer

Date: February 27, 1989

Management Approval: Jack W. Pratt II

Date: 3/14/89

QA Officer Approval: Gary Tof

Date: 3/14/89

3. Comments

3.1 Interferences

3.1.1 Filtration apparatus and filters must be carefully rinsed to remove potential interferences.

3.1.2 Samples high in dissolved solids may give high results if the filter is not rinsed well after filtration of the sample.

3.1.3 Non-representative particulates such as leaves, sticks, fish, and fecal matter should be excluded from the sample if it is determined that their inclusion is not desired in the final result.

3.2 Helpful Hints

The filtrate from this method may be used for the determination of Total Dissolved Solids (TDS), SOP: LM-RMA-1060.

4. Safety Issues

Follow normal laboratory precautions.

5. Sample Collection and Preservation

5.1 Samples are to be collected in plastic bottles and refrigerated at 4°C.

5.2 The holding time for TSS is 7 days.

6. Apparatus

6.1 Vacuum pump with moisture trap.

6.2 Vacuum filtration apparatus.

6.3 Glass fiber filters, Gelman type A/E. Filters must be rinsed and dried prior to use. Place filter on the filtration apparatus, apply vacuum, and wash with three successive 20 mL portions of deionized water. Dry in an oven at 103 - 105°C for one hour and store in a desiccator.

6.4 Drying oven, 103 - 105°C.

6.5 Thermometer.

6.6 Desiccator.

6.7 Analytical balance, 0.0001 g sensitivity.

6.8 Miscellaneous laboratory glassware and apparatus.

7. Reagents and Standards

7.1 DCS solutions. Obtain from ERA, EPA, or other reliable source.

8. Procedure

8.1 Weigh filters on an analytical balance. Place on an oven rack covered with aluminum foil and mark with appropriate identification for each filter.

8.2 Assemble filtration apparatus. Handle filters only with forceps. Place the filters with the patterned side down.

8.3 Mix the sample well, measure 250 mL with a graduated cylinder, and filter. A smaller amount may be filtered if the sample is high in TSS. Filter 25 mL at a time until filtration slows. Record the total volume filtered.

8.4 Rinse the graduated cylinder, filtration apparatus, and filter with three 10 mL portions of deionized water.

8.5 Continue to apply vacuum until all moisture has been removed. Carefully remove the filter from the filter support and dry for at least one hour at 103 - 105°C. Record the oven temperature on the bench sheet.

8.6 Cool the samples in a desiccator and weigh.

8.7 Return the samples to the oven for another hour, cool in a desiccator, and reweigh. Repeat the drying cycle until the weight loss is less than 0.5 mg. If more than three cycles are required, inform your supervisor.

8.8 Calculate TSS results below.

9. QA/QC Requirements

9.1 QC Samples

9.1.1 One blank (deionized water) is required with every batch of 20 or less samples.

9.1.2 Two DCS samples are required with every batch of 20 or less samples.

9.1.3 Duplicates may be required for project specific QC.

9.1.4 It is not possible to spike samples for TSS.

9.2 Acceptance Criteria

9.2.1 Control limits are:

Accuracy 85 - 115%
Precision 15%

9.2.2 Blanks must be between -0.5 and 1.5 mg residue weight.

9.2.3 There are no acceptance criteria for project specific QC.

9.3 Corrective Action Required

9.3.1 Poor DCS results usually indicate that the samples were not mixed well. The samples must be reanalyzed.

9.3.2 High blanks indicate contamination. Low blanks indicate that the filters were not properly rinsed and dried. Reanalyze the samples.

10. Calculations

10.1 Calculate the residue weights:

RESIDUE = 1000 x (FINALWT - INITIALWT)

RESIDUE = Residue weight, mg
FINALWT = Final weight of filter and residue, g
INITIALWT = Initial weight of filter, g

10.2 Calculate TSS:

TSS = (RESIDUE - BLANK) x 1000 / VOL
TSS = TSS result, mg/L
RESIDUE = Sample residue weight, mg
BLANK = Blank residue weight, mg
VOL = Sample volume filtered, mL

NOTE: If the blank is less than 0.5 mg, do not subtract it.

10.3 Calculate detection limit(s):

This is necessary only if the blank was more than 0.5 mg, or if less than 250 mL sample was used due to limited volume.

DETLIM = WT x 1000 / VOL

DETLIM = Detection limit, mg/L
WT = 0.5 mg OR blank residue weight, whichever is larger
VOL = 250 mL OR the sample volume used, whichever is smaller

11. Reporting

11.1 Reporting units are mg/L.

11.2 Reporting Limits

Values less than the detection limit are reported as ND.

11.3 Significant Figures

Range	Waters/Wastes
2 - 9	1
10 - 99	2
100+	3

11.4 LDMS Data Entry

Since drying times will vary, the analysis date will be the date that the samples were initially placed in the oven for drying.

12. References

12.1 Method Source: EPA Method 160.2

12.2 Deviations from source method and rationale
None.

ADDENDUM TO CWM Vickery GWMP QAPjP Appendix B-15
SOP Number: LM-RMA-1066
Title: Total Organic Carbon (TOC)

This addendum is specific to the Chemical Waste Management, Vickery, Ground Water Monitoring Plan QAPjP. Procedural changes or clarification statements presented herein are not applicable to Enseco SOPs for other projects, and are made here in response to an EPA letter dated March 17, 1992 to CWM containing comments (with additional attachment) regarding the CWM-Vickery GWMP QAPjP.

Total Organic Carbon analyses are to be performed on samples from the Brassfield monitor well. No TOC analyses are required on samples from the Knox-Kerbel monitor well.

SW-846 method for TOC requires that samples are analyzed in quadruplicate. This multiple analyses will be performed for this project.

Subject or Title: Total Organic Carbon (TOC) (O.I. 700)		Page 1 of 9
SOP No.: LM-RMA-1066	Revision No.: 1.0	Effective Date: August 1, 1988
Supersedes: Original		

1. Scope and Application

1.1 Analytes

This method covers the determination of various forms of carbon using the O.I. Corporation Model 700 TOC Analyzer. The instrument is capable of measuring various forms of carbon. The specific forms measured depend on sampling technique and subsequent handling in the laboratory. Unless special requirements are specified before the analysis is started, samples will be homogenized, the solids allowed to settle, and the liquid decanted for analysis.

The definition of organic carbon depends on the preliminary treatment of the samples. Unless otherwise specified, the result reported will NOT include purgeable organic carbon or particulate carbon.

Purgeable organic carbon and inorganic carbon may also be determined but are not reported unless specifically requested.

1.2 The detection limit is 0.1 mg/L.

1.3 Applicable Matrices

This method is applicable to drinking, surface, and saline waters, domestic and industrial wastes.

Prepared by: Lindsay Breyer	Date: 7/18/88
Management Approval: John W. Pratt II	Date: 11/21/88
QA Officer Approval: Jan Redenbaugh	Date: 11/22/88

1.4 Dynamic Range

Instrument response is linear to 50 mg/L. Higher concentrations may be analyzed by dilution of the samples.

1.5 Approximate analytical time is 10 minutes per sample.

2.0 Summary of Method

2.1 The sample is acidified and sparged to convert inorganic carbon (carbonates and bicarbonates) to carbon dioxide, which is trapped on a molecular seive. Purgeable organic carbon is also removed by sparging and trapped on a purgeables trap. The molecular seive is thermally desorbed and the carbon dioxide is detected by a nondispersive IR detector. The purgeables trap is then desorbed and the compounds pyrolyzed in an oxygen atmosphere to carbon dioxide, which is measured by the same detector. The sample is then digested with sodium persulfate at 100°C. Organic carbon is converted to carbon dioxide, which is trapped on the molecular seive trap. It is then thermally desorbed and the carbon dioxide measured by the nondispersive IR detector.

3. Comments

3.1 Interferences

3.1.1 Particulates in the sample have been found to cause erratic results even when the samples are homogenized. They will also cause carry-over to subsequent samples.

3.1.2 As noted above, the manner of preliminary treatment of the sample defines the types of carbon which are measured. Specific sample requirements must be defined when the samples are logged in for analysis.

3.1.3 Purgeable organic carbon will be lost if the samples are not collected in VOA vials with the headspace eliminated.

3.2 Helpful Hints

This SOP was written specifically for the OI 700 TOC Analyzer.

4. Safety Issues

Follow normal laboratory precautions.

5. Sample Collection and Preservation

5.1 Samples are collected in glass bottles and preserved by adding sulfuric acid to pH less than 2.

5.2 Samples requiring purgeable organic carbon must be collected in VOA vials with headspace eliminated.

5.3 The holding time for TOC is 28 days.

6. Apparatus

6.1 OI 700 TOC Analyzer with POC option, autosampler, etc.

6.2 Disposable glass autosampler tubes.

6.3 Volumetric pipettes, volumetric flasks, beakers, etc.

7. Reagents and Standards

7.1 Phosphoric Acid, 5% v/v

Carefully add 50 mL phosphoric acid to about 600 mL deionized water, mix, and dilute to 1000 mL.

7.2 Sodium Persulfate, 10% w/v

Dissolve 100 g sodium persulfate in deionized water and dilute to 1000 mL.

7.3 TOC Stock Standard, 1000 mg/L

Dissolve 2.128 g potassium hydrogen phthalate in about 600 mL deionized water, add 2 mL concentrated sulfuric acid, and dilute to 1000 mL.

7.4 TOC Working Standards

Dilute the stock standard with deionized water as follows:

Aliquot	Final Volume	TOC Concentration
1.0 mL	200 mL	5.0 mg/L
5.0 mL	200 mL	25.0 mg/L
10.0 mL	200 mL	50.0 mg/L

7.5 LCS Solution

Weigh an empty 250 mL glass bottle covered with a VOA cap. Fill with a diluted ERA demand sample and recap, eliminating all headspace. Inject 10.0 uL chloroform through the septum and reweigh. Shake vigorously until the chloroform has dissolved. The TOC concentration will be the true value of the ERA sample. The POC concentration is calculated from:

POC = 1491 / (WT2 - WT1)

POC = POC concentration, mg/L
WT2 = Weight of full bottle + cap, g
WT1 = Weight of empty bottle + cap, g

If POC is not required, it is unnecessary to spike the ERA sample with chloroform.

8. Procedure

8.1 Instrument Set-Up

8.1.1 The instrument should be left on with gases flowing in order to reduce the need for detector maintenance. If the instrument has been turned off for any reason, turn it back on and allow it to warm up until the IR output stabilizes (may be several hours).

8.1.2 Check gas pressures. Nitrogen should be at 30 psi and oxygen at 10 psi.

8.1.3 Check gas flows. Purge gas flow should be 6.0 and detector gas flow 4.5 on the rotameters. If these flows cannot be achieved, inform your supervisor.

8.1.4 Fill the deionized water reservoir and set the flow rate to keep the wash station full.

8.1.5 Fill the acid reservoir with 5% phosphoric acid and the oxidant reservoir with 10% sodium persulfate. Check to be sure that the reagent bottles are being sparged.

8.1.6 Open the keypad drawer and press the PRIME ACID button 10 to 20 times to prime the acid pump.

8.1.7 Press the PRIME OXIDANT button 10 to 20 times to prime the oxidant pump.

8.2 Reagent Blanks

8.2.1 Select Display Mode NORMAL PPM C and Analysis Mode POC/IC/TOC.

8.2.2 Press SET SYSTEM CONFIG 1. Set the instrument parameters as follows:

ACID INJECTION PUMP: Enabled
OXID INJECTION PUMP: Enabled
SAMPLE PUMP: Disabled
SAMPLE LOOP VALVE: Disabled
AUTO-RUN ANALYSIS: Enabled
AUTO-PRINT: Enabled
AUTO-SAMPLER: Disabled

Press CLEAR ENTRY when the proper system configuration has been established.

8.2.3 Press RUN/STOP. The instrument will automatically run blanks (acid and oxidant) and cleanse itself.

8.2.4 When the blanks show consistent results, press RUN/STOP and CLEAR.

8.2.5 If the instrument has already been calibrated, the results printed should be less than the detection limit. If not, as might happen with new reagents, it may be necessary to recalibrate. Compute the average millivolt reading for the last three blanks. Compute the average for all three forms of carbon.

8.3 Calibration

8.3.1 Check calibration by analyzing the 25 mg/l standard. If it is within 10%, recalibration is not necessary.

8.3.2 Press SET SYSTEM CONFIG and set the following parameters:

ACID INJECTION PUMP: Enabled
OXID INJECTION PUMP: Enabled
SAMPLE PUMP: Enabled*
SAMPLE LOOP VALVE: Enabled*
AUTO-RUN ANALYSIS: Enabled
AUTO-PRINT: Enabled
AUTO-SAMPLER: Disabled

*Changed from reagent blank configuration.

Press CLEAR ENTRY when finished.

8.3.3 Disconnect the sample line from the sampler and insert into the 25 mg/L calibration standard.

8.3.4 Press RUN/STOP. The instrument will analyze the standard repeatedly. Press RUN/STOP and CLEAR after at least 3 runs have been completed.

8.3.5 Compute the average mV response for organic carbon.

8.3.6 Press SELECT DISPLAY MODE twice to get to CALIBRATION CONSTANTS.

8.3.7 Press SELECT NEXT DISPLAY. Choose option 2, organic carbon calibration.

8.3.8 Enter the average blank mV for each form of carbon. If a value is already entered, add it to your average before entry. Also add it to the average mV for the standard.

8.3.9 ENTER STANDARD MASS: Multiply the standard concentration (mg/L) by the loop volume (mL) and enter the result. With a 1.010 mL loop and 25 mg/L standard, the standard mass is 25.25.

8.3.10 Press SELECT NEXT DISPLAY. Enter the mV average for the standard. The scaling factor will be displayed.

8.3.11 Press SELECT NEXT DISPLAY. Then press SELECT DISPLAY MODE to return to NORMAL PPM C. Reattach the sample line to the sampler.

8.4 Analysis

8.4.1 Mix samples well, fill sampler tubes, and load the autosampler. Deionized water should be first, followed by the standards and the LCS samples. Record the order in which the samples will be analyzed (the sampler moves counterclockwise). If POC is required, use the racks supplied for VOA vials and load them directly onto the sampler. Do not open VOA vials.

8.4.2 Press SET SYSTEM CONFIG 1. Set the following parameters:

ACID INJECTION PUMP: Enabled
OXID INJECTION PUMP: Enabled
SAMPLE PUMP: Enabled
SAMPLE LOOP VALVE: Enabled
AUTO-RUN ANALYSIS: Enabled
AUTO-PRINT: Enabled
AUTO-SAMPLER: Enabled
READY/STANDBY STATUS OVERRIDE: Disabled
SAMPLE ID NUMBER: 01
SAMPLE STOP NUMBER: **
NUMBER OF REPS PER SAMPLE: 1

**Position of last sample on the autosampler

8.4.3 Advance the sampler so that the first sample is under the sample line.

8.4.4 Press RUN/START. The run will proceed automatically and stop when the last sample has been analyzed.

8.4.5 Dilute and reanalyze any samples more than 50 mg/L. Turn off the deionized water reservoir when done.

9. QA/QC Requirements

9.1 QC Samples

9.1.1 Analyze one sample of deionized water with every batch of 20 or less samples.

9.1.2 Two LCS samples are required with every batch of 20 or less samples.

9.1.3 Linearity check standards (5, 25, 50 mg/L) are required at the start of every run. Calibration checks (25 mg/L) are required after every 10 or less samples and at the end of the run.

9.1.4 Duplicates may be required as project specific QC.

9.1.5 Spikes may be required as project specific QC. Dilute 1.0 mL stock standard to 100 mL with sample. The spiking concentration is 10 mg/L TOC. See your supervisor if spikes are required for POC.

9.2 Acceptance Criteria

9.2.1 Control limits are:

	Accuracy	Precision
TOC	91 - 109%	20%
POC	70 - 130%	20%

9.2.2 Standard checks must be within 10% of the expected value.

9.2.3 There are no acceptance criteria for project specific QC.

9.3 Corrective Action Required

Verify that the instrument is properly calibrated. Check autosampler tubes for contamination. Be sure that the sample pump and reagent pumps are operating correctly. Recalibrate and reanalyze samples as necessary.

Check for nonlinearity and also the IR output. If it is too high, the cell may need cleaning. Consult your supervisor.

Check gas flows with and without heating of the primary trap and POC trap. If the flow drops below 4.5 (primary trap) or 4.0 (POC trap) when heat is applied, the traps need maintenance. See your supervisor.

10. Calculations

Record the results printed out for each sample. Multiply by any dilution made to get the final result.

11. Reporting

11.1 Reporting units are mg/L

11.2 Reporting Limits

Samples less than 0.1 mg/L are reported as ND.

11.3 Significant Figures

0.1 to 0.9 mg/L	1 significant figure
> 1.0 mg/L	2 significant figures

11.4 LDMS Data Entry

The usual standards for data entry apply.

12. References

12.1 Method Source: EPA Method 415.1

12.2 Deviations from Source Method and Rationale

12.1 The source method is vague as to specific procedures to follow and references the instrument manual.

12.2 Solids are excluded from analysis unless specifically requested on the samples. Solids preclude the use of an autosampler and cause carryover and erratic response.

ADDENDUM TO CWM Vickery GWMP QAPjP Appendix B-16
SOP Number: LM-RMA-1001
Title: Acidity

This addendum is specific to the Chemical Waste Management, Vickery, Ground Water Monitoring Plan QAPjP. Procedural changes or clarification statements presented herein are not applicable to Enseco SOPs for other projects, and are made here in response to an EPA letter dated March 17, 1992 to CWM containing comments (with additional attachment) regarding the CWM-Vickery GWMP QAPjP.

Section 9.1.3: Duplicate analyses are required for this specific project. Acceptance control limits are matrix sensitive, and will not be determined until actual samples of the project matrix are analyzed. Limits will be indicated in the raw data.

STANDARD
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Subject or Title: Page 1 of 6

ACIDITY

SOP No.:	Revision No.:	Effective Date:
LM-RMA-1073	Original 1.0	April 14, 1988

Supersedes: None Original LM-RMA-1001, 12/9/87

1. Scope and Application

1.1 Analytes

This method is used for the determination of acidity as Calcium Carbonate. It measures the mineral acidity plus the acidity resulting from the oxidation and hydrolysis of polyvalent cations, including salts of iron and aluminum.

1.2 Detection Limit

The detection limit of this method is 10 mg/L as Calcium Carbonate.

1.3 Applicable Matrices

This method is applicable to surface waters, sewage and industrial wastes, particularly mine drainage and receiving streams, and other waters containing ferrous iron and other polyvalent cations in a reduced state.

1.4 Dynamic Range

This method covers the range from approximately 10 to 1000 mg/L as Calcium Carbonate, using 50 ml sample.

Prepared by:		Date: 5/23/88
Management Approval:		Date: 5/12/88
QA Officer Approval:		Date: 5/25/88

1.5 The approximate analytical time is 30 minutes per sample.

2. Summary of Method

2.1 The pH of the sample is measured and adjusted to 4 or less if necessary. Hydrogen peroxide is added, the solution is boiled, cooled to room temperature, and titrated to pH 8.2 with standard alkali.

3. Comments

3.1 Interferences

Suspended matter present in the sample, or precipitates formed during the titration, may cause a sluggish electrode response. To compensate, the sample is titrated slowly near the endpoint.

4. Safety Issues

Normal laboratory precautions should be followed.

Hydrogen peroxide is a strong oxidizer. Wear gloves when handling it. Do not allow it to come into contact with combustible or incompatible materials. Promptly clean up any spills.

5. Sample Collection and Preservation

Samples are collected in plastic bottles and cooled to 4°C. The holding time for acidity is 14 days.

6. Apparatus

6.1 pH meter and electrodes

6.2 Hot plate

6.3 Magnetic stirrer and stir bars

6.4 Beakers, burette, volumetric flasks, and other laboratory apparatus. All glassware must be thoroughly washed and rinsed with deionized water.

7. Reagents and Standards

7.1 30% Hydrogen peroxide

7.2 Standard sodium hydroxide, 0.02 N

Dissolve 0.80 g sodium hydroxide in water and dilute to 1 liter. Standardize versus 0.02 N sulfuric acid by titrating 25 ml sodium hydroxide solution with standard acid to a pH of 7.0. Determine the sodium hydroxide concentration from:

N (Base) = N (Acid) X V (Acid) / V (Base)

N (Base) = Normality of sodium hydroxide
N (Acid) = Normality of sulfuric acid
V (Acid) = Volume of acid used in titration
V (Base) = Volume of base titrated

7.3 Standard sulfuric acid, 0.02 N

Prepare and standardize according to the method given in the Alkalinity SOP.

7.4 Buffers for calibrating pH meter, values 4.0, 7.0, and 10.0.

8. Procedure

8.1 Sample Preparation

8.1.1 Pipette 50 ml sample into a 250 ml beaker.

8.1.2 Measure the pH of the sample. If the pH is more than 4.0 add 0.02 N sulfuric acid in 5.0 ml increments until the pH is less than 4.0. Record the total volume of sulfuric acid added.

If the sample pH is less than 4.0, do not add any acid.

8.1.3 Add 5 drops of 30% hydrogen peroxide.

8.1.4 Heat the sample to boiling and continue boiling for 4 minutes. If samples contain high concentrations of ferrous iron, more hydrogen peroxide and a longer boiling time may be necessary.

8.1.5 Cool the samples to room temperature.

8.2 Calibration

8.2.1 Calibrate the pH meter according to the manufacturer's instructions.

8.2.2 Standardize the sodium hydroxide and sulfuric acid as above.

8.3 Analysis

8.3.1 Place sample on the magnetic stirrer.

8.3.2 Titrate the samples to pH 8.2 with standard sodium hydroxide. Near the endpoint, add sodium hydroxide slowly to allow the solution to equilibrate.

9. QA/QC Requirements

9.1 QC Samples

9.1.1 A blank (deionized water) is required with every batch of 20 or less samples.

9.1.2 There is no LCS for acidity at this time.

9.1.3 Duplicates may be required for project specific QC.

9.1.4 There is no suitable spike for acidity at this time.

9.2 Acceptance Criteria

Since there is no LCS, no acceptance criteria have been established for acidity.

9.3 Corrective Action Required

Review the titration data carefully with your supervisor.

10. Calculations

ACIDITY = 50000 X (NBASE X VBASE - NACID X VACID) / VOL

ACIDITY = Sample acidity, mg/L as Calcium Carbonate
NBASE = Normality of sodium hydroxide titrant
VBASE = Volume (mL) of sodium hydroxide for titration
NACID = Normality of sulfuric acid added to sample
VACID = Volume (mL) of sulfuric acid added to acid
VOL = Sample volume analyzed (mL)

11. Reporting

11.1 Reporting Units

Acidity is reported in mg/L as Calcium Carbonate

11.2 Reporting Limits

Values less than 10 mg/L are reported as ND.

11.3 Significant Figures

Range	Sig. Figures
10 - 30	1
31 - 99	2
>100	3

11.4 LDMS Data Entry

The usual standards for data entry apply.

12. References

12.1 Method Source

EPA Method 305.1

12.2 Deviations from Source Method and Rationale

No deviations from the source method have been incorporated into this SOP.

ADDENDUM TO CWM Vickery GWMP QAPjP Appendix B-17
SOP Number: LM-RMA-1101
Title: Specific Gravity (Hydrometric)

This addendum is specific to the Chemical Waste Management, Vickery, Ground Water Monitoring Plan QAPjP. Procedural changes or clarification statements presented herein are not applicable to Enseco SOPs for other projects, and are made here in response to an EPA letter dated March 17, 1992 to CWM containing comments (with additional attachment) regarding the CWM-Vickery GWMP QAPjP.

Section 9.1.2: Duplicate specific gravity analyses are required for this specific project. A duplicate analyses will be performed on each sample. Acceptance control limits are matrix sensitive, and will not be determined until actual samples of the project matrix are analyzed. Section 9.2.1 of the SOP indicates tentative control limits. Limits will be indicated in the raw data.

STANDARD
OPERATING
PROCEDURE

Subject or Title: Specific Gravity (Hydrometric)		Page 1 of 4
SOP No.: LM-RMA-1101	Revision No.: Original	Effective Date: May 1, 1989
Supersedes: None		

1. Scope and Application

   1.1 This method covers the determination of specific gravity by hydrometry.

   1.2 Detection Limit

   A detection limit for specific gravity is not defined.

   1.3 Applicable Matrices

   This method is applicable to the analysis of drinking, surface and saline waters that are free of oil separable by filtration.

   1.4 Dynamic Range

   The approximate dynamic range of this method is 0.7 to 2.0.

   1.5 Approximate analytical time is 10 minutes per sample.

2. Summary of Method

   2.1 A volume of filtered sample is placed in a graduated cylinder and stabilized to 15.6^{o} C in a circulating water bath. A hydrometer is immersed in the sample and the specific gravity is read directly from the graduated scale.

Prepared by:	Kurt C. Ill	Date: 4/28/89
Management Approval:	John W. Pratt II	Date: 4/28/89
QA Officer Approval:	Lisa Ledenbarger	Date: 4/30/89

3. Comments

   3.1 Interferences

      3.1.1 Samples must be free of oil before measurement, therefore, only freshly filtered samples should be used.

4. Safety Issues

   4.1 All employees are expected to be familiar with and follow the procedures outlined in the Enseco/RMAL safety plan. Lab coats and safety glasses are required in all laboratory areas at all times. If you have any questions or safety concerns, see your supervisor or safety officer.

5. Sample Collection and Preservation

   5.1 Samples are to be collected in glass or plastic bottles. Any further attempts at preservation will alter the specific gravity of the sample.

   5.2 The holding time for specific gravity is not defined. Enseco recommends analysis within 28 days of collection.

6. Apparatus

   6.1 Circulating water bath, calibrated to 15.6$\pm$ 1°C

   6.2 500 mL graduated cylinder

   6.3 Hydrometer with graduations no greater than 0.002

7. Reagents and Standards

   7.1 DCS Solution

      Any solution of known specific gravity can be used. Enseco recommends deionized water (ASTM D 1193, Type II) with a true value of 1.0000 $\pm$ 0.009.

8. Procedure

   8.1 Place a sufficient quantity of glass wool, to trap any separable oil, into a glass or plastic funnel.

8.2 Place the funnel into a clean, dry 500 mL graduated cylinder and gravity filter approximately 250 mL of sample. Discard glass wool when finished.

8.3 Place the graduated cylinder containing the filtered sample into a heated, circulating water bath calibrated to 15.6 $\pm$ 1°C and allow to equilibrate for one hour.

8.4 Place a hydrometer into the sample such that it does not migrate to the sides of the graduated cylinder. The hydrometer must float freely in the sample and not touch the sides of the graduated cylinder.

Read the specific gravity directly from the scale on the hydrometer.

If the range on the first hydrometer is not within the sample value, another hydrometer with the appropriate range must be used. A good "rule of thumb" would be to start with the range of 0.9-1.0 units. If the hydrometer sinks below the 0.9 units a hydrometer with the scale of 0.8-0.9 or 0.7 to 0.8 will be needed. If the hydrometer floats above the 1.0 unit mark, a hydrometer with a scale of 1.0 to 1.2 or greater will be needed.

9. QA/QC Requirements

9.1 QC Samples

9.1.1 Two DCS samples are required with every batch of 20 or less samples.

9.1.2 Duplicates may be required as project specific QC.

9.1.3 Spiking of specific gravity is not applicable.

9.2 Acceptance Criteria

9.2.1 Control limits have not been formally established. Until a substantial body of data can be obtained, control limits will be:

Accuracy	Precision
99-101%	2%

10. Reporting

10.1 Reporting units for specific gravity are not applicable.

10.2 Significant Figures

Range	Waters
< 0.999	3
1+	4

11. References

11.1 Method Source:

ASTM D 1429-76 (Reapproved 1981). "Standard Test Method for Specific Gravity of Water and Brine," Method D, pp. 231-234.

11.2 Deviations from source methods and rationale

11.2.1 Samples are analyzed ONLY at 15.6°C (60°F). Corrections from other temperatures to 60°F are not necessary.

ADDENDUM TO CWM Vickery GWMP QAPjP Appendix B-18

SOP Number: LM-EST-4002

Title: Water Miscible Solvents by GC/FID, Using Direct Aqueous Injection

This addendum is specific to the Chemical Waste Management, Vickery, Ground Water Monitoring Plan QAPjP. Procedural changes or clarification statements presented herein are not applicable to Enseco SOPs for other projects, and are made here in response to an EPA letter dated March 17, 1992 to CWM containing comments (with additional attachment) regarding the CWM-Vickery GWMP QAPjP.

This is a different SOP from the method initially submitted with QAPjP revision No. O.

Section 6.2: The gas chromatograph column to be used is a RTX-1701 30m x 0.53mm, 3.0um film model.

Section 9.1: Matrix spike/matrix spike duplicate analyses will be performed at a frequency of one per every 20 or fewer samples prepared/analyzed. pike components will be the same compounds used in the DCS standards noted in SOP Section 7.4. Spike levels and control limits are matrix specific, and will be determined when analysis of project matrix samples are analyzed. The spiking levels and control limits will be included in the raw data.

Section 11: Data package requirements are found within this SOP Section 11.

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1.0 SCOPE AND APPLICATION

1.1 This method is suitable for the analysis of water miscible solvents in aqueous samples and extracts. Direct injection technique is used. Appropriate extraction techniques are outlined in Sec. 8.

1.2 Analytes: The analytes that can be determined by this method are listed in Table 1.

1.3 Reporting limits: The method reporting limits are listed in Table 1.

1.4 Applicable matrices: Water, Solid, Waste, Leachate.

1.5 Table 2 indicates the approximate retention time in minutes for the column used in this analysis.

1.6 Total analysis time per injection is approximately 25 to 30 minutes.

2.0 METHOD SUMMARY

2.1 This is a direct aqueous injection gas chromatography method applicable to the determination of the water miscible solvents listed in Table 1.

The solvents are injected onto a gas chromatographic column. The gas chromatograph is temperature programmed to separate the analytes which are then detected by a flame ionization detector.

3.0 COMMENTS

3.1 Matrix interferences may be caused by contaminants that are co-extracted from the sample. The extent of the matrix interferences will vary from source to source, depending upon the nature and diversity of the industrial complex or municipality being sampled. If the initial preparation of the sample has not removed these interferences, it may be necessary to re-extract the samples or dilute out the interferences.

4.0 SAFETY ISSUES

4.1 The toxicity or carcinogenicity of each reagent used in this method has not been precisely defined; however, each chemical compound should be treated as a potential health hazard. From this viewpoint, exposure to these chemicals must be reduced to the lowest possible level.

4.2 A Material Safety Data Sheet (MSDS) is available for each laboratory standard and reagent chemical. The appropriate MSDS must be reviewed by the employee before handling the chemical(s).

4.3 All laboratory personnel should be thoroughly familiar with the laboratory Safety Manual before undertaking any laboratory work.

5.0 SAMPLE COLLECTION, PRESERVATION, CONTAINERS, AND HOLDING TIMES

5.1 See the appropriate sample handline SOP's for sample collection, preservation, and containers.

5.2 It is recommended that all aqueous samples be analyzed within 14 days of collection. All solid and waste samples should be extracted within 14 days of collection.

5.3 All extracts must be analyzed within 40 days of extraction.

6.0 APPARATUS

6.1 Gas Chromatograph, Hewlett-Packard Model #5890 or equivalent, equipped with Flame Ionization Detector (FID).

6.2 Gas Chromatograph columns (recommended).

A: 6ft x 2mm ID glass packed with 1% SP-1000 on 60/80 Carbopack. Detector 300 degrees C, Injector 220 degrees C. Initial Temp 60 degrees C for 3 min., increase temp at 8 degrees C/min to final temp of 200 degrees C and hold for 5 min.

or B: DB624 FSCC 30m x 0.53mm ID, 3um df. Detector 300 degrees C, injector 280 degrees C (splitless mode, purge on at 1 min.). Initial temp 30 degrees C for 7 min., increase temp at 10 degrees C/min. to a final temp of 250 for 4 min.

6.3 Autosampler: Hewlett-Packard Model #7673 or equivalent.

6.4 Data system capable of integrating responses in either height or area, and reporting in terms of external standards.

7.0 REAGENTS AND STANDARDS

7.1 Reagent Water - Millipore Milli-Q water, purged for a minimum of 30 minutes.

7.2 Stock Standard Solution - Stock solution maybe prepared from pure standard materials or purchased as certified solutions. A 1 mg/ml secondary standard can be made by using the equation.

$$D = \frac{M}{V}$$

Where: D= density in g/ml
M= mass of solution in g
V= volume of neat solution needed in ml

$$V = \frac{M}{D}$$

7.3 Secondary Calibration Standards

Concentration Level	Volume of Secondary Standard 10 ml Reagent Water
5 ug/ml	50 ul
10 ug/ml	100 ul
25 ug/ml	250 ul
50 ug/ml	500 ul
100 ug/ml	1.0 ml

Additional levels maybe analyzed at the analyst's discretion.

7.4 Duplicate Control Sample (DCS) Standard. Methanol, 1-Propanol and 1-Butanol at 1.0 mg/ml each.

7.4.1 Aqueous DCS - add 125 ul of DCS standard solution + 4.9 ml reagent water, spike concentration 25 mg/l.

7.4.2 Soil DCS - add 125 ul of DCS standard into 5.0 grams Ottawa Sand. Extract with 4.9 ml reagent water, spike concentration 25 mg/l.

8.0 PROCEDURE

8.1 Sample preparation - No preparation is required for aqueous samples. Soil and waste samples are extracted in reagent water. Weigh 5 grams of soil into a 40 ml vial, add 5 ml of reagent water. Cap and shake for 2 min. Let settle and remove a portion of the aqueous phase, place in autovial for analysis.

8.2 Instrument Calibration

8.2.1 Inject the medium level std. on the gas chromatograph. Make certain that the data system correctly identifies all peaks in the report.

8.2.2 Inject calibration standards at a minimum of 5 concentration levels. 5, 10, 25, 50, 100 ug/ml

8.2.3 The Relative Standard Deviation (%RSD) for each compound must be less than 20%.

8.2.4 If the calibration is acceptable, enter the average calibration factors into the calibration table of the data system.

8.3 Daily Procedure

8.3.1 Before analyzing samples, inject the medium-level standard. All compounds must have a Relative Percent Difference (RPD) and less than 15% of the original average calibration factor.

8.4 Analysis

8.4.1 Analyze method blanks, reagent blanks, and DCS before proceeding to samples.

8.4.2 Sample dilution is made when necessary so response is in the calibration range.

8.4.3 After every 10 injections the medium-level standard is analyzed.

8.4.4 Analyze a check standard at the end of each sample sequence.

8.4.5 All injections should be noted in the injection logbook.

9.0 QA/QC REQUIREMENTS

9.1 QC Samples - the laboratory must, on an ongoing basis, demonstrate through the analysis of quality control check standards that the operation of the measurement system is in control.

9.2 Calibration - Calibration curves and method blanks should be analyzed daily. Calibration factors are calculated using the equation in 10.1. The average calibration factor must be based on a minimum of five concentration levels. The average calibration factor must include data from the 5.0 ug/ml levels in order to attain the desired reporting limit (5.0 mg/l).

9.3 Duplicate control samples (DCS) must be run with each curve and additionally for each 20 samples. The control samples are spiked at 25 mg/l with acceptable recovery being 50-150%, acceptable precision 20 RPD. The accuracy precision data is to be used for advisory purposes only.

9.4 Calibration check standards are to be run at the 25.0 mg/l level after each 10 samples as well as at the end of a sequence of samples. The measured concentration of the check standard must fall witin +/- 15% of the nominal value. If the check standard does not meet this criterion, it may be re-analyzed. If it still does not pass, a new calibration curve must be run. Any samples associated with the failing check standard must also be rerun.

9.5 Corrective action required - refer to current QC manual.

10.0 CALCULATIONS

10.1 Calibration calculations:

10.1.1 Calibration factor:

$$CF = \frac{Rpeak}{cstd}$$

Where: CF = Calibration factor
Rpeak = Response of component (area or height)
Cstd = Concentration of standard (mg/l)

10.1.2 Average calibration factor

Average CF = The sum of the CF's/# of stds.(levels)

10.1.3 Percent relative standard deviation (%RSD).

%RSD = Standard deviation/average calibration factor x 100.

10.2 Hand calculations for values

Rpeak / CFavg x mult/div = Csample

Where: CFavg = Average calibration factor
Rpeak = Response of peak (area or height)
Mult = Final volume of extract (ml)
Div = Initial weight or volume of sample (g or ml)
Csample= Concentration of analyte in sample (mg/l or mg/kg)

10.3 Calculations to check spiked amounts

Cspike (ng/ul) x [Vspike (ul / Vsample (ml)] = Sspike (ng/ml)

Where: Cspike = Concentration of spike solution (ug/l)
Vspike = Volume of spike solution used (ml)
Vsample = Volume of sample spiked (ml)
Sspike = Actual spike level in sample (ug/l)

10.4 Calculations to check concentrations of spike in extract, so can appropriate dilutions can be determined:

Spike (ng/ml or ng/g) x [div(ml or g)/mult(ml)] = Cspike (ng/ml)

Where: Sspike = Spike level of sample (ug/l)
Div = Initial mass or volume of sample(g or ml)
Mult = Final volume of extract (ml)
Cspike = Concentration of spike in extract (ug/l)

10.5 Calculations of reporting limits in the event of dilutions:

[Low standard] x mult/div = RL

Where: [Low standard] = Concentration of low standard (ug/ml)
Mult = Final extract volume (ml)
Div = Sample weight or volume (g or ml)
RL = New reporting limit (ug/ml or ug/g)

11.0 REPORTING REQUIREMENTS

11.1 Significant Figures.

11.1.1 When reporting concentrations of analyte present in samples, report all values to two significant figures.

11.1.2 When reporting concentrations of analyte present in spiked samples, report all concentration values to three significant figures.

11.1.3 When reporting percent recoveries and relative percent deviations for the purposes of quality control, round to two significant figures, unless the recovery values are over 100%. Then report them to three significant figures.

11.2 The following are required components of data packages submitted for approval:

11.2.1 A copy of the calibration curve.

11.2.2 Copies of all bracketing standards present, with at least one copy of each type of standard chromatogram where all the peaks are labelled, and all chromatograms showing evidence that they were checked for meeting continuing calibration criteria.

11.2.3 Concentrations of standards indicated on chromatograms.

11.2.4 On sample chromatograms where the samples have been analyzed at dilutions, the reporting limits should be verified.

11.2.5 Copy of appropriate DCS and Blank forms and chromatograms. If anything was out of control there should be a corrective comment from the supervisor.

11.2.6 Matrix Spike sheet present if Matrix spikes were extracted with the set of samples.

11.2.7 Copy of prep lab sheets (for soils and wastes only).

11.2.8 Copy of injection log.

11.2.9 When quantitating, be certain that all peaks used for quantitation are within the linear range of the detector as defined by the calibration curve.

11.2.10 Report all data in the LIMS database, and include computer generated report forms with the data package.

11.2.11 All calculations performed on the relevant chromatograms.

11.3 Reporting units - Aqueous samples mg/l; solid/waste samples mg/kg.

TABLE 1

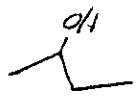
TARGET ANALYTE LIST

CAS#	TEST COMPONENT	REPORTING LIMIT AQUEOUS mg/l	REPORTING LIMIT SOIL (mg/kg)
67-56-1	METHANOL	5.0	5.0
64-17-5	ETHANOL	5.0	5.0
71-23-8	1-PROPANOL	5.0	5.0
67-63-0	ISOPROPANOL	5.0	5.0
75-65-0	2-METHYL-2-PROPANOL	5.0	5.0
78-92-2	2-BUTANOL	5.0	5.0
78-83-1	ISOBUTANOL	5.0	5.0
71-36-3	1-BUTANOL (n-BUTANOL)	5.0	5.0
75-85-4	2-METHYL-2-BUTANOL	5.0	5.0
123-51-3	3-METHYL-1-BUTANOL (ISOAMYL ALCOHOL)	5.0	5.0
137-32-6	2-METHYL-1-BUTANOL	5.0	5.0
78-93-3	METHYL ETHYL KETONE	5.0	5.0
67-64-1	DIMETHYL KETONE	5.0	5.0
108-10-1	METHYL ISOBUTYL KETONE	5.0	5.0

TABLE 2

APPROXIMATE RETENTION TIME (COLUMN A, SEC. 6.2)

TEST COMPONENT	APPROX. RETENTION TIME (min)
METHANOL	1.35
ETHANOL	3.83
ACETONE	5.71
ISOPROPANOL	6.99
1-PROPANOL	8.62
METHYL ETHYL KETONE	11.14
2-BUTANOL	12.07
ISO-BUTANOL	12.49
1-BUTANOL	13.88
METHYL ISOBUTYL KETONE	19.52



Injection Report

Acquired on 5-APR-1992 at 18:22

RMAL Chromatography System on DENCR2

Analyst Name : M. FAUGHT
Lims Id :
Comment :
Method Title : DAI by FID
Sample Name : GC-FID CSA 100ug/ml w/IS
Sample Id : HE 04/02/92
Sample Type : Sample Amount=1.000000
Bottle No : 3

PEAK INFORMATION

Peak	RT mins	RT Exp	Area uVs	ug/ml	Peak name	Width
1	1.702	1.711	192294	99.1401	Methanol	2.7
2	2.644	2.653	230349	103.0867	Ethanol	4.3
3	3.080	3.093	241898	98.6474	Acetone	5.1
4	3.444	3.458	255774	98.5422	Isopropanol	6.1
5	5.840	5.853	301817	102.1769	1-Propanol	6.7
6	6.147	6.156	226835	97.6739	Ethyl Acetate	6.4
7	6.453	6.467	316433	98.3195	2-Butanone	5.9
8	6.996	7.004	293853	101.2744	2-Butanol	6.4
9	8.151	8.160	344115	100.9771	Isobutyl Alcohol	5.9
10	9.302	9.316	324992	106.3500	1-Butanol	4.5
11	10.813	10.827	374591	97.4565	4-Methyl,2-Pentanone	4.8
12	11.209	11.218	72323		Isoamyl Alcohol	6.4
13	12.720	12.738	325090	0.1797	Ethylene Glycol	3.5
14	13.902	13.911	358923	92.5403	4,4'-Dimethylformamide	3.7
15	15.018	15.031	281894	101.5610	Mono-Butyl Ether (Surrogate)	4.0
16	15.929	15.947	566474	95.5173	DMSO	3.7
17	16.884	0.000	2113	0.0000		3.7

Totals		
Unknowns	0	N/A
Quantified	4710268	1393.4629
Grand Total	4710268	1393.4629

MISSING PEAKS

No missing peaks.

ANALYSIS SUMMARY

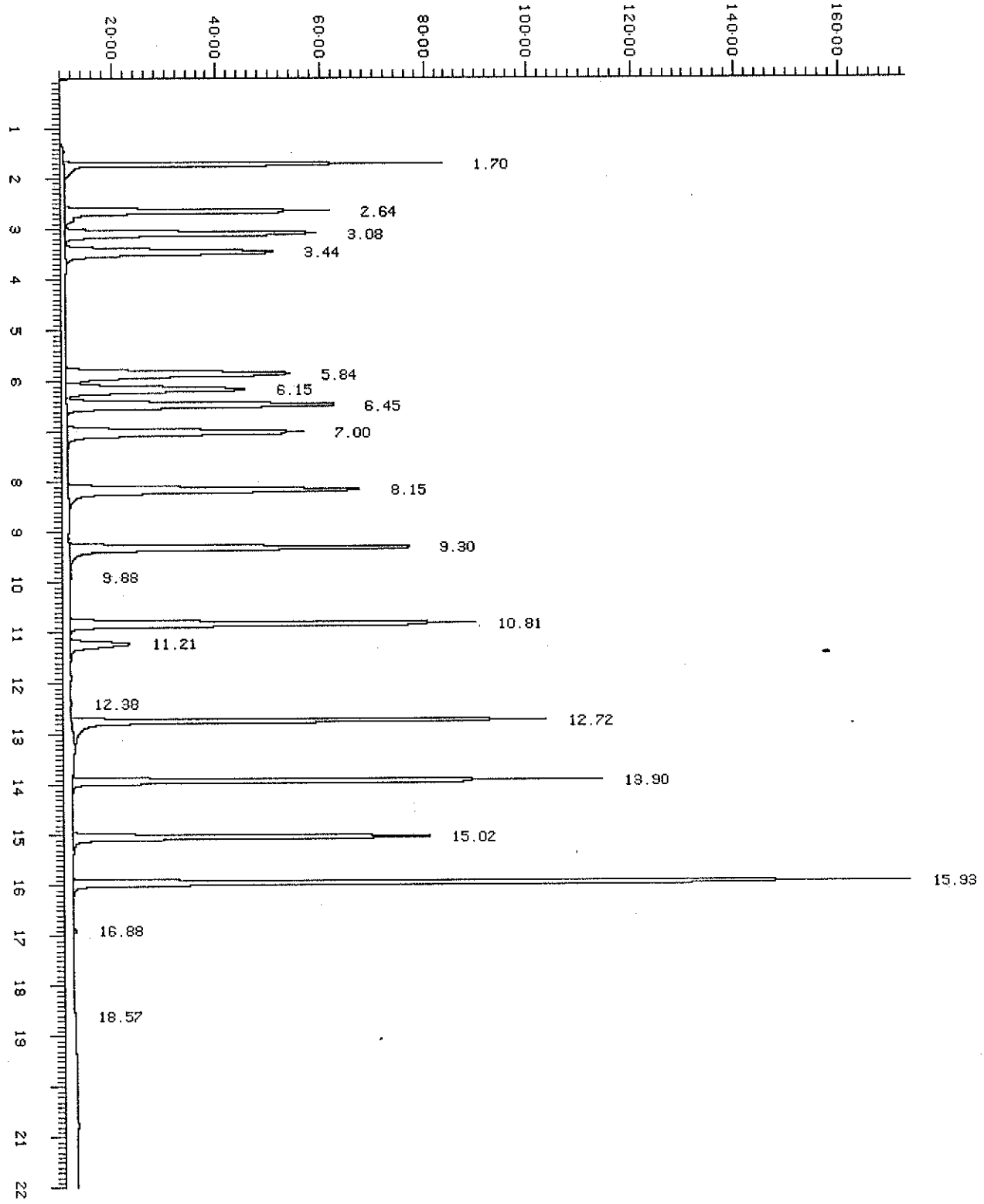
Method..... DAI
Run sequence..... DAISUN
Calibration..... 004APR92
Internal standard calibration using area
Calibration last modified on 6-APR-1992 at 11:27

Uncalibrated peaks use user factor (0.0000)

RMAL Chromatography System on DENCR2

[FID04_1] 23 DAI05APR92,4,1

GC-FID CSA 100ug/ml w/IS. Amount : 1.000.
Inst. "O" 5890A Restek-1701 0.53mm ID. 30m. 3.0um
Acquired on 5-APR-1992 at 18:22
Reported on 6-APR-1992 at 11:45
Box 1 (of 1)



SOP Number: LM-RMA-1018

Title: Cyanide (Automated Colormetric Analysis)

This addendum is specific to the Chemical Waste Management, Vickery, Ground Water Monitoring Plan QAPjP. Procedural changes or clarification statements presented herein are not applicable to Enseco SOPs for other projects, and are made here in response to an EPA letter dated March 17, 1992 to CWM containing comments (with additional attachment) regarding the CWM-Vickery GWMP QAPjP.

Section 5.2: The holding time for cyanide is 14 days from the time of sample collection.

Sections 7 and 8: A distilled standard will be analyzed in each batch of 20 environmental samples to assess the distillation efficiency of the sample preparation method.

Section 9.1.3: Matrix spike sample will be analyzed at a frequency of one for every 20 or fewer environmental samples prepared/analyzed.

Section 9.1.5 (Addition to SOP) A distilled mid-range standard will be analyzed at a frequency of one for every 20 environmental samples analyzed, as noted in Sections 7 and 8, above. Control limits are as in Section 9.2.2 of the SOP.

Section 10.3: Sample dilution factors (if dilution is required) will be utilized in all applicable calculations.

Section 10.4: The section concerning analyte concentrations detected in preparation blanks is revised as per the memorandum contained on pages 2 and 3 of this addendum.

Section 11.2: For this project, analytes reported as ND (not detected) means the analyte was not present at a level equalling or exceeding the reporting limit.

SOP-LM-RMA-1020:

This is the prep method for weak acid dissociable cyanide. Applicable comments above also apply to this SOP.

Date: 9-SEP-91 7:23a
From: SOMLIM::PSLEEVI
To: @QA,,CAMLIM::NROTHMAN
CC: PSLEEVI
RE: Method Blank Policy

MEMORANDUM

TO: QA Directors

FROM: Peggy Sleevi

DATE: September 10, 1991

RE: Revised Method Blank Policy (9/91)

After discussions at the May 1991 QA Directors meeting, the consensus was that the method blank policy presented in the Enseco QAPP should be revised such that reporting limits were not altered when blank contamination was present. Effectively, this is blank correction and is a carryover from an earlier method blank policy where blank correction of data was performed.

The following policy replaces that currently in Revision 3.4 of the Enseco QAPP and section 4.2.3 of M-EQA-0002, effective on or before October 1, 1991. The QA Director at each facility must document the actual implementation date of the revised policy. Any existing agreements for reporting blank data according to Revision 3.4 of the Enseco QAPP must be adhered to unless they are formally amended by the laboratory and agreed to by the client.

Method Blanks

Method blanks, also known as reagent, analytical, or preparation blanks, are analyzed to assess the level of background interference or contamination which exists in the analytical system and which might lead to the reporting of elevated concentration levels or false positive data.

As part of the standard Enseco QC program, a method blank is analyzed with every batch of samples processed. A method blank consists of reagents specific to the method which are carried through every aspect of the procedure, including preparation, clean-up and analysis. The results of the method blank analysis are evaluated, in conjunction with other QC information, to determine the acceptability of the data generated for that batch of samples.

Ideally, the concentration of target analytes in the blank should be below the Reporting Limit for that analyte. In practice, however, some common laboratory solvents and metals are difficult to eliminate to the parts-per-billion levels commonly reported in environmental analyses. Therefore, criteria for determining blank acceptability must be based on consideration of the analytical techniques used, analytes reported, and Reporting Limits required.

For organic analyses, the concentration of target analytes in the blank must be below the Reporting Limit for that analyte in order for the blank to be considered acceptable. An exception is made for common laboratory contaminants (methylene chloride, acetone, 2-butanone, and phthalate esters) which may be present in the blank at up to 5 times the Reporting Limit and

still be considered acceptable. This policy is consistent with the CLP policy and has been established in recognition of the fact that these compounds are frequently found at low levels in method blanks due to the materials used in the collection, preparation, and analysis of samples for organic parameters.

For non-routine organic analyses, other components may be established as common contaminants for that particular analysis. For example, naphthalene is frequently found in PAH-SIM analyses. If, upon thorough review of the method during validation it is deemed impossible to eliminate trace amounts of analytes from the process, these analytes are likewise allowed at up to 5 times the reporting limit.

For metals and Wet Chemistry analyses, where the Reporting Limits are typically near the Instrument Detection Limit (IDL), the policy is that the concentration of the target analytes in the blank must be below two times the Reporting Limit. If the blank value for a target analyte lies below the Reporting Limit, the analyte is reported with no flag on the associated sample data. If the blank value lies between the Reporting Limit and two times the Reporting Limit, the analyte in the associated samples is flagged to indicate contamination was present in the blank. A blank containing an analyte(s) above two times the Reporting Limit is considered unacceptable unless the lowest concentration of the analyte in the associated samples is at least ten times the blank concentration (as per CLP Protocol) or the concentration of the analyte in all samples associated with the blank is below the reporting limit.

In addition, for Wet Chemistry tests, the method SOP directs how the blank is treated. Generally, a reagent blank is used both to zero the equipment and as one of the calibration standards. If a preparation step is required for the analysis, then a prep blank is also analyzed to determine the extent of contamination or background interference. The concentration found in the prep blank is subtracted from the concentration found in any associated sample prior to calculating the final result when specified by the method. Blanks have no application or significance for some Wet Chemistry parameters (e.g. pH).

If the blank for any test does not meet acceptance criteria, the source of contamination must be investigated and appropriate corrective action must be taken and documented. Investigation includes an evaluation of the data to determine the extent and effect of the contamination on the sample results. Corrective actions may include reanalysis of the blank, and/or repreparation and reanalysis of the blank and all associated samples. If a blank meets the criteria, but has analytes above the reporting limit, investigation should occur to determine whether any corrective action could eliminate an ongoing source of target analytes. Additional actions or explicit corrective action procedures detailed in protocols, methods or project-specific project plans must be followed when applicable.

For organic and metals analyses, and selected Wet Chemistry tests, method blank results are reported with each set of sample results. Sample results are not corrected for blank contamination unless required by the analytical method or requested by the client. Occasionally, due to limited sample volume or other constraints, the laboratory reports data associated with an unacceptable blank. In these cases, the actual observed value is reported in the method blank and all sample results for the analyte(s) observed in the blank are flagged to indicate contamination was present in the associated method blank.

STANDARD
OPERATING
PROCEDURE

Subject or Title: Cyanide (Automated Colorimetric Analysis)

Enseco

SOP No.: LM-RMA-1018

Revision No.: 2.0

Effective Date: June 18, 1991

Supersedes: Revision No 1.0

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1. Scope and Application

1.1 Analytes

This method is applicable to the determination of:

Total cyanide
Cyanide amenable to chlorination
Weak acid dissociable cyanide
Reactive cyanide

The appropriate sample preparations must be performed prior to analysis by this method.

Prepared by: Toni J. Stavell — Date: 6/19/91

Management Approval: David B Roberts — Date: 6/19/91

QA Officer Approval: [illegible] — Date: 06/19/91

Enseco Incorporated
4955 Yarrow Street
Arvada, Colorado 80002
303/421-6611 Fax: 303/431-7171

1.2 Detection Limits:

Parameter	Waters	Soil/Waste
Total cyanide	0.01 mg/L	0.5 mg/kg
Amenable to chlorination	0.01 mg/L	0.5 mg/kg
Weak acid dissociable	0.01 mg/L	0.5 mg/kg
Reactive cyanide	0.1 mg/L	0.1 mg/kg

1.3 Applicable matrices

This method is applicable to drinking, surface, and saline waters, domestic and industrial wastes, soil and other non-aqueous matrices.

1.4 Dynamic range

The range extends to 0.4 mg/L (20 mg/kg). Higher concentrations are analyzed by dilution of the sample.

1.5 Approximate analytical time is 1 hour for a group of 20 samples, not including time for instrument set up.

2. Method Summary

2.1 Total cyanide samples are prepared by distillation of the cyanide from an acidic medium.

2.2 Cyanide amenable to chlorination is prepared by chlorinating an aliquot of the sample and then distilling for total cyanide. A second aliquot is distilled without chlorination for total cyanide. Cyanide amenable to chlorination is defined as the difference between the two results.

2.3 Weak acid dissociable cyanide is prepared by distillation from a slightly acidified solution.

2.4 Reactive cyanide is prepared by adjusting a sample to pH 2 and trapping the evolved hydrogen cyanide.

2.5 Sample preparation methods are described in SOPs: LM-RMA-1016 (amenable to chlorination) and LM-RMA-1020 (weak acid dissociable).

2.6 Samples prepared by the above methods are analyzed colorimetrically on a Technicon AA II Autoanalyzer System. The sample is buffered and reacted with Choramine-T to produce cyanogen chloride. This then reacts with a pyridine-barbituric acid reagent to produce a red colored complex.

3. Comments

3.1 Interferences

3.1.1 Oxidizing agents such as chlorine will destroy cyanide.

3.1.2 Some unidentified organic compounds may oxidize or form decomposition products during chlorination, giving higher results for cyanide after chlorination than before chlorination; this gives a negative value for cyanide amenable to chlorination. Examples include samples from petroleum refineries, the steel industry, and pulp and paper processing. The weak acid dissociable method should be used for these samples.

3.1.3 Sulfide may interfere with the analysis. Sulfide is tested for and removed during sample prep.

3.1.4 Chlorine added to the sample for amenable cyanide must be completely destroyed before distillation. Otherwise, it may distill over and destroy the non-amenable cyanide.

3.1.5 Nitrate and/or nitrite may react with organic compounds during distillation to form cyanide.

3.1.6 Samples containing surfactants may foam excessively during distillation.

3.1.7 The extent to which some metal-cyanide complexes are destroyed by chlorination depends on the amount of chlorine present and the time allowed for reaction.

3.1.8 High carbonate concentrations may react violently when sulfuric acid is added to the samples during distillation. It may also interfere with the automated colorimetric analysis by forming bubbles in the flow cell.

3.1.9 Aldehydes, glucose, and other sugars may convert cyanide to cyanohydrin during distillation.

3.1.10 Amino acids may distill with the cyanide and interfere with the analysis.

3.1.11 Fatty acids may interfere by forming soaps in the absorption solution.

3.2 Helpful hints

Cyanide amenable to chlorination is sometimes referred to as "Free Cyanide." The weak acid dissociable method also determines "Free Cyanide" and it is important to distinguish between the two due to the different sample preparation required.

4. Safety Issues

4.1 All employees are expected to be familiar and follow the procedures outlined in the Enseco-RMAL safety plan. Lab coats and safety glasses are required in all laboratory areas at all times. If you have any questions or safety concerns, see your supervisor or safety officer.

4.2 Wear gloves and apron when handling concentrated acids. Transport only in approved carriers. Avoid breathing acid fumes; handle in a hood. Any spills are to be neutralized and cleaned up immediately. In case of skin contact, flush with water for at least 15 minutes. Notify your supervisor or safety officer of any spills or exposures.

4.3 Wear gloves and apron when handling concentrated bases. Clean up any spills immediately. In case of skin contact, flush with water for at least 15 minutes. Notify your supervisor or safety officer of any spills or exposures.

4.4 Pyridine should be handled only in a fume hood. Wear gloves and clean up any spills promptly. The pyridine-barbituric acid reagent should be kept covered as much as possible.

4.5 Cyanide and its salts are extremely toxic. Handle only in a hood. Wear gloves and clean up spills immediately. Do not pour concentrated cyanide solutions down the drain. Do not allow acids to come into contact with cyanide salts or concentrated solutions. Do not breathe dust or vapors.

4.6 The waste from the analysis is slightly acidic. Add sodium hydroxide to the waste container to keep any unreacted cyanide from escaping into the air.

5. Sample Collection, Preservation, Containers, and Holding Times

5.1 Water samples are to be collected in plastic bottles and preserved with 2 mL of 10 N sodium hydroxide per liter of sample. Refrigerate at 4°C.

5.2 The holding time for cyanide is 14 days.

5.3 Soil and waste samples should be collected in wide mouth jars and refrigerated. Eliminate headspace from samples requiring reactivity. There is no preservative or holding time for these samples.

6. Apparatus

6.1 Technicon AA II consisting of sampler, pump, manifold, and colorimeter.

6.2 570 nm filter and 10 mm flow cell for colorimeter.

6.3 Miscellaneous laboratory apparatus and glassware.

7. Reagents and Standards

7.1 Pyridine-Barbituric

Place 15 g barbituric acid in a 1000 mL volumetric flask and add about 100 mL deionized water. Add 75 mL pyridine and mix. Carefully add 15 mL concentrated hydrochloric acid and mix. Dilute to volume with deionized water and store at 4°C.

7.2 Phosphate Buffer Solution

Dissolve 138 g sodium dihydrogen phosphate monohydrate ($NaH_2PO_4 \cdot H_2O$) in deionzed water and dilute to 1000 mL. Add 0.5 mL Brij-35. Store at 4°C.

7.3 Chloramine-T

Dissolve 0.40 g chloramine-T in deionized water and dilute to 100 mL. Prepare fresh daily.

7.4 Sampler Wash--Sodium Hydroxide, 1%

Dissolve 10 g sodium hydroxide in deionized water. Cool to room temperature, dilute to 1000 mL, and mix well. Store in a plastic bottle.

7.5 Calibration Standard Stock Solution, 1000 mg/L

Dissolve 2.51 g potassium cyanide and 2 g potassium hydroxide in water and dilute to 1000 mL. This solution is to be obtained from the Standards Prep Department.

7.6 50 mg/L Intermediate Calibration Standard

Pipette 5.0 mL 1000 mg/L Calibration Standard Stock into a 100 mL flask. Dilute to volume with 1% sodium hydroxide. Prepare monthly.

7.7 1.0 mg/L Working Standard

Pipette 2.0 mL Intermediate Standard (50 mg/L) into a 100 mL volumetric flask. Dilute to volume with 1% sodium hydroxide and mix. Prepare daily.

7.8 Calibration Standards

Dilute the 1.0 mg/L Working Standard with 1% sodium hydroxide:

Aliquot, mL	Final Vol., mL	Concentration, mg/L
0.0	50	Blank
0.5	50	0.01
2.0	50	0.04
5.0	50	0.10
10	50	0.20
20	50	0.40

Prepare standards daily.

7.9 DCS Stock, 1000 mg/L

Prepare as in 7.5 above, but independently to provide a reference material.

7.10 Working DCS, 50 mg/L

Pipette 5.0 ml 1000 mg/L DCS stock into a 100 ml flask. Dilute to volume with 1% sodium hydroxide. Prepare monthly.

8. Procedure

8.1 Set up the manifold as shown in the attached diagram (see Figure 1). Pump reagents through the system until a steady baseline is obtained.

8.2 While the system is pumping, prepare the calibration standards.

8.3 Fill three sampler cups with the high standard and place on the sampler.

8.4 When a steady baseline is obtained, adjust to the bottom of the chart with the baseline control.

8.5 Start the sampler and adjust the peaks for the high standard to full scale with the standard cal control. Readjust the baseline if necessary.

8.6 Analyze the standards in order of increasing concentration, followed by the Prep Blank, DCS's, and the samples. A blank (1% sodium hydroxide) and standard check should be performed at least every 10 samples, and again at the end of the run.

8.7 DCS's are prepared by spiking 200 uL Working DCS stock into 50 mL 1% NaOH. DCS's are taken through the distillation and analysis. The true value is 0.20 mg/L.

8.8 Each QC lot should be analyzed together as a group. Dilute any samples that are greater than the high standard and reanalyze. All dilutions must be performed with 1% sodium hydroxide. The sequence of standards, samples, etc. should be recorded on the bench sheet.

8.9 At the end of the run, flush the system with deionized water and turn off the instrument.

9. QA/QC Requirements

9.1 QC Samples

9.1.1 A blank and two DCS samples are required with every batch of 20 or less samples. These are prepared with the samples.

9.1.2 Duplicates may be required for project specific QC. Duplicates are to be taken through the entire prep and analysis together.

9.1.3 Spikes may be required for project specific QC. Spikes are prepared with the samples by adding 0.20 mLs of the 50 mg/L Intermediate Calibration Standard to 50 mLs of sample.

9.1.4 A blank (1% sodium hydroxide) and standard check are required after every 10 or less samples and at the end of the run.

9.2 Acceptance Criteria

9.2.1 If the prep blank reads greater than 2 times the detection limit, consult your supervisor.

9.2.2 Control limits are:

	Accuracy	RPD
Total Cyanide:	75 - 125%	20%
Amenable to Chlorination:	75 - 125	20
Weak Acid Dissociable:	75 - 125	20
Reactive Cyanide:	0 - 100	200

9.2.3 The standard curve must have a correlation coefficient of 0.995 or greater.

9.2.4 Standard checks must be within 10% of the expected value.

9.3 Corrective action required

9.3.1 Check the dilutions made when preparing standards and redilute if necessary.

9.3.2 Reprep samples if DCS results are out of the control limits or if the blank shows excessive contamination.

9.3.3 For cyanide amenable to chlorination, if the chlorinated aliquot shows more cyanide than the unchlorinated aliquot, consult your supervisor.

10. Calculations

10.1 Measure and record the peak height for each sample.

10.2 Prepare a calibration curve from the standard data. Use a linear least squares program.

10.3 Calculate the sample concentrations from the calibration curve and multiply by any dilution factors. Be sure to include dilutions made during prep.

10.4 If the prep blank is more than the detection limit, the detection limit is raised to the blank value. If the prep blank is more than twice the detection limit, the samples must be reprepped.

10.5 Cyanide amenable to chlorination:

Subtract the result for the chlorinated aliquot from the unchlorinated aliquot. This difference is cyanide amenable to chlorination.

11. Reporting Requirements

11.1 Reporting units are mg/L for waters and mg/kg for nonaqueous samples.

11.2 Samples less than the detection limit are reported as ND.

11.3 Significant figures to report are:

Range	Significant Figures
< 10	2
> 10	3

12. References

12.1 Method source: EPA Method 335.3

Additional information was obtained from Standards Methods and ASTM.

12.2 Deviations from source method and rationale

12.2.1 The automated method is used following manual distillation. Automatic distillation is not performed.

12.2.2 Standards are not distilled along with the samples since the distillation is not applicable to all the preparation methods.

12.2.3 Reactive cyanide is reported as mg/kg CN rather than mg/kg hydrogen cyanide. To convert the result to mg/kg as HCN, multiply by 1.04.

12.2.4 Color producing reagents are prepared at concentrations recommended for automated colorimetric method.

12.2.5 Standards are analyzed in order of increasimg concentration

12.3 Updates to SOP (Revision 1.0 to 2.0)

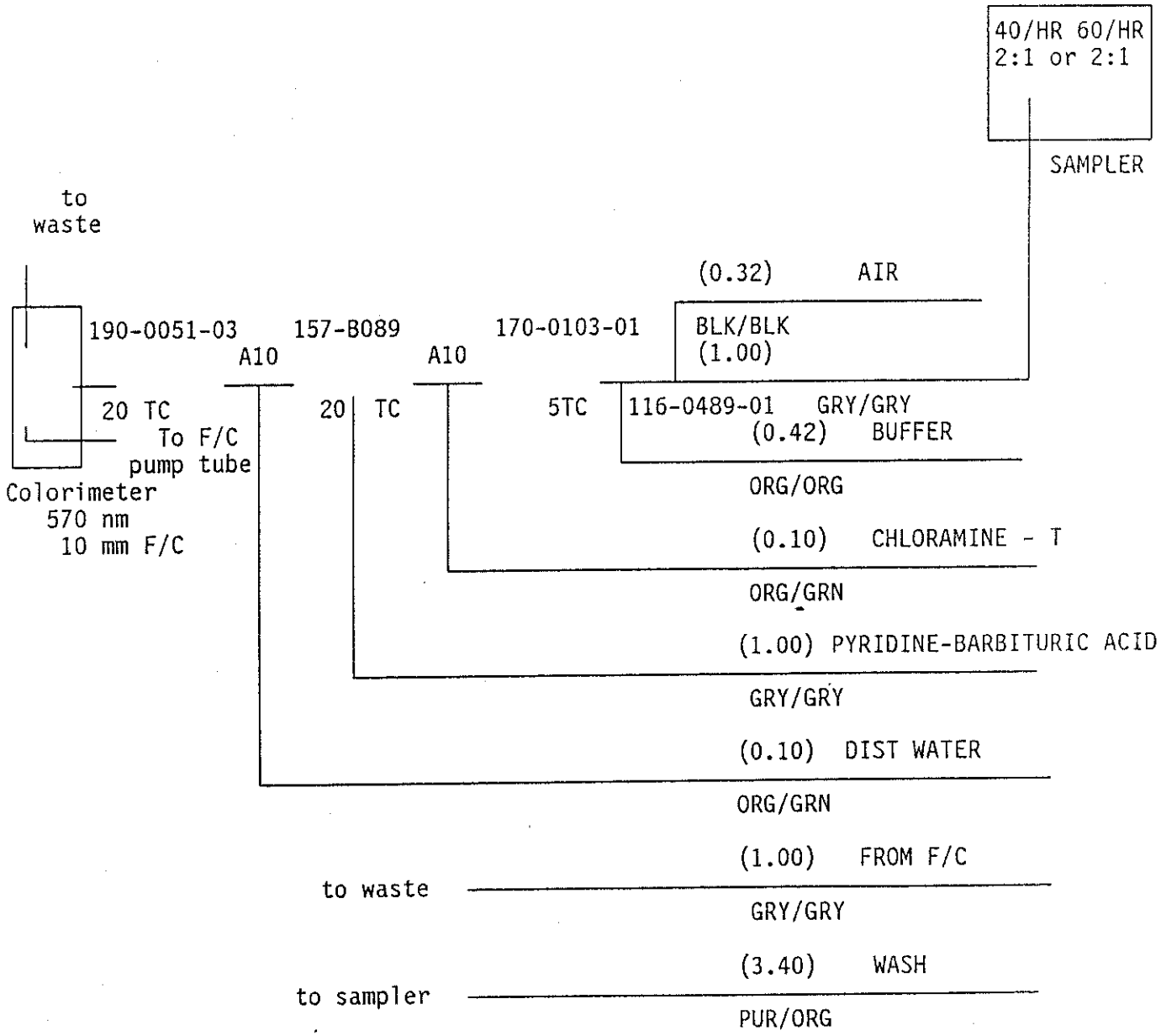
12.3.1 Analysis of standards was changed to "in order of increasing concentration"

12.3.2 Preparation of spike is given.

12.3.3 Significant figure protocol changed

12.3.4 Clerical corrections made

Figure 1. Automated Cyanide Analysis Schematic



STANDARD
OPERATING
PROCEDURE

Subject or Title: CYANIDE - WEAK ACID DISSOCIABLE SAMPLE PREPARATION		Page 1 of 8
SOP No.: LM-RMA-1020	Revision No.: 1.0	Effective Date: November 7, 1988
Supersedes: Original		

1. Scope and Application

1.1 Analytes

This method covers the determination of sample cyanide salts and weak acid dissociable complexes of cyanide ("free" cyanide).

1.2 Detection Limit

The detection limit is 0.01 mg/L for water samples and 0.5 mg/kg for soils and nonaqueous wastes.

1.3 Applicable Matrices

This method is applicable to water, wastewater, saline water, and solid matrices.

1.4 Dynamic Range

The range depends on the method used for analysis of the prepared samples. For the automated colorimetric method, it is 0.4 mg/L (20 mg/kg).

Prepared by: Lindsay Breyer LB	Date: June 13, 1988
Management Approval: Julius W. Pratt II	Date: 10/31/88
QA Officer Approval: Jan Redenbarger	Date: 11/1/88

2. Summary of Method

A slightly acidified sample is refluxed to convert the cyanide salts and dissociable complexes to hydrogen cyanide, which is swept from the solution into a trap filled with sodium hydroxide. The distillate may be analyzed by a variety of methods. By eliminating the catalyst and adding a precipitant, refractory complexes such as those of iron are not broken down.

3. Comments

3.1 Interferences

3.1.1 Oxidizing agents such as chlorine destroy cyanide.

3.1.2 Sulfide may interfere with the colorimetric analysis.

3.1.3 Nitrate and/or nitrite may react with organic compounds during distillation to form cyanide.

3.1.4 Samples containing surfactants may foam excessively during distillation.

3.1.5 High carbonate concentrations may react violently when sulfuric acid is added to the samples during distillation. It may also interfere with automated colorimetric analysis by forming bubbles in the flow cell.

3.1.6 Aldehydes, glucose, and other sugars may convert cyanide to cyanohydrin during distillation.

3.1.7 Amino acids may interfere by forming soaps in the absorption solution.

3.2 Helpful Hints

This parameter is sometimes referred to as "Free Cyanide". The amenable to chlorination method also determines "Free Cyanide" and it is important to distinguish between the two due to the different sample preparation required.

4. Safety Issues

4.1 All employees are expected to be familiar with and follow the procedures outlined in the Enseco-RMAL safety plan. Lab coats and safety glasses are required in all laboratory areas at all times. If you have any questions or safety concerns, see your supervisor or safety officer.

4.2 Wear gloves and apron when handling concentrated acids. Transport only in approved carriers. Avoid breathing acid fumes; handle in a hood. Any spills are to be neutralized and cleaned up immediately. In case of skin contact, flush with water for at least 15 minutes. Notify your supervisor or safety officer of any spills or exposures.

4.3 Wear gloves and apron when handling concentrated bases. Cleanup any spills immediately. In case of skin contact, flush with water for at least 15 minutes. Notify your supervisor or safety officer of any spills or exposures.

4.4 Cyanide and its salts are extremely toxic. Handle only in a hood. Wear gloves and clean up spills immediately. Do not pour concentrated cyanide solutions down the drain. Do not allow acids to come into contact with cyanide salts or concentrated solutions. Do not breathe dust or vapors.

4.5 Wear gloves, apron, and face protection when distilling samples. The thistle tubes should be pointed away from areas where people are working.

4.6 Build-up of pressure in the distillation apparatus will cause the hot, acidic solution to spray out of the thistle tube. Do not leave the stills unattended at any time. In case of vacuum loss, the condensers must be opened to prevent build-up of pressure. If the solution overflows onto the heating mantle, turn it off. Unplug and replace the heating mantle when cool.

4.7 All distillations are to be performed under the slot hood.

5. Sample Collection and Preservation

5.1 Samples are to be collected in plastic bottles and preserved with 2 ml of 10 N sodium hydroxide per liter of sample. Refrigerate at 4°C.

5.2 The holding time for cyanide is 14 days.

6. Apparatus

6.1 Microdistillation apparatus consisting of 125 ml round-bottom flasks, cold-finger condensers, absorption tubes, and associated apparatus.

6.2 Heating mantles for 125 ml round-bottom flasks.

6.3 Vacuum pump.

6.4 Recirculating chiller.

6.5 Miscellaneous laboratory apparatus and glassware.

7. Reagents and Standards

7.1 Sodium Hydroxide, 2%

Dissolve 20 g sodium hydroxide in deionized water, cool to room temperature, and dilute to 1000 ml.

7.2 Acetate Buffer

Dissolve 410 g sodium acetate trihydrate in 500 ml deionized water. Adjust pH to 4.5 with glacial acetic acid.

7.3 Zinc Acetate Solution

Dissolve 100 g zinc acetate monohydrate in 500 ml deionized water and dilute to 1000 ml.

7.4 Methyl Red Indicator Solution

Dissolve 0.1 g methyl red in 100 ml deionized water.

7.5 Sulfamic Acid, 10%

Dissolve 5 g sulfamic acid in 50 ml deionized water. Prepare daily.

7.6 Acetic Acid, 10%

Carefully add 100 ml glacial acetic acid to about 500 ml deionized water, mix, and dilute to 1000 ml.

7.7 Lead acetate paper.

7.8 pH test strips.

7.9 Cadmium carbonate power.

7.10 Boiling chips.

7.11 LCS Stock Solution, 1000 mg/L

Dissolve 2.51 g potassium cyanide and 2 g potassium hydroxide in water and dilute to 1000 ml. This solution is to be obtained from the Standards Prep Department.

7.12 5.0 mg/L LCS Solution

Place 50 mL 2% sodium hydroxide in a 100 ml volumetric flask. Pipette 0.50 ml 1000 mg/L LCS Stock into the flask, dilute to volume with deionized water, and mix. Prepare fresh daily.

7.13 LCS Samples, 0.10 mg/L

Pipette 10 ml of 5.0 mg/L LCS Solution into a 500 ml volumetric flask and dilute to volume with deionized water.

8. Procedure

8.1 Measure the pH of water samples with a pH test strip. Record the results on the bench sheet.

8.2 Measure 50 ml sample into a distillation flask. For soils, use 1.00 g and add 50 ml deionized water. Record the sample volume/weight on the bench sheet.

8.3 Add 2 or 3 boiling chips to each flask.

8.4 Place 25 ml 2% sodium hydroxide into the absorption tubes.

8.5 Assemble the distillation apparatus. All distillations are to be performed under the slot hood.

8.6 Turn on the vacuum pump and chiller. Also be sure that the slot hood is operating,

8.7 Adjust the vacuum to provide a flow rate of about 2 bubbles per second in the distillation flask, verifying that there are no leaks in the system by observing the flow into the absorber tube. The flow rate may not remain constant during the distillation; readjust as necessary.

8.8 For sludges, refinery wastes, and other samples containing nitrate and/or nitrite along with organic material, add 1 ml sulfamic acid solution through the thistle tube. Allow to mix for 3 minutes.

8.9 Add 1 ml acetate buffer, 1 ml zinc acetate, and 2 or 3 drops of methyl red indicator solution through the air inlet tube. Rinse down with about 2 ml deionized water and allow to mix.

8.10 If the solution is not pink, add 10% acetic acid until a pink color persists.

8.11 Turn on the heating mantles and heat the samples to boiling. While distilling the samples, carefully watch to make sure that vacuum is maintained on all of the stills. Adjust the flow as necessary.

8.12 Allow samples to reflux for 1 hour. Then turn off and lower the heating mantles and allow the samples to cool for 15 minutes while air is flowing.

8.13 Remove the absorption tube from the distillation apparatus. Rinse the inside and outside of the bubbler into the tube with deionized water.

8.14 Dilute the sodium hydroxide to 50 ml with deionized water. This is conveniently done by weight on a top-loading balance. Record the final volume on the bench sheet.

8.15 Check the samples for sulfide using lead acetate test paper. Moisten the paper with 2 or 3 drops of acetate buffer and then place 1 drop of sample on it. A dark color indicates a positive test for sulfide. Record the result of the test (positive or negative) on the bench sheet.

8.16 If a positive test is obtained, treat the sample with a small amount of powdered cadmium carbonate. A yellow precipitate (cadmium sulfide) will appear. Filter the sample into a clean vial. Test again for sulfide and repeat treatment until a negative test is obtained. Place filters containing cadmium sulfide in a waste container; do not throw them in the garbage cans.

8.17 Store the samples in plastic vials in a refrigerator until they are analyzed. Place each batch of distillates in a box labelled with your name and the QC lot number.

8.18 Raise the cold-finger condensers and rinse into the distillation flasks with deionized water. Then remove the flasks and rinse their contents down the drain with running water. Residue not removed by this method must be scrubbed out.

8.19 Rinse absorber tubes with deionized water.

8.20 At the end of the day, turn off the hood, vacuum, and chiller.

9. QA/QC Requirements

9.1 QC Samples

9.1.1 Distill a blank (deionized water) with each batch of 20 or less samples.

9.1.2 Distill 2 LCS samples with each batch of 20 or less samples.

9.1.3 Duplicates may be required for project specific QC.

9.1.4 Spikes may be required for project specific QC. Pipette 1.0 ml of 5.0 mg/L LCS solution into 50 ml sample (1.0 g soil) and distill. The spiking concentration is 0.10 mg/L (5.0 mg/kg for soils).

9.2 Acceptance Criteria

Cyanide can be analyzed by a variety of methods. Consult the appropriate analytical SOP for acceptance criteria.

10. Calculations

This is a prep SOP. There are no calculations.

11. Reporting

Record the pH of water samples and any interference checks or treatment performed.

12. References

12.1 Method source: ASTM D2036, Method C

12.2 Deviations from source method and rationale

12.2.1 The apparatus has been miniaturized in order to conserve reagents and laboratory space. Volumes were reduced proportionately.

12.2.2 For water samples, the final volume is the same as the initial volume; there is no concentration of the sample.

12.2.3 Cadmium carbonate is used for removal of sulfide rather than lead carbonate. The treatment is done after distillation.

12.2.4 Sulfide and nitrate/nitrite are the only interferences routinely treated.

ADDENDUM TO CWM Vickery GWMP QAPjP Appendix B-20
SOP Number: LM-RMA-1100
Title: Total, Fixed and Volatile Solids

This addendum is specific to the Chemical Waste Management, Vickery, Ground Water Monitoring Plan QAPjP. Procedural changes or clarification statements presented herein are not applicable to Enseco SOPs for other projects, and are made here in response to an EPA letter dated March 17, 1992 to CWM containing comments (with additional attachment) regarding the CWM-Vickery GWMP QAPjP.

Section 1.1: Only the total solids of samples from the Brassfield monitor well will be determined using this method, within the scope of this project. Total solids will not be determined for Knox-Kerbel monitor well samples.

Section 2: Only Sub-Section 2.1 (total solids) is applicable to this project.

Section 8.2: Only aqueous samples are involved in this project. Sample containers with the tops in place will be inverted rapidly three times to homogenize the sample before drawing the aliquot for analysis.

Section 9.1.3: Duplicate analyses at a frequency of one per batch of 20 or fewer samples will be performed. Acceptance control limits are matrix specific, and will be determined and reported with the raw data.

STANDARD
OPERATING
PROCEDURE

Subject or Title: Total, Fixed and Volatile Solids Percent Water (Soils/Wastes)

SOP No.:	Revision No.:	Effective Date:
LM-RMA-1100	2.0	March 14, 1991

Supersedes:
Revision 1.0 (October 30, 1989)

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1. Scope and Application

1.1 Analytes

This method determines the Total Solids content of a sample as well as its Fixed and Volatile fractions. These parameters are also referred to as Total, Ash or Non-Volatile, and Volatile Residues, respectively. Percent water is also determined.

Prepared by: Sherman Gray / Will Pratt	Date: March 14, 1991
Management Approval: Will Pratt	Date: 9/3/91
QA Officer Approval: Gary Tod	Date: 9/3/91

1.2 Reporting Limit

The reporting limit for each parameter is 0.1 percent.

1.3 Applicable Matrices

This method is applicable to soil and industrial/domestic waste samples.

1.4 Dynamic Range

The test range for each parameter is from 0.1 % to 100 %.

1.5 Analysis Time

The approximate analytical time is twenty four hours per sample including preparation and clean up. Multiple analyses can be performed at one time.

2. Method Summary

2.1 A 15 g aliquot of homogenized sample is oven-dried at 105°C. The dried sample is weighed and the Total Solids content is determined.

2.2 The dried sample is ignited at 550°C. The ignited sample is weighed and the Fixed Solids content is determined.

2.3 The Volatile Solids content is determined by difference.

2.4 Percent water is also determined by difference.

3. Comments

The Fixed and Volatile Solids results are expressed as a percentage of the Total Solids content of the sample, NOT as a percentage of the total sample.

The Percent Water result is used to calculate "dry weight" results for other analyses. This calculation is performed automatically by LIMS.

3.1 Interferences

3.1.1 The principal source of error is failure to obtain a representative sample.

3.1.2 Negative errors will result from, among others, evaporative losses, loss of water of crystallization and loss of volatile organic matter during drying.

3.1.3 Positive errors will result from the presence of significant amounts of oil and grease as well as the absorption of moisture after drying or ignition.

3.1.4 Determining low concentrations of Volatile Solids in the presence of high concentrations of Fixed Solids may result in considerable negative error due to occlusion.

3.2 Helpful Hints

Perform all weighings as quickly as possible. Wet samples lose weight through evaporation while dried or ignited samples can be very hygroscopic and absorb moisture from the air.

4. Safety Issues

4.1 All employees are expected to be familiar with and follow the procedures outlined in the Enseco/RMAL safety plan. A lab coat and safety glasses are required in all laboratory areas at all times. If you have any questions or safety concerns, see your supervisor or safety officer.

4.2 High temperature ovens are employed in this procedure. Adequate gloves and tongs should be used when transferring samples from the ovens samples.

5. Sample Collection, Preservation and Holding Times

5.1 Samples are to be collected in a glass or plastic bottle with a tight fitting cap and refrigerated to $4^{o}C$.

5.2 There is no holding time for these parameters, however, analysis should begin as soon as possible.

6. Apparatus

6.1 Aluminum weigh dishes.

6.2 Top-loading balance, 0.01 g sensitivity.

6.3 Drying oven (110°C capacity).

6.4 Muffle furnace (600°C capacity).

6.5 High temperature gloves.

6.6 Crucible tongs, long handled.

6.7 Desiccator.

7. Reagents and Standards

7.1 Desiccant (anhydrous sodium sulfate or equivalent).

8. Procedure

8.1 Instrument Set-up and Calibration

8.1.1 Turn on the drying oven and set the temperature for 105°C.

8.1.2 Turn on the muffle furnace and set the temperature for 550°C.

8.2 Preparation

8.2.1 Identify the samples and tests to be analyzed using the backlogs.

8.2.2 For samples requiring Total Solids (or Percent Water) only, place new, numbered aluminum weigh dishes in a preheated drying oven for 1 hour at 105°C. For samples requiring Fixed or Volatile Solids, place new, numbered aluminum weigh dishes in a preheated muffle furnace for 1 hour at 550°C. Remove, cool and store all weigh dishes in a desiccator until ready for use.

8.2.3 Check LIMS for Special Instructions for EVERY sample. Make copies whether they apply or not, include them with the data package and record on the benchsheet.

8.2.4 Obtain the samples to be analyzed from the walk-in cooler. Record the sample numbers on the benchsheet.

8.3 Analysis

For all analytes, sample masses are determined by first taring the balance with an empty weigh dish. BE CAREFUL NOT TO TARE THE BALANCE AGAIN PRIOR TO OBTAINING THE SAMPLE MASS. It has been found that the aluminum weigh dishes do not vary in mass more than 0.02 gram.

8.3.1 Remove a pretreated aluminum weigh dish from the desiccator, place on the top-loading balance and tare the balance. Record the weigh dish number on the benchsheet.

8.3.2 Homogenize the sample and pulverize large chunks. Place a 15.0 gram aliquot into the dish. Record the wet sample mass to the nearest 0.01 gram on the benchsheet.

8.3.3 Carefully place the sample and dish in the preheated drying oven. Allow the sample to dry for between 12 and 24 hours.

NOTE: Samples may be dried for less than 12 hours as long as the weight loss between drying cycles is no more than 0.01 g. Consult your supervisor before proceeding, however.

8.3.4 Remove and immediately place the dried samples in a desiccator. Allow to cool for one hour. If the sample appears oily, record on the benchsheet.

8.3.5 Tare the balance with an empty weigh dish. Weigh the dried sample and record the mass on the benchsheet. Total Solids (and Percent Water) may now be calculated. See section 10.1.

NOTE: If NEITHER Fixed NOR Volatile Solids determinations are required, proceed to section 8.4.

8.3.6 Carefully place the dried sample and dish in the preheated muffle furnace. Allow the sample to ignite for 1 hour at 550°C.

8.3.7 Remove and immediately place the ignited samples in a desiccator. Allow to cool for one hour.

8.3.8 Again tare the balance with an empty weigh dish. Weigh the ignited sample and record the mass on the benchsheet. Fixed and Volatile Solids may now be calculated. See sections 10.2 and 10.3, respectively.

8.4 Conclusion

8.4.1 Dispose of the "spent" sample in a properly labelled waste container.

8.4.2 Return all unused samples to the walk-in cooler.

8.4.3 Turn off all equipment, clean all apparatus and work area.

8.4.4 Complete the data package making sure the benchsheet is properly filled out (see attached example-Attachment I). Submit to supervisor for approval.

9. QA/QC Requirements

9.1 QC Samples

9.1.1 A blank is not applicable to Solids analyses.

9.1.2 DCSs are not applicable to Solids analyses.

9.1.3 Duplicates may be required for project specific QC.

9.1.4 Spikes are not applicable to Solids analyses.

9.1.5 See SOP: M-EQA-0002 and the Enseco QAPP.

9.2 Acceptance Criteria

There are no acceptance criteria for Solids analyses.

9.3 Corrective Actions

Follow the corrective actions outlined in the current Enseco QA Plan.

10. Calculations

10.1 Total Solids, % = $\left\{\frac{B}{A}\right\} * 100$

10.2 Fixed Solids, % = $\left\{\frac{C}{B}\right\} * 100$

10.3 Volatile Solids, % = $\left\{\frac{B - C}{B}\right\} * 100$

10.3 Percent Water, % = $100 - \left[\left\{\frac{B}{A}\right\} * 100\right]$

where "A" is the sample mass, wet (grams),
"B" is the sample mass, dry (grams) and
"C" is the sample mass, ignited (grams).

Volatile Solids may also be calculated as
100 - % Fixed Solids (see attached benchsheet example).

11. Reporting Requirements

11.1 Units

The reporting unit for Total Solids and Percent Water is % (of total sample).

The reporting unit for Fixed and Volatile Solids is % (of total solids).

11.2 Limits

The reporting limit for all parameters is 0.1 %.

11.3 Significant Figures

All results are to be reported to the nearest 0.1 %.

11.4 LIMS Data Entry

ALL Fixed Solids and Volatile Solids results are footnoted "Reported as a percentage of total solids content" (LIMS footnote "v").

11.5 Anomalies

Results from samples that appear oily after the drying cycle are anomalized "Results of sample XX may be inaccurate - sample appeared oily after drying".

12. Review Requirements

12.1 Verify that calculations were performed correctly by checking all of them.

12.2 Verify that Fixed Solids and Volatile Solids results are correctly footnoted.

12.3 Verify that results are correctly anomalized.

12.4 Transfer anomalies to preview report cover sheet.

13. References

13.1 Source Methods: Method 160.3 "Total Residue" and Method 160.4 "Volatile Residue", Methods for Chemical Analysis of Water and Wastes, EPA-600, March, 1983; ASTM D2216-80 "Laboratory Determination of Water (Moisture) Content of Soil, Rock and Soil-Aggregate Mixtures."

13.2 Related Documents

13.2.1 Method 2540 G. "Total, Fixed, and Volatile Solids in Solid and Semisolid Samples", Standard Methods for the Examination of Water and Wastewater, 17th Edition, 1989.

13.2.2 Method 7-2.2. "Gravimetry with Oven Drying", Methods of Soil Analysis, Number 9, C.A. Black, American Society of Agronomy, 1965.

13.3 Deviations from Source Method and Rationale

The EPA source methods specify waters and wastes as the applicable matrices. Deviations in this SOP exist as a result of the different matrices analyzed.

13.3.1 Aluminum weigh dishes are used instead of porcelain as a matter of convenience.

13.3.2 Method 2540 G recommends the use of a 25 - 50 g sample aliquot. 15 g is used since that is the approximate capacity of the aluminum weigh dishes employed.

13.3.3 The 12 to 24 hour drying time window was adapted from the EPA-CLP SOW 787, Part F.

13.3.4 Percent Water is expressed as a simple percentage, not as the ratio of "pore" or "free" water to the mass of solid material, as defined in the ASTM D2216 method.

13.4 Updates to SOP (Original to Revision 1.0)

13.4.1 Nomenclature has been revised (e.g. Fixed vs. Non-Volatile).

13.4.2 The actual weighing of empty dishes has been eliminated to save time during the calculations.

13.4.3 The reference methods were revised and expanded.

13.4.4 Revision 1.0 to Revision 2.0 incorporated the Percent Water analysis and all appropriate calculations and deviations. The example benchsheet has also been revised to reflect Percent Water.

Enseco

STANDARD OPERATING PROCEDURE

INTERNAL QC CHECKS

LABORATORY PERFORMANCE QC

SOP NO.: M-EQA-002

REVISION NO.: 2.0

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Richmond, Virginia 23230
804/359-1900 Fax: 804/353-1860

STANDARD
OPERATING
PROCEDURE

Subject or Title: Internal QC Checks--Laboratory Performance QC		Page 1 of 23
SOP No.: M-EQA-002	Revision No.: 2.0	Effective Date: May 15, 1989

Supersedes: M-EQA-002, Revision No. 1, June 28, 1988

1.0 PURPOSE

1.1 To describe the essential elements of Enseco's Internal QC Program related to Laboratory Performance QC.

1.2 Laboratory Performance QC consists of internal QC check samples which are used to determine whether the laboratory is "in control" during data generation. These check samples, called Laboratory Control Samples (LCS), are generated using a standard control matrix and are used to measure laboratory performance independent of sample matrix effects.

1.3 There are three types of LCS. Duplicate Control Samples (DCS), Surrogate Control Samples (SCS), and Method Blanks.

1.4 Surrogates are added to samples and QC samples for some organic methods. The monitoring of surrogate recoveries in QC samples is an element of Laboratory Performance QC. However, the monitoring of surrogate recoveries in samples is not used to control laboratory operations and thus is not an element of Laboratory Performance QC. Surrogate recoveries in samples are used to measure the effect of the matrix or method performance and are thus an element of Matrix Specific QC (See M-EQA-003).

Prepared by: Peggy Sleevi	Date: May 15, 1989
Management Approval: Peggy Sleevi for Kathy Carlberg	Date: 5-19-89
QA Approval: Peggy Sleevi	Date: 5-19-89

2.0 POLICIES

2.1 An essential element of Quality Control is to measure laboratory performance of a method. This is done using precision and accuracy data gathered from spiking a consistent, reproducible control matrix with a prescribed list of target analytes at known prescribed concentrations. A control matrix is used so that these measurements reflect laboratory performance and not matrix effects.

2.2 Quality control data, including recovery and method blank data, must be generated with every batch of samples processed.

2.3 QC information is generated and evaluated at the bench. The prime responsibility for implementation of the QC Program lies with the analyst. The QA Department serves in an audit function and addresses special QA needs such as QA Project Plans. QC information needed for standard reports is generated, documented, and entered into LIMS by the analyst.

3.0 SAFETY ISSUES

3.1 The toxicity or carcinogenicity of each chemical used in this procedure has not been precisely defined; however, each chemical compound should be treated as a potential health hazard. From this viewpoint, exposure to these chemicals should be reduced to the lowest possible level.

3.2 A Material Safety Data Sheet (MSDS) is available for each laboratory standard and reagent chemical. The appropriate MSDS must be reviewed by the employee before handling the chemical(s).

3.3 All laboratory personnel should be thoroughly familiar with the laboratory Safety Manual before undertaking any laboratory work.

4.0 PROCEDURE

4.1 <u>Types of Laboratory Performance QC Samples</u>.

4.1.1 Duplicate Control Sample (DCS): A <u>DCS</u> consists of a standard, control matrix which is spiked with a group of target compounds representative of the method analytes.

A DCS pair is analyzed for every 20 samples processed by a method. The DCS pair is used to monitor both the precision and accuracy of the analytical method on an ongoing basis, independent of matrix effects.

4.1.2 Single Control Sample (SCS): A SCS consists of a standard, control matrix which is spiked with surrogate compounds appropriate to the method. The surrogates are spiked into the method blank, which serves as both the method blank and the SCS. In cases where no surrogate is available for a method, e.g., metals analyses, the components of the SCS are identical to the DCS components and the SCS is analyzed in addition to the method blank.

A SCS is analyzed with each batch of samples processed to ensure that QC data are generated with every sample processed by Enseco. In the case where the SCS components are identical to the DCS components, e.g. metals analyses, the SCS are analyzed with every batch of samples which does not include the DCS pair.

4.1.3 Method Blank: A method blank consists of reagents specific to the method which are taken through the entire analytical process to assess the level of contamination which exists in the analytical system and which might lead to the reporting of elevated concentrations or false positives. Method blanks for aqueous samples include, in addition to reagents, an aliquot of analyte-free water equal in volume to the sample volume required in the method SOP. A method blank is analyzed with every batch of samples processed.

4.1.4 Surrogate Spikes of Samples: Certain methods, typically organic methods, specify that surrogates must be added to each sample and QC sample processed by the method. These surrogates are added routinely as specified in Appendix A.

Surrogates in QC samples are used to measure lab performance. However, surrogate recoveries in samples are not used to determine whether the laboratory was in control during data generation. Surrogate recoveries in samples are a measure of the effect of the matrix on method performance and are therefore an element of Matrix Specific QC (see SOP No. M-EQA-003).

4.2 Control Limits for Laboratory QC Samples.

4.2.1 DCS. DCS are monitored for accuracy (average recovery of each analyte in the DCS pair) and precision (Relative Percent Difference (RPD)) between each analyte in the DCS pair. Control limits for accuracy are based on the average recovery of each pair of DCS generated for a QC lot as described below.

4.2.1.1 Accuracy is determined by calculating the percent recovery of each spike component in the DCS using the following formula.

$$\text{DCS (\% Recovery)} = \frac{X}{T} \times 100$$

where: X = the observed value of the measurement,
T = the "true" value

The average recovery is calculated as follows.

$$\text{Average DCS Recovery} = \frac{DCS_1 + DCS_2}{2}$$

where: DCS_1 = first DCS recovery value
DCS_2 = second DCS recovery value

The control limits for accuracy are based on the average recovery of the DCS pairs. These limits are calculated from the historical average recovery of the average DCS values ± 3 standard deviation units.

Control limits are updated every six months using the most recent nine months of DCS data. CLP limits are used until sufficient data are generated to determine laboratory limits. If the calculated limits exceed CLP limits, CLP limits are implemented.

4.2.1.2 Precision is monitored by calculating the Relative Percent Difference (RPD) of the percent recoveries of each spike component in the DCS using the following formula:

$$RPD = \frac{|DCS_1 - DCS_2|}{(DCS_1 + DCS_2)/2} \times 100$$

where: RPD = Relative Percent Difference
DCS_1 = first DCS recovery value
DCS_2 = second DCS recovery value

The control limits for precision for the DCS are calculated based on the historical RPD and range from zero (no difference between DCS results) to the average RPD plus 3 standard deviation units.

Control limits are updated every six months using the most recent nine months of DCS data. CLP limits are used until sufficient data are generated to determine laboratory limits. If the calculated limits exceed CLP limits, CLP limits are implemented.

4.2.2 SCS. SCS are monitored for accuracy (percent recovery) of the spiked analytes.

Accuracy is determined by calculating the percent recovery of each spike component in the SCS.

$$\text{Percent Recovery} = \frac{X}{T} \times 100$$

where: X = the observed value of the measurement,
T = the "true" value

The control limits for accuracy for the SCS are calculated based on the historical average recovery of all SCS values ± 3 standard deviation units.

Control limits are updated every six months using the most recent nine months of SCS data. CLP limits are used until sufficient data are generated to determine laboratory limits. If the calculated limits exceed CLP limits, CLP limits are implemented.

4.2.3 Method Blanks. Control limits for method blanks are as follows:

4.2.3.1 For organic analyses, the concentration of target analytes in the method blank must be below the reporting limit for that analyte in order for the method blank to be considered acceptable. An exception is made for common laboratory contaminants [methylene chloride, acetone, 2-butanone, toluene and bis(2-ethylhexyl)phthalate] which may be present in the method blank at up to 5 times the reporting limit and still be considered acceptable.

4.2.3.2 For metals analyses, the concentration of the target analytes in the method blank must be below two times the reporting limit. If the method blank value for a target analyte lies below the reporting limit, the reporting limit for that analyte in the associated samples is unaffected. If the method blank value lies between the reporting limit and two times the reporting limit, the reporting limit for that analyte in the associated samples is raised to the level found in the method blank. A method blank containing analyte(s) above two times the reporting limit is considered unacceptable unless the lowest concentration of the analyte in the associated samples is at least ten times the method blank concentration (as per CLP protocol).

4.2.3.3 For conventional inorganic tests, the method SOP directs how the method blank is treated. Generally, a reagent blank is used both to zero the equipment and as one of the calibration standards. If a preparation step is required for the analysis, then a prep blank is also analyzed to determine the extent of contamination or background interference. In most cases, the concentration found in the prep blank is subtracted from the concentration found in any associated sample prior to calculating the final result. Method blanks have no application or significance for some conventional inorganic parameters (e.g. pH).

4.2.4 Surrogate Spikes of Samples: Enseco uses the recoveries of surrogate spikes added to method blanks (SCS) to monitor laboratory performance. Surrogate recoveries in samples are not used to make decisions on whether the laboratory was "in control" during data generation; sample surrogate recoveries are a measure of the effect of the matrix on the method performance and are, therefore, an element of Matrix Specific QC (see SOP No. M-EQA-003).

4.3 Generation of Laboratory QC Samples.

4.3.1 Volatile Organics (VOA):

4.3.1.1 DCS. A pair of DCS are analyzed for every 20 samples. DCS components and spike concentrations for VOA methods are given in Appendix A, Part 1.

For aqueous samples, the DCS components are spiked into organic-free water. For solid samples, organic-free Ottawa sand is used as the matrix.

4.3.1.2 SCS. A SCS is analyzed with every analytical batch. An analytical batch for VOA's is defined as VOA's analyzed within a 12-hour period. SCS components and spike concentrations are given in Appendix A, Part 1.

For aqueous samples, the SCS components are spiked into organic-free water. For solid samples, the SCS components are spiked into the extraction solvent when the method blank and the SCS are incorporated as one sample. For methods that do not have surrogates, the SCS, analyzed in addition to the method blank, is spiked with the components in the DCS. When the SCS and method blank are analyzed as separate samples, the SCS will incorporate Ottawa sand as the solid matrix.

4.3.1.3 Method Blank. For aqueous samples, an aliquot of organic-free water serves as the method blank for VOA analyses. For solid samples, a reagent blank is used as the method blank. Ottawa sand is never incorporated into the method blank.

A method blank must be analyzed with every analytical batch or with every 20 samples, whichever is more frequent. An analytical batch for VOA's is defined as VOA's analyzed within a 12-hour period.

For most VOA methods, at least one designated surrogate is spiked into the method blank. These surrogates also serve as the SCS components for these methods, and therefore, the method blank and the SCS are one and the same (see Appendix A, Part 1).

4.3.1.4 Surrogates Spiked into Samples. Surrogates compounds are required to be spiked into samples and QC samples for most VOA methods. Surrogates designated by the methods and spike concentrations to use are given in Appendix A, Part 1. These surrogates should be spiked into all samples and QC samples.

4.3.2 Extractable Organics:

4.3.2.1 DCS. A pair of DCS are analyzed for every 20 samples. DCS components and spike concentrations are given in Appendix A, Part 2. For aqueous samples, DCS components are spiked into organic-free water. For solid samples, the DCS components are spiked into the organic-free Ottawa sand used as the control matrix.

4.3.2.2 SCS. A SCS is analyzed with every analytical batch. An analytical batch for extractable organics is defined as samples extracted or prepared at the same time. SCS components and spike concentrations are given in Appendix A, Part 2.

For aqueous samples, the SCS components are spiked into organic-free water. For solid samples, the SCS components are spiked into the extraction solvent when the method blank and the SCS are incorporated as one sample. For methods that do not have surrogates, the SCS, analyzed in addition to the method blank, is spiked with the components in the DCS. When the SCS and method blank are analyzed as separate samples, the SCS will incorporate Ottawa sand as the solid matrix.

4.3.2.3 Method Blank. For aqueous samples, an aliquot of organic-free water taken through the entire analytical process serves as the method blank. For solid samples, a reagent blank is used as the method blank. Ottawa sand is never incorporated into the method blank.

A method blank must be analyzed with every analytical batch or with every 20 samples, whichever is more frequent. An analytical batch for extractable organics is defined as samples extracted or prepared at the same time.

For many extractable organic methods, at least one designated surrogate is spiked into the method blank. These surrogates also serve as the SCS components. For these methods, the method blank and the SCS are one and the same (see Appendix A, Part 2).

4.3.2.4 Surrogates Spiked into Samples. Surrogate compounds are required to be spiked into samples and QC samples for many extractable organic methods. Surrogates designated by the methods and spike concentrations to use are given in Appendix A, Part 2. These surrogates should be spiked into all samples and QC samples.

4.3.3 Metals:

4.3.3.1 DCS. A pair of DCS are analyzed for every 20 samples. Separate QC Categories have been established by matrix for Dissolved, Total, and Total Recoverable Metals. DCS components and spike concentrations for metals are given in Appendix A, Part 3. For aqueous samples, the DCS components are spiked into deionized water and taken through the procedure. For solid samples, the DCS components are spiked into ~~Ottawa sand~~ and taken through the procedure. EPA Solid Matrix

4.3.3.2 SCS. The SCS has the same components as the DCS. The SCS is analyzed with every analytical batch which does not include the DCS. An analytical batch for

metals is defined as samples which are digested at one time (total and total recoverable metals) or samples analyzed within a 24-hour period (dissolved metals). For solid samples, the SCS components are spiked into ~~Ottawa sand~~. EPA Solid Matrix

4.3.3.3 Method Blank. For both aqueous and solid samples, an aliquot of deionized water taken through the entire analytical process serves as the method blank. Ottawa sand is never incorporated into the method blank for solid samples.

A method blank must be analyzed with every analytical batch or with every 20 samples, whichever is more frequent. An analytical batch for metals is defined as samples which are digested at one time (total and total recoverable metals) or samples analyzed within a 24-hour period (dissolved metals).

For metals analyses, the method blank is analyzed <u>in addition</u> to the DCS and SCS (see Appendix A, Part 3).

4.3.3.4 Surrogates Spiked into Samples. Not applicable to metals analyses.

4.3.4 Conventional Inorganics:

4.3.4.1 DCS. A pair of DCS are analyzed for every 20 samples. DCS components and spike concentrations are given in Appendix A, Part 4. For aqueous and solid samples, the DCS components are spiked into deionized water. No solid matrix is incorporated into the DCS for conventional inorganics.

4.3.4.2 SCS. The SCS has the same components as the DCS. The SCS is analyzed with every analytical batch which does not include a pair of DCS. An analytical batch for conventional inorganics is defined as samples which are prepared or analyzed within a 24-hour period.

4.3.4.3 Method Blank. For both aqueous and solid samples, an aliquot of deionized water taken through the entire analytical process serves as the method blank for conventional inorganic analyses. No solid matrix is incorporated in the method blank for solid samples.

A method blank must be analyzed with every analytical batch or with every 20 samples, whichever is more frequent. An analytical batch for conventional inorganics is defined as samples which are prepared or analyzed within a 24-hour period.

For conventional inorganic analyses, the method blank is analyzed in addition to the DCS and SCS (see Appendix A, Part 4).

4.3.4.4 Surrogates Spiked into Samples. Not applicable to Conventional Inorganic analyses.

4.4 Tracking of Laboratory QC Samples.

4.4.1 All samples analyzed are assigned a QC lot number. This lot number is used to store and track the QC information associated with a particular sample or group of samples. QC data are identified with the following components:

a) the QC category,
b) the QC type,
c) the QC lot number, and
d) the QC run number.

4.4.2 The QC Category and QC Type: Each test in LIMS is assigned to a QC category which specifies the QC type. The QC type is DCS, SCS, or Method Blank. Associated with each QC type is the component list for the QC category. Variations of the same test (e.g., VOA-HSL list, VOA-PP list, and VOA-Refinery list) may be assigned to the same QC category. QC categories are assigned to the major analytical groups as follows:

4.4.2.1 Volatile Organics (VOA). QC categories are assigned based on the detection system used. Separate QC categories are assigned for aqueous and solid matrices. Separate QC categories are assigned for

low-level and medium-level methods. An instrument specific identifier can be assigned to track VOA QC as instrument specific QC. QC categories and the components and spike levels for each QC type for volatile organics are specified in Appendix A1.

4.4.2.2 Extractable Organics. QC categories are assigned based on prep technique/detection system combination. Separate QC categories are assigned for aqueous and solid matrices. Separate QC categories are assigned for low-level and medium-level methods. QC categories and the components and spike levels for each QC type for extractable organics are specified in Appendix A2.

4.4.2.3 Metals. QC categories are assigned based on prep technique/detection system combination. Separate categories are assigned to aqueous and solid matrices. The categories for aqueous matrix are Dissolved Metals, Total Metals, and Total Recoverable Metals. The QC category Total Recoverable Metals is assigned for the solid matrix. QC categories and the components and spike levels for each QC type for metals are specified in Appendix A3.

4.4.2.4 Conventional Inorganics. QC categories are assigned based on the analytical method. Aqueous and solid matrices are typically tracked in the same QC category. Separate QC categories are assigned when there are significant differences in the sample prep. QC categories and the components and spike levels for each QC type for conventional inorganics are specified in Appendix A4.

4.4.3 The QC Lot: Each DCS pair which is analyzed within a QC category is assigned a unique QC lot number. This number follows the format YYMMMDD [letter] (e.g., 88MAR19A).

where: YY is the year,
MMM is the month, abbreviated as three letters,
DD is the day that the lot number is assigned, and
[letter] is a single letter (from A - Z) designating distinct QC lots for the day.

This QC lot number is assigned to the DCS pair and all QC and environmental samples associated with these DCS. Typically, the same QC lot number is assigned to the DCS pair and the next 20 samples analyzed which have the same QC category.

The QC lot is assigned at the first step of the prep/analysis and tracks with the samples through analysis, data entry, and reporting. The QC lot is associated with the samples in LIMS during the data entry process.

4.4.4 The QC Run: Each analytical batch which is processed is assigned a QC run number which is used to track and store SCS and Blank results. The QC run is associated with a specific QC category and QC lot. The QC run number follows the format YYMMMDD [letter] (i.e., 88MAR15B)

where: YY is the year,
MMM is the month, as a three letter abbreviation,
DD is the day that the lot number is assigned, and
[letter] is a single letter (from A - Z) designating distinct QC runs for the day.

This QC run number is assigned to all samples analyzed within the analytical batch (QC samples plus environmental samples) and is also associated with a specific QC lot number.

The QC run is assigned at the first step of the prep/analysis and tracks with the samples through analysis, data entry, and reporting. The QC run is associated with the samples in LIMS during the data entry process.

Example:

Day 1 (March 4, 1988): 6 water samples analyzed for VOA-HSL. 20 samples have been analyzed since the last DCS were analyzed.

Day 2 (March 6, 1988): 7 water samples analyzed for VOA-PP.

Day 3 (March 7, 1988): 5 water samples analyzed for VOA-HSL.

Day 4 (March 9, 1988): 5 water samples analyzed for VOA-PP.

VOA-HSL and VOA-PP are both in the same QC category: 624-A. The lot numbers would be assigned as follows:

Day 1: QC category 624-A
QC lot 88MAR04A
QC run 88MAR04A

These numbers are assigned to the DCS, the Method Blank, and the 6 samples analyzed on Day 1. A method blank must be analyzed with every batch. With this test, the method blank also contains surrogates and, therefore, also serves as an SCS, although an SCS is not required to be analyzed since DCS are included with the batch.

Day 2: QC category 624-A
QC lot 88MAR04A
QC run 88MAR06A

These numbers are assigned to the 7 samples and the Method Blank/SCS analyzed on Day 2. DCS are not required because 20 samples have not been analyzed since the last set of DCS. A combination Method Blank/SCS is analyzed with the set to provide QC information for that day's analysis. A method blank must be analyzed with every batch. With this test, the method blank also contains surrogates and, therefore, also serves as the SCS.

Day 3: QC category 624-A
QC lot 88MAR04A
QC run 88MAR07A

These numbers are assigned to the 5 samples and the Method Blank/SCS analyzed on Day 3. The rationale is exactly the same as outlined in Day 2.

Day 4: QC category 624-A
QC lot 88MAR09A
QC run 88MAR09A

These numbers are assigned to the DCS, the Method Blank/SCS and the 5 samples analyzed on Day 4. DCS are required because 20 samples have been analyzed since the last DCS pair were run.

4.5 Scheduling of Samples.

4.5.1 Samples should be scheduled for analysis such that all environmental samples and QC samples with the same QC run number are carried through the entire analytical process together.

4.5.2 In instances where it is impossible to analyze all samples with the same QC run number together, the QC samples should be analyzed with the first set of samples analyzed from that batch. QC samples, including method blanks, should be analyzed only once. (EPA-CLP and NJ Tier I work require that method blanks be analyzed on each of the instruments used to generate data for samples associated with the method blank. In these cases, method blanks may be analyzed multiple times. However, samples should be scheduled to minimize the number of method blank analyses required).

4.5.3 Samples should be scheduled for analyses according to the following priorities:

a) Meet holding times
b) Meet promised due date
c) Keep samples within a QC run together.

4.6 Analysis of Samples.

4.6.1 The QC program is structured so that decisions about the acceptability of the data can be made by the analyst at the time the data are generated.

4.6.2 Sample analysis should be conducted according to the following protocol:

4.6.2.1 Prepare the instrument for analysis by calibrating the instrument and verifying that the calibration is within acceptable guidelines (see SOP's related to specific method and equipment.)

4.6.2.2 Analyze all QC samples (method blanks, DCS and/or SCS) in the QC run. Determine if QC results are within acceptable limits. If data are outside control limits DO NOT PROCEED. CONTACT YOUR SUPERVISOR. Proceed with step (4.6.2.4). Analysts using autosamplers must verify that QC results are acceptable before leaving the instrument for unattended operation.

4.6.2.3 If QC samples are acceptable, proceed with analysis of other samples associated with the QC run.

4.6.2.4 If QC results are unacceptable, determine the source of the problem. Reevaluate standards, instrumentation, sample prep, etc. Each analyst should have a checklist to aid in identifying problems. Determine whether the analysis of samples should proceed using the following criteria:

a. Validate instrument operational setting, sensitivity, and linearity. If a problem is detected and corrected, reanalyze standard(s) and reanalyze QC samples. If QC data are within control limits, proceed with the analysis of the other samples in the QC run. If QC samples are still outside limits, continue to troubleshoot or go to Step b.

b. Validate that analytical standards are good. If a problem with the standards is detected, use a different standard, recalibrate, and reanalyze QC samples. If QC data are within control limits, proceed with analysis of the other samples in the QC run. If QC data are still outside of the limits, go to Step c.

c. Validate that sample prep was performed correctly. Check prep sheets for any anomalies. If no anomalies are found, reprep the samples. If samples cannot be reprepped due to lack of sample, analyze the other samples in the QC run and report data with a qualifier indicating that the Laboratory QC performed with the sample was out of

normal control limits. If sufficient sample remains, but holding times have expired, reprep samples unless otherwise required by the client.

If problems with the prep are discovered based on examination of prep sheets, notify the supervisor. The supervisor decides whether to reprep the samples based on the following criteria:

1. If the problems identified with the prep of the QC sample clearly affected only the QC sample and none of the other samples in the run (example: QC sample taken to dryness in the KD), a decision should be made not to reprep the samples, and the sample results can be reported without qualifiers.

2. If the problems identified could have potentially affected all of the samples in the QC run, the samples must be reprepped. If the samples cannot be reprepped for some reason, (i.e., inadequate sample volume) the sample results must be reported with a qualifier.

3. The entire episode, including reasons to support the final decision, must be documented on an anomaly form. The anomaly form is submitted to the QA Department. It is also forwarded, with the results, to the Program Administrator.

4.7 Calculation of QC Results.

4.7.1 DCS: The percent recovery of all spike components is calculated using the equation given in 4.2.1.1.

The precision of the DCS pairs is calculated by determining the RPD for each spike component using the equation given in 4.2.1.2.

4.7.2 SCS: The percent recovery of all spike components in the SCS is measured using the equation given in 4.2.2.

4.7.3 Method Blanks: The concentrations of target analytes are measured using quantitative techniques described in the method SOP.

4.7.4 Surrogate Spikes of Samples: The percent recovery of all surrogate spikes is calculated using the equation given in 4.2.2.

4.8 Interpretation of QC Results

4.8.1 Data acceptability is based upon the results of Laboratory Control Samples (DCS, SCS, and Method Blanks) unless otherwise negotiated with the client. Data acceptability based on criteria other than DCS, SCS, and Method Blanks falls under Matrix Specific QC (see SOP No. M-EQA-003).

4.8.2 The QC data from the DCS and SCS associated with a particular QC lot are compared to established control limits. QC data must fall within established control limits in order for the laboratory to be considered "in control" when samples from that QC lot were analyzed.

4.8.2.1 For single analyte tests, all DCS recovery and precision data and all SCS recovery data must be within established control limits in order for the laboratory to be considered "in control". Method blank values must be acceptable.

4.8.2.2 For organic multi-analyte tests, at least 80% of the average of each pair of DCS recovery data, and at least 80% of the DCS precision data, and at least 80% of the SCS recovery data must be within established control limits in order for the laboratory to be considered "in control". Method blank values must be acceptable. The 80% rule is tabulated below.

a.

# components in DCS	maximum numbers of values permitted outside control limits	
	average recovery	precision
1 - 4	0	0
5 - 9	1	1
10 - 14	2	2
15 - 19	3	3
20 - 24	4	4

b.

# components in SCS	maximum number of values permitted outside control limits
1 - 4	0
5 - 9	1
10 - 14	2
15 - 19	3
20 - 24	4

4.8.2.3 For metals, all analytes requested by the client in the DCS associated with the samples must be within the control limits. Method blank values must be acceptable.

The DCS component lists for metals are divided into two categories:

a) Components which have been requested by the client to be analyzed in the samples associated with the DCS or SCS. The DCS or SCS counterpart of all analytes requested by the client must be within control limits in order for the laboratory to be considered "in control".

b) Components which are contained in the DCS or SCS but are not requested by the client. A maximum of three (3) analytes falling into this category may be outside control limits and the laboratory judged to be "in control". An anomaly form must be completed for these analytes to prevent analytical problems from going unresolved for a prolonged period of time.

Example: Two (2) projects are associated with the same DCS. Project A requires analyses of Ba, Ca, Cu, and V. Project B requires Cu, Ni, Na, Fe, and Zn.

In order for the lab to be "in control" and for analyses to proceed, the DCS values for Ba, Ca, Cu, V, Ni, Na, Fe, and Zn must be within control limits.

Of the remaining 13 metals in the DCS, at least 10 must also be within control limits.

4.8.3 Analytical data which are generated with DCS, SCS, and method blanks which fall within established control limits based on the criteria in 4.8.2. are judged to be in control. Data which are generated with DCS, SCS, or method blanks which fall outside of acceptance criteria are considered suspect and are reanalyzed or reported with qualifiers.

4.8.4 Sample results are accepted or rejected on the basis of the SCS, associated DCS and method blanks. If surrogates in the samples are outside of the control limits and the SCS is in control, the sample results are accepted and the surrogate recoveries are assumed to be affected by the matrix. In these cases, sample processing should be assessed to ensure that obvious problems with sample preparation and analysis (e.g. concentration of the sample to dryness, leaking septum) have been ruled out.

For certain projects, clients may specifically request sample reruns if the surrogates are outside specified limits in the samples (Lab limits or CLP limits). This is considered to be an element of Matrix Specific QC. Enseco policy duplicates the EPA-CLP program: a sample with surrogate recoveries outside the limits will be reanalyzed with the understanding that if, on reanalysis, surrogates fall within the limits, the lab reports the new data at no charge to the client. If, however, the second analysis duplicates the results from the first analysis, indicating a matrix effect, the client is charged for the second analysis. The same policy applies to matrix spike data (see SOP No. M-EQA-003).

4.9 <u>Reporting of Laboratory Specific QC</u>.

4.9.1 DCS, SCS, and method blank data are entered into LIMS with sample data. <u>ALL</u> QC data must be entered into LIMS, even if it fails the data acceptability criteria and samples are reanalyzed with new QC samples. The Blank QC Type contains method blank information for components typically found in a method blank. These components are lab-specific, but at a minimum, the components specified under Blank in Appendix A should be included in the Blank QC Type. Other compounds are

assumed to be ND (not detected). If the method blank is found to contain compounds other than those listed in the Blank QC type, they must be documented on the anomaly form and reported on the method blank data sheet.

4.9.2 Sample data must be reported with associated DCS, SCS, and method blank data. Sample data for organics and metals are not corrected for levels of analytes observed in the method blank. For conventional inorganic tests, the method SOP directs how the blank is treated. Method blank information is reported for all components in the analyte list for all organic and metals tests. Method blanks are not reported for most conventional inorganic tests, however, method blanks will be reported for Ion Chromatography, Cyanide, Phenol, TKN, Total Phosphorous, Fluoride by Distillation, Ammonia by Distillation, Chromium VI in soil, and Formaldehyde. QC data are reported in the QC section of the final report.

4.9.3 Report formats are shown in Appendix B.

5.0 RESPONSIBILITIES

5.1 The Analyst. The primary responsibility for implementation of the QC Program lies with the analyst. QC information needed for standard reports is generated, documented, and entered into LIMS by the analyst.

5.2 Management. The supervisors and managers who direct the analytical work are directly responsible for ensuring that all employees reporting to them are complying with the QC procedures set forth in this SOP.

5.3 QA Department. The QA Department is responsible for auditing the laboratory to ensure that the QC procedures set forth in this SOP are followed routinely. They are responsible for reviewing anomaly forms and initiating investigations of procedures and corrective actions, as appropriate.

5.4 Program Administrators/Technical Directors. Program Administrators and Technical Directors have the responsibility to convey to their client the quality of the data based on information contained on anomaly forms and in the LIMS QC database.

6.0 COMMENTS

As LIMS becomes more sophisticated, we will be tracking data based on both control limits (± 3 std. dev. units) and warning limits (± 2 std. dev. units). Enseco laboratories now have the ability to generate control charts using the QC data stored in LIMS. It is critical that ALL QC data, both good and bad, be entered into LIMS. The Method Blank database will be refined to allow entry of compounds other than common contaminants in an upcoming revision. The SOP will be updated at that time to reflect these changes.

7.0 DEFINITIONS

7.1 Quality Control (QC). The routine application of specific, well-documented procedures which ensures the generation of data of known and accepted quality which fulfill the objectives of the Quality Assurance Program.

7.2 Laboratory Control Sample (LCS). A well-characterized laboratory generated sample which is used to monitor the precision and accuracy of the analytical process or to assess the degree of laboratory contamination.

7.2 Duplicate Control Sample (DCS). A standard, control matrix which is spiked with a group of target compounds representative of the method analytes and is used to measure, on an ongoing basis, the precision and accuracy of a method, independent of matrix effects.

7.3. Single Control Sample (SCS). A standard, control matrix spiked with surrogate compounds appropriate to the method being used. In cases where no surrogate is available, the components of the DCS are used in the SCS. The SCS is used to monitor recovery with each analytical batch.

7.4 Method Blank. Reagents specific to a method which are carried through every aspect of the procedure to access the level of contamination which exists in the analytical system.

7.5 Analytical Batch. A group of samples considered to have been exposed to the same analytical conditions by virtue of the time frame in which they were analyzed.

7.6 Ottawa Sand. This material is pure silica sand of particle size 20-30 mesh, specially prepared to conform to ASTM C190 and AASHTO T-132. (Ottawa is a trademark of Bellrose Silica). The laboratory must verify by analysis of the sand using the appropriate method that each lot of sand used is organic- and metal-free at the levels required for spiking target analytes as described in this SOP. Ottawa sand is available from Fisher Scientific.

11. INTERNAL QC CHECKS

The Enseco QA/QC program monitors data quality with internal QC checks. Internal QC checks are used to answer two questions:

1) Are laboratory operations "in control," (i.e., operating within acceptable QC guidelines), during data generation?

2) What effect does the sample matrix have on the data being generated?

The first question is answered by Laboratory Performance QC. Laboratory performance QC is based on the use of a standard, control matrix to generate precision and accuracy data that are compared, on a daily basis, to control limits. This information, in conjunction with method blank data, is used to assess daily laboratory performance.

The second question is addressed with Matrix-Specific QC. Matrix-Specific QC is based on the use of an actual environmental sample for precision and accuracy determinations and commonly relies on the analysis of matrix spikes, matrix duplicates, and matrix spike duplicates. This information, supplemented with field blank results, is used to assess the effect of the matrix and field conditions on analytical data.

Laboratory Performance QC is provided as a standard part of every routine Enseco analysis. Matrix-Specific QC is available as an option to the client and should be specified based on the types of matrices to be analyzed and the Data Quality Objectives (DQOs) and regulatory requirements of the project. A complete discussion of the Enseco Internal QC Check program follows.

Laboratory Performance QC Program

Laboratory Performance QC is performed for every routine Enseco analysis to demonstrate that laboratory operations are "in control". The main elements of Laboratory Performance QC are:

- The analysis of Laboratory Control Samples, which include Duplicate Control Samples (DCS), Single Control Samples (SCS), and method blanks, and

- The use of calibration standards to assure that both qualitative identification and quantitative measurements are within control limits.

The Laboratory Control Sample program is discussed below. Please refer to Section 8 of this manual for a discussion of calibration procedures.

Laboratory Control Samples (LCS)

Laboratory Control Samples (LCS) are well-characterized, laboratory generated samples used to monitor the laboratory's day-to-day performance of routine analytical methods. Three types of LCS are routinely analyzed: Duplicate Control Samples (DCS), Single Control Samples (SCS), and method blanks. Certain LCS (DCS, SCS) are used to monitor the precision and accuracy of the analytical process, independent of matrix effects. Other LCS (method blanks) are used to identify any background interference or contamination of the analytical system which may lead to the reporting of elevated concentration levels or false positive data. Each of these LCS are described below.

The results of the LCS are compared to well-defined laboratory acceptance criteria to determine whether the laboratory system is "in control." Controlling lab operations with LCS (as opposed to matrix spike/matrix spike duplicate samples), offers the advantage of being able to differentiate quality problems due to laboratory procedural errors from those due to matrix effects. As a result, procedural errors can be identified and corrected by the analyst at the bench, without waiting for extensive senior level review or costly and time-consuming reanalysis of the sample.

Duplicate Control Samples (DCS)

Duplicate Control Samples (DCS) are used to monitor the precision and accuracy of the analytical system on an on-going basis. Each DCS consists of a standard, control matrix that is spiked with a group of target compounds representative of the method analytes. A DCS pair is analyzed for every 20 samples processed by the method. DCS are analyzed with environmental samples to provide evidence that the laboratory is performing the method within accepted QC guidelines for accuracy and precision.

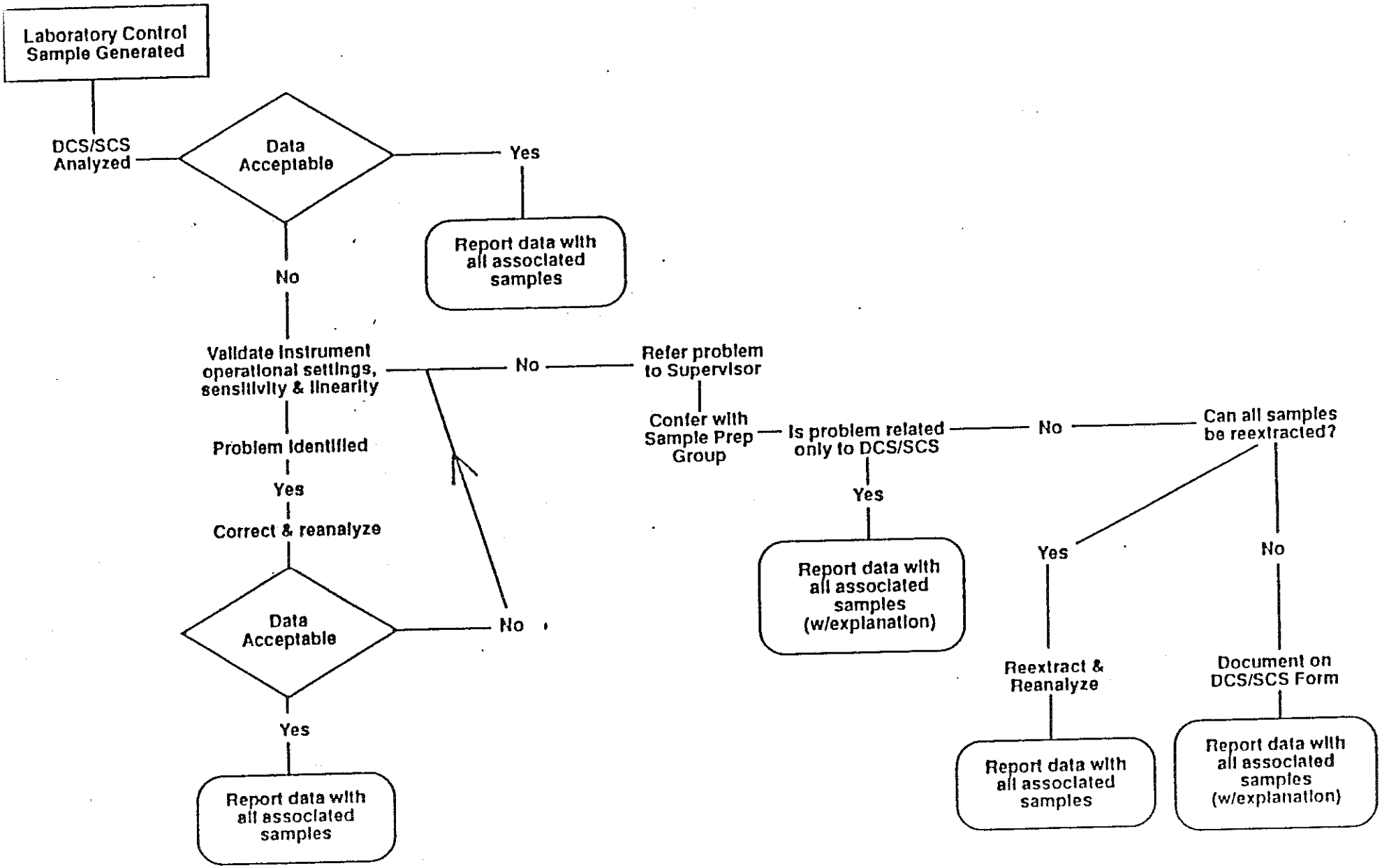
Accuracy data (average recovery of each analyte in the DCS pair) and precision data (Relative Percent Difference [RPD] between each analyte in the DCS pair) are compared to control limits that have been established for each of the analytes contained in the DCS. Initially, control limits for analytes spiked into the DCS are taken directly from the CLP program. If CLP limits are not available, Enseco historical data are used to set the control limits. The control limits are recalculated periodically, as sufficient laboratory data become available. Control limits for accuracy for each analyte are based on the historical average recovery (mean of the average recoveries of the DCS pairs) plus or minus three standard deviation units. Control limits for precision for each analyte are based on the historical RPD. Acceptable RPDs range from zero (no difference between DCS results) to the average RPD plus three standard deviation units. Analytical data that are generated with a DCS pair which falls within the established control limits are judged to be in control. Data generated with a DCS pair which falls outside of the control limits are considered suspect and corrective action must be performed. The procedure used to evaluate data from control samples is given in Figure 11-1. The procedures include examination of instrument performance and preparation and analysis information, consultation with the supervisor, and finally a decision path for determining whether reanalysis is warranted.

DCS have been established for each routine analytical method. Reagent water is used as the control matrix for the analysis of aqueous samples. The DCS compounds are spiked into reagent water and carried through the appropriate steps of the analysis. The control matrix for solids samples for organic analyses is standard Ottawa sand, an ASTM approved material for use in highway construction, due to its homogeneity. The DCS compounds are spiked into the Ottawa sand and carried through the appropriate steps of the analysis. For metal analyses, a spiked solid matrix from a commercial source is used.

As stated previously, DCS are analyzed at a frequency of no less than one DCS pair per 20 samples. The DCS program is supplemented with the SCS program to ensure that Laboratory Performance QC is available with each batch of samples processed (see following subsection).

Figure 11-1

Laboratory Performance QC Control Sample Evaluation



DCS precision and accuracy data are archived in the LIMS. In addition, the associated DCS data are reported with each set of sample results to enable the client to make a quality assessment of the data.

Single Control Samples (SCS)

As stated above, a DCS pair is analyzed with every 20 samples to measure the precision and accuracy of an analysis on an ongoing basis. However, samples are often analyzed in lots of less than 20, due to holding time or turn-around time requirements. Since it is necessary to have a measure of laboratory performance with each batch of samples processed, Enseco has instituted the SCS program.

An SCS consists of a control matrix that is spiked with surrogate compounds appropriate to the method being used. In cases where no surrogate is available, (e.g., metals or wet chemistry) a single DCS serves as the control sample. An SCS is prepared for each sample lot for which the DCS pair are not analyzed. Recovery data generated from the SCS are compared to control limits that have been established for each of the compounds being monitored. Initially, CLP control limits or Enseco historical data are used to set the control limits. Control limits are recalculated periodically as sufficient SCS data are available. Control limits for SCS components are based on the historical average recovery in the SCS plus or minus three standard deviation units.

Analytical data that are generated with an SCS which falls within the control limits are judged to be in control. Data that are generated with an SCS which falls outside of acceptance criteria are considered suspect and corrective action must be performed. The protocols for evaluating SCS are identical to those established for DCS (see Figure 11-1). SCS recovery (accuracy) data are archived in the LIMS. In addition, the associated SCS data are reported with each set of sample results to enable the client to make a quality assessment of the data.

Method Blank

Method blanks, also known as reagent, analytical, or preparation blanks, are analyzed to assess the level of background interference or contamination which exists in the analytical system and which might lead to the reporting of elevated concentration levels or false positive data.

As part of the standard Enseco QC program, a method blank is analyzed with every batch of samples processed. A method blank consists of reagents specific to the method which are carried through every aspect of the procedure, including preparation, clean-up, and analysis. The results of the method blank analysis are evaluated, in conjunction with other QC information, to determine the acceptability of the data generated for that batch of samples.

Ideally, the concentration of target analytes in the blank should be below the Reporting Limit for that analyte. In practice, however, some common laboratory solvents and metals are difficult to eliminate to the parts-per-billion levels commonly reported in environmental analyses. Therefore, criteria for determining blank acceptability must be based on consideration of the analytical techniques used, analytes reported, and Reporting Limits required.

For organic analyses, the concentration of target analytes in the blank must be below the Reporting Limit for that analyte in order for the blank to be considered acceptable. An exception is made for common laboratory contaminants (methylene chloride, acetone, 2-butanone, and phthalate esters) which may be present in the blank at up to 5 times the Reporting Limit and still be considered acceptable. This policy is consistent with the CLP policy and has been established in recognition of the fact that these compounds are frequently found at low levels in method blanks due to the materials used in the collection, preparation, and analysis of samples for organic parameters.

For non-routine organic analyses, other components may be established as common contaminants for that particular analysis. For example, naphthalene is frequently found in PAH-SIM analyses. If, upon thorough review of the method during validation (see Section 9) it is deemed impossible to eliminate trace amounts of analytes from the process, these analytes are likewise allowed at up to 5 times the reporting limit.

For metals and Wet Chemistry analyses, where the Reporting Limits are typically near the Instrument Detection Limit (IDL), the policy is that the concentration of the target analytes in the blank must be below two times the Reporting Limit. If the blank value for a target analyte lies below the Reporting Limit, the Reporting Limit for that analyte in the associated samples is unaffected. If the blank value lies between the Reporting Limit and two times the Reporting Limit, the Reporting Limit for that analyte in the associated samples is raised to the level found in the blank. A blank containing an analyte(s) above two times the Reporting Limit is considered unacceptable unless the lowest concentration of the analyte in the associated samples is at least ten times the blank concentration (as per CLP protocol) or the concentration of the analyte in all samples associated with the blank is below the reporting limit.

In addition, for Wet Chemistry tests, the method SOP directs how the blank is treated. Generally, a reagent blank is used both to zero the equipment and as one of the calibration standards. If a preparation step is required for the analysis, then a prep blank is also analyzed to determine the extent of contamination or background interference. The concentration found in the prep blank is subtracted from the concentration found in any associated sample prior to calculating the final result when specified by the method. Blanks have no application or significance for some Wet Chemistry parameters (e.g. pH).

If the blank does not meet acceptance criteria, the source of contamination must be investigated and appropriate corrective action must be taken and documented. Investigation includes an evaluation of the data to determine the extent and effect of the contamination on the sample results. Corrective actions may include reanalysis of the blank, and/or repreparation and reanalysis of the blank and all associated samples.

For organic and metals analyses, and selected Wet Chemistry tests, method blank results are reported with each set of sample results. Sample results are not corrected for blank contamination unless required by the analytical method or requested by the client. Occasionally, due to limited sample volume or other constraints, the laboratory reports data associated with an unacceptable blank. In these cases, the Reporting Limit for each analyte contained in the blank is raised to the level found in the blank for all sample results associated with that blank.

Matrix-Specific QC

Matrix-Specific QC is used to assess the effects of a sample matrix or field conditions on the analytical data. The main elements of Matrix-Specific QC are:

- The analysis of matrix spikes, matrix duplicates, and matrix spike duplicates;
- Monitoring the recovery of surrogate compounds from environmental samples;
- Monitoring the results of standard additions in environmental samples;
- The analysis of field blanks; and
- The determination of method detection limits in a specific matrix.

Different regulatory programs have different requirements in terms of Matrix-Specific QC. In order to ensure that the data generated meet all Data Quality Objectives, Enseco recommends that its clients include Matrix-Specific QC that fulfills the Data Quality Objectives and regulatory requirements of the project. A discussion of the different elements of Matrix-Specific QC follows.

Matrix Spikes, Matrix Duplicates, and Matrix Spike Duplicates

A Matrix Spike (MS) is an environmental sample to which known concentrations of analytes have been added. The MS is taken through the entire analytical procedure and the recovery of the analytes is calculated. Results are expressed as percent recovery. The MS is used to evaluate the effect of the sample matrix on the accuracy of the analysis.

A Matrix Duplicate (MD) is an environmental sample that is divided into two separate aliquots. The aliquots are processed separately and the results compared to determine the effects of the matrix on the precision of the analysis. Results are expressed as RPD.

A Matrix Spike Duplicate (MSD) is an environmental sample that is divided into two separate aliquots, each of which is spiked with known concentrations of analytes. The two spiked aliquots are processed separately and the results compared to determine the effects of the matrix on the precision and accuracy of the analysis. Results are expressed as RPD and percent recovery.

Surrogate Recoveries and Standard Additions

Surrogates are organic compounds which are similar to the analytes of interest in chemical behavior, but which are not normally found in

environmental samples. Surrogates are added to samples to monitor the effect of the matrix on the accuracy of the analysis. Results are reported in terms of percent recovery.

Enseco routinely adds surrogates to samples requiring GC or GC/MS analysis and reports these surrogate recoveries to the client. The laboratory does not control its operations based on surrogate recoveries in environmental samples. As discussed earlier in this section, Enseco controls its operations based on the results of Laboratory Control Samples. The surrogate recoveries are primarily used by the laboratory to assess matrix effects. However, obvious problems with sample preparation and analysis (e.g. evaporation to dryness, leaking septum, etc.) which can lead to poor surrogate spike recoveries must be ruled out prior to attributing low surrogate recoveries to matrix effects.

Standard Additions (SA) is the practice of adding a series of known amounts of an analyte to an environmental sample. The fortified samples are then analyzed and the recovery of the analytes calculated. The practice of SA's is generally used with metal and wet chemistry to determine the effect of the sample matrix on the accuracy of the analyses.

Field Blanks

Field blanks are check samples that monitor contamination originating from the collection, transport or storage of environmental samples. One example of a field blank is an equipment blank. An equipment blank is blank water that is poured through the sample collection device to check the adequacy of the cleaning procedures for the sampling equipment. Another type of field blank is a trip blank. A trip blank is a laboratory control matrix (typically water) which is sent to the field in an appropriate sample container, remains unopened in the field, and then

is sent back to the laboratory. The purpose of the trip blank is to assess the impact of field and shipping conditions on the samples. The results from field blanks are reported to the client as samples in the same concentration units as the samples. No correction of the analytical data is done in the laboratory based on the analysis of field blanks.

Matrix-Specific Detection Limits

Method Detection Limits (MDL's) determined on a specific sample matrix are called Matrix-Specific Detection Limits. See Section 14 for a discussion of detection and reporting limits.

10. DATA REDUCTION, VALIDATION, AND REPORTING

Data Reduction and Validation

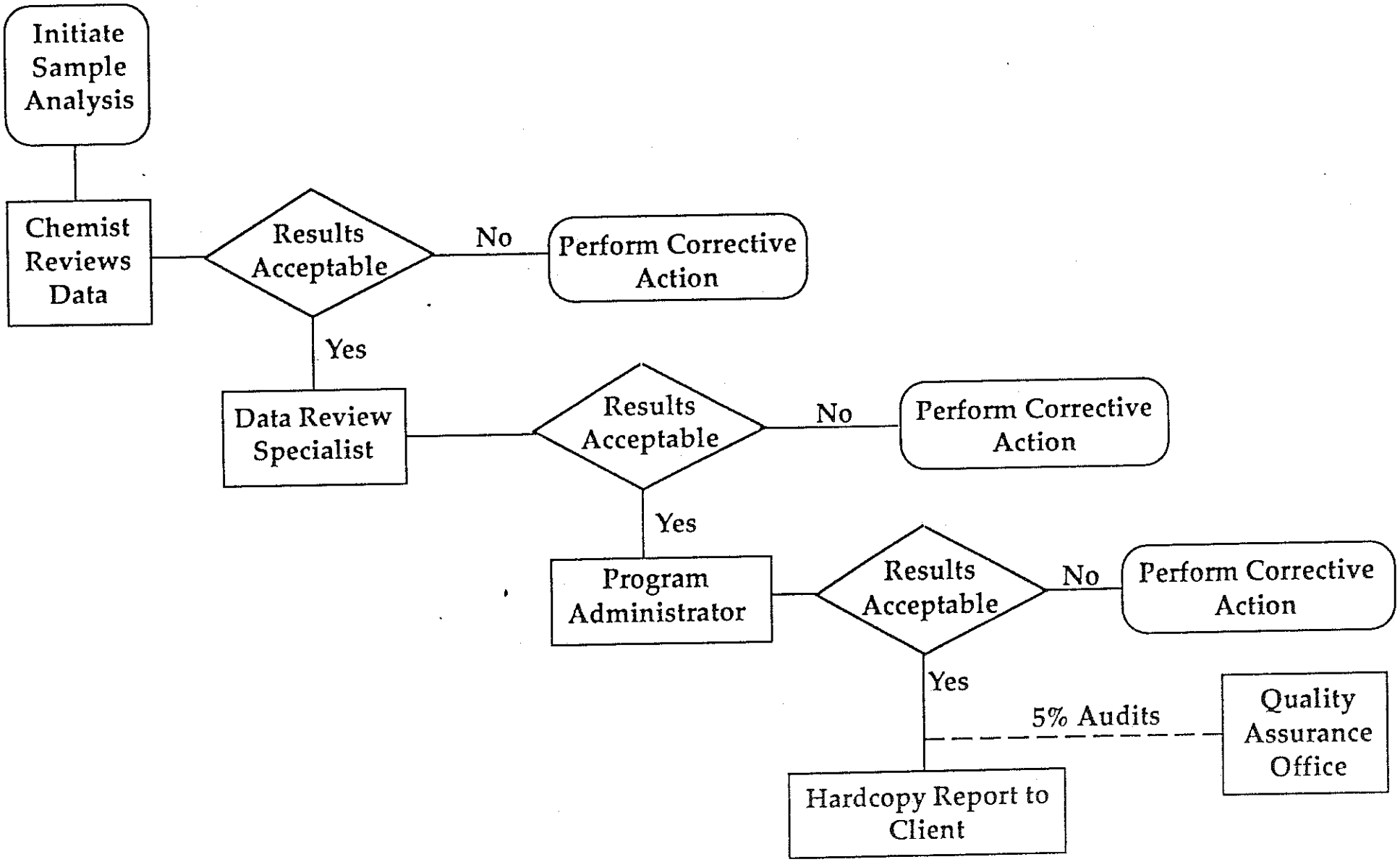
All analytical data generated within Enseco laboratories are extensively reviewed prior to report generation to assure the validity of the reported data. The data validation process consists of data generation, reduction, and three levels of documented review, as described below (also see Figure 10-1). In each stage, the review process is documented by the signature of the reviewer and the date reviewed.

The analyst who generates the analytical data has the prime responsibility for the correctness and completeness of the data. All data are generated and reduced following protocols specified in laboratory SOPs. Each analyst reviews the quality of his or her work based on an established set of guidelines. The analyst reviews the data package to ensure that:

- Sample preparation information is correct and complete;
- Analysis information is correct and complete;
- The appropriate SOPs have been followed;
- Analytical results are correct and complete;
- QC samples are within established control limits;
- Blanks are within appropriate QC limits;
- Special sample preparation and analytical requirements have been met; and
- Documentation is complete (e.g., all anomalies in the preparation and analysis have been documented, anomaly forms are complete; holding times are documented, etc.).

Figure 10-1

Data Validation Scheme



The data reduction and validation steps are documented, signed and dated by the analyst. This initial review step, performed by the analyst, is designated Level 1 review. The analyst then passes the data package to an independent reviewer, who performs a Level 2 review.

Level 2 review is performed by a supervisor or data review specialist whose function is to provide an independent review of the data package. This review is also conducted according to an established set of guidelines and is structured to ensure that:

- Calibration data are scientifically sound, appropriate to the method, and completely documented;
- QC samples are within established guidelines;
- Qualitative identification of sample components is correct;
- Quantitative results are correct;
- Documentation is complete and correct (e.g., anomalies in the preparation and analysis have been documented; anomaly forms are complete; holding times are documented, etc.);
- The data are ready for incorporation into the final report; and
- The data package is complete and ready for data archive.

Level 2 review is structured so that all calibration data and QC sample results are reviewed and all of the analytical results from 10% of the samples are checked back to the bench sheet. If no problems are found with the data package, the review is complete. If any problems are found with the data package, an additional 10% of the samples are checked to the bench sheet. The process continues until no errors are found or until the data package has been reviewed in its entirety.

An important element of Level 2 review is the documentation of any errors that have been identified and corrected during the review

process. Enseco believes that the data package submitted by the analyst for Level 2 review should be free of errors. Errors that are found are documented and transmitted to the appropriate supervisor. The cause of the errors is then addressed with additional training or clarification of procedures to ensure that quality data will be generated at the bench.

Level 2 data review is also documented and the signature of the reviewer and the date of review recorded. The reviewed data are then approved for release and a final report is prepared.

Before the report is released to the client, the data are reviewed for completeness and to ensure that the data meet the overall objectives of the project. This review is labeled Level 3 review and is typically done by the Program Administrator.

Each step of this review process involves evaluation of data quality based on both the results of the QC data and the professional judgment of those conducting the review. This application of technical knowledge and experience to the evaluation of the data is essential in ensuring that data of high quality are generated consistently.

In addition to the three levels of review discussed above, the Divisional QA department randomly audits 5% of all projects reported. The QA audit includes verifying that holding times have been met, calibration checks are adequate, qualitative and quantitative results are correct, documentation is complete, and QC results are complete and accurate. During the review, the QA department checks the data from 20% of the samples back to the bench sheet. If no problems are found with the data package, the review is complete. If any problems are found with the data package, an additional 10% of the samples are checked to the bench sheet. The process continues until no errors are found or until the data package has been reviewed in its entirety.

Data Reporting

A variety of reporting formats, from computerized data tables, to complex reports discussing regulatory issues, to a CLP-deliverables package, are available. In general, Enseco reports contain:

General Discussion: Description of sample types, tests performed, any problems encountered and general comments are given.

Analytical Data: Data are reported by sample or by test. Pertinent information including dates sampled, received, prepared, and extracted are included on each results page. The Enseco reporting limit for each analyte is also given.

Laboratory Performance QC Information: The results (Percent Recovery and Relative Percent Difference) of the Laboratory Control Samples analyzed with the project are listed, together with the control limits. Also, the analytical results for method blanks generated during analysis of organic and metals parameters are given.

Matrix-Specific QC Information: Results of any sample duplicates, matrix spikes, matrix spike duplicates or other project-specific QC requested by the client are also reported.

Methodology: Reference for analytical methodology used is cited.

Custom Services: Special services including data interpretation, special consultation, and raw data packages (when requested) are included.

WMI Environmental Monitoring
Laboratories, Inc.
2100 Cleanwater Drive
Geneva, Illinois 60134
708/208-3100

A Waste Management Company

Enclosed are the analytical results for samples received from your facility. The results in the Client Report are for a single ENS (Event Notification System) number only. The sampling event at your facility may include multiple ENS numbers. A separate Client Report will be generated for each one.

It is the goal of WMI Environmental Monitoring Laboratories, Inc. to provide analytical data in a timely fashion, formatted in a way that our clients will find most useful.

If you have any questions concerning the form or content of this report, please contact the WMI EML Customer Operations Department:

Main Number: (708)208-3100
FAX Number: (708)208-1175

Note: Two designations may appear in the results column of your Client Report: NA or ND.

The designation NA (for "Not Analyzed") is used to identify analytes which were requested in the monitoring program, but for which no suitable testing methodology exists. NA may also indicate a dry well, broken sample bottle, insufficient sample volume, or other condition which precludes analysis of a sample.

The designation ND (for "Not Detected") is used to indicate that the analyte of interest was not found at or above the concentration listed under the EMLRL (EML Reporting Limit) heading.

Unless otherwise indicated, all analytes meet the requirements of holding time as specified in the method.

Deborah Hockman, Ph.D.
Assistant Director
Laboratory Operations

Frank Jarke
Manager
Quality Programs

APPENDIX II

As an additional service, the EML is introducing the DATA QUALIFIER REPORT. This report documents important additional analytical information.

As defined in the EPA Contract Laboratory Program (CLP) and numerous state regulatory programs, applicable data qualifiers (annotations or flags) should be included with data reports to facilitate the appropriate interpretation and use of the data. These annotations will document to the client information such as dilution factors and matrix interferences that occurred during the analysis of a sample.

The DATA QUALIFIER REPORT produced for each affected Event Notification System (ENS) number is divided into five sections:

1) **Sample No.**- The affected EML sample numbers under the given ENS number are listed here. Refer to the Client Report for the EML sample number which has been assigned for a given sample point.

2) **Method ID** - The EML method code that the sample was analyzed by is listed here.

3) **Analyte** - The analyte being affected by the qualifier is listed here. If the method contains multiple analytes that were affected, the phrase "Every analyte for this method" will appear.

4) **Code** - Two letter abbreviations for applicable data qualifiers appear in this column. Please consult the accompanying key for a brief description. Additional information may be obtained by contacting your Account Representative.

5) **Dilution Factor** - This number is the factor by which your sample had to be diluted to bring the result into the working linear range of the instrument or to minimize an interferent.

Examples:

Sample No.	Method ID.	Analyte	Code	DF
AB2345-L3	VOMSAAA301	2-Chloroethyl Vinyl Ether	ST	--
AB2345-L3	VOMSAAA301	Every analyte for this method	DL	10

The comments that may accompany the data are as follows:

DL Sample diluted. Reporting limits have been adjusted when necessary.

(This qualifier is the one that appears most frequently. This qualifier means that the sample was diluted to bring it within linear range of the instrument or to minimize an interferent.

HS Headspace in the sample bottle exceeded allowable volume.

II Isomeric identification is tentative due to co-elution of a compound with similar mass spectra.

(The above qualifier indicates compounds that have tentative identification due to co-elution or lower quality matches with the spectral library. Results with these qualifiers are not quantitative.)

MI Recovery failed criteria for this compound: Quality Control Standard showed analytical system was in control. Result indicates a severe matrix interference, which could not be corrected for, and the results are semi-quantitative.

MX This sample was used for matrix spike; recovery failed criteria for this compound; Quality Control Standard showed analytical system was in control. Therefore, matrix interference is suspected and this may affect the result.

RA Acid Surrogate recovery failed quality control criteria. Matrix interference is suspected.

RB Base/Neutral Surrogate recovery failed quality control criteria. Matrix interference is suspected.

(The above four qualifiers (MI, MX, RA, RB) are qualifiers used to show matrix interference which occurred during analysis and may affect the results. The matrix spike being out of normal range is the primary indicator of this type of interference. Accompanying quality control standards in range indicate that matrix interference (not an out-of-control situation) existed during the analysis. Efforts are made to eliminate matrix interference where possible. If the matrix interference is eliminated, no qualifier is noted. Both MI and MX are reported as per EPA methodology.)

NQ No standard qualifier code is in use for this

qualification. See associated comment.

PX This sample was not in the acceptable pH range at the time of analysis.

SB Analysis of this sample was performed by an approved subcontract laboratory.

SU Analysis failed surrogate criteria.

BL Method Blank concentration for this parameter is greater than the maximum allowable concentration.

(The above two qualifiers (SU,BL) denote failed quality criteria for the method blank and surrogate recovery. Where appropriate, analyses that have failed these criteria are repeated.)

TX Analysis was conducted after the holding time expired.

ST This compound is not stable in acidic water.

B Broken bottle

D Dry well

I Insufficient volume to perform test

10/15/90

16-SEP-9

*** DATA QUALIFIER REPOP ***

Please be aware of the following information associated with the client reports for the ENS number [redacted]

SAMPLE NO.	METHOD ID	ANALYTE	CODE	DILUTION FACTOR
AD2800-H1	VOMSBAO201	EVERY ANALYTE FOR THIS METHOD	MX	
AD2802-C0	CRTDSROE01	SOLIDS, ROE	BL	
AD2803-A0	CRSULFAT01	SULFATE	DL	5
AD2804-A0	CRCHLORI01	CHLORIDE	DL	2
AD2805-H2	VOMSBAO201	EVERY ANALYTE FOR THIS METHOD	SU	
AD2806-H2	VOMSBAO201	EVERY ANALYTE FOR THIS METHOD	SU	
AD2807-H2	VOMSBAO201	EVERY ANALYTE FOR THIS METHOD	SU	

**** END OF REPORT *****

WMI ENVIRONMENTAL MON ING LABORATORIES, INC.

E V E N T S U M M A R Y R E P O R T

Site ID :

ENS Number : 91-11131
MPS Number : 495911
Rev / Task : 02 / 06
Sample Type : WELL
Reported : 11-SEP-1991

Analyte	495-01FB 1-AUG-1991	EMLRL	495-G149 1-AUG-1991	EMLRL	495-G52S 1-AUG-1991	EMLRL	Units
ALKALINITY	ND	10.000	414	10.000	305	10.000	MG/L
CHLORIDE	1.9	0.500	94.6	0.500	58.1	0.500	MG/L
PHENOLS	ND	0.050	ND	0.050	ND	0.050	MG/L
SULFATE	ND	5.000	320	5.000	179	5.000	MG/L
SOLIDS, ROE	NA	5.000	1040	5.000	851	5.000	MG/L
PH FIELD	7.16		6.94		7.02		PH UNITS
SPECIFIC CONDUCTANCE FIELD	2.33		1350.		941.		UMHOS/CM
DEPTH TO WATER FROM LAND SURFACE	NA		27.25		32.82		FT
DEPTH TO WATER FROM TOP OF CASING	NA		29.86		33.45		FT
GROUNDWATER ELEV.	NA		592.26		591.75		FT MSL
WELL DEPTH TOTAL	NA		37.71		40.22		FT
MEASURING POINT ELEV	NA		622.12		625.20		FT MSL
STICK-UP HEIGHT OF WELL ABOVE LAND SURF	NA		2.61		.63		FT
WATER TEMPERATURE IN DEGREES CELSIUS	26.0		14.7		15.7		DEGREES C
MERCURY-DISSOLVED	ND	2.000	ND	2.000	ND	2.000	UG/L
ARSENIC-DISSOLVED	ND	50.000	ND	50.000	ND	50.000	UG/L
LEAD-DISSOLVED	ND	40.000	ND	40.000	ND	40.000	UG/L
SELENIUM-DISSOLVED	ND	5.000	ND	5.000	ND	5.000	UG/L
BARIUM-DISSOLVED	ND	20.000	ND	20.000	45.1	20.000	UG/L
CALCIUM-DISSOLVED	ND	5000.000	117000	5000.000	135000	5000.000	UG/L
CADMIUM-DISSOLVED	ND	10.000	ND	10.000	ND	10.000	UG/L
CHROMIUM-DISSOLVED	ND	50.000	ND	50.000	ND	50.000	UG/L
IRON-DISSOLVED	ND	1000.000	ND	1000.000	2130	1000.000	UG/L
MAGNESIUM-DISSOLVED	ND	5000.000	52300	5000.000	64600	5000.000	UG/L
MANGANESE-DISSOLVED	ND	15.000	207	15.000	66.9	15.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank s = EML Subcontract Data

WMI ENVIRONMENTAL MON RING LABORATORIES, INC.

E V E N T S U M M A R Y R E P O R T

Site ID :

ENS Number : 91-11131
MPS Number : 495911
Rev / Task : 02 / 06
Sample Type : WELL
Reported : 11-SEP-1991

Analyte	495-01FB 1-AUG-1991	EMLRL	495-G149 1-AUG-1991	EMLRL	495-G52S 1-AUG-1991	EMLRL	Units
SODIUM-DISSOLVED	ND	5000.000	179000	5000.000	9320	5000.000	UG/L
3-METHYLPHENOL	ND	10.000	ND	10.000	ND	10.000	UG/L
4-METHYLPHENOL	ND	10.000	ND	10.000	ND	10.000	UG/L
BENZOIC ACID	ND	50.000	ND	50.000	ND	50.000	UG/L
1,1,1-TRICHLOROETHANE	ND	5.000	ND	5.000	ND	5.000	UG/L
1,1,2-TRICHLOROETHANE	ND	5.000	ND	5.000	ND	5.000	UG/L
1,1-DICHLOROETHANE	ND	5.000	ND	5.000	ND	5.000	UG/L
1,2-DICHLOROBENZENE	ND	5.000	ND	5.000	ND	5.000	UG/L
1,2-DICHLOROETHANE	ND	5.000	ND	5.000	ND	5.000	UG/L
1,2-DICHLOROPROPANE	ND	5.000	ND	5.000	ND	5.000	UG/L
2-BUTANONE	ND	10.000	ND	10.000	ND	10.000	UG/L
ACETONE	ND	100.000	ND	100.000	ND	100.000	UG/L
BENZENE	ND	5.000	ND	5.000	ND	5.000	UG/L
CARBON DISULFIDE	ND	5.000	ND	5.000	ND	5.000	UG/L
CHLOROBENZENE	ND	5.000	ND	5.000	ND	5.000	UG/L
CHLOROETHANE	ND	10.000	ND	10.000	ND	10.000	UG/L
CHLOROMETHANE	ND	10.000	ND	10.000	ND	10.000	UG/L
DICHLORODIFLUOROMETHANE	ND	5.000	ND	5.000	ND	5.000	UG/L
ETHYLBENZENE	ND	5.000	ND	5.000	ND	5.000	UG/L
METHYLENE CHLORIDE	ND	5.000	ND	5.000	ND	5.000	UG/L
TETRACHLOROETHENE	ND	5.000	ND	5.000	ND	5.000	UG/L
TOLUENE	ND	5.000	ND	5.000	ND	5.000	UG/L
TRANS-1,2-DICHLOROETHENE	ND	5.000	ND	5.000	ND	5.000	UG/L
TRICHLOROETHENE	ND	5.000	ND	5.000	ND	5.000	UG/L
TRICHLOROFLUOROMETHANE	ND	5.000	ND	5.000	ND	5.000	UG/L
VINYL CHLORIDE	ND	10.000	ND	10.000	ND	10.000	UG/L
XYLENE(TOTAL)	ND	5.000	ND	5.000	ND	5.000	UG/L
ISOBUTYL ALCOHOL	ND	10.000	ND	10.000	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank s = EML Subcontract Data

WMI ENVIRONMENTAL MON RING LABORATORIES, INC.

E V E N T S U M M A R Y R E P O R T

Site ID :

ENS Number : 91-11131
MPS Number : 495911
Rev / Task : 02 / 06
Sample Type : WELL
Reported : 11-SEP-1991

Analyte	495-G53S 31-JUL-1991	EMLRL	495-R111 1-AUG-1991	EMLRL	495-R112 1-AUG-1991	EMLRL	Units
ALKALINITY	314	10.000	341	10.000	321	10.000	MG/L
CHLORIDE	27.9	0.500	1.7	0.500	10.5	0.500	MG/L
PHENOLS	ND	0.050	ND	0.050	ND	0.050	MG/L
SULFATE	221	5.000	84.0	5.000	61.3	5.000	MG/L
SOLIDS, ROE	NA	5.000	496	5.000	617	5.000	MG/L
PH FIELD	6.90		7.29		7.23		PH UNITS
SPECIFIC CONDUCTANCE FIELD	900.		721.		672.		UMHOS/CM
DEPTH TO WATER FROM LAND SURFACE	32.99		19.98		21.41		FT
DEPTH TO WATER FROM TOP OF CASING	33.72		22.57		24.30		FT
GROUNDWATER ELEV.	591.30		593.11		591.71		FT MSL
WELL DEPTH TOTAL	43.14		33.48		52.70		FT
MEASURING POINT ELEV	625.02		615.68		616.01		FT MSL
STICK-UP HEIGHT OF WELL ABOVE LAND SURF	.73		2.59		2.89		FT
WATER TEMPERATURE IN DEGREES CELSIUS	15.8		13.3		14.6		DEGREES C
MERCURY-DISSOLVED	ND	2.000	ND	2.000	ND	2.000	UG/L
ARSENIC-DISSOLVED	ND	50.000	ND	50.000	ND	50.000	UG/L
LEAD-DISSOLVED	ND	40.000	ND	40.000	ND	40.000	UG/L
SELENIUM-DISSOLVED	ND	5.000	ND	5.000	ND	5.000	UG/L
BARIUM-DISSOLVED	29.8	20.000	103	20.000	82.8	20.000	UG/L
CALCIUM-DISSOLVED	123000	5000.000	81200	5000.000	66300	5000.000	UG/L
CADMIUM-DISSOLVED	ND	10.000	ND	10.000	ND	10.000	UG/L
CHROMIUM-DISSOLVED	ND	50.000	ND	50.000	ND	50.000	UG/L
IRON-DISSOLVED	2330	1000.000	1480	1000.000	ND	1000.000	UG/L
MAGNESIUM-DISSOLVED	64700	5000.000	43700	5000.000	44600	5000.000	UG/L
MANGANESE-DISSOLVED	48.7	15.000	42.1	15.000	32.8	15.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank s = EML Subcontract Data

WMI ENVIRONMENTAL MON RING LABORATORIES, INC.

E V E N T S U M M A R Y R E P O R T

Site ID :

ENS Number : 91-11131
MPS Number : 495911
Rev / Task : 02 / 06
Sample Type : WELL
Reported : 11-SEP-1991

Analyte	495-G53S 31-JUL-1991	EMLRL	495-R111 1-AUG-1991	EMLRL	495-R112 1-AUG-1991	EMLRL	Units
SODIUM-DISSOLVED	9570	5000.000	11400	5000.000	18700	5000.000	UG/L
3-METHYLPHENOL	ND	10.000	ND	10.000	ND	10.000	UG/L
4-METHYLPHENOL	ND	10.000	ND	10.000	ND	10.000	UG/L
BENZOIC ACID	ND	50.000	ND	50.000	ND	50.000	UG/L
1,1,1-TRICHLOROETHANE	ND	5.000	ND	5.000	ND	5.000	UG/L
1,1,2-TRICHLOROETHANE	ND	5.000	ND	5.000	ND	5.000	UG/L
1,1-DICHLOROETHANE	ND	5.000	ND	5.000	ND	5.000	UG/L
1,2-DICHLOROBENZENE	ND	5.000	ND	5.000	ND	5.000	UG/L
1,2-DICHLOROETHANE	ND	5.000	ND	5.000	ND	5.000	UG/L
1,2-DICHLOROPROPANE	ND	5.000	ND	5.000	ND	5.000	UG/L
2-BUTANONE	ND	10.000	ND	10.000	ND	10.000	UG/L
ACETONE	ND	100.000	ND	100.000	ND	100.000	UG/L
BENZENE	ND	5.000	ND	5.000	ND	5.000	UG/L
CARBON DISULFIDE	ND	5.000	ND	5.000	ND	5.000	UG/L
CHLOROBENZENE	ND	5.000	ND	5.000	ND	5.000	UG/L
CHLOROETHANE	ND	10.000	ND	10.000	ND	10.000	UG/L
CHLOROMETHANE	ND	10.000	ND	10.000	ND	10.000	UG/L
DICHLORODIFLUOROMETHANE	ND	5.000	ND	5.000	ND	5.000	UG/L
ETHYLBENZENE	ND	5.000	ND	5.000	ND	5.000	UG/L
METHYLENE CHLORIDE	ND	5.000	ND	5.000	ND	5.000	UG/L
TETRACHLOROETHENE	ND	5.000	ND	5.000	ND	5.000	UG/L
TOLUENE	ND	5.000	ND	5.000	ND	5.000	UG/L
TRANS-1,2-DICHLOROETHENE	ND	5.000	ND	5.000	ND	5.000	UG/L
TRICHLOROETHENE	ND	5.000	ND	5.000	ND	5.000	UG/L
TRICHLOROFLUOROMETHANE	ND	5.000	ND	5.000	ND	5.000	UG/L
VINYL CHLORIDE	ND	10.000	ND	10.000	ND	10.000	UG/L
XYLENE(TOTAL)	ND	5.000	ND	5.000	ND	5.000	UG/L
ISOBUTYL ALCOHOL	ND	10.000	ND	10.000	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank s = EML Subcontract Data

WMI ENVIRONMENTAL MON: ING LABORATORIES, INC.

E V E N T S U M M A R Y R E P O R T

Site ID :

ENS Number : 91-11131
MPS Number : 495911
Rev / Task : 02 / 06
Sample Type : WELL
Reported : 11-SEP-1991

Analyte	495-R113 1-AUG-1991	EMLRL	495-R114 10-AUG-1991	EMLRL	495-R114 1-AUG-1991	EMLRL	Units
ALKALINITY	375	10.000			454	10.000	MG/L
CHLORIDE	101	1.000			17.5	0.500	MG/L
PHENOLS	ND	0.050			ND	0.050	MG/L
SULFATE	231	5.000			599	25.000	MG/L
SOLIDS, ROE	995	5.000			1485	5.000	MG/L
PH FIELD	6.93		6.72				PH UNITS
SPECIFIC CONDUCTANCE FIELD	1230.		1440.				UMHOS/CM
DEPTH TO WATER FROM LAND SURFACE	27.58		31.51				FT
DEPTH TO WATER FROM TOP OF CASING	30.47		34.07				FT
GROUNDWATER ELEV.	593.94		593.76				FT MSL
WELL DEPTH TOTAL	36.82		45.86				FT
MEASURING POINT ELEV	624.41		627.83				FT MSL
STICK-UP HEIGHT OF WELL ABOVE LAND SURF	2.89		2.56				FT
WATER TEMPERATURE IN DEGREES CELSIUS	14.6		14.6				DEGREES C
MERCURY-DISSOLVED	ND	2.000			ND	2.000	UG/L
ARSENIC-DISSOLVED	ND	50.000			ND	50.000	UG/L
LEAD-DISSOLVED	ND	40.000			ND	40.000	UG/L
SELENIUM-DISSOLVED	ND	5.000			ND	5.000	UG/L
BARIUM-DISSOLVED	67.8	20.000			24.9	20.000	UG/L
CALCIUM-DISSOLVED	116000	5000.000			246000	5000.000	UG/L
CADMIUM-DISSOLVED	ND	10.000			ND	10.000	UG/L
CHROMIUM-DISSOLVED	ND	50.000			ND	50.000	UG/L
IRON-DISSOLVED	ND	1000.000			ND	1000.000	UG/L
MAGNESIUM-DISSOLVED	67100	5000.000			125000	5000.000	UG/L
MANGANESE-DISSOLVED	ND	15.000			62.8	15.000	UG/L

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WMI ENVIRONMENTAL MONI NG LABORATORIES, INC.

E V E N T S U M M A R Y R E P O R T

Site ID :

ENS Number : 91-11131
MPS Number : 495911
Rev / Task : 02 / 06
Sample Type : WELL
Reported : 11-SEP-1991

Analyte	495-R113 1-AUG-1991	EMLRL	495-R114 10-AUG-1991	EMLRL	495-R114 1-AUG-1991	EMLRL	Units
SODIUM-DISSOLVED	105000	5000.000			16600	5000.000	UG/L
3-METHYLPHENOL	ND	10.000			ND	10.000	UG/L
4-METHYLPHENOL	ND	10.000			ND	10.000	UG/L
BENZOIC ACID	ND	50.000			ND	50.000	UG/L
1,1,1-TRICHLOROETHANE	ND	5.000			ND	5.000	UG/L
1,1,2-TRICHLOROETHANE	ND	5.000			ND	5.000	UG/L
1,1-DICHLOROETHANE	ND	5.000			ND	5.000	UG/L
1,2-DICHLOROBENZENE	ND	5.000			ND	5.000	UG/L
1,2-DICHLOROETHANE	ND	5.000			ND	5.000	UG/L
1,2-DICHLOROPROPANE	ND	5.000			ND	5.000	UG/L
2-BUTANONE	ND	10.000			ND	10.000	UG/L
ACETONE	ND	100.000			ND	100.000	UG/L
BENZENE	ND	5.000			ND	5.000	UG/L
CARBON DISULFIDE	ND	5.000			ND	5.000	UG/L
CHLOROBENZENE	ND	5.000			ND	5.000	UG/L
CHLOROETHANE	ND	10.000			ND	10.000	UG/L
CHLOROMETHANE	ND	10.000			ND	10.000	UG/L
DICHLORODIFLUOROMETHANE	ND	5.000			ND	5.000	UG/L
ETHYLBENZENE	ND	5.000			ND	5.000	UG/L
METHYLENE CHLORIDE	ND	5.000			ND	5.000	UG/L
TETRACHLOROETHENE	ND	5.000			ND	5.000	UG/L
TOLUENE	ND	5.000			ND	5.000	UG/L
TRANS-1,2-DICHLOROETHENE	ND	5.000			ND	5.000	UG/L
TRICHLOROETHENE	ND	5.000			ND	5.000	UG/L
TRICHLOROFLUOROMETHANE	ND	5.000			ND	5.000	UG/L
VINYL CHLORIDE	ND	10.000			ND	10.000	UG/L
XYLENE(TOTAL)	ND	5.000			ND	5.000	UG/L
ISOBUTYL ALCOHOL	ND	10.000			ND	10.000	UG/L

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WMI ENVIRONMENTAL MON' 'ING LABORATORIES, INC.

E V E N T S U M M A R Y R E P O R T

Site ID :

ENS Number : 91-11131
MPS Number : 495911
Rev / Task : 02 / 06
Sample Type : WELL
Reported : 11-SEP-1991

Analyte	495-R122 1-AUG-1991	EMLRL		EMLRL		EMLRL	Units
ALKALINITY	355	10.000					MG/L
CHLORIDE	5.1	0.500					MG/L
PHENOLS	ND	0.050					MG/L
SULFATE	179	5.000					MG/L
SOLIDS, ROE	665	5.000					MG/L
PH FIELD	6.93						PH UNITS
SPECIFIC CONDUCTANCE FIELD	880.						UMHOS/CM
DEPTH TO WATER FROM LAND SURFACE	29.72						FT
DEPTH TO WATER FROM TOP OF CASING	32.21						FT
GROUNDWATER ELEV.	590.85						FT MSL
WELL DEPTH TOTAL	46.78						FT
MEASURING POINT ELEV	623.06						FT MSL
STICK-UP HEIGHT OF WELL ABOVE LAND SURF	2.49						FT
WATER TEMPERATURE IN DEGREES CELSIUS	13.5						DEGREES C
MERCURY-DISSOLVED	ND	2.000					UG/L
ARSENIC-DISSOLVED	ND	50.000					UG/L
LEAD-DISSOLVED	ND	40.000					UG/L
SELENIUM-DISSOLVED	ND	5.000					UG/L
BARIUM-DISSOLVED	47.6	20.000					UG/L
CALCIUM-DISSOLVED	108000	5000.000					UG/L
CADMIUM-DISSOLVED	ND	10.000					UG/L
CHROMIUM-DISSOLVED	ND	50.000					UG/L
IRON-DISSOLVED	2000	1000.000					UG/L
MAGNESIUM-DISSOLVED	56100	5000.000					UG/L
MANGANESE-DISSOLVED	45.2	15.000					UG/L

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WMI ENVIRONMENTAL MONI ING LABORATORIES, INC.

E V E N T S U M M A R Y R E P O R T

Site ID :

ENS Number : 91-11131
MPS Number : 495911
Rev / Task : 02 / 06
Sample Type : WELL
Reported : 11-SEP-1991

Analyte	495-R122 1-AUG-1991	EMLRL		EMLRL		EMLRL	Units
SODIUM-DISSOLVED	11200	5000.000					UG/L
3-METHYLPHENOL	ND	10.000					UG/L
4-METHYLPHENOL	ND	10.000					UG/L
BENZOIC ACID	ND	50.000					UG/L
1,1,1-TRICHLOROETHANE	ND	5.000					UG/L
1,1,2-TRICHLOROETHANE	ND	5.000					UG/L
1,1-DICHLOROETHANE	ND	5.000					UG/L
1,2-DICHLOROBENZENE	ND	5.000					UG/L
1,2-DICHLOROETHANE	ND	5.000					UG/L
1,2-DICHLOROPROPANE	ND	5.000					UG/L
2-BUTANONE	ND	10.000					UG/L
ACETONE	ND	100.000					UG/L
BENZENE	ND	5.000					UG/L
CARBON DISULFIDE	ND	5.000					UG/L
CHLOROBENZENE	ND	5.000					UG/L
CHLOROETHANE	ND	10.000					UG/L
CHLOROMETHANE	ND	10.000					UG/L
DICHLORODIFLUOROMETHANE	ND	5.000					UG/L
ETHYLBENZENE	ND	5.000					UG/L
METHYLENE CHLORIDE	ND	5.000					UG/L
TETRACHLOROETHENE	ND	5.000					UG/L
TOLUENE	ND	5.000					UG/L
TRANS-1,2-DICHLOROETHENE	ND	5.000					UG/L
TRICHLOROETHENE	ND	5.000					UG/L
TRICHLOROFLUOROMETHANE	ND	5.000					UG/L
VINYL CHLORIDE	ND	10.000					UG/L
XYLENE(TOTAL)	ND	5.000					UG/L
ISOBUTYL ALCOHOL	ND	10.000					UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank s = EML Subcontract Data

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

ite:

Sample Point: 01FB
Type: WELL
Sample No: AD2802
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
CRALKMOT01: ALKALINITY	ND	10.000	MG/L
CRCHLORI01: CHLORIDE	1.9	0.500	MG/L
CRPNHRAX01: PHENOLS	ND	0.050	MG/L
CRSULFAT01: SULFATE	ND	5.000	MG/L
CRTDSROE01: SOLIDS, ROE	NA	5.000	MG/L
FDPHSING01: PH FIELD	7.16		PH UNITS
FDSPCOND01: SPECIFIC CONDUCTANCE FIELD	2.33		UMHOS/CM
FDWDTWLS01: DEPTH TO WATER FROM LAND SURFACE	NA		FT
FDWDTWTC01: DEPTH TO WATER FROM TOP OF CASING	NA		FT
FDWGWELWDT: GROUNDWATER ELEV.	NA		FT MSL
WELL DEPTH TOTAL	NA		FT
FDWMEAPTEL: MEASURING POINT ELEV	NA		FT MSL
FDWSTKUP01: STICK-UP HEIGHT OF WELL ABOVE LAND SURF	NA		FT
FDXTEMPC01: WATER TEMPERATURE IN DEGREES CELSIUS	26.0		DEGREES C
INCVAADIHG: MERCURY-DISSOLVED	ND	2.000	UG/L
NGFAADIAS: ARSENIC-DISSOLVED	ND	50.000	UG/L
INGFAADIPB: LEAD-DISSOLVED	ND	40.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

ite:

Sample Point: 01FB
Type: WELL
Sample No: AD2802
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
INGFAADISE:			
SELENIUM-DISSOLVED	ND	5.000	UG/L
INICPDISBA:			
BARIUM-DISSOLVED	ND	20.000	UG/L
INICPDISCA:			
CALCIUM-DISSOLVED	ND	5000.000	UG/L
INICPDISCD:			
CADMIUM-DISSOLVED	ND	10.000	UG/L
INICPDISCR:			
CHROMIUM-DISSOLVED	ND	50.000	UG/L
INICPDISFE:			
IRON-DISSOLVED	ND	1000.000	UG/L
INICPDISMG:			
MAGNESIUM-DISSOLVED	ND	5000.000	UG/L
INICPDISMN:			
MANGANESE-DISSOLVED	ND	15.000	UG/L
INICPDISNA:			
SODIUM-DISSOLVED	ND	5000.000	UG/L
SVMS1ACD12:			
3-METHYLPHENOL	ND	10.000	UG/L
4-METHYLPHENOL	ND	10.000	UG/L
BENZOIC ACID	ND	50.000	UG/L
VOMSBAO201:			
1,1,1-TRICHLOROETHANE	ND	5.000	UG/L
1,1,2-TRICHLOROETHANE	ND	5.000	UG/L
1,1-DICHLOROETHANE	ND	5.000	UG/L
1,2-DICHLOROBENZENE	ND	5.000	UG/L
1,2-DICHLOROETHANE	ND	5.000	UG/L
1,2-DICHLOROPROPANE	ND	5.000	UG/L
2-BUTANONE	ND	10.000	UG/L
ACETONE	ND	100.000	UG/L
BENZENE	ND	5.000	UG/L
CARBON DISULFIDE	ND	5.000	UG/L
CHLOROBENZENE	ND	5.000	UG/L
CHLOROETHANE	ND	10.000	UG/L
CHLOROMETHANE	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

te:

Sample Point: 01FB
Type: WELL
Sample No: AD2802
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
DICHLORODIFLUOROMETHANE	ND	5.000	UG/L
ETHYLBENZENE	ND	5.000	UG/L
METHYLENE CHLORIDE	ND	5.000	UG/L
TETRACHLOROETHENE	ND	5.000	UG/L
TOLUENE	ND	5.000	UG/L
TRANS-1,2-DICHLOROETHENE	ND	5.000	UG/L
TRICHLOROETHENE	ND	5.000	UG/L
TRICHLOROFLUOROMETHANE	ND	5.000	UG/L
VINYL CHLORIDE	ND	10.000	UG/L
XYLENE (TOTAL)	ND	5.000	UG/L
VOMSDCC105:			
ISOBUTYL ALCOHOL	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

:te:

Sample Point: G149
Type: WELL
Sample No: AD2808
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
CRALKMOT01: ALKALINITY	414	10.000	MG/L
CRCHLORI01: CHLORIDE	94.6	0.500	MG/L
CRPNHRAX01: PHENOLS	ND	0.050	MG/L
CRSULFAT01: SULFATE	320	5.000	MG/L
CRTDSROE01: SOLIDS, ROE	1040	5.000	MG/L
FDPHSING01: PH FIELD	6.94		PH UNITS
FDSPCOND01: SPECIFIC CONDUCTANCE FIELD	1350.		UMHOS/CM
FDWDTWLS01: DEPTH TO WATER FROM LAND SURFACE	27.25		FT
FDWDTWTC01: DEPTH TO WATER FROM TOP OF CASING	29.86		FT
FDWGWELWDT: GROUNDWATER ELEV.	592.26		FT MSL
WELL DEPTH TOTAL	37.71		FT
FDWMEAPTEL: MEASURING POINT ELEV	622.12		FT MSL
FDWSTKUP01: STICK-UP HEIGHT OF WELL ABOVE LAND SURF	2.61		FT
FDXTEMPC01: WATER TEMPERATURE IN DEGREES CELSIUS	14.7		DEGREES C
INCVAADIHG: MERCURY-DISSOLVED	ND	2.000	UG/L
INGFAADIAS: ARSENIC-DISSOLVED	ND	50.000	UG/L
INGFAADIPB: LEAD-DISSOLVED	ND	40.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

te:

Sample Point: G149
Type: WELL
Sample No: AD2808
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
INGFAADISE:			
SELENIUM-DISSOLVED	ND	5.000	UG/L
INICPDISBA:			
BARIUM-DISSOLVED	ND	20.000	UG/L
INICPDISCA:			
CALCIUM-DISSOLVED	117000	5000.000	UG/L
INICPDISCD:			
CADMIUM-DISSOLVED	ND	10.000	UG/L
INICPDISCR:			
CHROMIUM-DISSOLVED	ND	50.000	UG/L
NICPDISFE:			
IRON-DISSOLVED	ND	1000.000	UG/L
INICPDISMG:			
MAGNESIUM-DISSOLVED	52300	5000.000	UG/L
INICPDISMN:			
MANGANESE-DISSOLVED	207	15.000	UG/L
INICPDISNA:			
SODIUM-DISSOLVED	179000	5000.000	UG/L
SVMS1ACD12:			
3-METHYLPHENOL	ND	10.000	UG/L
4-METHYLPHENOL	ND	10.000	UG/L
BENZOIC ACID	ND	50.000	UG/L
VOMSBAO201:			
1,1,1-TRICHLOROETHANE	ND	5.000	UG/L
1,1,2-TRICHLOROETHANE	ND	5.000	UG/L
1,1-DICHLOROETHANE	ND	5.000	UG/L
1,2-DICHLOROBENZENE	ND	5.000	UG/L
1,2-DICHLOROETHANE	ND	5.000	UG/L
1,2-DICHLOROPROPANE	ND	5.000	UG/L
2-BUTANONE	ND	10.000	UG/L
ACETONE	ND	100.000	UG/L
BENZENE	ND	5.000	UG/L
CARBON DISULFIDE	ND	5.000	UG/L
CHLOROBENZENE	ND	5.000	UG/L
CHLOROETHANE	ND	10.000	UG/L
CHLOROMETHANE	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

'te:

Sample Point: G149
Type: WELL
Sample No: AD2808
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
DICHLORODIFLUOROMETHANE	ND	5.000	UG/L
ETHYLBENZENE	ND	5.000	UG/L
METHYLENE CHLORIDE	ND	5.000	UG/L
TETRACHLOROETHENE	ND	5.000	UG/L
TOLUENE	ND	5.000	UG/L
TRANS-1,2-DICHLOROETHENE	ND	5.000	UG/L
TRICHLOROETHENE	ND	5.000	UG/L
TRICHLOROFLUOROMETHANE	ND	5.000	UG/L
VINYL CHLORIDE	ND	10.000	UG/L
XYLENE(TOTAL)	ND	5.000	UG/L
VOMSDCC105:			
ISOBUTYL ALCOHOL	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

.te:

Sample Point: G52S
Type: WELL
Sample No: AD2801
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
CRALKMOT01: ALKALINITY	305	10.000	MG/L
CRCHLORI01: CHLORIDE	58.1	0.500	MG/L
CRPNHRAX01: PHENOLS	ND	0.050	MG/L
CRSULFAT01: SULFATE	179	5.000	MG/L
CRTDSROE01: SOLIDS, ROE	851	5.000	MG/L
FDPHSING01: PH FIELD	7.02		PH UNITS
FDSPCOND01: SPECIFIC CONDUCTANCE FIELD	941.		UMHOS/CM
FDWDTWLS01: DEPTH TO WATER FROM LAND SURFACE	32.82		FT
FDWDTWTC01: DEPTH TO WATER FROM TOP OF CASING	33.45		FT
FDWGWELWDT: GROUNDWATER ELEV.	591.75		FT MSL
WELL DEPTH TOTAL	40.22		FT
FDWMEAPTEL: MEASURING POINT ELEV	625.20		FT MSL
FDWSTKUP01: STICK-UP HEIGHT OF WELL ABOVE LAND SURF	.63		FT
FDXTEMPC01: WATER TEMPERATURE IN DEGREES CELSIUS	15.7		DEGREES C
INCVAADIHG: MERCURY-DISSOLVED	ND	2.000	UG/L
INGFAADIAS: ARSENIC-DISSOLVED	ND	50.000	UG/L
INGFAADIPB: LEAD-DISSOLVED	ND	40.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

ite:

Sample Point: G52S
Type: WELL
Sample No: AD2801
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
INGFAADISE:			
SELENIUM-DISSOLVED	ND	5.000	UG/L
INICPDISBA:			
BARIUM-DISSOLVED	45.1	20.000	UG/L
INICPDISCA:			
CALCIUM-DISSOLVED	135000	5000.000	UG/L
INICPDISCD:			
CADMIUM-DISSOLVED	ND	10.000	UG/L
INICPDISCR:			
CHROMIUM-DISSOLVED	ND	50.000	UG/L
NICPDISFE:			
IRON-DISSOLVED	2130	1000.000	UG/L
INICPDISMG:			
MAGNESIUM-DISSOLVED	64600	5000.000	UG/L
INICPDISMN:			
MANGANESE-DISSOLVED	66.9	15.000	UG/L
INICPDISNA:			
SODIUM-DISSOLVED	9320	5000.000	UG/L
SVMS1ACD12:			
3-METHYLPHENOL	ND	10.000	UG/L
4-METHYLPHENOL	ND	10.000	UG/L
BENZOIC ACID	ND	50.000	UG/L
VOMSBAO201:			
1,1,1-TRICHLOROETHANE	ND	5.000	UG/L
1,1,2-TRICHLOROETHANE	ND	5.000	UG/L
1,1-DICHLOROETHANE	ND	5.000	UG/L
1,2-DICHLOROBENZENE	ND	5.000	UG/L
1,2-DICHLOROETHANE	ND	5.000	UG/L
1,2-DICHLOROPROPANE	ND	5.000	UG/L
2-BUTANONE	ND	10.000	UG/L
ACETONE	ND	100.000	UG/L
BENZENE	ND	5.000	UG/L
CARBON DISULFIDE	ND	5.000	UG/L
CHLOROBENZENE	ND	5.000	UG/L
CHLOROETHANE	ND	10.000	UG/L
CHLOROMETHANE	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

te:

Sample Point: G52S
Type: WELL
Sample No: AD2801
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
DICHLORODIFLUOROMETHANE	ND	5.000	UG/L
ETHYLBENZENE	ND	5.000	UG/L
METHYLENE CHLORIDE	ND	5.000	UG/L
TETRACHLOROETHENE	ND	5.000	UG/L
TOLUENE	ND	5.000	UG/L
TRANS-1,2-DICHLOROETHENE	ND	5.000	UG/L
TRICHLOROETHENE	ND	5.000	UG/L
TRICHLOROFLUOROMETHANE	ND	5.000	UG/L
VINYL CHLORIDE	ND	10.000	UG/L
XYLENE(TOTAL)	ND	5.000	UG/L
VOMSDCC105:			
ISOBUTYL ALCOHOL	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

te:

Sample Point: G53S
Type: WELL
Sample No: AD2800
Sampled: 31-JUL-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
CRALKMOT01: ALKALINITY	314	10.000	MG/L
CRCHLORI01: CHLORIDE	27.9	0.500	MG/L
CRPNHRAX01: PHENOLS	ND	0.050	MG/L
CRSULFAT01: SULFATE	221	5.000	MG/L
CRTDSROE01: SOLIDS, ROE	NA	5.000	MG/L
FDPHSING01: PH FIELD	6.90		PH UNITS
FDSPCOND01: SPECIFIC CONDUCTANCE FIELD	900.		UMHOS/CM
FDWDTWLS01: DEPTH TO WATER FROM LAND SURFACE	32.99		FT
FDWDTWTC01: DEPTH TO WATER FROM TOP OF CASING	33.72		FT
FDWGWELWDT: GROUNDWATER ELEV.	591.30		FT MSL
WELL DEPTH TOTAL	43.14		FT
FDWMEAPTEL: MEASURING POINT ELEV	625.02		FT MSL
FDWSTKUP01: STICK-UP HEIGHT OF WELL ABOVE LAND SURF	.73		FT
FDXTEMPC01: WATER TEMPERATURE IN DEGREES CELSIUS	15.8		DEGREES C
INCVAADIHG: MERCURY-DISSOLVED	ND	2.000	UG/L
NGFAADIAS: ARSENIC-DISSOLVED	ND	50.000	UG/L
INGFAADIPB: LEAD-DISSOLVED	ND	40.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

ite:

Sample Point: G53S
Type: WELL
Sample No: AD2800
Sampled: 31-JUL-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
INGFAADISE:			
SELENIUM-DISSOLVED	ND	5.000	UG/L
INICPDISBA:			
BARIUM-DISSOLVED	29.8	20.000	UG/L
INICPDISCA:			
CALCIUM-DISSOLVED	123000	5000.000	UG/L
INICPDISCD:			
CADMIUM-DISSOLVED	ND	10.000	UG/L
INICPDISCR:			
CHROMIUM-DISSOLVED	ND	50.000	UG/L
NICPDISFE:			
IRON-DISSOLVED	2330	1000.000	UG/L
INICPDISMG:			
MAGNESIUM-DISSOLVED	64700	5000.000	UG/L
INICPDISMN:			
MANGANESE-DISSOLVED	48.7	15.000	UG/L
INICPDISNA:			
SODIUM-DISSOLVED	9570	5000.000	UG/L
SVMS1ACD12:			
3-METHYLPHENOL	ND	10.000	UG/L
4-METHYLPHENOL	ND	10.000	UG/L
BENZOIC ACID	ND	50.000	UG/L
VOMSBAO201:			
1,1,1-TRICHLOROETHANE	ND	5.000	UG/L
1,1,2-TRICHLOROETHANE	ND	5.000	UG/L
1,1-DICHLOROETHANE	ND	5.000	UG/L
1,2-DICHLOROBENZENE	ND	5.000	UG/L
1,2-DICHLOROETHANE	ND	5.000	UG/L
1,2-DICHLOROPROPANE	ND	5.000	UG/L
2-BUTANONE	ND	10.000	UG/L
ACETONE	ND	100.000	UG/L
BENZENE	ND	5.000	UG/L
CARBON DISULFIDE	ND	5.000	UG/L
CHLOROBENZENE	ND	5.000	UG/L
CHLOROETHANE	ND	10.000	UG/L
CHLOROMETHANE	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

:te:

Sample Point: G53S
Type: WELL
Sample No: AD2800
Sampled: 31-JUL-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
DICHLORODIFLUOROMETHANE	ND	5.000	UG/L
ETHYLBENZENE	ND	5.000	UG/L
METHYLENE CHLORIDE	ND	5.000	UG/L
TETRACHLOROETHENE	ND	5.000	UG/L
TOLUENE	ND	5.000	UG/L
TRANS-1,2-DICHLOROETHENE	ND	5.000	UG/L
TRICHLOROETHENE	ND	5.000	UG/L
TRICHLOROFLUOROMETHANE	ND	5.000	UG/L
VINYL CHLORIDE	ND	10.000	UG/L
XYLENE(TOTAL)	ND	5.000	UG/L
VOMSDCC105:			
ISOBUTYL ALCOHOL	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

Site:

Sample Point: R111
Type: WELL
Sample No: AD2805
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
CRALKMOT01: ALKALINITY	341	10.000	MG/L
CRCHLORI01: CHLORIDE	1.7	0.500	MG/L
CRPNHRAX01: PHENOLS	ND	0.050	MG/L
CRSULFAT01: SULFATE	84.0	5.000	MG/L
CRTDSROE01: SOLIDS, ROE	496	5.000	MG/L
FDPHSING01: PH FIELD	7.29		PH UNITS
FDSPCOND01: SPECIFIC CONDUCTANCE FIELD	721.		UMHOS/CM
FDWDTWLS01: DEPTH TO WATER FROM LAND SURFACE	19.98		FT
FDWDTWTC01: DEPTH TO WATER FROM TOP OF CASING	22.57		FT
FDWGWELWDT: GROUNDWATER ELEV.	593.11		FT MSL
WELL DEPTH TOTAL	33.48		FT
FDWMEAPTEL: MEASURING POINT ELEV	615.68		FT MSL
FDWSTKUP01: STICK-UP HEIGHT OF WELL ABOVE LAND SURF	2.59		FT
FDXTEMPC01: WATER TEMPERATURE IN DEGREES CELSIUS	13.3		DEGREES C
INCVAADIHG: MERCURY-DISSOLVED	ND	2.000	UG/L
INGFAADIAS: ARSENIC-DISSOLVED	ND	50.000	UG/L
INGFAADIPB: LEAD-DISSOLVED	ND	40.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

ite:

Sample Point: R111
Type: WELL
Sample No: AD2805
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
INGFAADISE:			
SELENIUM-DISSOLVED	ND	5.000	UG/L
INICPDISBA:			
BARIUM-DISSOLVED	103	20.000	UG/L
INICPDISCA:			
CALCIUM-DISSOLVED	81200	5000.000	UG/L
INICPDISCD:			
CADMIUM-DISSOLVED	ND	10.000	UG/L
INICPDISCR:			
CHROMIUM-DISSOLVED	ND	50.000	UG/L
INICPDISFE:			
IRON-DISSOLVED	1480	1000.000	UG/L
INICPDISMG:			
MAGNESIUM-DISSOLVED	43700	5000.000	UG/L
INICPDISMN:			
MANGANESE-DISSOLVED	42.1	15.000	UG/L
INICPDISNA:			
SODIUM-DISSOLVED	11400	5000.000	UG/L
SVMS1ACD12:			
3-METHYLPHENOL	ND	10.000	UG/L
4-METHYLPHENOL	ND	10.000	UG/L
BENZOIC ACID	ND	50.000	UG/L
VOMSBAO201:			
1,1,1-TRICHLOROETHANE	ND	5.000	UG/L
1,1,2-TRICHLOROETHANE	ND	5.000	UG/L
1,1-DICHLOROETHANE	ND	5.000	UG/L
1,2-DICHLOROBENZENE	ND	5.000	UG/L
1,2-DICHLOROETHANE	ND	5.000	UG/L
1,2-DICHLOROPROPANE	ND	5.000	UG/L
2-BUTANONE	ND	10.000	UG/L
ACETONE	ND	100.000	UG/L
BENZENE	ND	5.000	UG/L
CARBON DISULFIDE	ND	5.000	UG/L
CHLOROBENZENE	ND	5.000	UG/L
CHLOROETHANE	ND	10.000	UG/L
CHLOROMETHANE	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

ite:

Sample Point: R111
Type: WELL
Sample No: AD2805
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
DICHLORODIFLUOROMETHANE	ND	5.000	UG/L
ETHYLBENZENE	ND	5.000	UG/L
METHYLENE CHLORIDE	ND	5.000	UG/L
TETRACHLOROETHENE	ND	5.000	UG/L
TOLUENE	ND	5.000	UG/L
TRANS-1,2-DICHLOROETHENE	ND	5.000	UG/L
TRICHLOROETHENE	ND	5.000	UG/L
TRICHLOROFLUOROMETHANE	ND	5.000	UG/L
VINYL CHLORIDE	ND	10.000	UG/L
XYLENE(TOTAL)	ND	5.000	UG/L
VOMSDCC105:			
ISOBUTYL ALCOHOL	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

te:

Sample Point: R112
Type: WELL
Sample No: AD2806
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
CRALKMOT01: ALKALINITY	321	10.000	MG/L
CRCHLORI01: CHLORIDE	10.5	0.500	MG/L
CRPNHRAX01: PHENOLS	ND	0.050	MG/L
CRSULFAT01: SULFATE	61.3	5.000	MG/L
CRTDSROE01: SOLIDS, ROE	617	5.000	MG/L
FDPHSING01: PH FIELD	7.23		PH UNITS
FDSPCOND01: SPECIFIC CONDUCTANCE FIELD	672.		UMHOS/CM
FDWDTWLS01: DEPTH TO WATER FROM LAND SURFACE	21.41		FT
FDWDTWTC01: DEPTH TO WATER FROM TOP OF CASING	24.30		FT
FDWGWELWDT: GROUNDWATER ELEV.	591.71		FT MSL
WELL DEPTH TOTAL	52.70		FT
FDWMEAPTEL: MEASURING POINT ELEV	616.01		FT MSL
FDWSTKUP01: STICK-UP HEIGHT OF WELL ABOVE LAND SURF	2.89		FT
FDXTEMPC01: WATER TEMPERATURE IN DEGREES CELSIUS	14.6		DEGREES C
INCVAADIHG: MERCURY-DISSOLVED	ND	2.000	UG/L
NGFAADIAS: ARSENIC-DISSOLVED	ND	50.000	UG/L
INGFAADIPB: LEAD-DISSOLVED	ND	40.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

ite:

Sample Point: R112
Type: WELL
Sample No: AD2806
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
INGFAADISE:			
SELENIUM-DISSOLVED	ND	5.000	UG/L
INICPDISBA:			
BARIUM-DISSOLVED	82.8	20.000	UG/L
INICPDISCA:			
CALCIUM-DISSOLVED	66300	5000.000	UG/L
INICPDISCD:			
CADMIUM-DISSOLVED	ND	10.000	UG/L
INICPDISCR:			
CHROMIUM-DISSOLVED	ND	50.000	UG/L
NICPDISFE:			
IRON-DISSOLVED	ND	1000.000	UG/L
INICPDISMG:			
MAGNESIUM-DISSOLVED	44600	5000.000	UG/L
INICPDISMN:			
MANGANESE-DISSOLVED	32.8	15.000	UG/L
INICPDISNA:			
SODIUM-DISSOLVED	18700	5000.000	UG/L
SVMS1ACD12:			
3-METHYLPHENOL	ND	10.000	UG/L
4-METHYLPHENOL	ND	10.000	UG/L
BENZOIC ACID	ND	50.000	UG/L
VOMSBAO201:			
1,1,1-TRICHLOROETHANE	ND	5.000	UG/L
1,1,2-TRICHLOROETHANE	ND	5.000	UG/L
1,1-DICHLOROETHANE	ND	5.000	UG/L
1,2-DICHLOROBENZENE	ND	5.000	UG/L
1,2-DICHLOROETHANE	ND	5.000	UG/L
1,2-DICHLOROPROPANE	ND	5.000	UG/L
2-BUTANONE	ND	10.000	UG/L
ACETONE	ND	100.000	UG/L
BENZENE	ND	5.000	UG/L
CARBON DISULFIDE	ND	5.000	UG/L
CHLOROBENZENE	ND	5.000	UG/L
CHLOROETHANE	ND	10.000	UG/L
CHLOROMETHANE	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

:te:

Sample Point: R112
Type: WELL
Sample No: AD2806
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
DICHLORODIFLUOROMETHANE	ND	5.000	UG/L
ETHYLBENZENE	ND	5.000	UG/L
METHYLENE CHLORIDE	ND	5.000	UG/L
TETRACHLOROETHENE	ND	5.000	UG/L
TOLUENE	ND	5.000	UG/L
TRANS-1,2-DICHLOROETHENE	ND	5.000	UG/L
TRICHLOROETHENE	ND	5.000	UG/L
TRICHLOROFLUOROMETHANE	ND	5.000	UG/L
VINYL CHLORIDE	ND	10.000	UG/L
XYLENE(TOTAL)	ND	5.000	UG/L
VOMSDCC105:			
ISOBUTYL ALCOHOL	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

'te:

Sample Point: R113
Type: WELL
Sample No: AD2804
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
CRALKMOT01: ALKALINITY	375	10.000	MG/L
CRCHLORI01: CHLORIDE	101	1.000	MG/L DL
CRPNHRAX01: PHENOLS	ND	0.050	MG/L
CRSULFAT01: SULFATE	231	5.000	MG/L
CRTDSROE01: SOLIDS, ROE	995	5.000	MG/L
FDPHSING01: PH FIELD	6.93		PH UNITS
FDSPCOND01: SPECIFIC CONDUCTANCE FIELD	1230.		UMHOS/CM
FDWDTWLS01: DEPTH TO WATER FROM LAND SURFACE	27.58		FT
FDWDTWTC01: DEPTH TO WATER FROM TOP OF CASING	30.47		FT
FDWGWELWDT: GROUNDWATER ELEV.	593.94		FT MSL
WELL DEPTH TOTAL	36.82		FT
FDWMEAPTEL: MEASURING POINT ELEV	624.41		FT MSL
FDWSTKUP01: STICK-UP HEIGHT OF WELL ABOVE LAND SURF	2.89		FT
FDXTEMPC01: WATER TEMPERATURE IN DEGREES CELSIUS	14.6		DEGREES C
INCVAADIHG: MERCURY-DISSOLVED	ND	2.000	UG/L
NGFAADIAS: ARSENIC-DISSOLVED	ND	50.000	UG/L
INGFAADIPB: LEAD-DISSOLVED	ND	40.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

te:

Sample Point: R113
Type: WELL
Sample No: AD2804
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
INGFAADISE:			
SELENIUM-DISSOLVED	ND	5.000	UG/L
INICPDISBA:			
BARIUM-DISSOLVED	67.8	20.000	UG/L
INICPDISCA:			
CALCIUM-DISSOLVED	116000	5000.000	UG/L
INICPDISCD:			
CADMIUM-DISSOLVED	ND	10.000	UG/L
INICPDISCR:			
CHROMIUM-DISSOLVED	ND	50.000	UG/L
NICPDISFE:			
IRON-DISSOLVED	ND	1000.000	UG/L
INICPDISMG:			
MAGNESIUM-DISSOLVED	67100	5000.000	UG/L
INICPDISMN:			
MANGANESE-DISSOLVED	ND	15.000	UG/L
INICPDISNA:			
SODIUM-DISSOLVED	105000	5000.000	UG/L
SVMS1ACD12:			
3-METHYLPHENOL	ND	10.000	UG/L
4-METHYLPHENOL	ND	10.000	UG/L
BENZOIC ACID	ND	50.000	UG/L
VOMSBAO201:			
1,1,1-TRICHLOROETHANE	ND	5.000	UG/L
1,1,2-TRICHLOROETHANE	ND	5.000	UG/L
1,1-DICHLOROETHANE	ND	5.000	UG/L
1,2-DICHLOROBENZENE	ND	5.000	UG/L
1,2-DICHLOROETHANE	ND	5.000	UG/L
1,2-DICHLOROPROPANE	ND	5.000	UG/L
2-BUTANONE	ND	10.000	UG/L
ACETONE	ND	100.000	UG/L
BENZENE	ND	5.000	UG/L
CARBON DISULFIDE	ND	5.000	UG/L
CHLOROBENZENE	ND	5.000	UG/L
CHLOROETHANE	ND	10.000	UG/L
CHLOROMETHANE	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

:te:

Sample Point: R113
Type: WELL
Sample No: AD2804
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
DICHLORODIFLUOROMETHANE	ND	5.000	UG/L
ETHYLBENZENE	ND	5.000	UG/L
METHYLENE CHLORIDE	ND	5.000	UG/L
TETRACHLOROETHENE	ND	5.000	UG/L
TOLUENE	ND	5.000	UG/L
TRANS-1,2-DICHLOROETHENE	ND	5.000	UG/L
TRICHLOROETHENE	ND	5.000	UG/L
TRICHLOROFLUOROMETHANE	ND	5.000	UG/L
VINYL CHLORIDE	ND	10.000	UG/L
XYLENE(TOTAL)	ND	5.000	UG/L
VOMSDCC105:			
ISOBUTYL ALCOHOL	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

te:

Sample Point: R114
Type: WELL
Sample No: AD2803
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units	
CRALKMOT01: ALKALINITY	454	10.000	MG/L	
CRCHLORI01: CHLORIDE	17.5	0.500	MG/L	
CRPNHRAX01: PHENOLS	ND	0.050	MG/L	
CRSULFAT01: SULFATE	599	25.000	MG/L	DL
CRTDSROE01: SOLIDS, ROE	1485	5.000	MG/L	
INCVAADIHG: MERCURY-DISSOLVED	ND	2.000	UG/L	
INGFAADIAS: ARSENIC-DISSOLVED	ND	50.000	UG/L	
INGFAADIPB: LEAD-DISSOLVED	ND	40.000	UG/L	
INGFAADISE: SELENIUM-DISSOLVED	ND	5.000	UG/L	
INICPDISBA: BARIUM-DISSOLVED	24.9	20.000	UG/L	
INICPDISCA: CALCIUM-DISSOLVED	246000	5000.000	UG/L	
INICPDISCD: CADMIUM-DISSOLVED	ND	10.000	UG/L	
INICPDISCR: CHROMIUM-DISSOLVED	ND	50.000	UG/L	
INICPDISFE: IRON-DISSOLVED	ND	1000.000	UG/L	
INICPDISMG: MAGNESIUM-DISSOLVED	125000	5000.000	UG/L	
INICPDISMN: MANGANESE-DISSOLVED	62.8	15.000	UG/L	

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

te:

Sample Point: R114
Type: WELL
Sample No: AD2803
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
INICPDISNA:			
SODIUM-DISSOLVED	16600	5000.000	UG/L
SVMS1ACD12:			
3-METHYLPHENOL	ND	10.000	UG/L
4-METHYLPHENOL	ND	10.000	UG/L
BENZOIC ACID	ND	50.000	UG/L
VOMSBA0201:			
1,1,1-TRICHLOROETHANE	ND	5.000	UG/L
1,1,2-TRICHLOROETHANE	ND	5.000	UG/L
1,1-DICHLOROETHANE	ND	5.000	UG/L
1,2-DICHLOROBENZENE	ND	5.000	UG/L
1,2-DICHLOROETHANE	ND	5.000	UG/L
1,2-DICHLOROPROPANE	ND	5.000	UG/L
2-BUTANONE	ND	10.000	UG/L
ACETONE	ND	100.000	UG/L
BENZENE	ND	5.000	UG/L
CARBON DISULFIDE	ND	5.000	UG/L
CHLOROBENZENE	ND	5.000	UG/L
CHLOROETHANE	ND	10.000	UG/L
CHLOROMETHANE	ND	10.000	UG/L
DICHLORODIFLUOROMETHANE	ND	5.000	UG/L
ETHYLBENZENE	ND	5.000	UG/L
METHYLENE CHLORIDE	ND	5.000	UG/L
TETRACHLOROETHENE	ND	5.000	UG/L
TOLUENE	ND	5.000	UG/L
TRANS-1,2-DICHLOROETHENE	ND	5.000	UG/L
TRICHLOROETHENE	ND	5.000	UG/L
TRICHLOROFLUOROMETHANE	ND	5.000	UG/L
VINYL CHLORIDE	ND	10.000	UG/L
XYLENE(TOTAL)	ND	5.000	UG/L
VOMSDCC105:			
ISOBUTYL ALCOHOL	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

ite:

Sample Point: R114
Type: WELL
Sample No: AD2803
Sampled: 10-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
FDPHSING01:			
PH FIELD	6.72		PH UNITS
FDSPCOND01:			
SPECIFIC CONDUCTANCE FIELD	1440.		UMHOS/CM
FDWDTWLS01:			
DEPTH TO WATER FROM LAND SURFACE	31.51		FT
FDWDTWTC01:			
DEPTH TO WATER FROM TOP OF CASING	34.07		FT
FDWGWELWDT:			
GROUNDWATER ELEV.	593.76		FT MSL
WELL DEPTH TOTAL	45.86		FT
FDWMEAPTEL:			
MEASURING POINT ELEV	627.83		FT MSL
FDWSTKUP01:			
STICK-UP HEIGHT OF WELL ABOVE LAND SURF	2.56		FT
FDXTEMPC01:			
WATER TEMPERATURE IN DEGREES CELSIUS	14.6		DEGREES C

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

te:

Sample Point: R122
Type: WELL
Sample No: AD2807
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
CRALKMOT01: ALKALINITY	355	10.000	MG/L
CRCHLORI01: CHLORIDE	5.1	0.500	MG/L
CRPNHRAX01: PHENOLS	ND	0.050	MG/L
CRSULFAT01: SULFATE	179	5.000	MG/L
CRTDSROE01: SOLIDS, ROE	665	5.000	MG/L
FDPHSING01: PH FIELD	6.93		PH UNITS
FDSPCOND01: SPECIFIC CONDUCTANCE FIELD	880.		UMHOS/CM
FDWDTWLS01: DEPTH TO WATER FROM LAND SURFACE	29.72		FT
FDWDTWTC01: DEPTH TO WATER FROM TOP OF CASING	32.21		FT
FDWGWELWDT: GROUNDWATER ELEV.	590.85		FT MSL
WELL DEPTH TOTAL	46.78		FT
FDWMEAPTEL: MEASURING POINT ELEV	623.06		FT MSL
FDWSTKUP01: STICK-UP HEIGHT OF WELL ABOVE LAND SURF	2.49		FT
FDXTEMPC01: WATER TEMPERATURE IN DEGREES CELSIUS	13.5		DEGREES C
INCVAADIHG: MERCURY-DISSOLVED	ND	2.000	UG/L
INGFAADIAS: ARSENIC-DISSOLVED	ND	50.000	UG/L
INGFAADIPB: LEAD-DISSOLVED	ND	40.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

ite:

Sample Point: R122
Type: WELL
Sample No: AD2807
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
INGFAADISE:			
SELENIUM-DISSOLVED	ND	5.000	UG/L
INICPDISBA:			
BARIUM-DISSOLVED	47.6	20.000	UG/L
INICPDISCA:			
CALCIUM-DISSOLVED	108000	5000.000	UG/L
INICPDISCD:			
CADMIUM-DISSOLVED	ND	10.000	UG/L
INICPDISCR:			
CHROMIUM-DISSOLVED	ND	50.000	UG/L
NICPDISFE:			
IRON-DISSOLVED	2000	1000.000	UG/L
INICPDISMG:			
MAGNESIUM-DISSOLVED	56100	5000.000	UG/L
INICPDISMN:			
MANGANESE-DISSOLVED	45.2	15.000	UG/L
INICPDISNA:			
SODIUM-DISSOLVED	11200	5000.000	UG/L
SVMS1ACD12:			
3-METHYLPHENOL	ND	10.000	UG/L
4-METHYLPHENOL	ND	10.000	UG/L
BENZOIC ACID	ND	50.000	UG/L
VOMSBAO201:			
1,1,1-TRICHLOROETHANE	ND	5.000	UG/L
1,1,2-TRICHLOROETHANE	ND	5.000	UG/L
1,1-DICHLOROETHANE	ND	5.000	UG/L
1,2-DICHLOROBENZENE	ND	5.000	UG/L
1,2-DICHLOROETHANE	ND	5.000	UG/L
1,2-DICHLOROPROPANE	ND	5.000	UG/L
2-BUTANONE	ND	10.000	UG/L
ACETONE	ND	100.000	UG/L
BENZENE	ND	5.000	UG/L
CARBON DISULFIDE	ND	5.000	UG/L
CHLOROBENZENE	ND	5.000	UG/L
CHLOROETHANE	ND	10.000	UG/L
CHLOROMETHANE	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

WMI ENVIRONMENTAL MONITORING LABORATORIES INC

CLIENT REPORT

te:

Sample Point: R122
Type: WELL
Sample No: AD2807
Sampled: 1-AUG-1991
Received: 2-AUG-1991
Reported: 5-SEP-1991

ENS: 91-11131 MP: 495911 REV: 02

Analyte	Result	EMLRL	Units
DICHLORODIFLUOROMETHANE	ND	5.000	UG/L
ETHYLBENZENE	ND	5.000	UG/L
METHYLENE CHLORIDE	ND	5.000	UG/L
TETRACHLOROETHENE	ND	5.000	UG/L
TOLUENE	ND	5.000	UG/L
TRANS-1,2-DICHLOROETHENE	ND	5.000	UG/L
TRICHLOROETHENE	ND	5.000	UG/L
TRICHLOROFLUOROMETHANE	ND	5.000	UG/L
VINYL CHLORIDE	ND	10.000	UG/L
XYLENE(TOTAL)	ND	5.000	UG/L
VOMSDCC105:			
ISOBUTYL ALCOHOL	ND	10.000	UG/L

NA = Not Analyzed ND = Not Detected TBK = Trip Blank

TABLE 10-1
GC/MS PREVENTATIVE MAINTENANCE SCHEDULE

On a quarterly basis each of the GC/MS systems are taken down to have preventative maintenance performed. The following is a list of routine items that are performed:

1) Turbomolecular pumps oil changed and pumps inspected.

2) Roughing pumps are swapped out with ones that have recently been maintenanced and pressure tested.

3) All printed circuit board assemblies are removed and cleaned.

4) Ion source is removed, inspected and cleaned.*

5) Quadrapole assembly is removed, inspected and cleaned if needed.*

6) Chromatographic column is evaluated and replaced if necessary.**

7) Recirculator pump is inspected and replaced with a fully charged unit if needed.

8) Purge and Trap units are inspected and cleaned.**

* These items are inspected and cleaned whenever a sensitivity problem exists that is related to a dirty ion source.

** These items are either cleaned or replaced whenever poor chromatography exists.

TABLE 10-1 (cont.)

GC/MS PREVENTATIVE MAINTENANCE SCHEDULE (cont.)

Each analyst is responsible for keeping their assigned instrument operating when necessary. If a problem develops that the analyst can't fix then everyone's knowledge is pooled together in order to troubleshoot the problem.

With the resources from various troubleshooting classes most GC/MS problems are solved by the volatile or semi-volatile supervisors and the on site service engineer. On occasion the Finnigan and Hewlett-Packard Technical Support Team is called to help troubleshoot a problem over the telephone.

Routine maintenance and non-routine repairs are documented in individual instrument logbooks.

Contingency Plan

When an instrument is experiencing downtime the workload is shifted to an operating instrument that is calibrated for the same test. After repairing the downed instrument it is then recalibrated, and its analytical validity is verified.

TABLE 10-1 (cont.)

GC-SEMIVOLATILE INSTRUMENT MAINTENANCE SCHEDULE

1. Change Septa: Approximately every 50 injections so that retention times remain stable.

2. Change Liner: When Endrin or DDT degradation exceeds 20%. Also loss of Methoxychlor response can indicate needed liner change for pesticide analysis. For hydrocarbon analysis, a overall loss of sensitivity may indicate time for liner change.

3. Cut Capillary Column ends: Squarely cut ends of capillary column with diamond scribe when needed such as after running high level samples. Column ends do not need to be cut every time a liner is changed.

4. Change solvent bottles weekly.

5. Check instrument flows weekly:
   Split Flow: Should be 50-80 mL/min.
   Septum Purge: Should be 4-5 mL/min.
   Column + Make-up Flow: Should be 60-100 mL/min. depending on the analysis.

6. Change Charcoal Filters: Monthly. Make sure there is no restriction to flow with charcoal tube in place.

7. Leave oven temperature elevated when not in use for extended periods of time. Temperature > 110°C to prevent build-up of moisture and condensation of non-volatile compounds. Also, leave septum purge on (split mode) to keep system clean.

3. There are multiple [illegible]

usually enough excess capacity available such that if an instrument will not meet calibration criteria or is malfunctioning for whatever reason, its workload can be shifted to another instrument. The malfunctioning instrument can then be repaired.

TABLE 10-1 (cont.)

SEMIVOLATILE INSTRUMENT MAINTENANCE LOG

INSTRUMENT I.D._____

								CHECK FLOWS				
DATE	SEPTUM A	SEPTUM B	LINERS A	LINERS B	CUT COLUMN A	CUT COLUMN B		SPLIT	SEPTUM PURGE	COLUMN & MAKE-UP	OTHER WORK	CHANGE CHARCOAL FILTER TRAPS

TABLE 10-1 (cont.)

GC-VOLATILE INSTRUMENT MAINTENANCE SCHEDULE

A. PURGE AND TRAP SYSTEMS/AUTOSAMPLERS

1. Change trap every 6 (six) months, or when needed due to high sample contamination or loss of brominated response.

2. Check purge flow monthly: Should be around 30-40 mL/min.

3. High pressure leak check of Tekmar System every month.

4. Change Swagelok Teflon Ferrules every 6 (six) months.

B. PID DETECTOR

1. Clean lamp and change lamp seal monthly.

2. Change lamp when sensitivity is too low, i.e. Can you detect lowest standard?

C. ELCD (HALL) DETECTOR

1. Change resins every 6 (six) months.

2. Check solvent level weekly; add solvent when system has equilibrated, about 24 hours.

D. DOCUMENTATION

Routine maintenance and non-routine repairs are documented in individual instrument logbooks.

E. CONTINGENCY PLAN

When an instrument is experiencing downtime the workload is shifted to an operating instrument that is calibrated for the same test. After repairing the downed instrument it is then recalibrated, and its analytical validity is verified.

TABLE 10-1 (cont.)

VOLATILE INSTRUMENT MAINTENANCE CHECKLIST

Instrument_____

W/M MAINTENANCE LIST	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
Purge flow (30-40 mL/min.												
Pressure Leak												
Clean Lamp Change Lamp Seal												
Solvent												
Solvent Flow												

IRREGULAR CHECK (CHANGE)

	JAN	JUN	DEC
Trap			
Repack col*			
Ferrules			
Resins			
Lamp*			
Reactor Tube			
Pump*			
Hall Detector*			
Ol Detector Cell*			
Needle (H&R)*			

* When needed.

TABLE 10-1 (cont.)

GC-HPLC INSTRUMENT MAINTENANCE SCHEDULE

1. No scheduled maintenance required.

2. Minor adjustments, parts replacements as needed.

3. Major adjustments, parts replacements by manufacturer service representative as needed.

4. Routine maintenance and non-routine repairs are documented in individual instrument logbooks.

5. There are spare parts kept onsite to repair many of the instrument problems that arise. If a part is required, it can usually be obtained overnight or by second day express delivery. In extreme cases where a problem cannot be solved in-house, a service call can have a technician out in one to two days to resolve the problem.

TABLE 10-1 (cont.)

MAINTENANCE SCHEDULE

SPECTRONIC 88 SPECTROPHOTOMETER

NOTE: ALL MAINTENANCE PERFORMED, WHETHER SCHEDULED OR UNSCHEDULED, IS TO BE RECORDED IN THE MAINTENANCE LOG.

A. **Daily/Each Use**

1. Record the absorbance of the blank and high standard for the parameter being analyzed. Calculate the Sensitivity (absorbance divided by concentration). See Sections 3.2.2 to 3.2.7 and Section 4.1.1 in the SOP.

2. Clean the cuvettes after use (4.1.2).

3. Turn off the instrument after use.

B. **Monthly**

1. Check the meter zero adjustment (4.2.1).

2. Run the performance checks using the wavelength calibration standards, as outlined in Section 4.2.2 of the SOP.

C. **Non-scheduled (as needed)**

1. Replace the lamp and align the mirror (Sections 4.3.1 and 4.3.2 of the SOP).

2. Align the mirror if determined to be necessary (4.3.2); this must also be performed whenever the lamp is replaced.

3. Clean the mirror only when absolutely necessary.

D. **Contingency Plan**

1. Spectronic 501 spectrophotometer can be used if instrument fails.

TABLE 10-1 (cont.)

MAINTENANCE SCHEDULE

SPECTRONIC 501 SPECTROPHOTOMETER

NOTE: ALL MAINTENANCE PERFORMED, WHETHER SCHEDULED OR UNSCHEDULED, IS TO BE RECORDED IN THE MAINTENANCE LOG.

A. Daily/Each Use

1. Record the absorbance of the blank and high standard for the parameter being analyzed. Calculate the sensitivity (absorbance divided by concentration). See Sections 3.2.4 to 3.2.6 and Section 4.1.1 in the SOP.

2. Thoroughly flush the cell with deionized water after use and empty the waste container.

3. At the end of the day, turn off all three modules (spectrophotometer, pump, and printer). Remove the pump tubes from the pump roller (the teflon tubes do not need to be disconnected); see Section 4.4.1.4 in the SOP.

B. Weekly

1. Measure and record the flow rate as in Section 4.2.1 of the SOP.

2. Clean the optics as directed in Section 4.3.2 of the SOP.

C. Monthly

1. Change the pump tubing as shown in Section 4.4.1 of the SOP.

2. Run the performance checks using the wavelength calibration standards, as outlined in Section 4.4.2 of the SOP.

D. Non-scheduled (as needed)

1. replace paper in the printer (4.5.1 in the SOP).

2. Replace and align the bulb (Sections 4.5.2 and 4.5.3 of the SOP).

3. Align the flow cell and pump platen (4.5.4 and 4.5.5 in SOP).

E. Contingency

1. Spectronic 88 spectrophotometer can be used if instrument fails.

TABLE 10-1 (cont.)

T.R.A.A.C.S. 800

MAINTENANCE SCHEDULE

I. REAGENT SEQUENCER:

None required. Technicon suggests changing the transmission tubing yearly or when discoloration is present.

II. ANALYTICAL CONSOLE:

Daily:

A. Verify pressure regulator setting of 22 ± 2 PSI inside Analytical Console; adjust if necessary.

B. Wipe off all surfaces when analysis is completed.

C. Inspect pump tubing for wear.

Monthly:

A. Replace silicone air valve tubing.

B. Replace pump tubing. Clean and lubricate pump rollers while the tubing is off.

C. Replace transmission lines and Tygon tubing connections on both manifolds.

Semiannual:

Replace pump platens (2) P/N 165-8039-01

Annual:

1. Replace colorimeter lamp.

2. Lightly lubricate the linear sampler slide rails.

Contingency:

In case of equipment failure, Technicon AAII can be set up to run desired parameters.

TABLE 10-1 (cont.)
O.I. 700 MAINTENANCE SCHEDULE

DAILY MAINTENANCE:

1. WIPE OFF ALL SURFACES OF THE T.O.C. ANALYZER AND AUTOSAMPLER. DISPOSE OF USED SAMPLE TUBES IF NECESSARY.

WEEKLY MAINTENANCE:

1. ADJUST I.R. OUTPUT TO BETWEEN 1.0 AND 10.0 mV
2. INSPECT THE SILICON SAMPLE PUMP TUBING FOR SIGNS OF WEAR.

MONTHLY MAINTENANCE:

1. INSPECT AND PERFORM MAINTENANCE ON THE SIX (6) PORT ROTARY VALVES. REFER TO CHAP. 5.2.5, PAGE 141 OF THE OPERATOR'S MANUAL.
2. INSPECT DIGESTION VESSEL "O" RINGS FOR SIGNS OF DEGRADATION AND REPLACE AS NECESSARY FOLLOWING THE PROCEDURE IN CHAP. 5.2.8, PAGE 143 OF THE OPERATOR'S MANUAL

SEMI-ANNUAL MAINTENANCE:

1. REPLACE THE PERMEATION DRYER TUBE ASSEMBLY.
2. CLEAN AND RECALIBRATE THE I.R. DETECTOR FOLLOWING THE PROCEDURE IN CHAPTER 5.3.10, PAGE 154 OF THE OPERATOR'S MANUAL.

CONTINGENCY:

1. DOHRMANN TOC ANALYSES MAY BE USED.
2. SAMPLES MAY BE SUBBED TO NETWORK LAB. (CONTRACT DEPENDANT)

TABLE 10-1 (cont.)

TECHNICON AUTOSAMPLER MAINTENANCE SCHEDULE

GENERAL

The maintenance information provided in this publication should be carefully followed to insure the best operation and maximum life of the module.

MAINTENANCE SCHEDULE

PROCEDURE	DAILY	WEEKLY	MONTHLY	QUARTERLY	18 MOS.
After system shutdown, discard all used sample cups.	X				
Remove all unused sample cups from tray.	X				
Remove sample tray cover and thoroughly clean.	X				
Lift off sample tray and clean.	X				
Wipe up all spills on module and under tray. Replace sample tray and sample tray cover in original position.	X				
Thoroughly wipe clean all surfaces of Sampler.		X			
Check sample tubing. Discard if dirty or clogged.		X			
Remove wash fluid receptacle, and clean with detergent.		X			
Clean sample probe with wire stylet. Replace if necessary.			X		
Replace sample tubing going to sample probe.				X	
Oil sampler motor. (See instructions this Section.)					X
Lubricate gears. (See instruction this Section.)					X

Contingency: Spare auto-sampler could be used in case of equipment failure.

TABLE 10-1 (cont.)
PREVENTIVE MAINTENANCE SCHEDULE TECHNICON PUMP

OPERATION	DAILY	WEEKLY	MONTHLY	BIANNUALLY
Make certain that the shoulders of the pump tubes are secure in the endblock holders.	X			
Check the tubing under the air bar for leaks or punctures.	X			
Clean pump rollers and platen with alcohol and lint-free cloth.		X		
Place one drop of Prolonged Service Oil (Technicon Part No. 538-0015-01) between the ends of each pump roller and the chain links.		X		
Remove the Pump platen and clean the Pump well with a cotton swab. NOTE Push the small rod to position the rollers so the cotton swab applicator can be inserted into the well for cleaning.		X		
Apply a thin, uniform coating of Semi-Fluid Lubricant (Technicon Part No. 590-0161-01) along the underside of the two side rails.		X		
Place 15 drops of Prolonged Service Oil on the two foam pads which contact the chain rollers.			X	
Place a drop of Prolonged Service Oil at the interface between each chain roller and chain link.			X	
Place 3 drops of Prolonged Service Oil in each of the holes on the sprocket drive shaft bearings.			X	
Place a drop of Prolonged Service Oil at the interface between each chain side-place and each chain roller link.				X
Replace the silicone tubing underneath the air bar.				X

Contingency: Spare pump could be used in case of equipment failure.

TABLE 10-1 (cont.)

TECHNICON MANIFOLD

MAINTENANCE SCHEDULE

A. Daily Checks:

1. Check all connections for leaks and repair as necessary.

2. Wipe off surface of manifold and manifold cover.

B. Monthly Checks:

1. Replace all Tygon tubing connections.

2. Replace all transmission tubing

3. Clean all mixing coils and "T" connections.

C. Contingency:

1. All spare parts, i.e. mixing coils and "T" connections are in house and back-ups are ordered when spare is used.

TABLE 10-1 (cont.)

TECHNICON COLORIMETER

Daily Maintenance Schedule

1. Open colorimeter and check for leaks or spills and clean if necessary.

Weekly Maintenance

1. None required!

Monthly Maintenance

1. Clean optical system.
2. Clean source lamp leads and mounting base.

Quarterly Maintenance

1. Peak colorimeter
2. Change tubing connections or flow cell.
3. Clean flow cell.

Non-Scheduled

1. Replace source lamp when necessary.
2. Replace flow-cell if broken.

Contingency

1. All spare parts are in house; order back-ups when spare is used.

TABLE 10-1 (cont.)

I.C. MAINTENANCE SCHEDULE

DAILY MAINTENANCE

1. CHECK INSIDE OF CHROMATOGRAPHY MODULE FOR SIGNS OF LEAKAGE.
2. CHECK ALL CONNECTIONS TO MAKE SURE THEY ARE SECURE.
3. WIPE OFF ALL MODULES AFTER USE.

MONTHLY MAINTENANCE

1. OIL ANALYTICAL PUMPS WITH A FEW DROPS OF MACHINE OIL.

SEMI-ANNUAL MAINTENANCE

1. CLEAN AND CALIBRATE THE CONDUCTIVITY CELL AND METER.
2. CHECK THE ANALYTICAL PUMP SEALS FOR LEAKAGE AND REPLACE IF NECESSARY.

ANNUAL MAINTENANCE

1. CHECK ALL TRANSMISSION TUBING FOR SIGNS OF WEAR AND REPLACE AS NECESSARY.

CONTINGENCY

1. CURRENTLY TWO IDENTICAL SYSTEMS ARE IN USE AND EACH IS A BACK-UP FOR THE OTHERS. IN CASE OF CATASTROPHIC BREAK-DOWN, SERVICE CONTRACT WITH DIONEX IS IN PLACE.

TABLE 10-1 (cont.)

TOX MAINTENANCE SCHEDULE

DAILY MAINTENANCE

1. CLEAN THE EXIT TUBE
2. WIPE OFF THE INSTRUMENT AND WORK AREA

WEEKLY MAINTENANCE

1. CLEAN THE INLET TUBE
2. CLEAN THE ADSORPTION MODULE
3. INSPECT THE TITRATION CELL

MONTHLY MAINTENANCE

1. CLEAN ALL ASSOCIATED GLASSWARE
2. CLEAN ALL STAINLESS STEEL COMPONENTS
3. INSPECT ALL GAS LINES FOR SIGNS OF WARE

CONTINGENCY

1. MITSUBISHI TOX-10 IS CURRENTLY IN USE WITH DOHRMANN INSTRUMENT AS BACK-UP.

TABLE 10-1 (cont.)

IR MAINTENANCE SCHEDULE

1. No maintenance required.

   Contingency: OCMA analyses are available as back-ups.

TURBIDIMETERS MAINTENANCE SCHEDULE

1. No maintenance required.

   Contingency: Space source lamps are in-house.

pH METERS MAINTENANCE SCHEDULE

1. No maintenance required.

   Contingency: A number of meters and probes are in-house.

ATOMIC ABSORPTION SPECTROPHOTOMETERS MAINTENANCE SCHEDULE

1. Maintenance by manufacturer service contract. Service contract from ST^2 service cleaning and repair of spectrometers and power supplies.

   A. Change cooling water hoses when needed.

   B. Change contact rings when needed.

   C. Clean filters.

ICP MAINTENANCE SCHEDULE

1. Biweekly or as needed.
   A. Change torch tip

2. Monthly

   A. Clean filters

   B. Replace plastic tubing weekly

2. Service Contract

   ICP service contract from Jarrel Ash.

TABLE 10-1 (Cont.)

BALANCES MAINTENANCE SCHEDULE

1. Yearly maintenance by manufacturer service contract

Ovens

A. Ovens-monitored on benchsheet when analysis is performed.

Refrigerstors

B. Refrigerator-Daily temperature monitoring and recording

Incubators

C. Incubators-continuous monitor and daily check with 0.2 degree imcremented thermometers.

14. SPECIFIC ROUTINE PROCEDURES USED TO ASSESS DATA QUALITY AND DETERMINE REPORTING LIMITS

Data Quality Assessment

The effectiveness of a QA program is measured by the quality of data generated by the laboratory. Data quality is judged in terms of its precision, accuracy, representativeness, completeness and comparability. These terms are described as follows:

Precision is the degree to which the measurement is reproducible. Precision can be assessed by replicate measurements of DCS, reference materials, or environmental samples. Enseco routinely monitors precision by comparing the RPD between DCS measurements with control limits established at plus three standard deviations from the mean RPD of historical DCS data.

Precision is frequently determined by comparison of replicates. The standard deviation of "n" measurements of "x" is commonly used to estimate precision.

Standard deviation (s) is calculated as follows:

$$s = \sqrt{\frac{1}{n-1} \sum_{i=1}^{n} (x_i - \bar{x})^2}$$

where a quantity "x" (e.g., a concentration) is measured "n" times.

The relative standard deviation, which expresses standard deviation as a percentage of the mean, is generally useful in the comparison of three or more replicates (although it may be applied in the case of n = 2).

$$RSD = 100\ (s/\bar{x})$$

where: RSD = relative standard deviation

s = standard deviation

$\bar{x}$ = mean

In the case of duplicates, the RPD between the two samples may be used to estimate precision.

$$RPD = \frac{|D_1 - D_2|}{(D_1 + D_2)/2} \times 100$$

where: RPD = relative percent difference

D_1 = first sample value

D_2 = second sample value (duplicate)

Accuracy is a determination of how close the measurement is to the true value. Accuracy can be assessed using LCS, standard reference materials, or spiked environmental samples. Unless specified otherwise in special contracts, Enseco monitors accuracy by comparing LCS results with control limits established at plus or minus three standard deviation units from the mean of historical LCS results.

The determination of the accuracy of a measurement requires a knowledge of the true or accepted value for the signal being measured. Accuracy may be calculated in terms of percent recovery as follows:

$$\text{Percent Recovery} = \frac{x}{T} \times 100$$

where: x = the observed value of measurement

T = "true" value

Representativeness is the degree to which data accurately and precisely represent a characteristic of a population, parameter variations at a sampling point, a process condition, or an environmental condition. Analytical data should represent the sample analyzed regardless of the heterogeneity of the original sample matrix. Enseco strives to accommodate all sample matrices. Some samples may require analysis of multiple phases to obtain representative results.

Completeness is a measure of the amount of valid data obtained from a measurement system compared with the amount that was expected to be obtained under normal conditions.

To be considered complete, the data set must contain all analytical results and data specified for the project. In addition, all data are compared to project requirements to ensure that specifications were met. Any deviations are reported in the report narrative.

The percent completeness for each set of samples can be calculated as follows:

$$\text{Completeness} = \frac{\text{valid data obtained}}{\text{total data planned}} \times 100\%$$

Comparability expresses the confidence with which one data set can be compared to another data set measuring the same property. Comparability is ensured through the use of established and approved analytical methods, consistency in the basis of analysis (wet weight, volume, etc.), consistency in reporting units (ppm, ppb, etc.), and analysis of standard reference materials.

EML/WMI GROUNDWATER MONITORING AUDIT FORM

Site: _____ Date: _____

Audited By: _____

Sampled By: _____

Purpose of Sampling: _____ RCRA _____ State _____ County

Other _____

Yes	No	N/A		
			Part I: AquaPaks Inspection	
			1)	Upon receipt of AquaPaks/local lab bottles, were Chain-of-Custody seals broken? If yes, comment: _____
		X	2)	When/where were AquaPaks/local lab bottles inspected? Comments: _____
			3)	Is the Statement of Work used to review sampling program? If no, comment: _____
			4)	Were AquaPaks packed according to ENS numbers. If no, comment: _____
		X	5)	Where were AquaPaks/local lab bottles stored? Comments: _____

Site: _____ Date: _____

Yes	No	N/A		
			6)	Did the sampling team fill out the Field Information Forms during AquaPaks check-in? If yes, comment: _____
			7)	Did the sampling team keep a good supply of frozen ice-packs 24 hours prior to the sampling event? If no, comment: _____
			8)	Were temporary seals used? If no, comment: _____
			9)	Were WMI sampling protocols and procedures followed for AquaPak check-in? If no, comment: _____

COMMENTS:

_____

Site: _____ Date: _____

Yes	No	N/A	
			Part II - Presampling Procedures
			A: Field Meter Calibration
			1) Did the sampling team calibrate the field meters and record in the field meter log book? _____ pH Meter _____ Specific Conductivity Meter _____ Temperature pH Meter - Mfg. _____ Model/Meter # _____ Probe type _____ pH Buffers _____, _____, _____ Sp. Cond. Meter - Mfg. _____ Model/Meter # _____ Probe type _____ KCl Stds. _____, _____, _____ Temp. Probe type _____ or Thermometers _____
			2) Were spare field meters available? If no, comment: _____
			3) Were the spare meters calibrated and brought into the field? If no, comment: _____
			4) Have the field equipment manuals (pH, Specific Conductivity, Depth to Water) been included in the WMI Manual for Groundwater Sampling? If no, comment: _____
			5) Is the field meter log book up-to-date? If no, comment: _____

Site: _____ Date: _____

Yes	No	N/A		
			6)	Does the log book contain the following information? _____ Date _____ Meter # Temperature: _____ NBS _____ Meter pH: _____ Original _____ Calibrated Specific Conductivity: _____ Standard _____ Cooled Temperature _____ Readings _____ Specific Conductivity of DI Water
		X	7)	From where was the Deionized Water obtained? Comment: _____
			8)	Was the Specified Conductivity of the Deionized Water measured and recorded in the field meter log book? _____ æmhos/cm at 25øC. If no, comment: _____
			B:	Sampling Equipment
			1)	Did the sampling team use an equipment check list? If no, comment: _____
		X	2)	Where was the sampling equipment stored when not in use? Comment: _____

Site: _____ Date: _____

Yes	No	N/A		
			3)	Was all sampling equipment clean and organized properly? If no, comment: _____
		X	4)	Condition of field vehicle used to transport equipment to sample location? Comments: _____
			5)	Were sampling equipment and AquaPaks placed in the vehicle properly and neatly? If no, comment: _____
			6)	Were WMI pre-sampling protocols and procedures followed? If no, comment: _____

COMMENTS:

Site: _____ Date: _____

Yes	No	N/A	
			Part III: At the Sampling Location
			A: Preliminary
			1) Were the following documents present:
			a) WMI Manual for Groundwater Sampling?
			b) Site Specific Groundwater Monitoring Plan?
			c) Well ID Charts?
			d) Statement of Work?
			2) Are the wells in proper condition? (Well integrity: Locking cap/I.D. sign present/ protective casing over well)? If no, comment: _____
			B: Purging
			1) Did the samplers wear new powderless gloves at each well? If no, comment: _____
		X	2) What was used to determine the depth to water? _____

Site: _____ Date: _____

Yes	No	N/A		
		X	3)	Where was this measured from (reference point)? _____
		X	4)	Were the well depths measured or obtained from reference material? Comments: _____
			5)	Was the purge volume calculated correctly and recorded on the Field Information Forms? _____
		X	6)	What type of purging equipment was used? Comments: _____
			7)	Is purging equipment in good condition? If no, comment: _____
			8)	Was all reusable equipment cleaned properly before and after each use? If no, comment: _____
			9)	Well purged 3 well volumes or to dryness? Comments: _____
			10)	During purging, was pH, specific conductivity and temperature measured per each well volume removed? If no, comment: _____

Site: _____ Date: _____

Yes	No	N/A		
			C:	Sampling
		X	1)	What type of sampling equipment was used? _____
			2)	Is sampling equipment in good condition? If no, comment: _____
			3)	Was all reuseable equipment cleaned properly before and after sampling? If no, comment: _____
			4)	Were pH, specific conductivity, and temperature measured at the sample point and recorded on the Field Information Form? If no, comment: _____
			5)	Were pH, specific conductivity, and temperature measurements made prior to obtaining any other samples? If no, comment: _____
			6)	Were duplicate or quadruplicate measurements made form one sample container? If no, comment: _____
			7)	If the sample container was reused, was it cleaned properly between each use? If no, comment: _____
			8)	Were measurements recorded to three significant figures? If no, comment: _____

Site: _____ Date: _____

Yes	No	N/A		
			9)	Is the electrode/probe rinsed throughly with lab grade D.I. water and dried between each sample measurement? If no, comment: _____
			10)	Were field pH, specific conductivity, and temperature probes stored in D.I. Water when not in use? If no, comment: _____
			11)	Were field instruments recalibrated/checked every 4 hours and at the end of the day? If no, comment: _____
			12)	Were the calibration checks for the pH?SC meters recorded on the Field Information Forms? If no, comment: _____
			13)	Were duplicates for field measurements taken on 1 out of every 10 samples or at least once per day, and recorded on the Field Information Forms? If no, comment: _____
			14a)	Were field blanks and/or duplicate samples obtained, and their identity noted on the Field Information Form? Comments: _____
			14b)	Were these prepared per WMI protocols and/or site specific monitoring plan? Comments: _____

Site: _____ Date: _____

Yes	No	N/A		
			15)	Were samples stored on ice during sampling? Comments: _____
		X	16)	Where the following physical characteristics of the samples reported? _____ Color _____ Odor _____ Turbidity _____ Phases or Layering
		X	17)	What type of filtration procedures were used? Where? (0.45 micron) _____ In-Line Mfg. _____ _____ Pressure (Lab/Field) Mfg. _____ _____ Vacuum Mfg. _____
			18)	Were new pre-filtration bottles used? If no, comment: _____
			19)	Were samples filtered in accordance with applicable requirements by: _____ Corporate policy? _____ Federal agencies? _____ State agencies? _____ Site specific policy? Comments: _____
		X	20)	Which analytes were filtered? _____ 1. _____ 6. _____ 2. _____ 7. _____ 3. _____ 8. _____ 4. _____ 9. _____ 5. _____ 10. _____

Site: _____ Date: _____

Yes	No	N/A		
			21)	Were both total and dissolved metals samples obtained? Comments: _____
			22)	Were only bottles supplied by EML or the approved local lab used? If no, comment: _____
		X	23)	What order were the sample bottle filled? 1. _____ 6. _____ 2. _____ 7. _____ 3. _____ 8. _____ 4. _____ 9. _____ 5. _____ 10. _____
			24)	Was a priority list used for filling sample bottles? Comments: _____
			25)	Is the proper flow rate used for filling each sample bottle? If no, comment: _____
			26)	Were sample bottles preserved properly per the Chain-of-Custody form? If no, comment: _____
			27)	Were the pH's of the samples checked and additional preservative added where required? Comments: _____

Site: _____ Date: _____

Yes	No	N/A		
			28)	Were TOX and VOA bottles checked for air bubbles? If no, comment: _____
			29)	Were the sizes of any air bubbles noted on the Chain-of-Custody form under sampler observation? Comments: _____
			30)	Were proper bailing techniques followed? If no, comment: _____
			31)	Is personal protective equipment being used properly? If no, comment: _____
			32)	Were WMI sampling protocols and procedures followed? If no, comment: _____
			33)	When finished at a well, was the well locked and all debris cleared? Comments: _____

COMMENTS:

_____

Site: _____ Date: _____

Yes	No	N/A	
			Part IV: AquaPak Shipment
			1) Was the Chain-of-Custody maintained intact from arrival at the site, through shipment to the lab? If no, comment: _____
			2) Were the Chain of Custody and Field Information Forms checked? By whom? If no, comment: _____
			3) Any missing information on the Field Information Forms? If yes, comment: _____
			4) Have all members of the sampling team been identified on the field forms? If no, comment: _____
			5) Were the AquaPaks repacked correctly? If no, comment: _____
			6) Were AquaPaks sealed properly? If no, comment: _____
		X	7) What type of transportation arrangements were made? Comments: _____

Site: _____ Date: _____

Yes No N/A

8) Was EML/Local Lab notified? Comments:

Comments:

Site: _____ Date: _____

Yes	No	N/A		
				Part V: Site Specific Monitoring Plan
			1)	Has a Site-Specific Groundwater Monitoring Plan been prepared for the site?
		X	2)	When was this plan prepared/updated?
			3)	Are the analytical methods presented in the Plan current, and what is actually used? (EML and approved local labs)
			4)	Have filtration (Yes/No) requirements been specified for each analyte and are they in agreement with the S.O.W?
			5)	Are specific bottles and preservatives (including volumes) as provided by EML and/ or local lab, specified for each parameter to be analyzed?
			6)	Does this plan include the following information (see WMI "Checklist for Monitoring Plan Review")?

COMMENTS:

Additional Comments

Page #	Question #

General Comments

1) Competence of Sampling Team: _____

_____

_____

_____

_____

_____

_____

_____

2) Ability of Sampling Team: _____

_____

_____

_____

_____

_____

_____

_____

3) Attitude of Sampling Team Members: _____

_____

_____

_____

_____

_____

_____

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION V

DATE: March 27, 1987

SUBJECT: Quality Assurance Project Plan - Hazardous Waste Ground Water Task Force Investigation at Chemical Waste Management, Inc., Vickery, Ohio Facility (C28253)

RECEIVED
MAR 31 1987
SOLID WASTE BRANCH
U.S. EPA, REGION V

FROM: Joseph J. Fredle, Field Team Leader
THRU: A.R. Winklhofer, Chief, EDO

TO: Addressees

Attached you will find a copy of the Project Plan, without signatures, for the above-mentioned investigation. Signatures from the appropriate officials are presently being obtained. Please review the Plan before arriving at the site. The investigation will begin on Monday, April 6, 1987, and will continue through most of the following two weeks.

If you have any questions, please call me at (216) 835-5200.

Attachment

Addressees

Anthony Montrone, WH-527
John Haggard, Region VIII
Joseph Boyle, 5HE
Craig Liska, 5HE
Gerald Lenssen, 5HS
Tinka Hyde, 5WD
Dave Petrovski, 5SPT
Maxine Long, 5SQA
Willie Harris, 5SCDO
Scott Thomas, 5SEDO
Philip Gehring, 5SEDO
Mark Lewis, Alliance
Tim Krichbaum, OEPA-CO
Janice DeLorenzo, OEPA-CO
Bob Carey, OEPA-CO
Tim Fishbaugh, OEPA-BG

QUALITY ASSURANCE PROJECT PLAN

GROUND WATER MONITORING EVALUATION

CHEMICAL WASTE MANAGEMENT, INC.

VICKERY, OHIO FACILITY

APRIL 1987

Approved:

Field Team Leader: Joseph Fryle

Office Director: O.R. Winkelhofer 3/27/87

Hazardous Waste Enforcement Branch: _____

Solid Waste Branch: _____

Quality Assurance Branch: _____

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PROJECT PLAN

GROUND WATER MONITORING EVALUATION

CHEMICAL WASTE MANAGEMENT, INC.

VICKERY, OHIO FACILITY

1.0 PROJECT DESCRIPTION

1.1 Introduction

The Administrator of the U.S. Environmental Protection Agency (USEPA) established a Hazardous Waste Ground Water Task Force to evaluate the level of compliance with ground water monitoring requirements at on-site and commercial off-site treatment, storage, and disposal (TSD) facilities and address the causes of noncompliance. The Task Force will also examine the suitability of the facility as a provider of treatment, storage, or disposal services for waste managed by the Agency's Superfund program (see Reference 1) The Task Force is comprised of personnel from EPA Headquarters and Regional Offices, and the States. Currently, 58 TSD facilities are scheduled for ground water monitoring evaluations. One of these is the Vickery, Ohio Facility of Chemical Waste Management, Inc. (CWM-V).

This evaluation is being conducted under the authority of the Resource Conservation and Recovery Act (RCRA), Toxic Substances Control Act (TSCA), the Underground Injection Control (UIC) regulations under the Safe Drinking Water Act, and the Clean Water Act.

The objectives of the Task Force evaluation at CWM-V are to: (1) determine compliance with the requirements of Ohio Administrative Code 3745-65-90 through 3745-65-94 and 40 CFR 265 Subpart F - Ground Water Monitoring, and the monitoring system's capability of providing the required data; (2) evaluate the facility's ground water monitoring program as described in the RCRA Part B permit application for compliance with 40 CFR Part 270.14 (c); (3) evaluate the facility's potential compliance with 40 CFR Part 264 Subpart F; (4) verify the quality of the company's ground water monitoring data and evaluate the sampling and analytical procedures; (5) determine if any ground water contamination currently exists from site operations; (6) determine if the facility is meeting the requirements of the Superfund off-site policy; and (7) evaluate the interrelationships of the RCRA, TSCA, and UIC regulations at this facility. Due to the lack of monitoring wells associated with the injection wells, the Task Force sampling effort will not be able to evaluate possible ground water contamination from the injection wells into the deeper sedimentary formation.

To accomplish the objectives, the Facility Evaluation Team will be comprised of a Management Team, a Technical (record) Review Team, a Laboratory Evaluation Team (to evaluate both on-site and off-site contractor laboratories), and a Sample Collection Team.

This project plan describes procedures and activities that will be conducted during the on-site field work phase of the Task Force Facility evaluation. The procedures and activities described in this plan are subject to change during the investigations at the discretion of the Field Team Leader

(FTL). Results obtained from this phase will be used to prepare a technical report which will summarize the Task Force findings and make recommendations for future action. Recommendations will address vendor suitability for future Superfund waste disposal, permit application status, and compliance status.

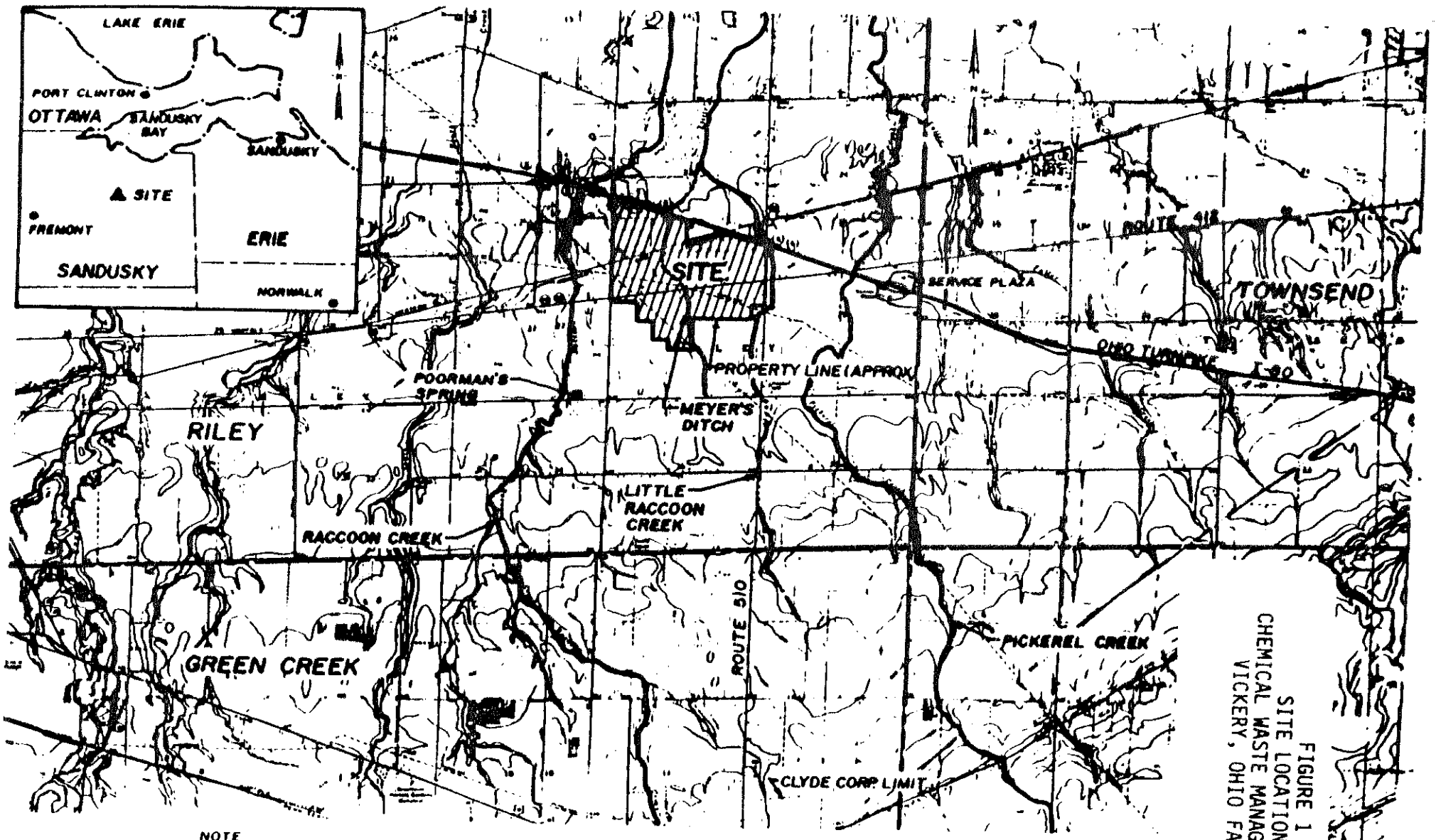
1.2 Background

A. Location/Operation

CMW-V operates a liquid treatment and disposal facility in Sandusky County, Ohio, approximately three miles north of Clyde along State Route 510 (see Figure 1). Wastes are currently disposed by deep-well injection into the six operational wells located on the 437-acre facility.

This site, originally known as Don's Waste Oil, was first used in 1958 to recycle waste oil collected from service stations. In 1961, the company began to accept various industrial wastes, such as cutting oils, hydraulic fluids, and some solvents. These materials were stored in containment ponds. In 1964, the Ohio Water Pollution Control Board (predecessor to the Ohio Environmental Protection Agency) granted the facility permission to accept chemical process wastes such as pickle liquors from metal-working operations, lime sludge, and other miscellaneous chemical products. More ponds were constructed to facilitate the growing inventory of liquid wastes, and by the late 1960's, the amount of industrial wastes received by the facility exceeded that of waste oil.

In 1971, the firm was incorporated as Ohio Liquid Disposal, Inc. Faced with growing volumes of waste, the company began investigating a suitable means of disposal. In 1972, permission was granted by the Ohio Division of Oil and Gas to drill a test hole to evaluate subsurface conditions for a possible injection well. Geological conditions were found to be suitable, and a permit was issued in July 1975 to use the test hole as an injection well.



SCALE: 1" = 3125'

NOTE
TAKEN FROM USGS CLYDE, VICKERY, FREMONT EAST AND WIGHTMANS

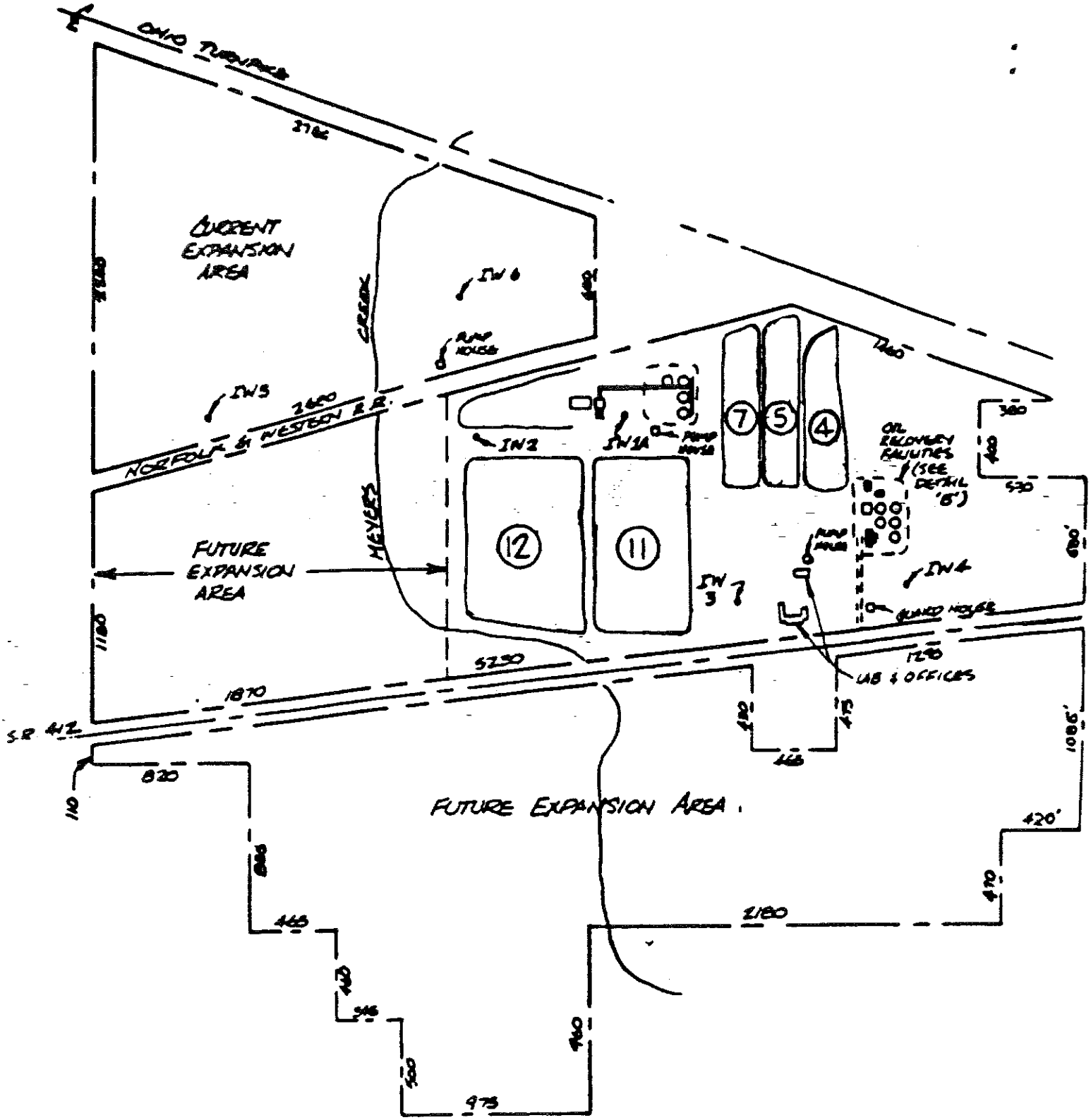
JOB NO 33767

FIGURE 1
SITE LOCATION MAP
CHEMICAL WASTE MANAGEMENT INC.
VICKERY, OHIO FACILITY

Injection into this well began in June 1976. In January 1976, permits were issued for the installation of wells Nos. 2, 3, and 4. Well No. 2 was completed in November 1976 and injection began in March 1977. Wells Nos. 3 and 4 were both completed in November 1976, with injection beginning in August 1977. Due to corrosion of the long string casing in well No. 1, it was not used for injection after July 1979 and was eventually plugged and capped. To replace well No. 1, well No. 1A was drilled and completed in October 1979. Injection into this well began in January 1980. Wells Nos. 5 and 6 were completed in December 1980 and May 1981, respectively. Injection of waste into both of these wells began in September 1981. Currently, all six wells are being used for injection.

CWM-V had, at one time, 12 ponds (Nos. 1-12) in which liquid wastes were settled and stored prior to filtration and injection. At this writing, all but five ponds (Nos. 4, 5, 7, 11, and 12) have been capped and sealed. Ponds Nos. 4, 5, and 7 (see Figure 2) have been drained, and the contaminated bottom sludge has been solidified and is currently being stored in a stockpile to the east of pond No. 4. This stockpiled material is to be replaced in ponds Nos. 4, 5, and 7 once an appropriate liner and leachate collection system are installed. Ponds 11 and 12 are partially drained and once completely emptied, the contaminated bottom sludge is also to be disposed on site. At the time of this writing, construction of the leachate collection system was suspended. Special consideration is being given to its design and construction due to the presence of PCBs in the lagoon sludges.

FIGURE 2
SITE SKETCH
CHEMICAL WASTE MANAGEMENT INC.
VICKERY, OHIO FACILITY



CWM-V is not currently accepting any commercial waste. The six operating injection wells are being used solely to process waste currently in storage. The resumption of commercial operation would require that temporary storage will no longer be in ponds, but rather the existing storage tanks. Once State air pollution permits are obtained for the storage tanks, CWM-V is expected to resume normal operation.

B. General Geology

CWM-V is located on the east flank of the Findlay Arch, which separates the Michigan and Appalachian basins. The bedrock under the site dips gently to the east, toward the Appalachian basin (see Reference 2). Bedrock is covered with 40 to 50 feet of glacial deposits. The bedrock under the site consists of the Tymochtee Dolomite (see Reference 3). The Tymochtee is a middle member of the Bass Islands Formation, which is upper Silurian. The Tymochtee is basically a Dolomite; however, in different areas it contains various amounts of shale, gypsum, and anhydrite. Beneath CWM-V, the Tymochtee Dolomite is approximately 140 feet thick.

The Tymochtee is underlain by the Greenfield Dolomite member of the Bass Islands Formation. The Greenfield Formation, approximately 50 feet thick in this area, lacks the evaporites of the overlaying Tymochtee. Fossil evidence indicates that the Greenfield Formation was deposited in an environment with saline marine conditions that were higher than normal.

The entire Bass Islands Formation is underlain by the Lockport Dolomite, sometimes known as the "Guelph" Dolomite, which is a normal marine deposit. The entire sequence represents a transition from a normal marine environment during the middle Silurian to a hypersaline condition in the upper Silurian. Geophysical logging did not fully penetrate the Lockport Formation at the site, but indicates that it is at least 400 feet thick.

The bedrock surface contains a major buried valley trending north/south through the center of Riley Township in Sandusky County. The stream lines for this buried valley and the modern Sandusky River are unrelated. The eastern side of the buried valley, on which the facility is located, has a uniform slope with no other major buried valley intersecting it.

Visual descriptions of rock cores and outcrops, along with geophysical logs, have been used to describe the characteristic differences between the Lockport, Greenfield, and Tymochtee Formations (see Reference 4). The gamma, self-potential, and resistivity logs for the Lockport Dolomite are smooth, reflecting the Formation's uniform consistency. The Greenfield and Tymochtee rocks exhibit the "ragged" appearance of the Bass Islands Formation, reflecting their highly variable composition.

Glacial deposits covering the bedrock were deposited by the retreat of ice sheets during the Wisconsin Age. The material originally trapped in the ice was deposited as an unsorted till and also as sorted outwash deposits. Silt and clay deposits are evidence of the existence of post-glacial lakes. The

last major lake to have covered the site area was probably Lake Lundy, whose shoreline was at elevation 620 MSL (see Reference 5). It is theorized that the lake was probably in existence 12,000 years ago.

C. Hydrogeology

Ground water occurs in the glacial deposits. CWM-V claims that the ground water levels in these deposits are shallow and tend to follow the general surface contours. The levels fluctuate from near the surface to 5 feet deep throughout the year. Streams and ditches affect the water levels in these shallow deposits.

Regional ground water flow in the bedrock aquifer is generally northerly toward Sandusky Bay and Lake Erie. Until the fall of 1984, the bedrock ground water flow directions near the site were affected by pumping from an on-site water supply well. In general, the pumping caused flow toward the center of the site (see Figure 3 and Reference 2).

After the fall of 1984, much less pumping was done from the aquifer (estimated reduction from 300,000 to 50,000 gallons per month). Ground water flow at the site, as determined from ground water level measurements in December 1984, indicates a well-defined flow direction to the north-northeast (see Figure 4). This general northerly flow is consistent with regional flow in the bedrock aquifer.

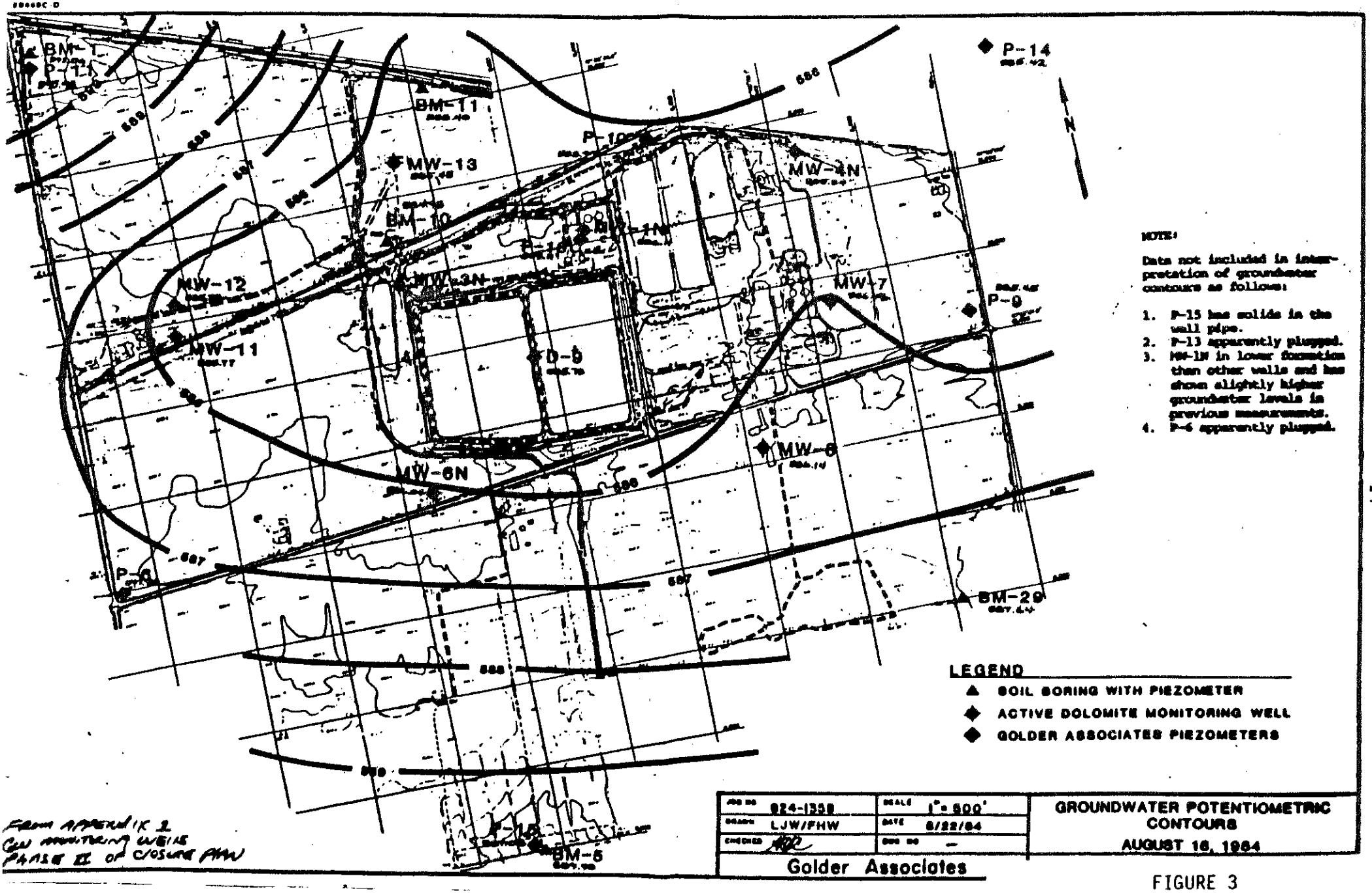


FIGURE 3
CHEMICAL WASTE MANAGEMENT INC.
VICKERY, OHIO FACILITY

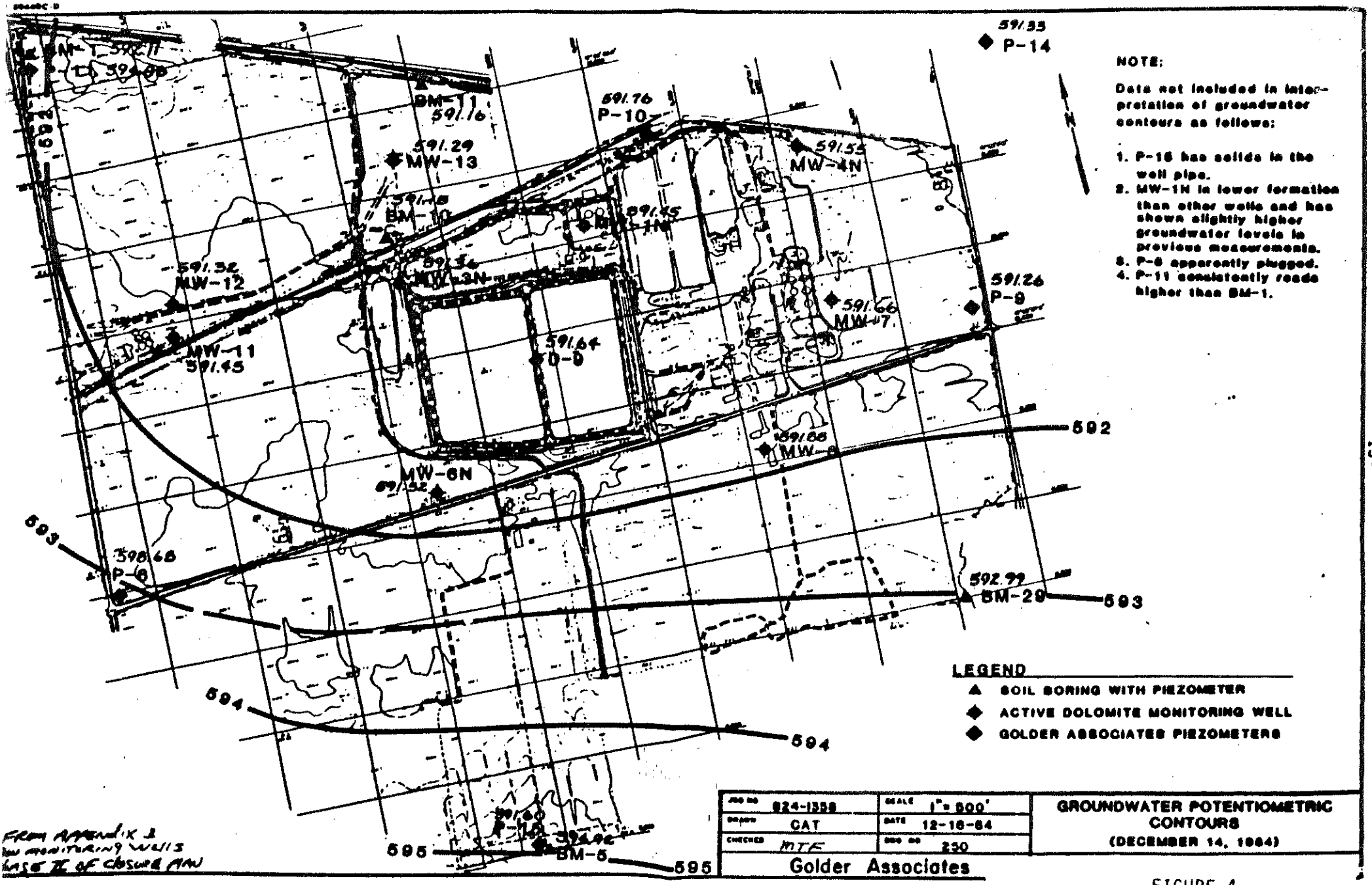


FIGURE 4
CHEMICAL WASTE MANAGEMENT INC.
VICKERY, OHIO FACILITY

D. Waste Characterization

In CWM-V's most recent RCRA Part A revision (September 25, 1986), it is stated that present plans call for receiving only bulk aqueous waste, which is to be treated for odor reduction and filtered before being deep-well injected. Many types of aqueous wastes (i.e., acids, alkalies, organics) have been disposed at this facility in the past and will be accepted pending resumption of waste handling activities at CWM-V. A list of the waste streams (by number) to be accepted can be found in Appendix A. This list was taken from the above mentioned Part A revision.

RCRA requires that a ground water monitoring program exist for existing and closed waste lagoons. CWM-V has sampled the sludges in the existing lagoons. The contaminants found must be considered when choosing target constituents for ground water sampling. Some of the contaminants reported by CWM-V to be in the lagoon sludges are:

Antimony	Carbon tetrachloride
Arsenic	1,1,1-trichloroethane
Cadmium	1,2-dichlorobenzene
Chromium	1,2-dichloroethane
Lead	Chlorobenzene
Mercury	Chloroform
Nickel	Heptachlor
Total Cyanide	Methylene choride
Toluene	Phenol
Trichloroethylene	Tetrachloroethylene
PCB	Dioxin
	Methanol

E. Ground Water Monitoring System

Historically, ground water monitoring at the CWM-V site was conducted by both the OEPA and CWM-V. The original ground water monitoring program began in 1972 and was conducted by the OEPA. The original monitoring system consisted of Chemical Waste Management monitoring wells No. 4 (OEPA No. 1), No. 5

(OEPA No. 2), No. 8 (OEPA No. 3), and OEPA No. 5. Two of these wells were on site and two were off site. In 1974, the monitoring system was revised when CWM-V added an on-site testing laboratory and began monitoring wells No. 4 (OEPA No. 1) and No. 5 (OEPA No. 2), and added OEPA No. 4. In 1975, the OEPA added well OEPA No. 6 to the system. Between 1976 and 1978, CWM-V added monitoring wells Nos. 1, 2, 3, 3A, 6, and 6A. In 1979, the older steel-cased wells were replaced with PVC-cased wells. Wells Nos. 1, 3, 4, and 6 were abandoned and replaced with wells 1N, 3N, 4N, and 6N. A new well, No. 7, was also added at this time. In 1981, three more monitoring wells (Nos. 11, 12, and 13) were added to the north of the existing waste management area (see Figure 2).

By 1983, the CWM-V monitoring system had evolved to include eight wells, 1N, 2, 3N, 4N, 5, 6N, 7, and 8. These wells were used initially to satisfy the ground water monitoring requirements specified in 40 CFR Part 265 (RCRA) and Part 761 (TSCA). In 1983, the USEPA found that these wells did not satisfy 40 CFR 265 and 761 because of inadequate well construction, locations, and depths. As a result of these findings, CWM-V agreed to enter into a Consent Agreement and Final Order (CAFO) on April 5, 1985, with the USEPA. The CAFO required, among other things, that new wells, constructed of type 316 stainless steel (316), be installed at several locations and depths. As a result of the CAFO, a Work Plan describing the new monitoring well system was provided by CWM-V to the USEPA and OEPA. On November 29, 1985, and on January 6, 1986, the USEPA and Ohio EPA, respectively, approved the Work Plan.

Since the approval, CWM-V has installed the wells described in the Work Plan, and the monitoring system as it presently exists is listed in Table 1 and shown on Figures 5 and 6. The new ground water monitoring wells have expanded the former eight-well system to a total of 50 wells. It is understood that the new wells are to replace the original eight-well monitoring system, pending final State approval.

The wells in the new system are designed to monitor three different zones (stratigraphic units). Nineteen L-series wells monitor the shallowest zone, an unconsolidated lacustrine deposit. Seven T-series wells are placed in glacial tills beneath the lacustrine deposits. Eleven MW-series wells are screened in bedrock (Tymochtee Dolomite).

The injection wells at this facility are completed into the Mt. Simon Formation. These wells (numbered 1 through 6) penetrate some intermediate water bearing zones before reaching the Mt. Simon Formation. There are no existing monitoring wells designed to monitor these intermediate zones.

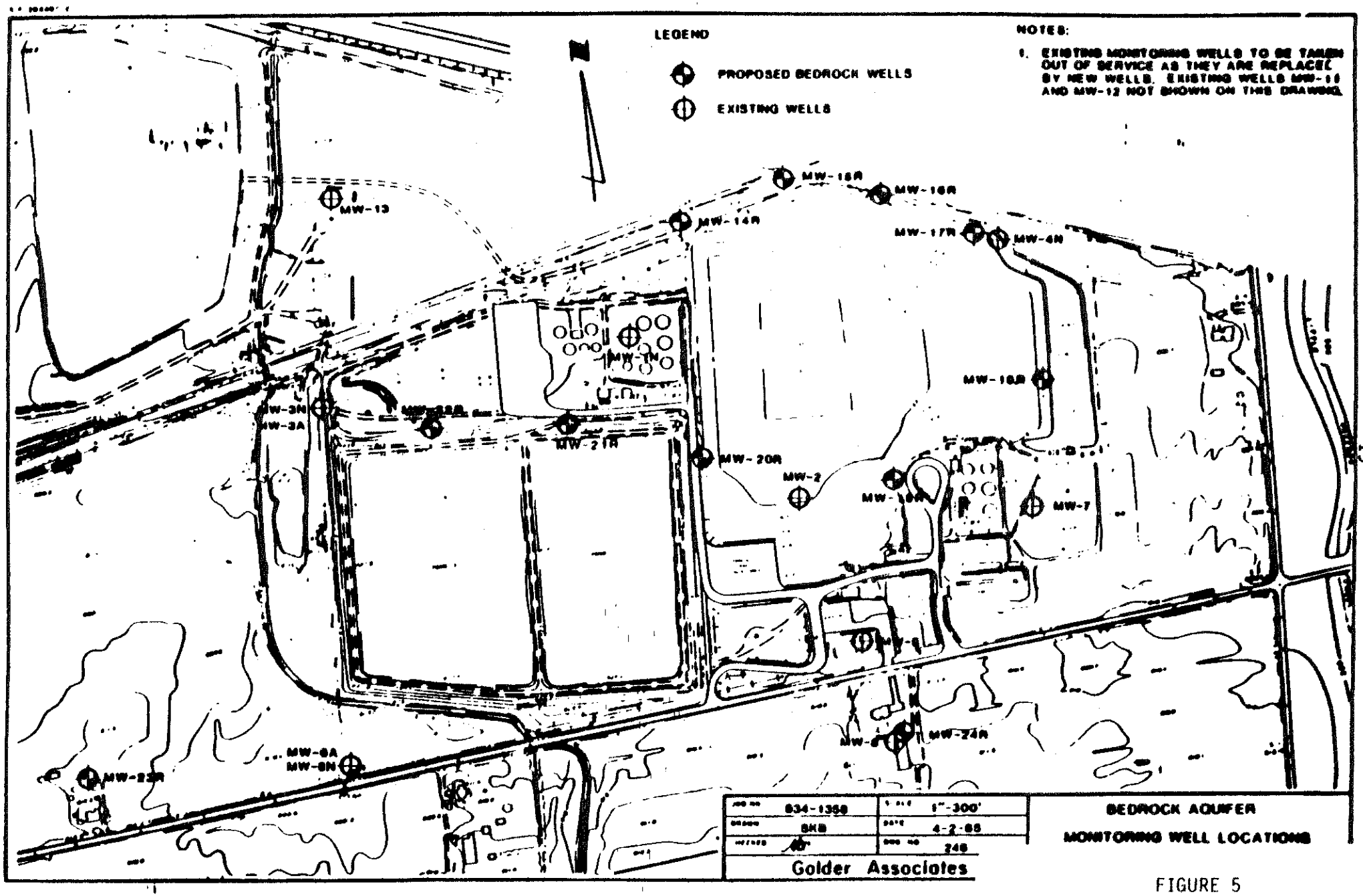
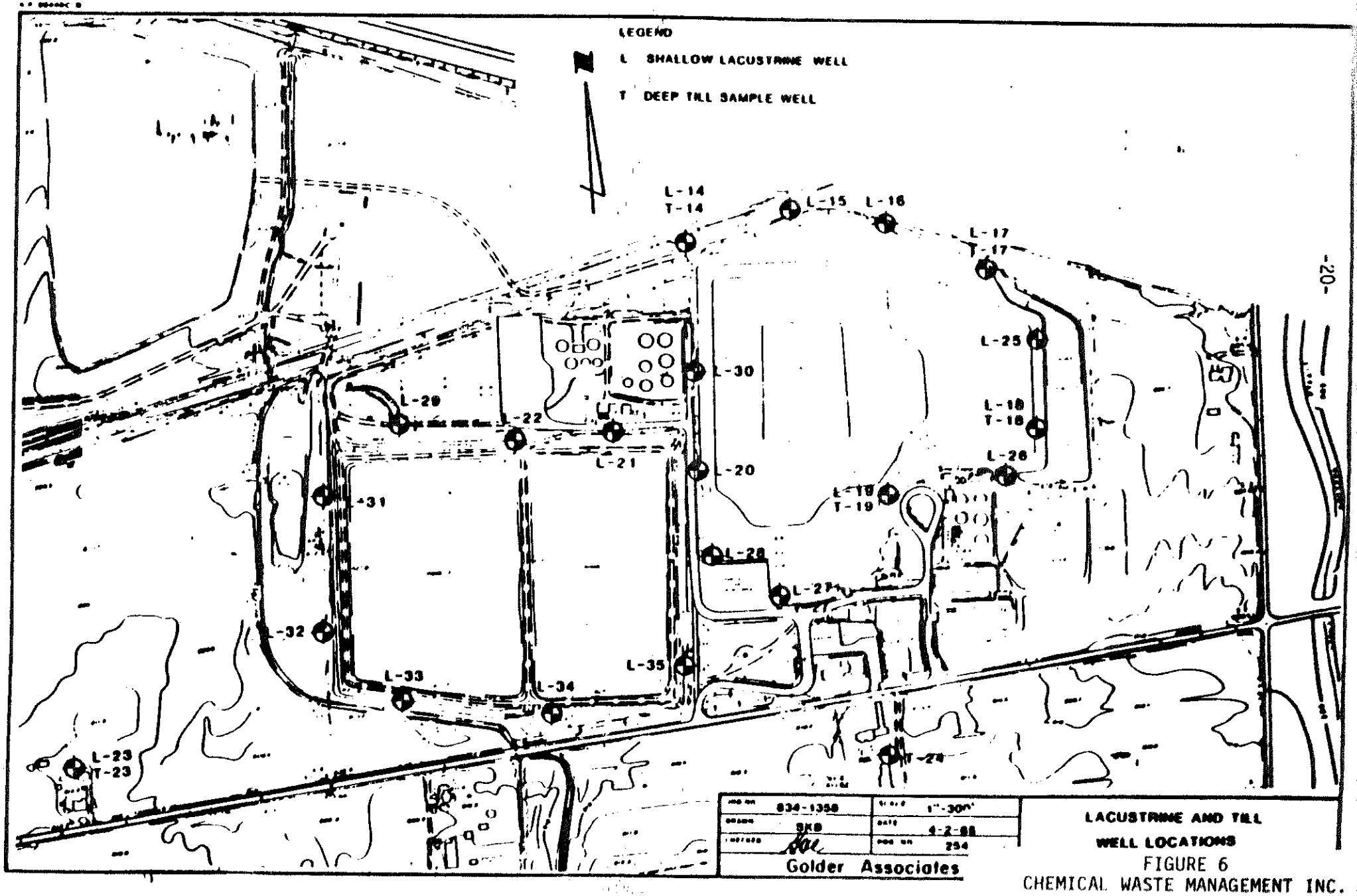


FIGURE 5
CHEMICAL WASTE MANAGEMENT INC.
VICKERY, OHIO FACILITY



LACUSTRINE AND TILL WELL LOCATIONS

FIGURE 6
CHEMICAL WASTE MANAGEMENT INC.
VICKERY, OHIO FACILITY

TABLE 1

Monitoring Wells at Chemical Waste Management
Vickery, Ohio Facility

Well No.	Old Bedrock Well	Old Overburden Well	New Well RCRA 265
L-14			X
L-15			X
L-16			X
L-19			X
L-20			X
L-21			X
L-22			X
L-23			X
L-26			X
L-27			X
L-28			X
L-29			X
L-30			X
L-31			X
L-32			X
L-33			X
L-34			X
L-35			X
L-39			X
MW-2	X		
MW-5	X		
MW-7	X		
MW-8	X		
MW-11	X		
MW-12	X		
MW-13	X		
MW-3A	X		
MW-6A		X	
MW-1N	X		
MW-3N	X		
MW-4N	X		
MW-6N	X		
MW-14R			X
*MW-15R			X
MW-16R			X
*MW-19R			X
MW-20R			X
MW-21R			X
MW-22R			X
MW-23R			X
*MW-24R			X
MW-37R			X
MW-38R			X

* TSCA Wells

TABLE 1 (CONTINUED)

Monitoring Wells at Chemical Waste Management
Vickery, Ohio Facility

Well No.	Old Bedrock Well	Old Overburden Well	New Well RCRA 265
T-14			X
T-19			X
T-23			X
T-24			X
T-27			X
T-37			X
T-38			X

F. Compliance

In May of 1984, CWM-V and the State of Ohio entered into a Consent Decree which took into consideration the following:

(1) Injection well improvements

(2) Overburden ground water testing

(3) Drinking water well sampling

(4) Surface water monitoring

(5) Site monitoring

(6) Closure of surface impoundment

This Decree stopped the facility from accepting off-site generated waste for disposal. The USEPA also entered into a Consent Agreement and Final Order (CAFO) with CWM-V in April 1985 covering both TSCA and RCRA issues. This CAFO took into consideration the following:

(1) Ground water sampling work plan

(2) Surface impoundment sampling and closure

(3) PCB status reports monthly

(4) Environmental audit of facility operations done; of little significance.

All of the requirements of the above mentioned agreements are being addressed by the facility.

New UIC permits for the injection wells are presently in the process of being issued by the Ohio Environmental Protection Agency.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITY

2.1 General

The information that will be collected during this inspection is needed to assist USEPA Region V management staff in the evaluation of CWM-V's ground water monitoring system. This requires that an assessment be made of waste management operation and pollution control practices, including the ground water monitoring system, surface drainage, and leachate management. To collect the needed information, the Facility Evaluation Team will conduct an on-site field investigation and file review. The Facility Evaluation Team will consist of four groups: a Management Team, a Technical Review Team, a Laboratory Evaluation Team, and a Sample Collection Team. All teams will be under the direction of the Field Team Leader (FTL). The present inspection schedule calls for all of the teams to begin work on April 6, 1987, and to have completed the on-site evaluation by April 17, 1987. Upon completion of the evaluation, a Technical Report will be written by the FTL. This report is scheduled to be finished in September 1987.

2.2 Safety Policy

Safety procedures to be followed during the inspection will comply with CWM-V safety practices and the Project Safety Plan (Appendix B). Personal safety equipment needed for the site inspection includes hard hats, safety glasses or goggles, safety shoes or boots, long-sleeved shirts, rain gear, and full-face cartridge-type respirators with dust and organic vapor cartridges. Those individuals who do not have safety training or equipment will be restricted to the facility office and will not be allowed near the waste management areas. During the laboratory evaluations, safety procedures of the respective laboratory will be followed.

In the event of an emergency, CWM-V directions for personal safety or vacating the site will be followed. A safety briefing will be given to all Task Force members by a CWM-V representative before they enter the site.

Task Force members will have personally-issued respirators with dust and organic vapor cartridges immediately available when inspecting site operations. Each agency or office represented during the inspection will provide the required personal safety equipment and training for its staff.

Copies of the Project Safety Plan will be posted in the EPA trailer at the site.

2.3 Management Team

A. Objective

The Management Team, through the EPA Field Team Leader (FTL), will be responsible for (1) assigning personnel to each team; (2) overall logistics, which includes coordination of transportation and communication (both on site and off site) and scheduling and prioritizing each day's activities; (3) assuring that all personnel comply with USEPA requirements regarding Confidential Business Information (CBI) and both CWM-V and USEPA safety requirements; and (4) conducting periodic debriefing sessions with facility personnel.

B. Team Members

Management Team members include Joseph Fredle, Field Team Leader (FTL); John Haggard, U.S. EPA Headquarters Task Force Core Team Hydrogeologist; Joseph Boyle, USEPA Region V Task Force contact; Scott Thomas, Technical Review Team Leader; Philip Gehring, Sampling Team Leader; and Maxine Long, Laboratory Evaluation Team Leader.

C. Logistics

The FTL and Eastern District Office of Region V will supply logistical support for this investigation. A trailer will be brought on site as a field office equipped with appropriate power and communications facilities.

2.4 Technical Review Team

A. Objective

The purpose of the Technical Review Team is to assess the adequacy of facility operations and records in six principal areas: (1) waste characterization, handling, and tracking; (2) ground water sampling and analysis; (3) site hydrogeologic characteristics; (4) site design; (5) ground water monitoring systems; and (6) ground water quality data. Additional subjects of concern may also be added during the inspection. Aspects of the above-mentioned areas will be evaluated with respect to RCRA, TSCA, and UIC programs. This information will then be used to fulfill the Task Force objectives and to support findings.

B. Team Members

The Technical Review Team will be headed by Scott Thomas from the USEPA Region V Eastern District Office. This team will include USEPA Region V representatives from the Eastern District Office, RCRA Enforcement Section and Technical Program Section of the Region V Waste Management Division, and the TSCA and UIC programs, as well as personnel from the Ohio Environmental Protection Agency.

C. Document Control

A Document Control Program, as set forth in the Hazardous Waste Ground Water Task Force - Protocol for Ground Water Evaluation (HWGWTF Protocol) September 1986 (see Reference 6), will be implemented. All documents, such as field notebooks, photographs, and original or photocopied information obtained from the facility, will be serialized and accountable as part of the permanent inspection evidence file. The Technical Review Team Leader is responsible for issuing field logbooks in which inspection notes will be taken. The Sampling Contractor, Alliance Technologies Corporation (Alliance), is responsible for document control on all sample documents.

D. Methods

To expedite the Technical Review, the subject matter has been divided into the six areas referenced previously. Within these general subject areas, the responsible CWM-V personnel or contractor will be interviewed. For instance, the facility's sampling technician might be asked to describe or demonstrate a sampling technique.

E. Schedule

The technical review is scheduled to begin after an opening conference on April 6, 1987. The work will be completed within normal hours of 0800 to 1700.

The tentative schedule of activities is as follows:

Date	
4/06/87	Opening Conference
4/06/87	Introduction to Technical Review
4/06/87	Waste Characterization, Handling, and Tracking
4/07-08/87	Site Hydrogeologic Characteristics
4/09/87	Site Design & UIC
4/10-13/87	Ground Water Monitoring System
4/14/87	Ground Water Sampling and Analysis
4/15/87	Ground Water Quality Data

This schedule is subject to revision dictated by from team personnel needs, logistics, and availability of facility representatives. The Management Team and Technical Review Team will meet with facility representatives twice each day. A morning meeting will be used to obtain documents for review during the day, and if necessary, schedule meetings with the appropriate facility personnel to answer questions the Team may have. The afternoon meeting will be used to (1) brief facility personnel on the day's sampling; (2) schedule the following day's sampling; (3) return documents reviewed that day; and (4) present the facility with a list of documents for review the following day.

2.5 Laboratory Evaluation Team (LET)

A. Objectives

A complete evaluation of CWM-V's ground water monitoring system will require an assessment of laboratory systems. This will require an evaluation of (1) the Waste Analysis Plan, (2) the Ground Water Sampling and Analysis Plan, and (3) visits to CWM-V's on-site and off-site contract laboratories.

B. Team Members

The LET will include Maxine Long from the USEPA Region V Quality Assurance Office (QAO) and other QAO representatives.

C. Methods

Information in the Waste Analysis Plan and the Ground Water Sampling and Analysis Plan is expected to be reviewed by the LET members before the laboratory evaluations take place.

The laboratory evaluation will cover all aspects of laboratory operations as they apply to the analysis of ground water and facility waste monitoring programs. There are nine general areas which are to be examined during the evaluation:

(1) personnel;
(2) laboratory facilities;
(3) laboratory equipment and supplies;
(4) general laboratory practices;
(5) analytical methodology;
(6) sample handling and preservation;
(7) quality assurance;
(8) records and data reporting; and,
(9) action response to laboratory results.

Numbered notebooks issued by the Technical Review Team Leader (TRTL) will be used during the Laboratory Review. Upon completion of the final report, the notebooks will be returned to the TRTL to be kept in the official inspection file at the Region V Eastern District Office. A copy of the laboratory's standard operation procedures (Methods Manual and Quality Assurance Manual) will be made available for the Team's use immediately upon the Team's arrival at the laboratory. Any records collected will be numbered, using the Task Force document control system as stated above. ETC of Edison, N.J. is presently used by the facility for ground water monitoring and will be evaluated by the LET.

The Field Team Leader will request CWM-V to provide authorization, names, and telephone numbers of the responsible individuals at each laboratory to the LET so that visits can be scheduled. The FTL and the LET members will then schedule the laboratory evaluations. This may require the evaluators to ask to interview both administrative personnel and bench analysts, to provide a fair and impartial assessment of laboratory capabilities.

2.6 Sampling Team

A. Objectives

The purpose of the Sampling Team is to collect representative samples from existing locations at the facility. In addition, the Team will observe the facility's sampling procedures, evaluate the capability of the facility's equipment to produce representative samples, and identify contamination sources or procedures which may affect the quality of samples. They will also evaluate the facility's written field and quality assurance procedures. The analytical data will be used to fulfill Task Force objectives and to support conclusions.

B. Team Members

The Sampling Team is headed by Philip Gehring of the USEPA Region V Eastern District Office. Personnel from the Eastern District Office, Region V Waste Management Division, and OEPA will assist Mr. Gehring as needed. Employees of the USEPA contractor, Alliance, will be present to collect, handle, and ship samples taken from the Task Force-selected locations.

C. Methods

All samples will be collected by a USEPA contractor, Alliance, using all of the appropriate guidelines mentioned in the HWGWTF Protocol (see Reference 6). Replicate volatile organic samples and splits of all other samples will be offered to the facility. Alliance will have available equipment to collect samples (e.g, water level indicators, bailers, buckets, and other necessary sampling equipment). The contractor will also be required to provide all equipment and materials necessary to manage, handle, field filter, document, and

ship the required samples. All wells will be monitored for organic vapors when first opened. Prior to purging or sampling the monitoring wells, water levels will be measured in all wells for use in the geological evaluation of the site. Generally, monitoring well sampling will involve purging (using bailers or pumps), such that a volume equal to three times the volume of water present in the well at the time of the static water level measurement will be evacuated, if practical, before sampling. Purge water disposal methods will be the responsibility of the facility. Wells that are purged to dryness may be sampled when there is a sufficient recharge volume of water to fill at least one parameter bottle set, including split samples. This may require purging on one day and sampling on the next day. Wells that are not purged to dryness must have three well volumes removed before sampling. Slow recharging wells may also be sampled when there is a sufficient volume of water for at least one parameter bottle set, including split samples. For example, the purgeable organic samples may be collected when there is a sufficient volume of water in the well for all of the purgeable organic bottles, including those to be split with the facility. To obtain a sufficient volume of water for all parameters, it may be necessary to return to the same well on successive days. All equipment which contracts sampled material and is reused on site will be thoroughly cleaned by Alliance with soap and water, rinsed with hexane, followed by a final rinse with deionized water, and air-dried. All samples will be shipped to the following contractor laboratories:

Laboratory	Location	Components to be Analyzed
Compu-Chem	RTP, NC	Dioxin, Furans
EMSI	Cammerillo, CA	Organics
Centec	Salem, VA	Inorganics

in accordance with applicable Department of Transportation (DOT) regulations (49 CFR Parts 171177). Leachate and suspected contaminated samples will be

considered "high-level hazardous" and other samples from wells and surface points will be considered "environmental" for shipping purposes. These samples will be collected in accordance with guidance in the document Characterization of Hazardous Waste Sites - A Methods Manual: Volume II. Available Sampling Methods, Second Edition", December, 1984 (Appendix C) (see Reference 7).

Each sample shipment will be accompanied by a Chain-of-Custody Record (Figure 7), completed by Alliance, identifying contents in terms of sample type, date and time, etc. The original records will accompany the shipment, and a copy will be provided to the Field Team Leader. Samples split with the facility will be noted in the "Remarks" section of the custody form.

Samples taken from the CWM-V site will be documented with a Receipt for Samples form, completed by Alliance (see Figure 8). The sample tag serial numbers from all samples taken off site are to be recorded on the form, and a copy of the receipt will be provided to facility personnel. The white originals are to be retained by the EPA Field Team Leader.

Alliance will also perform all analyses for pH, specific conductance, temperature, and turbidity, as well as field filtering of the dissolved metals samples. Samples will be analyzed for the constituents listed in Appendix A, using the methods required in the Specific Scope of Work for Viar & Company under USEPA Contract Laboratory Program SAS No. 1653-HQ (see Reference 8). The contract laboratory quality control data review will be performed by Lockheed, Inc. in Las Vegas, NV using the procedures given in Hazardous Waste Ground Water Task Force Assessment Program Quality Assurance Project Plan, September 27, 1985, Life Systems, Inc./PRC Environmental Management, Inc. (see Reference 9).

CHAIN OF CUSTODY RECORD

Project Code	Project Name

SAMPLERS (Signature)

REMARKS

Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received by: (Signature)	Relinquished by: (Signature)	Date/Time	Received by: (Signature)
Relinquished by: (Signature)	Date/Time	Received for Laboratory by: (Signature)	Date/Time	Remarks	

N 1000

Figure 7

RECEIPT FOR SAMPLES

PRC. NO | PROJECT NAME

Name of Facility

SAMPLERS (Signature)

Facility Location

Spill Samples Offered ( ) Accepted ( ) Declined

STA NO	DATE	TIME	COMP	GRAB	SPLIT SAMPLES	TAG NUMBERS	STATION DESCRIPTION	NO. OF CONTAINERS	REMARKS

Transferred by: (Signature)

Received by: (Signature) Telephone

Date Time

Title Date Time

Distribution: Original to Coordinator Field Files; Copy to Facility

N 349

Figure 8

Quality assurance and control (QA/QC) for EPA contractor sample collection, handling, and analysis will be conducted in accordance with, as appropriate, the HWGWTF Protocol (see Reference 6), prepared for the Task Force. The Sampling Team will review Alliance procedures during the sampling effort to ensure consistency with the QA/QC and evidence handling requirements. In addition, the above-mentioned document specifies the following QA/QC samples will be required:

- Blank Samples

These samples include field blanks, equipment blanks, and trip blanks. Field blanks will be prepared by Alliance using distilled deionized water of known high purity sent with unused sample bottles to the field. At least one field blank will be prepared at a representative sampling site by Alliance for all parameters sampled during the inspection. Additional field blanks may be required by the FTL if warranted by varied field conditions. Alliance will prepare one set of trip blanks for each type of analysis (e.g., organics, metals, volatiles) prior to departure from their home base in Bedford, Massachusetts. The trip blank will accompany the sampling crew throughout the entire sampling procedure. The trip blank will be submitted for analysis along with the last day's samples. Equipment blanks are to be prepared by flushing clean sample equipment with distilled deionized water in the field and using the flush water to prepare appropriate sample aliquots for each parameter group (as discussed above). This is also the responsibility of Alliance.

. Duplicate Samples

At each sampling location where volatile organics are to be sampled, duplicate samples (i.e., two VOA vials) will be taken. Also, samples at 10% of the sample locations (i.e., 2 out of 15 monitoring wells) will be collected in duplicate for the constituents listed in Appendix A.

D. Sampling Location

The sampling locations for this investigation are listed below:

Lacustrine Wells	Till Wells	Bedrock Wells
L15	T 19 (duplicate)	MW14R
L19	T 24 (background)	MW16R
L20		MW21R
L21		MW24R (background)
L26 (duplicate)		
L27		
L29		
L31		
L34		
L35		
L39 (background)		

Non-Ground Water Sites

Leachate (2)
Surface water (1)

Quality Assurance Samples

Duplicate samples (2) designated above
Field blanks (2)
Trip blank (1)

E. Scheduling

Prior to sampling activities, water levels will be measured in all of the wells and piezometers for use in the geological evaluation. Many logistical considerations, such as weather and well performance, will affect the time required to obtain the samples and influence the sequence of sampling. The Sampling Team Leader, in conjunction with the Field Team Leader, will prioritize the sampling points and develop a general schedule.

The Sampling Team Leader will provide daily updated sampling schedules for the Management Team's periodic briefing for facility personnel.

The Sampling Team Members will be responsible for calculating water volumes in each well from the static water levels measured at the time of purging, and estimating the time required to remove three well volumes. Task Force Team members will record the above data in the field logbooks, as well as the starting and ending times of purging, sampling times, and unusual activities taking place in the area during purging and sampling.

Field work will begin on Monday, April 6, 1987, and be completed no later than April 17, 1987. The work will be conducted during normal work hours of 0800 to 1700 hours.

3.0 SAMPLE CONTAINERS, LABORATORY METHODS, AND DATA QUALITY ASSURANCE OBJECTIVES

3.1 Sampling Order

Parameter, Bottle Type, and Preservative List

Sampling Order	Parameter	Bottle Type	Preservatives
1.	Volatile organics	2 - 40 mL VOA vials	Cool 4°C
2.	Field measurements	200 mL plastic	None
3.	Purgeable organic carbon (POC)	1 - 40 mL VOA vials	Cool 4°C
4.	Purgeable organic halogens (POX)	1 - 40 mL VOA vials	Cool 4°C
5.	Extractable organics	4 - 1 L. amber glass	Cool 4°C
6.	Pesticides/herbicides	2 - 1 L. amber glass	Cool 4°C
7.	Dioxin	2 - 1 L. amber glass	Cool 4°C
8.	Total organic carbon (TOC)	1 - 120 mL glass	H_2SO_4 2 ml (to pH <2) Cool 4°C
9.	Total organic halogens (TOX)	1 L. amber glass	Cool 4°C no headspace
10.	Total phenols (4AAP)	1 L. amber glass	H_2SO_4 2 ml (to pH <2)
11.	Cyanide	1 L. plastic	NaOH 2 ml (to pH <2) Cool 4°C
12.	Sulfide	1 L. plastic	Cool 4°C (to ph<2)
13.	Nitrate	1 L. plastic	H_2SO_4 2 ml (to pH <2) Cool 4°C
14.	Anions	1 L. plastic	
15.	Total metals	1 L. plastic	HNO_3 2 ml (to pH <2)
16.	Dissolved metals	1 L. plastic	HNO_3 2 ml (to pH <2)
17.	Field measurements	200 mL plastic	None

* Preservative Concentrations:

HNO_3 - 1:1 dilution of 35 % solution
H_2SO_4 - Concentrated (98 %)
NaOH - 400 g/L (10 Normal)

3.2 Data Quality Assurance Objectives

See Section 3.0, "Data Quality Objectives," of the Hazardous Waste Ground Water Task Force Facility Assessment Program Quality Assurance Project Plan, (see Reference 9), also incorporated under Appendix G of HWGWTF Protocol (see Reference 6).

3.3 Laboratory Methods

See VIAR Contracts (see Reference 8)

4.0 SAMPLING PROCEDURES

The sampling methods, locations, and schedules are discussed in Section 2.6 of this document.

5.0 SAMPLE CUSTODY

See Section 5.0 "Sample Custody" of Appendix G; and Section 7.5.2, "Chain of Custody" both in HWGWTF Protocol (see Reference 6).

6.0 CALIBRATION PROCEDURES AND FREQUENCY

See Section 6.0, "Calibration Procedures and Frequency" of Appendix G, and Section 7.3.1, "Routine Maintenance/Calibration of the HWGWTF Protocol (see Reference 6).

7.0 ANALYTICAL PROCEDURES

See Section 7.0 "Analytical Procedures" in Appendix G of the HWGWTF Protocol (see Reference 6). Also see VIAR Contracts (see Reference 8).

8.0 DATA REDUCTION, VALIDATION, AND REPORTING

See Section 8.0, "Data Reduction, Validation, and Reporting" in Appendix G of the HWGWTF Protocol (see Reference 6). Also see VIAR Contracts (see Reference 8).

9.0 INTERNAL QUALITY CONTROL CHECKS

See Section 9.0, "Internal Quality Control Checks" in Appendix G of the HWGWTF Protocol (see Reference 6). Also see VIAR Contracts (see Reference 8).

10.0 PERFORMANCE AND SYSTEM AUDITS

See Section 10.0, "Performance and System Audits" in Appendix G of the HWGWTF Protocol (see Reference 6). Also see VIAR Contracts (see Reference 8).

11.0 PREVENTIVE MAINTENANCE PROCEDURES AND SCHEDULES

See Section 11.0, "Preventive Maintenance Procedures and Schedules" in Appendix G of the HWGWTF Protocol (see Reference 6). Also see VIAR Contracts (see Reference 8).

12.0 SPECIFIC ROUTINE PROCEDURES USED TO ASSESS DATA PRECISION, ACCURACY, AND COMPLETENESS

See Section 12.0, "Specific Routine Procecures Used to Assess Data Precision, Accuracy, and Completeness" in Appendix G of the HWGWTF Protocol (see Reference 6). Also see VIAR Contracts (see Reference 8).

13.0 CORRECTIVE ACTION

See Section 13.0, "Corrective Action" in Appendix G of the HWGWTF Protocol (see Reference 6). Also see VIAR Contracts (see Reference 8).

14.0 QUALITY ASSURANCE REPORTS TO MANAGEMENT

See Section 14.0, "Quality Assurance Reports to Management" in Appendix G of the HWGWTF Protocol (see Reference 6). Also see VIAR Contracts (see Reference 8).

15.0 Selected References

1. Procedures for Planning and Implementing Off-Site Response Action; Federal Register, Vol. 50, No. 214, Pg. 45933, November 5, 1985.

2. Hydrogeologic Assessment Northern Ohio Treatment Facility, Vickery, Ohio; Bowers-Morner Testing Laboratories, Inc., May 3, 1983.

3. The Bass Islands Formation In Its Type Region; Sparling, D.R. (1970); Ohio Journal of Science 70 (1):1.

4. Availability of Ground Water From Limestone and Dolomite Aquifers in Northwest Ohio and Its Relation to Geologic Structure; Norrise, S.E., and Fidler, R.E.; U.S. Geological Survey Professional Paper 750-B, pp. B229-B235.

5. Geology of Michigan; Dorr, J.A., and D.F. Eschman (1970); University of Michigan Press, Ann Arbor, Michigan.

6. Hazardous Waste Ground Water Task Force Protocol for Ground Water Evaluation (HWGWTF Protocol), Hazardous Waste Ground Water Task Force, September 1986.

7. Characterization of Hazardous Waste Sites - A Method Manual: Volume II. Available Sampling Methods, Second Edition, U.S. EPA, December 1984 (See Appendix C).

8. Specific Scope of Work for Special Analytical Sevices under the U.S. EPA Contract Laboratory Program SAS No. 1653-HQ with Viar and Company.

9. Hazardous Waste Ground Water Task Force, Facility Assessment Program Quality Assurance Project Plan, Life Systems, Inc., September 1985.

APPENDIX A

Specific Wastes Accepted at CWM-V

continued from page 2

NOTE: Photocopy this page before completing if you have more than 26 wastes to list.

Form Approved OMB No. 158-S80004

EPA I.D. NUMBER (enter from page 1): OHD020273819

FOR OFFICIAL USE ONLY: DUP | DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

No.	A. EPA Hazard Waste No.	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Processes 1. Process Codes (enter)	D. Processes 2. Process Description (if a code is not entered in D(1))
1	D001	89,000	T	S04 T02 D79	*For all waste combinations and closure method, see p. 4 of 5
2	D001	89,000	T	S02 T01 D79	" " " "
3	D002	89,000	T	S04 T02 D79	" " " "
4	D002	89,000	T	S02 T01 D79	" " " "
5	D003	89,000	T	S04 T02 D79	" " " "
6	D003	89,000	T	S02 T01 D79	" " " "
7	D004	89,000	T	S04 T02 D79	" " " "
8	D004	89,000	T	S02 T01 D79	" " " "
9	D005	89,000	T	S04 T02 D79	" " " "
10	D005	89,000	T	S02 T01 D79	" " " "
11	D006	89,000	T	S04 T02 D79	" " " "
12	D006	89,000	T	S02 T01 D79	" " " "
13	D007	89,000	T	S04 T02 D79	" " " "
14	D007	89,000	T	S02 T01 D79	" " " "
15	D008	89,000	T	S04 T02 D79	" " " "
16	D008	89,000	T	S02 T01 D79	" " " "
17	D009	89,000	T	S04 T02 D79	" " " "
18	D009	89,000	T	S02 T01 D79	" " " "
19	D010	89,000	T	S04 T02 D79	" " " "
20	D010	89,000	T	S02 T01 D79	" " " "
21	D011	89,000	T	S04 T02 D79	" " " "
22	D011	89,000	T	S02 T01 D79	" " " "
23	D013	89,000	T	S04 T02 D79	" " " "
24	D013	89,000	T	S02 T01 D79	" " " "
25	D014	89,000	T	S04 T02 D79	" " " "
26	D014	89,000	T	S02 T01 D79	" " " "

EPA Form 3510-3 (6-80)

CONTINUE ON REVERSE

* As noted in Table A-1, CWM-Vickery does not accept wastes exhibiting the characteristics of ignitability or reactivity, as defined in 40 CFR Parts 261.21 and 261.23, respectively.

EPA I.D. NUMBER (enter from page 1): OHD020273819

FOR OFFICIAL USE ONLY: DUP | DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	D015	89,000	T	S04T02D79	*For all waste combinations and closure method, see p. 4 of 5.
2	D015	89,000	T	S02T01D79	" " " "
3	D016	89,000	T	S04T02D79	" " " "
4	D016	89,000	T	S02T01D79	" " " "
5	F001	89,000	T	S04T02D79	" " " "
6	F001	89,000	T	S02T01D79	" " " "
7	F002	89,000	T	S04T02D79	" " " "
8	F002	89,000	T	S02T01D79	" " " "
9	F003	89,000	T	S04T02D79	" " " "
10	F003	89,000	T	S02T01D79	" " " "
11	F004	89,000	T	S04T02D79	" " " "
12	F004	89,000	T	S02T01D79	" " " "
13	F005	89,000	T	S04T02D79	" " " "
14	F005	89,000	T	S02T01D79	" " " "
15	F006	89,000	T	S04T02D79	" " " "
16	F006	89,000	T	S02T01D79	" " " "
17	F019	89,000	T	S04T02D79	" " " "
18	F019	89,000	T	S02T01D79	" " " "
19	F007	89,000	T	S04T02D79	" " " "
20	F007	89,000	T	S02T01D79	" " " "
21	F008	89,000	T	S04T02D79	" " " "
22	F008	89,000	T	S02T01D79	" " " "
23	F009	89,000	T	S04T02D79	" " " "
24	F009	89,000	T	S02T01D79	" " " "
25	F010	89,000	T	S04T02D79	" " " "
26	F010	89,000	T	S02T01D79	" " " "

EPA Form 3510-3 (6-80)

CONTINUE ON REVERSE

PAGE 3 B OF 3
(enter "A", "B", "C", etc. behind the "3" to identify photocopied pages)

* As noted in Table A-1, CWM-Vickery does not accept wastes exhibiting the characteristics of ignitability or reactivity, as defined in 40 CFR Parts 261.21 and 261.23, respectively.

EPA I.D. NUMBER (enter from page 1): OHD020273819

FOR OFFICIAL USE ONLY: W DUP DUP

DESCRIPTION OF HAZARDOUS WASTES (continued)

	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
	F012	89,000	T	S04T02D79	*For all waste combinations and closure method, see p. 4 of 5.
	F012	89,000	T	S02T01D79	" " " "
	K017	89,000	T	S04T02D79	" " " "
	K017	89,000	T	S02T01D79	" " " "
	K049	89,000	T	S04T02D79	" " " "
	K049	89,000	T	S02T01D79	" " " "
	K052	89,000	T	S04T02D79	" " " "
	K052	89,000	T	S02T01D79	" " " "
	K060	89,000	T	S04T02D79	" " " "
0	K060	89,000	T	S02T01D79	" " " "
1	K062	89,000	T	S04T02D79	" " " "
2	K062	89,000	T	S02T01D79	" " " "
3	P001	89,000	T	S04T02D79	" " " "
4	P001	89,000	T	S02T01D79	" " " "
5	P005	89,000	T	S04T02D79	" " " "
6	P005	89,000	T	S02T01D79	" " " "
7	P010	89,000	T	S04T02D79	" " " "
8	P010	89,000	T	S02T01D79	" " " "
9	P012	89,000	T	S04T02D79	" " " "
0	P012	89,000	T	S02T01D79	" " " "
1	P018	89,000	T	S04T02D79	" " " "
2	P018	89,000	T	S02T01D79	" " " "
3	P022	89,000	T	S04T02D79	" " " "
4	P022	89,000	T	S02T01D79	" " " "
5	P030	89,000	T	S04T02D79	" " " "
6	P030	89,000	T	S02T01D79	" " " "

A Form 3510-3 (6-80)

CONTINUE ON REVERSE

PAGE 3 C OF 5

(enter "A", "B", "C", etc. behind the "3" to identify photocopied pages)

* As noted in Table A-1, CWM-Vickery does not accept wastes exhibiting the characteristics of ignitability or reactivity, as defined in 40 CFR Parts 261.21 and 261.23, respectively.

NOTE: Photocopy this page before completing if you have more than 20 wastes to list.

Form Approved OMB No. 158-580004

EPA I.D. NUMBER (enter from page 1)	FOR OFFICIAL USE ONLY	
W O H D 0 2 0 2 7 3 8 1 9	W DUP	2 DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	P044	89,000	T	S04 T02 D79	*For all waste combinations and closure method, see p. 4 of 5.
2	P044	89,000	T	S02 T01 D79	" " " "
3	P050	89,000	T	S04 T02 D79	" " " "
4	P050	89,000	T	S02 T01 D79	" " " "
5	P064	89,000	T	S04 T02 D79	" " " "
6	P064	89,000	T	S02 T01 D79	" " " "
7	P078	89,000	T	S04 T02 D79	" " " "
8	P078	89,000	T	S02 T01 D79	" " " "
9	P098	89,000	T	S04 T02 D79	" " " "
10	P098	89,000	T	S02 T01 D79	" " " "
11	P105	89,000	T	S04 T02 D79	" " " "
12	P105	89,000	T	S02 T01 D79	" " " "
13	P106	89,000	T	S04 T02 D79	" " " "
14	P106	89,000	T	S02 T01 D79	" " " "
15	P119	89,000	T	S04 T02 D79	" " " "
16	P119	89,000	T	S02 T01 D79	" " " "
17	P120	89,000	T	S04 T02 D79	" " " "
18	P120	89,000	T	S02 T01 D79	" " " "
19	U001	89,000	T	S04 T02 D79	" " " "
20	U001	89,000	T	S02 T01 D79	" " " "
21	U002	89,000	T	S04 T02 D79	" " " "
22	U002	89,000	T	S02 T01 D79	" " " "
23	U003	89,000	T	S04 T02 D79	" " " "
24	U003	89,000	T	S02 T01 D79	" " " "
25	U007	89,000	T	S04 T02 D79	" " " "
26	U007	89,000	T	S02 T01 D79	" " " "

EPA Form 3510-3 (6-80)

CONTINUE ON REVERSE

PAGE 3 D OF 5

(enter "A", "B", "C", etc. behind the "3" to identify photocopied pages)

* As noted in Table A-1, CWM-Vickery does not accept wastes exhibiting the characteristics of ignitability or reactivity, as defined in 40 CFR Parts 261.21 and 261.23, respectively.

EPA I.D. NUMBER (copy from page 1): W O H D O 2 0 2 7 3 8 1 9 1

FOR OFFICIAL USE ONLY: W DUP 2 DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	U008	89,000	T	S04 T02 D79	*For all waste combinations and closure method, see p. 4 of 5.
2	U008	89,000	T	S02 T01 D79	" " " "
3	U009	89,000	T	S04 T02 D79	" " " "
4	U009	89,000	T	S02 T01 D79	" " " "
5	U012	89,000	T	S04 T02 D79	" " " "
6	U012	89,000	T	S02 T01 D79	" " " "
7	U016	89,000	T	S04 T02 D79	" " " "
8	U016	89,000	T	S02 T01 D79	" " " "
9	U019	89,000	T	S04 T02 D79	" " " "
10	U019	89,000	T	S02 T01 D79	" " " "
11	U031	89,000	T	S04 T02 D79	" " " "
12	U031	89,000	T	S02 T01 D79	" " " "
13	U034	89,000	T	S04 T02 D79	" " " "
14	U034	89,000	T	S02 T01 D79	" " " "
15	U036	89,000	T	S04 T02 D79	" " " "
16	U036	89,000	T	S02 T01 D79	" " " "
17	U043	89,000	T	S04 T02 D79	" " " "
18	U043	89,000	T	S02 T01 D79	" " " "
19	U044	89,000	T	S04 T02 D79	" " " "
20	U044	89,000	T	S02 T01 D79	" " " "
21	U051	89,000	T	S04 T02 D79	" " " "
22	U051	89,000	T	S02 T01 D79	" " " "
23	U052	89,000	T	S04 T02 D79	" " " "
24	U052	89,000	T	S02 T01 D79	" " " "
25	U053	89,000	T	S04 T02 D79	" " " "
26	U053	89,000	T	S02 T01 D79	" " " "

EPA Form 3510-3 (6-80)

CONTINUE ON REVERSE

(enter "A", "B", "C", etc. behind the "2" to identify photocopied pages)

* As noted in Table A-1, CWM-Vickery does not accept wastes exhibiting the characteristics of ignitability or reactivity, as defined in 40 CFR Parts 261.21 and 261.23, respectively.

EPA I.D. NUMBER (enter from page 1): W O H D O 2 0 2 7 3 8 1 9

FOR OFFICIAL USE ONLY: DUP DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	U 0 5 5	89,000	T	S 0 4 T 0 2 D 7 9	*For all waste combinations and closure method, see p. 4 of 5.
2	U 0 5 5	89,000	T	S 0 2 T 0 1 D 7 9	" " " "
3	U 0 5 6	89,000	T	S 0 4 T 0 2 D 7 9	" " " "
4	U 0 5 6	89,000	T	S 0 2 T 0 1 D 7 9	" " " "
5	U 0 5 7	89,000	T	S 0 4 T 0 2 D 7 9	" " " "
6	U 0 5 7	89,000	T	S 0 2 T 0 1 D 7 9	" " " "
7	U 0 6 8	89,000	T	S 0 4 T 0 2 D 7 9	" " " "
8	U 0 6 8	89,000	T	S 0 2 T 0 1 D 7 9	" " " "
9	U 0 7 0	89,000	T	S 0 4 T 0 2 D 7 9	" " " "
10	U 0 7 0	89,000	T	S 0 2 T 0 1 D 7 9	" " " "
11	U 0 7 2	89,000	T	S 0 4 T 0 2 D 7 9	" " " "
12	U 0 7 2	89,000	T	S 0 2 T 0 1 D 7 9	" " " "
13	U 0 7 5	89,000	T	S 0 4 T 0 2 D 7 9	" " " "
14	U 0 7 5	89,000	T	S 0 2 T 0 1 D 7 9	" " " "
15	U 0 7 7	89,000	T	S 0 4 T 0 2 D 7 9	" " " "
16	U 0 7 7	89,000	T	S 0 2 T 0 1 D 7 9	" " " "
17	U 0 7 8	89,000	T	S 0 4 T 0 2 D 7 9	" " " "
18	U 0 7 8	89,000	T	S 0 2 T 0 1 D 7 9	" " " "
19	U 0 8 0	89,000	T	S 0 4 T 0 2 D 7 9	" " " "
20	U 0 8 0	89,000	T	S 0 2 T 0 1 D 7 9	" " " "
21	U 0 8 1	89,000	T	S 0 4 T 0 2 D 7 9	" " " "
22	U 0 8 1	89,000	T	S 0 2 T 0 1 D 7 9	" " " "
23	U 0 8 8	89,000	T	S 0 4 T 0 2 D 7 9	" " " "
24	U 0 8 8	89,000	T	S 0 2 T 0 1 D 7 9	" " " "
25	U 0 9 2	89,000	T	S 0 4 T 0 2 D 7 9	" " " "
26	U 0 9 2	89,000	T	S 0 2 T 0 1 D 7 9	" " " "

EPA Form 3510-3 (6-80)

CONTINUE ON REVERSE

(enter "A", "B", "C", etc. behind the "3" to identify photocopied pages)

* As noted in Table A-1, CWM-Vickery does not accept wastes exhibiting the characteristics of ignitability or reactivity, as defined in 40 CFR Parts 261.21 and 261.23, respectively.

EPA I.D. NUMBER (enter from page 1): W O H D 0 2 0 2 7 3 8 1 9

FOR OFFICIAL USE ONLY: W DUP DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES 1. PROCESS CODES (enter)	D. PROCESSES 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	U102	89,000	T	S04 T02 D79	*For all waste combinations and closure method, see p. 4 of 5.
2	U102	89,000	T	S02 T01 D79	" " " "
3	U103	89,000	T	S04 T02 D79	" " " "
4	U103	89,000	T	S02 T01 D79	" " " "
5	U105	89,000	T	S04 T02 D79	" " " "
6	U105	89,000	T	S02 T01 D79	" " " "
7	U108	89,000	T	S04 T02 D79	" " " "
8	U108	89,000	T	S02 T01 D79	" " " "
9	U112	89,000	T	S04 T02 D79	" " " "
10	U112	89,000	T	S02 T01 D79	" " " "
11	U113	89,000	T	S04 T02 D79	" " " "
12	U113	89,000	T	S02 T01 D79	" " " "
13	U115	89,000	T	S04 T02 D79	" " " "
14	U115	89,000	T	S02 T01 D79	" " " "
15	U117	89,000	T	S04 T02 D79	" " " "
16	U117	89,000	T	S02 T01 D79	" " " "
17	U121	89,000	T	S04 T02 D79	" " " "
18	U121	89,000	T	S02 T01 D79	" " " "
19	U122	89,000	T	S04 T02 D79	" " " "
20	U122	89,000	T	S02 T01 D79	" " " "
21	U123	89,000	T	S04 T02 D79	" " " "
22	U123	89,000	T	S02 T01 D79	" " " "
23	U124	89,000	T	S04 T02 D79	" " " "
24	U124	89,000	T	S02 T01 D79	" " " "
25	U125	89,000	T	S04 T02 D79	" " " "
26	U125	89,000	T	S02 T01 D79	" " " "

EPA Form 3510-3 (6-80)

CONTINUE ON REVERSE

* As noted in Table A-1, CWM-Vickery does not accept wastes exhibiting the characteristics of ignitability or reactivity, as defined in 40 CFR Parts 261.21 and 261.23, respectively.

EPA I.D. NUMBER: O H D 0 2 0 2 7 3 8 1 9 — DUP — DUP

IV. DESCRIPTION OF HAZARDOUS WASTES (continued)

LINE NO.	A. EPA HAZARD. WASTE NO. (enter code)	B. ESTIMATED ANNUAL QUANTITY OF WASTE	C. UNIT OF MEASURE (enter code)	D. PROCESSES: 1. PROCESS CODES (enter)				D. PROCESSES: 2. PROCESS DESCRIPTION (if a code is not entered in D(1))
1	U131	89,000	T	S04	T02	D79		*For all waste combinations and closure method, see p. A of 5
2	U131	89,000	T	S02	T01	D79		• • • •
3	U133	89,000	T	S04	T02	D79		• • • •
4	U133	89,000	T	S02	T01	D79		• • • •
5	U134	89,000	T	S04	T02	D79		• • • •
6	U134	89,000	T	S02	T01	D79		• • • •
7	U135	89,000	T	S04	T02	D79		• • • •
8	U135	89,000	T	S02	T01	D79		• • • •
9	U140	89,000	T	S04	T02	D79		• • • •
10	U140	89,000	T	S02	T01	D79		• • • •
11	U144	89,000	T	S04	T02	D79		• • • •
12	U144	89,000	T	S02	T01	D79		• • • •
13	U147	89,000	T	S04	T02	D79		• • • •
14	U147	89,000	T	S02	T01	D79		• • • •
15	U148	89,000	T	S04	T02	D79		• • • •
16	U148	89,000	T	S02	T01	D79		• • • •
17	U151	89,000	T	S04	T02	D79		• • • •
18	U151	89,000	T	S02	T01	D79		• • • •
19	U154	89,000	T	S04	T02	D79		• • • •
20	U154	89,000	T	S02	T01	D79		• • • •
21	U159	89,000	T	S04	T02	D79		• • • •
22	U159	89,000	T	S02	T01	D79		• • • •
23	U161	89,000	T	S04	T02	D79		• • • •
24	U161	89,000	T	S02	T01	D79		• • • •
25	U162	89,000	T	S04	T02	D79		• • • •
26	U162	89,000	T	S02	T01	D79		• • • •

EPA Form 3510-3 (6-80)

CONTINUE ON REVERSE

* As noted in Table A-1, CWM-Vickery does not accept wastes exhibiting the characteristics of ignitability or reactivity, as defined in 40 CFR Parts 261.21 and 261.23, respectively.

OHD0202738 19 I | W DUP | 2 DUP

V. DESCRIPTION OF HAZARDOUS WASTES (continued)

Line No.	A. EPA Hazard Waste No. (enter codes)	B. Estimated Annual Quantity of Waste	C. Unit of Measure (enter code)	D. Processes: 1. Process Codes (enter)	D. Processes: 2. Process Description (if a code is not entered in D(1))
1	U165	89,000	T	S04 T02 D79	*For all waste combinations and closure method, see p. 4 of 5.
2	U165	89,000	T	S02 T01 D79	• • • •
3	U167	89,000	T	S04 T02 D79	• • • •
4	U167	89,000	T	S02 T01 D79	• • • •
5	U169	89,000	T	S04 T02 D79	• • • •
6	U169	89,000	T	S02 T01 D79	• • • •
7	U182	89,000	T	S04 T02 D79	• • • •
8	U182	89,000	T	S02 T01 D79	• • • •
9	U188	89,000	T	S04 T02 D79	• • • •
10	U188	89,000	T	S02 T01 D79	• • • •
11	U190	89,000	T	S04 T02 D79	• • • •
12	U190	89,000	T	S02 T01 D79	• • • •
13	U196	89,000	T	S04 T02 D79	• • • •
14	U196	89,000	T	S02 T01 D79	• • • •
15	U201	89,000	T	S04 T02 D79	• • • •
16	U201	89,000	T	S02 T01 D79	• • • •
17	U207	89,000	T	S04 T02 D79	• • • •
18	U207	89,000	T	S02 T01 D79	• • • •
19	U208	89,000	T	S04 T02 D79	• • • •
20	U208	89,000	T	S02 T01 D79	• • • •
21	U210	89,000	T	S04 T02 D79	• • • •
22	U210	89,000	T	S02 T01 D79	• • • •
23	U211	89,000	T	S04 T02 D79	• • • •
24	U211	89,000	T	S02 T01 D79	• • • •
25	U213	89,000	T	S04 T02 D79	• • • •
26	U213	89,000	T	S02 T01 D79	• • • •

EPA Form 3510-3 (6-80)

CONTINUE ON REVERSE

PAGE 3 I OF 5

(enter "A", "B", "C", etc. behind the "3" to identify photocopied pages)

* As noted in Table A-1, CWM-Vickery does not accept wastes exhibiting the characteristics of ignitability or reactivity, as defined in 40 CFR Parts 261.21 and 261.23, respectively.

1 from page 2.

Form Approved OMB No. 158-S80004

I.D. NUMBER (enter from page 1): D002027381 9

FOR OFFICIAL USE ONLY: W DUP 2 DUP

DESCRIPTION OF HAZARDOUS WASTES (continued)

G. EPA HAZARD WASTE NO. (enter code)	H. ESTIMATED ANNUAL QUANTITY OF WASTE	I. UNIT OF MEASURE (enter code)	D. PROCESSES: 1. PROCESS CODES (enter)	J. PROCESS DESCRIPTION (if a code is not entered in D(1))
U219	89,000	T	S04T02D79	*For all waste combinations and closure method, see p. 4 of 5.
U219	89,000	T	S02T01D79	" " " "
U220	89,000	T	S04T02D79	" " " "
U220	89,000	T	S02T01D79	" " " "
U221	89,000	T	S04T02D79	" " " "
U221	89,000	T	S02T01D79	" " " "
U222	89,000	T	S04T02D79	" " " "
U222	89,000	T	S02T01D79	" " " "
U223	89,000	T	S04T02D79	" " " "
U223	89,000	T	S02T01D79	" " " "
U226	89,000	T	S04T02D79	" " " "
U226	89,000	T	S02T01D79	" " " "
U227	89,000	T	S04T02D79	" " " "
U227	89,000	T	S02T01D79	" " " "
U228	89,000	T	S04T02D79	" " " "
U228	89,000	T	S02T01D79	" " " "
U238	89,000	T	S04T02D79	" " " "
U238	89,000	T	S02T01D79	" " " "
U239	89,000	T	S04T02D79	" " " "
U239	89,000	T	S02T01D79	" " " "

Form 3510-3 10-80

CONTINUE ON REVERSE

* As noted in Table A-1, CWM-Vickery does not accept wastes exhibiting the characteristics of ignitability or reactivity, as defined in 40 CFR Parts 261.21 and 261.23, respectively.

APPENDIX B

Project Safety Plan

EPA - SAFETY PLAN

Chemical Waste Management, Inc.
Vickery, Ohio Facility

Field Team Leader: Joseph J. Fredle

ACTIVITIES: Sampling of monitoring wells, water supply wells (both environmental samples), leachate and surface water samples, and inspect facility.

HAZARDS ANTICIPATED:*

Toxic Vapors: Yes X No ____

If Yes, List: 1. UK 2. ____

3. ____ 4. ____ 5. ____

TLV TWa/STEL 1. UK 2. ____ 3. ____

4. ____ 5. ____

Explosivity:	Yes ____	No X
Radioactivity:	Yes ____	No X
O_2 Depletion:	Yes ____	No X
Buried Utilities:	Yes ____	No X
Corrosivity:	Yes ____	No X

LEVEL OF PROTECTION RECOMMENDED (Have available) Level C

Level A ____

Level B ____ Type SCBA ____

Level C ____ Type Cartridge Dust and organic vapor

Level D X

Enhancement Level C will be used if active cell must be entered.

* If unknown, mark UK.

EPA - SAFETY PLAN (Cont'd)

CONTRACTOR EQUIPMENT REQUIRED: Personal protection equipment and safety gear.

CONTRACTOR PERSONNEL:

Number and skills Three contractor personnel to collect water and leachate samples.

Medical Monitoring:

Yes X No ____

Respirator /SCBA Qualified (if required for activity)

Yes X No ____

SITE MONITORING PROCEDURES (equipment ot be used);

HNU meter will be used to check for organic vapors at the well head on first approaching a well.

DECONTAMINATION/DISPOSAL PROCEDURES:

All disposable personal protective equipment will be disposed of on site. Non-disposable equipment will be returned to Agency or contractor offices for decontamination. Reusable sampling equipment will be decontaminated on site, by the contractor. All decontamination/disposal procedures will be in accordance with the EPA Standard Operation Safety Guides, Nov. 1984, Office of Emergency and Remedial Response.

COMMENTS:

EPA - SAFETY PLAN (Cont'd)

EMERGENCY CONTACTS*

MEDICAL:

Location: Bellevue Hospital

811 Northwest Blvd., Bellevue, Ohio

Phone No: (800) 325-1361

FIRE:

Location: Townsend Twp. Fire Department

Phone No: (419) 547-8122

POLICE:

Location: Sandusky County Sheriff's Department

Phone No: (419) 332-2613

AMBULANCE:

Location: Sandusky County EMS

Phone No: (419) 334-4401

OTHER:

APPENDIX C

Sampling Methods

Agency

P.O. Box 15027
Las Vegas NV 89114

March 1983

Research and Development

EPA

Characterization of Hazardous Waste Sites

A Methods Manual

Volume II
Available Sampling Methods

CHARACTERIZATION OF HAZARDOUS WASTE SITES--A METHODS MANUAL
VOLUME II
AVAILABLE SAMPLING METHODS

by

Patrick J. Ford
Paul J. Turina
Douglas E. Seely
GCA CORPORATION
GCA/TECHNOLOGY DIVISION
Bedford, Massachusetts 01730

Prepared for

Lockheed Engineering and Management
Services Company, Inc.
Las Vegas, Nevada, 89114

Under

EPA Contract No. 68-03-3050

EPA Project Officer

Charles K. Fitzsimmons
Advanced Monitoring Systems Division
Environmental Monitoring System Laboratory
Las Vegas, Nevada 89114

ENVIRONMENTAL MONITORING SYSTEMS LABORATORY
OFFICE OF RESEARCH AND DEVELOPMENT
U.S. ENVIRONMENTAL PROTECTION AGENCY
LAS VEGAS, NEVADA 89114

I. INTRODUCTION

The Federal Regulations set forth by the Department of Transportation (DOT) for the packaging, labeling, and shipping of hazardous materials are extensive and broadly applicable. Therefore, a copy of the DOT requirements as described in the Code of Federal Regulations, 49 CFR 171-177, is an essential reference for those anticipating the need to ship samples of hazardous materials. What follows are generalized guidelines for compliance with DOT standards, along with references to the applicable sections in the Federal Register. It may be prudent to check with state and local agencies for any additional requirements or restrictions they may have.

II. SAMPLE TYPES

In selecting the proper shipping procedures it should first be decided which of the two basic categories the sample falls into: Environmental Sample or Hazardous Substance Sample. An additional need for this distinction is to provide bases for selecting health and safety precautions for the laboratory personnel receiving and handling the samples.

A. Environmental Samples--These are samples of soil, water, or air usually collected offsite of a hazardous waste dump or chemical spill and are therefore not expected to be contaminated with high concentrations of toxic materials. The function of "environmental sample" collection is usually to monitor the extent of contamination and/or the offsite transport of contaminated materials. If there is doubt as to the suitability of a sample to this classification it should be placed in the Hazardous Substance category.

B. Hazardous Substances--Samples falling into this group are known or expected to be contaminated at concentrations that are potentially harmful; including, but not limited to, onsite samples of soil or water, samples from drums or bulk storage tanks, contaminated pools, lagoons, etc., and leachates from hazardous waste sites.

These are operational definitions intended to aid in making decisions concerning sample handling and shipping. The specifics of the DOT definitions are found in 40 CFR §§261.3 and 261.4.

III. ENVIRONMENTAL SAMPLES

Although packaging and shipping requirements for environmental samples (associated with hazardous waste situations) are not as stringent as for hazardous waste samples, it is recommended that the following general packing procedure be utilized to ensure safe delivery and maintain sample integrity. This becomes especially important when samples are being transported by common carrier. If sufficient information is available concerning the nature of the sampled material, the following may be relaxed accordingly.

1. Hydrochloric acid solutions at concentrations 0.04 percent (w/w) or less.

2. Mercuric chloride in water solutions at concentrations less than or equal to 0.004 percent (w/w).

3. Nitric acid in water, concentrations less than or equal to 0.15 percent (w/w).

4. Sulfuric acid solutions, concentrations less than or equal to 0.035 percent (w/w).

5. Sodium hydroxide in water, concentrations less than or equal to 0.080 percent (w/w).

6. Phosphoric acid in water, concentrations yielding a pH range between 4 and 2.

IV. HAZARDOUS SUBSTANCE SAMPLES

Samples known or suspected to contain hazardous materials must be regarded as hazardous substances and be transported in coherence with DOT requirements. Samples with known or suspected hazardous constituents should be prepared and shipped as specified in 49 CFR 101, the DOT Hazardous Materials Table. When the exact nature of a substance is unknown or in question, a tentative class assignment should be made (49 CFR §§172.402(h) and 173.2) assuming a worst case designation. Start with the most severe classification of the sequence of precedence (49 CFR §173.2) shown in Table C-1 unless reliable information exists for elimination of that category. Therefore, a sample would be treated as radioactive unless knowledge of the sample or radiation detection measurements contradict this classification. Poison A would then be the next designation to consider, until reliable information provides for assigning it to the next applicable category. Of the Poison A group bromoacetone, cyanogen chloride (at temperatures less than 13.1°C), hydrocyanic acid (prussic) solution, methyldichloroarsine, and phosgene (diphosgene) occur as liquids. If a liquid can, by available reliable information, be exempted from this category, or if the sample is a solid then the next designation to apply is Flammable Liquid.

The packaging procedures previously described for environmental samples are suitable for the flammable liquids and all subsequent categories. There are additional requirements, however.

1. Sample bottles should be filled allowing sufficient ullage (approximately 10 percent of volume) to prevent the liquid from completely filling the bottle at 55°C (130°F).

2. Sample bottles should contain no more than 1 quart of liquid.

3. Labeling on the cooler must include

- "Laboratory Samples" label.
- "This End Up" label on lid.
- "This End Up" arrows on all four sides.
- "Flammable Liquid, n.o.s." label ("n.o.s.": not otherwise specified).
- Address label with name, address, and phone number of receiving lab; and a return address with the same information for the sender.

4. Air transport permitted solely on cargo only aircraft.

Sources

1. NEIC Policies and Procedures. EPA-330/9-78-001-R (Revised December 1981).
2. Technical Methods for Investigating Sites Containing Hazardous Substances. (Draft.) Sampling, Handling, Packaging, and Shipping Procedures. EPA Technical Monograph No. 22, June, 1981.
3. U.S. Department of Transportation Code of Federal Regulations. 49 CFR.

APPENDIX D

Analytical Parameters for Task Force Sampling

RCRA Indicator Parameters

Parameter	Detection Limit	Method
Chloride	1 mg/l	SW 846 Method 9252
Phenols	10 ug/l	SW 846 Method 9066
Sulfate	1 mg/l	SW 846 Method 9036 or 9038
Nitrate	300 ug/l	SW 846 Method 9200
Ammonia	100 ug/l	MCAWW Method 350.1 or 350.3
TOC	1 mg/l	SW 846 Method 9060
TOX	5 ug/l	SW 846 Method 9020
POC	10 ug/l	Groundwater, Vol. 22, pp 18-23, 1984, Dohrman Equipment
POX	5 ug/l	EPA 600/4-84-008
Total Metals	As specified in	IFB WA 84-J092
Cyanide	As specified in	IFB WA 84-J092
Dissolved Metals	As specified in	IFB WA 84-J092

APPENDIX IX - GROUND-WATER MONITORING LIST

Systematic Name	CAS RN	Common Name
Acenaphthylene	208-96-8	Acenaphthalene
Acenaphthylene, 1,2-dihydro-	83-32-9	Acenaphthene
Acetamide, N-(4-ethoxyphenyl)-	62-44-2	Phenacetin
Acetamide, N-9H-fluoren-2-yl-	53-96-3	2-Acetylaminofluorene
Acetic acid ethenyl ester	108-05-4	Vinyl acetate
Acetic acid, (2,4,5-trichlorophenoxy)-	93-76-5	2,4,5-T
Acetic acid, (2,4-dichlorophenoxy)-	94-75-7	2,4-Dichlorophenoxyacetic acid
Acetonitrile	75-05-8	Acetonitrile
Aluminum	7429-90-5	Aluminum (total)
Anthracene	120-12-7	Anthracene
Antimony	7440-36-0	Antimony (total)
Aroclor 1016	12674-11-2	Aroclor 1016
Aroclor 1221	11104-28-2	Aroclor 1221
Aroclor 1232	11141-16-5	Aroclor 1232
Aroclor 1242	53469-21-9	Aroclor 1242
Aroclor 1248	12672-29-6	Aroclor 1248

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APPENDIX IX -- GROUND-WATER MONITORING LIST

Systematic Name	CAS RN	Common Name
Aroclor 1254	11097-69-1	Aroclor 1254
Aroclor 1260	11096-82-5	Aroclor 1260
Arsenic	7440-38-2	Arsenic (total)
Barium	7440-39-3	Barium (total)
Benz[a]anthracene, 7,12-dimethyl-	57-97-6	7,12-Dimethylbenz[a]anthracene
Benz[j]aceanthrylene, 1,2-dihydro-3-methyl-	56-49-5	3-Methylcholanthrene
Benz[e]acephenanthrylene	205-99-2	Benzo[b]fluoranthene
Benzamide, 3,5-dichloro-N-(1,1-dimethyl-2-propynyl)-	23950-58-5	Pronamide
Benz[a]anthracene	56-55-3	Benz[a]anthracene
Benzenamine	62-53-3	Aniline
Benzenamine, 2-methyl-5-nitro-	99-55-8	5-Nitro-o-toluidine
Benzenamine, 2-nitro-	88-74-4	2-Nitroaniline
Benzenamine, 3-nitro-	99-09-2	3-Nitroaniline
Benzenamine, 4-chloro-	106-47-8	p-Chloroaniline
Benzenamine, 4-nitro-	100-01-6	p-Nitroaniline
Benzenamine, 4,4'-methylenebis(2-chloro-	101-14-4	4,4'-Methylenebis(2-chloroaniline)

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APPENDIX IX -- GROUND-WATER MONITORING LIST

Systematic Name	CAS RN	Common Name
Benzenamine, N-nitroso-N-phenyl-	86-30-6	N-Nitrosodiphenylamine
Benzenamine, N-phenyl-	122-39-4	Diphenylamine
Benzenamine, N,N-dimethyl-4-(phenylazo)-	60-11-7	p-Dimethylaminoazobenzene
Benzene	71-43-2	Benzene
Benzene, 1-bromo-4-phenoxy-	101-55-3	4-Bromophenyl phenyl ether
Benzene, 1-chloro-4-phenoxy-	7005-72-3	4-Chlorophenyl phenyl ether
Benzene, 1-methyl-2,4-dinitro-	121-14-2	2,4-Dinitrotoluene
Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-chloro-	50-29-3	DDT
Benzene, 1,1'-(2,2,2-trichloroethylidene)bis[4-methoxy-	72-43-5	Methoxychlor
Benzene, 1,1'-(2,2-dichloroethylidene)bis[4-chloro-	72-54-8	DDD
Benzene, 1,1'-(dichloroethenylidene)bis[4-chloro-	72-55-9	DDE
Benzene, 1,2-dichloro-	95-50-1	o-Dichlorobenzene
Benzene, 1,2,4-trichloro-	120-82-1	1,2,4-Trichlorobenzene
Benzene, 1,2,4,5-tetrachloro-	95-94-3	1,2,4,5-Tetrachlorobenzene
Benzene, 1,3-dichloro-	541-73-1	m-Dichlorobenzene
Benzene, 1,4-dichloro-	106-46-7	p-Dichlorobenzene

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APPENDIX IX -- GROUND-WATER MONITORING LIST

Systematic Name	CAS RN	Common Name
Benzene, 1,4-dinitro-	100-25-4	meta-Dinitrobenzene
Benzene, 2-methyl-1,3-dinitro-	606-20-2	2,6-Dinitrotoluene
Benzene, chloro-	108-90-7	Chlorobenzene
Benzene, dimethyl-	1330-20-7	Xylene (total)
Benzene, ethenyl-	100-42-5	Styrene
Benzene, ethyl-	100-41-4	Ethyl benzene
Benzene, hexachloro-	118-74-1	Hexachlorobenzene
Benzene, methyl-	108-88-3	Toluene
Benzene, nitro-	98-95-3	Nitrobenzene
Benzene, pentachloro-	608-93-5	Pentachlorobenzene
Benzene, pentachloronitro-	82-68-8	Pentachloronitrobenzene
Benzeneacetic acid, 4-chloro-α-(4-chlorophenyl)-α-hydroxy-, ethyl ester	510-15-6	Chlorobenzilate
1,2-Benzenedicarboxylic acid, bis(2-ethylhexyl) ester	117-81-7	Bis(2-ethylhexyl) phthalate
1,2-Benzenedicarboxylic acid, butyl phenylmethyl ester	85-68-7	Butyl benzyl phthalate
1,2-Benzenedicarboxylic acid, dibutyl ester	84-74-2	Di-n-butyl phthalate

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APPENDIX IX -- GROUND-WATER MONITORING LIST

Systematic Name	CAS RN	Common Name
1,2-Benzenedicarboxylic acid, diethyl ester	84-66-2	Diethyl phthalate
1,2-Benzenedicarboxylic acid, dimethyl ester	131-11-3	Dimethyl phthalate
1,2-Benzenedicarboxylic acid, dioctyl ester	117-84-0	Di-n-octyl phthalate
1,3-Benzenediol	108-46-3	Resorcinol
Benzeneethanamine, α,α-dimethyl-	122-09-8	alpha,alpha-Dimethylphenethylamine
Benzenemethanol	100-51-6	Benzyl alcohol
Benzenethiol	108-98-5	Benzenethiol
1,3-Benzodioxole, 5-(1-propenyl)-	120-58-1	Isosafrole
1,3-Benzodioxole, 5-(2-propenyl)-	94-59-7	Safrole
Benzo[k]fluoranthene	207-08-9	Benzo(k)fluoranthene
Benzoic acid	65-85-0	Benzoic acid
Benzo[rst]pentaphene	189-55-9	Dibenzo[a,i]pyrene
Benzo[ghi]perylene	191-24-2	Benzo(ghi)perylene
Benzo[a]pyrene	50-32-8	Benzo[a]pyrene
Beryllium	7440-41-7	Beryllium (total)
[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dichloro-	91-94-1	3,3'-Dichlorobenzidine

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APPENDIX IX -- GROUND-WATER MONITORING LIST

Systematic Name	CAS RN	Common Name
[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethoxy-	119-90-4	3,3'-Dimethoxybenzidine
[1,1'-Biphenyl]-4,4'-diamine, 3,3'-dimethyl-	119-93-7	3,3'-Dimethylbenzidine
[1,1'-Biphenyl]-4-amine	92-67-1	4-Aminobiphenyl
[1,1'-Biphenyl]-4,4'-diamine	92-87-5	Benzidine
1,3-Butadiene, 1,1,2,3,4,4-hexachloro-	87-68-3	Hexachlorobutadiene
1,3-Butadiene, 2-chloro-	126-99-8	2-Chloro-1,3-butadiene
1-Butanamine, N-butyl-N-nitroso-	924-16-3	N-Nitrosodi-n-butylamine
2-Butanone	78-93-3	Methyl ethyl ketone
2-Butene, 1,4-dichloro-, (E)-	110-57-6	trans-1,4-Dichloro-2-butene
Cadmium	7440-43-9	Cadmium (total)
Calcium	7440-70-2	Calcium (total)
Carbon disulfide	75-15-0	Carbon disulfide
Chromium	7440-47-3	Chromium (total)
Chrysene	218-01-9	Chrysene
Cobalt	7440-48-4	Cobalt (total)
Copper	7440-50-8	Copper (total)

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APPENDIX IX -- GROUND-WATER MONITORING LIST

Systematic Name	CAS RN	Common Name
Cyanide	57-12-5	Cyanide
2,5-Cyclohexadiene-1,4-dione	106-51-4	p-Benzoquinone
Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1α,2α,3β,4α,5β,6β)-	319-84-6	alpha-BHC
Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1α,2β,3α,4β,5α,6β)-	319-85-7	beta-BHC
Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1α,2α,3α,4β,5α,6β)-	319-86-8	delta-BHC
Cyclohexane, 1,2,3,4,5,6-hexachloro-, (1α,2α,3β,4α,5α,6β)-	58-89-9	gamma-BHC
2-Cyclohexen-1-one, 3,5,5-trimethyl-	78-59-1	Isophorone
1,3-Cyclopentadiene, 1,2,3,4,5,5-hexachloro-	77-47-4	Hexachlorocyclopentadiene
Dibenz[a,h]anthracene	53-70-3	Dibenz[a,h]anthracene
Dibenzo[b,e][1,4]dioxin, 2,3,7,8-tetrachloro-	1746-01-6	2,3,7,8-Tetrachlorodibenzo-p-dioxin
		Hexachlorodibenzo-p-dioxins
		Pentachlorodibenzo-p-dioxins
		Tetrachlorodibenzo-p-dioxins
Dibenzo[b,def]chrysene	189-64-0	Dibenzo[a,h]pyrene
Dibenzofuran	132-64-9	Dibenzofuran
		Hexachlorodibenzofurans

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APPENDIX IX -- GROUND-WATER MONITORING LIST

Systematic Name	CAS RN	Common Name
		Pentachlorodibenzofurans
		Tetrachlorodibenzofurans
2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a, 2,2a,3,6,6a,7,7a-octahydro-, (1aα,2β,2aα,3β,6β,6aα, 7β,7aα)-	60-57-1	Dieldrin
2,7:3,6-Dimethanonaphth[2,3-b]oxirene, 3,4,5,6,9,9-hexachloro-1a, 2,2a,3,6,6a,7,7a-octahydro-, (1aα,2β,2aβ,3α,6α,6aβ, 7β,7aα)-	72-20-8	Endrin
1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8, 8a-hexahydro-, (1α,4α,4aβ,5α,8α,8aβ)-	309-00-2	Aldrin
1,4:5,8-Dimethanonaphthalene, 1,2,3,4,10,10-hexachloro-1,4,4a,5,8, 8a-hexahydro-, (1α,4α,4aβ,5β,8β,8aβ)-	465-73-6	Isodrin
1,4-Dioxane	123-91-1	1,4-Dioxane
Ethanamine, N-ethyl-N-nitroso-	55-18-5	N-Nitrosodiethylamine
Ethanamine, N-methyl-N-nitroso-	10595-95-6	N-Nitrosomethylethylamine
Ethane, 1,1-dichloro-	75-34-3	1,1-Dichloroethane
Ethane, 1,1'-[methylenebis(oxy)]bis[2-chloro-	111-91-1	Bis(2-chloroethoxy)methane
Ethane, 1,1'-oxybis[2-chloro-	111-44-4	Bis(2-chloroethyl) ether
Ethane, 1,1,1-trichloro-	71-55-6	1,1,1-Trichloroethane
Ethane, 1,1,1,2-tetrachloro-	630-20-6	1,1,1,2-Tetrachloroethane

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APPENDIX IX -- GROUND-WATER MONITORING LIST

Systematic Name	CAS RN	Common Name
Ethane, 1,1,2-trichloro-	79-00-5	1,1,2-Trichloroethane
Ethane, 1,1,2,2-tetrachloro-	79-34-5	1,1,2,2-Tetrachloroethane
Ethane, 1,2-dibromo-	106-93-4	1,2-Dibromoethane
Ethane, 1,2-dichloro-	107-06-2	1,2-Dichloroethane
Ethane, chloro-	75-00-3	Chloroethane
Ethane, hexachloro-	67-72-1	Hexachloroethane
Ethane, pentachloro-	76-01-7	Pentachloroethane
1,2-Ethanediamine, N,N-dimethyl-N'-2-pyridinyl-N'-(2-thienylmethyl)-	91-80-5	Methapyrilene
Ethanone, 1-phenyl-	98-86-2	Acetophenone
Ethene, (2-chloroethoxy)-	110-75-8	2-Chloroethyl vinyl ether
Ethene, 1,1-dichloro-	75-35-4	1,1-Dichloroethylene
Ethene, 1,2-dichloro-, (E)-	156-60-5	trans-1,2-Dichloroethene
Ethene, chloro-	75-01-4	Vinyl chloride
Ethene, tetrachloro-	127-18-4	Tetrachloroethene
Ethene, trichloro-	79-01-6	Trichloroethene
Fluoranthene	206-44-0	Fluoranthene

APPENDIX IX -- GROUND-WATER MONITORING LIST

Systematic Name	CAS RN	Common Name
Fluoride	16984-48-8	Fluoride
9H-Fluorene	86-73-7	Fluorene
2-Hexanone	591-78-6	2-Hexanone
Hydrazine, 1,2-diphenyl-	122-66-7	1,2-Diphenylhydrazine
Indeno[1,2,3-cd]pyrene	193-39-5	Indeno(1,2,3-cd)pyrene
Iron	7439-89-6	Iron (total)
Lead	7439-92-1	Lead (total)
Magnesium	7439-95-4	Magnesium (total)
Manganese	7439-96-5	Manganese (total)
Mercury	7439-97-6	Mercury (total)
Methanamine, N-methyl-N-nitroso-	62-75-9	N-Nitrosodimethylamine
Methane, bromo-	74-83-9	Bromomethane
Methane, bromodichloro-	75-27-4	Bromodichloromethane
Methane, chloro-	74-87-3	Chloromethane
Methane, dibromo-	74-95-3	Dibromomethane
Methane, dibromochloro-	124-48-1	Chlorodibromomethane

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APPENDIX IX -- GROUND-WATER MONITORING LIST

Systematic Name	CAS RN	Common Name
Methane, dichloro-	75-09-2	Dichloromethane
Methane, dichlorodifluoro-	75-71-8	Dichlorodifluoromethane
Methane, iodo-	74-88-4	Iodomethane
Methane, tetrachloro-	56-23-5	Carbon tetrachloride
Methane, tribromo-	75-25-2	Tribromomethane
Methane, trichloro-	67-66-3	Chloroform
Methane, trichlorofluoro-	75-69-4	Trichloromonofluoromethane
Methanesulfonic acid, methyl ester	66-27-3	Methyl methanesulfonate
Methanethiol, trichloro-	75-70-7	Trichloromethanethiol
4,7-Methano-1H-indene, 1,2,4,5,6,7,8,8-octachloro-2,3,3a,4,7,7a-hexahydro-	57-74-9	Chlordane
4,7-Methano-1H-indene, 1,4,5,6,7,8,8-heptachloro-3a,4,7,7a-tetrahydro-	76-44-8	Heptachlor
2,5-Methano-2H-indeno[1,2-b]oxirene, 2,3,4,5,6,7,7-heptachloro-1a,1b,5,5a,6,6a-hexahydro-, (1aα,1bβ,2α,5α,5aβ,6β,6aα)-	1024-57-3	Heptachlor epoxide
6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide, (3α,5aβ,6α,9α,9aβ)-	959-98-8	Endosulfan I
6,9-Methano-2,4,3-benzodioxathiepin, 6,7,8,9,10,10-hexachloro-1,5,5a,6,9,9a-hexahydro-, 3-oxide, (3α,5aα,6β,9β,9aα)-	33213-65-9	Endosulfan II

APPENDIX IX -- GROUND-WATER MONITORING LIST

Systematic Name	CAS RN	Common Name
1,3,4-Metheno-2H-cyclobuta[cd]pentalen-2-one, 1,1a,3,3a,4,5,5,5a,5b,6-decachlorooctahydro-	143-50-0	Kepone
1,2,4-Methenocyclopenta[cd]pentalene-5-carboxaldehyde, 2,2a,3,3,4,7-hexachlorodecahydro-, (1α,2β,2aβ,4β,4aβ,5β,6aβ,6bβ,7R*)-	7421-93-4	Endrin aldehyde
Morpholine, 4-nitroso-	59-89-2	N-Nitrosomorpholine
1-Naphthalenamine	134-32-7	1-Naphthylamine
2-Naphthalenamine	91-59-8	2-Naphthylamine
Naphthalene	91-20-3	Naphthalene
Naphthalene, 2-chloro-	91-58-7	2-Chloronaphthalene
Naphthalene, 2-methyl-	91-57-6	2-Methylnaphthalene
1,4-Naphthalenedione	130-15-4	1,4-Naphthoquinone
Naphtho[1,2,3,4-def]chrysene	192-65-4	Dibenzo[a,e]pyrene
Nickel	7440-02-0	Nickel (total)
Osmium	7440-04-2	Osmium (total)
Oxirane	75-21-8	Ethylene oxide
2-Pentanone, 4-methyl-	108-10-1	4-Methyl-2-pentanone
Phenanthrene	85-01-8	Phenanthrene

APPENDIX IX -- GROUND-WATER MONITORING LIST

Systematic Name	CAS RN	Common Name
Phenol	108-95-2	Phenol
Phenol, 2-(1-methylpropyl)-4,6-dinitro-	88-85-7	2-sec-Butyl-4,6-dinitrophenol
Phenol, 2-chloro-	95-57-8	2-Chlorophenol
Phenol, 2-methyl-	95-48-7	ortho-Cresol
Phenol, 2-methyl-4,6-dinitro-	534-52-1	4,6-Dinitro-o-cresol
Phenol, 2-nitro-	88-75-5	2-Nitrophenol
Phenol, 2,2'-methylenebis[3,4,6-trichloro-	70-30-4	Hexachlorophene
Phenol, 2,3,4,6-tetrachloro-	58-90-2	2,3,4,6-Tetrachlorophenol
Phenol, 2,4-dichloro-	120-83-2	2,4-Dichlorophenol
Phenol, 2,4-dimethyl-	105-67-9	2,4-Dimethylphenol
Phenol, 2,4-dimethyl-	105-67-9	2,4-Dimethylphenol
Phenol, 2,4-dinitro-	51-28-5	2,4-Dinitrophenol
Phenol, 2,4,5-trichloro-	95-95-4	2,4,5-Trichlorophenol
Phenol, 2,4,6-trichloro-	88-06-2	2,4,6-Trichlorophenol
Phenol, 2,6-dichloro-	87-65-0	2,6-Dichlorophenol
Phenol, 4-chloro-3-methyl-	59-50-7	p-Chloro-m-cresol

APPENDIX IX -- GROUND-WATER MONITORING LIST

Systematic Name	CAS RN	Common Name
Phenol, 4-methyl-	106-44-5	para-Cresol
Phenol, 4-nitro-	100-02-7	4-Nitrophenol
Phenol, pentachloro-	87-86-5	Pentachlorophenol
Phosphorodithioic acid, O,O-diethyl S-[(ethylthio)methyl] ester	298-02-2	Phorate
Phosphorodithioic acid, O,O-diethyl S-[2-(ethylthio)ethyl] ester	298-04-4	Disulfoton
Phosphorothioic acid, O-[4-[(dimethylamino)sulfonyl]phenyl] O,O-dimethyl ester	52-85-7	Famphur
Phosphorothioic acid, O,O-diethyl O-(4-nitrophenyl) ester	56-38-2	Parathion
Phosphorothioic acid, O,O-diethyl O-pyrazinyl ester	297-97-2	O,O-Diethyl O-2-pyrazinyl phosphorothioate
Phosphorothioic acid, O,O-dimethyl O-(4-nitrophenyl) ester	298-00-0	Methyl parathion
Piperidine, 1-nitroso-	100-75-4	N-Nitrosopiperidine
Potassium	7440-09-7	Potassium (total)
1-Propanamine, N-nitroso-N-propyl-	621-64-7	Di-n-propylnitrosamine
Propane, 1,2-dibromo-3-chloro-	96-12-8	1,2-Dibromo-3-chloropropane
Propane, 1,2-dichloro-	78-87-5	1,2-Dichloropropane
Propane, 1,2,3-trichloro-	96-18-4	1,2,3-Trichloropropane

APPENDIX IX -- GROUND-WATER MONITORING LIST

Systematic Name	CAS RN	Common Name
Propane, 2,2'-oxybis(1-chloro-	108-60-1	Bis(2-chloroisopropyl) ether
Propanedinitrile	109-77-3	Malononitrile
Propanenitrile	107-12-0	Ethyl cyanide
Propanenitrile, 3-chloro-	542-76-7	3-Chloropropionitrile
Propanoic acid, 2-(2,4,5-trichlorophenoxy)-	93-72-1	Silvex
1-Propanol, 2,3-dibromo-, phosphate (3:1)	126-72-7	Tris(2,3-dibromopropyl) phosphate
1-Propanol, 2-methyl-	78-83-1	Isobutyl alcohol
2-Propanone	67-64-1	Acetone
2-Propenal	107-02-8	Acrolein
1-Propene, 1,1,2,3,3,3-hexachloro-	1888-71-7	Hexachloropropene
1-Propene, 1,3-dichloro-, (E)-	10061-02-6	trans-1,3-Dichloropropene
1-Propene, 1,3-dichloro-, (Z)-	10061-01-5	cis-1,3-Dichloropropene
1-Propene, 3-chloro-	107-05-1	3-Chloropropene
2-Propenenitrile, 2-methyl-	126-98-7	Methacrylonitrile
2-Propenenitrile	107-13-1	Acrylonitrile
2-Propenoic acid, 2-methyl-, ethyl ester	97-63-2	Ethyl methacrylate

APPENDIX IX -- GROUND-WATER MONITORING LIST

Systematic Name	CAS RN	Common Name
2-Propenoic acid, 2-methyl-, methyl ester	80-62-6	Methyl methacrylate
2-Propen-1-ol	107-18-6	Allyl alcohol
2-Propyn-1-ol	107-19-7	2-Propyn-1-ol
Pyrene	129-00-0	Pyrene
Pyridine	110-86-1	Pyridine
Pyridine, 2-methyl-	109-06-8	2-Picoline
Pyrrolidine, 1-nitroso-	930-55-2	N-Nitrosopyrrolidine
Selenium	7782-49-2	Selenium (total)
Silver	7440-22-4	Silver (total)
Sodium	7440-23-5	Sodium (total)
Sulfide	18496-25-8	Sulfide
Sulfurous acid, 2-chloroethyl 2-[4-(1,1-dimethylethyl)phenoxy]-1-methylethyl ester	140-57-8	Aramite
Thallium	7440-28-0	Thallium (total)
Thiodiphosphoric acid ($[(HO)_2P(S)]_2O$), tetraethyl ester	3689-24-5	Tetraethyldithiopyrophosphate
Tin	7440-31-5	Tin (total)

17

APPENDIX IX -- GROUND-WATER MONITORING LIST

Systematic Name	CAS RN	Common Name
Toxaphene	8001-35-2	Toxaphene
Vanadium	7440-62-2	Vanadium (total)
Zinc	7440-66-6	Zinc (total)

QUALITY ASSURANCE PROJECT PLAN

FOR

CHEMICAL WASTE MANAGEMENT, INC.
Vickery, Ohio

ADDENDUM TO THE GROUND WATER MONITORING PLAN

MAY 29, 1992

VOLUME 3

PREPARED BY:

TEXAS WORLD OPERATIONS, INC.
Houston, Texas

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NOV 30 1992
QUALITY ASSURANCE SECTION
ENVIRONMENTAL SCIENCES DIV.

APPENDIX G

ENSECO DATA PACKAGE

Data in this appendix is in the same order in which it normally appears in an actual report.

Enseco Incorporated

Enseco
A Corning Company

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NOV 30 1992
QUALITY ASSURANCE SECTION
ENVIRONMENTAL SCIENCES DIV.

ANALYTICAL RAW DATA

(Long Form)

for

(Client Name Inserted Here)

ENSECO-RMAL NO. (Project Number assigned Here)

RECEIVED
NOV 30 1992
QUALITY ASSURANCE SECTION
ENVIRONMENTAL SCIENCES DIV.

The enclosed **LONG FORM** raw data package is arranged in the order in which the initial calibration curve, internal quality control samples (DCS/SCS), and the samples for this project were analyzed. The data is organized by instrument (alphabetically) then by date (chronologically) when applicable.

GC/MS:

I. Initial Calibration
   A. Tuning data (summary, bar graph spectrum, mass listing)
   B. Initial calibration summary (response factors, %RSDs), diagnostic report, quantitation summary, chromatograms (RIC)

II. Sample Data
   A. Preparation logs, logbook pages, internal standard area checks
   B. Tuning data (summary, bar graph spectrum, mass listing)
   C. Continuing calibration summary (response factors, %RSDs, %Ds), diagnostic report, quantitation summary, chromatograms (RIC)
   D. Sample raw data, duplicate control samples raw data, single control sample raw data*

* For GC/MS, raw data includes the summary sheet, diagnostic report, quantitation summary, chromatograms (RIC), spectra, TIC report and library searches (when applicable).

GC:

I. Initial Calibration Data
   A. Initial calibration summary, analysis report and chromatograms for each column.

II. Sample Data
   A. Logbook pages, preparation logs (where applicable)
   C. Bracketing continuing calibration standards (where applicable)
   D. Sample raw data, duplicate control samples raw data, single control sample raw data**
   E. Bracketing continuing calibration standards (where applicable)

** For GC, raw data includes the analysis report and chromatograms for each column.

Inorganic Raw Data

I. Metals Raw Data
   A. Preparation logs
   B. GFAA and/or CVAA data (includes analysis benchsheets listing all calibration, samples, duplicate control samples, single control sample)
   C. ICP data (includes computer printouts listing all calibration, samples, duplicate control samples, single control sample)

II. Wet Chemistry Raw Data

GC/MS VOA

METHOD/TEST 8240

INSTRUMENT F

INITIAL CALIBRATION DATE 06/15/92

BROMOFLUOROBENZENE

Tuning Report
06/15/92 21:34:00 + 3:32
Instrument: I50F
Case Number:

Data: F0607 # 212
Cali: 15JUN92F # 3
Analyst:
Laboratory:

Base m/z: 95
RIC: 15584.
Acct. No.:
Contract:

m/z	Intensity	% RA	Ion Abundance Criteria Min %	Max %	Mass	Actual	Status
50	771.	26.6	15.0	40.0	95	26.6	PASS
75	1726.	59.6	30.0	60.0	95	59.6	PASS
95	2896.	100.0	100.0	---	---	100.0	PASS
96	205.	7.1	5.0	9.0	95	7.1	PASS
173	0.	0.0	---	2.0	174	0.0	PASS
174	2024.	69.9	50.0	---	95	69.9	PASS
175	167.	5.8	5.0	9.0	174	8.3	PASS
176	1952.	67.4	95.0	101.0	174	96.4	PASS
177	130.	4.5	5.0	9.0	176	6.7	PASS

6/15/92

Mass List
06/15/92 21:34:00 + 3:32
Sample: 50 NG BFB
Conds.:

Data: F0607 # 212
Cali: 15JUN92F # 3

Base m/z: 95
RIC: 15584.

000006

37 0.00 0. Minima Min Inten: 0.
219 Maxima # 0

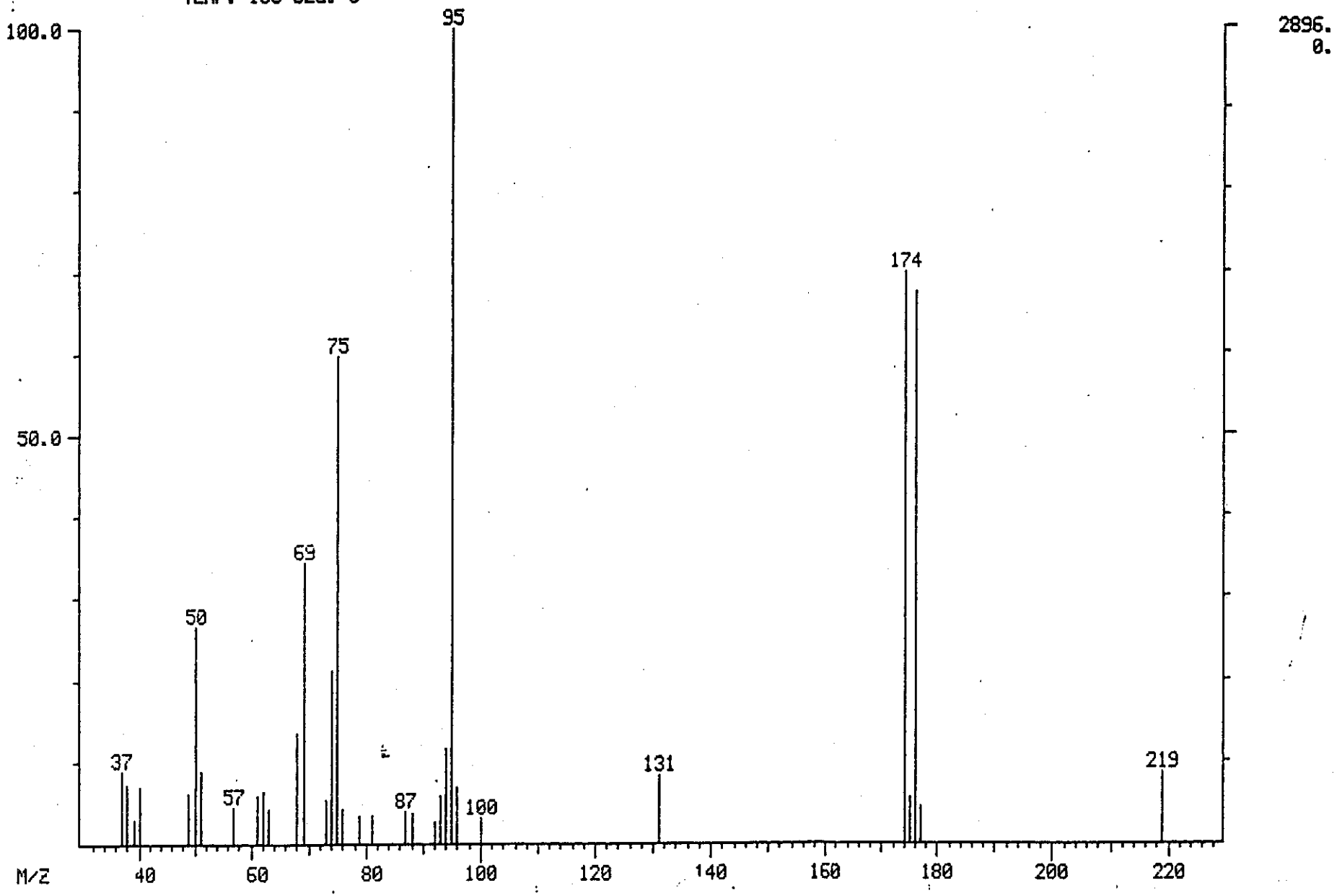
Mass	% RA	Inten.
37?	8.87	257.
38?	7.35	213.
39?	3.00	87.
40?	7.04	204.
49?F	6.08	176.
50?F	26.62	771.
51?	8.84	256.
57?	4.70	136.
61?	5.90	171.
62?	6.46	187.
63?	4.32	125.
68?	13.40	388.
69	34.53	1000.
73	5.28	153.
74 F	21.34	618.
75 F	59.60	1726.
76	4.35	126.
79	3.56	103.
81	3.49	101.
87	3.97	115.
88	3.69	107.
92	2.80	81.
93	5.90	171.
94	11.67	338.
95	100.00	2896.
96	7.08	205.
100	3.14	91.
131	8.36	242.
174	69.89	2024.
175	5.77	167.
176	67.40	1952.
177	4.49	130.
219	8.56	248.

200000

MASS SPECTRUM
06/15/92 21:34:00 + 3:32
SAMPLE: 50 NG BFB
CONDS.:
TEMP: 105 DEG. C

DATA: F0607 #212
CALI: 15JUN92F #3

BASE M/Z: 95
RIC: 15584.

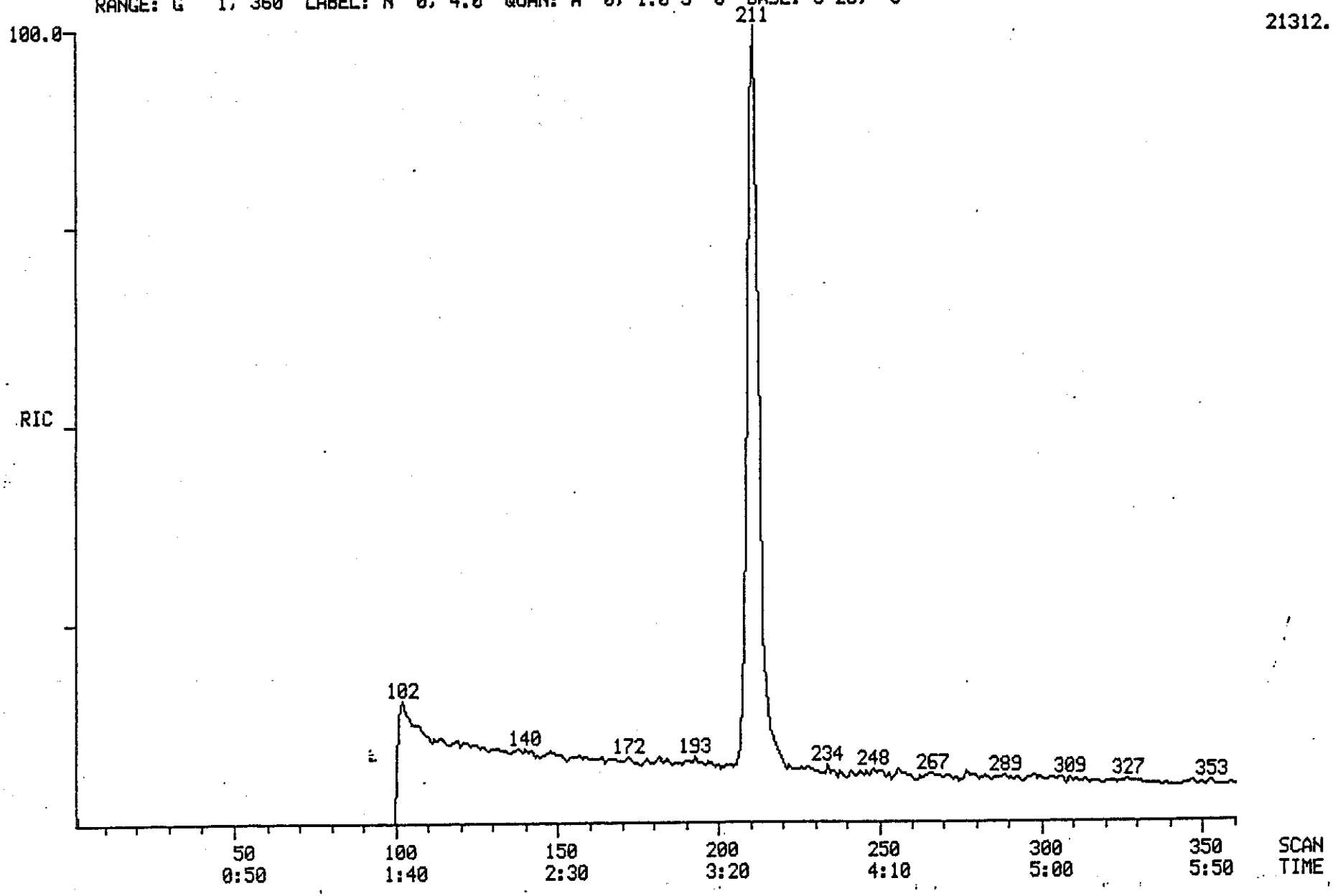


000008

RIC
06/15/92 21:34:00
SAMPLE: 50 NG BFB
CONDS.:
RANGE: G 1, 360 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F0607 #210 SCANS 1 TO 360
CALI: 15JUN92F #3

21312.



Enseco GC/MS
VOA CALIBRATION CHECK

INITIAL CALIBRATION 20 UG/L	VOAF0610	06/15/92	23:48:00
INITIAL CALIBRATION 50 UG/L	VOAF0608	06/15/92	21:48:00
INITIAL CALIBRATION 100 UG/L	VOAF0611	06/16/92	0:19:00
INITIAL CALIBRATION 150 UG/L	VOAF0612	06/16/92	0:51:00
INITIAL CALIBRATION 200 UG/L	VOAF0609	06/15/92	22:48:00

Library Entry		Compound	Initial Calibration Response Factor Avg	Min	% RSD	Max	Continuing Calibration Response Factor	Min	% Diff	Max
V1	94	V011 CIS-1,2-DICHLOR	1.781		6.3					
V1	99	V013 TETRAHYDROFURAN	0.388		17.4					
V1	20	V001 DICHLORODIFLUOR	0.690		20.5					
V1	10	C010 CHLOROMETHANE	0.832	0.300	18.0					
V1	25	C020 VINYL CHLORIDE	1.088		12.8	30.0				
V1	15	C015 BROMOMETHANE	1.194		11.7					
V1	35	C025 CHLOROETHANE	0.835		9.8					
V1	70	V007 TRICHLOROFLUORO	3.633		20.7					
V1	80	C045 1,1-DICHLOROETH	1.464		13.7	30.0				
V1	105	V015 TRICHLORO-TRIFL	1.482		16.0					
V1	65	C040 CARBON DISULFID	3.313		15.6					
V1	50	C035 ACETONE	0.353		26.6					
V1	45	C030 METHYLENE CHLOR	1.737		9.3					
V1	95	V012 TRANS-1,2-DICHL	1.410		8.5					
V1	98	C110 2-BUTANONE	0.099		17.7					
V1	90	C050 1,1-DICHLOROETH	2.834	0.300	5.9					
V2	25	C125 VINYL ACETATE	0.618		7.3					
V1	100	C060 CHLOROFORM	3.800		4.7	30.0				
V2	15	C115 1,1,1-TRICHLORO	0.733		13.4					
V2	20	C120 CARBONTETRACHLO	0.707		8.4					
V2	60	C165 BENZENE	0.990		9.4					
V1	110	C065 1,2-DICHLOROETH	2.923		7.5					
V2	45	C150 TRICHLOROETHENE	0.504		11.2					
V2	35	C140 1,2-DICHLOROPRO	0.430		9.6	30.0				
V1	130	V019 1,4-DIOXANE	0.014		22.0					
V2	30	C130 BROMODICHLOROME	0.759		10.3					
/2	75	V023 2-CHLOROETHYL V	0.095		112.3					
V2	40	C143 CIS-1,3-DICHLOR	0.568		5.2					
V3	10	C205 4-METHYL-2-PENT	0.466		17.6					
V3	35	C230 TOLUENE	0.896		10.0	30.0				
V2	65	C172 TRANS-1,3-DICHL	0.491		7.8					
V2	55	C160 1,1,2-TRICHLORO	0.329		8.0					
V3	20	C220 TETRACHLOROETHE	0.485		11.8					
V3	15	C210 2-HEXANONE	0.268		16.9					
V2	50	C155 DIBROMOCHLOROME	0.603		4.2					
V2	70	V022 1,2-DIBROMOETHA	0.439		12.0					
V3	40	C235 CHLOROBENZENE	1.052	0.300	8.5					
V3	50	C240 ETHYLBENZENE	0.497		8.7	30.0				
V3	75	V032 M+P XYLENES	0.871		8.3					
V3	60	V029 O-XYLENE	0.523		10.6					
V3	55	C245 STYRENE	1.072		6.8					
V2	80	C180 BROMOFORM	0.459	0.250	8.3					
V3	25	C225 1,1,2,2-TETRACH	0.799	0.300	11.3					
V3	80	V035 M-DICHLOROBENZE	1.012		10.8					
V3	90	V037 P-DICHLOROBENZE	1.066		9.5					
V3	85	V036 O-DICHLOROBENZE	0.976		12.5					
V1	32	V003 DICHLOROFLUOROM	2.271		24.5					
V1	63	TERT-BUTYL METHYL ET	2.200		13.1					
V1	102	V009 HEXANE	1.930		14.9					
V1	115	V016 DIBROMOMETHANE	1.707		10.3					
V1	40	V004 IODOMETHANE	3.067		19.1					
V1	60	V006 ACRYLONITRILE	0.282		10.7					
V1	55	V005 ACROLEIN	0.192		16.8					
V2	90	V025 1,2,3-TRICHLORO	0.381		12.5					
V3	30	V026 T-1,4-DICHLORO-	0.186		10.6					
V3	38	V027 ETHYL METHACRYL	0.481		10.9					
V3	2	CS05 TOLUENE-D8	1.224		13.5					
V3	3	CS10 BROMOFLUOROBENZ	0.794		12.4					
V1	2	CS15 1,2-DICHLOROETH	2.526		10.9					

Enseco GC/MS
VOA CALIBRATION CHECK

INITIAL CALIBRATION	20 UG/L	VOAF0610	06/15/92	23:48:00
INITIAL CALIBRATION	50 UG/L	VOAF0608	06/15/92	21:48:00
INITIAL CALIBRATION	100 UG/L	VOAF0611	06/16/92	0:19:00
INITIAL CALIBRATION	150 UG/L	VOAF0612	06/16/92	0:51:00
INITIAL CALIBRATION	200 UG/L	VOAF0609	06/15/92	22:48:00

		VOAF0610		VOAF0608		VOAF0611		VOAF0612		VOAF0609			
Lib	#	Conc	RRF	Conc	RRF	Conc	RRF	Conc	RRF	Conc	RRF	Conc	RRF
V1	94	20,	1.837	50,	1.658	100,	1.714	150,	1.751	200,	1.944		
V1	99	20,	0.479	50,	0.375	100,	0.290	150,	0.396	200,	0.398		
V1	20	20,	0.701	50,	0.629	100,	0.501	150,	0.733	200,	0.886		
V1	10	20,	0.606	50,	0.911	100,	0.782	150,	0.859	200,	1.002		
V1	25	20,	0.972	50,	1.147	100,	0.951	150,	1.077	200,	1.293		
V1	15	20,	1.097	50,	1.210	100,	1.048	150,	1.204	200,	1.410		
V1	35	20,	0.792	50,	0.895	100,	0.722	150,	0.836	200,	0.928		
V1	70	20,	4.269	50,	2.719	100,	2.973	150,	3.837	200,	4.368		
V1	80	20,	1.436	50,	1.302	100,	1.273	150,	1.542	200,	1.767		
V1	105	20,	1.501	50,	1.509	100,	1.119	150,	1.496	200,	1.784		
V1	65	20,	3.349	50,	2.838	100,	2.821	150,	3.495	200,	4.062		
V1	50	20,	0.490	50,	0.385	100,	0.258	150,	0.273	200,	0.360		
V1	45	20,	1.974	50,	1.745	100,	1.550	150,	1.630	200,	1.786		
V1	95	20,	1.577	50,	1.389	100,	1.288	150,	1.314	200,	1.483		
V1	98	20,	0.129	50,	0.090	100,	0.088	150,	0.088	200,	0.102		
V1	90	20,	3.040	50,	2.774	100,	2.645	150,	2.733	200,	2.979		
V2	25	20,	0.670	50,	0.622	100,	0.554	150,	0.598	200,	0.647		
V1	100	20,	3.842	50,	3.791	100,	3.585	150,	3.710	200,	4.072		
V2	15	20,	0.902	50,	0.704	100,	0.654	150,	0.679	200,	0.728		
V2	20	20,	0.795	50,	0.687	100,	0.637	150,	0.684	200,	0.730		
V2	60	20,	1.136	50,	0.989	100,	0.889	150,	0.937	200,	0.999		
V1	110	20,	2.964	50,	2.763	100,	2.728	150,	2.884	200,	3.276		
V2	45	20,	0.601	50,	0.499	100,	0.453	150,	0.480	200,	0.489		
V2	35	20,	0.499	50,	0.434	100,	0.395	150,	0.409	200,	0.412		
V1	130	400,	0.018	1000,	0.017	2000,	0.011	3000,	0.014	4000,	0.012		
V2	30	20,	0.888	50,	0.727	100,	0.684	150,	0.728	200,	0.767		
V2	75	20,	0.200	50,	0.222	100,	0.037	150,	0.011	200,	0.006		
/2	40	32,	0.608	81,	0.554	162,	0.534	243,	0.554	324,	0.588		
V3	10	20,	0.603	50,	0.443	100,	0.406	150,	0.404	200,	0.476		
V3	35	20,	1.035	50,	0.834	100,	0.831	150,	0.844	200,	0.938		
V2	65	8,	0.502	19,	0.459	38,	0.448	57,	0.504	76,	0.543		
V2	55	20,	0.354	50,	0.322	100,	0.294	150,	0.318	200,	0.356		
V3	20	20,	0.580	50,	0.448	100,	0.476	150,	0.433	200,	0.486		
V3	15	20,	0.333	50,	0.251	100,	0.225	150,	0.236	200,	0.297		
V2	50	20,	0.629	50,	0.581	100,	0.572	150,	0.606	200,	0.625		
V2	70	40,	0.457	100,	0.431	200,	0.355	300,	0.498	400,	0.455		
V3	40	20,	1.160	50,	0.970	100,	1.000	150,	0.990	200,	1.138		
V3	50	20,	0.546	50,	0.471	100,	0.462	150,	0.463	200,	0.541		
V3	75	20,	0.958	50,	0.813	100,	0.843	150,	0.804	200,	0.939		
V3	60	20,	0.611	50,	0.477	100,	0.490	150,	0.493	200,	0.542		
V3	55	20,	1.160	50,	1.003	100,	1.028	150,	1.028	200,	1.140		
V2	80	20,	0.495	50,	0.453	100,	0.409	150,	0.440	200,	0.499		
V3	25	20,	0.935	50,	0.764	100,	0.719	150,	0.733	200,	0.842		
V3	80	20,	1.152	50,	0.918	100,	0.998	150,	0.900	200,	1.091		
V3	90	20,	1.209	50,	0.948	100,	1.033	150,	1.018	200,	1.121		
V3	85	20,	1.162	50,	0.884	100,	0.960	150,	0.857	200,	1.016		
V1	32	20,	2.603	50,	1.992	100,	1.426	150,	2.558	200,	2.774		
V1	63	20,	2.446	50,	2.283	100,	1.838	150,	2.476	200,	1.959		
V1	102	20,	2.305	50,	1.853	100,	1.549	150,	2.108	200,	1.835		
V1	115	20,	1.854	50,	1.717	100,	1.480	150,	1.896	200,	1.590		
V1	40	40,	2.994	100,	2.759	200,	2.318	300,	3.829	400,	3.437		
V1	60	80,	0.283	200,	0.302	400,	0.232	600,	0.309	800,	0.283		
V1	55	100,	0.206	250,	0.188	500,	0.138	750,	0.218	1000,	0.211		
V2	90	20,	0.428	50,	0.381	100,	0.304	150,	0.412	200,	0.380		
V3	30	20,	0.195	50,	0.183	100,	0.154	150,	0.206	200,	0.192		
V3	38	40,	0.530	100,	0.467	200,	0.399	300,	0.521	400,	0.486		
V3	2	20,	1.432	50,	1.095	100,	1.126	150,	1.373	200,	1.092		
V3	3	20,	0.925	50,	0.735	100,	0.735	150,	0.874	200,	0.703		
V1	2	20,	2.670	50,	2.296	100,	2.339	150,	2.943	200,	2.382		

Name List: HEDR1 Entry # 1 of 1 **000011**
File Name: F0608

(1)Format: VOACLP
(3)Sample ID: VSTD050
(5)Matrix:
(7)Fraction: VOA
(10)Analyst: EG
(12)Purge Volume: NA
(14)Extract Volume: NA
(16)Sample Amount: NA
(19)Run Factor: NA

(2)Case: STDF
(4)Level:
(6)Lab Sample ID: V6327
(8)Type: CAL
(11)Quan List Units: UG/L
(13)Extract Dilution: NA
(15)Extract Vol. Used: NA
(17)Percent Moisture: NA
(20)SURROGATE VOLUME:: NA

6/15/92 21:48:03
Acquisition started

Acquire Run 3:F0608 Starting
06/15/92 21:48:00 + 0:00 Free sectors: 11145 Scan: 0 of 1464
Sample: CLP,STDF ,,VSTD050 , , ,V6327,VOA,CAL ,
Conds.: UG/L *NA *100%/NA *(NA/NA)/NA NA M
Formula: NANA Instrument: I50F Weight: 0.000
Submitted by: RMAL Analyst: EG Acct. No: VOACLP

*** GC not ready and being equilibrated ***
GC Desc.: VN Elapsed time : 0.0 Min

Seq. #	Temp (DegC)	Rate (C/min)	Time (minutes) period	total			
1	-20--18	2.0	1.0	1.0	Injector A	:	220 Deg C
2	-18-102	7.0	17.1	18.1	GC oven	:	68 Deg C
3	102-202	30.3	3.3	21.4	Transfer-line	:	203 Deg C
					Ion source	:	182 Deg C

Valve A : closed Valve B : closed
*** Instrument parameters ***
Post acquisition state -> Filament : Off Multiplier : Off
MODE: EI (+) Centroid + Temp - Sequence: VO (1 time window.)

Sequence Window # 1
Number of cycles: 1
Filament is ON
Multiplier is ON
Scan descriptor: VO Mass intervals: 1 Positive ion mode.
Total scan time: 1.000 s Master rate: B

MPW: 3 MFW: 70 MA: 50 TH: 1 BL: 0

Int #	Lo mass	Hi mass	Time
1	36.511	300.590	1.000

Calibration table: 3:15JUN92F

Interface number	0	
Instrument type	G	
Full scale mass	1170	u
Zero scale mass	1	u
Intensity/ion	2	
Peak width	1000.	mmu
Offset at low mass	0	mmu
Offset at high mass	0	mmu
Voltage settling time(ms)	4	

Current instrument parameters.

	Positive ion mode	Negative ion mode
Resolution (high)	123.00	0.00
Resolution (low)	125.00	0.00
Quad offset	-2.00	0.00
Quad programming	-1.00	0.00
Lens offset	-30.00	0.00
Lens programming	0.00	0.00
Ext offset	-4.00	0.00
Ext programming	0.00	0.00
Collector	30.00	0.00
Ion offset	4.00	0.00

PROCEDURE: TCA DIAGNOSTIC REPORT 6/15/92 22:20:15
DATA FILE: F0608
REFERENCE: 11TABLE
NAME LIST: LLNL INITIALIZATION OPTION: 2 PROCESSING OPTION: 3
REPORT: IS01

000012

---- STANDARDS ----- ><				--- PLUS UNKNOWNS --- ><				- LIST NAMES - >
PROC	USED	POSS	RMS	PROC	USED	POSS	RMS	STANDARD/UNKNOWN
1	1	1	0	11	11	4	95	IS01/TC01
1	1	1	0	11	10	4	33	IS02/TC02
1	1	1	0	4	4	1	51	IS03/TC03
3	3	1	0	13	13	1	60	IS04/TC04
3	3	1	0	13	12	1	117	IS05/TC05
3	3	1	0	7	7	1	53	IS06/TC06
1	1	1	0	11	11	2	57	IS07/TC07
1	1	1	0	4	4	4	8	IS08/TC08

63 COMPOUNDS PROCESSED, 61 FOUND

< COMPOUND ><			---------- SEARCH ---------- >< SAT >< ------ CHRO ------- >										
NO	LIB	ENTRY	REF	PRED	SEL	DELTA	PEAKS	FIT	PEAKS	M/Z	TOP	DELTA	PEAKS
1	V1	1	-464	465	465	.	1	993	.	128	465	.	1
2	V1	20	-71	70	70	.	2	997	.	85	70	.	1
3	V1	10	-86	85	83	-2	1	996	.	50	83	.	1
4	V1	25	-103	102	102	.	1	996	.	62	102	.	1
5	V1	15	-143	142	143	1	1	991	.	94	143	.	1
6	V1	35	-162	162	163	1	1	984	.	64	163	.	1
7	V1	70	-197	197	197	.	1	994	.	101	197	.	1
8	V1	32	-209	209	209	.	1	924	.	67	209	.	1
9	V1	80	-257	257	257	.	1	991	.	96	257	.	1
10	V1	65	-260	260	261	1	1	985	.	76	261	.	1
11	V1	55	-260	260	261	1	2	999	.	56	261	.	1
12	V1	38	-261	261	.	.	.	.	.	45	261	.	1
13	V1	40	-263	263	263	.	1	992	.	142	263	.	1
14	V1	105	-271	271	271	.	1	998	.	151	271	.	1
15	V1	50	-285	285	285	.	1	1000	.	43	285	.	1
16	V1	45	-320	320	320	.	1	986	.	84	320	.	1
17	V1	95	-345	345	345	.	1	991	.	96	345	.	1
18	V1	60	-354	354	354	.	2	997	.	53	354	.	1
19	V1	63	-356	356	356	.	1	999	.	73	356	.	1
20	V1	102	-375	375	376	1	2	999	.	57	376	.	1
21	V1	90	-387	387	387	.	1	996	.	63	387	.	1
22	V2	25	-409	409	409	.	1	984	.	43	409	.	1
23	V1	94	-445	445	445	.	1	985	.	96	445	.	1
24	V1	98	-458	458	458	.	1	994	.	72	458	.	1
25	V2	1	-566	567	567	.	1	998	.	114	567	.	1
26	V3	1	-844	845	845	.	1	994	.	117	845	.	1
27	V1	99	-471	471	472	1	1	973	.	42	472	.	1
28	V1	100	-482	482	481	-1	1	997	.	83	481	.	1
29	V2	15	-484	484	484	.	1	995	.	97	484	.	1
30	V2	20	-498	498	498	.	1	1000	.	117	498	.	1
31	V2	60	-518	518	518	.	1	980	.	78	518	.	1
32	V1	2	-519	519	519	.	1	978	.	65	519	.	1
33	V1	110	-526	526	526	.	1	979	.	62	526	.	1
34	V2	45	-583	583	583	.	1	991	.	130	582	-1	1
35	V2	35	-602	602	602	.	1	985	.	63	602	.	1
36	V1	115	-613	613	613	.	1	992	.	174	613	.	1
37	V1	130	-629	629	626	-3	1	993	.	88	626	.	1
38	V2	30	-636	636	636	.	1	993	.	83	636	.	1
39	V2	75	-674	674	675	1	1	996	.	63	675	.	1
40	V2	40	-679	679	680	1	1	994	.	75	680	.	1
41	V3	2	-700	700	700	.	1	981	.	98	700	.	1
42	V3	10	-704	704	.	.	.	.	.	43	704	.	1
43	V3	35	-706	706	706	.	1	988	.	92	706	.	1
44	V2	65	-739	739	739	.	1	996	.	75	739	.	1
45	V2	55	-755	755	755	.	1	951	.	97	754	-1	1
46	V3	20	-757	757	757	.	1	960	.	164	757	.	1
47	V3	38	-758	759	758	-1	1	986	.	41	758	.	1
48	V2	50	-789	789	790	1	1	987	.	129	789	-1	1
49	V3	15	-789	789	789	.	1	971	.	43	790	1	1
50	V2	70	-793	793	793	.	1	969	.	107	793	.	1
51	V3	40	-847	847	847	.	1	984	.	112	847	.	1
52	V3	50	-865	865	865	.	1	990	.	106	865	.	1
53	V3	75	-878	878	878	.	2	993	.	106	878	.	1
54	V3	60	-919	919	919	.	1	995	.	106	919	.	1
55	V3	55	-923	923	922	-1	1	990	.	104	922	.	1
56	V2	80	-937	937	937	.	1	992	.	173	937	.	1
57	V3	3	-976	976	976	.	1	990	.	95	976	.	1
58	V2	90	-1002	1002	1003	1	1	991	.	75	1002	-1	1
59	V3	25	-1005	1005	1005	.	1	981	.	83	1005	.	1
60	V3	30	-1011	1011	1011	.	1	987	.	53	1011	.	1
61	V3	80	-1096	1096	1096	.	2	987	.	146	1096	.	1
62	V3	90	-1107	1107	1107	.	2	987	.	146	1107	.	1
63	V3	85	-1136	1136	1136	.	1	986	.	146	1136	.	1

Ion programming	1.00	0.00
Rod polarity	Reverse	Normal

Electron multiplier voltage: 1279.
Filament emission current: 750.
Electrometer range: 10 ^-7
Electrometer zero: 128.0

Analyzer Fore Pressure .....: 0.025 Torr
Separator/Source Pressure .....: 0.361 Torr

6/15/92 22:18:43
ACQUISITION COMPLETED
Scans 1 to 1464 Centroid

Mode	Scans	Secs	Out of	%	Peaks per scan	per sec	
Centroid	1464	1.4	1464.0	0.1	22681.	15.	15.

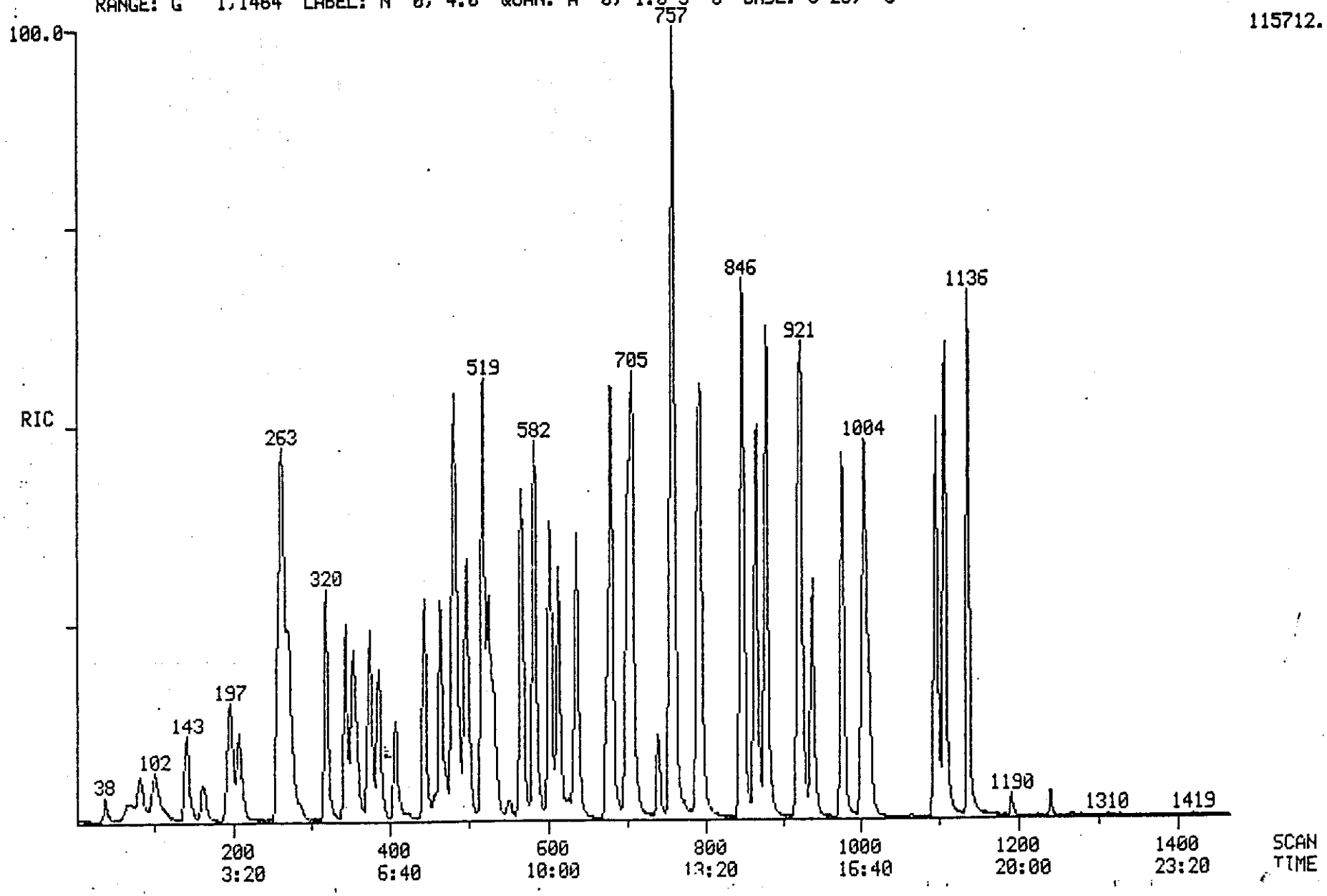
000014

RIC
06/15/92 21:48:00
SAMPLE: CLP,STDF ,,VSTD050 , , ,V6327,VOA,CAL ,
CONDS.: UG/L *NA *100%/NA *(NA/NA)/NA NA M
RANGE: G 1,1464 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

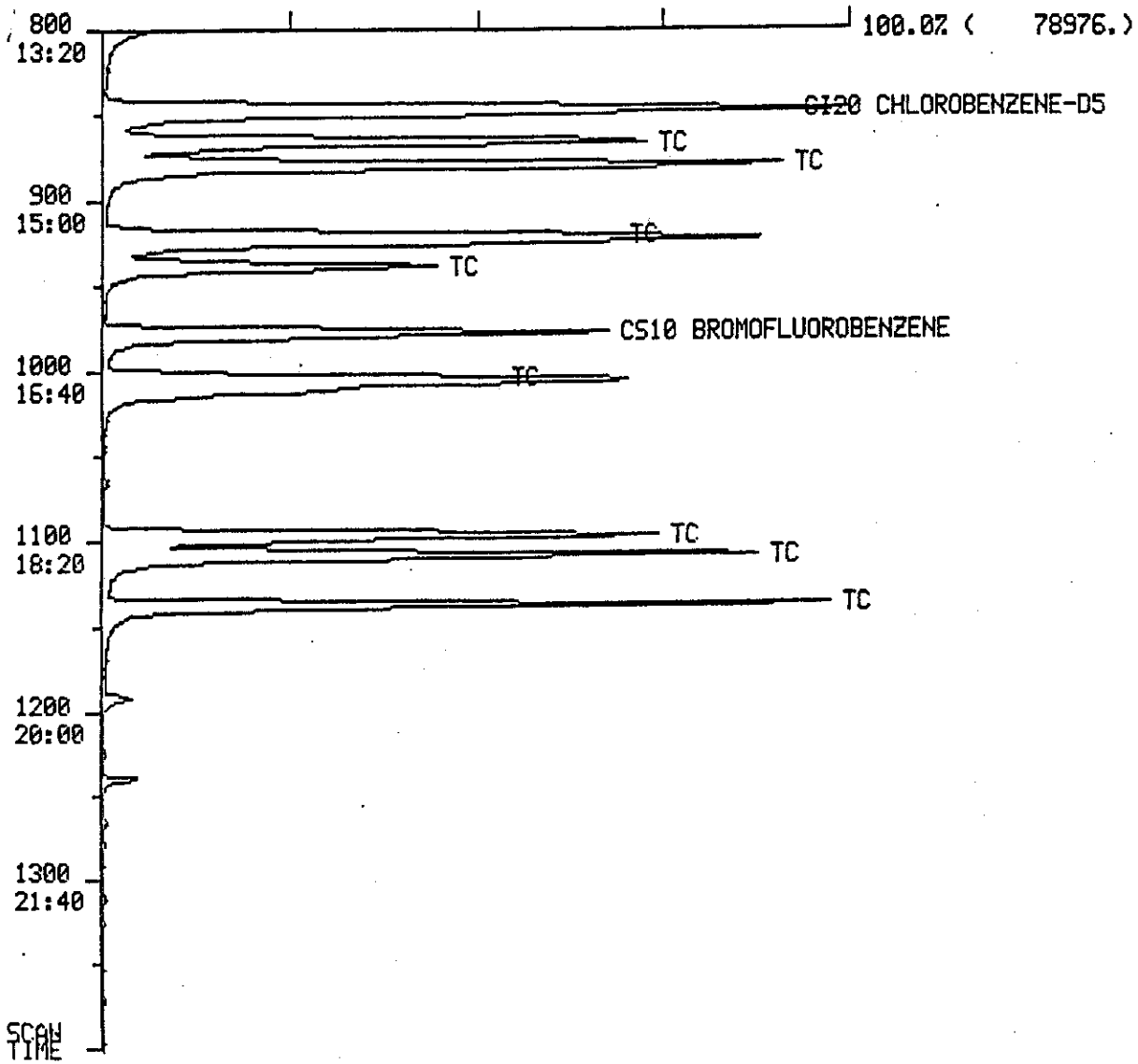
DATA: F0608 #4
CALI: 15JUN92F #3

SCANS 1 TO 1464

115712.



DATA FROM FILE: F0608 SCANS 800 TO 1400 ACQUIRED: 06/15/92 21:48:00
CALI: F0608 #3
SAMPLE: CLP,STDF ,,VSTD050 , , ,V6327,VOA,CAL ,
CONDS.: UG/L *NA *100%/NA *(NA/NA)/NA NA M

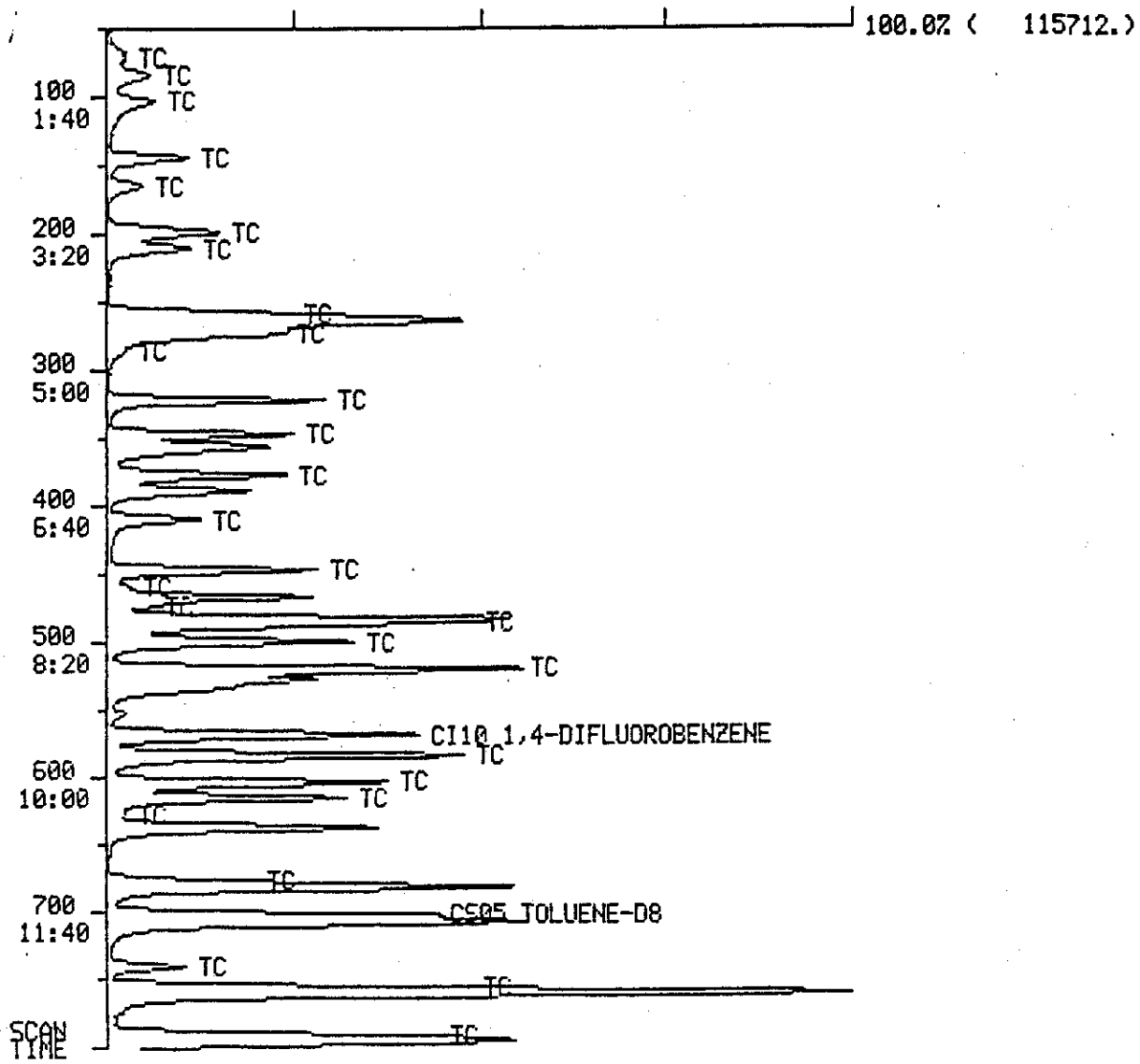


000015

RMAL QUANTITATION SUMMARY FILE: F0608
COMPOUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

NO	LIBRARY ENTRY	NAME	MASS	SCAN	REF	AREA	UNITS: RRF	UG/L AMOUNT
1	V1# 1	CI01 BROMOCHLOROMETHANE	128	465	1	22485.	1.000	50.000
2	V2# 1	CI10 1,4-DIFLUOROBENZENE	114	567	2	110108.	1.000	50.000
3	V3# 1	CI20 CHLOROBENZENE-D5	117	845	3	80565.	1.000	50.000
4	V3# 2	CS05 TOLUENE-D8	98	700	3	88250.	1.182	46.338
5	V3# 3	CS10 BROMOFLUOROBENZENE	95	976	3	59224.	0.725	50.711
6	V1# 2	CS15 1,2-DICHLOROETHANE-	65	519	1	51616.	2.235	51.351
7	V1# 20	V001 DICHLORODIFLUOROMET	85	70	1	14148.	0.337	93.307
8	V1# 10	C010 CHLOROMETHANE	50	83	1	20477.	0.585	77.853
9	V1# 25	C020 VINYL CHLORIDE	62	102	1	25792.	0.792	72.425
10	V1# 15	C015 BROMOMETHANE	94	143	1	27200.	1.017	59.465
11	V1# 35	C025 CHLOROETHANE	64	163	1	20125.	0.691	64.746
12	V1# 70	V007 TRICHLOROFLUOROMETH	101	197	1	61146.	3.627	37.487
13	V1# 32	V003 DICHLORODFLUOROMETHA	67	209	1	44791.	2.147	46.398
14	V1# 80	C045 1,1-DICHLOROETHENE	96	257	1	29273.	1.221	53.295
15	V1# 65	C040 CARBON DISULFIDE	76	261	1	63805.	2.916	48.650
16	V1#105	V015 TRICHLORO-TRIFLUORO	151	271	1	33925.	1.146	65.807
17	V1# 50	C035 ACETONE	43	285	1	8650.	0.334	57.589
18	V1# 45	C030 METHYLENE CHLORIDE	84	320	1	39240.	1.745	49.997
19	V1# 95	V012 TRANS-1,2-DICHLORDE	96	345	1	31241.	1.324	52.471
20	V1#102	V009 HEXANE	57	376	1	41675.	1.959	47.315
21	V1# 90	C050 1,1-DICHLOROETHANE	63	387	1	62369.	2.604	53.262
22	V2# 25	C125 VINYL ACETATE	43	409	2	68468.	0.637	48.818
23	V1# 94	V011 CIS-1,2-DICHLOROETH	96	445	1	37282.	1.601	51.769
24	V1# 98	C110 2-BUTANONE	72	458	1	2021.	0.091	49.548
25	V1# 99	V013 TETRAHYDROFURAN	42	472	1	8422.	0.387	48.367
26	V1#100	C060 CHLOROFORM	83	481	1	85243.	3.556	53.305
27	V2# 15	C115 1,1,1-TRICHLOROETHA	97	484	2	77529.	0.704	49.998
28	V2# 20	C120 CARBONTETRACHLORIDE	117	498	2	75663.	0.660	52.045
29	V2# 60	C165 BENZENE	78	518	2	108855.	0.969	51.037
30	V1#110	C065 1,2-DICHLOROETHANE	62	526	1	62120.	2.641	52.299
31	V2# 45	C150 TRICHLOROETHENE	130	582	2	54908.	0.476	52.338
32	V2# 35	C140 1,2-DICHLOROPROPANE	63	602	2	47768.	0.428	50.679
33	V1#130	V019 1,4-DIOXANE	88	626	1	7844.	0.015	1158.340
34	V2# 30	C130 BROMODICHLOROMETHAN	83	636	2	80050.	0.738	49.268
35	V2# 75	V023 2-CHLOROETHYL VINYL	63	675	2	24449.	0.067	165.815
36	V2# 40	C143 CIS-1,3-DICHLOROPRO	75	680	2	98890.	0.546	82.307
37	V3# 10	C205 4-METHYL-2-PENTANON	43	704	3	35694.	0.475	46.597
38	V3# 35	C230 TOLUENE	92	706	3	67181.	0.877	47.566
39	V2# 65	C172 TRANS-1,3-DICHLOROP	75	739	2	19216.	0.450	19.409
40	V2# 55	C160 1,1,2-TRICHLOROETHA	97	754	2	35487.	0.314	51.312
41	V3# 20	C220 TETRACHLOROETHENE	164	757	3	36064.	0.506	44.244
42	V3# 15	C210 2-HEXANONE	43	790	3	20228.	0.259	48.424
43	V2# 50	C155 DIBROMOCHLOROMETHAN	129	789	2	64011.	0.572	50.804
44	V2# 70	V022 1,2-DIBROMOETHANE	107	793	2	95016.	0.446	96.724
45	V3# 40	C235 CHLOROBENZENE	112	847	3	78123.	1.026	47.233
46	V3# 50	C240 ETHYLBENZENE	106	865	3	37914.	0.483	48.695
47	V3# 75	V032 M+P XYLENES	106	878	3	65519.	0.837	48.590
48	V3# 60	V029 O-XYLENE	106	919	3	38414.	0.499	47.795
49	V3# 55	C245 STYRENE	104	922	3	80790.	1.054	47.583
50	V2# 80	C180 BROMOFORM	173	937	2	49933.	0.490	46.292
51	V3# 25	C225 1,1,2,2-TETRACHLORO	83	1005	3	61517.	0.792	48.176
52	V3# 80	V035 M-DICHLOROBENZENE	146	1096	3	73985.	0.995	46.144
53	V3# 90	V037 P-DICHLOROBENZENE	146	1107	3	76373.	1.016	46.665
54	V3# 85	V036 O-DICHLOROBENZENE	146	1136	3	71233.	0.942	46.934
55	V1# 38	V040 ETHANOL	45	261	1	113.	0.001	212.642
56	V1# 40	V004 IODOMETHANE	142	263	1	124066.	2.891	95.419
57	V1# 55	V005 ACROLEIN	56	261	1	21174.	0.183	257.841
58	V1# 60	V006 ACRYLONITRILE	53	354	1	27133.	0.295	204.493
59	V1# 63	TERT-BUTYL METHYL ETHER	73	356	1	51327.	2.010	56.783
60	V1#115	V016 DIBROMOMETHANE	174	613	1	38598.	1.837	46.723
61	V2# 90	V025 1,2,3-TRICHLOROPROP	75	1002	2	41973.	0.371	51.341
62	V3# 38	V027 ETHYL METHACRYLATE	41	758	3	75228.	0.478	97.729
63	V3# 30	V026 T-1,4-DICHLORO-2-BU	53	1011	3	14716.	0.186	49.234

DATA FROM FILE: F0608 SCANS 50 TO 800 ACQUIRED: 06/15/92 21:48:00
CALI: F0608 #3
SAMPLE: CLP,STDF ,,VSTD050 , , ,V6327,VOA,CAL ,
CONDS.: UG/L *NA *100%/NA *(NA/NA)/NA NA M



000017

Name List: HEDR1 Entry # 1 of 1
File Name: F0609

(1)Format: VOAIND
(3)SAMPLE: 200 PPB HS
(5)COMMENT: ICAL
(11)Quan List Units: 1.00UG/L
(13)Extract Dilution: NA
(15)Extract Vol. Used: NA
(17)Percent Moisture: NA
(20)SURROGATE VOLUME:: 0.00500L

(2)PROJECT:
(4)MATRIX: WATER
(10)Analyst: EG
(12)Purge Volume: 5.00ML
(14)Extract Volume: NA
(16)Sample Amount: 5.00ML
(19)Run Factor: 1.00UG/L

6/15/92 22:48:37
Acquisition started

Acquire
06/15/92 22:48:00 + 0:00
Sample: -200 PPB HS WATER ICAL
Conds.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
Formula: 1.00UG/L0.00500L
Submitted by: RMAL

Run 3:F0609
Free sectors: 10889
Instrument: I50F
Analyst: EG

Starting
Scan: 0 of 1464
Weight: 0.000
Acct. No: VOAIND

*** GC not ready and being equilibrated ***
GC Desc.: VN
Elapsed time : 0.0 Min

Seq. #	Temp (DegC)	Rate (C/min)	Time (minutes) period	total
1	-20--18	2.0	1.0	1.0
2	-18-102	7.0	17.1	18.1
3	102-202	30.3	3.3	21.4

Injector A	:	220 Deg C
GC oven	:	69 Deg C
Transfer-line	:	203 Deg C
Ion source	:	181 Deg C

Valve A : closed Valve B : closed

*** Instrument parameters ***
Post acquisition state -> Filament : Off Multiplier : Off
MODE: EI (+) Centroid + Temp - Sequence: VO (1 time window.)

Sequence Window # 1
Number of cycles: 1
Filament is ON
Multiplier is ON
Scan descriptor: VO Mass intervals: 1 Positive ion mode.
Total scan time: 1.000 s Master rate: 8

MPW: 3 MFW: 70 MA: 50 TH: 1 BL: 0

Int #	Lo mass	Hi mass	Time
1	36.511	300.590	1.000

Calibration table: 3:15JUN92F

Interface number	0	
Instrument type	G	
Full scale mass	1170	u
Zero scale mass	1	u
Intensity/ion	2	
Peak width	1000.	mmu
Offset at low mass	0	mmu
Offset at high mass	0	mmu
Voltage settling time(ms)	4	

Current instrument parameters.

	Positive ion mode	Negative ion mode
Resolution (high)	123.00	0.00
Resolution (low)	125.00	0.00
Quad offset	-2.00	0.00
Quad programming	-1.00	0.00
Lens offset	-30.00	0.00
Lens programming	0.00	0.00
Ext offset	-4.00	0.00
Ext programming	0.00	0.00
Collector	30.00	0.00
Ion offset	4.00	0.00

000019

Ion programming	1.00	0.00
Rod polarity	Reverse	Normal

Electron multiplier voltage: 1279.
Filament emission current: 750.
Electrometer range: 10 ^-7
Electrometer zero: 128.0

Analyzer Fore Pressure .....: 0.024 Torr
Separator/Source Pressure .....: 0.366 Torr

6/15/92 23:17:56
ACQUISITION COMPLETED
Scans 1 to 1464 Centroid

Mode	Scans	Secs	Out of	%	Peaks per scan	per sec
Centroid	1464	2.7	1464.0	0.2	37167. 25.	25.

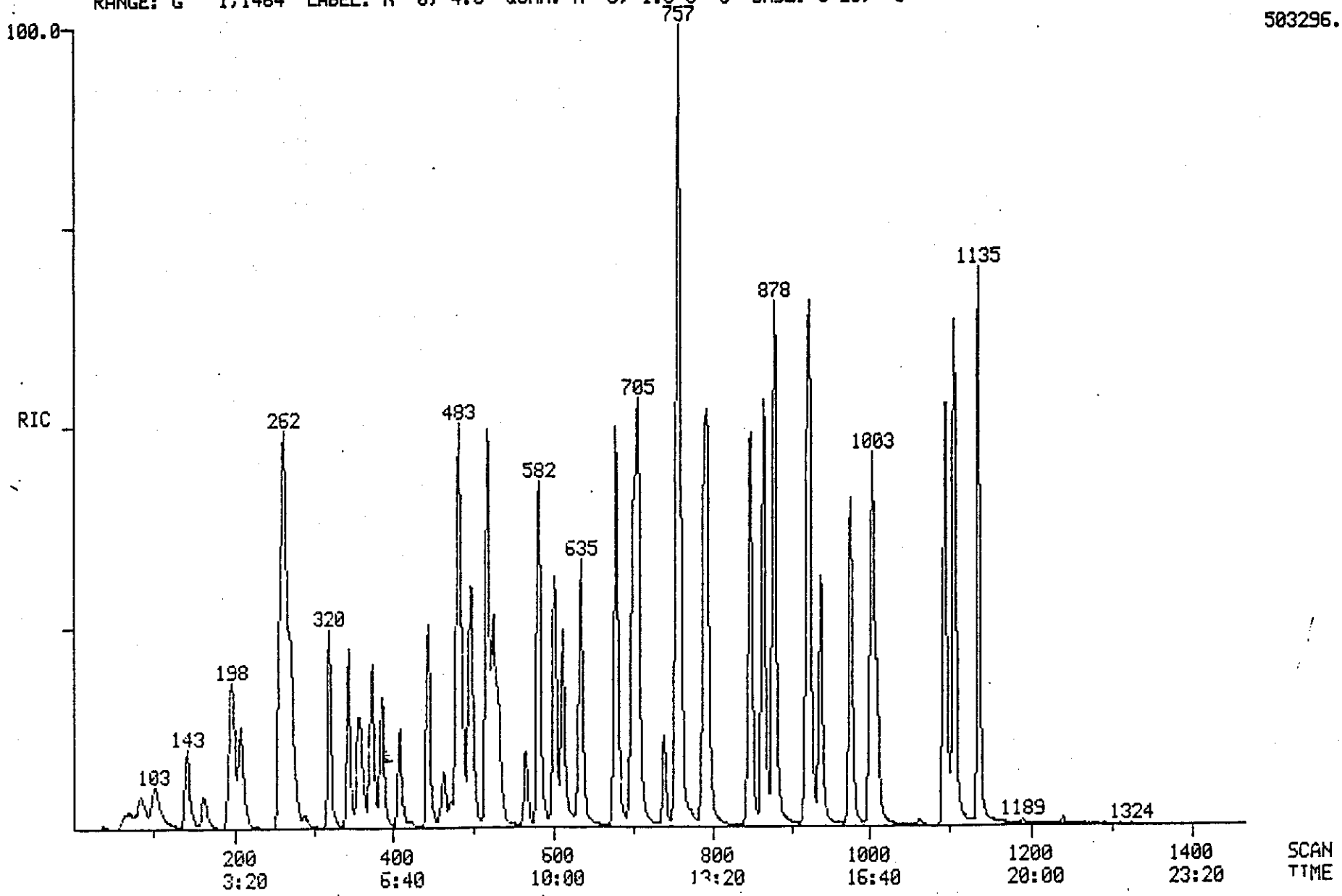
000020

RIC
06/15/92 22:48:00
SAMPLE: -200 PPB HS WATER ICAL
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
RANGE: G 1,1464 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F0609 #4
CALI: 15JUN92F #3

SCANS 1 TO 1464

503296.



PROCEDURE: TCA DIAGNOSTIC REPORT 6/15/92 23:19:32
DATA FILE: F0609
REFERENCE: 11TABLE
NAME LIST: LLNL INITIALIZATION OPTION: 2 PROCESSING OPTION: 3 **000021**
REPORT: ISO1

< ---- STANDARDS ----- >				< --- PLUS UNKNOWNS --- >				< - LIST NAMES - >
PROC	USED	POSS	RMS	PROC	USED	POSS	RMS	STANDARD/UNKNOWN
1	1	1	0	11	11	1	98	ISO1/TCO1
1	1	1	0	11	11	8	217	ISO2/TCO2
1	1	1	0	4	4	1	147	ISO3/TCO3
3	3	1	58	13	13	1	72	ISO4/TCO4
3	3	1	58	13	11	2	69	ISO5/TCO5
3	3	1	58	7	7	1	84	ISO6/TCO6
1	1	1	0	11	11	4	49	ISO7/TCO7
1	1	1	0	4	4	4	65	ISO8/TCO8

63 COMPOUNDS PROCESSED, 61 FOUND

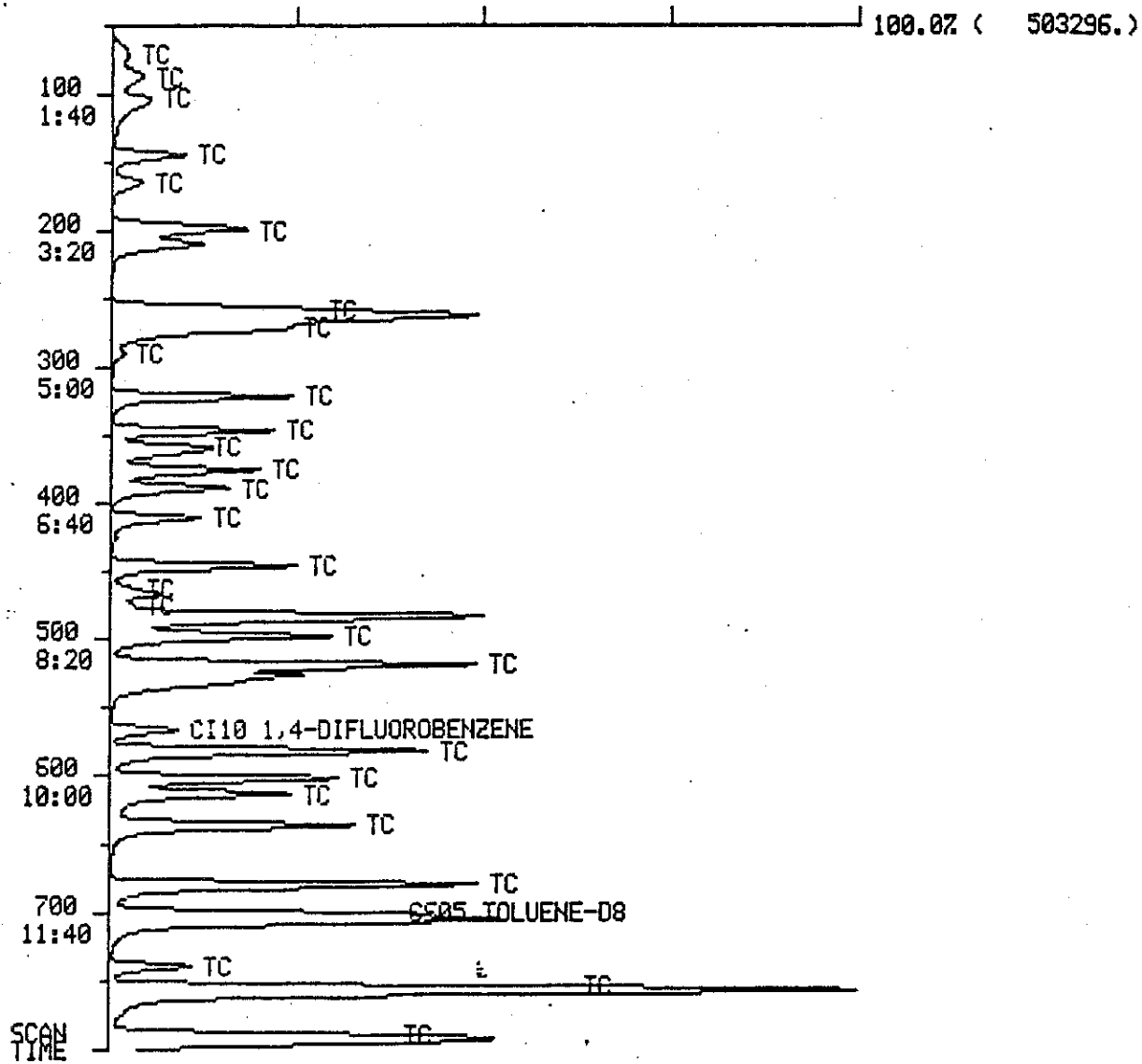
< COMPOUND >			< ---------- SEARCH ---------- >					< SAT >	< ------ CHRO ------- >			
NO	LIB	ENTRY	REF	PRED	SEL	DELTA	PEAKS	FIT	PEAKS	M/Z	TOP	DELTA	PEAKS
1	V1	1	-464	465	465	.	1	997	.	128	465	.	1
2	V1	20	-70	71	70	-1	1	995	.	85	70	.	1
3	V1	10	-83	84	86	2	1	997	.	50	86	.	1
4	V1	25	-102	103	102	-1	1	997	.	62	102	.	1
5	V1	15	-143	143	143	.	1	989	.	94	143	.	1
6	V1	35	-163	163	163	.	1	984	.	64	163	.	1
7	V1	70	-197	197	198	1	1	997	.	101	198	.	1
8	V1	32	-209	209	209	.	1	929	.	67	209	.	1
9	V1	80	-257	257	257	.	1	989	.	96	257	.	1
10	V1	38	-261	261	261	.	1	878	.	45	260	-1	1
11	V1	55	-261	261	261	.	1	1000	.	56	261	.	1
12	V1	65	-261	262	260	-2	1	978	.	76	260	.	1
13	V1	40	-263	264	263	-1	1	998	.	142	263	.	1
14	V1	105	-271	272	270	-2	1	995	.	151	270	.	1
15	V1	50	-285	286	289	3	2	1000	.	43	289	.	1
16	V1	45	-320	321	320	-1	1	988	.	84	320	.	1
17	V1	95	-345	346	345	-1	1	992	.	96	345	.	1
18	V1	60	-354	355	357	2	2	1000	.	53	357	.	1
19	V1	63	-356	357	361	4	1	1000	.	73	361	.	1
20	V1	102	-376	377	375	-2	2	997	.	57	375	.	1
21	V1	90	-387	388	388	.	1	999	.	63	388	.	1
22	V2	25	-409	410	410	.	1	982	.	43	410	.	1
23	V1	94	-445	446	445	-1	1	983	.	96	445	.	1
24	V1	98	-458	459	461	2	1	998	.	72	461	.	1
25	V2	1	-566	566	566	.	1	1000	.	114	566	.	1
26	V3	1	-844	844	844	.	1	995	.	117	844	.	1
27	V1	99	-472	472	474	2	1	986	.	42	474	.	1
28	V1	100	-481	481	482	1	1	995	.	83	482	.	1
29	V2	15	-484	484	484	.	1	993	.	97	484	.	1
30	V2	20	-498	498	497	-1	1	1000	.	117	497	.	1
31	V2	60	-518	518	518	.	1	976	.	78	518	.	1
32	V1	2	-519	519	519	.	1	976	.	65	519	.	1
33	V1	110	-526	526	526	.	1	984	.	62	526	.	1
34	V2	45	-582	582	582	.	1	990	.	130	582	.	1
35	V2	35	-602	602	602	.	1	986	.	63	602	.	1
36	V1	115	-613	613	613	.	1	993	.	174	613	.	1
37	V1	130	-626	626	625	-1	2	995	.	88	625	.	1
38	V2	30	-636	636	635	-1	1	995	.	83	635	.	1
39	V2	75	-675	675	.	.	.	.	.	63	.	.	.
40	V2	40	-680	680	679	-1	1	996	.	75	679	.	1
41	V3	2	-700	700	699	-1	1	980	.	98	699	.	1
42	V3	10	-704	703	.	.	.	.	.	43	703	.	1
43	V3	35	-706	705	705	.	1	989	.	92	705	.	1
44	V2	65	-739	738	738	.	1	996	.	75	738	.	1
45	V2	55	-754	753	754	1	1	960	.	97	754	.	1
46	V3	20	-757	756	757	1	1	962	.	164	757	.	1
47	V3	38	-758	758	758	.	1	990	.	41	758	.	1
48	V2	50	-789	789	789	.	1	983	.	129	789	.	1
49	V3	15	-790	790	788	-2	1	976	.	43	788	.	1
50	V2	70	-793	793	793	.	1	973	.	107	793	.	1
51	V3	40	-847	847	847	.	1	981	.	112	847	.	1
52	V3	50	-865	865	864	-1	1	992	.	106	864	.	1
53	V3	75	-878	878	878	.	2	993	.	106	878	.	1
54	V3	60	-919	919	919	.	1	989	.	106	918	-1	1
55	V3	55	-922	922	922	.	1	993	.	104	922	.	1
56	V2	80	-937	937	936	-1	1	991	.	173	936	.	1
57	V3	3	-976	975	975	.	1	997	.	95	975	.	1
58	V2	90	-1002	1001	1002	1	2	991	.	75	1001	-1	1
59	V3	25	-1005	1004	1004	.	1	982	.	83	1004	.	1
60	V3	30	-1011	1010	1010	.	1	984	.	53	1010	.	1
61	V3	80	-1096	1095	1094	-1	2	987	.	146	1094	.	1
62	V3	90	-1107	1106	1106	.	2	987	.	146	1106	.	1
63	V3	85	-1136	1135	1135	.	1	985	.	146	1135	.	1

RMAL QUANTITATION SUMMARY FILE: F0609
COMPOUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

NO	LIBRARY ENTRY		NAME	MASS	SCAN	REF	AREA	UNITS: RRF	UG/L AMOUNT
1	V1#	1	CI01 BROMOCHLOROMETHANE	128	465	1	19779.	1.000	50.000
2	V2#	1	CI10 1,4-DIFLUOROBENZENE	114	566	2	106882.	1.000	50.000
3	V3#	1	CI20 CHLOROBENZENE-D5	117	844	3	79795.	1.000	50.000
4	V3#	2	CS05 TOLUENE-D8	98	699	3	348574.	1.094	199.577
5	V3#	3	CS10 BROMOFLUOROBENZENE	95	975	3	224484.	0.776	181.274
6	V1#	2	CS15 1,2-DICHLOROETHANE-	65	519	1	188424.	2.582	184.491
7	V1#	20	V001 DICHLORODIFLUOROMET	85	70	1	70135.	0.591	299.757
8	V1#	10	C010 CHLOROMETHANE	50	86	1	79300.	0.620	323.181
9	V1#	25	C020 VINYL CHLORIDE	62	102	1	102276.	0.993	260.424
10	V1#	15	C015 BROMOMETHANE	94	143	1	111549.	1.163	242.522
11	V1#	35	C025 CHLOROETHANE	64	163	1	73394.	0.812	228.385
12	V1#	70	V007 TRICHLOROFLUOROMETH	101	198	1	345576.	4.887	178.754
13	V1#	32	V003 DICHLOROFLUOROMETHA	67	209	1	219463.	2.882	192.479
14	V1#	80	C045 1,1-DICHLOROETHENE	96	257	1	139833.	1.811	195.228
15	V1#	65	C040 CARBON DISULFIDE	76	260	1	321374.	4.079	199.183
16	V1#	105	V015 TRICHLORO-TRIFLUORO	151	270	1	141150.	1.814	196.676
17	V1#	50	C035 ACETONE	43	289	1	28482.	0.403	178.705
18	V1#	45	C030 METHYLENE CHLORIDE	84	320	1	141272.	2.215	161.204
19	V1#	95	V012 TRANS-1,2-DICHLOROE	96	345	1	117307.	1.464	202.556
20	V1#	102	V009 HEXANE	57	375	1	145156.	1.775	206.683
21	V1#	90	C050 1,1-DICHLOROETHANE	63	388	1	235698.	2.451	243.082
22	V2#	25	C125 VINYL ACETATE	43	410	2	276629.	0.574	225.594
23	V1#	94	V011 CIS-1,2-DICHLOROETH	96	445	1	153765.	1.583	245.580
24	V1#	98	C110 2-BUTANONE	72	461	1	8077.	0.106	193.114
25	V1#	99	V013 TETRAHYDROFURAN	42	474	1	31508.	0.391	203.603
26	V1#	100	C060 CHLOROFORM	83	482	1	322131.	3.909	208.332
27	V2#	15	C115 1,1,1-TRICHLOROETHA	97	484	2	311291.	0.777	187.454
28	V2#	20	C120 CARBONTETRACHLORIDE	117	497	2	311951.	0.743	196.384
29	V2#	60	C165 BENZENE	78	518	2	427170.	1.029	194.275
30	V1#	110	C065 1,2-DICHLOROETHANE	62	526	1	259193.	2.996	218.671
31	V2#	45	C150 TRICHLOROETHENE	130	582	2	209121.	0.454	215.522
32	V2#	35	C140 1,2-DICHLOROPROPANE	63	602	2	176211.	0.367	224.637
33	V1#	130	V019 1,4-DIOXANE	88	625	1	18728.	0.010	4839.030
34	V2#	30	C130 BROMODICHLOROMETHAN	83	635	2	327716.	0.737	208.036
35	V2#	75	V023 2-CHLOROETHYL VINYL	63	679	2	2532.	0.229	5.171
36	V2#	40	C143 CIS-1,3-DICHLOROPRO	75	679	2	407213.	0.573	332.209
37	V3#	10	C205 4-METHYL-2-PENTANON	43	703	3	151910.	0.380	250.470
38	V3#	35	C230 TOLUENE	92	705	3	299537.	0.802	233.987
39	V2#	65	C172 TRANS-1,3-DICHLOROP	75	738	2	88264.	0.491	84.137
40	V2#	55	C160 1,1,2-TRICHLOROETHA	97	754	2	152260.	0.341	208.903
41	V3#	20	C220 TETRACHLOROETHENE	164	757	3	155032.	0.449	216.555
42	V3#	15	C210 2-HEXANONE	43	788	3	94830.	0.219	271.635
43	V2#	50	C155 DIBROMOCHLOROMETHAN	129	789	2	267401.	0.607	206.189
44	V2#	70	V022 1,2-DIBROMOETHANE	107	793	2	389066.	0.453	401.606
45	V3#	40	C235 CHLOROBENZENE	112	847	3	363249.	0.982	231.784
46	V3#	50	C240 ETHYLBENZENE	106	864	3	172829.	0.470	230.413
47	V3#	75	V032 M+P XYLENES	106	878	3	299831.	0.813	231.105
48	V3#	60	V029 O-XYLENE	106	918	3	172881.	0.500	216.847
49	V3#	55	C245 STYRENE	104	922	3	363732.	1.046	217.894
50	V2#	80	C180 BROMOFORM	173	936	2	213442.	0.457	218.641
51	V3#	25	C225 1,1,2,2-TETRACHLORO	83	1004	3	268684.	0.753	223.438
52	V3#	80	V035 M-DICHLOROBENZENE	146	1094	3	348374.	0.996	219.094
53	V3#	90	V037 P-DICHLOROBENZENE	146	1106	3	357938.	1.093	205.113
54	V3#	85	V036 O-DICHLOROBENZENE	146	1135	3	324376.	0.906	224.410
55	V1#	38	V040 ETHANOL	45	260	1	1594.	0.003	1535.150
56	V1#	40	V004 IODOMETHANE	142	263	1	543909.	3.938	349.110
57	V1#	55	V005 ACROLEIN	56	261	1	83483.	0.230	918.971
58	V1#	60	V006 ACRYLONITRILE	53	357	1	89687.	0.263	862.767
59	V1#	63	TERT-BUTYL METHYL ETHER	73	361	1	155009.	2.160	181.372
60	V1#	115	V016 DIBROMOMETHANE	174	613	1	125796.	1.534	207.346
61	V2#	90	V025 1,2,3-TRICHLOROPROP	75	1001	2	162617.	0.406	187.262
62	V3#	38	V027 ETHYL METHACRYLATE	41	758	3	310172.	0.480	405.272
63	V3#	30	V026 T-1,4-DICHLORO-2-BU	53	1010	3	61424.	0.207	185.914

000023

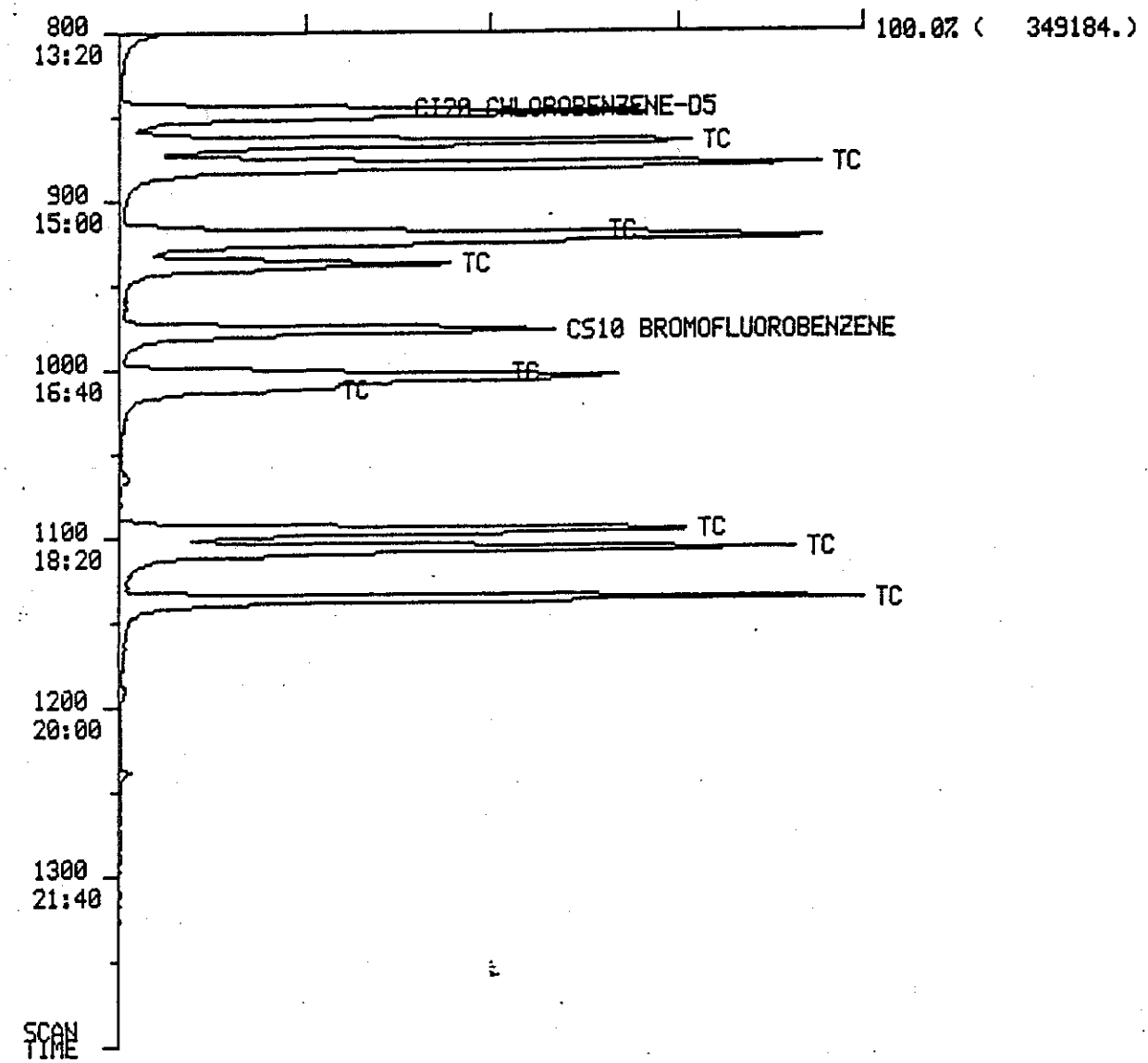
DATA FROM FILE: F0609 SCANS 50 TO 800 ACQUIRED: 06/15/92 22:48:00
CALI: F0609 #3
SAMPLE: -200 PPB HS WATER ICAL
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M



000024

DATA FROM FILE: F0609 SCANS 800 TO 1400 ACQUIRED: 06/15/92 22:48:00
CALI: F0609 #3

SAMPLE: -200 PPB HS WATER ICAL
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M



Name List: HEDR1 Entry # 1 of 1
File Name: F0610

000025

(1)Format: VOAIND
(3)SAMPLE: 20 PPB HSL
(5)COMMENT: ICAL
(11)Quan List Units: 1.00UG/L
(13)Extract Dilution: NA
(15)Extract Vol. Used: NA
(17)Percent Moisture: NA
(20)SURROGATE VOLUME:: 0.00500L

(2)PROJECT:
(4)MATRIX: WATER
(10)Analyst: EG
(12)Purge Volume: 5.00ML
(14)Extract Volume: NA
(16)Sample Amount: 5.00ML
(19)Run Factor: 1.00UG/L

6/15/92 23:48:32
Acquisition started

Acquire
06/15/92 23:48:00 + 0:00
Sample: -20 PPB HSL WATER ICAL
Conds.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
Formula: 1.00UG/L0.00500L
Submitted by: RMAL

Run 3:F0610
Free sectors: 10519
Instrument: I50F
Analyst: EG

Starting
Scan: 0 of 1464
Weight: 0.000
Acct. No: VOAIND

*** GC not ready and being equilibrated ***

GC Desc.: VN Elapsed time : 0.0 Min

Seq. #	Temp (DegC)	Rate (C/min)	Time (minutes) period	total
1	-20--18	2.0	1.0	1.0
2	-18-102	7.0	17.1	18.1
3	102-202	30.3	3.3	21.4

Injector A	:	220	Deg C
GC oven	:	68	Deg C
Transfer-line	:	203	Deg C
Ion source	:	181	Deg C

Valve A : closed Valve B : closed

*** Instrument parameters ***

Post acquisition state -> Filament : Off Multiplier : Off
MODE: EI (+) Centroid + Temp - Sequence: VO (1 time window.)

Sequence Window # 1
Number of cycles: 1
Filament is ON
Multiplier is ON
Scan descriptor: VO Mass intervals: 1 Positive ion mode.
Total scan time: 1.000 s Master rate: 8

MPW: 3 MFW: 70 MA: 50 TH: 1 BL: 0

Int #	Lo mass	Hi mass	Time
1	36.511	300.590	1.000

Calibration table: 3:15JUN92F

Interface number	0	
Instrument type	Q	
Full scale mass	1170	u
Zero scale mass	1	u
Intensity/ion	2	
Peak width	1000.	mmu
Offset at low mass	0	mmu
Offset at high mass	0	mmu
Voltage settling time(ms)	4	

Current instrument parameters.

	Positive ion mode	Negative ion mode
Resolution (high)	123.00	0.00
Resolution (low)	125.00	0.00
Quad offset	-2.00	0.00
Quad programming	-1.00	0.00
Lens offset	-30.00	0.00
Lens programming	0.00	0.00
Ext offset	-4.00	0.00
Ext programming	0.00	0.00
Collector	30.00	0.00
Ion offset	4.00	0.00

Ion programming	1.00	0.00
Rod polarity	Reverse	Normal

Electron multiplier voltage: 1279.
Filament emission current: 750.
Electrometer range: 10 ^-7
Electrometer zero: 128.0

Analyzer Fore Pressure .....: 0.024 Torr
Separator/Source Pressure .....: 0.366 Torr

6/16/92 0:18:34
ACQUISITION COMPLETED
Scans 1 to 1464 Centroid

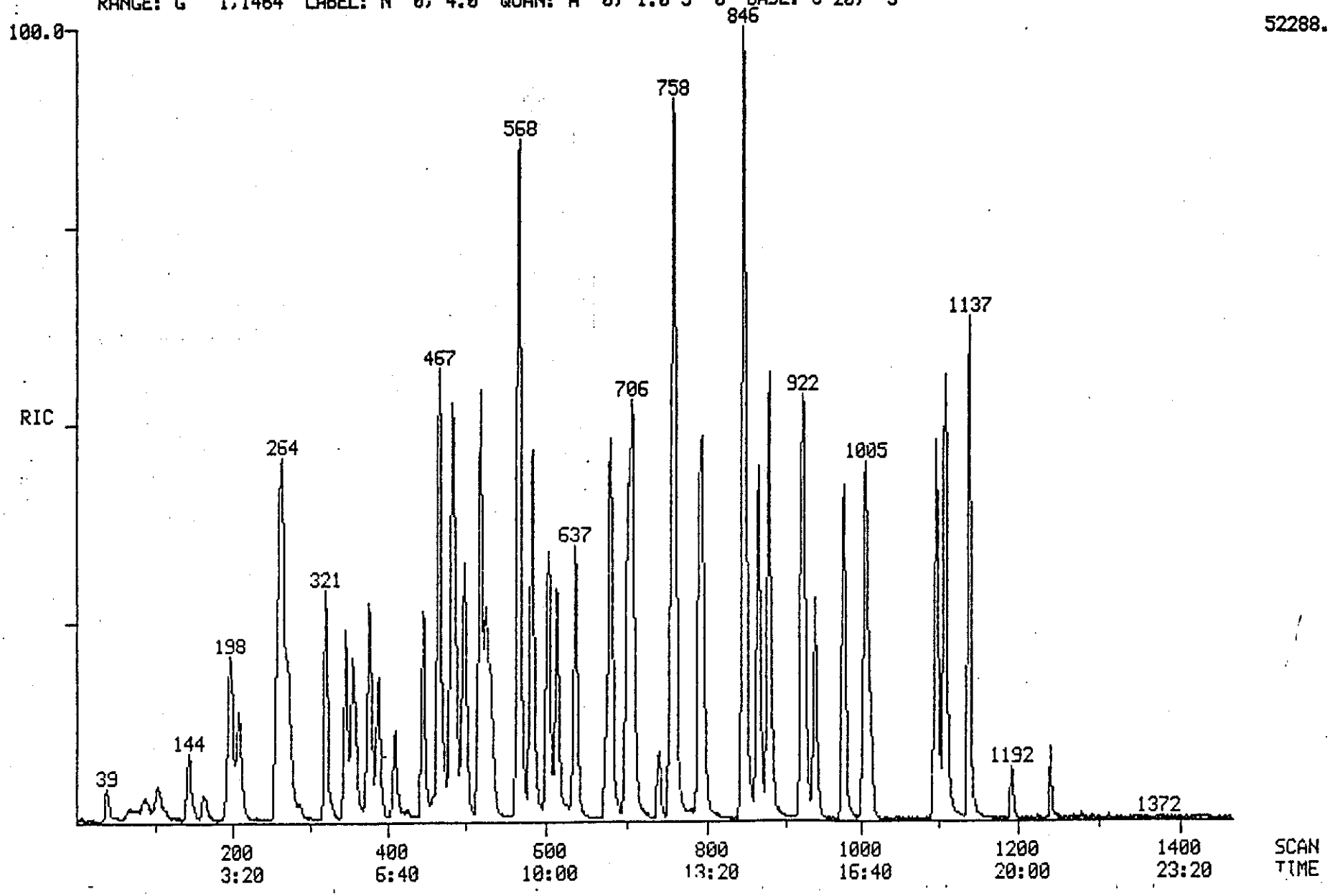
Mode	Scans	Secs	Out of	%	Peaks per scan	per sec
Centroid	1464	1.1	1464.0	0.1	14958. 10.	10.

000027

RIC
06/15/92 23:48:00
SAMPLE: -20 PPB HSL WATER ICAL
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
RANGE: G 1,1464 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F0610 #4
CALI: 15JUN92F #3

SCANS 1 TO 1464



PROCEDURE: TCA DIAGNOSTIC REPORT 6/16/92 0:53:56
DATA FILE: F0610
REFERENCE: 11TABLE
NAME LIST: LLNL INITIALIZATION OPTION: 2 PROCESSING OPTION: 3
REPORT: ISO1

000028

STANDARDS PROC	STANDARDS USED	STANDARDS POSS	STANDARDS RMS	PLUS UNKNOWNS PROC	PLUS UNKNOWNS USED	PLUS UNKNOWNS POSS	PLUS UNKNOWNS RMS	LIST NAMES STANDARD/UNKNOWN
1	1	1	0	11	10	6	157	ISO1/TCO1
1	1	1	0	11	11	1	53	ISO2/TCO2
1	1	1	0	4	4	1	43	ISO3/TCO3
3	3	1	21	13	13	1	63	ISO4/TCO4
3	3	1	21	13	12	2	65	ISO5/TCO5
3	3	1	21	7	7	1	15	ISO6/TCO6
1	1	1	0	11	11	2	41	ISO7/TCO7
1	1	1	0	4	4	4	62	ISO8/TCO8

63 COMPOUNDS PROCESSED, 61 FOUND

COMPOUND NO	LIB	ENTRY	SEARCH REF	PRED	SEL	DELTA	PEAKS	SAT FIT	PEAKS	CHRO M/Z	TOP	DELTA	PEAKS
1	V1	1	-464	466	466	.	1	1000	.	128	466	.	1
2	V1	20	-70	71	70	-1	3	912	.	85	70	.	1
3	V1	10	-83	84	88	4	1	996	.	50	88	.	1
4	V1	25	-102	103	104	1	1	994	.	62	104	.	1
5	V1	15	-143	144	144	.	1	989	.	94	144	.	1
6	V1	35	-163	164	163	-1	1	988	.	64	163	.	1
7	V1	70	-197	198	198	.	1	995	.	101	198	.	1
8	V1	32	-209	210	210	.	1	929	.	67	210	.	1
9	V1	80	-257	258	258	.	1	990	.	96	258	.	1
10	V1	38	-261	262	.	.	.	.	.	45	.	.	.
11	V1	55	-261	262	261	-1	2	1000	.	56	261	.	1
12	V1	65	-261	262	261	-1	1	984	.	76	261	.	1
13	V1	40	-263	264	264	.	1	994	.	142	264	.	1
14	V1	105	-271	272	272	.	1	996	.	151	272	.	1
15	V1	50	-285	286	287	1	1	999	.	43	287	.	1
16	V1	45	-320	321	321	.	1	989	.	84	321	.	1
17	V1	95	-345	346	346	.	1	990	.	96	346	.	1
18	V1	60	-354	355	355	.	1	998	.	53	355	.	1
19	V1	63	-356	357	357	.	1	1000	.	73	357	.	1
20	V1	102	-376	377	377	.	1	995	.	57	377	.	1
21	V1	90	-387	388	389	1	1	997	.	63	389	.	1
22	V2	25	-409	410	410	.	1	987	.	43	410	.	1
23	V1	94	-445	447	446	-1	1	982	.	96	446	.	1
24	V1	98	-458	460	460	.	1	989	.	72	459	-1	1
25	V2	1	-566	568	568	.	1	997	.	114	568	.	1
26	V3	1	-844	845	845	.	1	999	.	117	845	.	1
27	V1	99	-472	473	472	-1	1	935	.	42	472	.	1
28	V1	100	-481	482	483	1	1	993	.	83	483	.	1
29	V2	15	-484	485	485	.	1	997	.	97	485	.	1
30	V2	20	-498	499	499	.	1	999	.	117	499	.	1
31	V2	60	-518	519	519	.	1	978	.	78	519	.	1
32	V1	2	-519	520	520	.	1	980	.	65	520	.	1
33	V1	110	-526	527	527	.	1	984	.	62	527	.	1
34	V2	45	-582	583	584	1	1	993	.	130	583	-1	1
35	V2	35	-602	603	603	.	1	984	.	63	604	1	1
36	V1	115	-613	614	614	.	1	992	.	174	614	.	1
37	V1	130	-626	627	626	-1	2	956	.	88	628	2	1
38	V2	30	-636	637	637	.	1	993	.	83	637	.	1
39	V2	75	-675	676	675	-1	1	994	.	63	675	.	1
40	V2	40	-680	681	680	-1	1	994	.	75	680	.	1
41	V3	2	-700	701	701	.	1	985	.	98	701	.	1
42	V3	10	-704	705	.	.	.	.	.	43	705	.	1
43	V3	35	-706	707	707	.	1	987	.	92	707	.	1
44	V2	65	-739	740	740	.	1	995	.	75	740	.	1
45	V2	55	-754	755	755	.	1	956	.	97	755	.	1
46	V3	20	-757	758	758	.	1	968	.	164	758	.	1
47	V3	38	-758	759	759	.	1	989	.	41	759	.	1
48	V2	50	-789	790	790	.	1	990	.	129	790	.	1
49	V3	15	-790	791	791	.	1	979	.	43	791	.	1
50	V2	70	-793	794	794	.	1	975	.	107	794	.	1
51	V3	40	-847	848	848	.	1	985	.	112	848	.	1
52	V3	50	-865	866	865	-1	1	989	.	106	865	.	1
53	V3	75	-878	879	879	.	2	992	.	106	879	.	1
54	V3	60	-919	920	920	.	1	991	.	106	920	.	1
55	V3	55	-922	923	923	.	1	991	.	104	923	.	1
56	V2	80	-937	938	938	.	1	983	.	173	938	.	1
57	V3	3	-976	977	977	.	1	994	.	95	977	.	1
58	V2	90	-1002	1003	1004	1	1	992	.	75	1003	-1	1
59	V3	25	-1005	1006	1006	.	1	983	.	83	1006	.	1
60	V3	30	-1011	1012	1012	.	1	983	.	53	1012	.	1
61	V3	80	-1096	1096	1096	.	2	985	.	146	1096	.	1
62	V3	90	-1107	1107	1107	.	2	985	.	146	1107	.	1
63	V3	85	-1136	1136	1137	1	1	987	.	146	1137	.	1

RMAL QUANTITATION SUMMARY FILE: F0610
COMPOUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

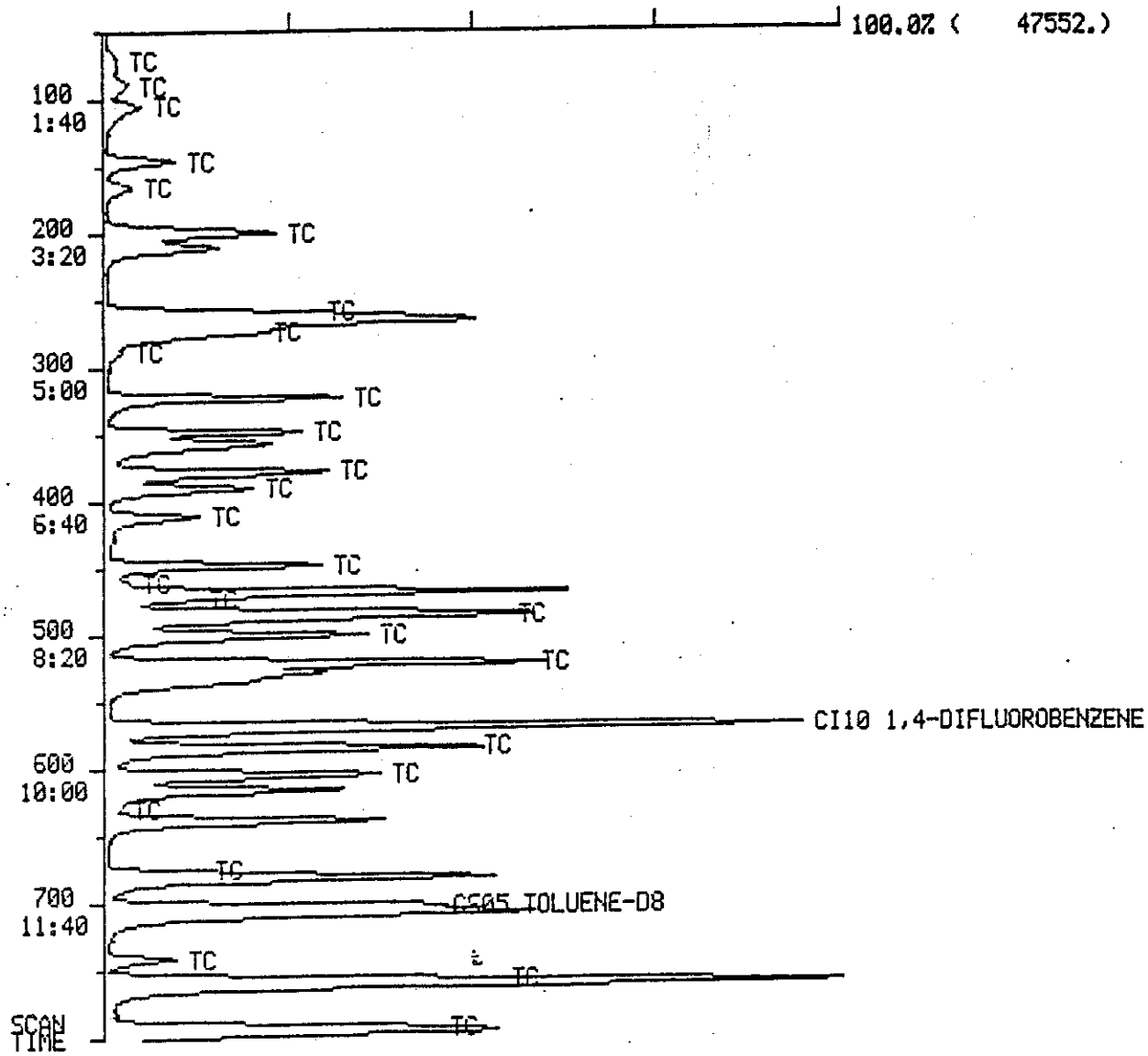
000029

NO	LIBRARY ENTRY		NAME	MASS	SCAN	REF	AREA	UNITS: RRF	UG/L AMOUNT
1	V1#	1	CI01 BROMOCHLOROMETHANE	128	466	1	23110.	1.000	50.000
2	V2#	1	CI10 1,4-DIFLUOROBENZENE	114	568	2	101140.	1.000	50.000
3	V3#	1	CI20 CHLOROBENZENE-D5	117	845	3	69105.	1.000	50.000
4	V3#	2	CS05 TOLUENE-D8	98	701	3	39594.	1.095	26.153
5	V3#	3	CS10 BROMOFLUOROBENZENE	95	977	3	25578.	0.735	25.175
6	V1#	2	CS15 1,2-DICHLOROETHANE-	65	520	1	24682.	2.296	23.263
7	V1#	20	V001 DICHLORODIFLUOROMET	85	70	1	6476.	0.629	22.268
8	V1#	10	C010 CHLOROMETHANE	50	88	1	5598.	0.911	13.298
9	V1#	25	C020 VINYL CHLORIDE	62	104	1	8981.	1.147	16.940
10	V1#	15	C015 BROMOMETHANE	94	144	1	10137.	1.210	18.130
11	V1#	35	C025 CHLOROETHANE	64	163	1	7323.	0.895	17.702
12	V1#	70	V007 TRICHLOROFLUOROMETH	101	198	1	39467.	2.719	31.400
13	V1#	32	V003 DICHLOROFLUOROMETHA	67	210	1	24058.	1.992	26.130
14	V1#	80	C045 1,1-DICHLOROETHENE	96	258	1	13275.	1.302	22.061
15	V1#	65	C040 CARBON DISULFIDE	76	261	1	30958.	2.838	23.604
16	V1#	105	V015 TRICHLORO-TRIFLUORO	151	272	1	13876.	1.509	19.898
17	V1#	50	C035 ACETONE	43	287	1	4531.	0.385	25.482
18	V1#	45	C030 METHYLENE CHLORIDE	84	321	1	18247.	1.745	22.622
19	V1#	95	V012 TRANS-1,2-DICHLOROE	96	346	1	14580.	1.389	22.704
20	V1#	102	V009 HEXANE	57	377	1	21309.	1.853	24.875
21	V1#	90	C050 1,1-DICHLOROETHANE	63	389	1	28099.	2.774	21.918
22	V2#	25	C125 VINYL ACETATE	43	410	2	27089.	0.622	21.537
23	V1#	94	V011 CIS-1,2-DICHLOROETH	96	446	1	16983.	1.658	22.161
24	V1#	98	C110 2-BUTANONE	72	459	1	1189.	0.090	28.614
25	V1#	99	V013 TETRAHYDROFURAN	42	472	1	4430.	0.375	25.588
26	V1#	100	C060 CHLOROFORM	83	483	1	35512.	3.791	20.266
27	V2#	15	C115 1,1,1-TRICHLOROETHA	97	485	2	36483.	0.704	25.615
28	V2#	20	C120 CARBONTETRACHLORIDE	117	499	2	32147.	0.687	23.128
29	V2#	60	C165 BENZENE	78	519	2	45970.	0.989	22.988
30	V1#	110	C065 1,2-DICHLOROETHANE	62	527	1	27400.	2.763	21.458
31	V2#	45	C150 TRICHLOROETHENE	130	583	2	24320.	0.499	24.110
32	V2#	35	C140 1,2-DICHLOROPROPANE	63	604	2	20187.	0.434	23.004
33	V1#	130	V019 1,4-DIOXANE	88	628	1	3249.	0.017	403.000
34	V2#	30	C130 BROMODICHLOROMETHAN	83	637	2	35930.	0.727	24.433
35	V2#	75	V023 2-CHLOROETHYL VINYL	63	675	2	8105.	0.222	18.045
36	V2#	40	C143 CIS-1,3-DICHLOROPRO	75	680	2	39833.	0.554	35.520
37	V3#	10	C205 4-METHYL-2-PENTANON	43	705	3	16680.	0.443	27.240
38	V3#	35	C230 TOLUENE	92	707	3	28616.	0.834	24.830
39	V2#	65	C172 TRANS-1,3-DICHLOROP	75	740	2	7722.	0.459	8.312
40	V2#	55	C160 1,1,2-TRICHLOROETHA	97	755	2	14321.	0.322	21.967
41	V3#	20	C220 TETRACHLOROETHENE	164	758	3	16026.	0.448	25.904
42	V3#	15	C210 2-HEXANONE	43	791	3	9215.	0.251	26.555
43	V2#	50	C155 DIBROMOCHLOROMETHAN	129	790	2	25448.	0.581	21.641
44	V2#	70	V022 1,2-DIBROMOETHANE	107	794	2	36969.	0.431	42.358
45	V3#	40	C235 CHLOROBENZENE	112	848	3	32067.	0.970	23.927
46	V3#	50	C240 ETHYLBENZENE	106	865	3	15087.	0.471	23.196
47	V3#	75	V032 M+P XYLENES	106	879	3	26477.	0.813	23.557
48	V3#	60	V029 O-XYLENE	106	920	3	16897.	0.477	25.641
49	V3#	55	C245 STYRENE	104	923	3	32065.	1.003	23.136
50	V2#	80	C180 BROMOFORM	173	938	2	20018.	0.453	21.822
51	V3#	25	C225 1,1,2,2-TETRACHLORO	83	1006	3	25834.	0.764	24.480
52	V3#	80	V035 M-DICHLOROBENZENE	146	1096	3	31840.	0.918	25.086
53	V3#	90	V037 P-DICHLOROBENZENE	146	1107	3	33421.	0.948	25.509
54	V3#	85	V036 O-DICHLOROBENZENE	146	1137	3	32133.	0.884	26.295
55	V1#	38	V040 ETHANOL	45		1	NOT FOUND		
56	V1#	40	V004 IODOMETHANE	142	264	1	55357.	2.759	43.413
57	V1#	55	V005 ACROLEIN	56	261	1	9537.	0.188	109.555
58	V1#	60	V006 ACRYLONITRILE	53	355	1	10480.	0.302	75.164
59	V1#	63	TERT-BUTYL METHYL ETHER	73	357	1	22609.	2.283	21.429
60	V1#	115	V016 DIBROMOMETHANE	174	614	1	17140.	1.717	21.603
61	V2#	90	V025 1,2,3-TRICHLOROPROP	75	1003	2	17327.	0.381	22.471
62	V3#	38	V027 ETHYL METHACRYLATE	41	759	3	29303.	0.467	45.412
63	V3#	30	V026 T-1,4-DICHLORO-2-BU	53	1012	3	5382.	0.183	21.319

000030

DATA FROM FILE: F0610 SCANS 50 TO 800 ACQUIRED: 06/15/92 23:48:00
CALI: F0610 #3

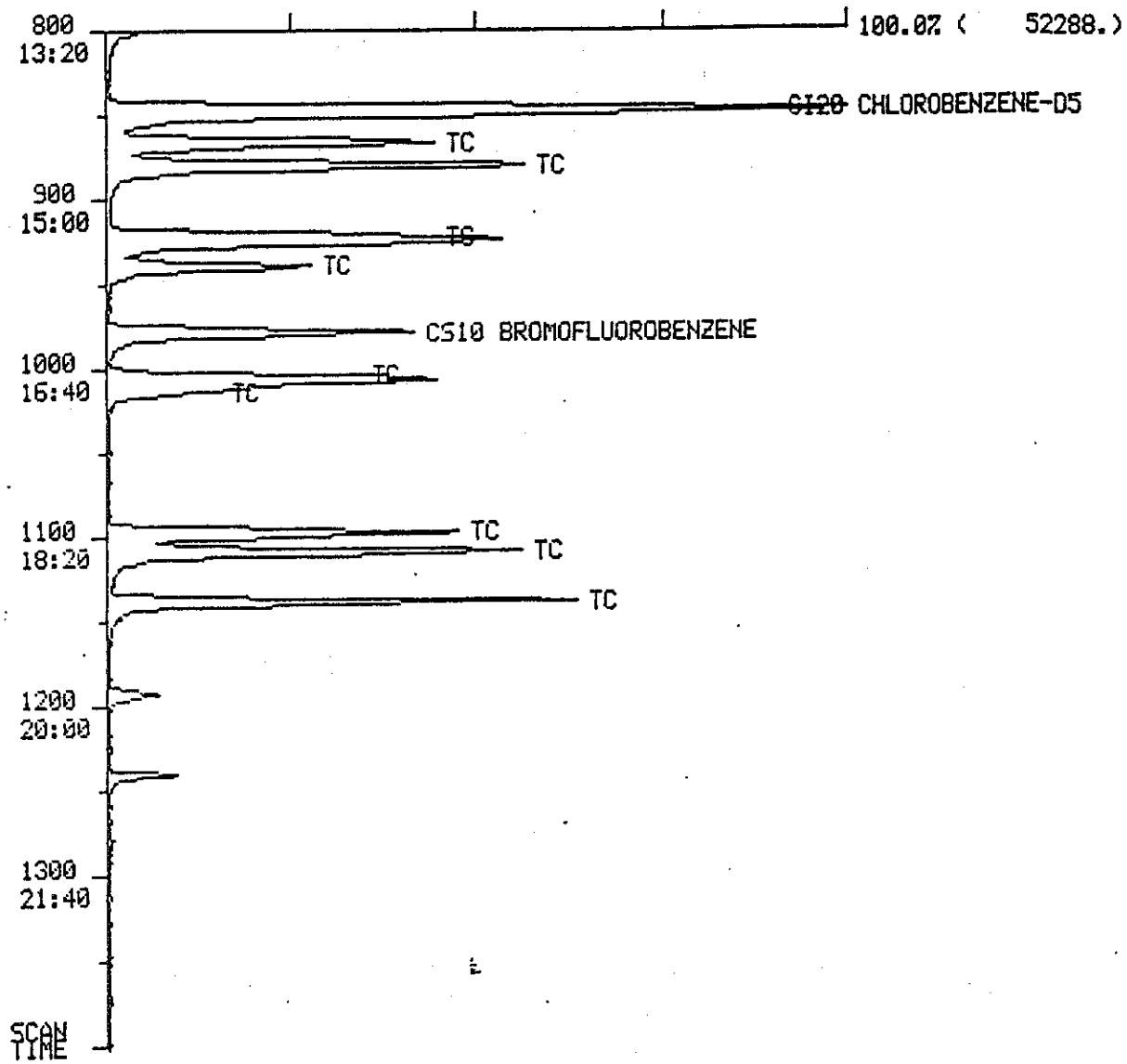
SAMPLE: -20 PPB HSL WATER ICAL
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M



000031

DATA FROM FILE: F0610 SCANS 800 TO 1400 ACQUIRED: 06/15/92 23:48:00
CALI: F0610 #3

SAMPLE: -20 PPB HSL WATER ICAL
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M



Name List: HEDR1 Entry # 1 of 1
File Name: F0611

000032

(1)Format: VOAIND
(3)SAMPLE: 100 PPB HS
(5)COMMENT: ICAL
(11)Quan List Units: 1.00UG/L
(13)Extract Dilution: NA
(15)Extract Vol. Used: NA
(17)Percent Moisture: NA
(20)SURROGATE VOLUME:: 0.00500L

(2)PROJECT:
(4)MATRIX: WATER
(10)Analyst: EG
(12)Purge Volume: 5.00ML
(14)Extract Volume: NA
(16)Sample Amount: 5.00ML
(19)Run Factor: 1.00UG/L

6/16/92 0:19:38
Acquisition started

Acquire Run 3:F0611 Starting
06/16/92 0:19:00 + 0:00 Free sectors: 10336 Scan: 0 of 1464
Sample: -100 PPB HS WATER ICAL
Conds.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
Formula: 1.00UG/L0.00500L Instrument: I50F Weight: 0.000
Submitted by: RMAL Analyst: EG Acct. No: VOAIND

*** GC not ready and being equilibrated ***
GC Desc.: VN Elapsed time : 0.0 Min

Seq. #	Temp (DegC)	Rate (C/min)	Time (minutes) period	total		
1	-20--18	2.0	1.0	1.0	Injector A :	220 Deg C
2	-18-102	7.0	17.1	18.1	GC oven :	110 Deg C
3	102-202	30.3	3.3	21.4	Transfer-line:	203 Deg C
					Ion source :	184 Deg C

Valve A : closed Valve B : closed
*** Instrument parameters ***
Post acquisition state -> Filament : Off Multiplier : Off
MODE: EI (+) Centroid + Temp - Sequence: VO (1 time window.)

Sequence Window # 1
Number of cycles: 1
Filament is ON
Multiplier is ON
Scan descriptor: VO Mass intervals: 1 Positive ion mode.
Total scan time: 1.000 s Master rate: 8

MPW: 3 MFW: 70 MA: 50 TH: 1 BL: 0

Int #	Lo mass	Hi mass	Time
1	36.511	300.590	1.000

Calibration table: 3:15JUN92F

Interface number	0	
Instrument type	Q	
Full scale mass	1170	u
Zero scale mass	1	u
Intensity/ion	2	
Peak width	1000.	mmu
Offset at low mass	0	mmu
Offset at high mass	0	mmu
Voltage settling time(ms)	4	

Current instrument parameters.

	Positive ion mode	Negative ion mode
Resolution (high)	123.00	0.00
Resolution (low)	125.00	0.00
Quad offset	-2.00	0.00
Quad programming	-1.00	0.00
Lens offset	-30.00	0.00
Lens programming	0.00	0.00
Ext offset	-4.00	0.00
Ext programming	0.00	0.00
Collector	30.00	0.00
Ion offset	4.00	0.00

000033

Ion programming	1.00	0.00
Rod polarity	Reverse	Normal

Electron multiplier voltage: 1279.
Filament emission current: 750.
Electrometer range: 10 ^-7
Electrometer zero: 128.0

Analyzer Fore Pressure .....: 0.025 Torr
Separator/Source Pressure .....: 0.373 Torr

6/16/92 0:50:42
ACQUISITION COMPLETED
Scans 1 to 1464 Centroid

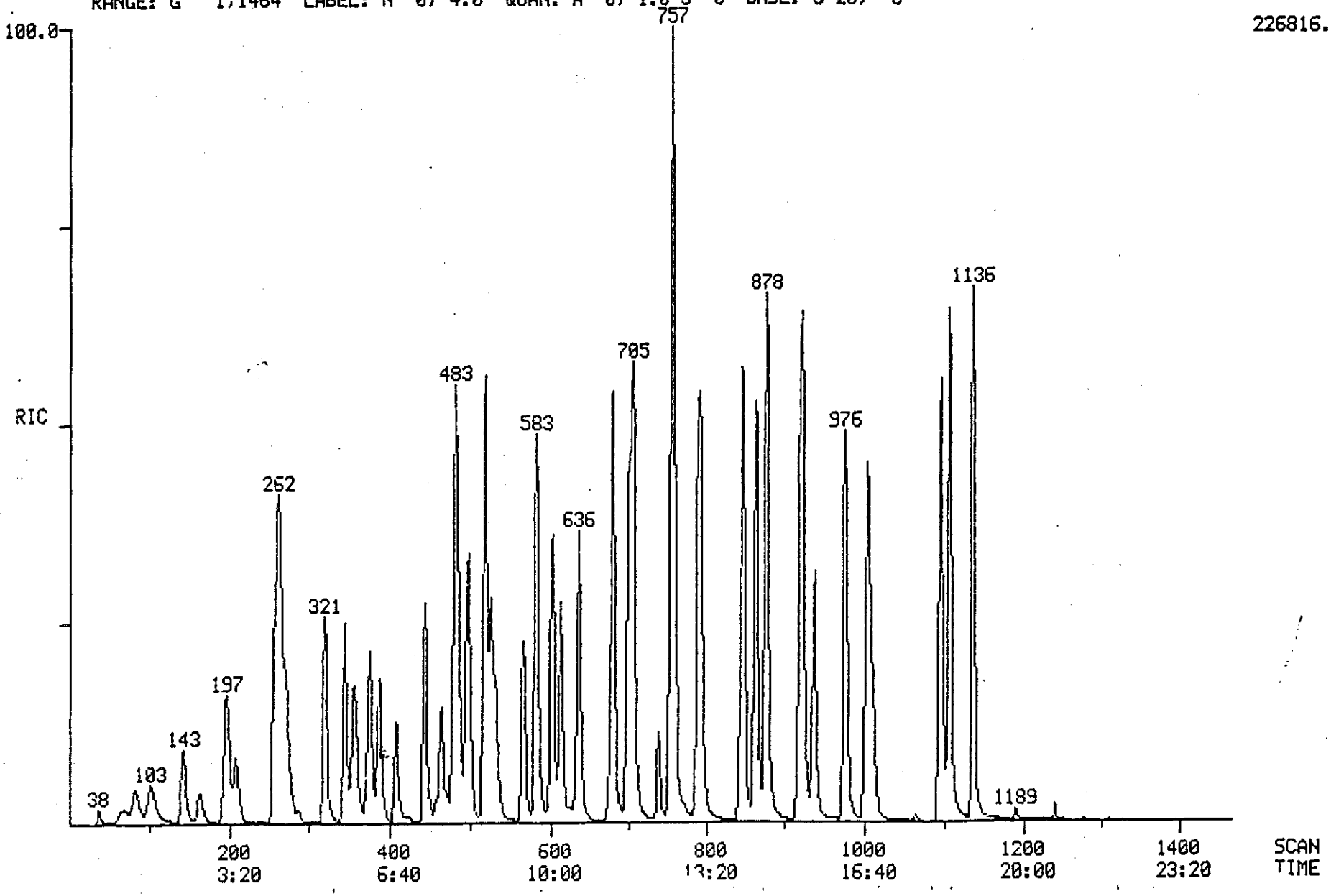
Mode	Scans	Secs	Out of	%	Peaks per scan	per sec
Centroid	1464	1.7	1464.0	0.1	26520. 18.	18.

000034

RIC
06/16/92 0:19:00
SAMPLE: -100 PPB HS WATER ICAL
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
RANGE: G 1,1464 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F0611 #4
CALI: 15JUN92F #3

SCANS 1 TO 1464



PROCEDURE: TCA DIAGNOSTIC REPORT 6/16/92 1:09:09
DATA FILE: F0611
REFERENCE: 11TABLE
NAME LIST: LLNL INITIALIZATION OPTION: 2 PROCESSING OPTION: 3 000035
REPORT: ISO1

STANDARDS PROC	STANDARDS USED	STANDARDS POSS	STANDARDS RMS	PLUS UNKNOWNS PROC	PLUS UNKNOWNS USED	PLUS UNKNOWNS POSS	PLUS UNKNOWNS RMS	LIST NAMES STANDARD/UNKNOWN
1	1	1	0	11	10	2	56	ISO1/TCO1
1	1	1	0	11	11	4	113	ISO2/TCO2
1	1	1	0	4	4	1	26	ISO3/TCO3
3	3	1	37	13	13	1	59	ISO4/TCO4
3	3	1	37	13	12	1	63	ISO5/TCO5
3	3	1	37	7	7	1	46	ISO6/TCO6
1	1	1	0	11	11	2	43	ISO7/TCO7
1	1	1	0	4	4	8	8	ISO8/TCO8

63 COMPOUNDS PROCESSED, 61 FOUND

COMPOUND NO	LIB	ENTRY	SEARCH REF	SEARCH PRED	SEARCH SEL	SEARCH DELTA	SEARCH PEAKS	SAT FIT	SAT PEAKS	CHRO M/Z	CHRO TOP	CHRO DELTA	CHRO PEAKS
1	V1	1	-464	466	466	.	1	996	.	128	466	.	1
2	V1	20	-70	70	70	.	1	997	.	85	70	.	1
3	V1	10	-83	83	83	.	2	995	.	50	83	.	1
4	V1	25	-102	102	103	1	1	995	.	62	103	.	1
5	V1	15	-143	143	143	.	1	988	.	94	143	.	1
6	V1	35	-163	163	163	.	1	983	.	64	163	.	1
7	V1	70	-197	197	197	.	1	996	.	101	197	.	1
8	V1	32	-209	209	209	.	1	927	.	67	209	.	1
9	V1	80	-257	258	257	-1	1	994	.	96	257	.	1
10	V1	38	-261	262	.	.	.	.	.	45	260	.	1
11	V1	55	-261	262	261	-1	1	1000	.	56	261	.	1
12	V1	65	-261	262	260	-2	1	983	.	76	260	.	1
13	V1	40	-263	264	264	.	1	994	.	142	264	.	1
14	V1	105	-271	272	271	-1	1	995	.	151	271	.	1
15	V1	50	-285	286	288	2	1	1000	.	43	288	.	1
16	V1	45	-320	321	321	.	1	989	.	84	320	-1	1
17	V1	95	-345	346	346	.	1	988	.	96	346	.	1
18	V1	60	-354	355	356	1	2	999	.	53	356	.	1
19	V1	63	-356	357	358	1	1	1000	.	73	358	.	1
20	V1	102	-376	377	376	-1	2	994	.	57	376	.	1
21	V1	90	-387	388	388	.	1	997	.	63	388	.	1
22	V2	25	-409	409	409	.	1	986	.	43	409	.	1
23	V1	94	-445	446	446	.	1	982	.	96	446	.	1
24	V1	98	-458	460	460	.	1	998	.	72	459	-1	1
25	V2	1	-566	567	567	.	1	999	.	114	567	.	1
26	V3	1	-844	844	844	.	1	996	.	117	844	.	1
27	V1	99	-472	473	473	.	1	979	.	42	473	.	1
28	V1	100	-481	482	482	.	1	996	.	83	482	.	1
29	V2	15	-484	485	485	.	1	994	.	97	484	-1	1
30	V2	20	-498	499	498	-1	1	998	.	117	498	.	1
31	V2	60	-518	519	519	.	1	974	.	78	519	.	1
32	V1	2	-519	520	519	-1	1	982	.	65	519	.	1
33	V1	110	-526	527	526	-1	1	979	.	62	526	.	1
34	V2	45	-582	583	583	.	1	992	.	130	583	.	1
35	V2	35	-602	603	603	.	1	986	.	63	603	.	1
36	V1	115	-613	614	613	-1	1	993	.	174	613	.	1
37	V1	130	-626	627	628	1	1	994	.	88	628	.	1
38	V2	30	-636	637	636	-1	1	991	.	83	636	.	1
39	V2	75	-675	676	675	-1	1	994	.	63	675	.	1
40	V2	40	-680	680	680	.	1	996	.	75	680	.	1
41	V3	2	-700	700	700	.	1	985	.	98	700	.	1
42	V3	10	-704	704	.	.	.	.	.	43	704	.	1
43	V3	35	-706	706	706	.	1	990	.	92	706	.	1
44	V2	65	-739	739	739	.	1	995	.	75	739	.	1
45	V2	55	-754	754	755	1	1	950	.	97	755	.	1
46	V3	20	-757	757	757	.	1	962	.	164	757	.	1
47	V3	38	-758	758	758	.	1	986	.	41	758	.	1
48	V2	50	-789	789	789	.	1	987	.	129	789	.	1
49	V3	15	-790	790	789	-1	1	979	.	43	789	.	1
50	V2	70	-793	793	793	.	1	972	.	107	793	.	1
51	V3	40	-847	847	847	.	1	981	.	112	847	.	1
52	V3	50	-865	865	864	-1	1	991	.	106	864	.	1
53	V3	75	-878	878	878	.	2	990	.	106	878	.	1
54	V3	60	-919	919	919	.	1	992	.	106	918	-1	1
55	V3	55	-922	922	922	.	1	989	.	104	922	.	1
56	V2	80	-937	937	937	.	1	990	.	173	937	.	1
57	V3	3	-976	976	976	.	1	994	.	95	976	.	1
58	V2	90	-1002	1002	1002	.	1	992	.	75	1002	.	1
59	V3	25	-1005	1005	1005	.	1	987	.	83	1005	.	1
60	V3	30	-1011	1011	1010	-1	1	989	.	53	1010	.	1
61	V3	80	-1096	1095	1095	.	2	988	.	146	1095	.	1
62	V3	90	-1107	1106	1106	.	2	988	.	146	1106	.	1
63	V3	85	-1136	1135	1135	.	2	988	.	146	1135	.	1

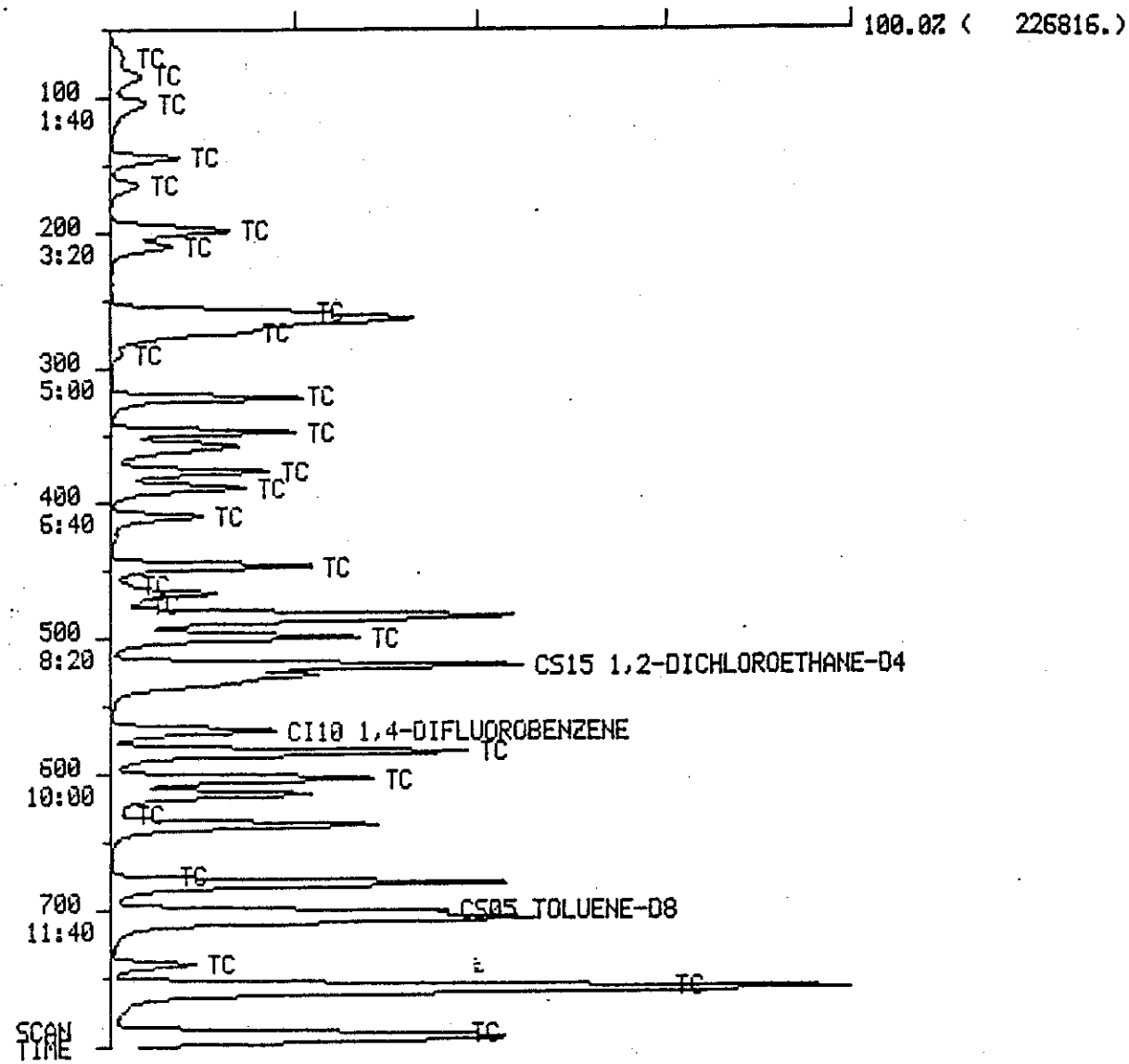
RMAL QUANTITATION SUMMARY FILE: F0611
COMPOUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

NO	LIBRARY ENTRY	NAME	MASS	SCAN	REF	AREA	UNITS: RRF	UG/L AMOUNT
1	V1# 1	CI01 BROMOCHLOROMETHANE	128	466	1	22477.	1.000	50.000
2	V2# 1	CI10 1,4-DIFLUOROBENZENE	114	567	2	117000.	1.000	50.000
3	V3# 1	CI20 CHLOROBENZENE-D5	117	844	3	81621.	1.000	50.000
4	V3# 2	CS05 TOLUENE-D8	98	700	3	183863.	1.095	102.823
5	V3# 3	CS10 BROMOFLUOROBENZENE	95	976	3	119987.	0.735	99.988
6	V1# 2	CS15 1,2-DICHLOROETHANE-	65	519	1	105169.	2.296	101.913
7	V1# 20	V001 DICHLORODIFLUOROMET	85	70	1	22514.	0.629	79.596
8	V1# 10	C010 CHLOROMETHANE	50	83	1	35159.	0.911	85.879
9	V1# 25	C020 VINYL CHLORIDE	62	103	1	42750.	1.147	82.904
10	V1# 15	C015 BROMOMETHANE	94	143	1	47099.	1.210	86.609
11	V1# 35	C025 CHLOROETHANE	64	163	1	32470.	0.895	80.701
12	V1# 70	V007 TRICHLOROFLUOROMETH	101	197	1	133629.	2.719	109.310
13	V1# 32	V003 DICHLOROFLUOROMETHA	67	209	1	64086.	1.992	71.564
14	V1# 80	C045 1,1-DICHLOROETHENE	96	257	1	57247.	1.302	97.816
15	V1# 65	C040 CARBON DISULFIDE	76	260	1	126805.	2.838	99.405
16	V1#105	V015 TRICHLORO-TRIFLUORO	151	271	1	50284.	1.509	74.138
17	V1# 50	C035 ACETONE	43	288	1	11611.	0.385	67.139
18	V1# 45	C030 METHYLENE CHLORIDE	84	320	1	69669.	1.745	88.805
19	V1# 95	V012 TRANS-1,2-DICHLOROE	96	346	1	57905.	1.389	92.709
20	V1#102	V009 HEXANE	57	376	1	69641.	1.853	83.581
21	V1# 90	C050 1,1-DICHLOROETHANE	63	388	1	118895.	2.774	95.350
22	V2# 25	C125 VINYL ACETATE	43	409	2	129664.	0.622	89.112
23	V1# 94	V011 CIS-1,2-DICHLOROETH	96	446	1	77061.	1.658	103.386
24	V1# 98	C110 2-BUTANONE	72	459	1	3936.	0.090	97.401
25	V1# 99	V013 TETRAHYDROFURAN	42	473	1	13045.	0.375	77.471
26	V1#100	C060 CHLOROFORM	83	482	1	161155.	3.791	94.561
27	V2# 15	C115 1,1,1-TRICHLOROETHA	97	484	2	153070.	0.704	92.904
28	V2# 20	C120 CARBONTETRACHLORIDE	117	498	2	149101.	0.687	92.726
29	V2# 60	C165 BENZENE	78	519	2	208066.	0.989	89.941
30	V1#110	C065 1,2-DICHLOROETHANE	62	526	1	122625.	2.763	98.734
31	V2# 45	C150 TRICHLOROETHENE	130	583	2	106032.	0.499	90.867
32	V2# 35	C140 1,2-DICHLOROPROPANE	63	603	2	92496.	0.434	91.114
33	V1#130	V019 1,4-DIOXANE	88	628	1	9578.	0.017	1221.490
34	V2# 30	C130 BROMODICHLOROMETHAN	83	636	2	160077.	0.727	94.096
35	V2# 75	V023 2-CHLOROETHYL VINYL	63	675	2	8635.	0.222	16.619
36	V2# 40	C143 CIS-1,3-DICHLOROPRO	75	680	2	202243.	0.554	155.898
37	V3# 10	C205 4-METHYL-2-PENTANON	43	704	3	66206.	0.443	91.541
38	V3# 35	C230 TOLUENE	92	706	3	135694.	0.834	99.685
39	V2# 65	C172 TRANS-1,3-DICHLOROP	75	739	2	39880.	0.459	37.109
40	V2# 55	C160 1,1,2-TRICHLOROETHA	97	755	2	68904.	0.322	91.365
41	V3# 20	C220 TETRACHLOROETHENE	164	757	3	77638.	0.448	106.246
42	V3# 15	C210 2-HEXANONE	43	789	3	36696.	0.251	89.532
43	V2# 50	C155 DIBROMOCHLOROMETHAN	129	789	2	133806.	0.581	98.362
44	V2# 70	V022 1,2-DIBROMOETHANE	107	793	2	166213.	0.431	164.627
45	V3# 40	C235 CHLOROBENZENE	112	847	3	163221.	0.970	103.112
46	V3# 50	C240 ETHYLBENZENE	106	864	3	75393.	0.471	98.140
47	V3# 75	V032 M+P XYLENES	106	878	3	137614.	0.813	103.659
48	V3# 60	V029 O-XYLENE	106	918	3	79960.	0.477	102.730
49	V3# 55	C245 STYRENE	104	922	3	167847.	1.003	102.534
50	V2# 80	C180 BROMOFORM	173	937	2	95712.	0.453	90.196
51	V3# 25	C225 1,1,2,2-TETRACHLORO	83	1005	3	117335.	0.764	94.133
52	V3# 80	V035 M-DICHLOROBENZENE	146	1095	3	162938.	0.918	108.690
53	V3# 90	V037 P-DICHLOROBENZENE	146	1106	3	168675.	0.948	108.999
54	V3# 85	V036 O-DICHLOROBENZENE	146	1135	3	156728.	0.884	108.587
55	V1# 38	V040 ETHANOL	45	260	1	515.	0.001	2279.580
56	V1# 40	V004 IODOMETHANE	142	264	1	208394.	2.759	168.030
57	V1# 55	V005 ACROLEIN	56	261	1	30987.	0.188	365.984
58	V1# 60	V006 ACRYLONITRILE	53	356	1	41783.	0.302	308.096
59	V1# 63	TERT-BUTYL METHYL ETHER	73	358	1	82618.	2.283	80.511
60	V1#115	V016 DIBROMOMETHANE	174	613	1	66531.	1.717	86.214
61	V2# 90	V025 1,2,3-TRICHLOROPROP	75	1002	2	71031.	0.381	79.632
62	V3# 38	V027 ETHYL METHACRYLATE	41	758	3	130407.	0.467	171.105
63	V3# 30	V026 T-1,4-DICHLORO-2-BU	53	1010	3	25176.	0.183	84.433

000037

DATA FROM FILE: F0611 SCANS 50 TO 800 ACQUIRED: 06/16/92 0:19:00
CALI: F0611 #3

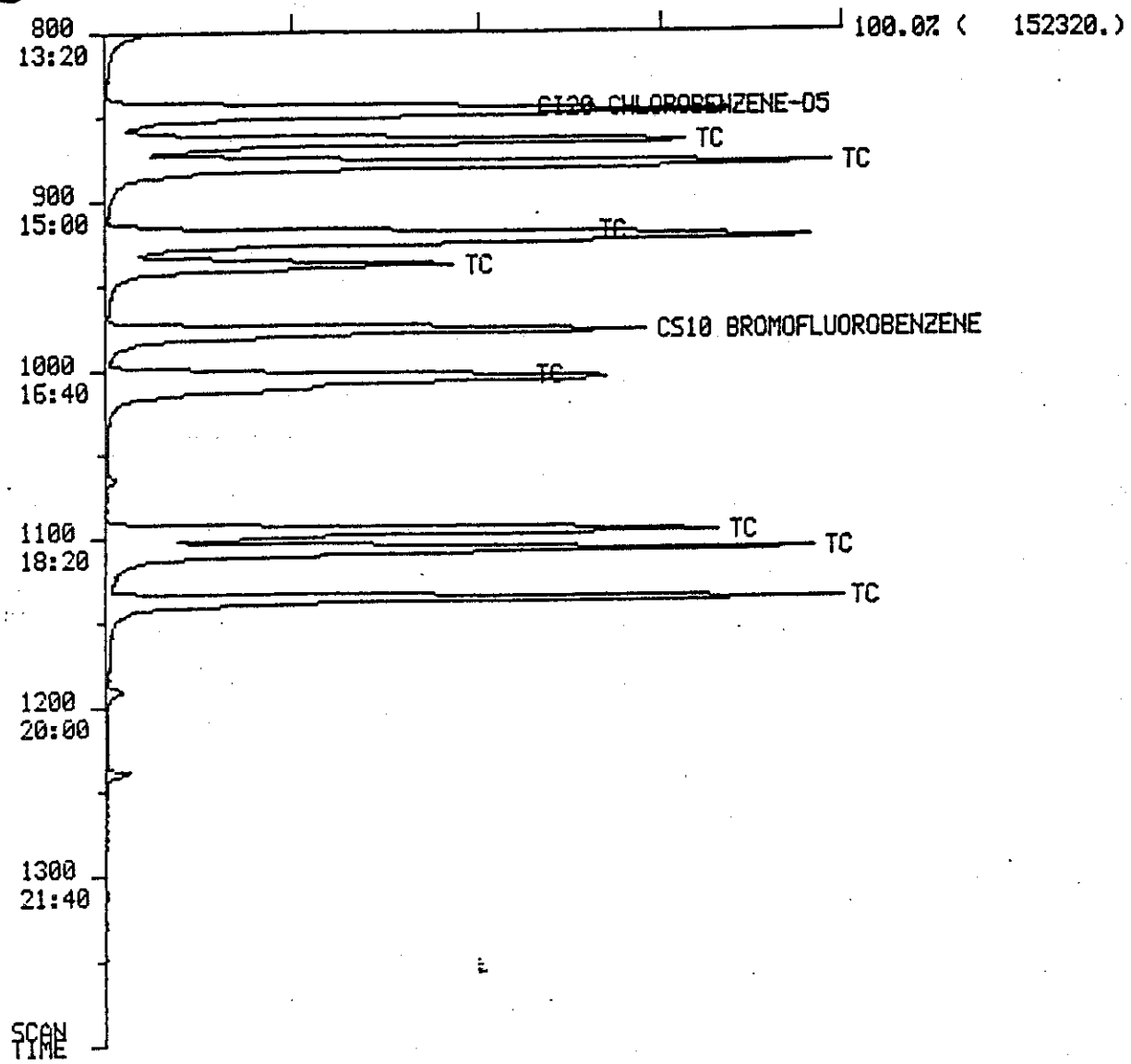
SAMPLE: -100 PPB HS WATER ICAL
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M



000038

DATA FROM FILE: F0611 SCANS 800 TO 1400 ACQUIRED: 06/16/92 0:19:00
CALI: F0611 #3

SAMPLE: -100 PPB HS WATER ICAL
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M



Name List: HEDR1 Entry # 1 of 1
File Name: F0612

(1)Format: VOAIND
(3)SAMPLE: 150 PPB HS
(5)COMMENT: ICAL
(11)Quan List Units: 1.00UG/L
(13)Extract Dilution: NA
(15)Extract Vol. Used: NA
(17)Percent Moisture: NA
(20)SURROGATE VOLUME:: 0.00500L

(2)PROJECT:
(4)MATRIX: WATER
(10)Analyst: EG
(12)Purge Volume: 5.00ML
(14)Extract Volume: NA
(16)Sample Amount: 5.00ML
(19)Run Factor: 1.00UG/L

6/16/92 0:51:47
Acquisition started

Acquire Run 3:F0612 Starting
06/16/92 0:51:00 + 0:00 Free sectors: 10062 Scan: 0 of 1464
Sample: -150 PPB HS WATER ICAL
Conds.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
Formula: 1.00UG/L0.00500L Instrument: I50F Weight: 0.000
Submitted by: RMAL Analyst: EG Acct. No: VOAIND

*** GC not ready and being equilibrated ***
GC Desc.: VN Elapsed time : 0.0 Min

Seq. #	Temp (DegC)	Rate (C/min)	Time (minutes) period	total			
1	-20--18	2.0	1.0	1.0	Injector A	:	220 Deg C
2	-18-102	7.0	17.1	18.1	GC oven	:	107 Deg C
3	102-202	30.3	3.3	21.4	Transfer-line	:	204 Deg C
					Ion source	:	184 Deg C

Valve A : closed Valve B : closed
*** Instrument parameters ***
Post acquisition state -> Filament : Off Multiplier : Off
MODE: EI (+) Centroid + Temp - Sequence: VO (1 time window.)

Sequence Window # 1
Number of cycles: 1
Filament is ON
Multiplier is ON
Scan descriptor: VO Mass intervals: 1 Positive ion mode.
Total scan time: 1.000 s Master rate: 8

MPW: 3 MFW: 70 MA: 50 TH: 1 BL: 0

Int #	Lo mass	Hi mass	Time
1	36.511	300.590	1.000

Calibration table: 3:15JUN92F

Interface number	0	
Instrument type	Q	
Full scale mass	1170	u
Zero scale mass	1	u
Intensity/ion	2	
Peak width	1000.	mmu
Offset at low mass	0	mmu
Offset at high mass	0	mmu
Voltage settling time(ms)	4	

Current instrument parameters.

	Positive ion mode	Negative ion mode
Resolution (high)	123.00	0.00
Resolution (low)	125.00	0.00
Quad offset	-2.00	0.00
Quad programming	-1.00	0.00
Lens offset	-30.00	0.00
Lens programming	0.00	0.00
Ext offset	-4.00	0.00
Ext programming	0.00	0.00
Collector	30.00	0.00
Ion offset	4.00	0.00

000040

Ion programming	1.00	0.00
Rod polarity	Reverse	Normal

Electron multiplier voltage: 1279.
Filament emission current: 750.
Electrometer range: 10 ^-7
Electrometer zero: 128.0

Analyzer Fore Pressure .....: 0.025 Torr
Separator/Source Pressure .....: 0.381 Torr

6/16/92 1:22:22
ACQUISITION COMPLETED
Scans 1 to 1464 Centroid

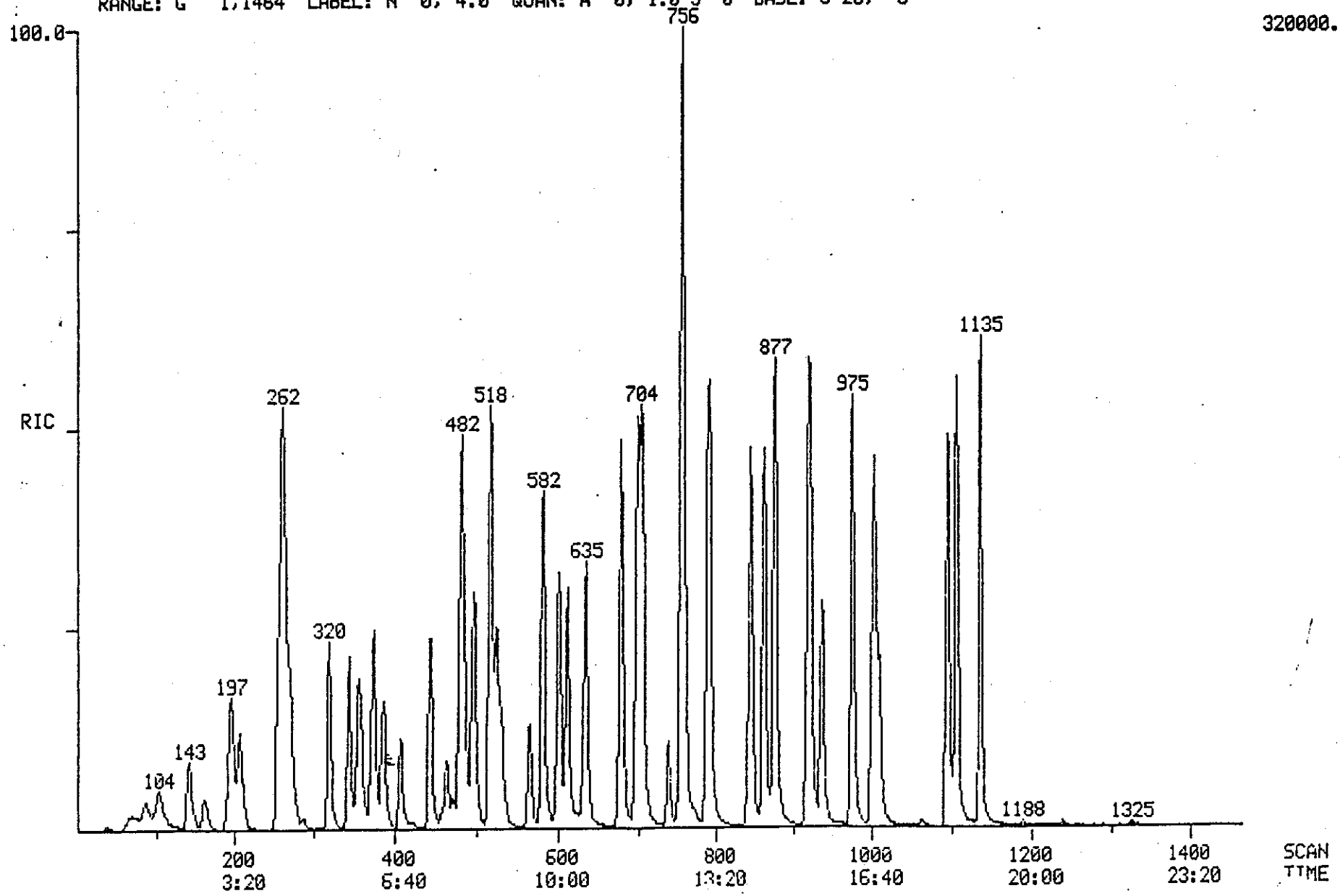
Mode	Scans	Secs	Out of	%	Peaks per scan	per sec
Centroid	1464	1.7	1464.0	0.1	30013. 21.	21.

000041

RIC
06/16/92 0:51:00
SAMPLE: -150 PPB HS WATER ICAL
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
RANGE: G 1,1464 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F0612 #4
CALI: 15JUN92F #3

SCANS 1 TO 1464



PROCEDURE: TCA DIAGNOSTIC REPORT 6/16/92 1:24:46
DATA FILE: F0612
REFERENCE: 11TABLE
NAME LIST: LLNL INITIALIZATION OPTION: 2 PROCESSING OPTION: 3
REPORT: IS01

000042

STANDARDS PROC	STANDARDS USED	STANDARDS POSS	STANDARDS RMS	PLUS UNKNOWNS PROC	PLUS UNKNOWNS USED	PLUS UNKNOWNS POSS	PLUS UNKNOWNS RMS	LIST NAMES STANDARD/UNKNOWN
1	1	1	0	11	11	1	154	IS01/TC01
1	1	1	0	11	11	4	177	IS02/TC02
1	1	1	0	4	4	1	86	IS03/TC03
3	3	1	37	13	13	1	73	IS04/TC04
3	3	1	37	13	12	1	64	IS05/TC05
3	3	1	37	7	7	1	46	IS06/TC06
1	1	1	0	11	11	2	30	IS07/TC07
1	1	1	0	4	4	4	62	IS08/TC08

63 COMPOUNDS PROCESSED, 62 FOUND

COMPOUND NO	COMPOUND LIB	COMPOUND ENTRY	SEARCH REF	SEARCH PRED	SEARCH SEL	SEARCH DELTA	SEARCH PEAKS	SAT FIT	SAT PEAKS	CHRO M/Z	CHRO TOP	CHRO DELTA	CHRO PEAKS
1	V1	1	-464	465	465	.	1	995	.	128	465	.	1
2	V1	20	-70	71	69	-2	1	995	.	85	67	-2	1
3	V1	10	-83	84	87	3	1	996	.	50	87	.	1
4	V1	25	-102	103	103	.	1	998	.	62	103	.	1
5	V1	15	-143	143	143	.	1	989	.	94	143	.	1
6	V1	35	-163	163	163	.	1	985	.	64	163	.	1
7	V1	70	-197	197	197	.	1	993	.	101	197	.	1
8	V1	32	-209	209	209	.	1	927	.	67	209	.	1
9	V1	80	-257	257	257	.	1	990	.	96	257	.	1
10	V1	38	-261	261	259	-2	1	897	.	45	259	.	1
11	V1	55	-261	261	261	.	1	1000	.	56	261	.	1
12	V1	65	-261	262	260	-2	1	981	.	76	260	.	1
13	V1	40	-263	264	264	.	1	999	.	142	264	.	1
14	V1	105	-271	272	270	-2	1	996	.	151	270	.	1
15	V1	50	-285	286	289	3	1	997	.	43	289	.	1
16	V1	45	-320	321	320	-1	1	990	.	84	320	.	1
17	V1	95	-345	346	345	-1	1	993	.	96	345	.	1
18	V1	60	-354	355	356	1	2	1000	.	53	356	.	1
19	V1	63	-356	357	359	2	1	999	.	73	359	.	1
20	V1	102	-376	377	375	-2	2	998	.	57	375	.	1
21	V1	90	-387	388	387	-1	1	998	.	63	387	.	1
22	V2	25	-409	409	409	.	1	985	.	43	409	.	1
23	V1	94	-445	446	445	-1	1	981	.	96	444	-1	1
24	V1	98	-458	459	460	1	1	994	.	72	460	.	1
25	V2	1	-566	566	566	.	1	998	.	114	566	.	1
26	V3	1	-844	843	843	.	1	997	.	117	843	.	1
27	V1	99	-472	472	473	1	1	985	.	42	473	.	1
28	V1	100	-481	481	481	.	1	997	.	83	481	.	1
29	V2	15	-484	484	483	-1	1	997	.	97	483	.	1
30	V2	20	-498	498	497	-1	1	998	.	117	497	.	1
31	V2	60	-518	518	518	.	1	969	.	78	517	-1	1
32	V1	2	-519	519	518	-1	1	985	.	65	519	1	1
33	V1	110	-526	526	525	-1	1	980	.	62	525	.	1
34	V2	45	-582	582	582	.	1	989	.	130	581	-1	1
35	V2	35	-602	601	601	.	1	985	.	63	601	.	1
36	V1	115	-613	612	612	.	1	991	.	174	612	.	1
37	V1	130	-626	626	626	.	1	991	.	88	626	.	1
38	V2	30	-636	636	635	-1	1	991	.	83	635	.	1
39	V2	75	-675	674	674	.	1	851	.	63	.	.	.
40	V2	40	-680	679	678	-1	1	998	.	75	678	.	1
41	V3	2	-700	699	699	.	1	982	.	98	699	.	1
42	V3	10	-704	703	.	.	.	.	.	43	703	.	1
43	V3	35	-706	705	705	.	1	992	.	92	705	.	1
44	V2	65	-739	738	738	.	1	995	.	75	738	.	1
45	V2	55	-754	753	754	1	1	951	.	97	753	-1	1
46	V3	20	-757	756	756	.	1	955	.	164	756	.	1
47	V3	38	-758	757	757	.	1	991	.	41	757	.	1
48	V2	50	-789	788	788	.	1	987	.	129	788	.	1
49	V3	15	-790	789	788	-1	1	978	.	43	788	.	1
50	V2	70	-793	792	792	.	1	974	.	107	792	.	1
51	V3	40	-847	846	846	.	1	982	.	112	846	.	1
52	V3	50	-865	864	863	-1	1	993	.	106	863	.	1
53	V3	75	-878	877	877	.	2	994	.	106	877	.	1
54	V3	60	-919	918	918	.	1	994	.	106	918	.	1
55	V3	55	-922	921	921	.	1	994	.	104	921	.	1
56	V2	80	-937	936	936	.	1	990	.	173	936	.	1
57	V3	3	-976	975	975	.	1	997	.	95	975	.	1
58	V2	90	-1002	1001	1001	.	1	994	.	75	1001	.	1
59	V3	25	-1005	1004	1004	.	1	979	.	83	1004	.	1
60	V3	30	-1011	1010	1010	.	1	989	.	53	1010	.	1
61	V3	80	-1096	1094	1094	.	2	987	.	146	1094	.	1
62	V3	90	-1107	1105	1105	.	2	987	.	146	1105	.	1
63	V3	85	-1136	1134	1135	1	1	983	.	146	1135	.	1

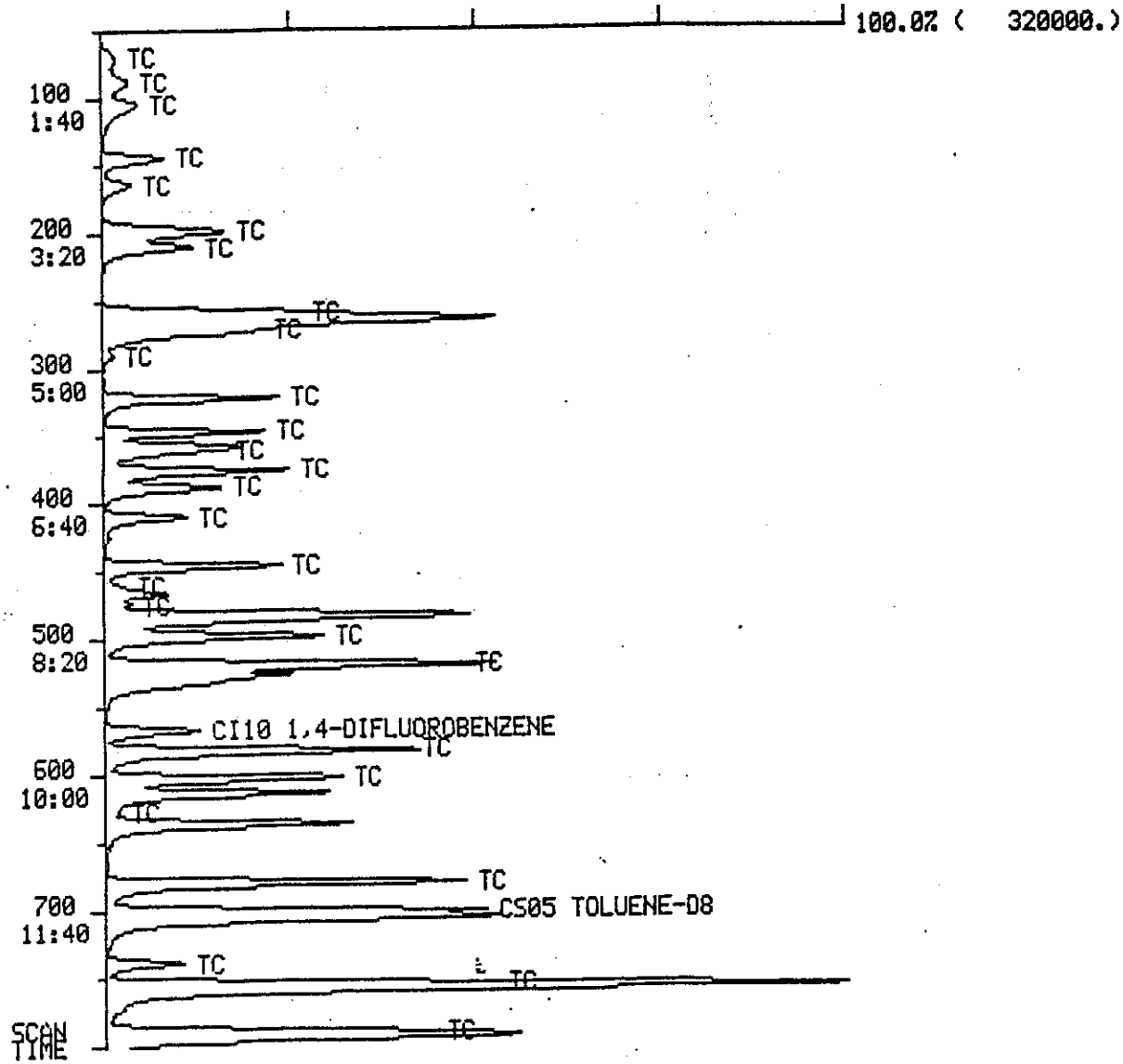
RMAL QUANTITATION SUMMARY FILE: F0612
COMPOUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

NO	LIBRARY ENTRY	NAME	MASS	SCAN	REF	AREA	UNITS: RRF	UG/L AMOUNT
1	V1# 1	CI01 BROMOCHLOROMETHANE	128	465	1	17543.	1.000	50.000
2	V2# 1	CI10 1,4-DIFLUOROBENZENE	114	566	2	93193.	1.000	50.000
3	V3# 1	CI20 CHLOROBENZENE-D5	117	843	3	69633.	1.000	50.000
4	V3# 2	CS05 TOLUENE-D8	98	699	3	286877.	1.094	188.223
5	V3# 3	CS10 BROMOFLUOROBENZENE	95	975	3	182512.	0.776	168.889
6	V1# 2	CS15 1,2-DICHLOROETHANE-	65	519	1	154862.	2.582	170.956
7	V1# 20	V001 DICHLORODIFLUOROMET	85	67	1	38586.	0.591	185.938
8	V1# 10	C010 CHLOROMETHANE	50	87	1	45203.	0.620	207.702
9	V1# 25	C020 VINYL CHLORIDE	62	103	1	56671.	0.993	162.694
10	V1# 15	C015 BROMOMETHANE	94	143	1	63358.	1.163	155.306
11	V1# 35	C025 CHLOROETHANE	64	163	1	44024.	0.812	154.453
12	V1# 70	V007 TRICHLOROFLUOROMETH	101	197	1	201913.	4.887	117.754
13	V1# 32	V003 DICHLOROFLUOROMETHA	67	209	1	134630.	2.882	133.126
14	V1# 80	C045 1,1-DICHLOROETHENE	96	257	1	81169.	1.811	127.768
15	V1# 65	C040 CARBON DISULFIDE	76	260	1	183943.	4.079	128.536
16	V1#105	V015 TRICHLORO-TRIFLUORO	151	270	1	78756.	1.814	123.724
17	V1# 50	C035 ACETONE	43	289	1	14368.	0.403	101.639
18	V1# 45	C030 METHYLENE CHLORIDE	84	320	1	85798.	2.215	110.382
19	V1# 95	V012 TRANS-1,2-DICHLORDE	96	345	1	69171.	1.464	134.662
20	V1#102	V009 HEXANE	57	375	1	110948.	1.775	178.110
21	V1# 90	C050 1,1-DICHLOROETHANE	63	387	1	143812.	2.451	167.221
22	V2# 25	C125 VINYL ACETATE	43	409	2	167107.	0.574	156.294
23	V1# 94	V011 CIS-1,2-DICHLOROETH	96	444	1	92136.	1.583	165.907
24	V1# 98	C110 2-BUTANONE	72	460	1	4625.	0.106	124.687
25	V1# 99	V013 TETRAHYDROFURAN	42	473	1	20818.	0.391	151.667
26	V1#100	C060 CHLOROFORM	83	481	1	195240.	3.909	142.361
27	V2# 15	C115 1,1,1-TRICHLOROETHA	97	483	2	189866.	0.777	131.128
28	V2# 20	C120 CARBONTETRACHLORIDE	117	497	2	191224.	0.743	138.065
29	V2# 60	C165 BENZENE	78	517	2	261862.	1.029	136.587
30	V1#110	C065 1,2-DICHLOROETHANE	62	525	1	151807.	2.996	144.398
31	V2# 45	C150 TRICHLOROETHENE	130	581	2	134246.	0.454	158.677
32	V2# 35	C140 1,2-DICHLOROPROPANE	63	601	2	114400.	0.367	167.260
33	V1#130	V019 1,4-DIOXANE	88	626	1	14610.	0.010	4256.280
34	V2# 30	C130 BROMODICHLOROMETHAN	83	635	2	203555.	0.737	148.198
35	V2# 75	V023 2-CHLOROETHYL VINYL	63	678	2	3194.	0.229	7.482
36	V2# 40	C143 CIS-1,3-DICHLOROPRO	75	678	2	251042.	0.573	234.885
37	V3# 10	C205 4-METHYL-2-PENTANON	43	703	3	84409.	0.380	159.486
38	V3# 35	C230 TOLUENE	92	705	3	176320.	0.802	157.836
39	V2# 65	C172 TRANS-1,3-DICHLOROP	75	738	2	53522.	0.491	58.514
40	V2# 55	C160 1,1,2-TRICHLOROETHA	97	753	2	89024.	0.341	140.082
41	V3# 20	C220 TETRACHLOROETHENE	164	756	3	90553.	0.449	144.948
42	V3# 15	C210 2-HEXANONE	43	788	3	49235.	0.219	161.614
43	V2# 50	C155 DIBROMOCHLOROMETHAN	129	788	2	169478.	0.607	149.878
44	V2# 70	V022 1,2-DIBROMOETHANE	107	792	2	278668.	0.453	329.902
45	V3# 40	C235 CHLOROBENZENE	112	846	3	206853.	0.982	151.252
46	V3# 50	C240 ETHYLBENZENE	106	863	3	96695.	0.470	147.726
47	V3# 75	V032 M+P XYLENES	106	877	3	167874.	0.813	148.279
48	V3# 60	V029 O-XYLENE	106	918	3	103088.	0.500	148.175
49	V3# 55	C245 STYRENE	104	921	3	214831.	1.046	147.477
50	V2# 80	C180 BROMOFORM	173	936	2	123140.	0.457	144.667
51	V3# 25	C225 1,1,2,2-TETRACHLORO	83	1004	3	153050.	0.753	145.852
52	V3# 80	V035 M-DICHLOROBENZENE	146	1094	3	188006.	0.996	135.493
53	V3# 90	V037 P-DICHLOROBENZENE	146	1105	3	212674.	1.093	139.656
54	V3# 85	V036 O-DICHLOROBENZENE	146	1135	3	179055.	0.906	141.952
55	V1# 38	V040 ETHANOL	45	259	1	840.	0.003	912.100
56	V1# 40	V004 IODOMETHANE	142	264	1	403077.	3.938	291.691
57	V1# 55	V005 ACROLEIN	56	261	1	57235.	0.230	710.331
58	V1# 60	V006 ACRYLONITRILE	53	356	1	65126.	0.263	706.352
59	V1# 63	TERT-BUTYL METHYL ETHER	73	359	1	130336.	2.160	171.940
60	V1#115	V016 DIBROMOMETHANE	174	612	1	99774.	1.534	185.415
61	V2# 90	V025 1,2,3-TRICHLOROPROP	75	1001	2	115323.	0.406	152.307
62	V3# 38	V027 ETHYL METHACRYLATE	41	757	3	217517.	0.480	325.685
63	V3# 30	V026 T-1,4-DICHLORO-2-BU	53	1010	3	42947.	0.207	148.958

000044

DATA FROM FILE: F0612 SCANS 50 TO 800 ACQUIRED: 06/16/92 0:51:00
CALI: F0612 #3

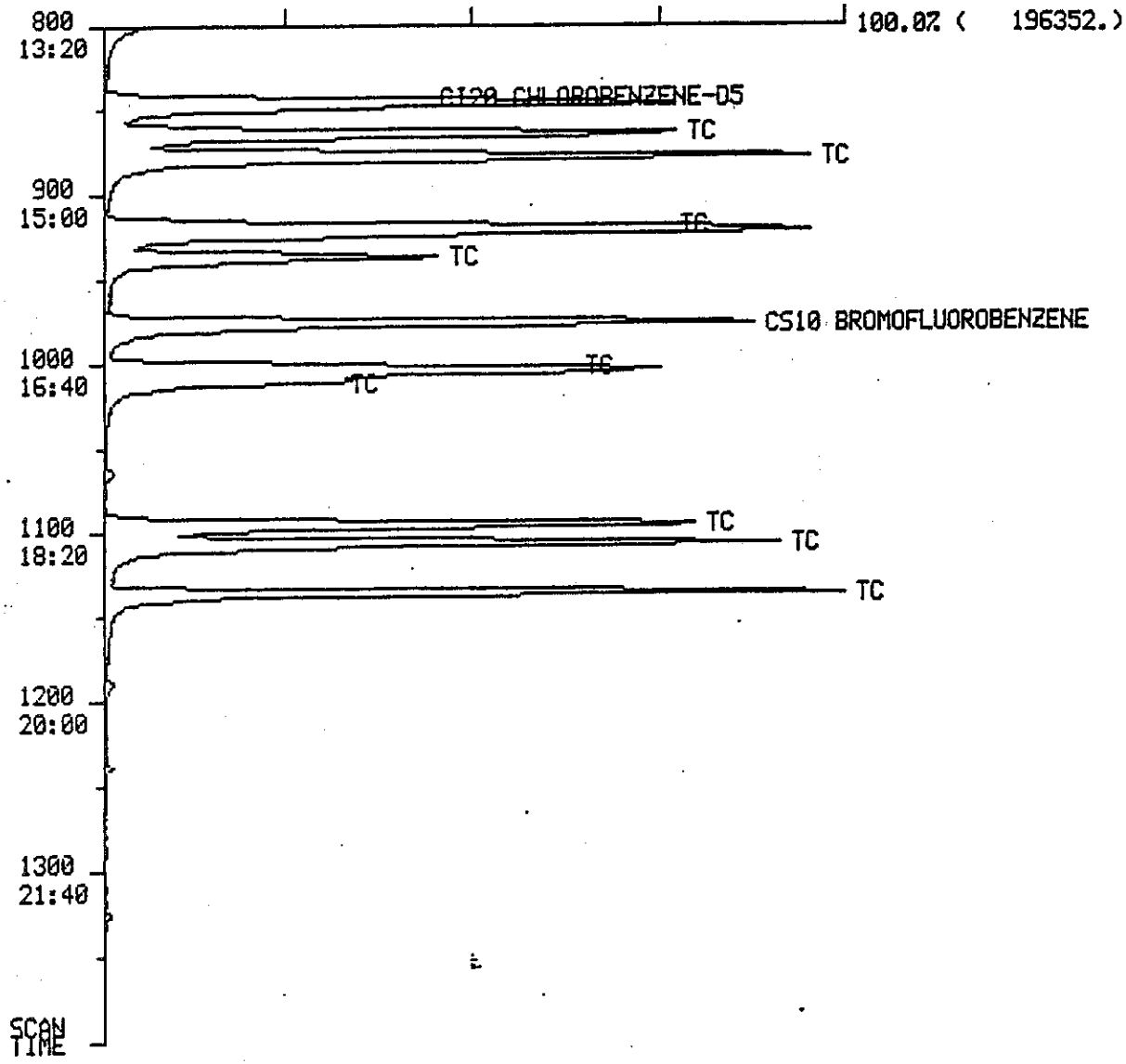
SAMPLE: -150 PPB HS WATER ICAL
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M



000045

DATA FROM FILE: F0612 SCANS 800 TO 1400 ACQUIRED: 06/16/92 0:51:00
CALI: F0612 #3

SAMPLE: -150 PPB HS WATER ICAL
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M



GC/MS VOA

METHOD/TEST 8240

INSTRUMENT F

INITIAL CALIBRATION DATE 08/03/92

Enseco GC/MS
VOA AP9 CALIBRATION CHECK

NITIAL CALIBRATION	20 UG/L	F2869	08/03/90	15:01:00
NITIAL CALIBRATION	50 UG/L	F2870	08/03/90	15:36:00
NITIAL CALIBRATION	100 UG/L	F2871	08/03/90	16:10:00
NITIAL CALIBRATION	150 UG/L	F2872	08/03/90	16:46:00
NITIAL CALIBRATION	200 UG/L	F2873	08/03/90	17:21:00

.ibrary Entry	Compound	Initial Calibration Response Factor Avg	Min	% RSD	Max	Continuing Calibration Response Factor	Min	% Diff	Max
'1 30	V002 ACETONITRILE	0.033		55.8					
'1 40	V004 IODOMETHANE	4.175		7.9					
'1 55	V005 ACROLEIN	0.098		5.4					
'1 60	V006 ACRYLONITRILE	0.274		19.2					
'1 75	PROPIONITRILE (ETHYL	0.092		17.1					
'1 85	ALLYL CHLORIDE (3-CH	0.699		19.8					
'1 115	V016 DIBROMOMETHANE	1.940		9.3					
'1 120	V017 METHACRYLONITRI	0.630		23.5					
'1 125	ISOBUTANOL	0.038		11.1					
'1 135	CHLOROPRENE (2-CHLOR	1.092		11.0					
'2 28	METHYL METHACRYLATE	0.270		12.7					
'2 85	V024 1,1,1,2-TETRACH	0.408		5.7					
'2 90	V025 1,2,3-TRICHLORO	0.420		21.0					
'3 38	V027 ETHYL METHACRYL	0.396		11.2					
'3 30	V026 T-1,4-DICHLORO-	0.115		10.9					
'3 45	V028 1,2-DIBROMO-3-C	0.188		11.4					

Enseco GC/MS
VOA AP9 CALIBRATION CHECK

000048

NITIAL CALIBRATION	20 UG/L	F2869	08/03/90	15:01:00
NITIAL CALIBRATION	50 UG/L	F2870	08/03/90	15:36:00
NITIAL CALIBRATION	100 UG/L	F2871	08/03/90	16:10:00
ITIAL CALIBRATION	150 UG/L	F2872	08/03/90	16:46:00
NITIAL CALIBRATION	200 UG/L	F2873	08/03/90	17:21:00

		F2869		F2870		F2871		F2872		F2873			
ib	#	Conc	RRF	Conc	RRF	Conc	RRF	Conc	RRF	Conc	RRF	Conc	RRF
1	30	200,	0.031	500,	0.009	1000,	0.046	1500,	0.022	2000,	0.055		
1	40	40,	4.116	100,	4.168	200,	4.037	300,	3.833	400,	4.722		
1	55	100,	0.093	250,	0.093	500,	0.101	750,	0.105	1000,	0.100		
1	60	80,	0.218	200,	0.254	400,	0.262	600,	0.275	800,	0.360		
1	75	20,	0.075	50,	0.104	100,	0.086	150,	0.083	200,	0.113		
1	85	10,	0.585	25,	0.616	50,	0.674	75,	0.683	100,	0.936		
1	115	20,	1.801	50,	1.891	100,	1.860	150,	1.890	200,	2.256		
1	120	20,	0.653	50,	0.678	100,	0.465	150,	0.513	200,	0.840		
1	125	200,	0.036	500,	0.033	1000,	0.037	1500,	0.042	2000,	0.043		
1	135	20,	1.019	50,	1.021	100,	1.069	150,	1.046	200,	1.304		
2	28	40,	0.230	100,	0.290	200,	0.273	300,	0.314	400,	0.243		
2	85	20,	0.409	50,	0.404	100,	0.391	150,	0.389	200,	0.447		
2	90	20,	0.329	50,	0.339	100,	0.450	150,	0.440	200,	0.542		
3	38	40,	0.347	100,	0.389	200,	0.390	300,	0.386	400,	0.469		
3	30	20,	0.103	50,	0.111	100,	0.111	150,	0.112	200,	0.136		
3	45	40,	0.172	100,	0.182	200,	0.183	300,	0.179	400,	0.226		

VOAAP9 STD

000049

Name List: HEDR1 Entry # 1 of 1
File Name: F2975

(1)Format: VOACLP
(3)Sample ID: VSTD050
(5)Matrix:
(7)Fraction: VOA
(10)Analyst: BA
(12)Purge Volume: NA
(14)Extract Volume: NA
(16)Sample Amount: NA
(19)Run Factor: NA

(2)Case: STDF
(4)Level:
(6)Lab Sample ID: 3598
(8)Type: CAL
(11)Quan List Units: UG/L
(13)Extract Dilution: NA
(15)Extract Vol. Used: NA
(17)Percent Moisture: NA
(20)SURROGATE VOLUME:: NA

8/13/90 10:35:29
Acquisition started

cquire Run 0:F2975 Starting
8/13/90 10:35:00 + 0:00 Free sectors: 27722 Scan: 0 of 1590
ample: CLP,STDF ,,VSTD050 , , ,3598,VOA,CAL ,
onds.: UG/L *NA *100%/NA *(NA/NA)/NA NA M
ormula: NANA Instrument: I50F Weight: 0.000
ubmitted by: RMAL Analyst: BA Acct. No: VOACLP

*** GC not ready and being equilibrated ***
C Desc.: VA Elapsed time : 0.0 Min

eq. #	Temp (DegC)	Rate (C/min)	Time (minutes) period	total			
1	-20--20	-	1.0	1.0	Injector A	:	220 Deg C
2	-20-100	8.3	14.4	15.4	GC oven	:	68 Deg C
3	100-200	12.5	8.0	23.4	Transfer-line	:	310 Deg C
					Ion source	:	197 Deg C

alve A : closed Valve B : closed
*** Instrument parameters ***
Post acquisition state -> Filament : Off Multiplier : Off
ODE: EI (+) Centroid + Temp - Sequence: VO (1 time window.)

equence Window # 1
Number of cycles: 1
Filament is ON
Multiplier is ON
can descriptor: VO Mass intervals: 1 Positive ion mode.
otal scan time: 1.000 s Master rate: 8

PW: 3 MFW: 70 MA: 20 TH: 1 BL: 0

Int #	Lo mass	Hi mass	Time
1	36.511	300.590	1.000

Calibration table: 3:081390CF

Interface number	0	
Instrument type	Q	
Full scale mass	1170	u
Zero scale mass	1	u
Intensity/ion	2	
Peak width	1000.	mmu
Offset at low mass	0	mmu
Offset at high mass	0	mmu
Voltage settling time(ms)	4	

urrent instrument parameters.

	Positive ion mode	Negative ion mode
Resolution (high)	140.00	0.00
Resolution (low)	155.00	0.00
Quad offset	0.00	0.00
Quad programming	0.00	0.00
Lens offset	-40.00	0.00
Lens programming	0.00	0.00
Ext offset	2.00	0.00
Ext programming	0.00	0.00
Collector	30.00	0.00
Ion offset	3.70	0.00

000050

Ion programming	5.00	0.00
Rod polarity	Reverse	Normal

Electron multiplier voltage: 1353.
Filament emission current: 750.
Electrometer range: 10 ^-7
Electrometer zero: 122.0

nalyzer Fore Pressure .....: 0.003 Torr
eparator/Source Pressure .....: 0.061 Torr

8/13/90 11:11:29
ACQUISITION COMPLETED
Scans 1 to 1590 Centroid

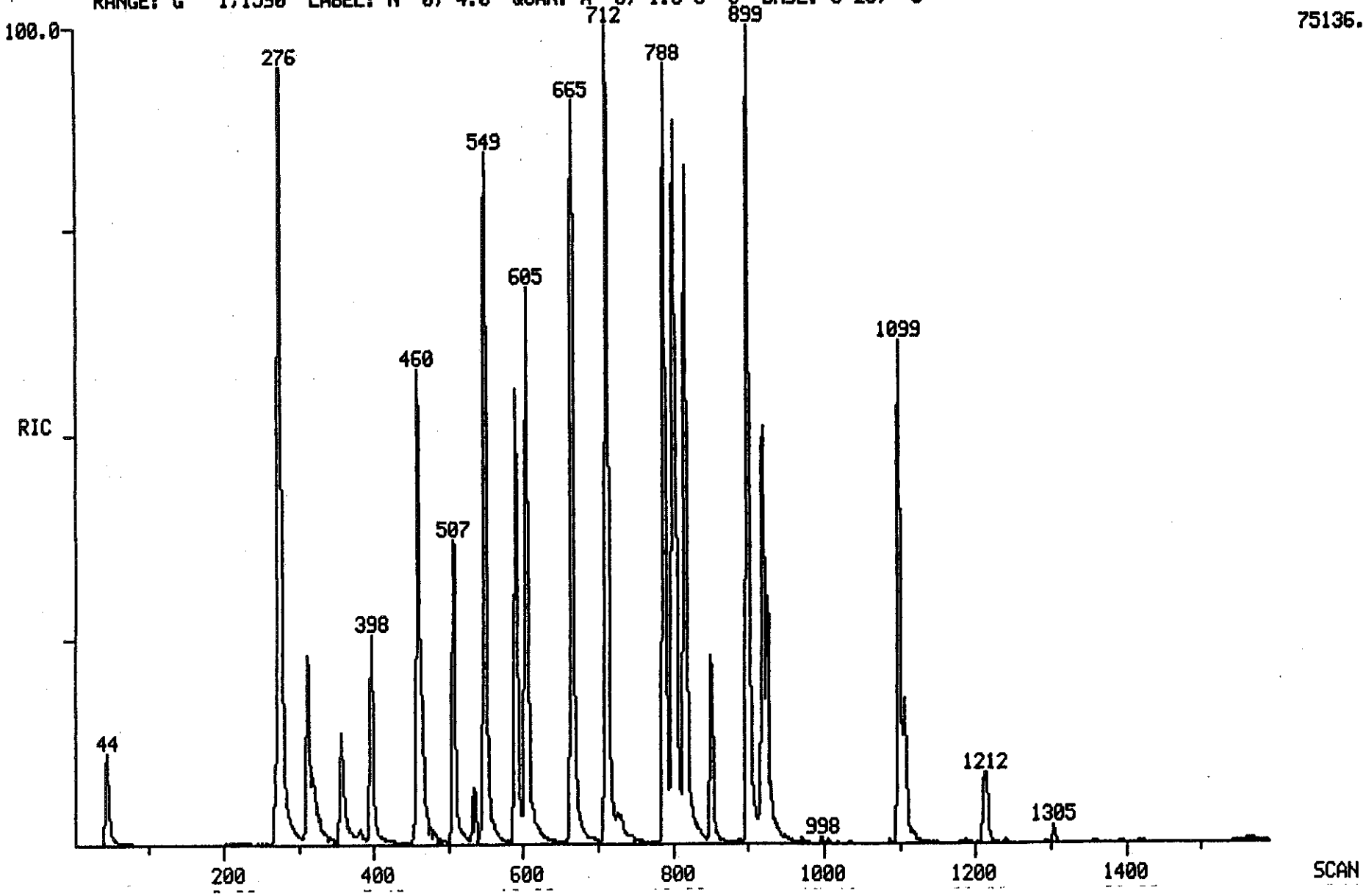
ode	Scans	Secs	Out of	%	Peaks per scan	per sec
entroid	1590	1.2	1590.0	0.1	15462. 10.	10.

000051

RIC
08/13/90 10:35:00
SAMPLE: CLP,STDF ,,VSTD050 , , ,3598,VOA,CAL ,
CONDS.: UG/L *NA *100%/NA *(NA/NA)/NA NA M
RANGE: G 1,1590 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F2975 #4
CALI: 081390CF #3

SCANS 1 TO 1590



ROCEDURE: TCA DIAGNOSTIC REPORT 8/13/90 11:15:07
ATA FILE: F2975
EFERENCE: 11TABLE
AME LIST: LLNL INITIALIZATION OPTION: 2 PROCESSING OPTION: 3 000052
REPORT: ISO1

---- STANDARDS -----				>< --- PLUS UNKNOWNS ---				>< - LIST NAMES - >
PROC	USED	POSS	RMS	PROC	USED	POSS	RMS	STANDARD/UNKNOWN
1	1	1	0	8	7	4	100	ISO1/TCO1
3	3	1	0	8	8	2	91	ISO2/TCO2
1	1	1	0	5	5	1	250	ISO3/TCO3

19 COMPOUNDS PROCESSED, 18 FOUND

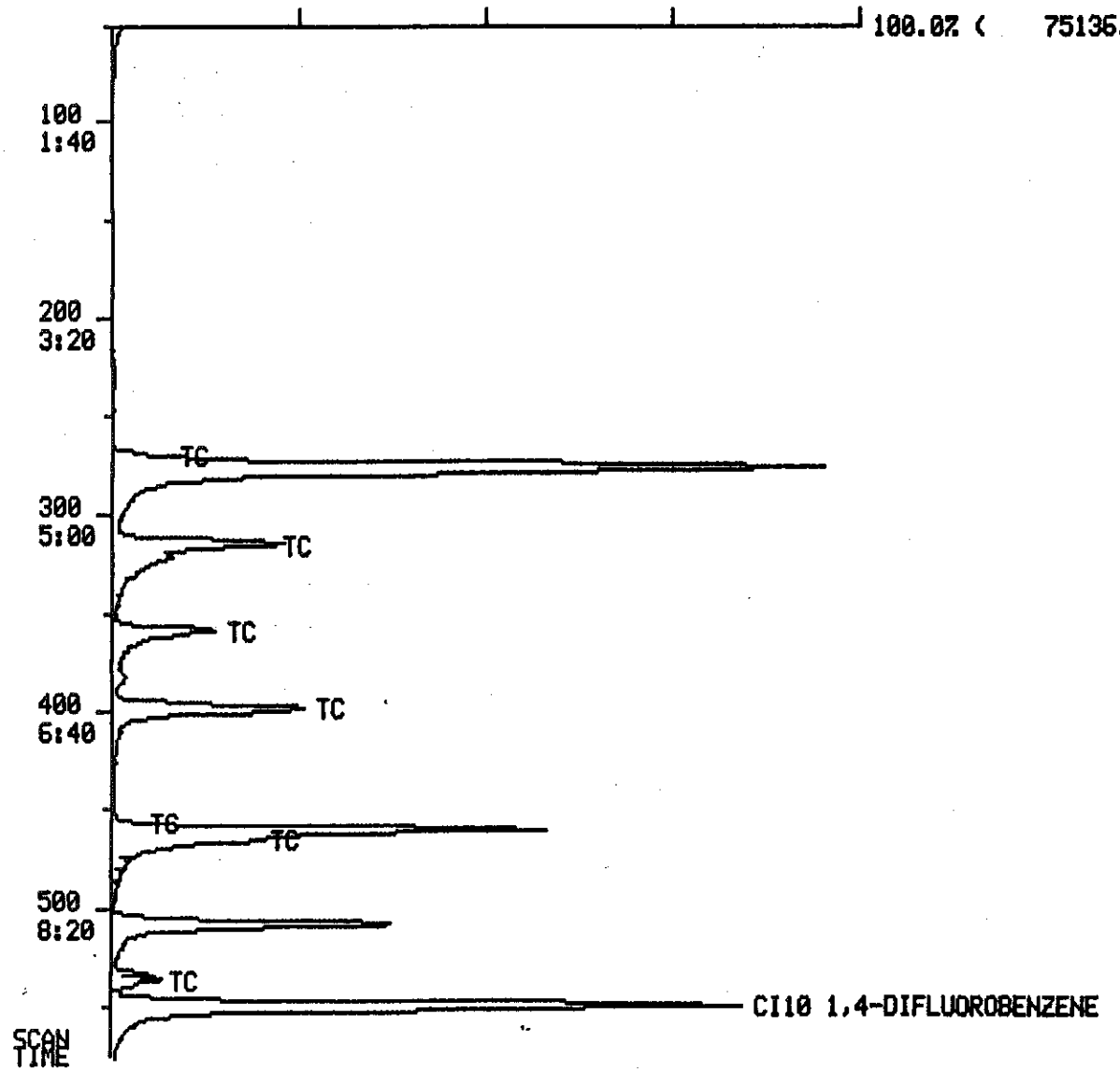
COMPOUND ><				---------- SEARCH ----------				>< SAT	>< ------ CHRO ------- >			
NO	LIB	ENTRY	REF	PRED	SEL	DELTA	PEAKS	FIT	PEAKS	M/Z	TOP	DELTA	PEAKS
1	V1	1	-459	460	460	.	1	998	.	128	460	.	1
2	V1	55	-273	270	270	.	1	999	.	56	270	.	1
3	V1	40	-280	277	276	-1	1	997	.	142	276	.	1
4	V1	85	-315	313	313	.	2	993	.	76	314	1	1
5	V1	30	-321	319	321	2	2	951	.	40	319	-2	2
6	V1	60	-359	358	358	.	1	1000	.	53	358	.	1
7	V1	135	-398	398	398	.	1	987	.	53	398	.	1
8	V1	75	-456	457	.	.	.	.	.	54	456	.	1
9	V2	1	-548	549	549	.	1	995	.	114	549	.	1
10	V3	1	-787	788	788	.	1	998	.	117	788	.	1
11	V1	120	-466	466	465	-1	1	981	.	41	465	.	1
12	V1	125	-535	536	535	-1	1	991	.	41	536	1	2
13	V1	115	-588	589	590	1	1	992	.	174	590	.	1
14	V2	28	-604	605	605	.	2	992	.	41	604	-1	1
15	V3	38	-710	711	712	1	1	991	.	41	713	1	1
16	V2	85	-801	803	801	-2	1	984	.	131	801	.	1
17	V2	90	-915	917	920	3	1	988	.	75	920	.	1
18	V3	30	-923	925	926	1	1	988	.	53	926	.	1
19	V3	45	-1099	1101	1099	-2	1	994	.	157	1099	.	1

MAL QUANTITATION SUMMARY FILE: F2975 000053
OMPOUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

NO	LIBRARY ENTRY	NAME	MASS	SCAN	REF	AREA	UNITS: RRF	UG/L AMOUNT
1	V1# 1	CI01 BROMOCHLOROMETHANE	128	460	1	30780.	1.000	50.000
2	V2# 1	CI10 1,4-DIFLUOROBENZENE	114	549	2	137229.	1.000	50.000
3	V3# 1	CI20 CHLOROBENZENE-D5	117	788	3	114930.	1.000	50.000
4	V1# 30	V002 ACETONITRILE	40	319	1	6435.	0.009	1193.260
5	V1# 40	V004 IODOMETHANE	142	276	1	245715.	3.662	109.005
6	V1# 55	V005 ACROLEIN	56	270	1	13783.	0.097	231.766
7	V1# 60	V006 ACRYLONITRILE	53	358	1	25869.	0.294	142.959
8	V1# 75	PROPIONITRILE (ETHYL CYA	54	456	1	2414.	0.054	72.444
9	V1# 85	ALLYL CHLORIDE (3-CHLORO	76	314	1	10368.	0.643	26.181
10	V1#115	V016 DIBROMOMETHANE	174	590	1	47570.	1.313	58.874
11	V1#120	V017 METHACRYLONITRILE	41	465	1	15733.	0.285	89.665
12	V1#125	ISOBUTANOL	41	536	1	6275.	0.011	910.339
13	V1#135	CHLOROPRENE (2-CHLORO-1,	53	398	1	33223.	1.091	49.485
14	V2# 28	METHYL METHACRYLATE	41	604	2	65068.	0.211	112.153
15	V2# 85	V024 1,1,1,2-TETRACHLORO	131	801	2	56201.	0.419	48.907
16	V2# 90	V025 1,2,3-TRICHLOROPROP	75	920	2	43261.	0.567	27.811
17	V3# 38	V027 ETHYL METHACRYLATE	41	713	3	97381.	0.330	128.220
18	V3# 30	V026 T-1,4-DICHLORO-2-BU	53	926	3	10625.	0.153	30.299
19	V3# 45	V028 1,2-DIBROMO-3-CHLOR	157	1099	3	32666.	0.159	89.371

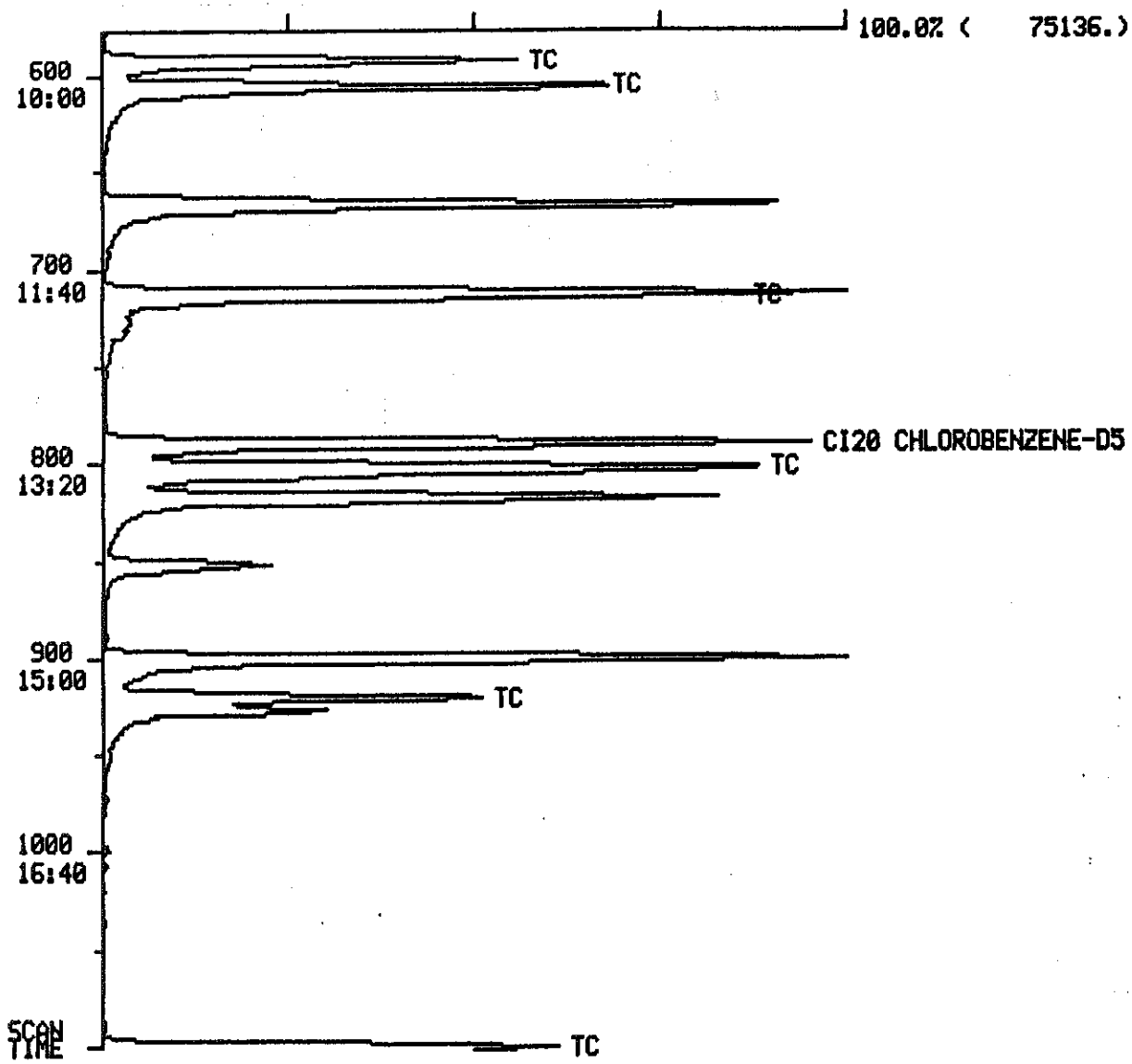
000054

DATA FROM FILE: F2975 SCANS 50 TO 575 ACQUIRED: 08/13/90 10:35:00
CALI: F2975 #3 OUT OF 50 TO 1100
SAMPLE: CLP,STDF ,,VSTD050 , , ,3598,VOA,CAL ,
CONDS.: UG/L *NA *100%/NA *(NA/NA)/NA NA M



000055

DATA FROM FILE: F2975 SCANS 575 TO 1100 ACQUIRED: 08/13/90 10:35:00
CALI: F2975 #3 OUT OF 50 TO 1100
SAMPLE: CLP,STDF ,,VSTD050 , , ,3598,VOA,CAL ,
CONDS.: UG/L *NA *100%/NA *(NA/NA)/NA NA M



Sample: F2866 Performance Check: F2832 Sample: F2866 Performance Check: F2832 Sam
Name List: HEOF1 Entry # 1 of 1 **000056**
File Name: F2869

(1)Format: VOACLP
(2)Case: STDF
(3)Sample ID: VBT0020
(4)Level:
(5)Matrix:
(6)Lab Sample ID: 3569
(7)Fraction: VOA
(8)Type: CAL
(10)Analyst: DA
(11)Quan List Units: UG/L
(12)Purge Volume: NA
(13)Extract Dilution: NA
(14)Extract Volume: NA
(15)Extract Vol. Used: NA
(16)Sample Amount: NA
(17)Percent Moisture: NA
(19)Run Factor: NA
(20)SURROGATE VOLUME:: NA

9/8/90 15:01:47
Acquisition started

[illegible] File: F2869 Starting
[illegible] Prev. scans: 20937 Scan: 0 of 1590
Sample: CLP,STDF,,VBT0020,,,,3569,VOA,CAL,
Prep: CC/L [illegible] NA,M
Sample: MANUA Instrument: 150F Weight: 0.000
Submitted by: RIAL Analyst: DA Acct. No: VOACLP

*** GC not ready and being equilibrated ***
0 Deg : VA Elapsed time : 0.0 Min

Seq	Temp (Deg C)	Rate (C min)	time (minutes) period	time (minutes) total			
1	-20--20	-	1.0	1.0	Injector A	:	220 Deg C
2	-20--100	8.0	11.1	15.1	GC oven	:	59 Deg C
3	100-200	12.5	8.0	23.4	Transfer-line	:	313 Deg C
					Ion source	:	132 Deg C

Valve A : closed Valve B : closed
*** Instrument parameters ***
Fast acquisition state -> Filament : Off Multiplier : Off
[illegible] EI (+) Profile
[illegible] MODE: Centroid - Temp - Sequence: VO (1 time window.)

Sequence Window # 1
Number of cycles: 1
Filament is ON
Multiplier is ON
Scan descriptor: VO Mass intervals: 1 Positive ion mode.
Total scan time: 1.000 s Master rate: 8

PW: 3 MPW: 70 MA: 20 TH: 1 BL: 0

Int #	Lo mass	Hi mass	Time
1	36.511	200.590	1.000

Calibration table: 3:080390CF

Interface number	0	
Instrument type	0	
Full scale mass	1170	u
Zero scale mass	1	u
Intensity/ion	2	
Peak width	1000	mmu
Offset at low mass	0	mmu
Offset at high mass	0	mmu
Voltage settling time(ms)	4	

Current instrument parameters:

	Positive ion mode	Negative ion mode
Resolution (high)	100.00	0.00
Resolution (low)	152.00	0.00
Quad offset	-1.00	0.00
Quad programming	-1.00	0.00
Lens offset	-40.00	0.00
Lens programming	0.00	0.00
Ext offset	0.00	0.00
Ext programming	0.00	0.00
Collector	30.00	0.00

000057

Ion offset	3.50	0.00
Ion programming	6.00	0.00
Rod polarity	Reverse	Normal

Electron multiplier voltage: 1304.
Filament emission current: 750.
Electrometer range: 10 ^-7
Electrometer zero: 122.0

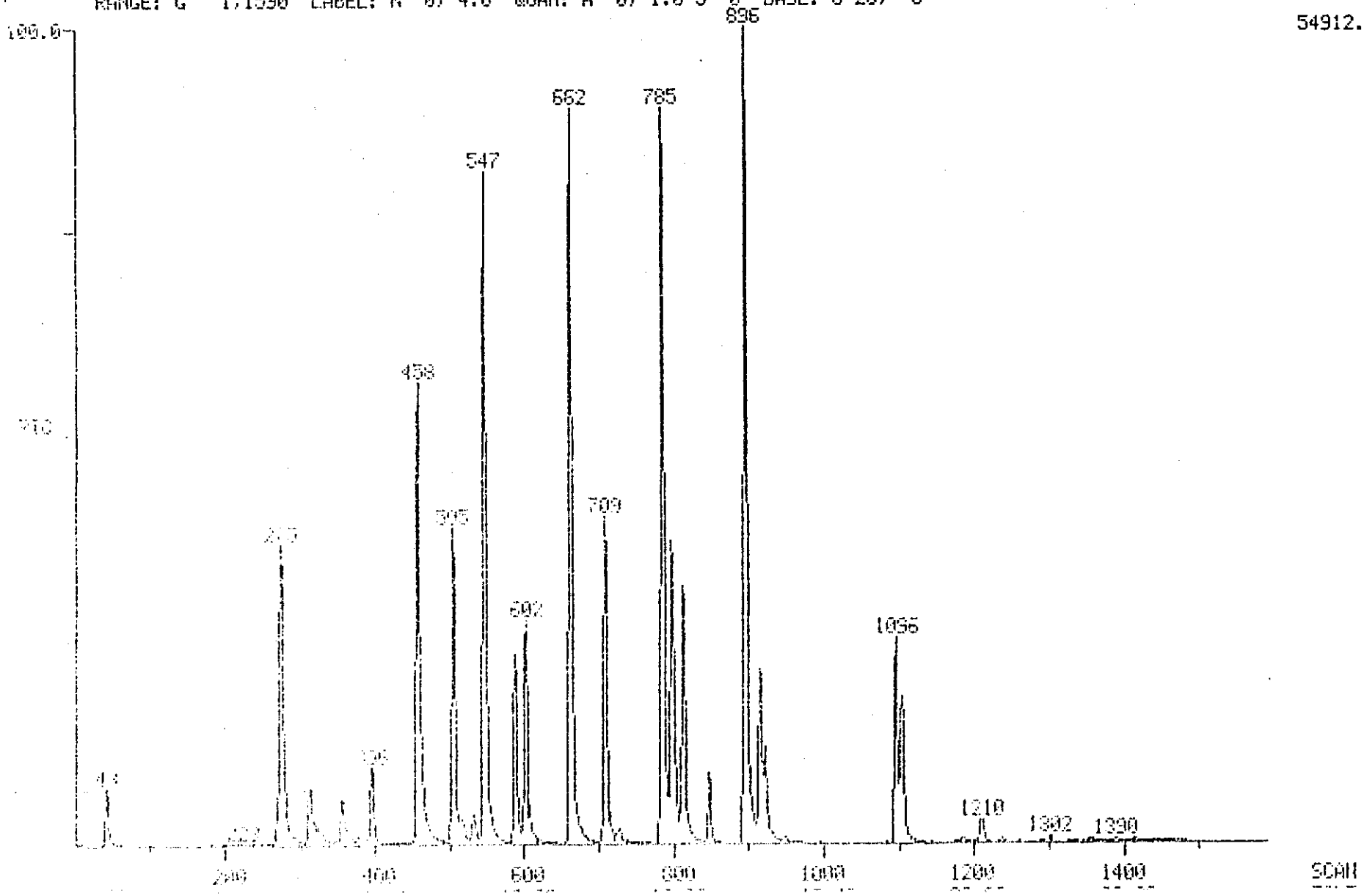
nalyzer Fore Pressure .....: 0.004 Torr
eparator/Source Pressure .....: 0.062 Torr

8/3/90 15:24:29
ACQUISITION COMPLETED
Scans 1 to 1590 Centroid

ode	Scans	Cacs	Out of	%	Peaks per scan	per sec
entroid	1590	0.9	1590.0	0.1	11105. 7.	7.

000058

RIC DATA: F2869 #4 SCANS 1 TO 1590
03/03/90 15:01:00 CALI: 080390CF #3
SAMPLE: CLP,STDF ,,VSTD020 , , ,3569,VOA,CAL ,
CONDS.: UG/L %HA %100%/NA %(HA/NA)/NA NA M
RANGE: G 1,1590 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3



000059

				--- PLUS UNKNOWNS ---				>< - LIST NAMES - >
	[illegible]	[illegible]	RMS	PROC	USED	POSS	RMS	STANDARD/UNKNOWN
	1	2	0	8	7	2	39	IS01/TC01
3	3	1	93	8	8	2	77	IS02/TC02
1	1	1	0	5	5	1	61	IS03/TC03

.# COMPOUNDS PROCESSED, 18 FOUND

COMPOUND			>< ---------- SEARCH ----------					>< SAT		>< ------ CHRO -------			>
[illegible]	LIB	ENTRY	REF	PRED	SEL	DELTA	PEAKS	FIT	PEAKS	M/Z	TOP	DELTA	PEAKS
[illegible]	V1	[illegible]	-461	458	458	.	2	999	.	128	458	.	1
[illegible]	V1	[illegible]	-272	269	269	.	1	996	.	56	269	.	1
[illegible]	V1	40	-278	275	275	.	1	995	.	142	275	.	1
[illegible]	V1	[illegible]	-316	313	313	.	1	976	.	76	313	.	1
[illegible]	V1	[illegible]	-323	320	320	.	2	999	.	40	319	-1	1
[illegible]	V1	60	-360	357	357	.	1	1000	.	53	356	-1	1
[illegible]	V1	[illegible]	-400	397	396	-1	1	985	.	53	396	.	1
[illegible]	V1	[illegible]	-458	455	.	.	.	.	.	54	454	.	1
[illegible]	V2	1	-551	547	546	-1	1	993	.	114	546	.	1
[illegible]	V2	1	-791	785	785	.	1	993	.	117	785	.	1
[illegible]	V1	120	-468	464	463	-1	1	960	.	41	463	.	1
[illegible]	V1	125	-536	531	532	1	1	988	.	41	532	.	1
[illegible]	V1	115	-594	589	588	-1	1	993	.	174	588	.	1
[illegible]	V2	28	-607	602	602	.	2	997	.	41	602	.	1
[illegible]	V3	38	-715	709	709	.	1	987	.	41	709	.	1
[illegible]	V2	85	-805	798	798	.	1	983	.	131	798	.	1
[illegible]	V2	90	-923	916	916	.	1	989	.	75	916	.	1
[illegible]	V3	30	-930	923	923	.	1	982	.	53	923	.	1
[illegible]	V3	45	-1102	1096	1096	.	1	992	.	157	1096	.	1

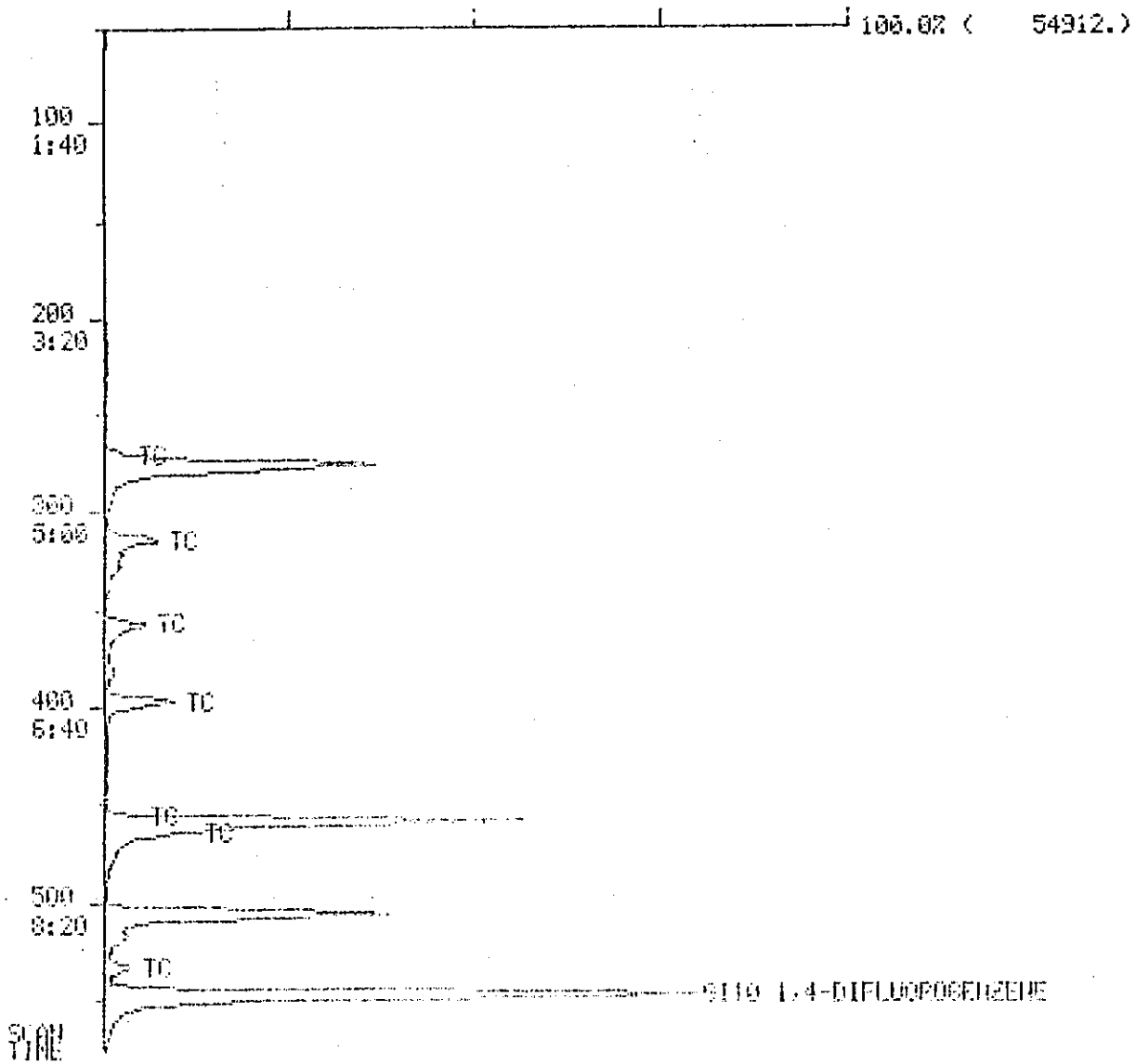
MAL QUANTITATION SUMMARY FILE: F2869
OMPOUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

000060

NO	LIBRARY ENTRY	NAME	MASS	SCAN	REF	AREA	UNITS: RRF	UG/L AMOUNT
1	V1# 1	C101 BROMOCHLOROMETHANE	129	458	1	22328.	1.000	50.000
2	V2# 1	C110 1,4-DIFLUOROBENZENE	114	546	2	101687.	1.000	50.000
3	V3# 1	C120 CHLOROBENZENE-D5	117	785	3	81815.	1.000	50.000
4	V1# 30	V002 ACETONITRILE	40	319	1	2730.	0.026	236.273
5	V1# 40	V004 IODOMETHANE	142	275	1	73525.	4.185	39.339
6	V1# 55	V005 ACROLEIN	56	269	1	4136.	0.080	115.224
7	V1# 60	V006 ACRYLONITRILE	53	356	1	7771.	0.184	94.678
8	V1# 75	PROPIONITRILE (ETHYL CYA	54	454	1	667.	0.070	21.341
9	V1# 85	ALLYL CHLORIDE (3-CHLORO	76	313	1	2613.	0.667	8.770
10	V1#115	V016 DIBROMOMETHANE	174	588	1	16088.	1.747	20.616
11	V1#120	V017 METHACRYLONITRILE	41	463	1	5833.	0.458	28.528
12	V1#125	ISOBUTANOL	41	532	1	3241.	0.015	478.596
13	V1#135	CHLOROPRENE (2-CHLORO-1,	53	396	1	9100.	1.026	19.861
14	V2# 28	METHYL METHACRYLATE	41	602	2	18740.	0.178	51.689
15	V2# 35	V024 1,1,1,2-TETRACHLORO	131	798	2	16635.	0.401	20.406
16	V2# 90	V025 1,2,3-TRICHLOROPROP	75	916	2	13379.	0.351	18.768
17	V3# 38	V027 ETHYL METHACRYLATE	41	709	3	22743.	0.374	37.152
18	V3# 30	V025 T-1,4-DICHLORO-2-BU	53	923	3	3364.	0.101	20.419
19	V3# 45	V029 1,2-DIBROMO-3-CHLOR	157	1096	3	11238.	0.149	46.152

000061

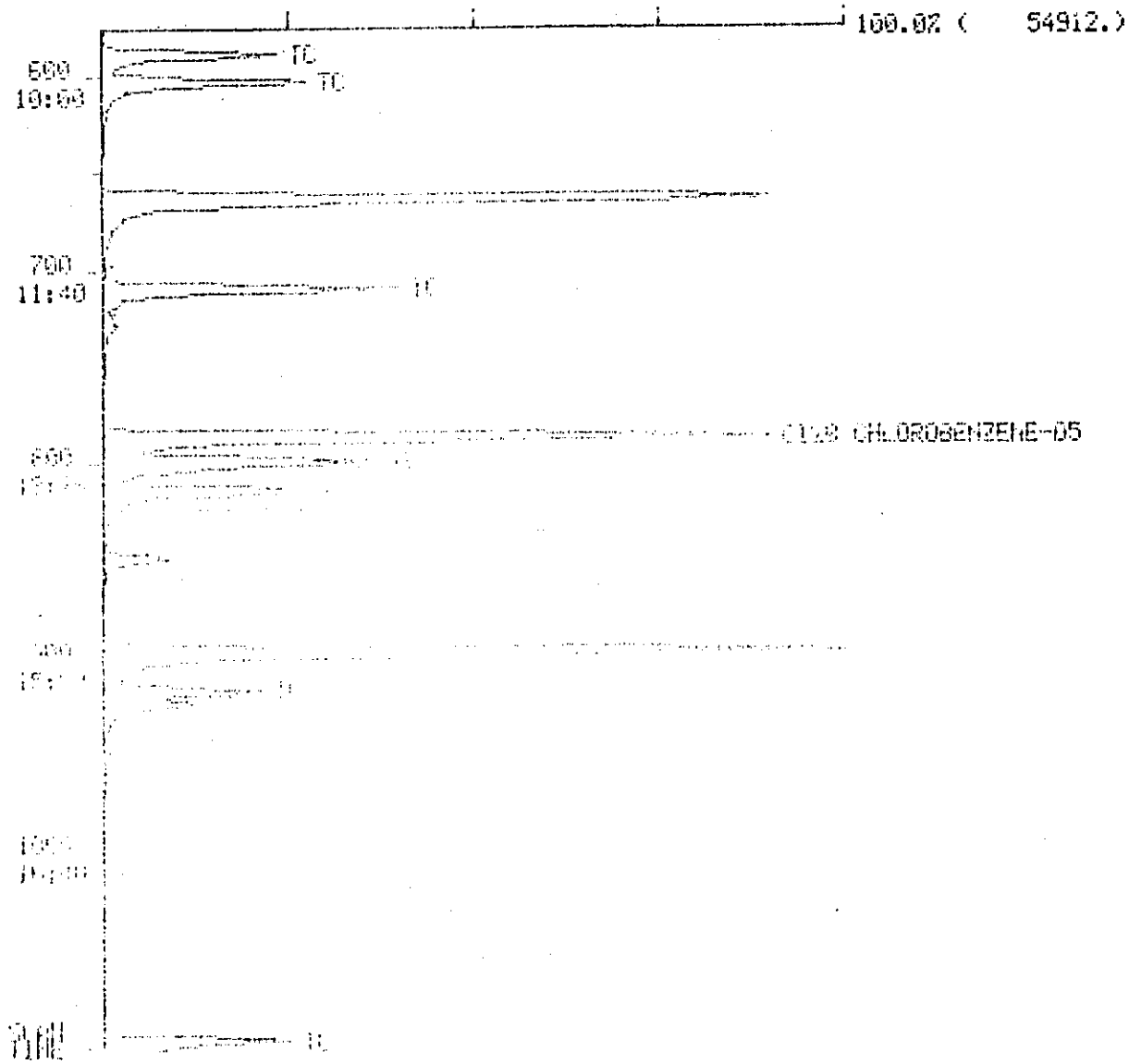
DATA FROM FILE: F2869 SCANS 50 TO 575 ACQUIRED: 08/03/90 15:01:00
CALI: F2869 #3 OUT OF 50 TO 1100
SAMPLE: CLP,STDF ,,VSTD020 , , ,3558,VOA,CAL ,
CONDS.: UG/L *NA *100%/NA *(NA/NA)/NA NA M



000062

DATA FROM FILE: F2869 SCANS 575 TO 1100 ACQUIRED: 08/03/90 15:01:00
CALI: F2869 #3 OUT OF 50 TO 1100

SAMPLE: CLP,STDF ,,VST0020 , , ,3569,VOA,CAL ,
CONDS.: UG/L #NA $100%/NA $(NA/NA)/NA NA M



Name List: [illegible] Entry # 1 of 1
File Name: [illegible]

[illegible]	(2)Case: STDF
[illegible]	(4)Level:
[illegible]	(6)Lab Sample ID: 3569
[illegible]	(8)Type: CAL
[illegible]	(11)Quan List Units: UG/L
[illegible]	(13)Extract Dilution: NA
[illegible]	(15)Extract Vol. Used: NA
[illegible]	(17)Percent Moisture: NA
[illegible]	(20)SURROGATE VOLUME:: NA

[illegible] 15:36 [illegible]
Acquisition started

[illegible] Run 3:F2870 Starting
[illegible] + 0.00 Freq sectors: 20774 Scan: 0 of 1590
[illegible] STDF [illegible] 3569 VOA CAL
[illegible] NA M
[illegible] Instrument: I30F Weight: 0.000
[illegible] Analyst: BA Acct. No: VOACLP

*** GC not ready and being equilibrated ***
[illegible] Elapsed time : 0.0 Min

Seq #	Temp (Deg C)	Rate (C/min)	Time (minutes) period	total		
1	-20--20	-	1.0	1.0	Injector A :	220 Deg C
2	-20-100	9.3	14.4	15.4	GC oven :	76 Deg C
3	100-200	12.5	8.0	23.4	Transfer-line:	315 Deg C
					Ion source :	196 Deg C

alve A : closed valve B : closed
*** Instrument parameters ***
Post acquisition state -> Filament : Off Multiplier : Off
ODE: EI (+) Centroid + Temp - Sequence: VO (1 time window.)

equence Window # 1
Number of cycles: 1
Filament is ON
Multiplier is ON
can descriptor: VO Mass intervals: 1 Positive ion mode.
otal scan time: 1.000 s Master rate: 8

PW: 3 MFW: 70 MA: 20 TH: 1 BL: 0

Int #	Lo mass	Hi mass	Time
1	36.511	300.590	1.000

Calibration table: 3:080390CF

Interface number	0	
Instrument type	Q	
Full scale mass	1170	u
Zero scale mass	1	u
Intensity/ion	2	
Peak width	1000.	mmu
Offset at low mass	0	mmu
Offset at high mass	0	mmu
Voltage settling time(ms)	4	

urrent instrument parameters.

	Positive ion mode	Negative ion mode
Resolution (high)	100.00	0.00
Resolution (low)	152.00	0.00
Quad offset	-1.00	0.00
Quad programming	-1.00	0.00
Lens offset	-40.00	0.00
Lens programming	0.00	0.00
Ext offset	0.00	0.00
Ext programming	0.00	0.00
Collector	30.00	0.00
Ion offset	3.50	0.00

000064

Ion programming	6.00	0.00
Rod polarity	Reverse	Normal
Electron multiplier voltage:		1304.
Filament emission current:		750.
Electrometer range:		10 ^-7
Electrometer zero:		122.0

naiyzer Fore Pressure ....: 0.004 Torr
eparator/Source Pressure .....: 0.062 Torr

8/3/90 16:09:57
ACQUISITION COMPLETED
Scans 1 to 1590 Centroid

ode	Scans	Secs	Out of	%	Peaks per scan	per sec
entroid	1590	1.0	1590 0	0.1	15443. 10.	10.

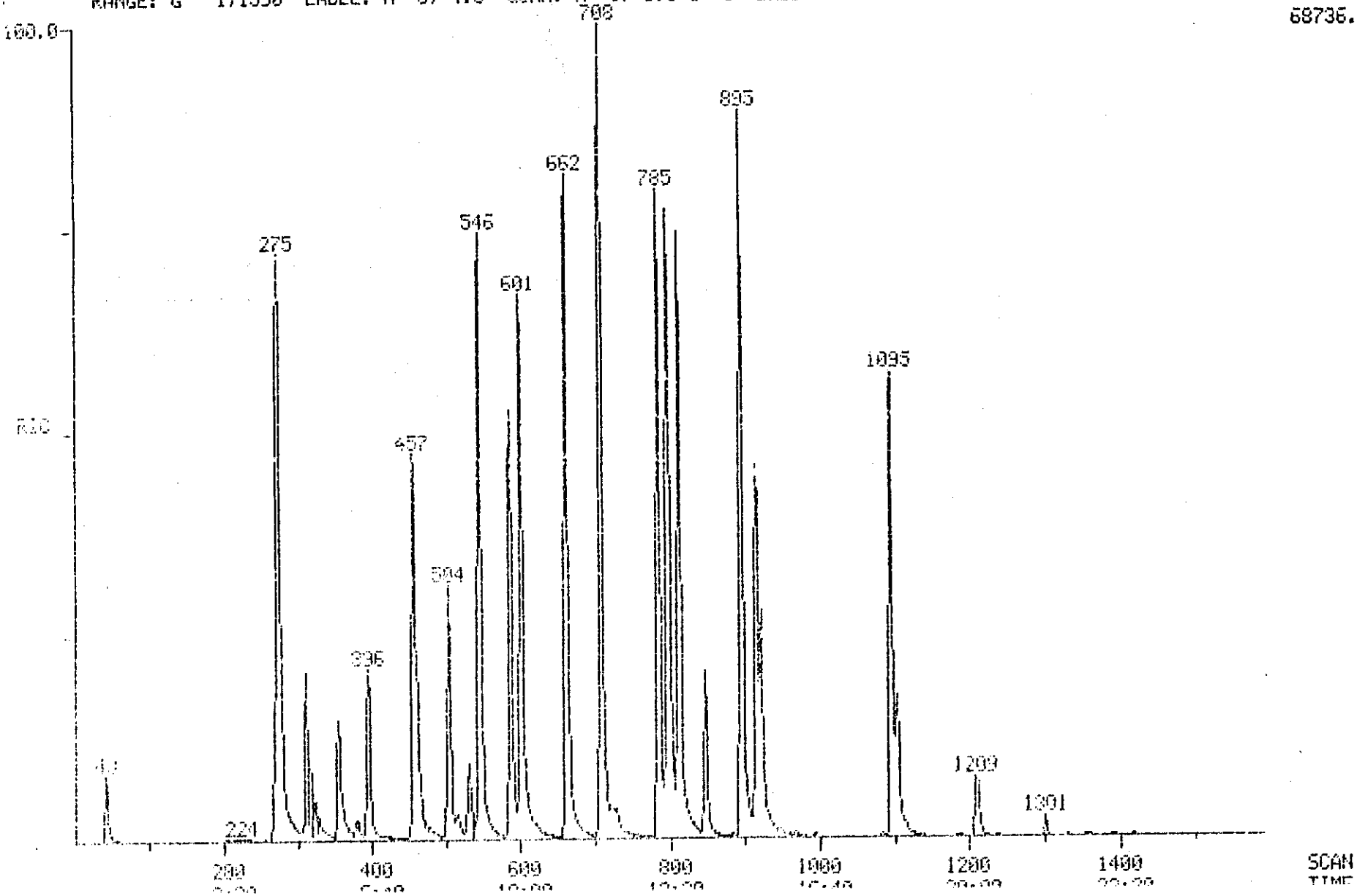
000065

RIC
08/03/90 15:36:00
SAMPLE: CLP,STDF ,,VSTD050 , , ,3569,VOA,CAL ,
CONDS.: UG/L *NA *100Z/NA *(NA/NA)/NA NA M
RANGE: G 1,1590 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F2379 #4
CALI: 080390CF #3

SCANS 1 TO 1590

68736.



---- STANDARDS ----				--- PLUS UNKNOWNS ---				>< - LIST NAMES - >
PROC	USED	PTIE	CMS	PROC	USED	PESC	RMS	STANDARD/UNKNOWN
1	1	[illegible]	[illegible]	3	7	[illegible]	98	IS01/TC01
2	2	[illegible]	28	2	2	8	91	IS02/TC02
4	1	1	2	2	2	1	96	IS03/TC03

19 COMPOUNDS PROCESSED, 18 FOUND

COMPOUND							>< SAT >< ------ CHRO ------- >					
NO	LIB	SUTR	RET	PRED	SEL	DELTA	PEAKS	FIT	PEAKS	M/Z	TOP	DELTA	PEAKS
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		1	998	.	128	457	.	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		1	991	.	56	269	.	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		1	[illegible]	.	142	274	-1	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		1	[illegible]	.	78	315	.	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		3	[illegible]	.	40	319	.	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		1	[illegible]	.	50	356	.	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		1	[illegible]	.	53	396	.	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]					.	54	453	.	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		1	[illegible]	.	114	546	.	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		1	[illegible]	.	117	735	.	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-1	2	998	.	41	462	.	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		1	990	.	41	531	.	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-1	1	992	.	174	587	.	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		1	998	.	41	601	.	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-1	1	989	.	41	708	.	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-1	1	980	.	131	797	.	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]		1	990	.	75	916	.	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-1	1	984	.	53	922	.	1
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	1	986	.	157	1095	.	1

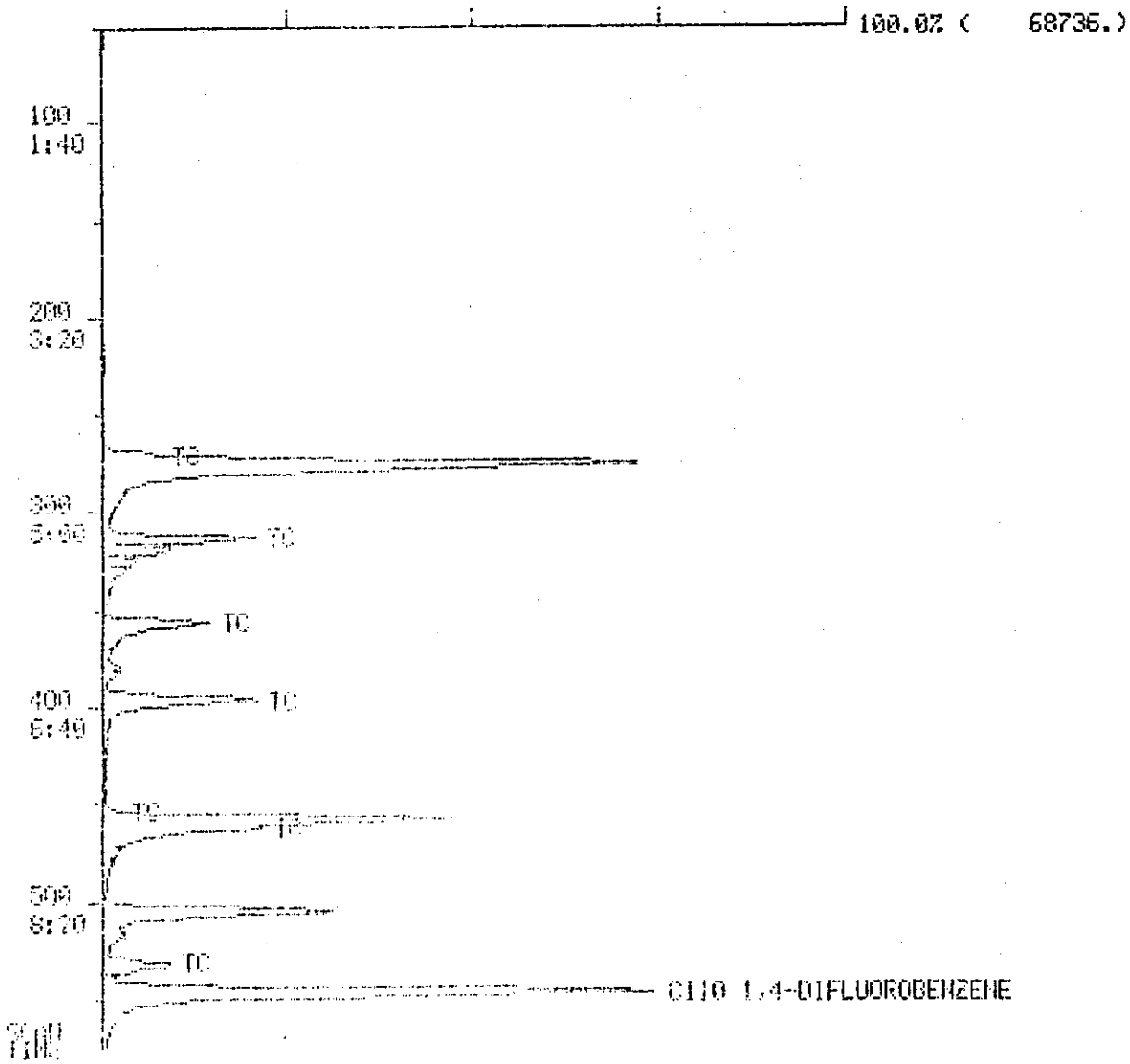
MAL QUANTITATION SUMMARY FILE: F2870
OMPOUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

000067

NO	LIBRARY ENTRY	NAME	MASS	SCAN	REF	AREA	UNITS: RRF	UG/L AMOUNT	
1	V1# 1	C101 BROMOCHLOROMETHANE	128	457	1	24018.	1.000	50.000	
2	V2# 1	C110 1,4-DIFLUOROBENZENE	114	546	2	115475.	1.000	50.000	
3	V3# 1	C120 CHLOROBENZENE-D5	117	795	3	94933.	1.000	50.000	
4	V1# 30	V002 ACETONITRILE	40	319	1	2256.	0.026	181.537	500
5	V1# 40	V004 IODOMETHANE	142	274	1	200194.	4.185	99.577	100
6	V1# 55	V007 ACROLEIN	56	269	1	11132.	0.080	289.602	250
7	V1# 60	V008 ACRYLONITRILE	53	356	1	24362.	0.184	275.922	200
8	V1# 75	PROPIONITRILE (ETHYL CYA	54	453	1	2490.	0.070	74.064	50
9	V1# 85	ALLYL CHLORIDE (3-CHLORO	76	312	1	7399.	0.667	23.087	25
10	V1#115	V016 DIBROMOMETHANE	174	587	1	45415.	1.747	54.105	50
11	V1#120	V017 METHACRYLONITRILE	41	462	1	16278.	0.458	74.011	50
12	V1#125	1BOBUTANOL	41	531	1	7945.	0.015	1090.700	500
13	V1#135	CHLOROPRENE (2-CHLORO-1,	53	396	1	24532.	1.026	49.773	50
14	V2# 25	METHYL METHACRYLATE	41	601	2	66884.	0.178	162.451	
15	V2# 35	V024 1,1,1,2-TETRACHLORO	131	797	2	46636.	0.401	50.377	
16	V2# 50	V025 1,2,3-TRICHLOROPROP	75	916	2	39152.	0.351	48.364	
17	V3# 28	V027 ETHYL METHACRYLATE	41	708	3	73876.	0.374	104.004	
18	V3# 30	V026 T-1,4-DICHLORO-2-BU	53	922	3	10549.	0.101	55.183	
19	V3# 40	V028 1,2-DIBROMO-3-CHLOR	157	1095	3	34536.	0.149	122.234	

000068

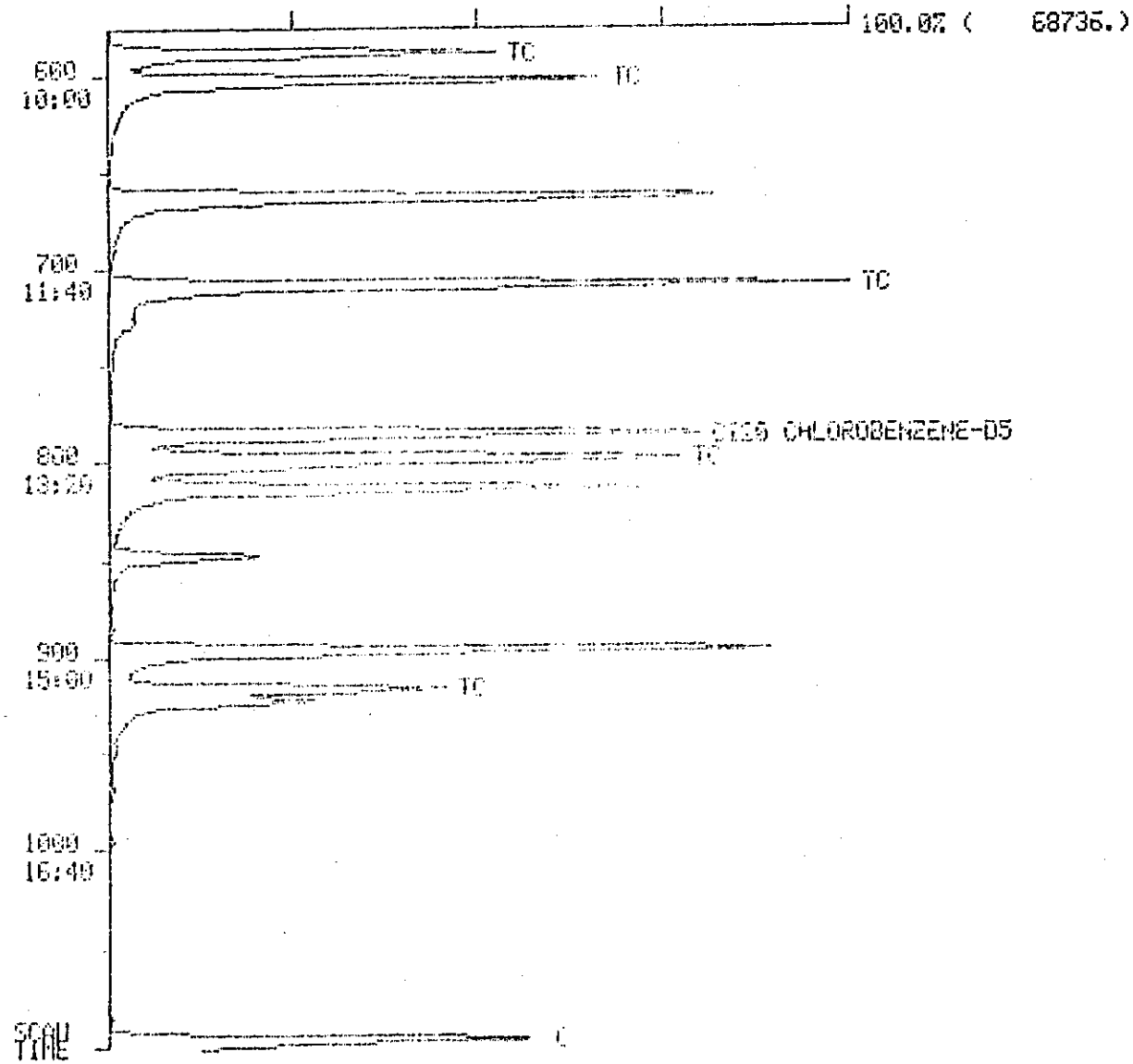
DATA FROM FILE: F2870 SCANS 50 TO 575 ACQUIRED: 08/03/90 15:36:00
CALI: F2870 #3 OUT OF 50 TO 1100
SAMPLE: CLP,STDF ,,VSTD050 , , ,3569,VOA,CAL ,
CONDS.: UG/L *NA *100%/NA *(NA/NA)/NA NA M



000069

DATA FROM FILE: F2870 SCANS 575 TO 1100 ACQUIRED: 08/03/90 15:36:00
CALI: F2570 #3 OUT OF 50 TO 1100

SAMPLE: CLP,STDF ,,VSTD050 , , ,3553,UO9,CAL ,
CONDS.: UG/L *NA *100%/NA *(NA/NA)/NA NA M



Name List: HEDR1 Entry # 1 of 1
File Name: F2571

(1)Format: VOACLP
(3)Sample ID: VSTD100
(5)Matrix:
(7)Fraction: VOA
(10)Analyst: BA
(12)Purge Volume: NA
(14)Extract Volume: NA
(16)Sample Amount: NA
(18)Run Factor: NA

(2)Case: STDF
(4)Level:
(6)Lab Sample ID: 3569
(8)Type: CAL
(11)Quan List Units: UG/L
(13)Extract Dilution: NA
(15)Extract Vol. Used: NA
(17)Percent Moisture: NA
(20)SURROGATE VOLUME:: NA

BIOMPC 12.10.87
Acquisition started

Sys: 3.F2571 Starting
Freq factors: 20582 Scan: 0 of 1590
Sample: CLP STDF , VSTD100 , ,3569,VOA,CAL ,
Conds: VO L *NA *100%/NA *(NA/NA)/NA NA M
Formula: NANA Instrument: I50F Weight: 0.000
Submitted by: RMAL Analyst: BA Acct. No: VOACLP

*** GC not ready and being equilibrated ***
GC Desc.: VA Elapsed time : 0.0 Min

Seq. #	Temp (DegC)	Rate (C/min)	Time (minutes) period	total			
1	-20--20	-	1.0	1.0	Injector A	:	220 Deg C
2	-20-100	8.0	14.4	15.4	GC oven	:	107 Deg C
3	100-200	12.5	8.0	23.4	Transfer-line	:	315 Deg C
					Ion source	:	172 Deg C

Valve A : closed Valve B : closed
*** Instrument parameters ***
Fast acquisition state -> Filament : Off Multiplier : Off
MODE. EI (+) Centroid + Temp - Sequence: VO (1 time window.)

Sequence Window # 1
Number of cycles: 1
Filament is ON
Multiplier is ON
Scan descriptor: VO Mass intervals: 1 Positive ion mode.
Total scan time: 1.000 s Master rate: 8

MPW: 3 MFW: 70 MA: 20 TH: 1 BL: 0

Int #	Lo mass	Hi mass	Time
1	36.511	300.590	1.000

Calibration table: 3:080390CF

Interface number	0	
Instrument type	0	
Full scale mass	1170	u
Zero scale mass	1	u
Intensity/ion	2	
Peak width	1000.	mmu
Offset at low mass	0	mmu
Offset at high mass	0	mmu
Voltage settling time(ms)	4	

Current instrument parameters.

	Positive ion mode	Negative ion mode
Resolution (high)	100.00	0.00
Resolution (low)	152.00	0.00
Quad offset	-1.00	0.00
Quad programming	-1.00	0.00
Lens offset	-40.00	0.00
Lens programming	0.00	0.00
Ext offset	0.00	0.00
Ext programming	0.00	0.00
Collector	30.00	0.00
Ion offset	3.50	0.00

Ion programming	6.00	0.00
Rod polarity	Reverse	Normal

Electron multiplier voltage: 1304.
Filament emission current: 730.
Electrometer range: 10 ^-7
Electrometer zero: 122.0

nalyzer Fore Pressure .....: 0.003 Torr
eparator/Source Pressure .....: 0.062 Torr

8/3/90 16:45:04
ACQUISITION COMPLETED
Scans 1 to 1590 Centroid

ode	Scans	Secs	Out of	%	Peaks per scan	per sec
entroid	1590	1.4	1590.0	0.1	21575. 14.	14.

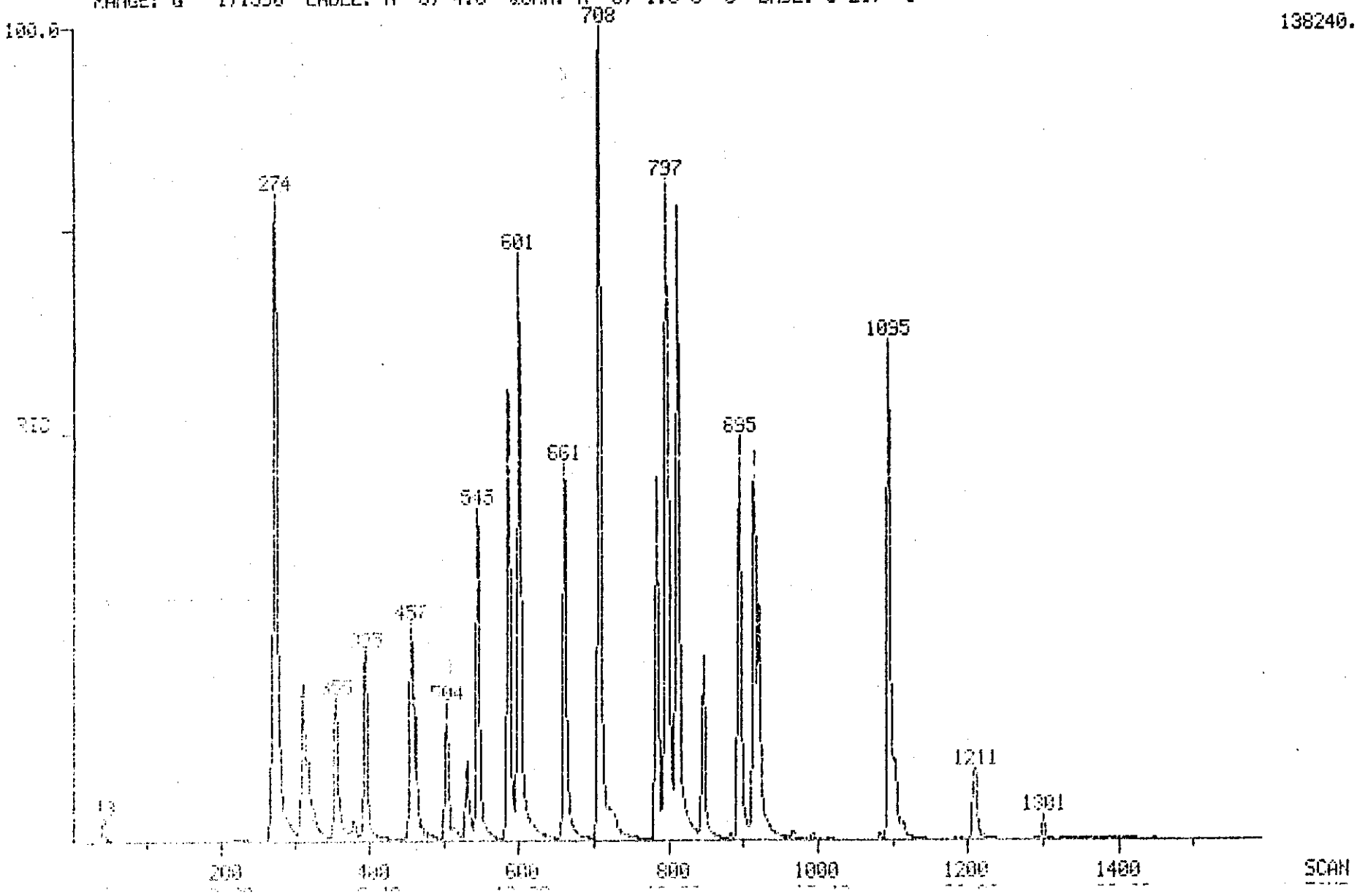
000072

RIC
08/03/90 16:10:00
SAMPLE: CLP,STDF ,VST0100 , , ,3563,VOA,CAL ,
CONDS.: UG/L #NA *100Z/NA *(NA/NA)/NA NA M
RANGE: G 1,1590 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F2871 #4
CALI: 080330CF #3

SCANS 1 TO 1590

138240.



PROCEDURE: TCA DIAGNOSTIC REPORT 8/03/90 18:00:01
DATA FILE: F2871
REFERENCE: 11TABLE
NAME LIST: LLNL INITIALIZATION OPTION: 2 PROCESSING OPTION: 3 000073
REPORT: ISO1

---- STANDARDS ----- ><				--- PLUS UNKNOWNS --- ><				- LIST NAMES - >
PROC	USED	POSS	RMS	PROC	USED	POSS	RMS	STANDARD/UNKNOWN
1	1	1	0	8	7	4	76	ISO1/TCO1
3	3	1	93	8	8	1	119	ISO2/TCO2
1	1	1	0	5	5	1	96	ISO3/TCO3

19 COMPOUNDS PROCESSED, 18 FOUND

COMPOUND ><			---------- SEARCH ---------- >< SAT >< ------ CHRO ------- >											
NO	LIB	ENTRY	REF	PRED	SEL	DELTA	PEAKS	FIT	PEAKS	M/Z	TOP	DELTA	PEAKS
1	V1	1	-461	457	457	.	1	997	.	128	457	.	1
2	V1	55	-272	268	269	1	1	999	.	56	269	.	1
3	V1	40	-276	274	274	.	1	994	.	142	274	.	1
4	V1	85	-315	312	312	.	2	976	.	76	312	.	1
5	V1	30	-322	319	318	-1	2	997	.	40	318	.	1
6	V1	60	-360	356	355	-1	1	999	.	53	355	.	1
7	V1	135	-400	395	395	.	1	979	.	53	395	.	1
8	V1	75	-458	453	.	.	.	.	.	54	452	.	1
9	V2	1	-551	546	545	-1	1	993	.	114	545	.	1
10	V3	1	-791	784	784	.	1	993	.	117	784	.	1
11	V1	120	-468	462	461	-1	1	986	.	41	461	.	2
12	V1	125	-526	530	531	1	1	991	.	41	531	.	1
13	V1	115	-594	588	586	-2	1	987	.	174	586	.	1
14	V2	28	-607	601	601	.	1	998	.	41	601	.	1
15	V3	38	-715	708	708	.	1	991	.	41	708	.	1
16	V2	85	-805	797	797	.	1	977	.	131	797	.	1
17	V2	90	-923	915	915	.	1	990	.	75	915	.	1
18	V3	30	-930	922	921	-1	1	977	.	53	922	1	1
19	V3	45	-1102	1094	1095	1	1	988	.	157	1095	.	1

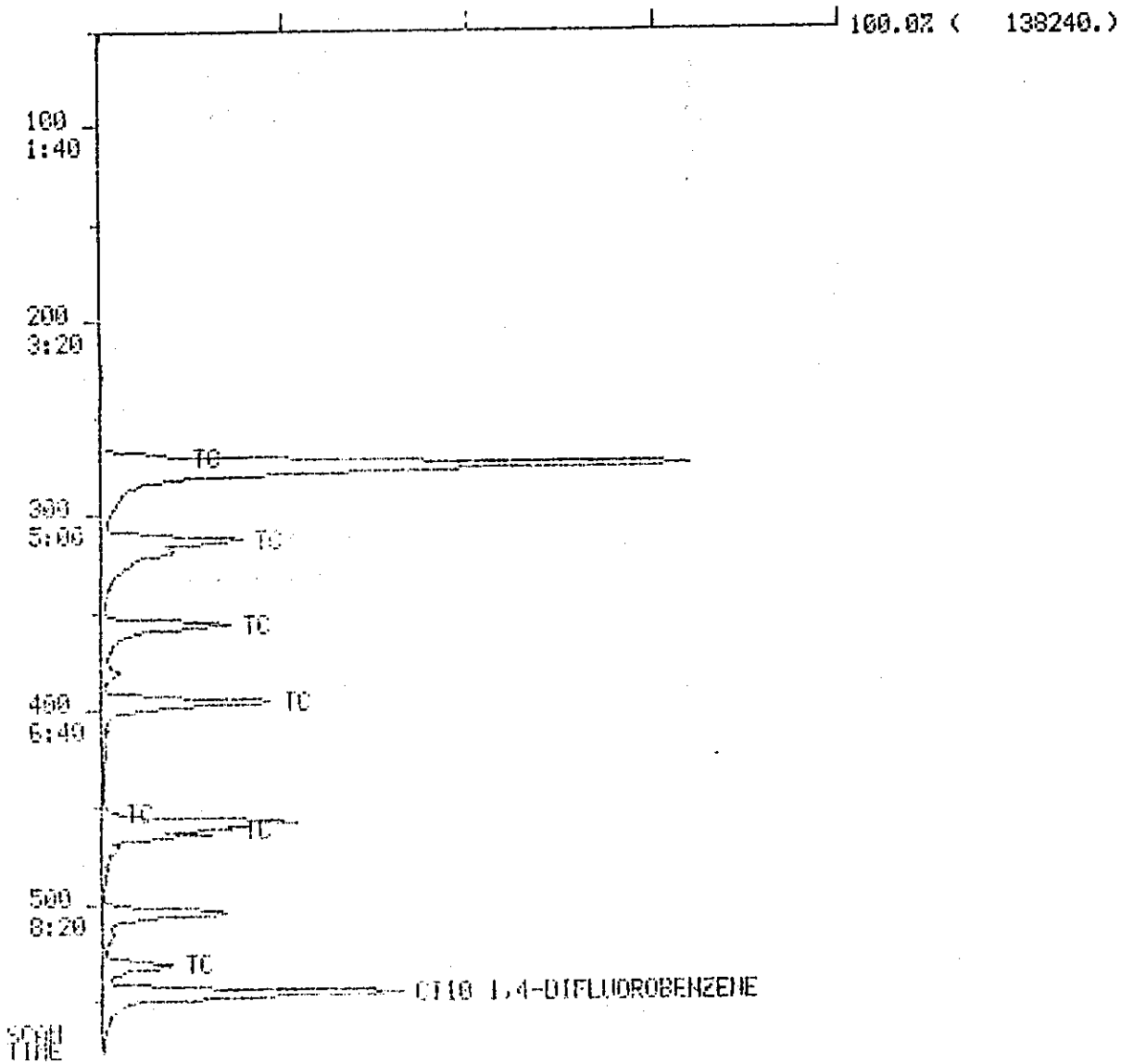
MAL QUANTITATION SUMMARY FILE: F2871
OMPOUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

NO	LIBRARY ENTRY	NAME	MASS	SCAN	REF	AREA	UNITS: RRF	UG/L AMOUNT
1	V1# 1	CI01 BROMOCHLOROMETHANE	128	457	1	26751.	1.000	50.000
2	V2# 1	CI10 1,4-DIFLUOROBENZENE	114	545	2	129329.	1.000	50.000
3	V3# 1	CI20 CHLOROBENZENE-D5	117	784	3	102340.	1.000	50.000
4	V1# 30	V002 ACETONITRILE	40	318	1	24544.	0.026	1773.290
5	V1# 40	V004 IODOMETHANE	142	274	1	432013.	4.185	192.932
6	V1# 55	V005 ACROLEIN	56	269	1	26999.	0.080	627.816
7	V1# 60	V006 ACRYLONITRILE	53	355	1	56166.	0.184	571.138
8	V1# 75	PROPIONITRILE (ETHYL CYA	54	452	1	4597.	0.070	122.766
9	V1# 85	ALLYL CHLORIDE (3-CHLORO	76	312	1	18034.	0.667	50.523
10	V1#115	V016 DIBROMOMETHANE	174	586	1	99523.	1.747	106.453
11	V1#120	V017 METHACRYLONITRILE	41	461	1	24865.	0.458	101.500
12	V1#125	ISOBUTANOL	41	531	1	19903.	0.015	2453.190
13	V1#135	CHLOROPRENE (2-CHLORO-1,	53	395	1	57212.	1.026	104.221
14	V2# 23	METHYL METHACRYLATE	41	601	2	141109.	0.178	306.020
15	V2# 85	V024 1,1,1,2-TETRACHLORO	131	797	2	101140.	0.401	97.551
16	V2# 90	V025 1,2,3-TRICHLOROPROP	75	915	2	116318.	0.351	128.294
17	V3# 38	V027 ETHYL METHACRYLATE	41	708	3	159537.	0.374	208.344
18	V3# 30	V026 T-1,4-DICHLORO-2-BU	53	922	3	22632.	0.101	109.822
19	V3# 45	V028 1,2-DIBROMO-3-CHLOR	157	1095	3	74799.	0.149	245.577

000075

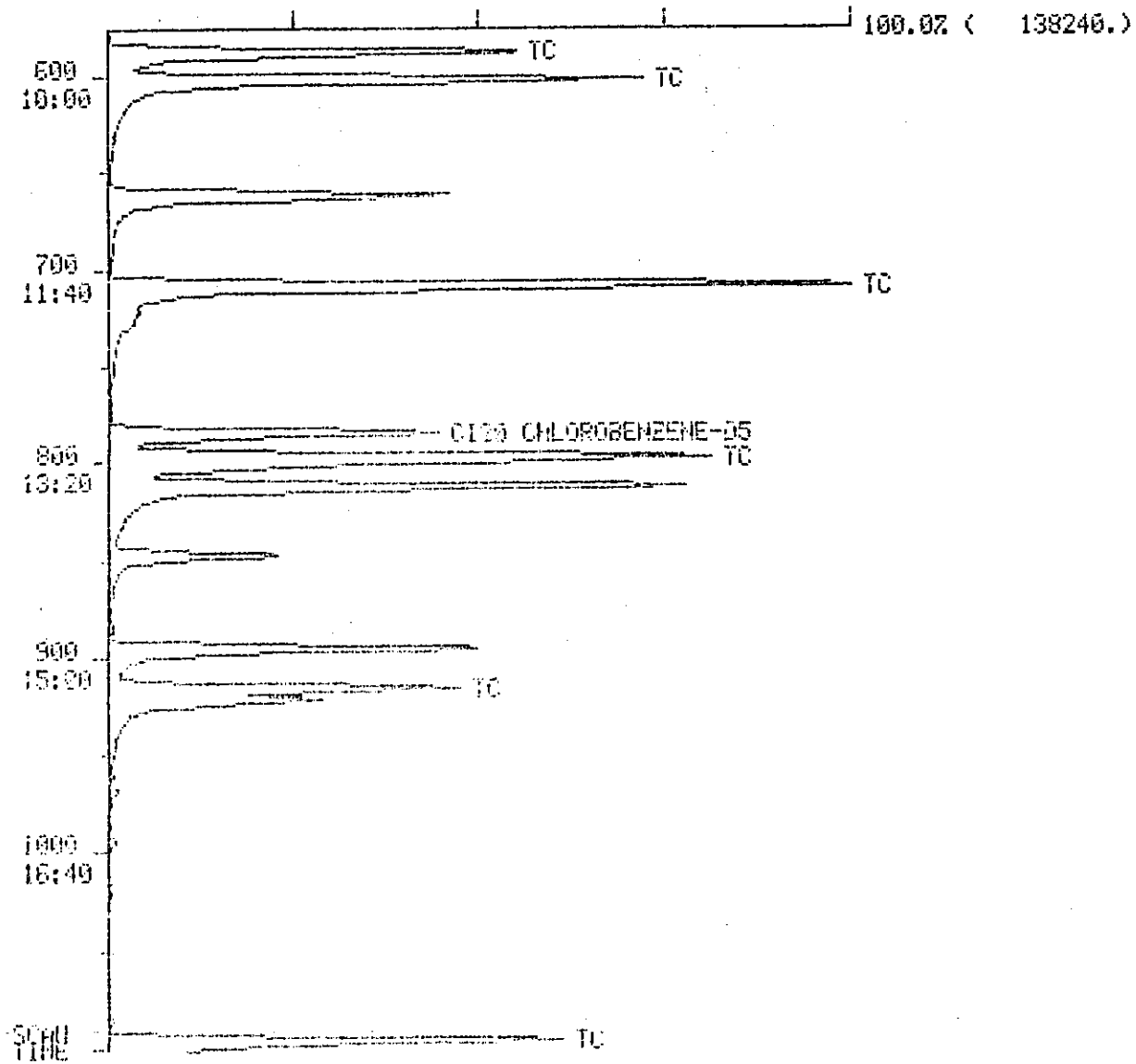
DATA FROM FILE: F2871 SCANS 50 TO 575 ACQUIRED: 08/03/90 16:10:00
CALI: F2871 #3 OUT OF 50 TO 1100

SAMPLE: CLP,STDF ,,VSTD100 , , ,3569,UOA,CAL ,
CONDS.: UG/L #NA #100%/NA #(NA/NA)/NA NA M



000076

DATA FROM FILE: F2871 SCANS 575 TO 1100 ACQUIRED: 08/03/90 16:10:00
CALI: F2871 #3 OUT OF 50 TO 1100
SAMPLE: CLP,STDF ,,VSTD100 , , ,3569,VOA,CAL ,
CONDS.: UG/L #NA #100%/NA #(NA/NA)/NA NA M



Name List: MEDB1 Entry # 1 of 1
File Name: F2372

1)Format: VOACLP	2)Case: STDF
3)Sample ID: VE70190	4)Level:
5)Matrix:	6)Lab Sample ID: 3569
7)Fraction: VOA	8)Type: CAL
10)Analyst: BA	11)Quan List Units: UG/L
12)Purge Volume: NA	13)Extract Dilution: NA
14)Extract Volume: NA	15)Extract Vol. Used: NA
16)Sample Amount: NA	17)Percent Moisture: NA
19)Rcn Factor: NA	20)SURROGATE VOLUME:: NA

[illegible] 16:46:04
Acquisition Started

[illegible] Run: 3:F2372 Starting
[illegible] 16:46:00 [illegible] 0:00 Free sectors 20042 Scan: 0 of 1590
Sample: CLP,STDF ,VETD190 , ,3569,VOA,CAL ,
[illegible] 0.0L [illegible] /NA NA M
Sample: MAMA Instrument: T50F Weight: 0.000
Operator by: RTML Analyst: BA Acct. No: VOACLP

*** GC not ready and being equilibrated ***
Desc.: VA Elapsed time : 0.0 Min

Seq.	Temp (DegC)	Rate (C/min)	Time (minutes) period	total		
	-20--20	-	1.0	1.0	Injector A :	220 Deg C
	-20-100	8.0	11.0	13.4	GC oven :	107 Deg C
	100-200	12.0	8.0	23.4	Transfer-line:	314 Deg C
					Ion source :	137 Deg C

Valve A : closed Valve B : closed
*** Instrument parameters ***
Post acquisition state -> Filament : Off Multiplier : Off
MODE: EI (+) Centroid + Temp - Sequence: VO (1 time window.)

Sequence Window # 1
Number of cycles: 1
Filament is ON
Multiplier is ON
Scan descriptor: VO Mass intervals: 1 Positive ion mode.
Total scan time: 1.000 s Master rate: 8

SW: 3 MFW: 70 MA: 20 TH: 1 BL: 0

Int #	Lo mass	Hi mass	Time
1	36.511	300.590	1.000

Calibration table: 3:080390CF

Interface number	0	
Instrument type	Q	
Full scale mass	1170	u
Zero scale mass	1	u
Intensity/ion	2	
Peak width	1000.	mmu
Offset at low mass	0	mmu
Offset at high mass	0	mmu
Voltage settling time(ms)	4	

Current instrument parameters.

	Positive ion mode	Negative ion mode
Resolution (high)	100.00	0.00
Resolution (low)	152.00	0.00
Quad offset	-1.00	0.00
Quad programming	-1.00	0.00
Lens offset	-40.00	0.00
Lens programming	0.00	0.00
Ext offset	0.00	0.00
Ext programming	0.00	0.00
Collector	30.00	0.00
Ion offset	3.50	0.00

Ion programming 6.00 0.00
Rod polarity Reverse Normal
Electron multiplier voltage: 1304.
Filament emission current: 750.
Electrometer range: 10 ^-7
Electrometer zero: 122.0

000078

nalyzer Fore Pressure .....: 0.004 Torr
eparator/Source Pressure .....: 0.061 Torr

3/3/90 17:20:11
ACQUISITION COMPLETED
Scans 1 to 1590 Centroid

ode	Scans	Secs	Cut off	%	Peaks per scan	per sec
entroid	1590	1.4	1340.0	0.1	28922. 18.	18.

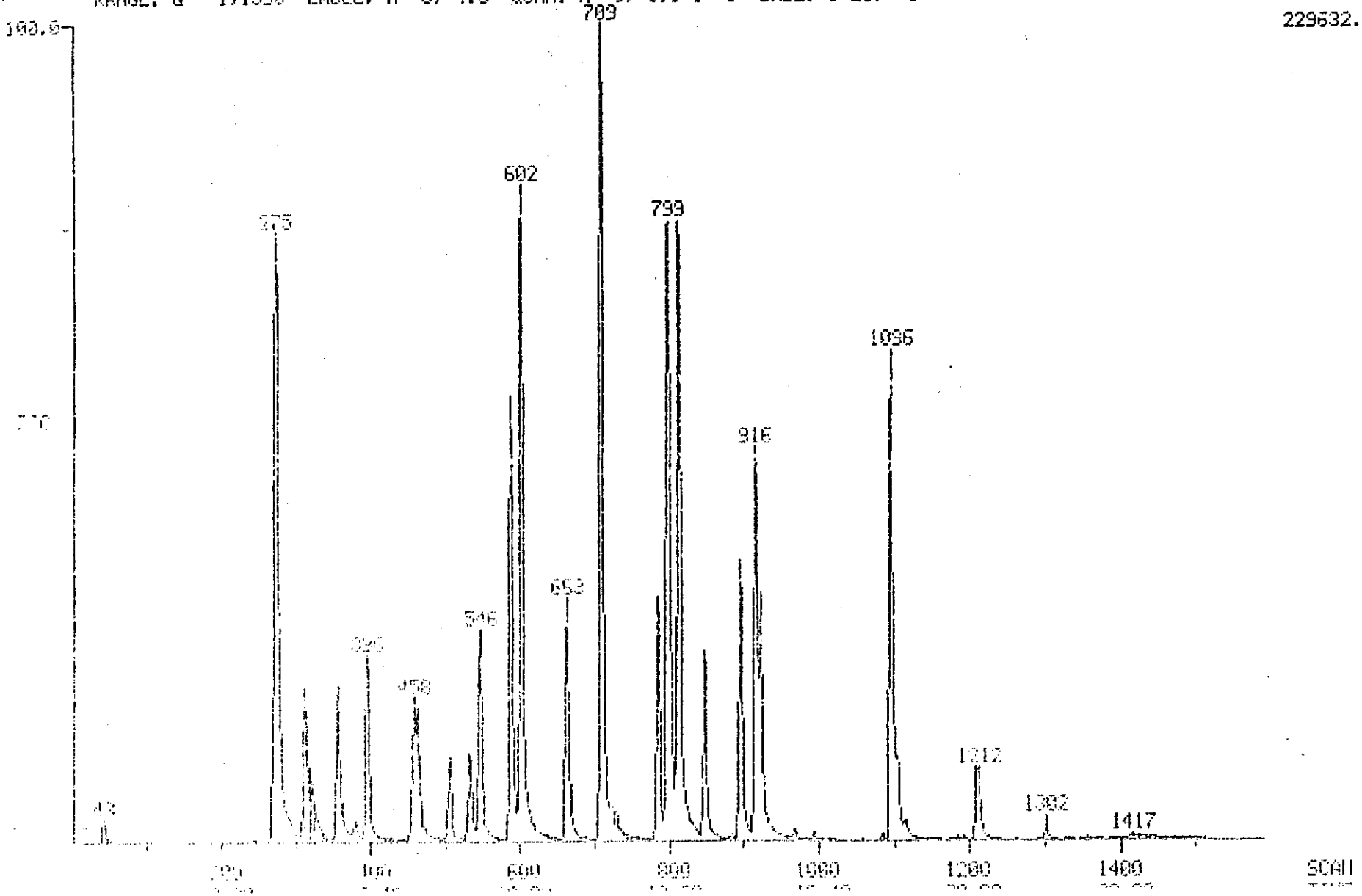
000079

RIC
08/03/90 16:46:00
SAMPLE: CLP,STDF ,,VSTD150 , , ,3569,VOA,CAL ,
CONDS.: UG/L *NA *100Z/NA *(NA/NA)/NA NA M
RANGE: G 1,1590 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F2872 #4
CALI: 080390CF #3

SCANS 1 TO 1590

229632.



PROCEDURE: TOA DIAGNOSTIC REPORT 8/03/90 18:06:00
DATA FILE: F2872
REFERENCE: 11TABLE
NAME LIST: LLNL INITIALIZATION OPTION: 2 PROCESSING OPTION: 3
REPORT: ISO1

000080

---- STANDARDS -----				>< --- PLUS UNKNOWNS ---				>< - LIST NAMES - >
PROC	USED	POSS	RMS	PROC	USED	POSS	RMS	STANDARD/UNKNOWN
1	1	1	0	8	7	16	64	ISO1/TCO1
2	3	1	14	8	8	4	97	ISO2/TCO2
1	1	1	0	5	5	1	61	ISO3/TCO3

15 COMPOUNDS PROCESSED, 13 FOUND

COMPOUND		>< ---------- SEARCH ----------						>< SAT	>< ------ CHRO ------- >			
NO	LIB	ENTRY	REF	PRED	SEL	DELTA	PEAKS	FIT	PEAKS	M/Z	TOP	DELTA	PEAKS
1	V1	1	-461	458	458	.	1	997	.	128	456	.	1
2	V1	55	-272	270	270	.	1	998	.	56	270	.	1
3	V1	40	-278	275	275	.	1	990	.	142	275	.	1
4	V1	85	-315	313	313	.	4	985	.	76	312	-1	1
5	V1	30	-323	320	321	1	4	1000	.	40	320	-1	1
6	V1	60	-360	357	357	.	1	998	.	53	357	.	1
7	V1	135	-400	397	396	-1	1	975	.	53	396	.	1
8	V1	75	-458	455	.	.	.	.	.	54	454	.	1
9	V2	1	-551	547	547	.	1	992	.	114	547	.	1
10	V3	1	-791	785	785	.	1	995	.	117	785	.	1
11	V1	120	-468	464	463	-1	1	926	.	41	463	.	2
12	V1	125	-536	532	533	1	2	993	.	41	535	2	1
13	V1	115	-594	589	588	-1	1	990	.	174	588	.	1
14	V2	28	-607	602	602	.	2	988	.	41	601	-1	1
15	V2	33	-715	709	709	.	1	990	.	41	709	.	1
16	V2	85	-805	798	798	.	1	977	.	131	798	.	1
17	V2	90	-923	916	916	.	1	989	.	75	916	.	1
18	V3	30	-920	923	923	.	1	976	.	53	923	.	1
19	V3	45	-1102	1096	1096	.	1	988	.	157	1096	.	1

MAL QUANTITATION SUMMARY FILE. F2572
OMPOUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

000081

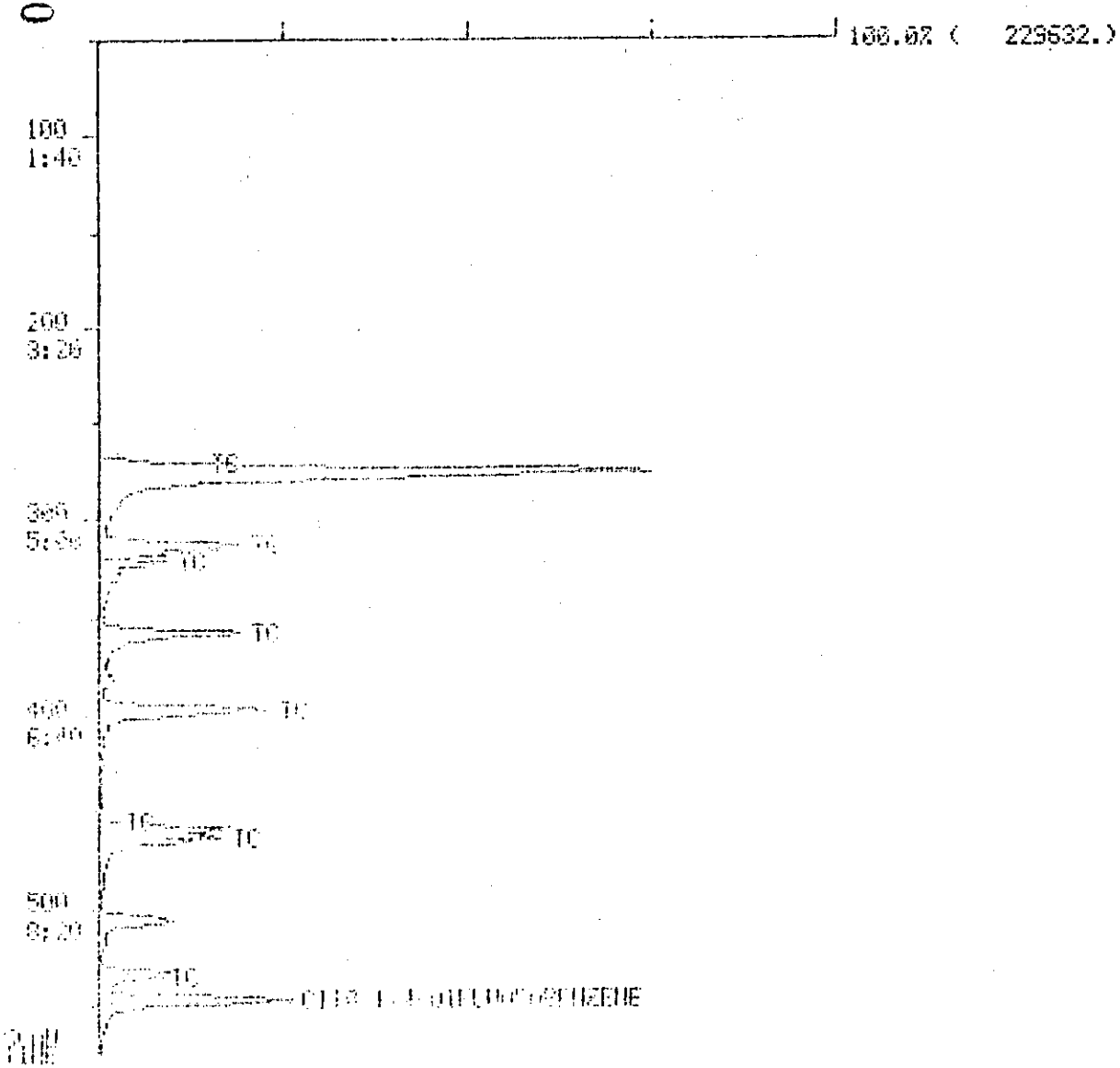
UNITS: UG/L

NO	LIBRARY ENTRY	NAME	MASS	SCAN	REF	AREA	RRF	AMOUNT
1	V1# 1	CI01 BROMOCHLOROMETHANE	128	458	1	29255.	1.000	50.000
2	V2# 1	CI10 1,4-DIFLUOROBENZENE	114	547	2	145807.	1.000	50.000
3	V3# 1	CI20 CHLOROBENZENE-D5	117	755	3	116211.	1.000	50.000
4	V1# 30	V002 ACETONITRILE	40	320	1	19524.	0.026	1289.830
5	V1# 40	V004 IODOMETHANE	142	275	1	672820.	4.185	274.753
6	V1# 55	V005 ACROLEIN	56	270	1	45932.	0.080	976.642
7	V1# 60	V006 ACRYLONITRILE	53	357	1	96409.	0.184	896.433
8	V1# 75	PROPIONITRILE (ETHYL CYA	54	454	1	7292.	0.070	178.068
9	V1# 85	ALLYL CHLORIDE (3-CHLORO	76	312	1	29991.	0.667	76.830
10	V1#115	V016 DIBROMOMETHANE	174	588	1	165884.	1.747	162.245
11	V1#120	V017 METHACRYLONITRILE	41	460	1	45029.	0.458	168.080
12	V1#125	ISOBUTANOL	41	535	1	36682.	0.015	4134.300
13	V1#135	CHLOROPRENE (2-CHLORO-1,	53	396	1	91527.	1.026	152.958
14	V2# 28	METHYL METHACRYLATE	41	601	2	274989.	0.178	528.968
15	V2# 85	V024 1,1,1,2-TETRACHLORO	131	793	2	170001.	0.401	145.437
16	V2# 90	V025 1,2,3-TRICHLOROPROP	75	915	2	192271.	0.351	188.102
17	V3# 38	V027 ETHYL METHACRYLATE	41	709	3	269189.	0.374	309.581
18	V3# 30	V026 T-1,4-DICHLORO-2-BU	53	923	3	39119.	0.101	167.167
19	V3# 45	V028 1,2-DIBROMO-3-CHLOR	157	1096	3	124636.	0.149	360.357

000082

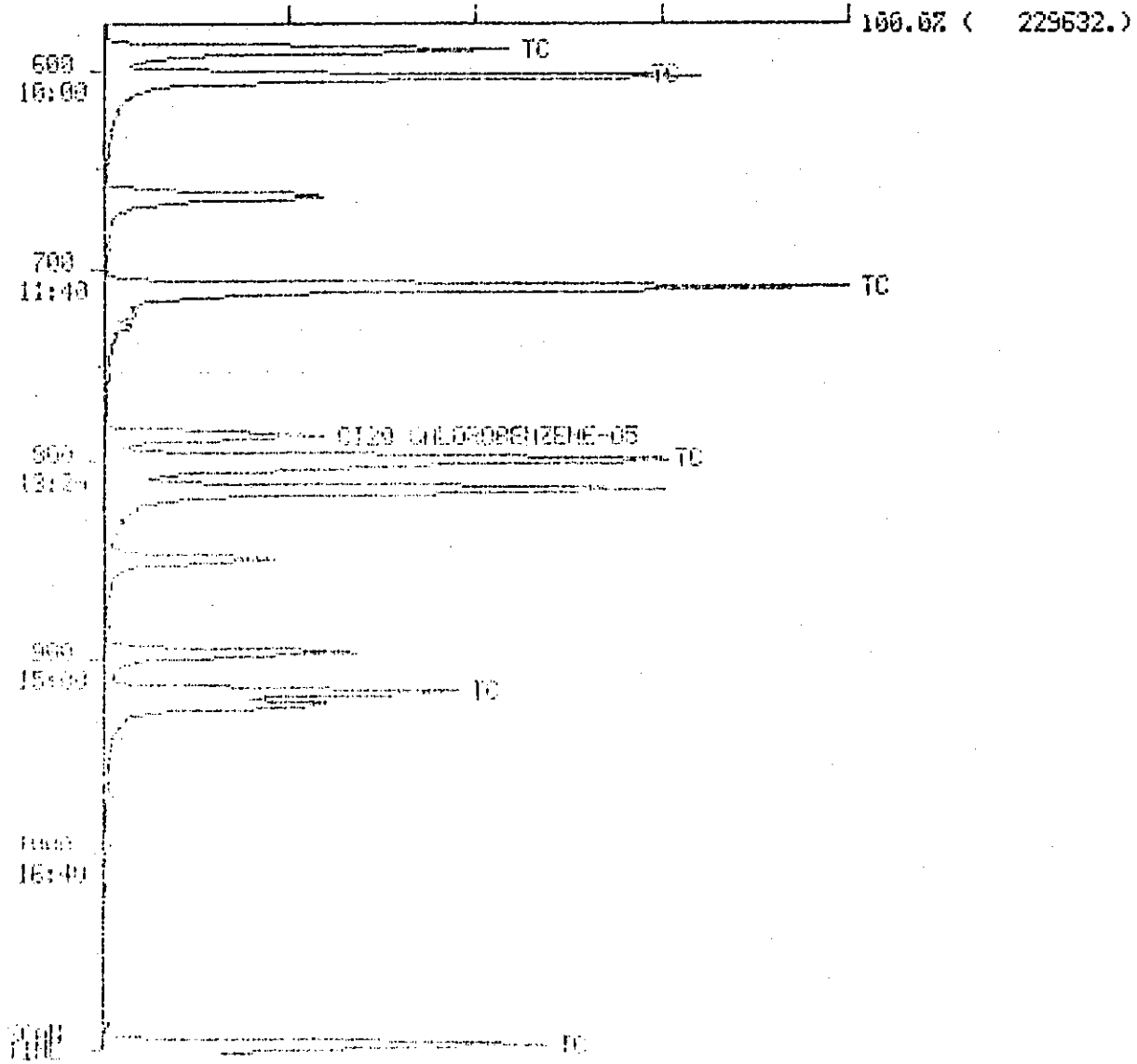
DATA FROM FILE: F2872 SCANS 50 TO 575 ACQUIRED: 08/03/90 16:46:00
CALI: F2872 #3 OUT OF 50 TO 1100

SAMPLE: CLP,STOF ,,VST5150 , , ,3569,VOA.CAL ,
CONDS.: UG/L *NA *100%/NA *(NA/NA)/NA NA M



000083

DATA FROM FILE: F2872 SCANS 575 TO 1100 ACQUIRED: 08/03/90 16:46:00
CALI: F2872 #3 OUT OF 50 TO 1100
SAMPLE: CLP,STDF ,,VSTD150 , , ,3568,VOA,CAL ,
CONDS.: UG/L #NA #1002/NA #(NA/NA)/NA NA M



Name List: HEDR1 Entry # 1 of 1
File Name: F2370

000084

(1)Format: VOACLP
(2)Case: STDF
(3)Sample ID: WST0200
(4)Level:
(5)Matrix:
(6)Lab Sample ID: 3569
(7)Fraction: VOA
(8)Type: CAL
(10)Analyst: BA
(11)Quan List Units: UG/L
(12)Purge Volume: NA
(13)Extract Dilution: NA
(14)Extract Volume: NA
(15)Extract Vol. Used: NA
(16)Sample Amount: NA
(17)Percent Moisture: NA
(19)Run Factor: NA
(20)SURROGATE VOLUME:: NA

3/2/90 17:21:40
Acquisition started

File: NA Run: 3 F2370 Starting
5 Scans, 15 Frags - 0-NA Free sectors: 20044 Scan: 0 of 1590
Sample: CLP.Prep ,WST0200 , , ,3569,VOA.CAL ,
Conc: UG/L NA *100.0/NA *(NA/NA)/NA NA M
Operator: NAMA Instrument: I5CF Weight: 0.000
Submitted by: RMAL Analyst: BA Acct. No: VOACLP

*** GC not ready and being equilibrated ***
Case : VA Elapsed time : 0.0 Min

Seq #	Temp (Deg.)	Rate (C/min)	Time (minutes) period	total		
1	-20--20	-	1.0	1.0	Injector A :	220 Deg C
2	-20-100	8.3	14.4	15.4	GC oven :	84 Deg C
3	100-200	12.5	8.0	23.4	Transfer-line:	313 Deg C
					Ion source :	203 Deg C

Valve A : closed Valve B : closed
*** Instrument parameters ***
Post acquisition state -> Filament : Off Multiplier : Off
DIE: EI (+) Centroid + Temp - Sequence: VO (1 time window.)

Sequence Window # 1
Number of cycles: 1
Filament is ON
Multiplier is ON
Scan descriptor: VO Mass intervals: 1 Positive ion mode.
Total scan time: 1.000 s Master rate: 8

PW: 3 MFW: 70 MA: 20 TH: 1 BL: 0

Int #	Lo mass	Hi mass	Time
1	36.511	300.590	1.000

Calibration table: 3:080390CF

Interface number	0	
Instrument type	Q	
Full scale mass	1170	u
Zero scale mass	1	u
Intensity/ion	2	
Peak width	1000.	mmu
Offset at low mass	0	mmu
Offset at high mass	0	mmu
Voltage settling time(ms)	4	

Current instrument parameters.

	Positive ion mode	Negative ion mode
Resolution (high)	100.00	0.00
Resolution (low)	152.00	0.00
Quad offset	-1.00	0.00
Quad programming	-1.00	0.00
Lens offset	-40.00	0.00
Lens programming	0.00	0.00
Ext offset	0.00	0.00
Ext programming	0.00	0.00
Collector	30.00	0.00
Ion offset	3.50	0.00

000085

Ion programming	6.00	0.00
Rod polarity	Reverse	Normal

Electron multiplier voltage: 1304.
Filament emission current: 750.
Electrometer range: 10 ^-7
Electrometer zero: 122.0

nalyzer Fore Pressure .....: 0.004 Torr
eparator/Source Pressure .....: 0.062 Torr

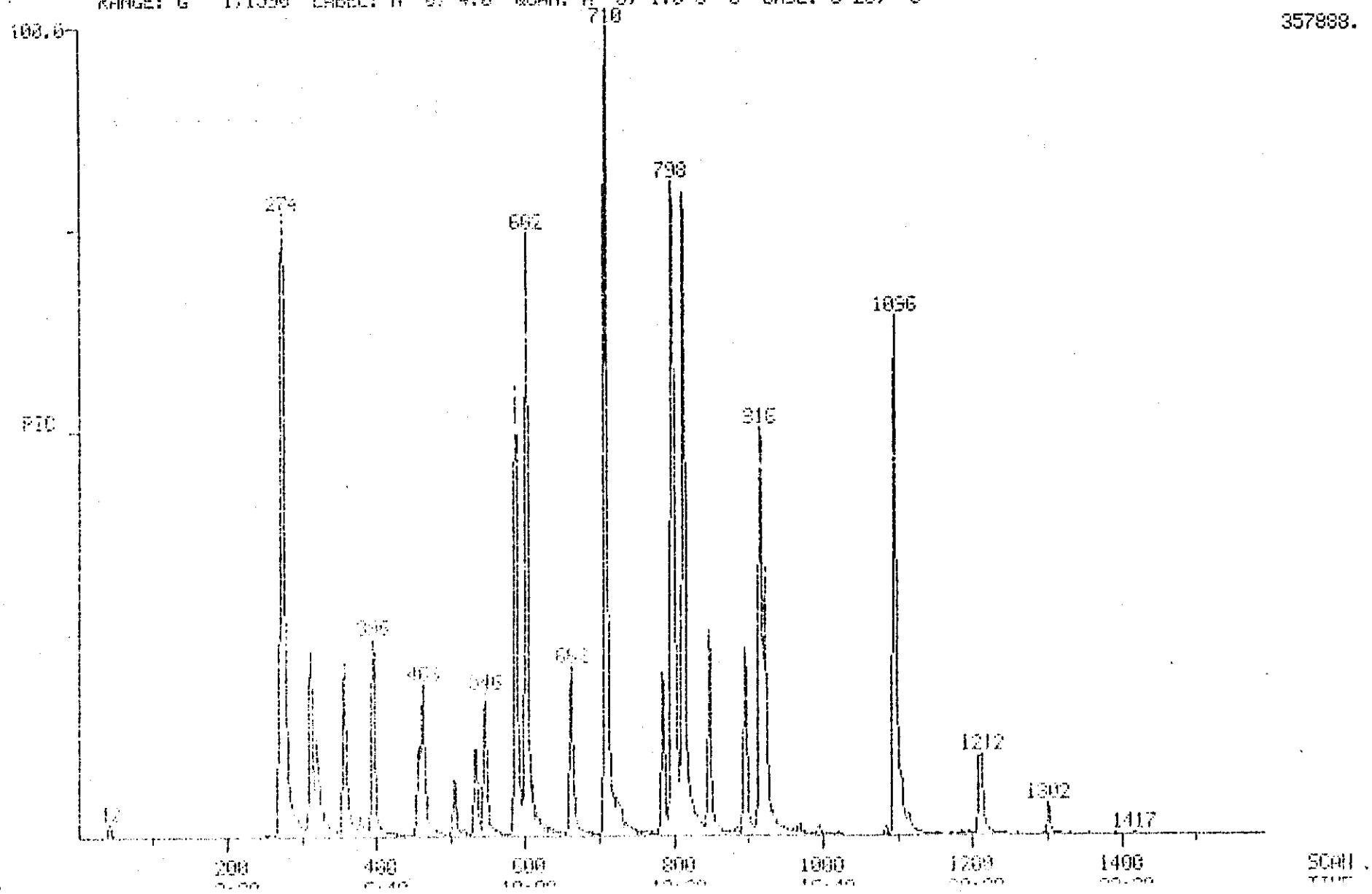
3/3/90 17:55:08
ACQUISITION COMPLETED
Scans 1 to 1590 Centroid

ode	Scans	Secs	Out of	%	Peaks per scan	per sec
entroid	1590	2.6	1590 0	0.2	33316. 21.	21.

930000

RIC
08/03/90 17:21:00
SAMPLE: CLP,STDF ,,VSTD200 , , ,3568,UGA,CAL ,
CONDS.: UG/L #NA *1002/NA *(NA/NA)/NA NA M
RANGE: G 1,1500 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F2873 #4 SCANS 1 TO 1530
CALI: 080390CF #3



PROCEDURE: TRA DIAGNOSTIC REPORT 8/03/90 18:12:04

000087

DTA FILE: F8070
SPECTRUM: 11TABLE
AMS LIST: CLNL INITIALIZATION OPTION: 2 PROCESSING OPTION: 3
REPORT: IS01

---- STANDARDS -----				>< --- PLUS UNKNOWNS ---				>< - LIST NAMES - >
PROC	USED	POSS	RMS	PROC	USED	POSS	RMS	STANDARD/UNKNOWN
1	1	1	0	8	8	6	88	IS01/TC01
2	3	1	14	8	8	1	99	IS02/TC02
3	1	1	0	5	5	1	61	IS03/TC03

19 COMPOUNDS PROCESSED, 19 FOUND

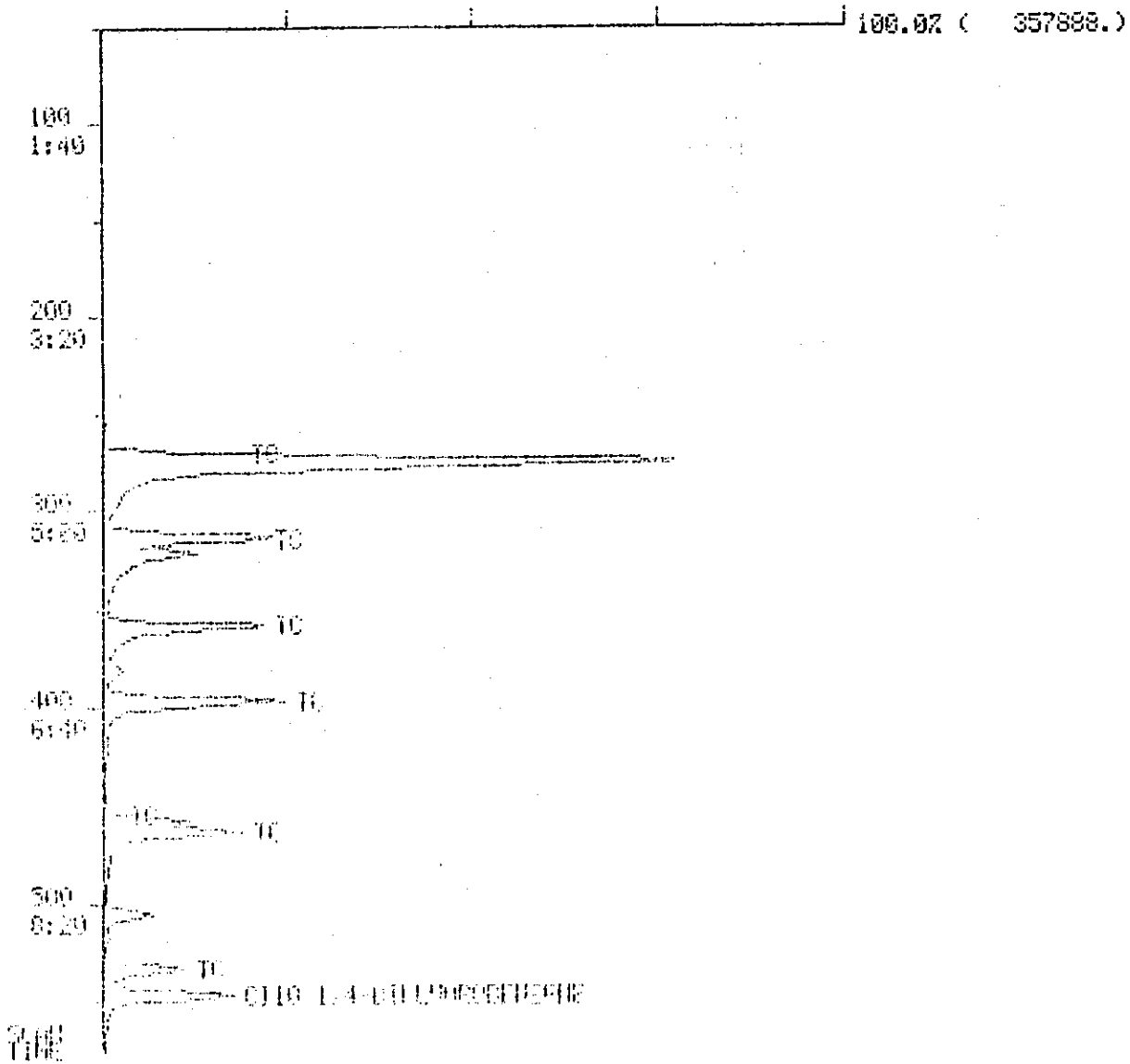
COMPOUND				---------- SEARCH ----------					>< SAT	>< ------ CHRO ------- >			
NO	LIB	ENTRY	REF	PREC	SEL	DELTA	PEAKS	FIT	PEAKS	M/Z	TOP	DELTA	PEAKS
1	[illegible]	[illegible]	-1451	978	978	.	1	978	.	128	458	.	1
2	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	1	998	.	55	270	.	1
3	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-1	1	987	-1	142	275	1	1
4	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	1	[illegible]	.	76	313	1	1
5	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	1	1000	.	40	320	.	1
6	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	1	1000	.	56	357	.	1
7	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-1	1	[illegible]	.	50	396	.	1
8	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	1	[illegible]	.	54	454	-2	1
9	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	1	[illegible]	.	114	547	.	1
10	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	1	[illegible]	.	117	785	.	1
11	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-1	1	[illegible]	.	41	463	.	1
12	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	1	[illegible]	.	41	534	1	1
13	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	-1	1	[illegible]	.	174	588	.	1
14	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	1	1000	.	41	602	.	2
15	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	1	[illegible]	-1	41	710	.	2
16	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	1	[illegible]	.	131	798	.	1
17	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	1	[illegible]	.	75	916	.	1
18	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	.	1	974	.	53	923	.	1
19	[illegible]	[illegible]	[illegible]	1096	1096	.	1	[illegible]	.	157	1096	.	1

MAL QUANTITATION SUMMARY FILE: F2073
OMPOUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

NO	LIBRARY ENTRY	NAME	MASS	SCAN	REF	AREA	UNITS: RRF	UG/L AMOUNT
1	V1# 1	C101 BROMOCHLOROMETHANE	128	458	1	29767.	1.000	50.000
2	V2# 1	C110 1,4-DIFLUOROBENZENE	114	547	2	153197.	1.000	50.000
3	V3# 1	C120 CHLOROBENZENE-D5	117	785	3	117975.	1.000	50.000
4	V1# 30	V002 ACETONITRILE	40	320	1	65228.	0.026	4235.010
5	V1# 40	V004 IODOMETHANE	142	275	1	1124470.	4.185	451.282
6	V1# 55	V005 ACROLEIN	56	270	1	59816.	0.080	1249.960
7	V1# 60	V006 ACRYLONITRILE	53	357	1	171375.	0.184	1566.060
8	V1# 75	PROPIONITRILE (ETHYL CYA	54	454	1	13426.	0.070	322.215
9	V1# 87	ALLYL CHLORIDE (3-CHLORO	76	313	1	55734.	0.667	140.318
10	V1#115	V016 DIBROMOMETHANE	174	588	1	268659.	1.747	258.241
11	V1#120	V017 METHACRYLONITRILE	41	463	1	100038.	0.458	366.979
12	V1#125	IODOETHANE	41	534	1	50824.	0.015	5629.600
13	V1#135	CHLOROPRENE (2-CHLORO-1	87	396	1	155295.	1.026	254.224
14	V2# 28	METHYL METHACRYLATE	41	602	2	297853.	0.178	545.315
15	V2# 55	V024 1,1,2-TETRACHLORO	131	798	2	273612.	0.401	222.786
16	V2# 90	V025 1,2,3-TRICHLOROPROP	75	916	2	331991.	0.351	309.124
17	V3# 38	V027 ETHYL METHACRYLATE	41	710	3	442915.	0.374	501.759
18	V3# 50	V028 1-1,4-DICHLORO-2-BU	53	923	3	64392.	0.101	271.054
19	V3# 45	V029 1,2-DIBROMO-3-CHLOR	157	1096	3	213595.	0.149	608.328

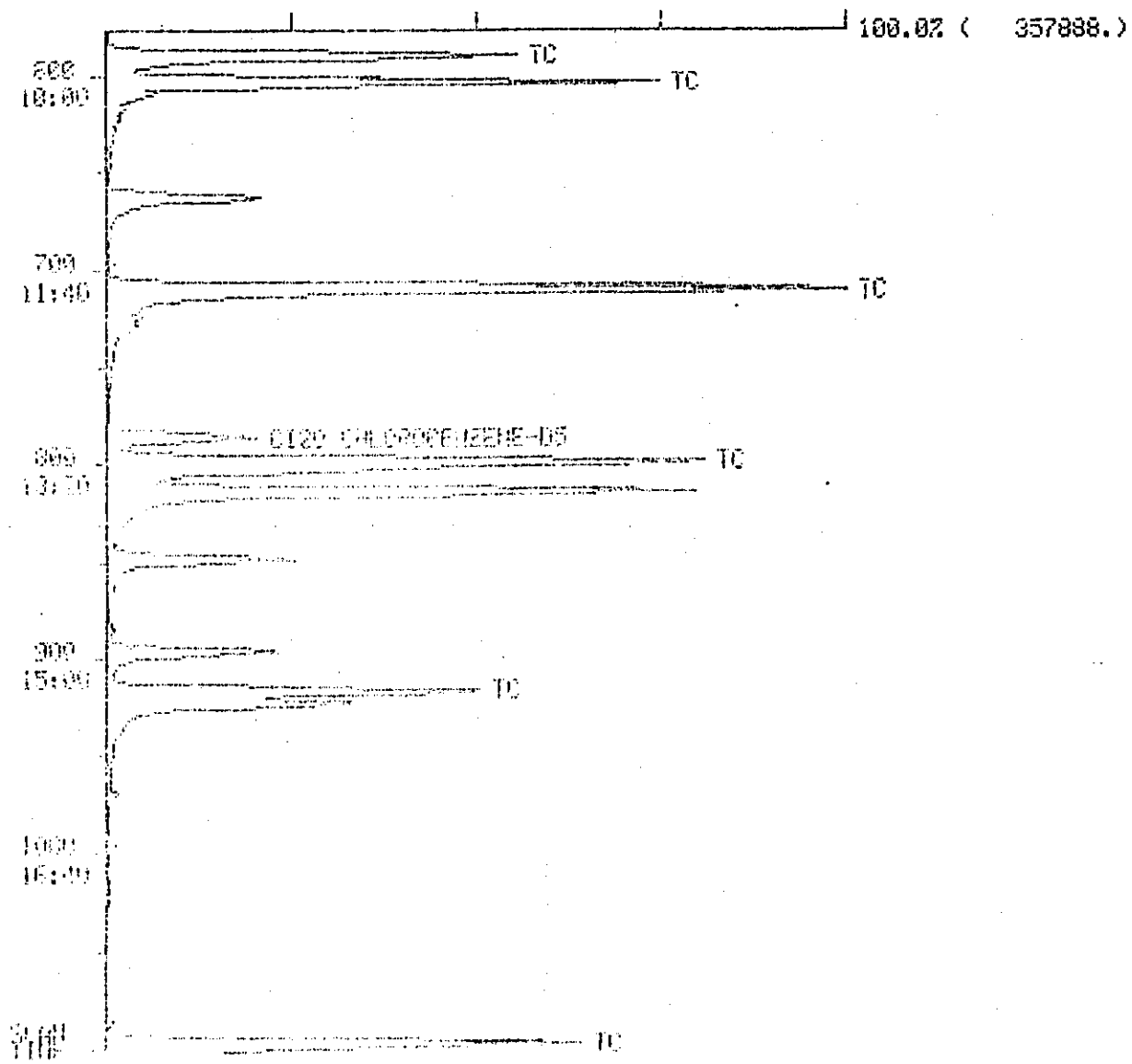
000069

DATA FROM FILE: F2873 SCANS 50 TO 575 ACQUIRED: 08/03/90 17:21:00
CALI: F2873 #3 OUT OF 50 TO 1100
SAMPLE: CLP,STDF ,,VSTD200 , , ,3569,VOA,CAL ,
CONDS.: UG/L #NA #100%NA #(NA/NA)/NA NA M



000090

DATA FROM FILE: F2873 SCANS 573 TO 1100 ACQUIRED: 08/03/90 17:21:00
CALI: F2873 #3 OUT OF 50 TO 1100
SAMPLE: CLP,STDF ,,US70280 , , ,3563,VOA,CAL ,
COMDS.: UG/L #NA %100Z/NA %(NA/NA)/NA NA M



GC/MS VOA

METHOD/TEST 8240

INSTRUMENT F

INITIAL CALIBRATION DATE 06/15/92

ANALYSIS RUN DATE 06/30/92

SAMPLES ASSOCIATED DCS

ENSECO - ROCKY MOUNTAIN ANALYTICAL LABORATORY GC/MS VOLATILE ANALYSIS

PAGE NUMBER 106 INSTRUMENT F

GC CONDITIONS							ALS	DETECTOR					
COL	PHASE	INJ TEMP	INIT TEMP	TEMP. RAMP PROGRAM	FINAL TEMP	PRESS psig	PURGE FLOW	TYPE	EM	RANGE	TEMP	MASS	SCAN T
		220°C	-20°C	-20°C - 100°C 100°C - 200°C	200°C	13	40 ml/min	MS			180°C	35-200	1 sec.

COMMENTS:

PROJ/SAMP	DATE 1992	PURGE VOL.	SAMPLE AMT.	EXTRACTION/ DILUTION INFO.	FILE	TAPE	DISK	IS OK #1	IS OK #2	IS OK #3	SS OK #1	SS OK #2	SS OK #3	DIL. OK	12 hr?	TEST - CODE	pH	COMMENTS	ALS #	INIT
-2 TB	6/30	5ml	5ml		F1028	760	3:	✓	✓	✓	✓	✓	✓	✓	✓	APS-AP		OK	16	MEB
-9 TB	↓	↓	↓		F1029	↓	↓	✓	46	47	✓	✓	✓	✓	✓	REF-AP		RR	1	↓
-1	↓	↓	↓		F1030	↓	↓	✓	✓	✓	✓	✓	✓	✓	✓	APS-AP		OK	2	↓
BFB	6/30	–	1 µl		F1031	↓	3:												–	EG
50 ppb HSL std	↓	5ml	5 µl		F1032	↓	↓									updated	JS/IS #5	CS1#4 6327 CS2#3 6381 API/BU #1 6338	3	↓
VBLANK	↓	↓	5ml		F1033	↓	↓	✓	✓	✓	✓	✓	✓	✓	✓			OK	1	↓
DCS	↓	↓	10 µl		F1034	↓	↓	✓	✓	✓	✓	✓	✓	✓	✓			7/29/92 MEB NOT USED OK	2	↓
DCS	↓	↓	10 µl		F1035	↓	↓	✓	✓	✓	✓	✓	✓	✓	✓			NOT USED	3	↓
-1	↓	↓	5ml		F1036	↓	↓	✓	✓	✓	✓	✓	✓	✓	✓	TCL-AP	✓	OK	4	↓
-2	↓	↓	8 ml EG 6/30/92		F1037	↓	↓	✓	✓	✓	✓	✓	✓	✓	✓		✓	OK	5	↓
DCS-3	↓	↓	10 µl		F1038	↓	↓	✓	✓	✓	✓	✓	✓	✓	✓			NOT USED MEB 7/29/92 OK	6	↓

STANDARD FILENAME: _____ STANDARD FILENAME: _____

IS AREAS: _____, _____, _____ IS AREAS: _____, _____, _____

IS #1= BROMOCHLOROMETHANE SS #1= D4-1,2-DICHLOROETHANE

#2= 1,4-DIFLUOROBENZENE #2= D8-TOLUENE

#3= D5-CHLOROBENZENE #3= BROMOFLUOROBENZENE

000092

ENSECO - ROCKY MOUNTAIN ANALYTICAL LABORATORY GC/MS VOLATILE ANALYSIS

PAGE NUMBER 106 INSTRUMENT F

GC CONDITIONS							ALS	DETECTOR					
COL	PHASE	INJ TEMP	INIT TEMP	TEMP. RAMP PROGRAM	FINAL TEMP	PRESS psig	PURGE FLOW	TYPE	EM	RANGE	TEMP	MASS	SCAN T
		220°C	-20°C	-20°C - 100°C 100°C - 200°C	200°C	13	40 ml/min	MS			180°C	35-300	1 sec

COMMENTS:

PROJ/SAMP	DATE 1992	PURGE VOL.	SAMPLE AMT.	EXTRACTION/ DILUTION INFO.	FILE	TAPE	DISK	IS OK #1	IS OK #2	IS OK #3	SS OK #1	SS OK #2	SS OK #3	DIL. OK	12 hr?	TEST - CODE	pH	COMMENTS	ALS #	INIT
DCS	7/1	5ml	10µl		F1039		3:	✓	✓	✓	✓	✓	✓	✓	✓			OK	7	EG
3			5ml		F1040			✓	✓	✓	✓	✓	✓	✓	✓	TCL-AP	✓	OK	8	
-4			150µl		F1041			✓	✓	✓	✓	✓	✓	✓	✓		7	OK	9	
-1			5ml		F1042			✓	✓	✓	✓	✓	✓	✓	✓			OK	10	
-2			3ml		F1043			✓	✓	✓	✓	✓	✓	ND	✓			RR	11	
-3			5ml		F1044			42	45	45	✓	✓	✓	✓	✓			RR	12	
-4					F1045			✓	✓	✓	✓	✓	✓	✓	✓			OK	13	
-5					F1046			✓	✓	✓	✓	✓	✓	✓	✓			OK	14	
-6					F1047			✓	✓	✓								Not Acquired	15	
-7					F1048			16	18	18								RR	15A	
-8					F1049			✓	✓	✓	✓	✓	✓	✓	✓			OK	16	
Ory Purge		—	—		—													ALS Method 4		7/1

STANDARD FILENAME: _____
IS AREAS: _____, _____, _____

STANDARD FILENAME: _____
IS AREAS: _____, _____, _____

IS #1= BROMOCHLOROETHANE
#2= 1,4-DIFLUOROBENZENE
#3= D5-CHLOROBENZENE

SS #1= D4-1,2-DICHLOROETHANE
#2= D8-TOLUENE
#3= BROMOFLUOROBENZENE

'OA, V LIBRARIES

ANALYST: MRB DATE: 7/1/92

INTERNAL STANDARD AREA CHECK

STANDARD

FILENAME: F1032

COMPOUND	AREA IN STANDARD	AREA LIMITS % OF AREA IN STANDARD LOW	HIGH
IS # 1 CI01 BROMOCHLOROMETH	19573.	50	200
IS # 2 CI10 1,4-DIFLUOROBEN	92086.	50	200
IS # 3 CI20 CHLOROBENZENE-D	73935.	50	200

SAMPLES

FILENAME	% OF AREA IN STANDARD IS#1	IS#2	IS#3
F1033	121	117	126
F1034	129	124	126
F1035	111	102	109
F1036	108	111	117
F1037	100	96	101
F1038	99	104	105
F1039	104	104	104
F1040	111	106	110
F1041	84	80	82
F1042	85	82	88
1043	79	81	83
1044	42*	45*	45*
F1045	90	89	96
F1046	72	72	73
F1048	16*	18*	18*
F1049	83	81	83

NOTE: * INDICATES THAT AN INTERNAL STANDARD AREA IS OUTSIDE QC LIMITS

BROMOFLUOROBENZENE

000095

'g Report
/92 20:00:00 + 3:33
ument: I50F
e Number:

Data: F1031 # 213
Cali: 063092CF # 3
Analyst:
Laboratory:

Base m/z: 95
RIC: 15184.
Acct. No.:
Contract:

/z	Intensity	% RA	Ion Abundance Criteria Min %	Max %	Mass	Actual	Status
50	830.	24.7	15.0	40.0	95	24.7	PASS
75	1690.	50.3	30.0	60.0	95	50.3	PASS
95	3360.	100.0	100.0	---	---	100.0	PASS
96	246.	7.3	5.0	9.0	95	7.3	PASS
173	0.	0.0	---	2.0	174	0.0	PASS
174	2412.	71.8	50.0	---	95	71.8	PASS
175	172.	5.1	5.0	9.0	174	7.1	PASS
176	2384.	71.0	95.0	101.0	174	98.8	PASS
177	177.	5.3	5.0	9.0	176	7.4	PASS

s List
30/92 20:00:00 + 3:33
le: 50 NG BFB
s.:

Data: F1031 # 213
Cali: 063092CF # 3

Base m/z: 95
RIC: 15184.

37 0.00 0.
77

Minima Min Inten: 0.
Maxima # 0

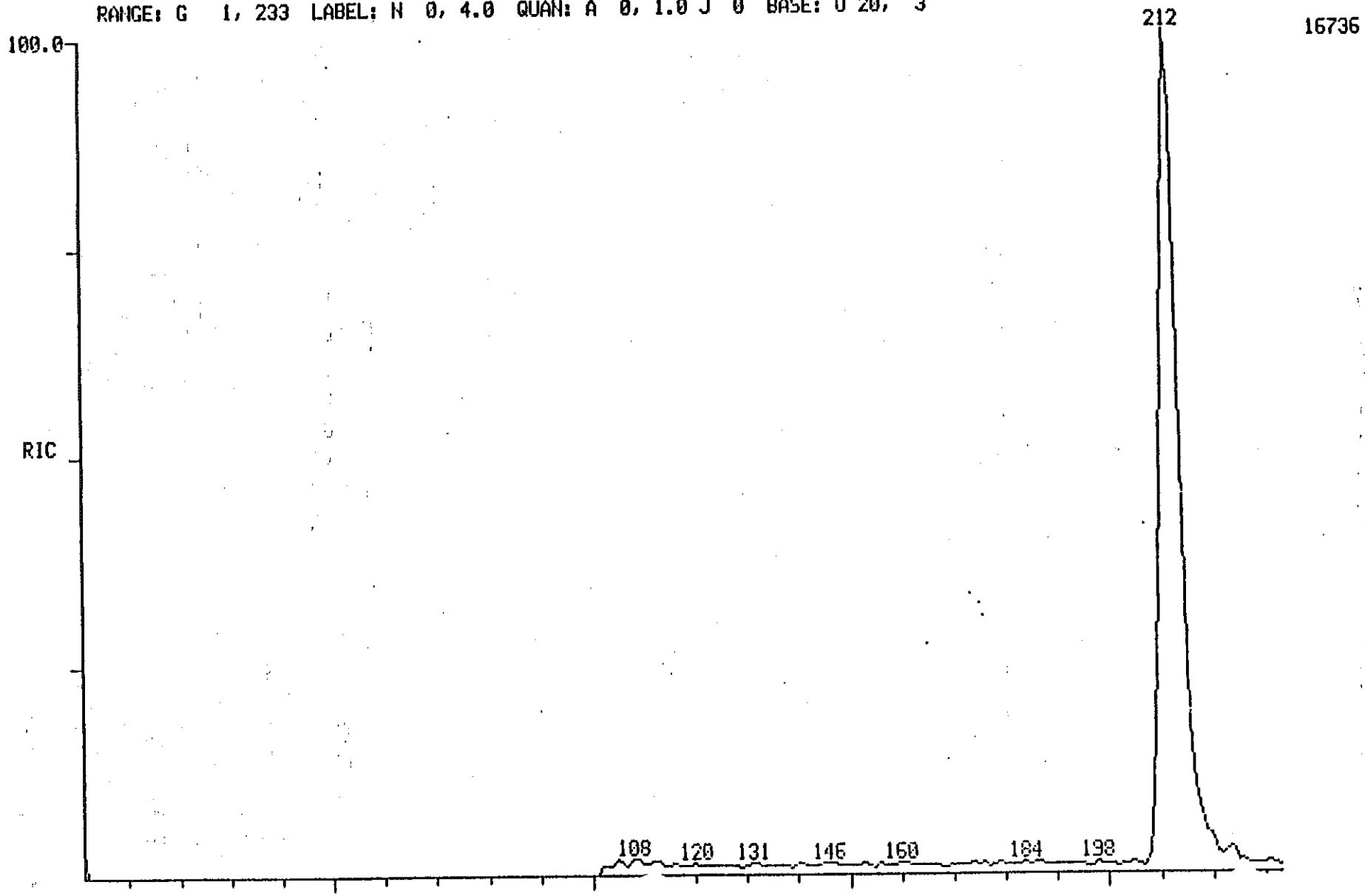
ss		% RA	Inten.
37?		6.90	232.
38?		6.28	211.
40?		5.27	177.
49?		4.32	145.
50?		24.70	830.
51?		7.53	253.
61?		4.05	136.
62?		5.00	168.
63?		3.72	125.
68?		11.10	373.
69		10.60	356.
73	F	4.08	137.
74	FM	17.68	594.
75		50.30	1690.
76		4.29	144.
87		4.52	152.
88		3.04	102.
93		3.69	124.
94	FM	14.08	473.
95		100.00	3360.
96		7.32	246.
74		71.79	2412.
75	F	5.12	172.
76	F	70.95	2384.
77		5.27	177.

000097

RIC
06/30/92 20:00:00
SAMPLE: 50 NG BFB
CONDS.:
RANGE: G 1, 233 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F1031 #213
CALI: 063092CF #3

SCANS 1 TO 233

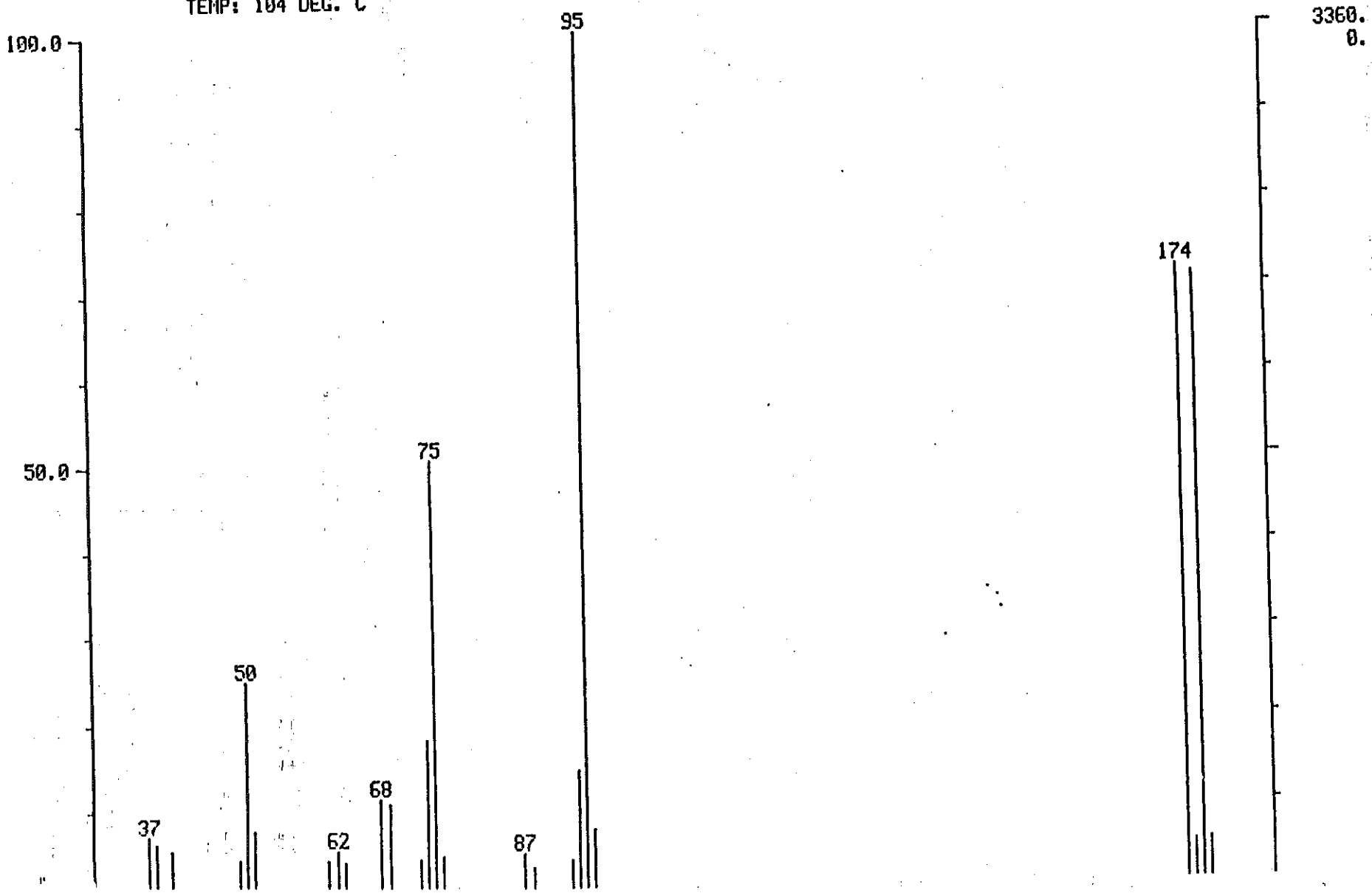


000098

MASS SPECTRUM
06/30/92 20:00:00 + 3:33
SAMPLE: 50 NG BFB
CONDS.:
TEMP: 104 DEG. C

DATA: F1031 #213
CALI: 063092CF #3

BASE M/Z: 95
RIC: 15184.



Enseco GC/MS
VOA CALIBRATION CHECK

.N. CALIBRATION 50 UG/L	F1032	06/30/92	20:08:00
TIAL CALIBRATION 20 UG/L	VOAF0610	06/15/92	23:48:00
TIAL CALIBRATION 50 UG/L	VOAF0608	06/15/92	21:48:00
TIAL CALIBRATION 100 UG/L	VOAF0611	06/16/92	0:19:00
TIAL CALIBRATION 150 UG/L	VOAF0612	06/16/92	0:51:00
TIAL CALIBRATION 200 UG/L	VOAF0609	06/15/92	22:48:00

ary try	Compound	Initial Calibration Response Factor Avg	Min	% RSD	Max	Continuing Calibration Response Factor	Min	% Diff	Max
94	V011 CIS-1,2-DICHLOR	1.781		6.3		1.700		4.5	
99	V013 TETRAHYDROFURAN	0.388		17.4		0.345		11.1	
20	V001 DICHLORODIFLUOR	0.690		20.5		1.133		-64.2	
10	C010 CHLOROMETHANE	0.832	0.300	18.0		0.715	0.300	14.1	
25	C020 VINYL CHLORIDE	1.088		12.8	30.0	0.925		15.0	25.0
15	C015 BROMOMETHANE	1.194		11.7		1.152		3.5	
35	C025 CHLOROETHANE	0.835		9.8		0.791		5.3	
70	V007 TRICHLOROFLUORO	3.633		20.7		3.028		16.7	
80	C045 1,1-DICHLOROETH	1.464		13.7	30.0	1.451		0.9	25.0
105	V015 TRICHLORO-TRIFL	1.482		16.0		1.251		15.6	
65	C040 CARBON DISULFID	3.313		15.6		3.393		-2.4	
50	C035 ACETONE	0.353		26.6		0.308		12.7	
45	C030 METHYLENE CHLOR	1.737		9.3		1.734		0.2	
95	V012 TRANS-1,2-DICHL	1.410		8.5		1.549		-9.9	
98	C110 2-BUTANONE	0.099		17.7		0.087		12.1	
90	C050 1,1-DICHLOROETH	2.834	0.300	5.9		2.818	0.300	0.6	
25	C125 VINYL ACETATE	0.618		7.3		0.603		2.4	
100	C060 CHLOROFORM	3.800		4.7	30.0	3.162		16.8	25.0
15	C115 1,1,1-TRICHLORO	0.733		13.4		0.580		20.9	
20	C120 CARBONTETRACHLO	0.707		8.4		0.491		30.6	
60	C165 BENZENE	0.990		9.4		0.934		5.7	
110	C065 1,2-DICHLOROETH	2.923		7.5		1.974		32.5	
45	C150 TRICHLOROETHENE	0.504		11.2		0.431		14.5	
35	C140 1,2-DICHLOROPRO	0.430		9.6	30.0	0.390		9.3	25.0
30	V019 1,4-DIOXANE	0.014		22.0		0.012		14.3	
30	C130 BROMODICHLOROME	0.759		10.3		0.646		14.9	
75	V023 2-CHLOROETHYL V	0.095		112.3		0.204		*-114	
40	C143 CIS-1,3-DICHLOR	0.568		5.2		0.534		6.0	
10	C205 4-METHYL-2-PENT	0.466		17.6		0.324		30.5	
35	C230 TOLUENE	0.896		10.0	30.0	0.816		8.9	25.0
65	C172 TRANS-1,3-DICHL	0.491		7.8		0.435		11.4	
55	C160 1,1,2-TRICHLORO	0.329		8.0		0.317		3.6	
20	C220 TETRACHLOROETHE	0.485		11.8		0.424		12.6	
15	C210 2-HEXANONE	0.268		16.9		0.179		33.2	
50	C155 DIBROMOCHLOROME	0.603		4.2		0.488		19.1	
70	V022 1,2-DIBROMOETHA	0.439		12.0		0.396		9.8	
40	C235 CHLOROBENZENE	1.052	0.300	8.5		0.894	0.300	15.0	
50	C240 ETHYLBENZENE	0.497		8.7	30.0	0.479		3.6	25.0
75	V032 M+P XYLENES	0.871		8.3		0.767		11.9	
60	V029 O-XYLENE	0.523		10.6		0.452		13.6	
55	C245 STYRENE	1.072		6.8		0.925		13.7	
80	C180 BROMOFORM	0.459	0.250	8.3		0.346	0.250	24.6	
25	C225 1,1,2,2-TETRACH	0.799	0.300	11.3		0.599	0.300	25.0	
80	V035 M-DICHLOROBENZE	1.012		10.8		0.829		18.1	
90	V037 P-DICHLOROBENZE	1.066		9.5		0.855		19.8	
85	V036 O-DICHLOROBENZE	0.976		12.5		0.782		19.9	
32	V003 DICHLOROFLUOROM	2.271		24.5		2.371		-4.4	
63	TERT-BUTYL METHYL ET	2.200		13.1		2.569		-16.8	
102	V009 HEXANE	1.930		14.9		2.074		-7.5	
115	V016 DIBROMOMETHANE	1.707		10.3		1.493		12.5	
40	V004 IODOMETHANE	3.067		19.1		2.928		4.5	
60	V006 ACRYLONITRILE	0.282		10.7		0.257		8.9	
55	V005 ACROLEIN	0.192		16.8		0.159		17.2	
90	V025 1,2,3-TRICHLORO	0.381		12.5		0.306		19.7	
30	V026 T-1,4-DICHLORO-	0.186		10.6		0.142		23.7	
38	V027 ETHYL METHACRYL	0.481		10.9		0.388		19.3	
2	CS05 TOLUENE-D8	1.224		13.5		1.109		9.4	
3	CS10 BROMOFLUOROBENZ	0.794		12.4		0.638		19.6	
2	CS15 1,2-DICHLOROETH	2.526		10.9		2.044		19.1	

Enseco GC/MS
VOA CALIBRATION CHECK

N.	CALIBRATION	50 UG/L	F1032	06/30/92	20:08:00
TIAL	CALIBRATION	20 UG/L	VOAF0610	06/15/92	23:48:00
TIAL	CALIBRATION	50 UG/L	VOAF0608	06/15/92	21:48:00
TIAL	CALIBRATION	100 UG/L	VOAF0611	06/16/92	0:19:00
TIAL	CALIBRATION	150 UG/L	VOAF0612	06/16/92	0:51:00
TIAL	CALIBRATION	200 UG/L	VOAF0609	06/15/92	22:48:00

	F1032		VOAF0610		VOAF0608		VOAF0611		VOAF0612		VOAF0609	
#	Conc	RRF	Conc	RRF	Conc	RRF	Conc	RRF	Conc	RRF	Conc	RRF
94	50,	1.700	20,	1.837	50,	1.658	100,	1.714	150,	1.751	200,	1.944
99	50,	0.345	20,	0.479	50,	0.375	100,	0.290	150,	0.396	200,	0.398
20	50,	1.133	20,	0.701	50,	0.629	100,	0.501	150,	0.733	200,	0.886
10	50,	0.715	20,	0.606	50,	0.911	100,	0.782	150,	0.859	200,	1.002
25	50,	0.925	20,	0.972	50,	1.147	100,	0.951	150,	1.077	200,	1.293
15	50,	1.152	20,	1.097	50,	1.210	100,	1.048	150,	1.204	200,	1.410
35	50,	0.791	20,	0.792	50,	0.895	100,	0.722	150,	0.836	200,	0.928
70	50,	3.028	20,	4.269	50,	2.719	100,	2.973	150,	3.837	200,	4.368
80	50,	1.451	20,	1.436	50,	1.302	100,	1.273	150,	1.542	200,	1.767
105	50,	1.251	20,	1.501	50,	1.509	100,	1.119	150,	1.496	200,	1.784
65	50,	3.393	20,	3.349	50,	2.838	100,	2.821	150,	3.495	200,	4.062
50	50,	0.308	20,	0.490	50,	0.385	100,	0.258	150,	0.273	200,	0.360
45	50,	1.734	20,	1.974	50,	1.745	100,	1.550	150,	1.630	200,	1.786
95	50,	1.549	20,	1.577	50,	1.389	100,	1.288	150,	1.314	200,	1.483
98	50,	0.087	20,	0.129	50,	0.090	100,	0.088	150,	0.088	200,	0.102
90	50,	2.818	20,	3.040	50,	2.774	100,	2.645	150,	2.733	200,	2.979
25	50,	0.603	20,	0.670	50,	0.622	100,	0.554	150,	0.598	200,	0.647
100	50,	3.162	20,	3.842	50,	3.791	100,	3.585	150,	3.710	200,	4.072
15	50,	0.580	20,	0.902	50,	0.704	100,	0.654	150,	0.679	200,	0.728
20	50,	0.491	20,	0.795	50,	0.687	100,	0.637	150,	0.684	200,	0.730
60	50,	0.934	20,	1.136	50,	0.989	100,	0.889	150,	0.937	200,	0.999
110	50,	1.974	20,	2.964	50,	2.763	100,	2.728	150,	2.884	200,	3.276
45	50,	0.431	20,	0.601	50,	0.499	100,	0.453	150,	0.480	200,	0.489
35	50,	0.390	20,	0.499	50,	0.434	100,	0.395	150,	0.409	200,	0.412
30	1000,	0.012	400,	0.018	1000,	0.017	2000,	0.011	3000,	0.014	4000,	0.012
30	50,	0.646	20,	0.888	50,	0.727	100,	0.684	150,	0.728	200,	0.767
75	50,	0.204	20,	0.200	50,	0.222	100,	0.037	150,	0.011	200,	0.006
40	81,	0.534	32,	0.608	81,	0.554	162,	0.534	243,	0.554	324,	0.588
10	50,	0.324	20,	0.603	50,	0.443	100,	0.406	150,	0.404	200,	0.476
35	50,	0.816	20,	1.035	50,	0.834	100,	0.831	150,	0.844	200,	0.938
65	19,	0.435	8,	0.502	19,	0.459	38,	0.448	57,	0.504	76,	0.543
55	50,	0.317	20,	0.354	50,	0.322	100,	0.294	150,	0.318	200,	0.356
20	50,	0.424	20,	0.580	50,	0.448	100,	0.476	150,	0.433	200,	0.486
15	50,	0.179	20,	0.333	50,	0.251	100,	0.225	150,	0.236	200,	0.297
50	50,	0.488	20,	0.629	50,	0.581	100,	0.572	150,	0.606	200,	0.625
70	100,	0.396	40,	0.457	100,	0.431	200,	0.355	300,	0.498	400,	0.455
40	50,	0.894	20,	1.160	50,	0.970	100,	1.000	150,	0.990	200,	1.138
50	50,	0.479	20,	0.546	50,	0.471	100,	0.462	150,	0.463	200,	0.541
75	50,	0.767	20,	0.958	50,	0.813	100,	0.843	150,	0.804	200,	0.939
60	50,	0.452	20,	0.611	50,	0.477	100,	0.490	150,	0.493	200,	0.542
55	50,	0.925	20,	1.160	50,	1.003	100,	1.028	150,	1.028	200,	1.140
80	50,	0.346	20,	0.495	50,	0.453	100,	0.409	150,	0.440	200,	0.499
25	50,	0.599	20,	0.935	50,	0.764	100,	0.719	150,	0.733	200,	0.842
80	50,	0.829	20,	1.152	50,	0.918	100,	0.998	150,	0.900	200,	1.091
90	50,	0.855	20,	1.209	50,	0.948	100,	1.033	150,	1.018	200,	1.121
85	50,	0.782	20,	1.162	50,	0.884	100,	0.960	150,	0.857	200,	1.016
32	50,	2.371	20,	2.603	50,	1.992	100,	1.426	150,	2.558	200,	2.774
63	50,	2.569	20,	2.446	50,	2.283	100,	1.838	150,	2.476	200,	1.959
102	50,	2.074	20,	2.305	50,	1.853	100,	1.549	150,	2.108	200,	1.835
115	50,	1.493	20,	1.854	50,	1.717	100,	1.480	150,	1.896	200,	1.590
40	100,	2.928	40,	2.994	100,	2.759	200,	2.318	300,	3.829	400,	3.437
60	200,	0.257	80,	0.283	200,	0.302	400,	0.232	600,	0.309	800,	0.283
55	250,	0.159	100,	0.206	250,	0.188	500,	0.138	750,	0.218	1000,	0.211
90	50,	0.306	20,	0.428	50,	0.381	100,	0.304	150,	0.412	200,	0.380
30	50,	0.142	20,	0.195	50,	0.183	100,	0.154	150,	0.206	200,	0.192
38	100,	0.388	40,	0.530	100,	0.467	200,	0.399	300,	0.521	400,	0.486
2	50,	1.109	20,	1.432	50,	1.095	100,	1.126	150,	1.373	200,	1.092
3	50,	0.638	20,	0.925	50,	0.735	100,	0.735	150,	0.874	200,	0.703
2	50,	2.044	20,	2.670	50,	2.296	100,	2.339	150,	2.943	200,	2.382

```
e List: HEDR1                    Entry #   1 of   1
  Name: F1032

)Format: VOACLP                          ( 2)Case: STDF
3)Sample ID: VSTD050                     ( 4)Level:
5)Matrix:                                ( 6)Lab Sample ID: V6327
7)Fraction: VOA                          ( 8)Type: CAL
))Analyst: EG                            (11)Quan List Units: UG/L
2)Purge Volume: NA                       (13)Extract Dilution: NA
4)Extract Volume: NA                     (15)Extract Vol. Used: NA
6)Sample Amount: NA                      (17)Percent Moisture: NA
9)Run Factor: NA                         (20)SURROGATE VOLUME:: NA


30/92    20:09:00
  Acquisition started

uire                          Run 3:F1032                  Starting
30/92 20:08:00 +  0:00        Free sectors: 20356          Scan: 0 of 1464
ple: CLP,STDF ,,VSTD050 ,  , ,V6327,VOA,CAL ,
ds.: UG/L *NA *100%/NA *(NA/NA )/NA  NA M
nula: NANA                    Instrument: I50F             Weight:     0.000
nitted by:  RMAL              Analyst: EG                  Acct. No: VOACLP

                *** GC not ready and being equilibrated ***
                                                Elapsed time :    0.0 Min
Desc.: VN
  Temp     Rate      Time (minutes)
 (DegC)   (C/min)   period     total      Injector A    :   220 Deg C
 -20--18    2.0       1.0       1.0       GC oven       :    73 Deg C
 -18-102    7.0      17.1      18.1       Transfer-line:    204 Deg C
 102-202   30.3       3.3      21.4       Ion source    :   183 Deg C
ve A : closed        Valve B : closed
                *** Instrument parameters ***
   Post acquisition state ->   Filament : Off  Multiplier : Off
E: EI (+) Centroid + Temp - Sequence: VO ( 1 time window. )

 ence Window #  1
                Number of cycles:      1
                Filament is ON
                Multiplier is ON
n descriptor: VO        Mass intervals:  1        Positive ion mode.
al scan time:  1.000  s                           Master rate:      8

:   3  MFW:  70  MA:  50  TH:   1  BL:   0
t #   Lo mass    Hi mass      Time
1      36.511    300.590     1.000

 Calibration table:        3:063092CF

 Interface number              0
 Instrument type               Q
 Full scale mass            1170  u
 Zero scale mass               1  u
 Intensity/ion                 2
 Peak width                 1000.  mmu
 Offset at low mass            0  mmu
 Offset at high mass           0  mmu
 Voltage settling time(ms)     4


rent instrument parameters.
                  Positive ion mode    Negative ion mode
Resolution (high)      123.00                0.00
Resolution (low)       125.00                0.00
Quad offset             -2.00                0.00
Quad programming        -1.00                0.00
Lens offset            -30.00                0.00
Lens programming         0.00                0.00
Ext offset              -4.00                0.00
Ext programming          0.00                0.00
Collector               30.00                0.00
Ion offset               4.00                0.00
```

on programming 1.00 0.00
d polarity Reverse Normal
Electron multiplier voltage: 1402.
Filament emission current: 750.
Electrometer range: 10 ^-7
Electrometer zero: 128.0

yzer Fore Pressure .....: 0.027 Torr
rator/Source Pressure .....: 0.361 Torr

0/92 20:43:30
ACQUISITION COMPLETED
Scans 1 to 1464 Centroid

	Scans	Secs	Out of	%	Peaks per scan	per sec
troid	1464	1.0	1464.0	0.1	16736. 11.	11.

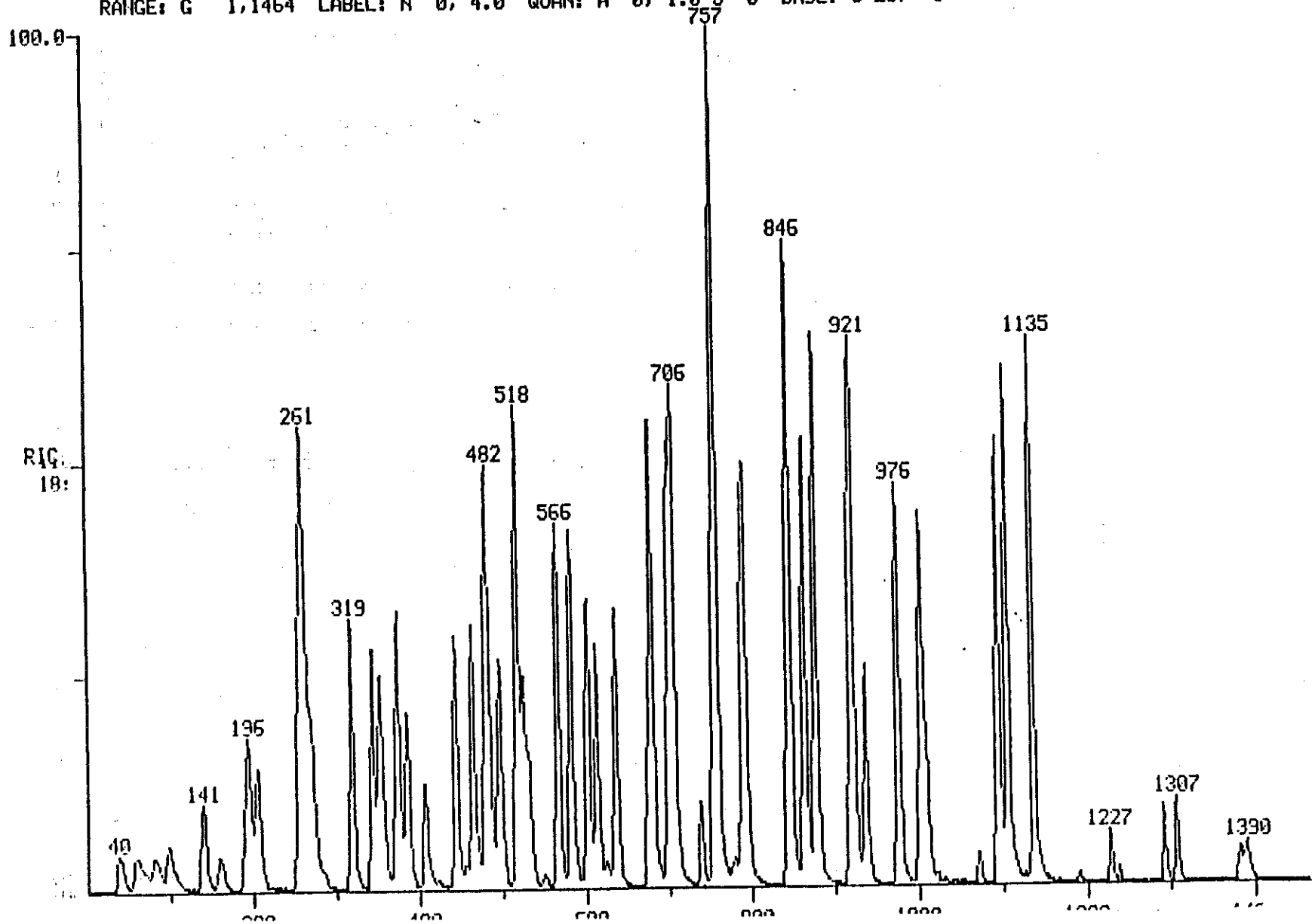
000103

RIC
06/30/92 20:08:00
SAMPLE: CLP,STDF ,,VSTD050 , , ,V6327,VOA,CAL ,
CONDS.: UG/L *NA *100%/NA *(NA/NA)/NA NA M
RANGE: G 1,1464 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F1032 #4
CALI: 063092CF #3

SCANS 1 TO 1464

86656.



CEDURE: TCA DIAGNOSTIC REPORT 6/30/93 20:45:04
4 FILE: F1032
RENCE: 11TABLE
LIST: LLNL INITIALIZATION OPTION: 2 PROCESSING OPTION: 3
..EPORT: ISO1

--- STANDARDS ----- ><				--- PLUS UNKNOWNS --- ><				- LIST NAMES - >
OC	USED	POSS	RMS	PROC	USED	POSS	RMS	STANDARD/UNKNOWN
1	1	1	0	11	10	8	86	ISO1/TCO1
1	1	1	0	11	11	12	176	ISO2/TCO2
1	1	1	0	4	4	2	98	ISO3/TCO3
3	3	2	16	13	13	1	64	ISO4/TCO4
3	3	1	16	13	12	1	97	ISO5/TCO5
3	3	1	16	7	7	1	94	ISO6/TCO6
1	1	1	0	11	11	3	68	ISO7/TCO7
1	1	1	0	4	4	12	8	ISO8/TCO8

63 COMPOUNDS PROCESSED, 61 FOUND

COMPOUND ><		---------- SEARCH ---------- >< SAT ><							------ CHRO ------- >			
LIB	ENTRY	REF	PRED	SEL	DELTA	PEAKS	FIT	PEAKS	M/Z	TOP	DELTA	PEAKS
V1	1	-464	464	464	.	1	992	.	128	464	.	1
V1	20	-60	60	61	1	2	993	.	85	59	-2	1
V1	10	-85	85	84	-1	2	998	.	50	82	-2	1
V1	25	-101	101	100	-1	1	995	.	62	100	.	1
V1	15	-142	142	142	.	1	998	.	94	142	.	1
V1	35	-163	163	162	-1	1	929	.	64	162	.	1
V1	70	-197	197	196	-1	1	994	.	101	196	.	1
V1	32	-208	208	207	-1	1	922	.	67	207	.	1
V1	80	-255	255	256	1	1	985	.	96	256	.	1
V1	38	-259	259	.	.	.	.	.	45	.	.	.
V1	55	-259	259	259	.	2	1000	.	56	259	.	1
V1	65	-259	258	260	2	2	971	.	76	260	.	1
V1	40	-262	261	262	1	1	997	.	142	262	.	1
V1	105	-269	268	270	2	1	987	.	151	271	1	1
V1	50	-288	287	285	-2	1	1000	.	43	285	.	1
V1	45	-320	319	319	.	1	984	.	84	319	.	1
V1	95	-345	344	345	1	1	988	.	96	344	-1	1
V1	60	-356	355	353	-2	3	998	.	53	353	.	1
V1	63	-359	358	355	-3	1	996	.	73	355	.	1
V1	102	-375	374	375	1	2	995	.	57	375	.	1
V1	90	-388	387	387	.	1	995	.	63	387	.	1
V2	25	-410	408	408	.	1	982	.	43	408	.	1
V1	94	-445	444	444	.	1	976	.	96	444	.	1
V1	98	-460	459	458	-1	2	1000	.	72	457	-1	1
V2	1	-565	566	566	.	1	999	.	114	566	.	1
V3	1	-842	845	845	.	2	998	.	117	845	.	1
V1	99	-473	472	471	-1	1	976	.	42	470	-1	1
V1	100	-482	481	481	.	1	990	.	83	481	.	1
V2	15	-484	483	483	.	1	998	.	97	483	.	1
V2	20	-498	497	497	.	1	1000	.	117	497	.	1
V2	60	-518	518	518	.	1	975	.	78	518	.	1
V1	2	-519	519	518	-1	1	984	.	65	518	.	1
V1	110	-526	526	526	.	1	985	.	62	526	.	1
V2	45	-582	582	583	1	1	984	.	130	583	.	1
V2	35	-602	603	603	.	1	988	.	63	603	.	1
V1	115	-613	614	614	.	1	997	.	174	614	.	1
V1	130	-627	627	625	-2	1	993	.	88	625	.	1
V2	30	-636	637	636	-1	1	989	.	83	636	.	1
V2	75	-674	675	675	.	1	993	.	63	675	.	1
V2	40	-679	680	680	.	1	993	.	75	680	.	1
V3	2	-699	700	700	.	1	978	.	98	700	.	1
V3	10	-703	704	.	.	.	.	.	43	705	.	1
V3	35	-705	706	706	.	1	979	.	92	706	.	1
V2	65	-738	739	739	.	1	994	.	75	739	.	1
V2	55	-753	754	755	1	1	962	.	97	754	-1	1
V3	20	-756	757	757	.	1	973	.	164	757	.	1
V3	38	-757	758	758	.	1	991	.	41	758	.	1
V2	50	-789	790	789	-1	1	980	.	129	789	.	1
V3	15	-789	790	790	.	1	978	.	43	790	.	1
V2	70	-792	793	793	.	1	991	.	107	793	.	1
V3	40	-846	848	847	-1	1	975	.	112	847	.	1
V3	50	-863	865	865	.	1	984	.	106	865	.	1
V3	75	-877	879	878	-1	3	985	.	106	878	.	1
V3	60	-917	919	919	.	1	991	.	106	919	.	1
V3	55	-921	923	922	-1	1	987	.	104	922	.	1
V2	80	-935	937	937	.	1	987	.	173	937	.	1
V3	3	-974	976	976	.	1	990	.	95	976	.	1
V2	90	-1000	1002	1002	.	1	989	.	75	1002	.	1
V3	25	-1003	1005	1005	.	1	981	.	83	1005	.	1

V3	90	-1104	1106	1106	.	3	991	.	146	1106	.	1
V3	85	-1133	1135	1135	.	2	994	.	146	1135	.	1

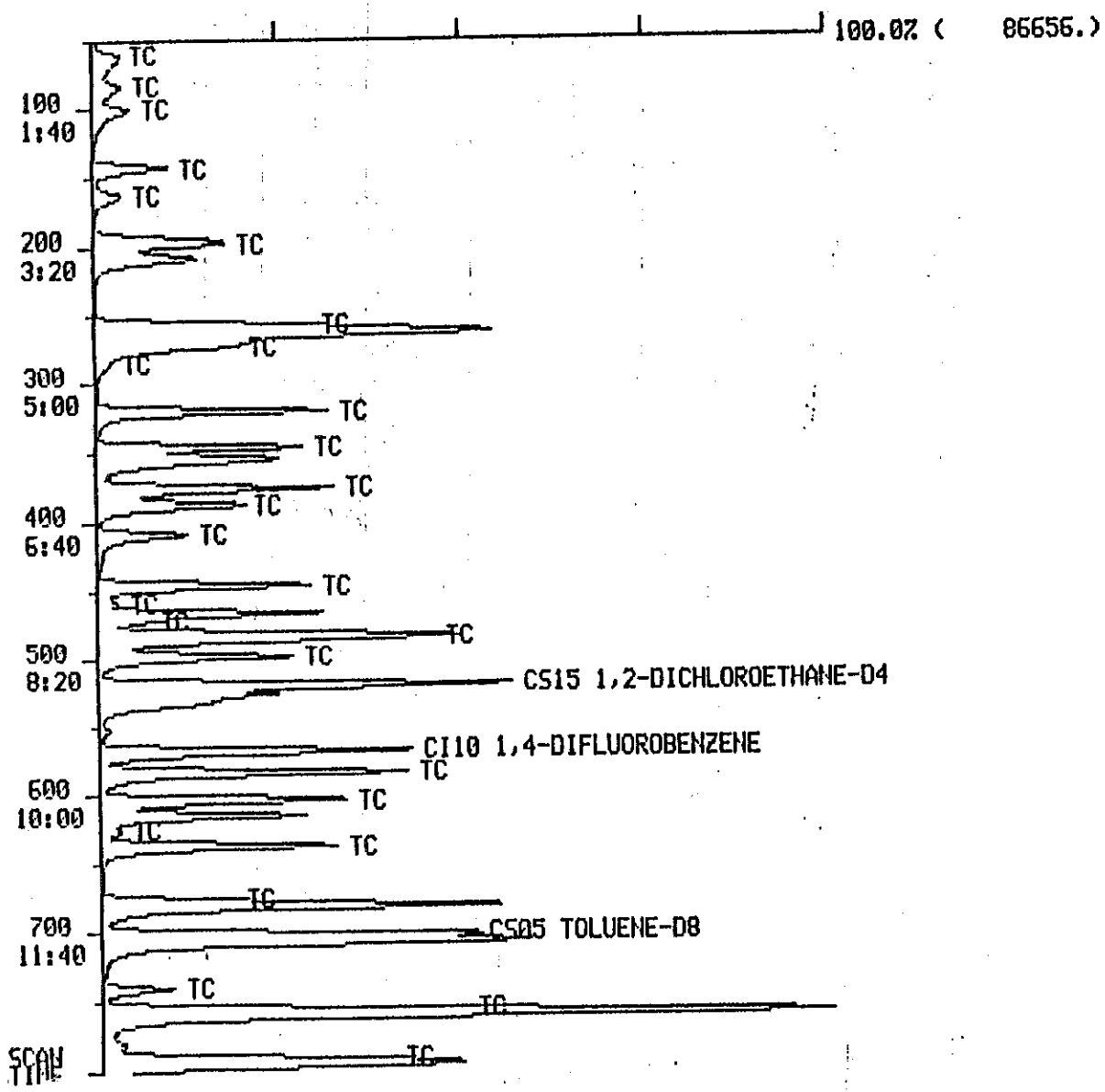
000105

QUANTITATION SUMMARY FILE: F1032
COUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

LIBRARY ENTRY		NAME	MASS	SCAN	REF	AREA	UNITS: RRF	UG/L AMOUNT
V1# 1	CI01	BROMOCHLOROMETHANE	128	464	1	19573.	1.000	50.000
V2# 1	CI10	1,4-DIFLUOROBENZENE	114	566	2	92086.	1.000	50.000
V3# 1	CI20	CHLOROBENZENE-D5	117	845	3	73935.	1.000	50.000
V3# 2	CS05	TOLUENE-D8	98	700	3	81989.	1.094	50.691
V3# 3	CS10	BROMOFLUOROBENZENE	95	976	3	47153.	0.658	48.448
V1# 2	CS15	1,2-DICHLOROETHANE-	65	518	1	40017.	1.801	56.747
V1# 20	V001	DICHLORODIFLUOROMET	85	59	1	22179.	1.178	48.090
V1# 10	C010	CHLOROMETHANE	50	82	1	13987.	0.826	43.249
V1# 25	C020	VINYL CHLORIDE	62	100	1	18096.	0.930	49.709
V1# 15	C015	BROMOMETHANE	94	142	1	22540.	1.273	45.222
V1# 35	C025	CHLOROETHANE	64	162	1	15482.	0.904	43.742
V1# 70	V007	TRICHLOROFLUOROMETH	101	196	1	59265.	3.188	47.491
V1# 32	V003	DICHLOROFLUOROMETHA	67	207	1	46407.	2.557	46.363
V1# 80	C045	1,1-DICHLOROETHENE	96	256	1	28399.	1.537	47.207
V1# 65	C040	CARBON DISULFIDE	76	260	1	66409.	3.600	47.119
V1#105	V015	TRICHLORO-TRIFLUORO	151	271	1	24477.	1.448	43.195
V1# 50	C035	ACETONE	43	285	1	6031.	0.298	51.615
V1# 45	C030	METHYLENE CHLORIDE	84	319	1	33945.	1.852	46.832
V1# 95	V012	TRANS-1,2-DICHLOROE	96	344	1	30320.	1.595	48.573
V1#102	V009	HEXANE	57	375	1	40593.	2.528	41.022
V1# 90	C050	1,1-DICHLOROETHANE	63	387	1	55148.	2.945	47.829
V2# 25	C125	VINYL ACETATE	43	408	2	55523.	0.600	50.273
V1# 94	V011	CIS-1,2-DICHLOROETH	96	444	1	33269.	1.722	49.347
V1# 98	C110	2-BUTANONE	72	457	1	1704.	0.084	52.031
V1# 99	V013	TETRAHYDROFURAN	42	470	1	6756.	0.349	49.410
V1#100	C060	CHLOROFORM	83	481	1	61888.	3.233	48.905
V2# 15	C115	1,1,1-TRICHLOROETHA	97	483	2	53437.	0.576	50.358
V2# 20	C120	CARBONTETRACHLORIDE	117	497	2	45257.	0.484	50.743
V2# 60	C165	BENZENE	78	518	2	85976.	0.952	49.019
V1#110	C065	1,2-DICHLOROETHANE	62	526	1	38630.	2.003	49.256
V2# 45	C150	TRICHLOROETHENE	130	583	2	39711.	0.437	49.390
V2# 35	C140	1,2-DICHLOROPROPANE	63	603	2	35908.	0.386	50.476
V1#130	V019	1,4-DIOXANE	88	625	1	4734.	0.013	923.638
V2# 30	C130	BROMODICHLOROMETHAN	83	636	2	59524.	0.639	50.542
V2# 75	V023	2-CHLOROETHYL VINYL	63	675	2	18806.	0.225	45.383
V2# 40	C143	CIS-1,3-DICHLOROPRO	75	680	2	79610.	0.548	78.935
V3# 10	C205	4-METHYL-2-PENTANON	43	705	3	23943.	0.327	49.473
V3# 35	C230	TOLUENE	92	706	3	60336.	0.851	47.958
V2# 65	C172	TRANS-1,3-DICHLOROP	75	739	2	15215.	0.440	18.758
V2# 55	C160	1,1,2-TRICHLOROETHA	97	754	2	29146.	0.302	52.331
V3# 20	C220	TETRACHLOROETHENE	164	757	3	31347.	0.492	43.090
V3# 15	C210	2-HEXANONE	43	790	3	13249.	0.180	49.740
V2# 50	C155	DIBROMOCHLOROMETHAN	129	789	2	44893.	0.503	48.421
V2# 70	V022	1,2-DIBROMOETHANE	107	793	2	72966.	0.424	93.515
V3# 40	C235	CHLOROBENZENE	112	847	3	66126.	0.944	47.362
V3# 50	C240	ETHYLBENZENE	106	865	3	35425.	0.451	53.103
V3# 75	V032	M+P XYLENES	106	878	3	56692.	0.802	47.791
V3# 60	V029	O-XYLENE	106	919	3	33447.	0.496	45.572
V3# 55	C245	STYRENE	104	922	3	68366.	1.044	44.269
V2# 80	C180	BROMOFORM	173	937	2	31867.	0.368	46.974
V3# 25	C225	1,1,2,2-TETRACHLORO	83	1005	3	44320.	0.650	46.117
V3# 80	V035	M-DICHLOROBENZENE	146	1095	3	61284.	0.969	42.768
V3# 90	V037	P-DICHLOROBENZENE	146	1106	3	63246.	1.047	40.865
V3# 85	V036	O-DICHLOROBENZENE	146	1135	3	57796.	0.949	41.180
V1# 38	V040	ETHANOL	45		1	NOT FOUND		
V1# 40	V004	IODOMETHANE	142	262	1	114630.	3.040	96.314
V1# 55	V005	ACROLEIN	56	259	1	15595.	0.192	207.515
V1# 60	V006	ACRYLONITRILE	53	353	1	20114.	0.271	189.541
V1# 63		TERT-BUTYL METHYL ETHER	73	355	1	50289.	2.538	50.619
V1#115	V016	DIBROMOMETHANE	174	614	1	29220.	1.546	48.271
V2# 90	V025	1,2,3-TRICHLOROPROP	75	1002	2	28150.	0.343	44.600
V3# 38	V027	ETHYL METHACRYLATE	41	758	3	57362.	0.413	93.819
V3# 30	V026	T-1,4-DICHLORO-2-BU	53	1011	3	10487.	0.153	46.311

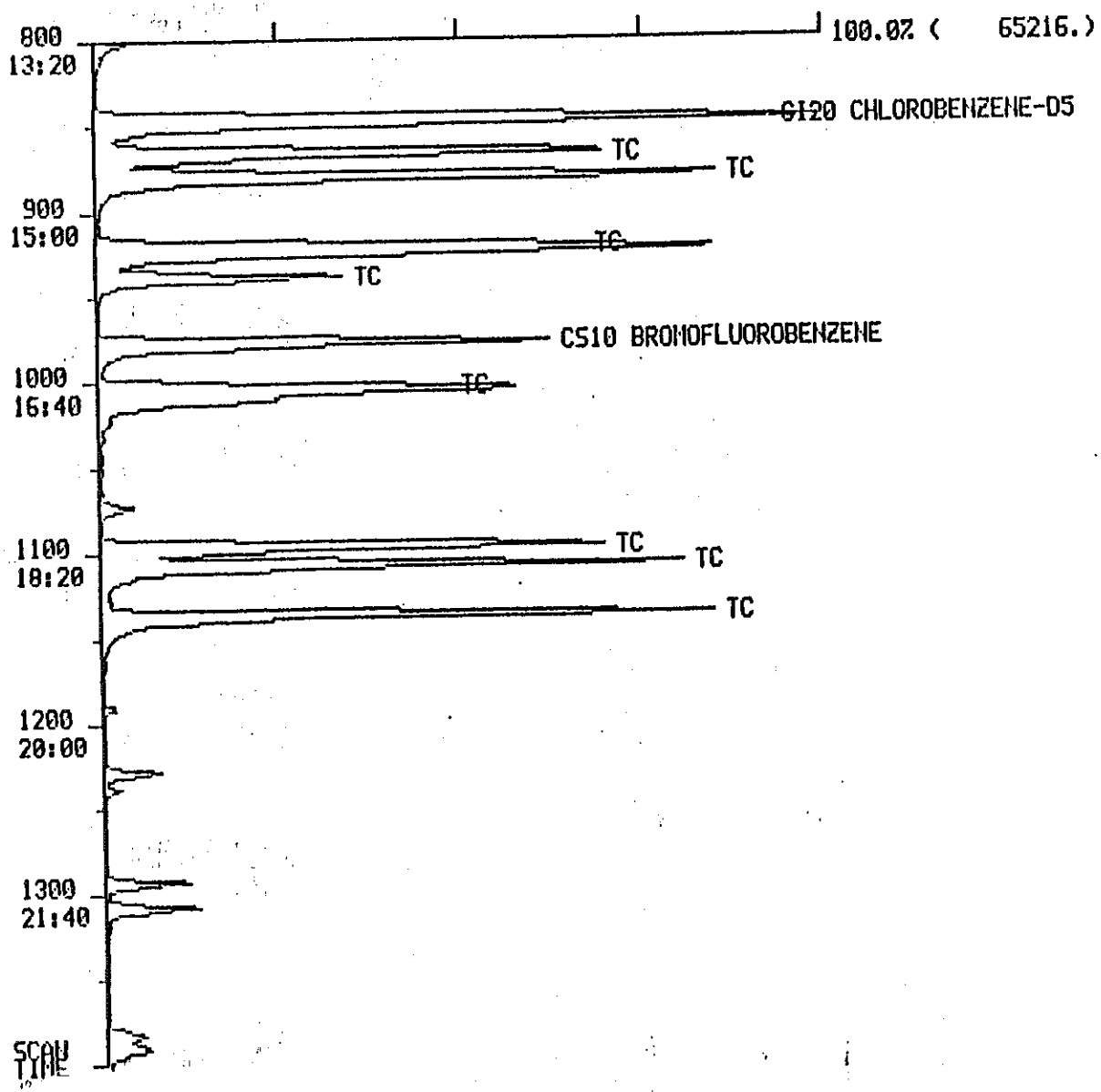
000106

DATA FROM FILE: F1032 SCANS 50 TO 800 ACQUIRED: 06/30/92 20:08:00
CALI: F1032 #3
SAMPLE: CLP,STDF ,,VSTD050 , , ,V6327,VOA,CAL ,
CONDS.: UG/L *NA *100%/NA *(NA/NA)/NA NA M



0001107

DATA FROM FILE: F1032 SCANS 800 TO 1400 ACQUIRED: 06/30/92 20:08:00
CALI: F1032 #3
SAMPLE: CLP,STDF ,,VSTD050 , , ,V6327,VOA,CAL ,
CONDS.: UG/L *NA *100%/NA *(NA/NA)/NA NA M



QC LOT #: 30JUN92F

DATE ANALYZED: 06/30/92

000108

METHOD: 624
ORGANICS BY GC/MS
LCS (LABORATORY CONTROL SAMPLES)
VOA, AQUEOUS QC

		DATA FILE	RUN FACTOR	CALI STANDARD
ANALYST: EG	LCS #1	F1034	1.00	F1032
INSTRUMENT: F	LCS #2	F1039	1.00	F1032
MATRIX: AQUEOUS				

SAMPLE #	SAMPLE #	SAMPLE #	SAMPLE #	SAMPLE #
-5	-01 02	-7		
8	01	9		
-01	-1	3		
01 00	-2	-1		
-3	4			
4	6			

COMPOUND	SPIKE CONC. UG/L	MEASURED CONCENTRATION UG/L LCS #1	LCS #2	AVERAGE
C045 1,1-DICHLOROETHENE	50.0	46.5	41.7	44.1
C150 TRICHLOROETHENE	50.0	45.2	42.7	44.0
C165 BENZENE	50.0	47.2	45.4	46.3
C230 TOLUENE	50.0	42.3	42.1	42.2
C235 CHLOROBENZENE	50.0	49.7	51.2	50.4

COMPOUND	ACCURACY AVERAGE % RECOVERY	ACCURACY CONTROL LIMITS	PRECISION RPD	PRECISION CONTROL LIMIT
C045 1,1-DICHLOROETHENE	88	56-138	11.	20
C150 TRICHLOROETHENE	88	76-109	5.7	13
C165 BENZENE	93	78-119	3.9	12
C230 TOLUENE	84	82-114	0.47	13
C235 CHLOROBENZENE	101	84-117	3.0	10

NOTE: 80% OF VALUES MUST BE WITHIN CONTROL LIMITS

100% OF AVERAGE PERCENT RECOVERIES ARE WITHIN CONTROL LIMITS
100% OF RPD ARE WITHIN CONTROL LIMITS

SUPERVISOR APPROVAL :

NCR - 995 7/15/92

NCR - 950 7/15/92

Sample: F1034 Performance Check: F1031 Elapsed Time: 1:36:00

Sample: F1034 Calibration Stds.: F1032,

Data Reduced by : MRB Date: 7/1/92

Data Reviewed by: _____ Date: _____

Data File: F1034

000109

Enseco GC/MS
Target Compound Data Summary Sheet

Sample: -DCS WATER 30JUN92F
Conditions: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
Date Analyzed: 06/30/92 21:36:00
Analyst: EG
Quan List Threshold: 1.00

Units: UG/L
Run Factor: 1.00
Surrogate Vol.: 0.00500

Surrogate Spike Recoveries
VOA, AQUEOUS QC

Compound	Surrogate Amount (ug) Spiked	Measured	% Recovery Measured	QC limits
CS05 TOLUENE-D8	0.2500	0.2365	94.6	90 112
CS10 BROMOFLUOROBENZ	0.2500	0.2525	101.	83 113
CS15 1,2-DICHLOROETH	0.2500	0.2170	86.8	82 112

Target Compounds: BLACK

Scan #	Concentration Quan List UG/L	Sample UG/L	Compound
	BDL		V001 DICHLORODIFLUOROMETHANE
	BDL		C010 CHLOROMETHANE
	BDL		C020 VINYL CHLORIDE
	BDL		C015 BROMOMETHANE
	BDL		C025 CHLOROETHANE
	BDL		V007 TRICHLOROFLUOROMETHANE
	BDL		V003 DICHLOROFLUOROMETHANE
256	46.496	46.5	C045 1,1-DICHLOROETHENE
	BDL		C040 CARBON DISULFIDE
	BDL		V015 TRICHLORO-TRIFLUORO-ETHANE
284	2.004	2.00	C035 ACETONE
320	1.269	1.27	C030 METHYLENE CHLORIDE
	BDL		V012 TRANS-1,2-DICHLOROETHENE
	BDL		V009 HEXANE
	BDL		C050 1,1-DICHLOROETHANE
	BDL		C125 VINYL ACETATE
	BDL		V011 CIS-1,2-DICHLOROETHENE
	BDL		C110 2-BUTANONE
	BDL		V013 TETRAHYDROFURAN
	BDL		C060 CHLOROFORM
	BDL		C115 1,1,1-TRICHLOROETHANE
	BDL		C120 CARBONTETRACHLORIDE
518	47.171	47.2	C165 BENZENE
	BDL		C065 1,2-DICHLOROETHANE
582	45.162	45.2	C150 TRICHLOROETHENE
	BDL		C140 1,2-DICHLOROPROPANE
	BDL		V019 1,4-DIOXANE
	BDL		C130 BROMODICHLOROMETHANE
	BDL		V023 2-CHLOROETHYL VINYL ETHER
	BDL		C143 CIS-1,3-DICHLOROPROPENE
706	1.195	1.19	C205 4-METHYL-2-PENTANONE
705	42.333	42.3	C230 TOLUENE
	BDL		C172 TRANS-1,3-DICHLOROPROPENE
	BDL		C160 1,1,2-TRICHLOROETHANE
	BDL		C220 TETRACHLOROETHENE
	BDL		C210 2-HEXANONE
	BDL		C155 DIBROMOCHLOROMETHANE
	BDL		V022 1,2-DIBROMOETHANE
846	49.715	49.7	C235 CHLOROBENZENE
	BDL		C240 ETHYLBENZENE
	BDL		V032 M+P XYLENES
	BDL		V029 O-XYLENE
	BDL		C245 STYRENE
	BDL		C180 BROMOFORM
	BDL		C225 1,1,2,2-TETRACHLOROETHANE
	BDL		V035 M-DICHLOROBENZENE
	BDL		V037 P-DICHLOROBENZENE

BDL	V040 ETHANOL
BDL	V004 IODOMETHANE
BDL	V005 ACROLEIN
BDL	V006 ACRYLONITRILE
BDL	TERT-BUTYL METHYL ETHER (MTBE)
BDL	V016 DIBROMOMETHANE
BDL	V025 1,2,3-TRICHLOROPROPANE
BDL	V027 ETHYL METHACRYLATE
BDL	V026 T-1,4-DICHLORO-2-BUTENE

lame List: HEDR1 Entry # 1 of 1
'le Name: F1034

1)Format: VOAIND
3)SAMPLE: DCS
5)COMMENT: 30JUN92F
(11)Quan List Units: 1.00UG/L
(13)Extract Dilution: NA
(15)Extract Vol. Used: NA
(17)Percent Moisture: NA
(20)SURROGATE VOLUME:: 0.00500L

(2)PROJECT:
(4)MATRIX: WATER
(10)Analyst: EG
(12)Purge Volume: 5.00ML
(14)Extract Volume: NA
(16)Sample Amount: 5.00ML
(19)Run Factor: 1.00UG/L

5/30/92 21:36:30
Acquisition started

cquire
5/30/92 21:36:00 + 0:00
ample: -DCS WATER 30JUN92F
onds.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
ormula: 1.00UG/L0.00500L
ubmitted by: RMAL

Run 3:F1034
Free sectors: 20044
Instrument: I50F
Analyst: EG

Starting
Scan: 0 of 1464
Weight: 0.000
Acct. No: VOAIND

*** GC not ready and being equilibrated ***
Elapsed time : 0.0 Min

C Desc.: VN

eq. #	Temp (DegC)	Rate (C/min)	Time (minutes) period	total
1	-20--18	2.0	1.0	1.0
2	-18-102	7.0	17.1	18.1
3	102-202	30.3	3.3	21.4

Injector A : 220 Deg C
GC oven : 94 Deg C
Transfer-line: 204 Deg C
Ion source : 184 Deg C

alve A : closed Valve B : closed

*** Instrument parameters ***
Post acquisition state -> Filament : Off Multiplier : Off
ODE: EI (+) Centroid + Temp - Sequence: VO (1 time window.)

equence Window # 1
Number of cycles: 1
Filament is ON
Multiplier is ON

.an descriptor: VO Mass intervals: 1
otal scan time: 1.000 s

Positive ion mode.
Master rate: 8

PW: 3 MFW: 70 MA: 50 TH: 1 BL: 0

Int #	Lo mass	Hi mass	Time
1	36.511	300.590	1.000

Calibration table: 3:063092CF

Interface number	0	
Instrument type	Q	
Full scale mass	1170	u
Zero scale mass	1	u
Intensity/ion	2	
Peak width	1000.	mmu
Offset at low mass	0	mmu
Offset at high mass	0	mmu
Voltage settling time(ms)	4	

urrent instrument parameters.

	Positive ion mode	Negative ion mode
Resolution (high)	123.00	0.00
Resolution (low)	125.00	0.00
Quad offset	-2.00	0.00
Quad programming	-1.00	0.00
Lens offset	-30.00	0.00
Lens programming	0.00	0.00
Ext offset	-4.00	0.00
Ext programming	0.00	0.00
Collector	30.00	0.00
Ion offset	4.00	0.00

Ion programming	1.00	0.00
Rod polarity	Reverse	Normal

Electron multiplier voltage: 1402.
Filament emission current: 750.
Electrometer range: 10 ^-7
Electrometer zero: 128.0

ıalyzer Fore Pressure .....: 0.027 Torr
:parator/Source Pressure .....: 0.373 Torr

›/30/92 22:58:47
ACQUISITION COMPLETED
Scans 1 to 1464 Centroid

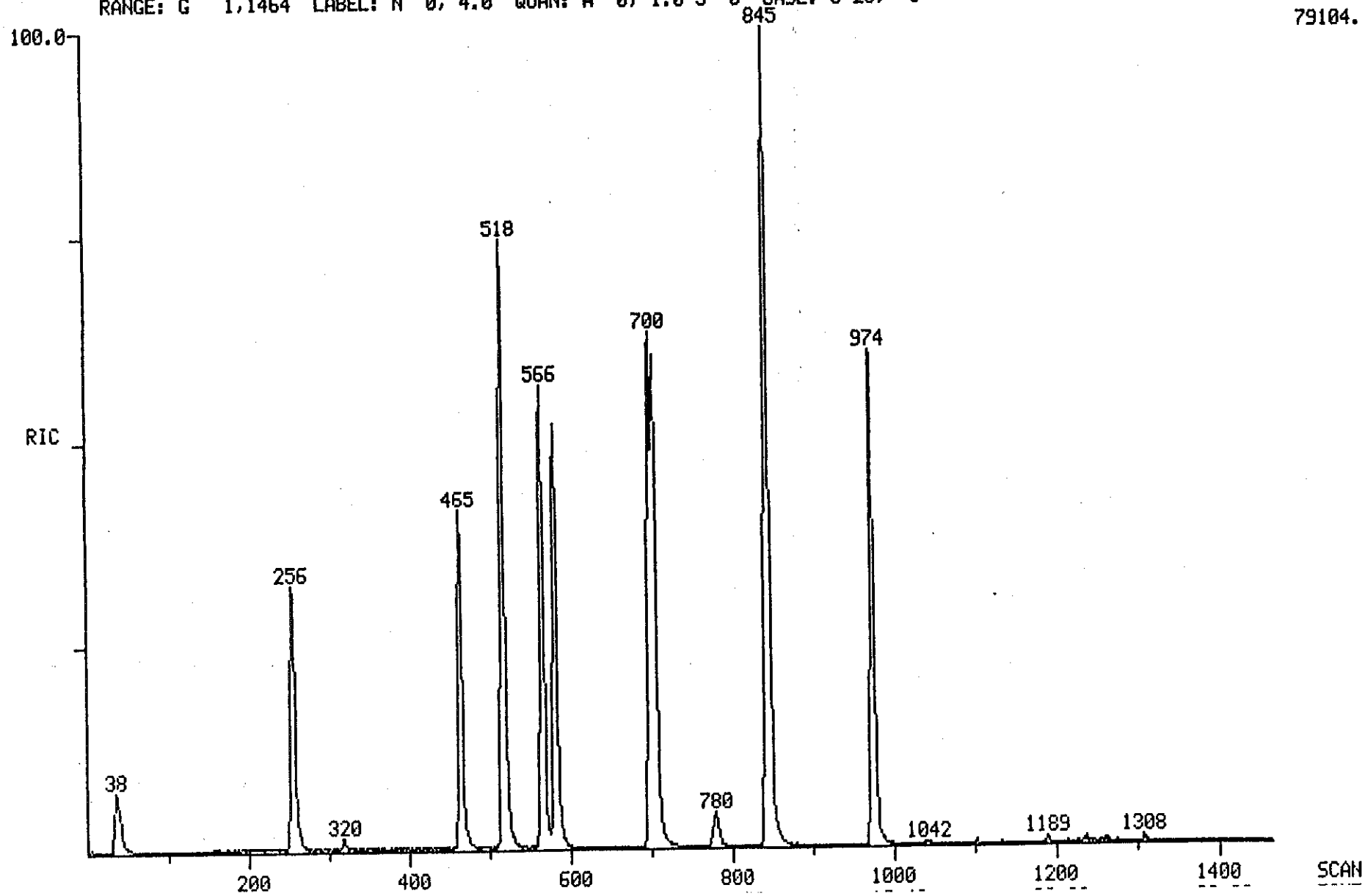
ıde	Scans	Secs	Out of	%	Peaks per scan		per sec
›ntroid	1464	0.7	1464.0	0.0	5525.	4.	4.

000113

RIC
06/30/92 21:36:00
SAMPLE: -DCS WATER 30JUN92F
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
RANGE: G 1,1464 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F1034 #4
CALI: 063092CF #3

SCANS 1 TO 1464



ROCEDURE: TCA
TA FILE: F1034
FERENCE: 11TABLE
IE LIST: LLNL
REPORT: ISO1

DIAGNOSTIC REPORT

7/01/92 14:41:30

000114

INITIALIZATION OPTION: 2 PROCESSING OPTION: 3

---- STANDARDS -----				>< --- PLUS UNKNOWNS ---				>< - LIST NAMES - >
PROC	USED	POSS	RMS	PROC	USED	POSS	RMS	STANDARD/UNKNOWN
1	1	1	0	11	2	1	0	ISO1/TC01
1	1	1	0	11	2	1	0	ISO2/TC02
1	1	1	0	4	2	1	69	ISO3/TC03
3	3	2	37	13	6	1	107	ISO4/TC04
3	3	1	37	13	5	1	43	ISO5/TC05
3	3	1	37	7	3	1	37	ISO6/TC06
1	1	1	0	11	3	1	68	ISO7/TC07
1	1	1	0	4	1	1	0	ISO8/TC08

63 COMPOUNDS PROCESSED, 13 FOUND

COMPOUND		>< ---------- SEARCH						>< SAT	>< ------ CHRO			
NO	LIB	ENTRY	REF	PRED	SEL	DELTA	PEAKS	FIT	PEAKS	M/Z	TOP	DELTA	PEAKS
1	V1	1	-463	465	465	.	1	993	.	128	464	-1	1
2	V1	20	-59	57	.	.	.	.	.	85	.	.	.
3	V1	10	-82	80	.	.	.	.	.	50	.	.	.
4	V1	25	-100	98	.	.	.	.	.	62	.	.	.
5	V1	15	-142	141	.	.	.	.	.	94	.	.	.
6	V1	35	-162	161	.	.	.	.	.	64	.	.	.
7	V1	70	-196	195	.	.	.	.	.	101	.	.	.
8	V1	32	-207	207	.	.	.	.	.	67	.	.	.
9	V1	80	-256	256	256	.	1	987	.	96	256	.	1
10	V1	38	-259	259	.	.	.	.	.	45	.	.	.
11	V1	55	-259	259	.	.	.	.	.	56	.	.	.
12	V1	65	-260	261	.	.	.	.	.	76	.	.	.
13	V1	40	-262	263	.	.	.	.	.	142	.	.	.
14	V1	105	-271	272	.	.	.	.	.	151	.	.	.
15	V1	50	-285	286	.	.	.	.	.	43	284	.	1
16	V1	45	-319	320	320	.	1	925	.	84	320	.	1
17	V1	95	-344	345	.	.	.	.	.	96	.	.	.
8	V1	60	-353	354	.	.	.	.	.	53	.	.	.
9	V1	63	-355	356	.	.	.	.	.	73	.	.	.
20	V1	102	-375	376	.	.	.	.	.	57	.	.	.
21	V1	90	-387	388	.	.	.	.	.	63	.	.	.
22	V2	25	-408	409	.	.	.	.	.	43	.	.	.
23	V1	94	-444	445	.	.	.	.	.	96	.	.	.
24	V1	98	-457	458	458	.	1	800	.	72	.	.	.
25	V2	1	-565	566	566	.	1	996	.	114	566	.	1
26	V3	1	-844	844	844	.	2	998	.	117	844	.	1
27	V1	99	-470	471	.	.	.	.	.	42	.	.	.
28	V1	100	-481	482	.	.	.	.	.	83	.	.	.
29	V2	15	-483	484	.	.	.	.	.	97	.	.	.
30	V2	20	-497	498	.	.	.	.	.	117	.	.	.
31	V2	60	-518	519	518	-1	1	979	.	78	518	.	1
32	V1	2	-518	519	518	-1	1	981	.	65	518	.	1
33	V1	110	-526	526	.	.	.	.	.	62	.	.	.
34	V2	45	-583	583	582	-1	1	981	.	130	582	.	1
35	V2	35	-603	603	.	.	.	.	.	63	.	.	.
36	V1	115	-614	614	.	.	.	.	.	174	.	.	.
37	V1	130	-625	626	.	.	.	.	.	88	.	.	.
38	V2	30	-636	637	.	.	.	.	.	83	.	.	.
39	V2	75	-675	675	.	.	.	.	.	63	.	.	.
40	V2	40	-680	680	.	.	.	.	.	75	.	.	.
41	V3	2	-700	700	700	.	1	973	.	98	700	.	1
42	V3	10	-705	705	.	.	.	.	.	43	706	.	1
43	V3	35	-706	706	706	.	1	978	.	92	705	-1	1
44	V2	65	-739	739	.	.	.	.	.	75	.	.	.
45	V2	55	-754	754	.	.	.	.	.	97	.	.	.
46	V3	20	-757	757	.	.	.	.	.	164	.	.	.
47	V3	38	-758	758	.	.	.	.	.	41	.	.	.
48	V2	50	-789	789	.	.	.	.	.	129	.	.	.
49	V3	15	-790	790	.	.	.	.	.	43	.	.	.
50	V2	70	-793	793	.	.	.	.	.	107	.	.	.
51	V3	40	-847	846	846	.	1	977	.	112	846	.	1
52	V3	50	-865	864	.	.	.	.	.	106	.	.	.
3	V3	75	-878	877	.	.	.	.	.	106	.	.	.
54	V3	60	-919	918	.	.	.	.	.	106	.	.	.
55	V3	55	-922	921	.	.	.	.	.	104	.	.	.
56	V2	80	-937	935	.	.	.	.	.	173	.	.	.
57	V3	3	-976	974	974	.	1	988	.	95	974	.	1
58	V2	90	-1002	1000	.	.	.	.	.	75	.	.	.
59	V3	25	-1005	1003	.	.	.	.	.	83	.	.	.
60	V3	30	-1011	1009	.	.	.	.	.	53	.	.	.

51	V3	80	-1079	1079	.	.	.	.	.	146	.
52	V3	90	-1106	1106	.	.	.	.	.	146	.
53	V3	85	-1135	1135	.	.	.	.	.	.	.

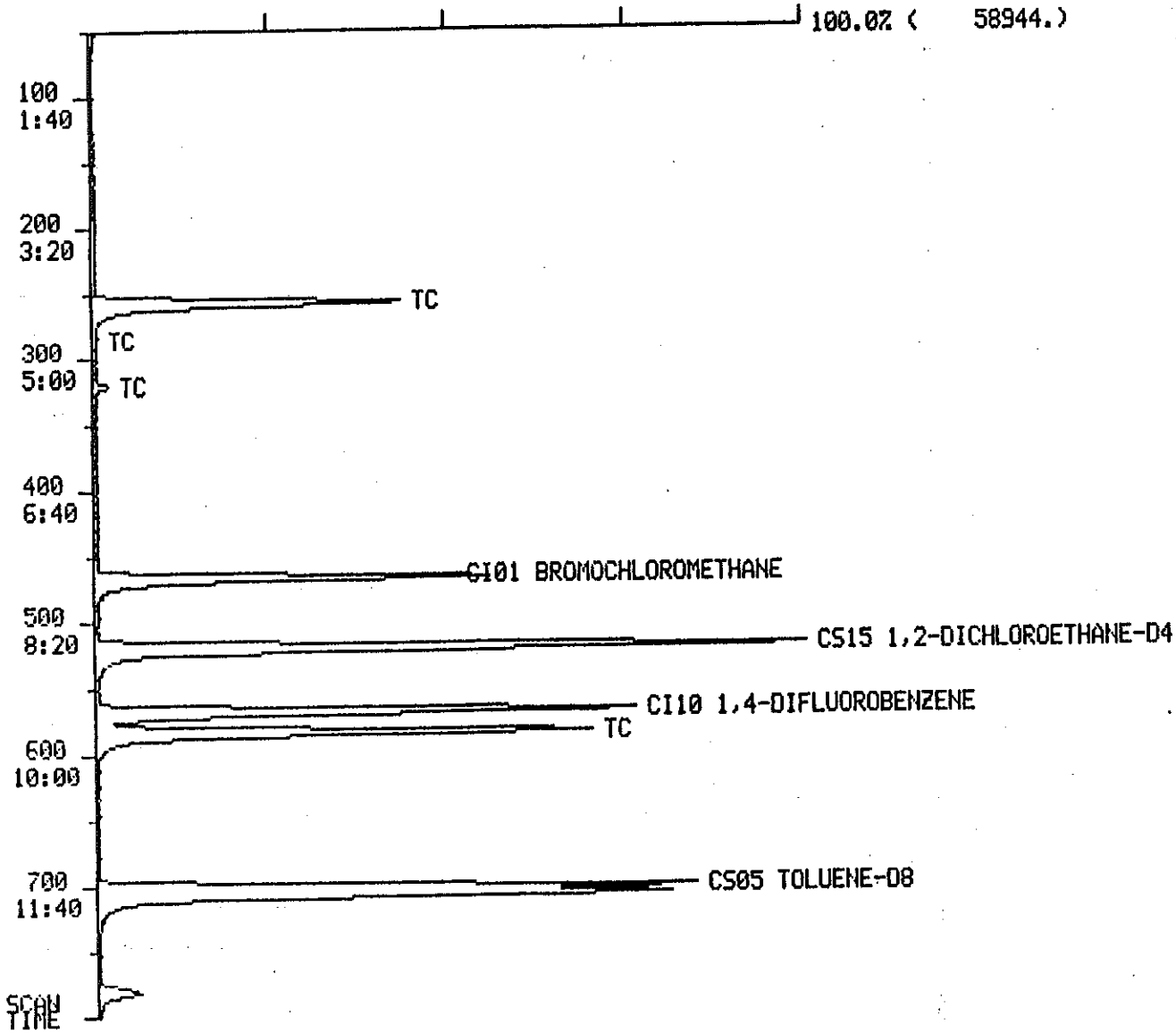
MAL QUANTITATION SUMMARY FILE: F1034
MPOUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

NO	LIBRARY ENTRY		NAME	MASS	SCAN	REF	AREA	UNITS: RRF	UG/L AMOUNT
1	V1#	1	CI01 BROMOCHLOROMETHANE	128	464	1	25181.	1.000	50.000
2	V2#	1	CI10 1,4-DIFLUOROBENZENE	114	566	2	113947.	1.000	50.000
3	V3#	1	CI20 CHLOROBENZENE-D5	117	844	3	93032.	1.000	50.000
4	V3#	2	CS05 TOLUENE-D8	98	700	3	97682.	1.109	47.341
5	V3#	3	CS10 BROMOFLUOROBENZENE	95	974	3	59893.	0.638	50.472
6	V1#	2	CS15 1,2-DICHLOROETHANE-	65	518	1	44653.	2.044	43.367
7	V1#	20	V001 DICHLORODIFLUOROMET	85		1	NOT FOUND		
8	V1#	10	C010 CHLOROMETHANE	50		1	NOT FOUND		
9	V1#	25	C020 VINYL CHLORIDE	62		1	NOT FOUND		
10	V1#	15	C015 BROMOMETHANE	94		1	NOT FOUND		
11	V1#	35	C025 CHLOROETHANE	64		1	NOT FOUND		
12	V1#	70	V007 TRICHLOROFLUOROMETH	101		1	NOT FOUND		
13	V1#	32	V003 DICHLOROFLUOROMETHA	67		1	NOT FOUND		
14	V1#	80	C045 1,1-DICHLOROETHENE	96	256	1	33975.	1.451	46.496
15	V1#	65	C040 CARBON DISULFIDE	76		1	NOT FOUND		
16	V1#	105	V015 TRICHLORO-TRIFLUORO	151		1	NOT FOUND		
17	V1#	50	C035 ACETONE	43	284	1	311.	0.308	2.004
18	V1#	45	C030 METHYLENE CHLORIDE	84	320	1	1108.	1.734	1.269
19	V1#	95	V012 TRANS-1,2-DICHLOROE	96		1	NOT FOUND		
20	V1#	102	V009 HEXANE	57		1	NOT FOUND		
21	V1#	90	C050 1,1-DICHLOROETHANE	63		1	NOT FOUND		
22	V2#	25	C125 VINYL ACETATE	43		2	NOT FOUND		
23	V1#	94	V011 CIS-1,2-DICHLOROETH	96		1	NOT FOUND		
24	V1#	98	C110 2-BUTANONE	72		1	NOT FOUND		
25	V1#	99	V013 TETRAHYDROFURAN	42		1	NOT FOUND		
26	V1#	100	C060 CHLOROFORM	83		1	NOT FOUND		
27	V2#	15	C115 1,1,1-TRICHLOROETHA	97		2	NOT FOUND		
28	V2#	20	C120 CARBONTETRACHLORIDE	117		2	NOT FOUND		
29	V2#	60	C165 BENZENE	78	518	2	100368.	0.934	47.171
30	V1#	110	C065 1,2-DICHLOROETHANE	62		1	NOT FOUND		
31	V2#	45	C150 TRICHLOROETHENE	130	582	2	44384.	0.431	45.162
32	V2#	35	C140 1,2-DICHLOROPROPANE	63		2	NOT FOUND		
33	V1#	130	V019 1,4-DIOXANE	88		1	NOT FOUND		
34	V2#	30	C130 BROMODICHLOROMETHAN	83		2	NOT FOUND		
35	V2#	75	V023 2-CHLOROETHYL VINYL	63		2	NOT FOUND		
36	V2#	40	C143 CIS-1,3-DICHLOROPRO	75		2	NOT FOUND		
37	V3#	10	C205 4-METHYL-2-PENTANON	43	706	3	720.	0.324	1.195
38	V3#	35	C230 TOLUENE	92	705	3	64279.	0.816	42.333
39	V2#	65	C172 TRANS-1,3-DICHLOROP	75		2	NOT FOUND		
40	V2#	55	C160 1,1,2-TRICHLOROETHA	97		2	NOT FOUND		
41	V3#	20	C220 TETRACHLOROETHENE	164		3	NOT FOUND		
42	V3#	15	C210 2-HEXANONE	43		3	NOT FOUND		
43	V2#	50	C155 DIBROMOCHLOROMETHAN	129		2	NOT FOUND		
44	V2#	70	V022 1,2-DIBROMOETHANE	107		2	NOT FOUND		
45	V3#	40	C235 CHLOROBENZENE	112	846	3	82732.	0.894	49.715
46	V3#	50	C240 ETHYLBENZENE	106		3	NOT FOUND		
47	V3#	75	V032 M+P XYLENES	106		3	NOT FOUND		
48	V3#	60	V029 O-XYLENE	106		3	NOT FOUND		
49	V3#	55	C245 STYRENE	104		3	NOT FOUND		
50	V2#	80	C180 BROMOFORM	173		2	NOT FOUND		
51	V3#	25	C225 1,1,2,2-TETRACHLORO	83		3	NOT FOUND		
52	V3#	80	V035 M-DICHLOROBENZENE	146		3	NOT FOUND		
53	V3#	90	V037 P-DICHLOROBENZENE	146		3	NOT FOUND		
54	V3#	85	V036 O-DICHLOROBENZENE	146		3	NOT FOUND		
55	V1#	38	V040 ETHANOL	45		1	NOT FOUND		
56	V1#	40	V004 IODOMETHANE	142		1	NOT FOUND		
57	V1#	55	V005 ACROLEIN	56		1	NOT FOUND		
58	V1#	60	V006 ACRYLONITRILE	53		1	NOT FOUND		
59	V1#	63	TERT-BUTYL METHYL ETHER	73		1	NOT FOUND		
60	V1#	115	V016 DIBROMOMETHANE	174		1	NOT FOUND		
61	V2#	90	V025 1,2,3-TRICHLOROPROP	75		2	NOT FOUND		
62	V3#	38	V027 ETHYL METHACRYLATE	41		3	NOT FOUND		
63	V3#	30	V026 T-1,4-DICHLORO-2-BU	53		3	NOT FOUND		

000116

DATA FROM FILE: F1034 SCANS 50 TO 800 ACQUIRED: 06/30/92 21:36:00
CALI: F1034 #3

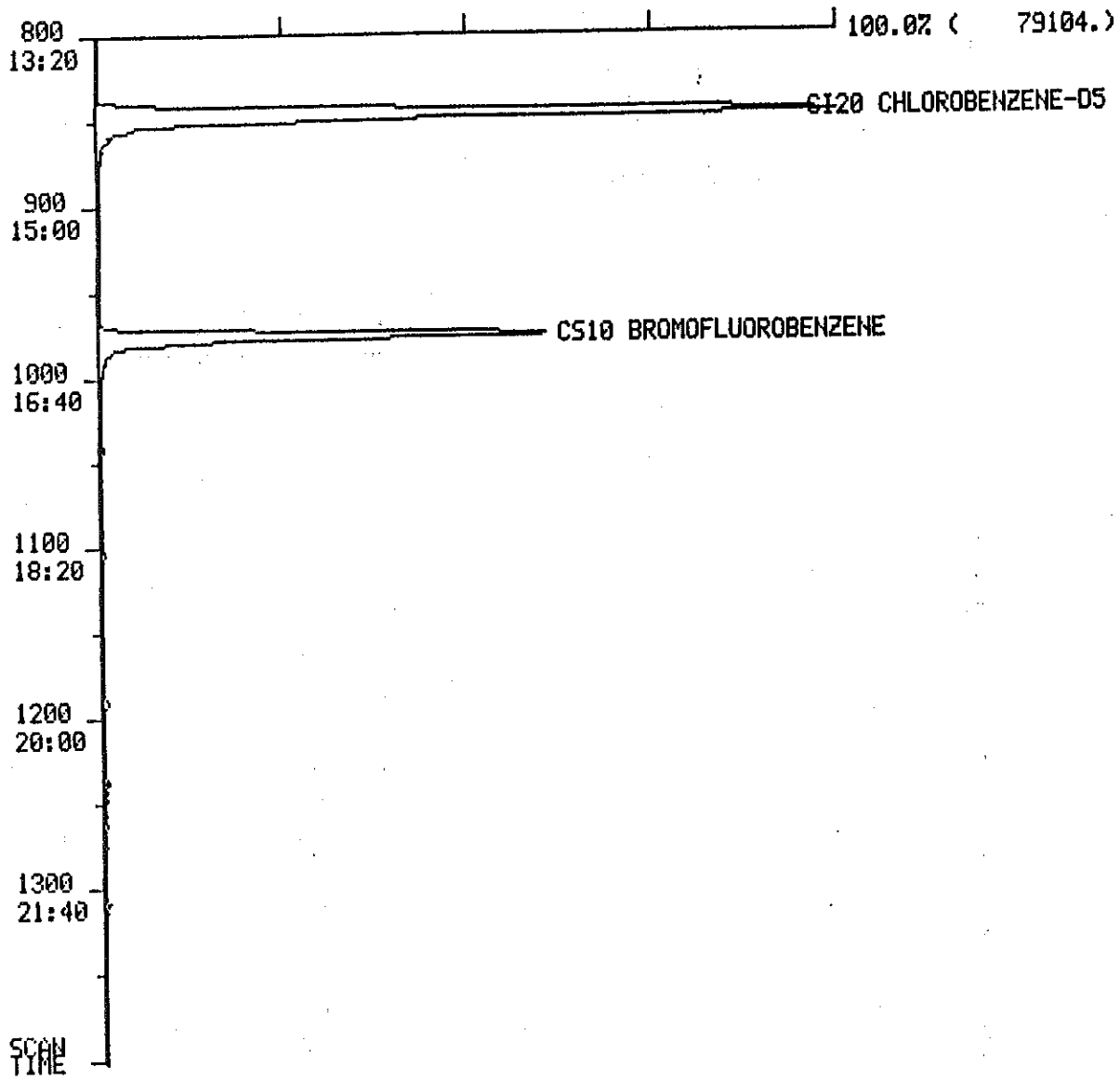
SAMPLE: -DCS WATER 30JUN92F
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M



000117

DATA FROM FILE: F1034 SCANS 800 TO 1400 ACQUIRED: 06/30/92 21:36:00
CALI: F1034 #3

SAMPLE: -DCS WATER 30JUN92F
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M



ample: F1039 Performance Check: F1031 Elapsed Time: 5:08:00 000118
ample: F1039 Calibration Stds.: F1032,

ta Reduced by : [illegible] Date: 7/1/92 Data File: F1039
ta Reviewed by: _____ Date: _____

Enseco GC/MS
Target Compound Data Summary Sheet

ample: -DCS WATER 30JUN92F
onditions: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
ate Analyzed: 07/01/92 1:08:00 Units: UG/L
nalyst: EG Run Factor: 1.00
uan List Threshold: 1.00 Surrogate Vol.: 0.00500

Surrogate Spike Recoveries
VOA, AQUEOUS, V LIBRARIES

mpound	Surrogate Amount (ug) Spiked	Measured	% Recovery Measured	QC limits
S05 TOLUENE-D8	0.2500	0.2500	100.	88 110
S10 BROMOFLUOROBENZ	0.2500	0.2570	103.	86 115
S15 1,2-DICHLOROETH	0.2500	0.2420	96.8	76 114

Target Compounds: BLACK

can #	Concentration Quan List UG/L	Sample UG/L	Compound
	BDL		V001 DICHLORODIFLUOROMETHANE
	BDL		C010 CHLOROMETHANE
	BDL		C020 VINYL CHLORIDE
	BDL		C015 BROMOMETHANE
	BDL		C025 CHLOROETHANE
	BDL		V007 TRICHLOROFLUOROMETHANE
	BDL		V003 DICHLOROFLUOROMETHANE
256	41.748	41.7	C045 1,1-DICHLOROETHENE
	BDL		C040 CARBON DISULFIDE
	BDL		V015 TRICHLORO-TRIFLUORO-ETHANE
	BDL		C035 ACETONE
319	1.241	1.24	C030 METHYLENE CHLORIDE
	BDL		V012 TRANS-1,2-DICHLOROETHENE
	BDL		V009 HEXANE
	BDL		C050 1,1-DICHLOROETHANE
	BDL		C125 VINYL ACETATE
	BDL		V011 CIS-1,2-DICHLOROETHENE
	BDL		C110 2-BUTANONE
	BDL		V013 TETRAHYDROFURAN
	BDL		C060 CHLOROFORM
	BDL		C115 1,1,1-TRICHLOROETHANE
	BDL		C120 CARBONTETRACHLORIDE
517	45.374	45.4	C165 BENZENE
	BDL		C065 1,2-DICHLOROETHANE
581	42.711	42.7	C150 TRICHLOROETHENE
	BDL		C140 1,2-DICHLOROPROPANE
	BDL		V019 1,4-DIOXANE
	BDL		C130 BROMODICHLOROMETHANE
	BDL		V023 2-CHLOROETHYL VINYL ETHER
	BDL		C143 CIS-1,3-DICHLOROPROPENE
	BDL		C205 4-METHYL-2-PENTANONE
705	42.101	42.1	C230 TOLUENE
	BDL		C172 TRANS-1,3-DICHLOROPROPENE
	BDL		C160 1,1,2-TRICHLOROETHANE
	BDL		C220 TETRACHLOROETHENE
	BDL		C210 2-HEXANONE
	BDL		C155 DIBROMOCHLOROMETHANE
	BDL		V022 1,2-DIBROMOETHANE
845	51.177	51.2	C235 CHLOROBENZENE
	BDL		C240 ETHYLBENZENE
	BDL		V032 M+P XYLENES
	BDL		V029 O-XYLENE
	BDL		C245 STYRENE
	BDL		C180 BROMOFORM
	BDL		C225 1,1,2,2-TETRACHLOROETHANE
	BDL		V035 M-DICHLOROBENZENE
	BDL		V037 P-DICHLOROBENZENE

BDL	V040 ETHANOL
BDL	V004 IODOMETHANE
BDL	V005 ACROLEIN
BDL	V006 ACRYLONITRILE
BDL	TERT-BUTYL METHYL ETHER (MTBE)
BDL	V016 DIBROMOMETHANE
BDL	V025 1,2,3-TRICHLOROPROPANE
BDL	V027 ETHYL METHACRYLATE
BDL	V026 T-1,4-DICHLORO-2-BUTENE

lame List: HEDR1 Entry # 1 of 1
-le Name: F1039

1)Format: VOAIND
3)SAMPLE: DCS
5)COMMENT: 30JUN92F
11)Quan List Units: 1.00UG/L
13)Extract Dilution: NA
15)Extract Vol. Used: NA
17)Percent Moisture: NA
20)SURROGATE VOLUME:: 0.00500L

(2)PROJECT:
(4)MATRIX: WATER
(10)Analyst: EG
(12)Purge Volume: 5.00ML
(14)Extract Volume: NA
(16)Sample Amount: 5.00ML
(19)Run Factor: 1.00UG/L

'/1/92 1:08:57
Acquisition started

:quire
'/01/92 1:08:00 + 0:00
ample: -DCS WATER 30JUN92F
onds.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
ormula: 1.00UG/L0.00500L
ubmitted by: RMAL

Run 3:F1039
Free sectors: 19444
Instrument: I50F
Analyst: EG

Starting
Scan: 0 of 1464
Weight: 0.000
Acct. No: VOAIND

*** GC not ready and being equilibrated ***
Elapsed time : 0.0 Min

C Desc.: VN

eq. #	Temp (DegC)	Rate (C/min)	Time (minutes) period	total
1	-20--18	2.0	1.0	1.0
2	-18-102	7.0	17.1	18.1
3	102-202	30.3	3.3	21.4

Injector A : 220 Deg C
GC oven : 106 Deg C
Transfer-line: 204 Deg C
Ion source : 183 Deg C

alve A : closed Valve B : closed

*** Instrument parameters ***
Post acquisition state -> Filament : Off Multiplier : Off
ODE: EI (+) Centroid + Temp - Sequence: VO (1 time window.)

equence Window # 1
Number of cycles: 1
Filament is ON
Multiplier is ON

an descriptor: VO Mass intervals: 1 Positive ion mode.
otal scan time: 1.000 s Master rate: 8

PW: 3 MFW: 70 MA: 50 TH: 1 BL: 0

Int #	Lo mass	Hi mass	Time
1	36.511	300.590	1.000

Calibration table: 3:063092CF

Interface number	0	
Instrument type	Q	
Full scale mass	1170	u
Zero scale mass	1	u
Intensity/ion	2	
Peak width	1000.	mmu
Offset at low mass	0	mmu
Offset at high mass	0	mmu
Voltage settling time(ms)	4	

urrent instrument parameters.

	Positive ion mode	Negative ion mode
Resolution (high)	123.00	0.00
Resolution (low)	125.00	0.00
Quad offset	-2.00	0.00
Quad programming	-1.00	0.00
Lens offset	-30.00	0.00
Lens programming	0.00	0.00
Ext offset	-4.00	0.00
Ext programming	0.00	0.00
Collector	30.00	0.00
Ion offset	4.00	0.00

Ion programming	1.00	0.00
Rod polarity	Reverse	Normal

Electron multiplier voltage: 1402.
Filament emission current: 750.
Electrometer range: 10 ^-7
Electrometer zero: 128.0

ıalyzer Fore Pressure .....: 0.027 Torr
:parator/Source Pressure .....: 0.378 Torr

7/1/92 1:39:45
ACQUISITION COMPLETED
Scans 1 to 1464 Centroid

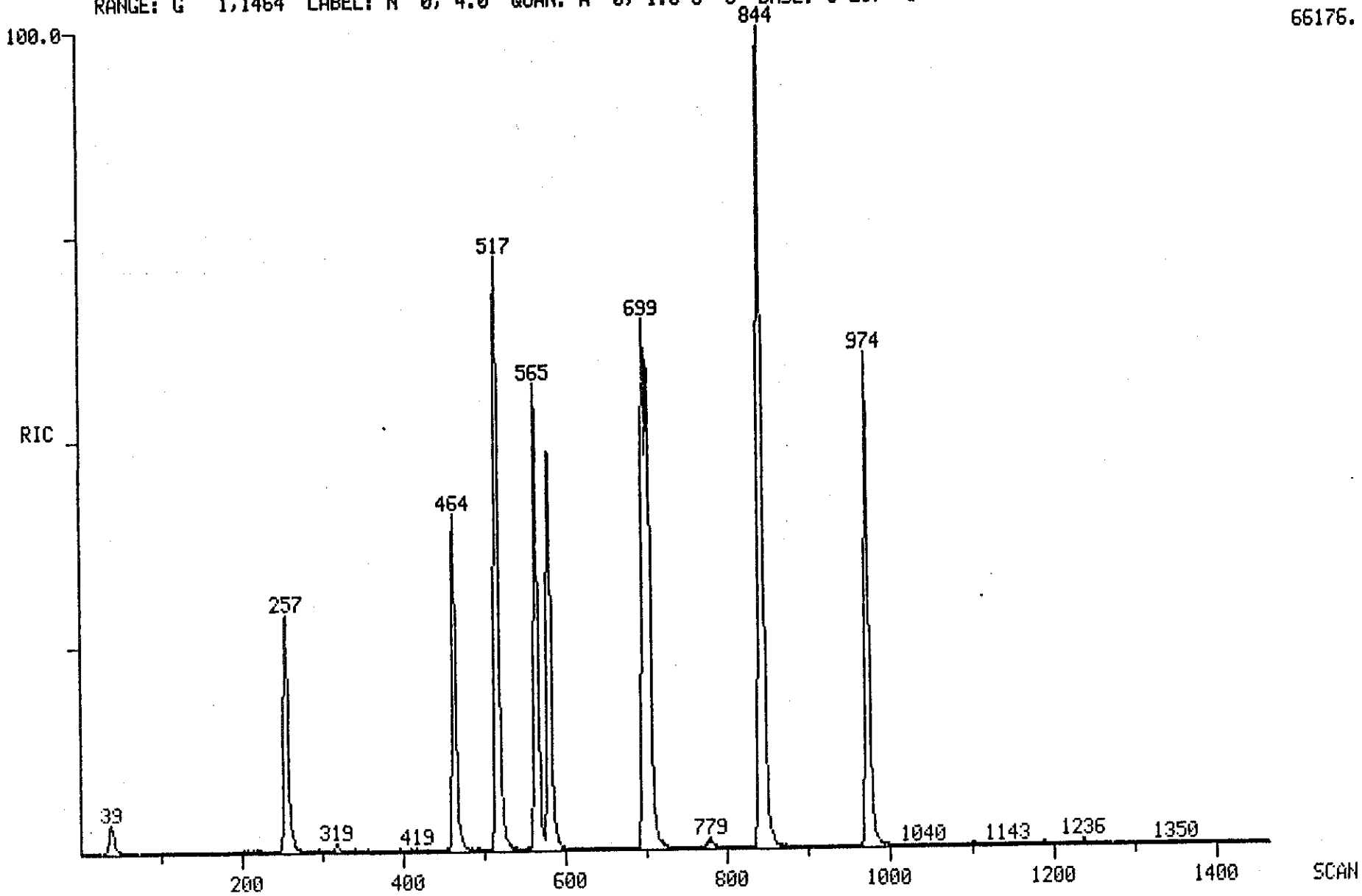
ɔde	Scans	Secs	Out of	%	Peaks per scan	per sec
entroid	1464	0.7	1464.0	0.0	4554. 3.	3.

000122

RIC
07/01/92 1:08:00
SAMPLE: -DCS WATER 30JUN92F
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
RANGE: G 1,1464 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F1039 #4
CALI: 063092CF #3

SCANS 1 TO 1464



ROCEDURE: TCA DIAGNOSTIC REPORT 7/01/92 1:42:42
ATA FILE: F1039
FERENCE: 11TABLE
IE LIST: LLNL INITIALIZATION OPTION: 2 PROCESSING OPTION: 3
REPORT: ISO1

---- STANDARDS ----- ><				--- PLUS UNKNOWNS --- ><				- LIST NAMES - >
PROC	USED	POSS	RMS	PROC	USED	POSS	RMS	STANDARD/UNKNOWN
1	1	1	0	11	2	1	0	ISO1/TCO1
1	1	1	0	11	1	1	0	ISO2/TCO2
1	1	1	0	4	1	1	0	ISO3/TCO3
3	3	1	37	13	6	1	107	ISO4/TCO4
3	3	1	37	13	5	1	43	ISO5/TCO5
3	3	1	37	7	3	1	37	ISO6/TCO6
1	1	1	0	11	3	1	70	ISO7/TCO7
1	1	1	0	4	1	1	0	ISO8/TCO8

63 COMPOUNDS PROCESSED, 11 FOUND

COMPOUND ><			---------- SEARCH ---------- >< SAT >< ------ CHRO ------- >										
NO	LIB	ENTRY	REF	PRED	SEL	DELTA	PEAKS	FIT	PEAKS	M/Z	TOP	DELTA	PEAKS
1	V1	1	-463	464	464	.	1	994	.	128	464	.	1
2	V1	20	-59	60	.	.	.	.	.	85	.	.	.
3	V1	10	-82	83	.	.	.	.	.	50	.	.	.
4	V1	25	-100	101	.	.	.	.	.	62	.	.	.
5	V1	15	-142	143	.	.	.	.	.	94	.	.	.
6	V1	35	-162	163	.	.	.	.	.	64	.	.	.
7	V1	70	-196	197	.	.	.	.	.	101	.	.	.
8	V1	32	-207	208	.	.	.	.	.	67	.	.	.
9	V1	80	-256	257	257	.	1	987	.	96	256	-1	1
10	V1	38	-259	260	.	.	.	.	.	45	.	.	.
11	V1	55	-259	260	.	.	.	.	.	56	.	.	.
12	V1	65	-260	261	.	.	.	.	.	76	.	.	.
13	V1	40	-262	263	.	.	.	.	.	142	.	.	.
14	V1	105	-271	272	.	.	.	.	.	151	.	.	.
15	V1	50	-285	286	.	.	.	.	.	43	.	.	.
16	V1	45	-319	320	.	.	.	.	.	84	319	.	1
17	V1	95	-344	345	.	.	.	.	.	96	.	.	.
18	V1	60	-353	354	.	.	.	.	.	53	.	.	.
19	V1	63	-355	356	.	.	.	.	.	73	.	.	.
20	V1	102	-375	376	.	.	.	.	.	57	.	.	.
21	V1	90	-387	388	.	.	.	.	.	63	.	.	.
22	V2	25	-408	409	.	.	.	.	.	43	.	.	.
23	V1	94	-444	445	.	.	.	.	.	96	.	.	.
24	V1	98	-457	458	.	.	.	.	.	72	.	.	.
25	V2	1	-565	565	565	.	1	996	.	114	565	.	1
26	V3	1	-844	843	843	.	1	997	.	117	843	.	1
27	V1	99	-470	470	.	.	.	.	.	42	.	.	.
28	V1	100	-481	481	.	.	.	.	.	83	.	.	.
29	V2	15	-483	483	.	.	.	.	.	97	.	.	.
30	V2	20	-497	497	.	.	.	.	.	117	.	.	.
31	V2	60	-518	518	517	-1	1	978	.	78	517	.	1
32	V1	2	-518	518	517	-1	1	988	.	65	517	.	1
33	V1	110	-526	525	.	.	.	.	.	62	.	.	.
34	V2	45	-583	582	581	-1	1	981	.	130	581	.	1
35	V2	35	-603	602	.	.	.	.	.	63	.	.	.
36	V1	115	-614	613	.	.	.	.	.	174	.	.	.
37	V1	130	-625	625	.	.	.	.	.	88	.	.	.
38	V2	30	-636	636	.	.	.	.	.	83	.	.	.
39	V2	75	-675	674	.	.	.	.	.	63	.	.	.
40	V2	40	-680	679	.	.	.	.	.	75	.	.	.
41	V3	2	-700	699	699	.	1	976	.	98	699	.	1
42	V3	10	-705	704	.	.	.	.	.	43	.	.	.
43	V3	35	-706	705	705	.	1	976	.	92	705	.	1
44	V2	65	-739	738	.	.	.	.	.	75	.	.	.
45	V2	55	-754	753	.	.	.	.	.	97	.	.	.
46	V3	20	-757	756	.	.	.	.	.	164	.	.	.
47	V3	38	-758	757	.	.	.	.	.	41	.	.	.
48	V2	50	-789	788	.	.	.	.	.	129	.	.	.
49	V3	15	-790	789	.	.	.	.	.	43	.	.	.
50	V2	70	-793	792	.	.	.	.	.	107	.	.	.
51	V3	40	-847	845	845	.	1	972	.	112	845	.	1
52	V3	50	-865	863	.	.	.	.	.	106	.	.	.
53	V3	75	-878	876	.	.	.	.	.	106	.	.	.
54	V3	60	-919	917	.	.	.	.	.	106	.	.	.
55	V3	55	-922	920	.	.	.	.	.	104	.	.	.
56	V2	80	-937	935	.	.	.	.	.	173	.	.	.
57	V3	3	-976	974	974	.	1	989	.	95	974	.	1
58	V2	90	-1002	1000	.	.	.	.	.	75	.	.	.
59	V3	25	-1005	1003	.	.	.	.	.	83	.	.	.
60	V3	30	-1011	1009	.	.	.	.	.	53	.	.	.

52	V3	90	-1106	1105	.	.	.	.	.	145	.	.	.
53	V3	85	-1135	1134	.	.	.	.	.	146	.	.	.

000124

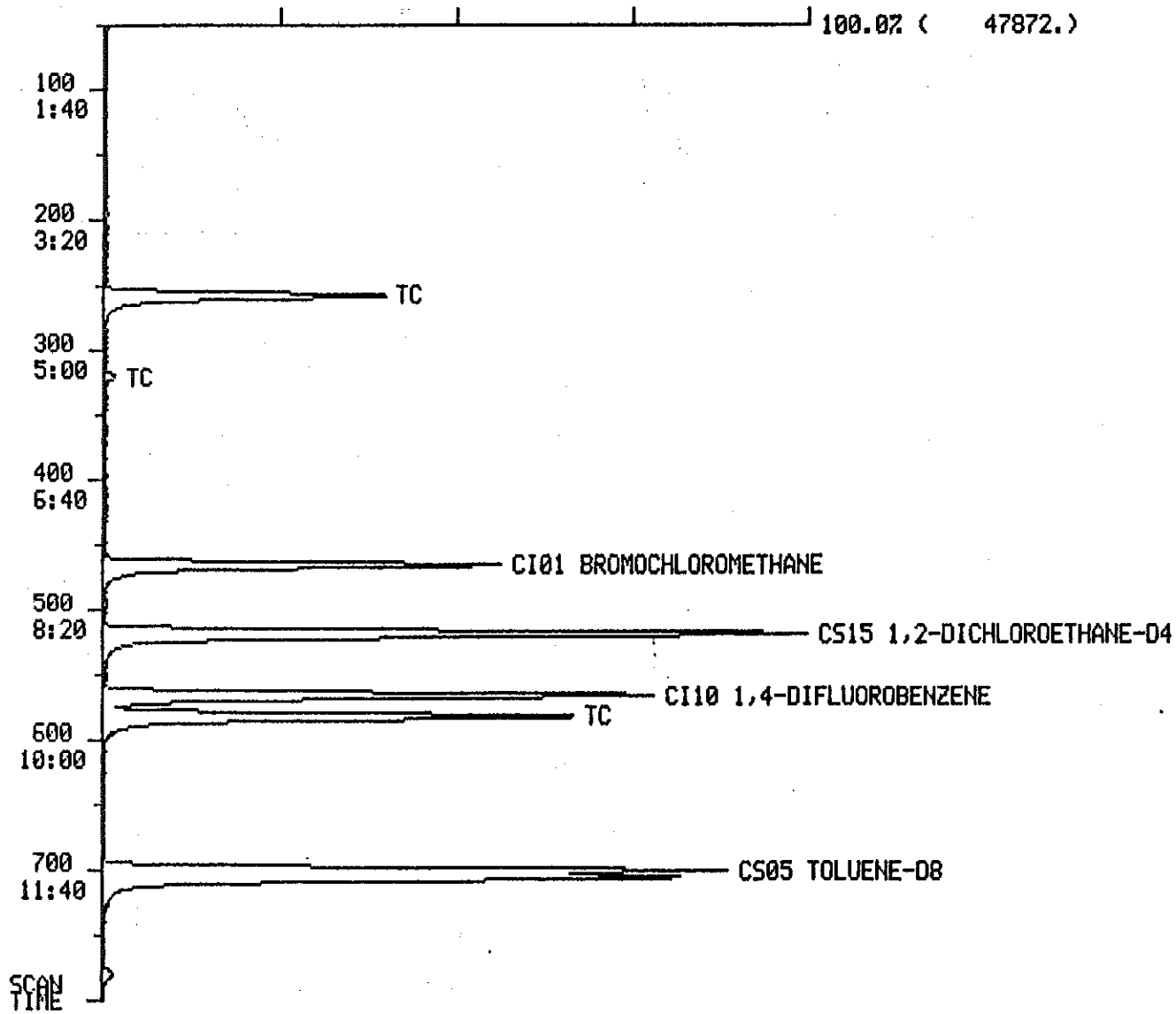
MAL QUANTITATION SUMMARY FILE: F1039
MPOUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

NO	LIBRARY ENTRY		NAME	MASS	SCAN	REF	AREA	UNITS: RRF	UG/L AMOUNT
1	V1#.	1	CI01 BROMOCHLOROMETHANE	128	464	1	20283.	1.000	50.000
2	V2#	1	CI10 1,4-DIFLUOROBENZENE	114	565	2	96133.	1.000	50.000
3	V3#	1	CI20 CHLOROBENZENE-D5	117	843	3	76770.	1.000	50.000
4	V3#	2	CS05 TOLUENE-D8	98	699	3	85080.	1.109	49.969
5	V3#	3	CS10 BROMOFLUOROBENZENE	95	974	3	50294.	0.638	51.361
6	V1#	2	CS15 1,2-DICHLOROETHANE-	65	517	1	40158.	2.044	48.420
7	V1#	20	V001 DICHLORODIFLUOROMET	85		1	NOT FOUND		
8	V1#	10	C010 CHLOROMETHANE	50		1	NOT FOUND		
9	V1#	25	C020 VINYL CHLORIDE	62		1	NOT FOUND		
10	V1#	15	C015 BROMOMETHANE	94		1	NOT FOUND		
11	V1#	35	C025 CHLOROETHANE	64		1	NOT FOUND		
12	V1#	70	V007 TRICHLOROFLUOROMETH	101		1	NOT FOUND		
13	V1#	32	V003 DICHLOROFLUOROMETHA	67		1	NOT FOUND		
14	V1#	80	C045 1,1-DICHLOROETHENE	96	256	1	24572.	1.451	41.748
15	V1#	65	C040 CARBON DISULFIDE	76		1	NOT FOUND		
16	V1#	105	V015 TRICHLORO-TRIFLUORO	151		1	NOT FOUND		
17	V1#	50	C035 ACETONE	43		1	NOT FOUND		
18	V1#	45	C030 METHYLENE CHLORIDE	84	319	1	873.	1.734	1.241
19	V1#	95	V012 TRANS-1,2-DICHLOROE	96		1	NOT FOUND		
20	V1#	102	V009 HEXANE	57		1	NOT FOUND		
21	V1#	90	C050 1,1-DICHLOROETHANE	63		1	NOT FOUND		
22	V2#	25	C125 VINYL ACETATE	43		2	NOT FOUND		
23	V1#	94	V011 CIS-1,2-DICHLOROETH	96		1	NOT FOUND		
24	V1#	98	C110 2-BUTANONE	72		1	NOT FOUND		
25	V1#	99	V013 TETRAHYDROFURAN	42		1	NOT FOUND		
26	V1#	100	C060 CHLOROFORM	83		1	NOT FOUND		
27	V2#	15	C115 1,1,1-TRICHLOROETHA	97		2	NOT FOUND		
28	V2#	20	C120 CARBONTETRACHLORIDE	117		2	NOT FOUND		
9	V2#	60	C165 BENZENE	78	517	2	81449.	0.934	45.374
0	V1#	110	C065 1,2-DICHLOROETHANE	62		1	NOT FOUND		
31	V2#	45	C150 TRICHLOROETHENE	130	581	2	35413.	0.431	42.711
32	V2#	35	C140 1,2-DICHLOROPROPANE	63		2	NOT FOUND		
33	V1#	130	V019 1,4-DIOXANE	88		1	NOT FOUND		
34	V2#	30	C130 BROMODICHLOROMETHAN	83		2	NOT FOUND		
35	V2#	75	V023 2-CHLOROETHYL VINYL	63		2	NOT FOUND		
36	V2#	40	C143 CIS-1,3-DICHLOROPRO	75		2	NOT FOUND		
37	V3#	10	C205 4-METHYL-2-PENTANON	43		3	NOT FOUND		
38	V3#	35	C230 TOLUENE	92	705	3	52752.	0.816	42.101
39	V2#	65	C172 TRANS-1,3-DICHLOROP	75		2	NOT FOUND		
40	V2#	55	C160 1,1,2-TRICHLOROETHA	97		2	NOT FOUND		
41	V3#	20	C220 TETRACHLOROETHENE	164		3	NOT FOUND		
42	V3#	15	C210 2-HEXANONE	43		3	NOT FOUND		
43	V2#	50	C155 DIBROMOCHLOROMETHAN	129		2	NOT FOUND		
44	V2#	70	V022 1,2-DIBROMOETHANE	107		2	NOT FOUND		
45	V3#	40	C235 CHLOROBENZENE	112	845	3	70277.	0.894	51.177
46	V3#	50	C240 ETHYLBENZENE	106		3	NOT FOUND		
47	V3#	75	V032 M+P XYLENES	106		3	NOT FOUND		
48	V3#	60	V029 O-XYLENE	106		3	NOT FOUND		
49	V3#	55	C245 STYRENE	104		3	NOT FOUND		
50	V2#	80	C180 BROMOFORM	173		2	NOT FOUND		
51	V3#	25	C225 1,1,2,2-TETRACHLORO	83		3	NOT FOUND		
52	V3#	80	V035 M-DICHLOROBENZENE	146		3	NOT FOUND		
53	V3#	90	V037 P-DICHLOROBENZENE	146		3	NOT FOUND		
54	V3#	85	V036 O-DICHLOROBENZENE	146		3	NOT FOUND		
55	V1#	38	V040 ETHANOL	45		1	NOT FOUND		
56	V1#	40	V004 IODOMETHANE	142		1	NOT FOUND		
57	V1#	55	V005 ACROLEIN	56		1	NOT FOUND		
58	V1#	60	V006 ACRYLONITRILE	53		1	NOT FOUND		
59	V1#	63	TERT-BUTYL METHYL ETHER	73		1	NOT FOUND		
60	V1#	115	V016 DIBROMOMETHANE	174		1	NOT FOUND		
61	V2#	90	V025 1,2,3-TRICHLOROPROP	75		2	NOT FOUND		
62	V3#	38	V027 ETHYL METHACRYLATE	41		3	NOT FOUND		
63	V3#	30	V026 T-1,4-DICHLORO-2-BU	53		3	NOT FOUND		

000125

DATA FROM FILE: F1039 SCANS 50 TO 800 ACQUIRED: 07/01/92 1:08:00
CALI: F1039 #3

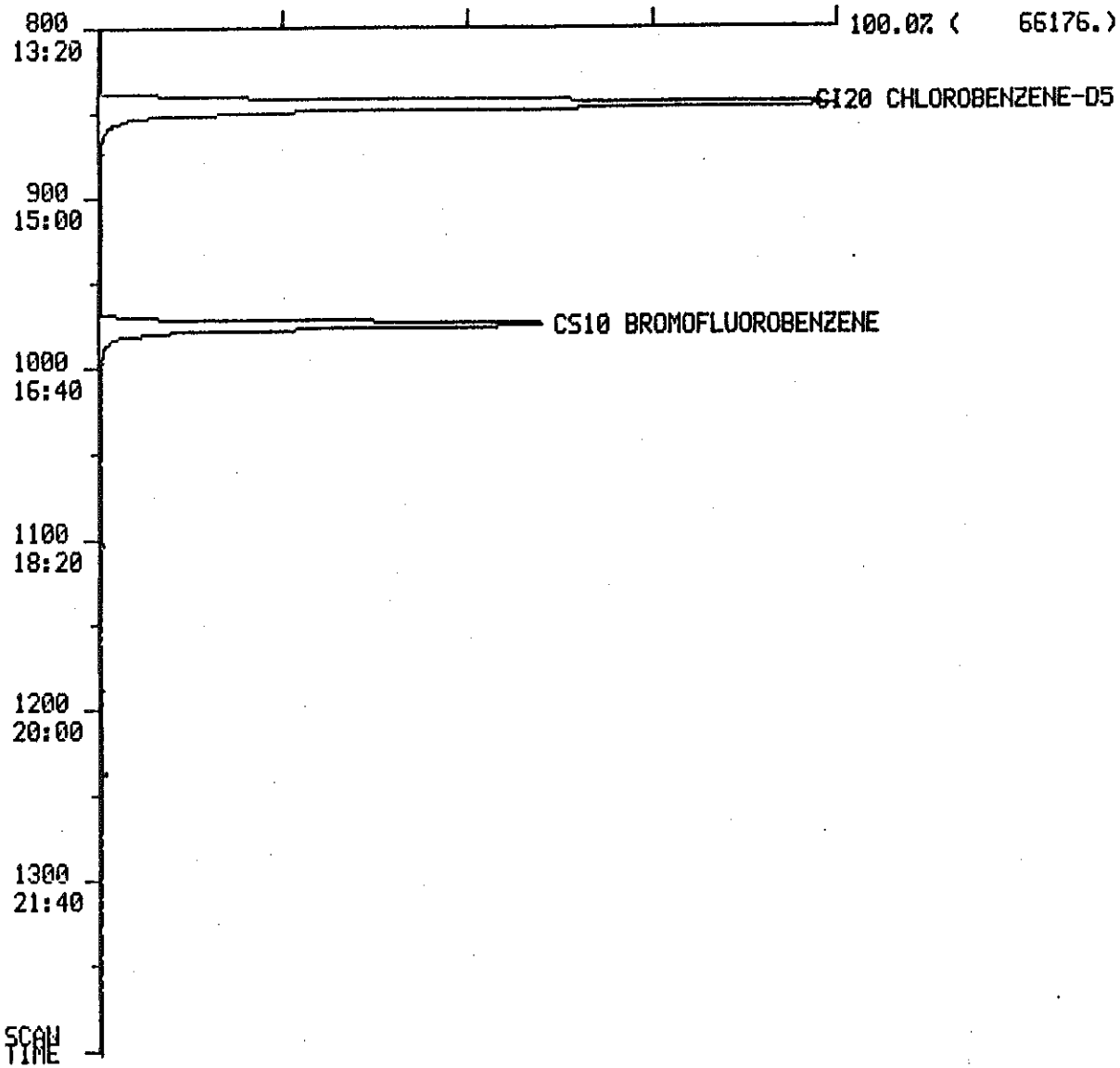
SAMPLE: -DCS WATER 30JUN92F
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M



000126

DATA FROM FILE: F1039 SCANS 800 TO 1400 ACQUIRED: 07/01/92 1:08:00
CALI: F1039 #3

SAMPLE: -DC5 WATER 30JUN92F
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M

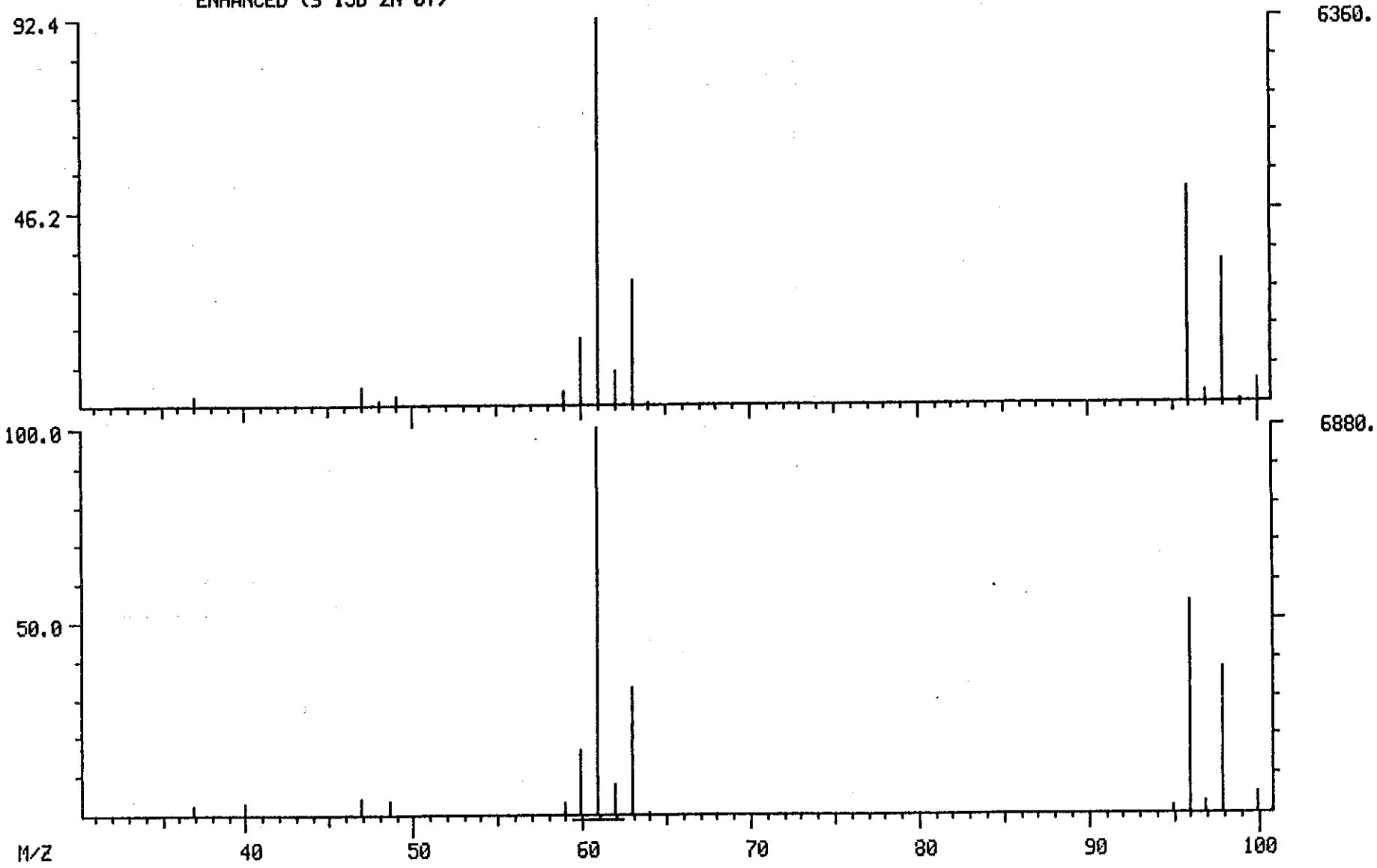


000127

DUAL MASS SPECTRUM
07/01/92 1:08:00 + 4:16
SAMPLE: -DCS WATER 30JUN92F
CONDS.: V1#80 M/Z 96 C045 1,1-DICHLOROETHENE
TEMP: 4 DEG. C
ENHANCED (S 15B 2N 0T)

DATA: F1039 #256
CALI: 063092CF #3

BASE M/Z: 61/ 61
RIC: 17472./ 19008.

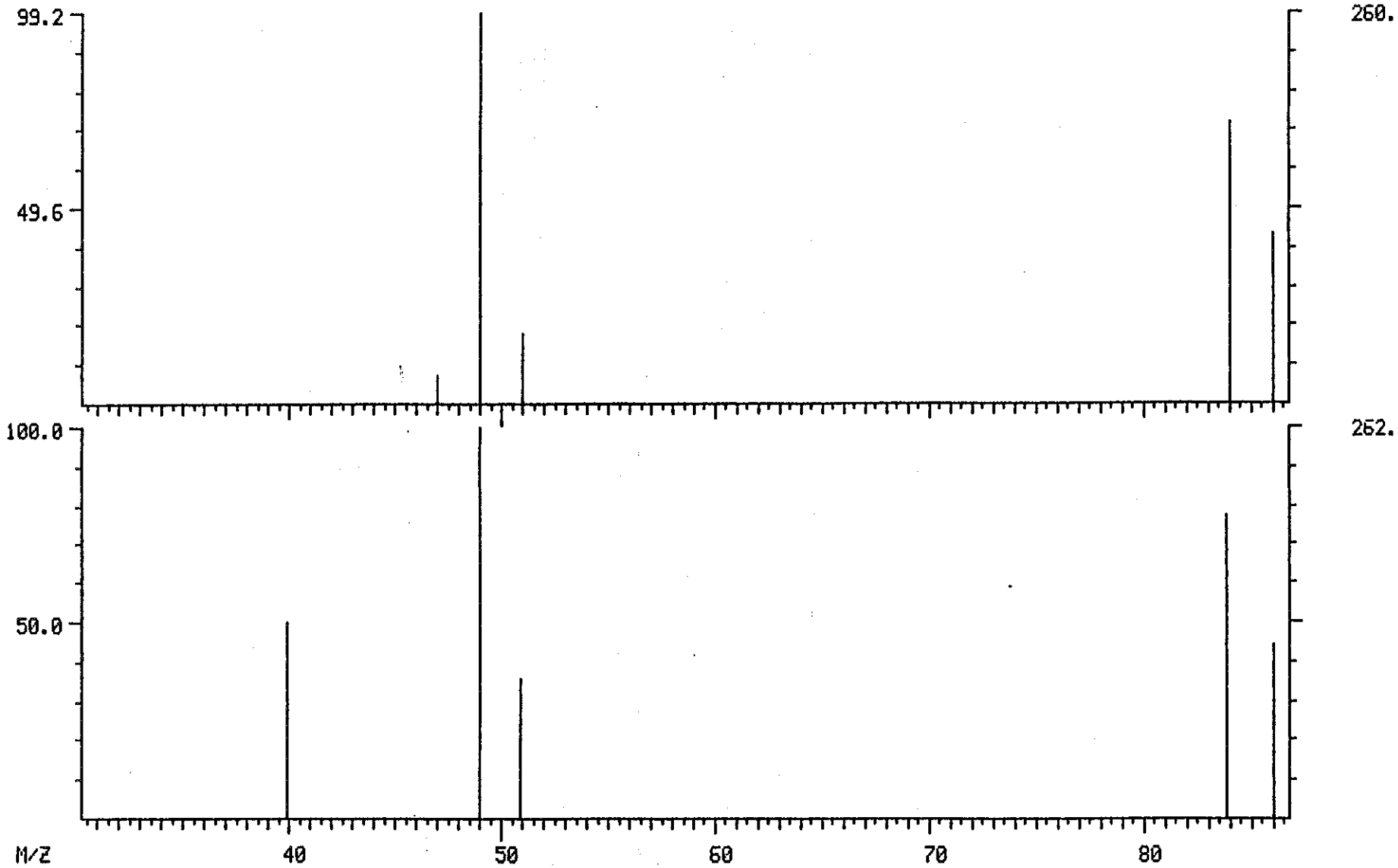


000128

DUAL MASS SPECTRUM
07/01/92 1:08:00 + 5:19
SAMPLE: -DCS WATER 30JUN92F
CONDS.: V1#45 M/Z 84 C030 METHYLENE CHLORIDE
TEMP: 12 DEG. C
ENHANCED (S 15B 2N 0T)

DATA: F1039 #319
CALI: 063092CF #3

BASE M/Z: 49/ 49
RIC: 627./ 804.

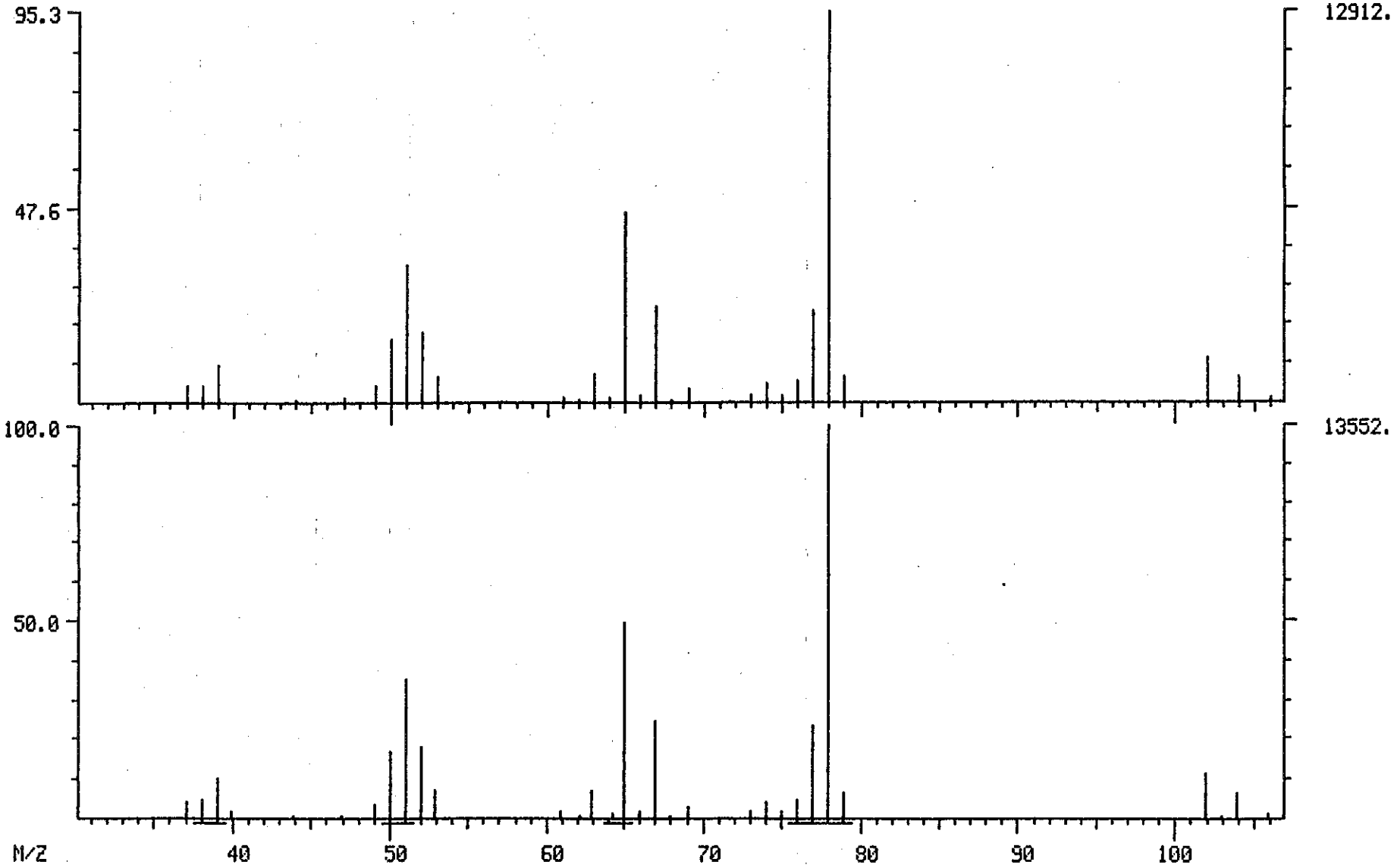


000129

DUAL MASS SPECTRUM
07/01/92 1:08:00 + 8:37
SAMPLE: -DCS WATER 30JUN92F
CONDS.: V2#60 M/Z 78 C165 BENZENE
TEMP: 34 DEG. C
ENHANCED (S 15B 2N 0T)

DATA: F1039 #517
CALI: 063092CF #3

BASE M/Z: 78/ 78
RIC: 45184./ 47936.

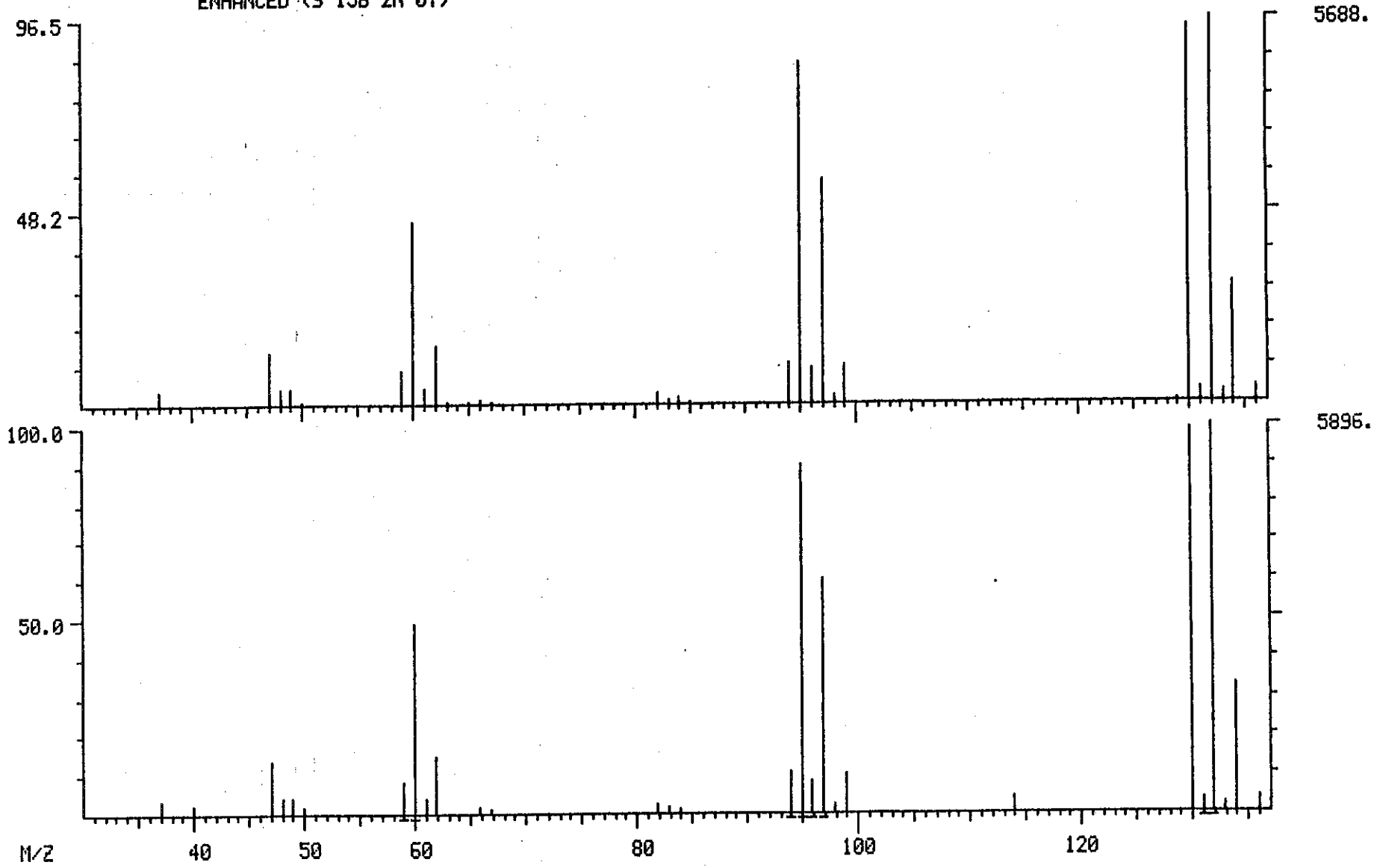


000130

DUAL MASS SPECTRUM
07/01/92 1:08:00 + 9:41
SAMPLE: -DCS WATER 30JUN92F
CONDS.: V2#45 M/Z 130 C150 TRICHLOROETHENE
TEMP: 42 DEG. C
ENHANCED (S 15B 2N 0T)

DATA: F1039 #581
CALI: 063092CF #3

BASE M/Z: 132/ 132
RIC: 30272./ 31968.

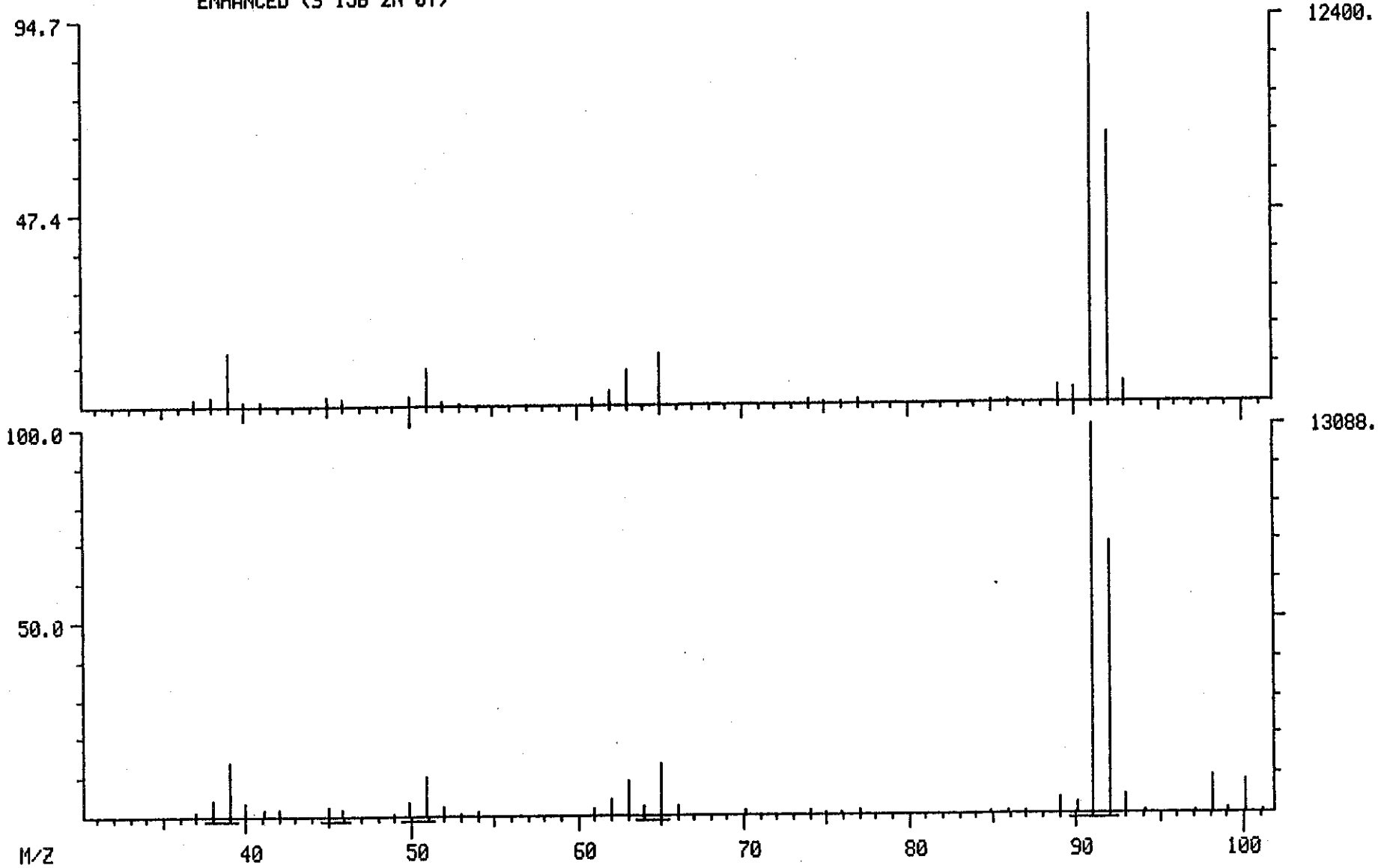


000131

DUAL MASS SPECTRUM
07/01/92 1:08:00 + 11:45
SAMPLE: -DC5 WATER 30JUN92F
CONDS.: V3#35 M/Z 92 C230 TOLUENE
TEMP: 56 DEG. C
ENHANCED (S 15B 2N 0T)

DATA: F1039 #705
CALI: 063092CF #3

BASE M/Z: 91/ 91
RIC: 31392./ 38080.

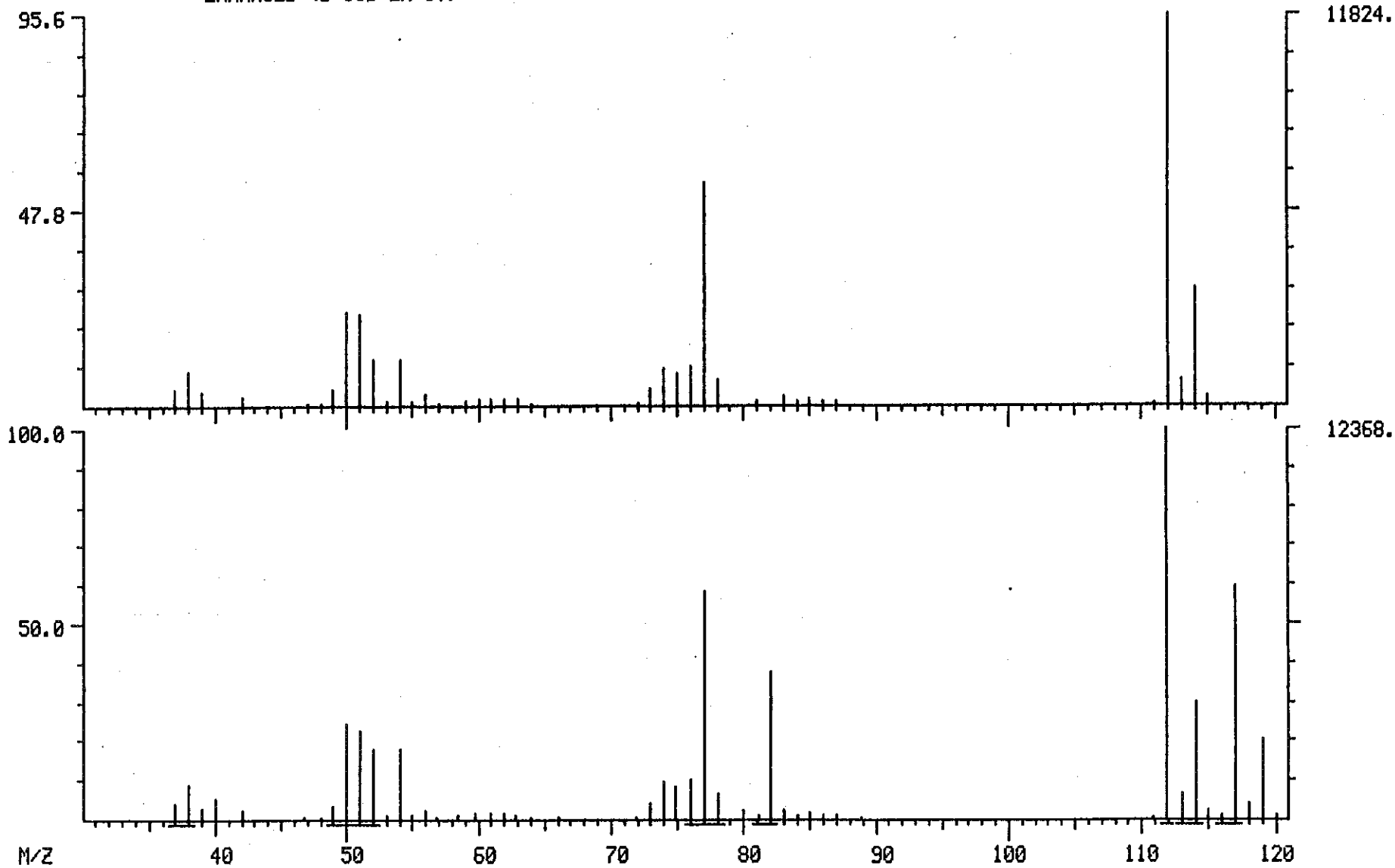


000132

DUAL MASS SPECTRUM
07/01/92 1:08:00 + 14:05
SAMPLE: -DCS WATER 30JUN92F
CONDS.: V3#40 M/Z 112 C235 CHLOROBENZENE
TEMP: 73 DEG. C
ENHANCED (S 15B 2N 0T)

DATA: F1039 #845
CALI: 063092CF #3

BASE M/Z: 112/ 112
RIC: 42048./ 61568.



GC/MS VOA

METHOD/TEST 8240

INSTRUMENT F

INITIAL CALIBRATION DATE 06/15/92

ANALYSIS RUN DATE 07/14/92 -

SAMPLES ASSOCIATED SCS, 01

ENSECO - ROCKY MOUNTAIN ANALYTICAL LABORATORY GC/MS VOLATILE ANALYSIS

PAGE NUMBER 111 INSTRUMENT F

GC CONDITIONS							ALS	DETECTOR					
COL	PHASE	INJ TEMP	INIT TEMP	TEMP. RAMP PROGRAM	FINAL TEMP	PRESS psig	PURGE FLOW	TYPE	EM	RANGE	TEMP	MASS	SCAN T
		220°C	-20°C	-20°C - 100°C 100°C - 200°C	200°C	13	40 ml/min	MS			180°C	35-300	1 sec

COMMENTS:

PROJ/SAMP	DATE 1992	PURGE VOL.	SAMPLE AMT.	EXTRACTION/ DILUTION INFO.	FILE	TAPE	DISK	IS OK #1	IS OK #2	IS OK #3	SS OK #1	SS OK #2	SS OK #3	DIL. OK	12 hr?	TEST - CODE	pH	COMMENTS	ALS #	INIT
CF43	7/12	-	-		071292CF		0:												-	[illegible]
BFB	↓	-	1 µl		F1084		↓												-	↓
50 ppb MSC std		5ml	5 µl		F1085														9	
BFB		↓	↓		F1086														-	
50 ppb MSL std	↓	↓	↓		F1087		↓												10	↓
CF43	7/14	—			071492CF		0:													BLANK
BFB		—	1ml		F1088															
CF43	7/14				071492CF		3:													MBR
BFB	↓				F1089		↓											(13:31)		↓
50 ppb MSC STD	↓	5ml			F1090		↓									HIT UPDATED		CM/ES 6321 m/z 6326 6381 6330 6334	1	

STANDARD FILENAME: _____ STANDARD FILENAME: _____

IS AREAS: _____, _____, _____ IS AREAS: _____, _____, _____

IS #1= BROMOCHLOROMETHANE SS #1= D4-1,2-DICHLOROETHANE

#2= 1,4-DIFLUOROBENZENE #2= D8-TOLUENE

#3= D5-CHLOROBENZENE #3= BROMOFLUOROBENZENE

ENSECO - ROCKY MOUNTAIN ANALYTICAL LABORATORY GC/MS VOLATILE ANALYSIS

PAGE NUMBER 117 INSTRUMENT F

GC CONDITIONS							ALS	DETECTOR					
COL	PHASE	INJ TEMP	INIT TEMP	TEMP. RAMP PROGRAM	FINAL TEMP	PRESS psig	PURGE FLOW	TYPE	EM	RANGE	TEMP	MASS	SCAN T
		220°C	-20°C	-20°C - 100°C 100°C - 200°C	200°C	13	40 ml/min	MS			180°C	35-300	1 sec.

COMMENTS:

PROJ/SAMP	DATE 1992	PURGE VOL.	SAMPLE ANT.	EXTRACTION/ DILUTION INFO.	FILE	TAPE	DISK	IS OK #1	IS OK #2	IS OK #3	SS OK #1	SS OK #2	SS OK #3	DIL. OK	12 hr?	TEST - CODE	pH	COMMENTS	ALS #	INIT
500 PPC AP, 500	7/14	5ml			F1091		3:									UPDATRO		MPA blank	2	MEB
VBLK					F1092			✓	✓	✓	✓	✓	✓	✓	✓			OK	3	
SAMPLE -1			1ml		F1093			0	0	0						APA-AP		TEDO PURGE	RS2	4
2			1.5ml		F1094			✓	✓	✓	✓	✓	✓	✓	✓				OK	5
4X			~~2.5ml~~	EJ2	F1095			✓	✓	✓	✓	✓	✓	✓	✓				OK	6
5X			~~3.0ml~~	EJ2 7/14/92	F1096			✓	✓	✓	↑	✓	✓	✓	✓				RS2	7
6X			5ml	EJ2	F1097			✓	✓	✓	✓	✓	✓	✓	✓				OK	8
7X			5ml		F1098			✓	✓	✓	✓	✓	✓	✓	✓				OK	9
8X					F1099			✓	✓	✓	↑	✓	✓	✓	✓				RS2	10
9X					F1100			✓	✓	✓	✓	✓	✓	✓	✓		Z		OK	11
3X					F1101			✓	✓	✓	✓	✓	✓	✓	✓				OK	12
-1					F1102			✓	✓	✓	✓	✓	✓	✓	✓	~~AFIR~~	7		OK	13

STANDARD FILENAME: _____ STANDARD FILENAME: _____

IS AREAS: _____, _____, _____ IS AREAS: _____, _____, _____

IS #1= BROMOCHLOROMETHANE SS #1= D4-1,2-DICHLOROETHANE

#2= 1,4-DIFLUOROBENZENE #2= D8-TOLUENE

#3= D5-CHLOROBENZENE #3= BROMOFLUOROBENZENE

VO V LIBRARIES ANALYST: MEB DATE: 7/15/92 000136

INTERNAL STANDARD AREA CHECK

STANDARD

FILENAME: F1090

	COMPOUND	AREA IN STANDARD	AREA LIMITS % OF AREA IN STANDARD LOW	HIGH
IS # 1	CI01 BROMOCHLOROMETH	24353.	50	200
IS # 2	CI10 1,4-DIFLUOROBEN	122073.	50	200
IS # 3	CI20 CHLOROBENZENE-D	95205.	50	200

SAMPLES

FILENAME	% OF AREA IN STANDARD IS#1	IS#2	IS#3
F1091	102	102	96
F1092	106	99	107
F1093	0*	0*	0*
F1094	98	92	88
F1095	82	81	79
F1096	89	89	89
F1097	90	94	90
F1098	73	78	74
F1099	66	70	67
F1[illegible]	80	74	75
F1[illegible]	76	78	76
F1[illegible]2	75	75	78
F1103	69	64	64
F1104	0*	0*	0*
F1105	68	75	77
F1106	75	80	78
F1107	71	74	76
F1108	77	79	79
F1109	67	67	69
F1110	79	76	75

NOTE: * INDICATES THAT AN INTERNAL STANDARD AREA IS OUTSIDE QC LIMITS

BROMOFLUOROBENZENE

ning Report
/14/92 13:31:00 + 3:28
strument: I50F
e Number:

Data: F1089 # 208
Cali: 071492CF # 3
Analyst:
Laboratory:

Base m/z: 95
RIC: 18016.
Acct. No.:
Contract:

000137

m/z	Intensity	% RA	Ion Abundance Criteria Min %	Max %	Mass	Actual	Status
50	786.	23.8	15.0	40.0	95	23.8	PASS
75	1674.	50.6	30.0	60.0	95	50.6	PASS
95	3308.	100.0	100.0	---	---	100.0	PASS
96	264.	8.0	5.0	9.0	95	8.0	PASS
173	0.	0.0	---	2.0	174	0.0	PASS
174	2700.	81.6	50.0	---	95	81.6	PASS
175	205.	6.2	5.0	9.0	174	7.6	PASS
176	2708.	81.9	95.0	101.0	174	100.3	PASS
177	197.	6.0	5.0	9.0	176	7.3	PASS

OK

MKB 7/14/92

ss List
/14/92 13:31:00 + 3:28
mple: 50 NG BFB
nds.:

Data: F1089 # 208
Cali: 071492CF # 3

Base m/z: 95
RIC: 18016.

37 0.00 0.
264

Minima Min Inten: 0.
Maxima # 0

000138

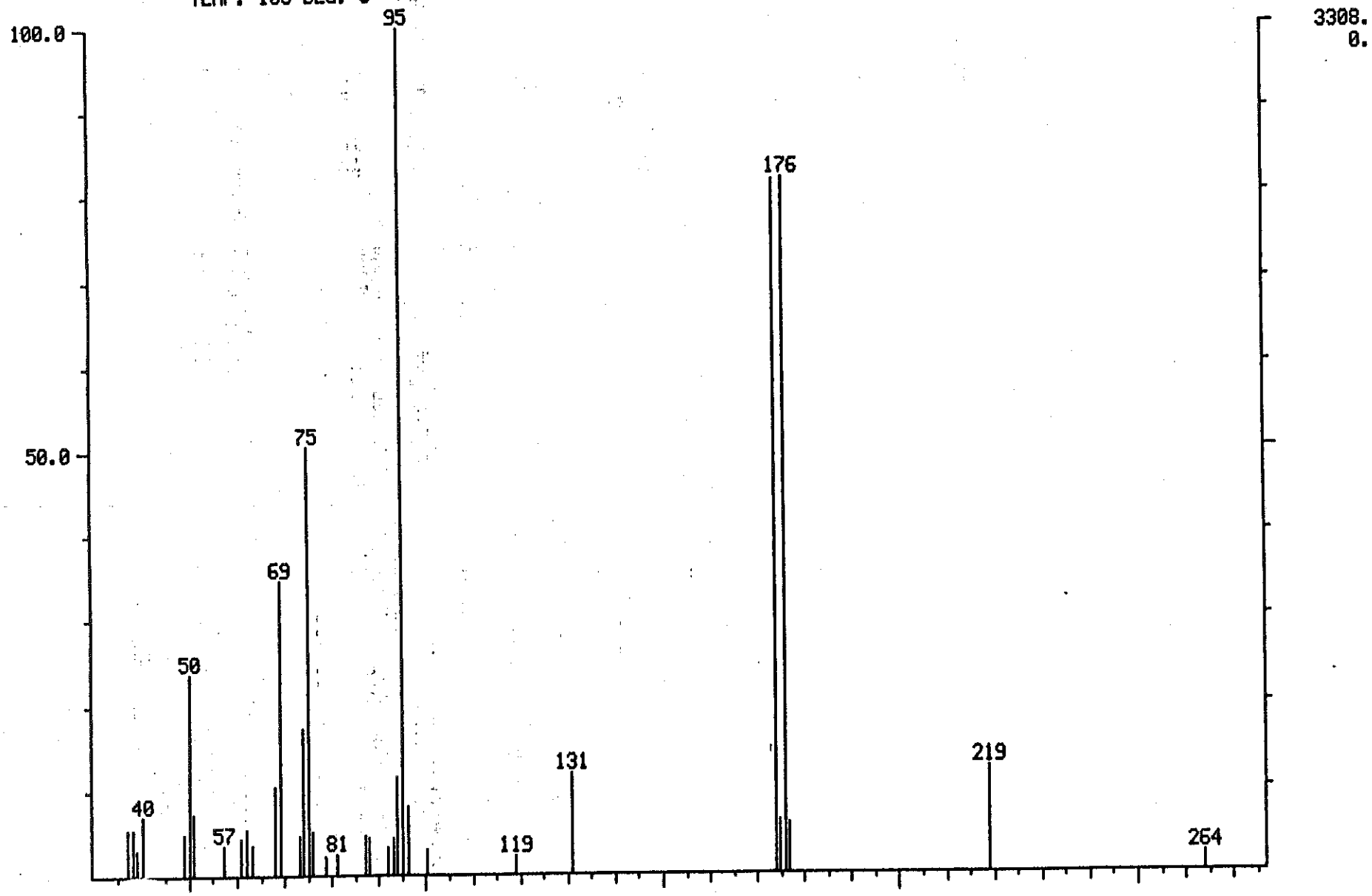
ıs	% RA	Inten.
37?	5.47	181.
38?	5.35	177.
39?	2.96	98.
40?	7.07	234.
49?	4.93	163.
50?	23.76	786.
51?	7.38	244.
57?	3.60	119.
61?	4.35	144.
62?	5.26	174.
63?	3.51	116.
68?F	10.37	343.
69 F	34.58	1144.
73	4.50	149.
74	17.26	571.
75	50.60	1674.
76	5.23	173.
79	2.27	75.
81	2.48	82.
87	4.69	155.
88	4.32	143.
92	3.17	105.
93	4.41	146.
94 F	11.67	386.
95 F	100.00	3308.
96	7.98	264.
100	3.05	101.
119	2.21	73.
131	11.70	387.
174	81.62	2700.
175 F	6.20	205.
176 F	81.86	2708.
177	5.96	197.
19	12.30	407.
4	2.24	74.

000139

MASS SPECTRUM
07/14/92 13:31:00 + 3:28
SAMPLE: 50 NG BFB
CONDS.:
TEMP: 103 DEG. C

DATA: F1089 #208
CALI: 071492CF #3

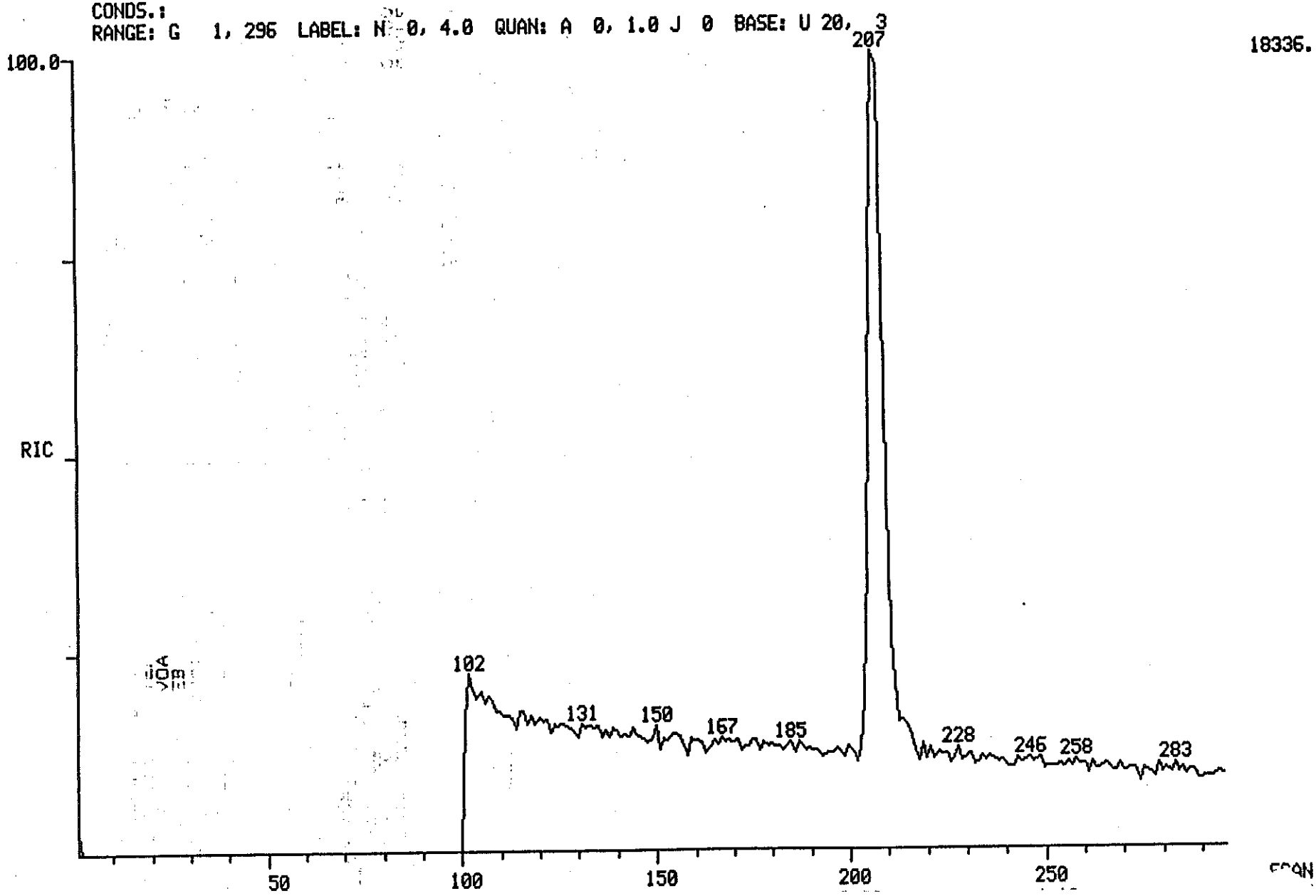
BASE M/Z: 95
RIC: 18016.



000140

RIC
07/14/92 13:31:00
SAMPLE: 50 NG BFB
CONDS.:
RANGE: G 1, 296 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F1089 #208 SCANS 1 TO 296
CALI: 071492CF #3



Enseco GC/MS
VOA CALIBRATION CHECK

000141

NTIN. CALIBRATION 50 UG/L	F1090	07/14/92	13:45:00	
ITIAL CALIBRATION 20 UG/L	VOAF0610	06/15/92	23:48:00	
TIAL CALIBRATION 50 UG/L	VOAF0608	06/15/92	21:48:00	
TIAL CALIBRATION 100 UG/L	VOAF0611	06/16/92	0:19:00	
TIAL CALIBRATION 150 UG/L	VOAF0612	06/16/92	0:51:00	
ITIAL CALIBRATION 200 UG/L	VOAF0609	06/15/92	22:48:00	

brary ntry	Compound	Initial Calibration Response Factor Avg	Min	% RSD	Max	Continuing Calibration Response Factor	Min	% Diff	Max
94	V011 CIS-1,2-DICHLOR	1.781		6.3		1.572		11.7	
99	V013 TETRAHYDROFURAN	0.388		17.4		0.211		45.6	
20	V001 DICHLORODIFLUOR	0.690		20.5		1.651		*-139	CAL
10	C010 CHLOROMETHANE	0.832	0.300	18.0		1.057	0.300	-27.0	
25	C020 VINYL CHLORIDE	1.088		12.8	30.0	1.184		-8.8	25.0
15	C015 BROMOMETHANE	1.194		11.7		1.337		-12.0	
35	C025 CHLOROETHANE	0.835		9.8		0.805		3.6	
70	V007 TRICHLOROFLUORO	3.633		20.7		3.041		16.3	
80	C045 1,1-DICHLOROETH	1.464		13.7	30.0	1.413		3.5	25.0
105	V015 TRICHLORO-TRIFL	1.482		16.0		1.736		-17.1	
65	C040 CARBON DISULFID	3.313		15.6		3.023		8.8	
50	C035 ACETONE	0.353		26.6		0.201		43.1	
45	C030 METHYLENE CHLOR	1.737		9.3		1.524		12.3	
95	V012 TRANS-1,2-DICHL	1.410		8.5		1.439		-2.1	
98	C110 2-BUTANONE	0.099		17.7		0.050		49.5	
90	C050 1,1-DICHLOROETH	2.834	0.300	5.9		2.545	0.300	10.2	
25	C125 VINYL ACETATE	0.618		7.3		0.362		41.4	
100	C060 CHLOROFORM	3.800		4.7	30.0	2.961		22.1	25.0
15	C115 1,1,1-TRICHLORO	0.733		13.4		0.549		25.1	
20	C120 CARBONTETRACHLO	0.707		8.4		0.547		22.6	
60	C165 BENZENE	0.990		9.4		0.858		13.3	
110	C065 1,2-DICHLOROETH	2.923		7.5		1.856		36.5	
45	C150 TRICHLOROETHENE	0.504		11.2		0.454		9.9	
35	C140 1,2-DICHLOROPRO	0.430		9.6	30.0	0.337		21.6	25.0
130	V019 1,4-DIOXANE	0.014		22.0		0.010		28.6	
30	C130 BROMODICHLOROME	0.759		10.3		0.574		24.4	
75	V023 2-CHLOROETHYL V	0.095		112.3		0.156		-64.2	
40	C143 CIS-1,3-DICHLOR	0.568		5.2		0.464		18.3	
10	C205 4-METHYL-2-PENT	0.466		17.6		0.217		53.4	
35	C230 TOLUENE	0.896		10.0	30.0	0.751		16.2	25.0
65	C172 TRANS-1,3-DICHL	0.491		7.8		0.353		28.1	
55	C160 1,1,2-TRICHLORO	0.329		8.0		0.250		24.0	
20	C220 TETRACHLOROETHE	0.485		11.8		0.497		-2.5	
15	C210 2-HEXANONE	0.268		16.9		0.140		47.8	
50	C155 DIBROMOCHLOROME	0.603		4.2		0.410		32.0	
70	V022 1,2-DIBROMOETHA	0.439		12.0		0.320		27.1	
40	C235 CHLOROBENZENE	1.052	0.300	8.5		0.856	0.300	18.6	
50	C240 ETHYLBENZENE	0.497		8.7	30.0	0.422		15.1	25.0
75	V032 M+P XYLENES	0.871		8.3		0.722		17.1	
60	V029 O-XYLENE	0.523		10.6		0.426		18.5	
55	C245 STYRENE	1.072		6.8		0.862		19.6	
80	C180 BROMOFORM	0.459	0.250	8.3		0.330	0.250	28.1	
25	C225 1,1,2,2-TETRACH	0.799	0.300	11.3		0.460	0.300	42.4	
80	V035 M-DICHLOROBENZE	1.012		10.8		0.823		18.7	
90	V037 P-DICHLOROBENZE	1.066		9.5		0.851		20.2	
85	V036 O-DICHLOROBENZE	0.976		12.5		0.813		16.7	
32	V003 DICHLOROFLUOROM	2.271		24.5		2.287		-0.7	
63	TERT-BUTYL METHYL ET	2.200		13.1		2.295		-4.3	
102	V009 HEXANE	1.930		14.9		1.857		3.8	
115	V016 DIBROMOMETHANE	1.707		10.3		1.397		18.2	
40	V004 IODOMETHANE	3.067		19.1		3.045		0.7	
60	V006 ACRYLONITRILE	0.282		10.7		0.149		47.2	
55	V005 ACROLEIN	0.192		16.8		0.096		50.0	
90	V025 1,2,3-TRICHLORO	0.381		12.5		0.210		44.9	
30	V026 T-1,4-DICHLORO-	0.186		10.6		0.091		51.1	
38	V027 ETHYL METHACRYL	0.481		10.9		0.262		45.5	
2	CS05 TOLUENE-D8	1.224		13.5		1.093		10.7	
3	CS10 BROMOFLUOROBENZ	0.794		12.4		0.631		20.5	
2	CS15 1,2-DICHLOROETH	2.526		10.9		1.726		31.7	

Enseco GC/MS
VOA CALIBRATION CHECK

NTIN. CALIBRATION	50 UG/L	F1090	07/14/92	13:45:00
ITIAL CALIBRATION	20 UG/L	VOAF0610	06/15/92	23:48:00
TIAL CALIBRATION	50 UG/L	VOAF0608	06/15/92	21:48:00
TIAL CALIBRATION	100 UG/L	VOAF0611	06/16/92	0:19:00
TIAL CALIBRATION	150 UG/L	VOAF0612	06/16/92	0:51:00
ITIAL CALIBRATION	200 UG/L	VOAF0609	06/15/92	22:48:00

	F1090		VOAF0610		VOAF0608		VOAF0611		VOAF0612		VOAF0609	
b #	Conc	RRF	Conc	RRF	Conc	RRF	Conc	RRF	Conc	RRF	Conc	RRF
94	50,	1.572	20,	1.837	50,	1.658	100,	1.714	150,	1.751	200,	1.944
99	50,	0.211	20,	0.479	50,	0.375	100,	0.290	150,	0.396	200,	0.398
20	50,	1.651	20,	0.701	50,	0.629	100,	0.501	150,	0.733	200,	0.886
10	50,	1.057	20,	0.606	50,	0.911	100,	0.782	150,	0.859	200,	1.002
25	50,	1.184	20,	0.972	50,	1.147	100,	0.951	150,	1.077	200,	1.293
15	50,	1.337	20,	1.097	50,	1.210	100,	1.048	150,	1.204	200,	1.410
35	50,	0.805	20,	0.792	50,	0.895	100,	0.722	150,	0.836	200,	0.928
70	50,	3.041	20,	4.269	50,	2.719	100,	2.973	150,	3.837	200,	4.368
80	50,	1.413	20,	1.436	50,	1.302	100,	1.273	150,	1.542	200,	1.767
105	50,	1.736	20,	1.501	50,	1.509	100,	1.119	150,	1.496	200,	1.784
65	50,	3.023	20,	3.349	50,	2.838	100,	2.821	150,	3.495	200,	4.062
50	50,	0.201	20,	0.490	50,	0.385	100,	0.258	150,	0.273	200,	0.360
45	50,	1.524	20,	1.974	50,	1.745	100,	1.550	150,	1.630	200,	1.786
95	50,	1.439	20,	1.577	50,	1.389	100,	1.288	150,	1.314	200,	1.483
98	50,	0.050	20,	0.129	50,	0.090	100,	0.088	150,	0.088	200,	0.102
90	50,	2.545	20,	3.040	50,	2.774	100,	2.645	150,	2.733	200,	2.979
25	50,	0.362	20,	0.670	50,	0.622	100,	0.554	150,	0.598	200,	0.647
100	50,	2.961	20,	3.842	50,	3.791	100,	3.585	150,	3.710	200,	4.072
15	50,	0.549	20,	0.902	50,	0.704	100,	0.654	150,	0.679	200,	0.728
20	50,	0.547	20,	0.795	50,	0.687	100,	0.637	150,	0.684	200,	0.730
60	50,	0.858	20,	1.136	50,	0.989	100,	0.889	150,	0.937	200,	0.999
110	50,	1.856	20,	2.964	50,	2.763	100,	2.728	150,	2.884	200,	3.276
45	50,	0.454	20,	0.601	50,	0.499	100,	0.453	150,	0.480	200,	0.489
35	50,	0.337	20,	0.499	50,	0.434	100,	0.395	150,	0.409	200,	0.412
1301	1000,	0.010	400,	0.018	1000,	0.017	2000,	0.011	3000,	0.014	4000,	0.012
30	50,	0.574	20,	0.888	50,	0.727	100,	0.684	150,	0.728	200,	0.767
75	50,	0.156	20,	0.200	50,	0.222	100,	0.037	150,	0.011	200,	0.006
40	81,	0.464	32,	0.608	81,	0.554	162,	0.534	243,	0.554	324,	0.588
10	50,	0.217	20,	0.603	50,	0.443	100,	0.406	150,	0.404	200,	0.476
35	50,	0.751	20,	1.035	50,	0.834	100,	0.831	150,	0.844	200,	0.938
65	19,	0.353	8,	0.502	19,	0.459	38,	0.448	57,	0.504	76,	0.543
55	50,	0.250	20,	0.354	50,	0.322	100,	0.294	150,	0.318	200,	0.356
20	50,	0.497	20,	0.580	50,	0.448	100,	0.476	150,	0.433	200,	0.486
15	50,	0.140	20,	0.333	50,	0.251	100,	0.225	150,	0.236	200,	0.297
50	50,	0.410	20,	0.629	50,	0.581	100,	0.572	150,	0.606	200,	0.625
70	100,	0.320	40,	0.457	100,	0.431	200,	0.355	300,	0.498	400,	0.455
40	50,	0.856	20,	1.160	50,	0.970	100,	1.000	150,	0.990	200,	1.138
50	50,	0.422	20,	0.546	50,	0.471	100,	0.462	150,	0.463	200,	0.541
75	50,	0.722	20,	0.958	50,	0.813	100,	0.843	150,	0.804	200,	0.939
60	50,	0.426	20,	0.611	50,	0.477	100,	0.490	150,	0.493	200,	0.542
55	50,	0.862	20,	1.160	50,	1.003	100,	1.028	150,	1.028	200,	1.140
80	50,	0.330	20,	0.495	50,	0.453	100,	0.409	150,	0.440	200,	0.499
25	50,	0.460	20,	0.935	50,	0.764	100,	0.719	150,	0.733	200,	0.842
80	50,	0.823	20,	1.152	50,	0.918	100,	0.998	150,	0.900	200,	1.091
90	50,	0.851	20,	1.209	50,	0.948	100,	1.033	150,	1.018	200,	1.121
85	50,	0.813	20,	1.162	50,	0.884	100,	0.960	150,	0.857	200,	1.016
32	50,	2.287	20,	2.603	50,	1.992	100,	1.426	150,	2.558	200,	2.774
63	50,	2.295	20,	2.446	50,	2.283	100,	1.838	150,	2.476	200,	1.959
102	50,	1.857	20,	2.305	50,	1.853	100,	1.549	150,	2.108	200,	1.835
115	50,	1.397	20,	1.854	50,	1.717	100,	1.480	150,	1.896	200,	1.590
40	100,	3.045	40,	2.994	100,	2.759	200,	2.318	300,	3.829	400,	3.437
60	200,	0.149	80,	0.283	200,	0.302	400,	0.232	600,	0.309	800,	0.283
55	250,	0.096	100,	0.206	250,	0.188	500,	0.138	750,	0.218	1000,	0.211
90	50,	0.210	20,	0.428	50,	0.381	100,	0.304	150,	0.412	200,	0.380
30	50,	0.091	20,	0.195	50,	0.183	100,	0.154	150,	0.206	200,	0.192
38	100,	0.262	40,	0.530	100,	0.467	200,	0.399	300,	0.521	400,	0.486
2	50,	1.093	20,	1.432	50,	1.095	100,	1.126	150,	1.373	200,	1.092
3	50,	0.631	20,	0.925	50,	0.735	100,	0.735	150,	0.874	200,	0.703
2	50,	1.726	20,	2.670	50,	2.296	100,	2.339	150,	2.943	200,	2.382

Name List: HEDR1 Entry # 1 of 1
File Name: F1090

(1)Format: VOACLP
(3)Sample ID: VSTD050
(5)Matrix: WATER
(7)Fraction: VOA
(10)Analyst: MEB
(12)Purge Volume: NA
(14)Extract Volume: NA
(16)Sample Amount: NA
(19)Run Factor: NA

(2)Case: STDF
(4)Level: LOW
(6)Lab Sample ID: V#6386
(8)Type: CAL
(11)Quan List Units: UG/L
(13)Extract Dilution: NA
(15)Extract Vol. Used: NA
(17)Percent Moisture: NA
(20)SURROGATE VOLUME:: NA

7/14/92 13:45:21
Acquisition started

Acquire
07/14/92 13:45:00 + 0:00
Sample: CLP,STDF ,,VSTD050 ,LOW,WATER,V#6386,VOA,CAL ,
Conds.: UG/L *NA *100%/NA *(NA/NA)/NA NA M
Formula: NANA
Submitted by: RMAL

Run 3:F1090
Free sectors: 13652
Instrument: I50F
Analyst: MEB

Starting
Scan: 0 of 1464

Weight: 0.000
Acct. No: VOACLP

*** GC not ready and being equilibrated ***
Elapsed time : 0.0 Min

GC Desc.: VN

Seq. #	Temp (DegC)	Rate (C/min)	Time (minutes) period	total
1	-20--18	2.0	1.0	1.0
2	-18-102	7.0	17.1	18.1
3	102-202	30.3	3.3	21.4

Injector A : 220 Deg C
GC oven : 69 Deg C
Transfer-line: 203 Deg C
Ion source : 181 Deg C

Valve A : closed Valve B : closed

*** Instrument parameters ***
Post acquisition state -> Filament : Off Multiplier : Off
MODE: EI (+) Centroid + Temp - Sequence: VO (1 time window.)

Sequence Window # 1
Number of cycles: 1
Filament is ON
Multiplier is ON
Scan descriptor: VO Mass intervals: 1 Positive ion mode.
Total scan time: 1.000 s Master rate: 8

MPW: 3 MFW: 70 MA: 50 TH: 1 BL: 0

Int #	Lo mass	Hi mass	Time
1	36.511	300.590	1.000

Calibration table: 3:071492CF

Interface number	0	
Instrument type	Q	
Full scale mass	1170	u
Zero scale mass	1	u
Intensity/ion	2	
Peak width	1000.	mmu
Offset at low mass	0	mmu
Offset at high mass	0	mmu
Voltage settling time(ms)	4	

Current instrument parameters.

	Positive ion mode	Negative ion mode
Resolution (high)	123.00	0.00
Resolution (low)	125.00	0.00
Quad offset	-2.00	0.00
Quad programming	-1.00	0.00
Lens offset	-40.00	0.00
Lens programming	0.00	0.00
Ext offset	-4.50	0.00
Ext programming	0.00	0.00
Collector	30.00	0.00
Ion offset	4.00	0.00

000144

Ion programming	1.00	0.00
Rod polarity	Reverse	Normal

Electron multiplier voltage: 1390.
Filament emission current: 750.
Electrometer range: 10 ^-7
Electrometer zero: 128.0

Analyzer Fore Pressure .....: 0.028 Torr
Separator/Source Pressure .....: 0.375 Torr

7/14/92 14:15:20
ACQUISITION COMPLETED
Scans 1 to 1464 Centroid

Mode	Scans	Secs	Out of	%	Peaks per scan	per sec
Centroid	1464	1.6	1464.0	0.1	22293. 15.	15.

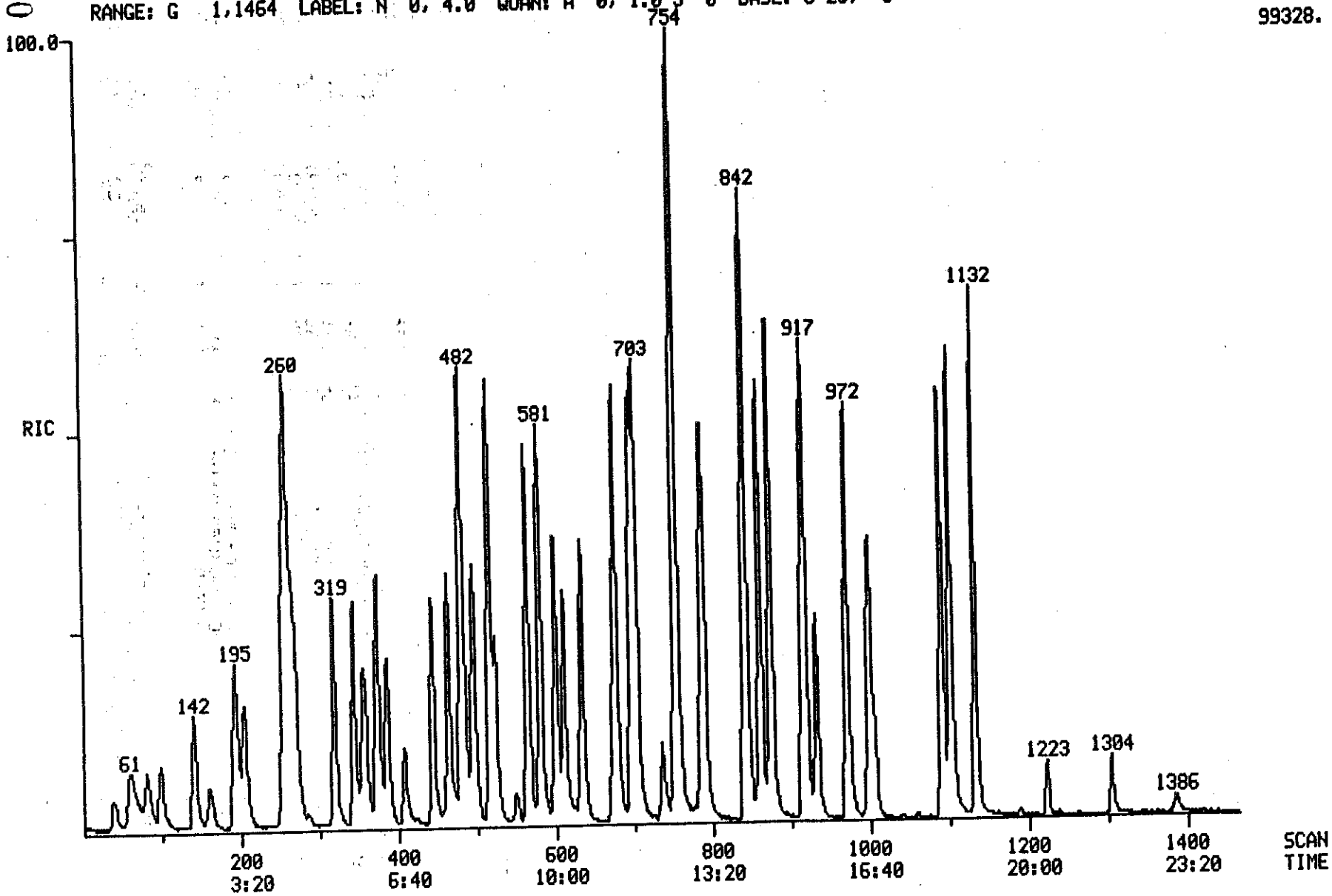
000145

RIC
07/14/92 13:45:00
SAMPLE: CLP,STDF ,,VSTD050",LOW,WATER,V#6386,VOA,CAL ,
CONDS.: UG/L *NA *100%/NA *(NA/NA)/NA NA M
RANGE: G 1,1464 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F1090 #4
CALI: 071492CF #3

SCANS 1 TO 1464

99328.



PROCEDURE: TCA DIAGNOSTIC REPORT 7/14/92 14:16:08
DATA FILE: F1090
REFERENCE: 11TABLE
NAME LIST: LLNL INITIALIZATION OPTION: 2 PROCESSING OPTION: 3 000146
REPORT: ISO1

< ---- STANDARDS ----- >				< --- PLUS UNKNOWNS --- >				< - LIST NAMES - >
PROC	USED	POSS	RMS	PROC	USED	POSS	RMS	STANDARD/UNKNOWN
1	1	1	0	11	11	2	67	ISO1/TCO1
1	1	1	0	11	11	8	128	ISO2/TCO2
1	1	1	0	4	4	2	251	ISO3/TCO3
3	3	1	94	13	13	2	97	ISO4/TCO4
3	3	1	94	13	12	2	96	ISO5/TCO5
3	3	1	94	7	7	1	76	ISO6/TCO6
1	1	1	0	11	11	2	55	ISO7/TCO7
1	1	1	0	4	4	4	57	ISO8/TCO8

63 COMPOUNDS PROCESSED, 62 FOUND

< COMPOUND >			< ---------- SEARCH ---------- >					< SAT >	< ------ CHRO ------- >			
NO	LIB	ENTRY	REF	PRED	SEL	DELTA	PEAKS	FIT	PEAKS	M/Z	TOP	DELTA	PEAKS
1	V1	1	-459	465	465	.	1	995	.	128	465	.	1
2	V1	20	-59	61	62	1	1	991	.	85	62	.	1
3	V1	10	-81	83	82	-1	2	995	.	50	82	.	1
4	V1	25	-97	99	99	.	1	994	.	62	99	.	1
5	V1	15	-139	141	142	1	1	998	.	94	142	.	1
6	V1	35	-158	161	161	.	1	969	.	64	161	.	1
7	V1	70	-192	195	195	.	1	991	.	101	195	.	1
8	V1	32	-203	206	206	.	1	922	.	67	206	.	1
9	V1	80	-252	256	255	-1	1	980	.	96	255	.	1
10	V1	65	-255	259	258	-1	1	975	.	76	258	.	1
11	V1	55	-256	260	259	-1	1	997	.	56	259	.	1
12	V1	38	-257	260	262	2	1	897	.	45	.	.	.
13	V1	40	-259	262	261	-1	1	995	.	142	261	.	1
14	V1	105	-266	269	269	.	1	987	.	151	268	-1	1
15	V1	50	-284	287	287	.	1	998	.	43	287	.	1
16	V1	45	-316	319	319	.	1	980	.	84	319	.	1
17	V1	95	-341	345	345	.	2	985	.	96	345	.	1
18	V1	60	-353	357	355	-2	2	1000	.	53	355	.	1
19	V1	63	-356	360	358	-2	1	997	.	73	358	.	1
20	V1	102	-370	374	375	1	2	995	.	57	375	.	1
21	V1	90	-383	387	387	.	1	995	.	63	387	.	1
22	V2	25	-405	409	409	.	1	975	.	43	409	.	1
23	V1	94	-440	444	444	.	1	972	.	96	444	.	1
24	V1	98	-458	462	459	-3	2	991	.	72	459	.	1
25	V2	1	-561	566	565	-1	1	996	.	114	564	-1	1
26	V3	1	-838	841	841	.	1	1000	.	117	841	.	1
27	V1	99	-469	473	473	.	2	952	.	42	473	.	1
28	V1	100	-478	482	481	-1	1	992	.	83	481	.	1
29	V2	15	-479	483	483	.	1	998	.	97	483	.	1
30	V2	20	-493	497	496	-1	1	997	.	117	496	.	1
31	V2	60	-513	517	517	.	1	983	.	78	517	.	1
32	V1	2	-514	518	518	.	1	983	.	65	518	.	1
33	V1	110	-521	525	525	.	1	981	.	62	525	.	1
34	V2	45	-578	581	581	.	1	979	.	130	581	.	1
35	V2	35	-598	601	600	-1	1	990	.	63	600	.	1
36	V1	115	-609	612	611	-1	1	997	.	174	611	.	1
37	V1	130	-621	624	625	1	2	988	.	88	625	.	1
38	V2	30	-632	635	634	-1	1	989	.	83	634	.	1
39	V2	75	-670	673	672	-1	1	985	.	63	672	.	1
40	V2	40	-675	678	677	-1	1	996	.	75	677	.	1
41	V3	2	-695	698	697	-1	1	973	.	98	697	.	1
42	V3	10	-699	702	.	.	.	.	.	43	702	.	1
43	V3	35	-701	704	703	-1	1	976	.	92	703	.	1
44	V2	65	-734	736	736	.	1	990	.	75	736	.	1
45	V2	55	-749	751	752	1	1	956	.	97	752	.	1
46	V3	20	-752	754	754	.	1	980	.	164	754	.	1
47	V3	38	-753	756	755	-1	1	985	.	41	755	.	1
48	V2	50	-784	786	786	.	1	987	.	129	786	.	1
49	V3	15	-784	786	787	1	1	974	.	43	787	.	1
50	V2	70	-788	790	790	.	1	989	.	107	790	.	1
51	V3	40	-841	843	844	1	1	972	.	112	844	.	1
52	V3	50	-859	861	861	.	1	978	.	106	861	.	1
53	V3	75	-872	874	874	.	2	983	.	106	875	1	1
54	V3	60	-913	915	915	.	1	992	.	106	915	.	1
55	V3	55	-916	918	918	.	1	980	.	104	919	1	1
56	V2	80	-931	933	933	.	1	993	.	173	933	.	1
57	V3	3	-969	971	972	1	1	984	.	95	972	.	1
58	V2	90	-995	998	998	.	1	991	.	75	998	.	1
59	V3	25	-998	1001	1001	.	1	985	.	83	1001	.	1
60	V3	30	-1004	1007	1006	-1	1	983	.	53	1006	.	1
61	V3	80	-1088	1090	1090	.	2	993	.	146	1090	.	1
62	V3	90	-1099	1101	1102	1	2	993	.	146	1102	.	1
63	V3	85	-1130	1132	1132	.	1	996	.	146	1132	.	1

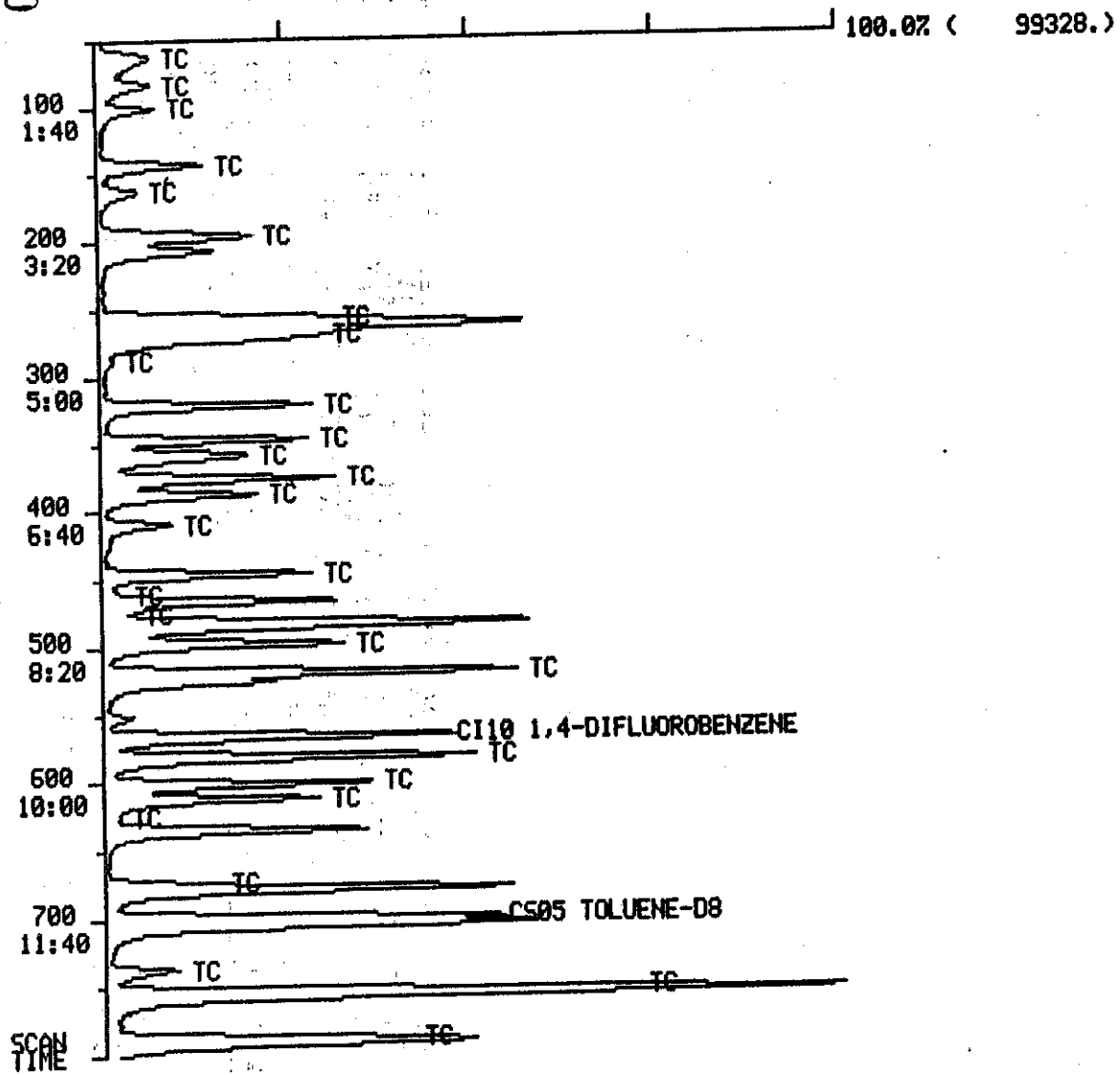
000147

DATA FROM FILE: F1090 SCANS 50 TO 800 ACQUIRED: 07/14/92 13:45:00

CALI: F1090 #3

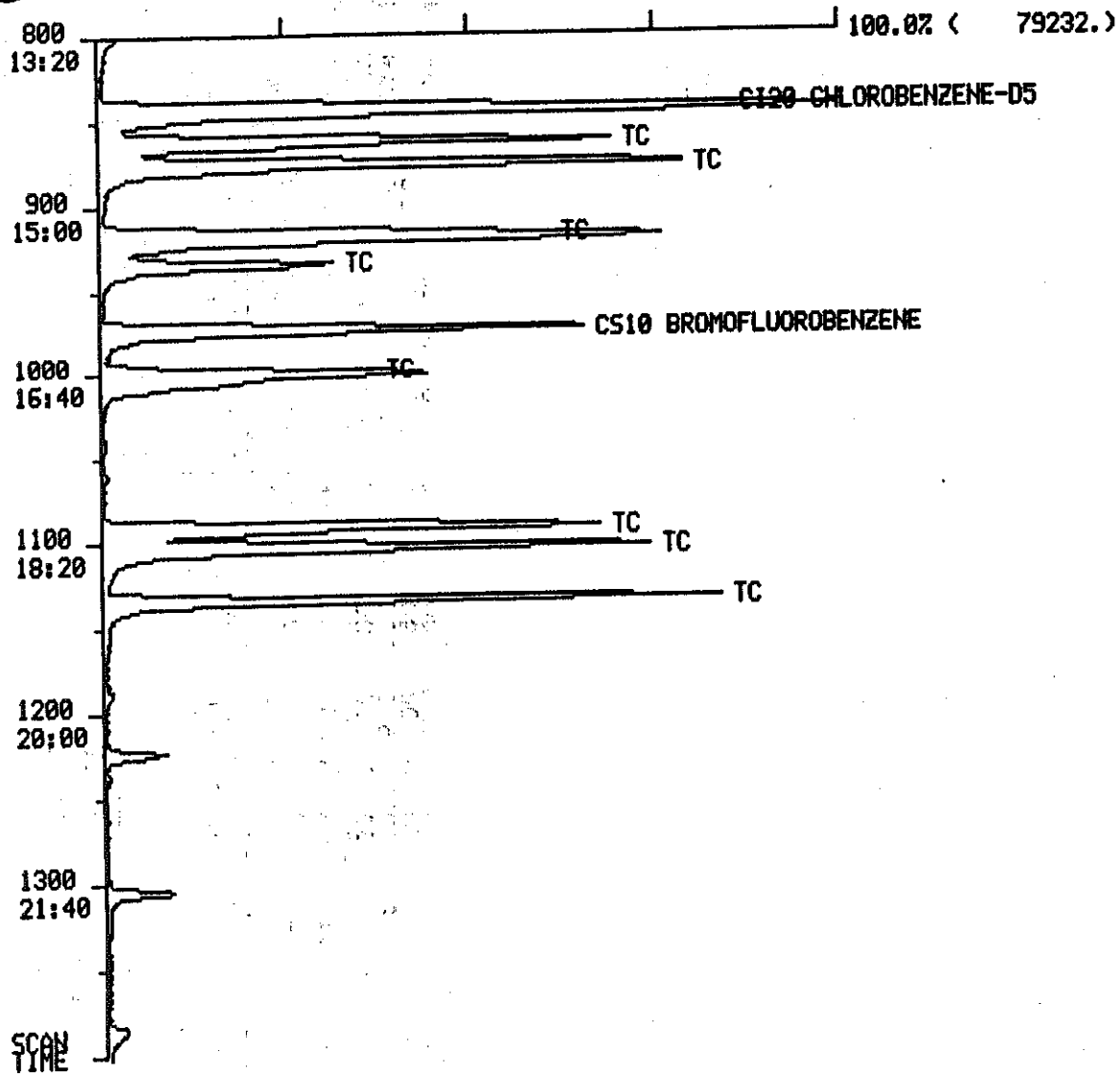
SAMPLE: CLP,STDF ,,VSTD050 ,LOW,WATER,V#6386,VOA,CAL ,

CONDS.: UG/L *NA *100%/NA *(NA/NA)/NA NA M



0001148

DATA FROM FILE: F1090 SCANS 800 TO 1400 ACQUIRED: 07/14/92 13:45:00
CALI: F1090 #3
SAMPLE: CLP,STDF ,,VSTD050 ,LOW,WATER,V#6386,VOA,CAL ,
CONDS.: UG/L *NA *100%/NA *(NA/NA)/NA NA M



RMAL QUANTITATION SUMMARY FILE: F1090
COMPOUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

NO	LIBRARY ENTRY		NAME	MASS	SCAN	REF	AREA	UNITS: RRF	UG/L AMOUNT
1	V1#	1	CI01 BROMOCHLOROMETHANE	128	465	1	24353.	1.000	50.000
2	V2#	1	CI10 1,4-DIFLUOROBENZENE	114	564	2	122073.	1.000	50.000
3	V3#	1	CI20 CHLOROBENZENE-D5	117	841	3	95205.	1.000	50.000
4	V3#	2	CS05 TOLUENE-D8	98	697	3	104034.	1.093	50.000
5	V3#	3	CS10 BROMOFLUOROBENZENE	95	972	3	60060.	0.631	50.000
6	V1#	2	CS15 1,2-DICHLOROETHANE-	65	518	1	42024.	1.726	50.000
7	V1#	20	V001 DICHLORODIFLUOROMET	85	62	1	40206.	1.651	50.000
8	V1#	10	C010 CHLOROMETHANE	50	82	1	25739.	1.057	50.000
9	V1#	25	C020 VINYL CHLORIDE	62	99	1	28831.	1.184	50.000
10	V1#	15	C015 BROMOMETHANE	94	142	1	32572.	1.337	50.000
11	V1#	35	C025 CHLOROETHANE	64	161	1	19605.	0.805	50.000
12	V1#	70	V007 TRICHLOROFLUOROMETH	101	195	1	74056.	3.041	50.000
13	V1#	32	V003 DICHLOROFLUOROMETHA	67	206	1	55704.	2.287	50.000
14	V1#	80	C045 1,1-DICHLOROETHENE	96	255	1	34422.	1.413	50.000
15	V1#	65	C040 CARBON DISULFIDE	76	258	1	73619.	3.023	50.000
16	V1#	105	V015 TRICHLORO-TRIFLUORO	151	268	1	42285.	1.736	50.000
17	V1#	50	C035 ACETONE	43	287	1	4903.	0.201	50.000
18	V1#	45	C030 METHYLENE CHLORIDE	84	319	1	37125.	1.524	50.000
19	V1#	95	V012 TRANS-1,2-DICHLOROE	96	345	1	35038.	1.439	50.000
20	V1#	102	V009 HEXANE	57	375	1	45232.	1.857	50.000
21	V1#	90	C050 1,1-DICHLOROETHANE	63	387	1	61969.	2.545	50.000
22	V2#	25	C125 VINYL ACETATE	43	409	2	44145.	0.362	50.000
23	V1#	94	V011 CIS-1,2-DICHLOROETH	96	444	1	38283.	1.572	50.000
24	V1#	98	C110 2-BUTANONE	72	459	1	1219.	0.050	50.000
25	V1#	99	V013 TETRAHYDROFURAN	42	473	1	5147.	0.211	50.000
26	V1#	100	C060 CHLOROFORM	83	481	1	72108.	2.961	50.000
27	V2#	15	C115 1,1,1-TRICHLOROETHA	97	483	2	67040.	0.549	50.000
28	V2#	20	C120 CARBONTETRACHLORIDE	117	496	2	66794.	0.547	50.000
29	V2#	60	C165 BENZENE	78	517	2	104731.	0.858	50.000
30	V1#	110	C065 1,2-DICHLOROETHANE	62	525	1	45205.	1.856	50.000
31	V2#	45	C150 TRICHLOROETHENE	130	581	2	55393.	0.454	50.000
32	V2#	35	C140 1,2-DICHLOROPROPANE	63	600	2	41153.	0.337	50.000
33	V1#	130	V019 1,4-DIOXANE	88	625	1	4901.	0.010	1000.000
34	V2#	30	C130 BROMODICHLOROMETHAN	83	634	2	70021.	0.574	50.000
35	V2#	75	V023 2-CHLOROETHYL VINYL	63	672	2	19030.	0.156	50.000
36	V2#	40	C143 CIS-1,3-DICHLOROPRO	75	677	2	91663.	0.464	81.000
37	V3#	10	C205 4-METHYL-2-PENTANON	43	702	3	20690.	0.217	50.000
38	V3#	35	C230 TOLUENE	92	703	3	71520.	0.751	50.000
39	V2#	65	C172 TRANS-1,3-DICHLOROP	75	736	2	16378.	0.353	19.000
40	V2#	55	C160 1,1,2-TRICHLOROETHA	97	752	2	30565.	0.250	50.000
41	V3#	20	C220 TETRACHLOROETHENE	164	754	3	47359.	0.497	50.000
42	V3#	15	C210 2-HEXANONE	43	787	3	13299.	0.140	50.000
43	V2#	50	C155 DIBROMOCHLOROMETHAN	129	786	2	50096.	0.410	50.000
44	V2#	70	V022 1,2-DIBROMOETHANE	107	790	2	78116.	0.320	100.000
45	V3#	40	C235 CHLOROBENZENE	112	844	3	81482.	0.856	50.000
46	V3#	50	C240 ETHYLBENZENE	106	861	3	40221.	0.422	50.000
47	V3#	75	V032 M+P XYLENES	106	875	3	68740.	0.722	50.000
48	V3#	60	V029 O-XYLENE	106	915	3	40540.	0.426	50.000
49	V3#	55	C245 STYRENE	104	919	3	82049.	0.862	50.000
50	V2#	80	C180 BROMOFORM	173	933	2	40265.	0.330	50.000
51	V3#	25	C225 1,1,2,2-TETRACHLORO	83	1001	3	43797.	0.460	50.000
52	V3#	80	V035 M-DICHLOROBENZENE	146	1090	3	78377.	0.823	50.000
53	V3#	90	V037 P-DICHLOROBENZENE	146	1102	3	80992.	0.851	50.000
54	V3#	85	V036 O-DICHLOROBENZENE	146	1132	3	77449.	0.813	50.000
55	V1#	40	V004 IODOMETHANE	142	261	1	148297.	3.045	100.000
56	V1#	55	V005 ACROLEIN	56	259	1	11704.	0.096	250.000
57	V1#	60	V006 ACRYLONITRILE	53	355	1	14473.	0.149	200.000
58	V1#	63	TERT-BUTYL METHYL ETHER	73	358	1	55899.	2.295	50.000
59	V1#	115	V016 DIBROMOMETHANE	174	611	1	34019.	1.397	50.000
60	V2#	90	V025 1,2,3-TRICHLOROPROP	75	998	2	25637.	0.210	50.000
61	V3#	38	V027 ETHYL METHACRYLATE	41	755	3	49982.	0.262	100.000
62	V3#	30	V026 T-1,4-DICHLORO-2-BU	53	1006	3	8621.	0.091	50.000

Enseco GC/MS
VOA AP9 CALIBRATION CHECK

000150

ONTIN. CALIBRATION	50 UG/L	F1091	07/14/92	14:16:00
NITIAL CALIBRATION	20 UG/L	F2869	08/03/90	15:01:00
ITIAL CALIBRATION	50 UG/L	F2870	08/03/90	15:36:00
ITIAL CALIBRATION	100 UG/L	F2871	08/03/90	16:10:00
ITIAL CALIBRATION	150 UG/L	F2872	08/03/90	16:46:00
NITIAL CALIBRATION	200 UG/L	F2873	08/03/90	17:21:00

ibrary Entry	Compound	Initial Calibration Response Factor Avg	Min	% RSD Max	Continuing Calibration Response Factor Min	% Diff Max
1 30	V002 ACETONITRILE	0.033		55.8	0.013	60.6
1 75	PROPIONITRILE (ETHYL	0.092		17.1	0.058	37.0
1 85	ALLYL CHLORIDE (3-CH	0.699		19.8	0.550	21.3
1 120	V017 METHACRYLONITRI	0.630		23.5	0.482	23.5
1 125	ISOBUTANOL	0.038		11.1	0.026	31.6
1 135	CHLOROPRENE (2-CHLOR	1.092		11.0	0.996	8.8
2 28	METHYL METHACRYLATE	0.270		12.7	0.215	20.4
2 85	V024 1,1,1,2-TETRACH	0.408		5.7	0.391	4.2
3 45	V028 1,2-DIBROMO-3-C	0.188		11.4	0.148	21.3

Enseco GC/MS
VOA AP9 CALIBRATION CHECK

ONTIN.	CALIBRATION	50 UG/L	F1091	07/14/92	14:16:00
NITIAL	CALIBRATION	20 UG/L	F2869	08/03/90	15:01:00
NITIAL	CALIBRATION	50 UG/L	F2870	08/03/90	15:36:00
ITIAL	CALIBRATION	100 UG/L	F2871	08/03/90	16:10:00
ITIAL	CALIBRATION	150 UG/L	F2872	08/03/90	16:46:00
ITIAL	CALIBRATION	200 UG/L	F2873	08/03/90	17:21:00

		F1091		F2869		F2870		F2871		F2872		F2873	
ib	#	Conc	RRF	Conc	RRF	Conc	RRF	Conc	RRF	Conc	RRF	Conc	RRF
1	30	500,	0.013	200,	0.031	500,	0.009	1000,	0.046	1500,	0.022	2000,	0.055
1	75	50,	0.058	20,	0.075	50,	0.104	100,	0.086	150,	0.083	200,	0.113
1	85	25,	0.550	10,	0.585	25,	0.616	50,	0.674	75,	0.683	100,	0.936
1	120	50,	0.482	20,	0.653	50,	0.678	100,	0.465	150,	0.513	200,	0.840
1	125	500,	0.026	200,	0.036	500,	0.033	1000,	0.037	1500,	0.042	2000,	0.043
1	135	50,	0.996	20,	1.019	50,	1.021	100,	1.069	150,	1.046	200,	1.304
2	28	100,	0.215	40,	0.230	100,	0.290	200,	0.273	300,	0.314	400,	0.243
2	85	50,	0.391	20,	0.409	50,	0.404	100,	0.391	150,	0.389	200,	0.447
3	45	100,	0.148	40,	0.172	100,	0.182	200,	0.183	300,	0.179	400,	0.226

Name List: HEDR1 Entry # 1 of 1
File Name: F1091

(1)Format: VOAIND
(3)SAMPLE: 50PPB
(5)COMMENT: AP9 STD
(11)Quan List Units: 1.00UG/L
(13)Extract Dilution: NA
(15)Extract Vol. Used: NA
(17)Percent Moisture: NA
(20)SURROGATE VOLUME:: 0.00500L

(2)PROJECT:
(4)MATRIX: WATER
(10)Analyst: MEB
(12)Purge Volume: 5.00ML
(14)Extract Volume: NA
(16)Sample Amount: 5.00ML
(19)Run Factor: 1.00UG/L

7/14/92 14:16:50
Acquisition started

Acquire
07/14/92 14:16:00 + 0:00
Sample: -50PPB WATER AP9 STD
Conds.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
Formula: 1.00UG/L0.00500L
Submitted by: RMAL

Run 3:F1091
Free sectors: 13411
Instrument: I50F
Analyst: MEB

Starting
Scan: 0 of 1464
Weight: 0.000
Acct. No: VOAIND

*** GC not ready and being equilibrated ***
Elapsed time : 0.0 Min

GC Desc.: VN

Seq. #	Temp (DegC)	Rate (C/min)	Time (minutes) period	total
1	-20--18	2.0	1.0	1.0
2	-18-102	7.0	17.1	18.1
3	102-202	30.3	3.3	21.4

Injector A	:	220 Deg C
GC oven	:	95 Deg C
Transfer-line	:	203 Deg C
Ion source	:	183 Deg C

Valve A : closed Valve B : closed

*** Instrument parameters ***
Post acquisition state -> Filament : Off Multiplier : Off
MODE: EI (+) Centroid + Temp - Sequence: VO (1 time window.)

Sequence Window # 1
Number of cycles: 1
Filament is ON
Multiplier is ON
Scan descriptor: VO Mass intervals: 1 Positive ion mode.
Total scan time: 1.000 s Master rate: 8

MPW: 3 MFW: 70 MA: 50 TH: 1 BL: 0

Int #	Lo mass	Hi mass	Time
1	36.511	300.590	1.000

Calibration table: 3:071492CF

Interface number	0	
Instrument type	G	
Full scale mass	1170	u
Zero scale mass	1	u
Intensity/ion	2	
Peak width	1000.	mmu
Offset at low mass	0	mmu
Offset at high mass	0	mmu
Voltage settling time(ms)	4	

Current instrument parameters.

	Positive ion mode	Negative ion mode
Resolution (high)	123.00	0.00
Resolution (low)	125.00	0.00
Quad offset	-2.00	0.00
Quad programming	-1.00	0.00
Lens offset	-40.00	0.00
Lens programming	0.00	0.00
Ext offset	-4.50	0.00
Ext programming	0.00	0.00
Collector	30.00	0.00
Ion offset	4.00	0.00

000153

Ion programming	1.00	0.00
Rod polarity	Reverse	Normal

Electron multiplier voltage: 1390.
Filament emission current: 750.
Electrometer range: 10 ^-7
Electrometer zero: 128.0

Analyzer Fore Pressure .....: 0.028 Torr
Separator/Source Pressure .....: 0.384 Torr

7/14/92 14:48:29
ACQUISITION COMPLETED
Scans 1 to 1464 Centroid

Mode	Scans	Secs	Out of	%	Peaks per scan	per sec	
Centroid	1464	0.7	1464.0	0.0	8446.	6.	6.

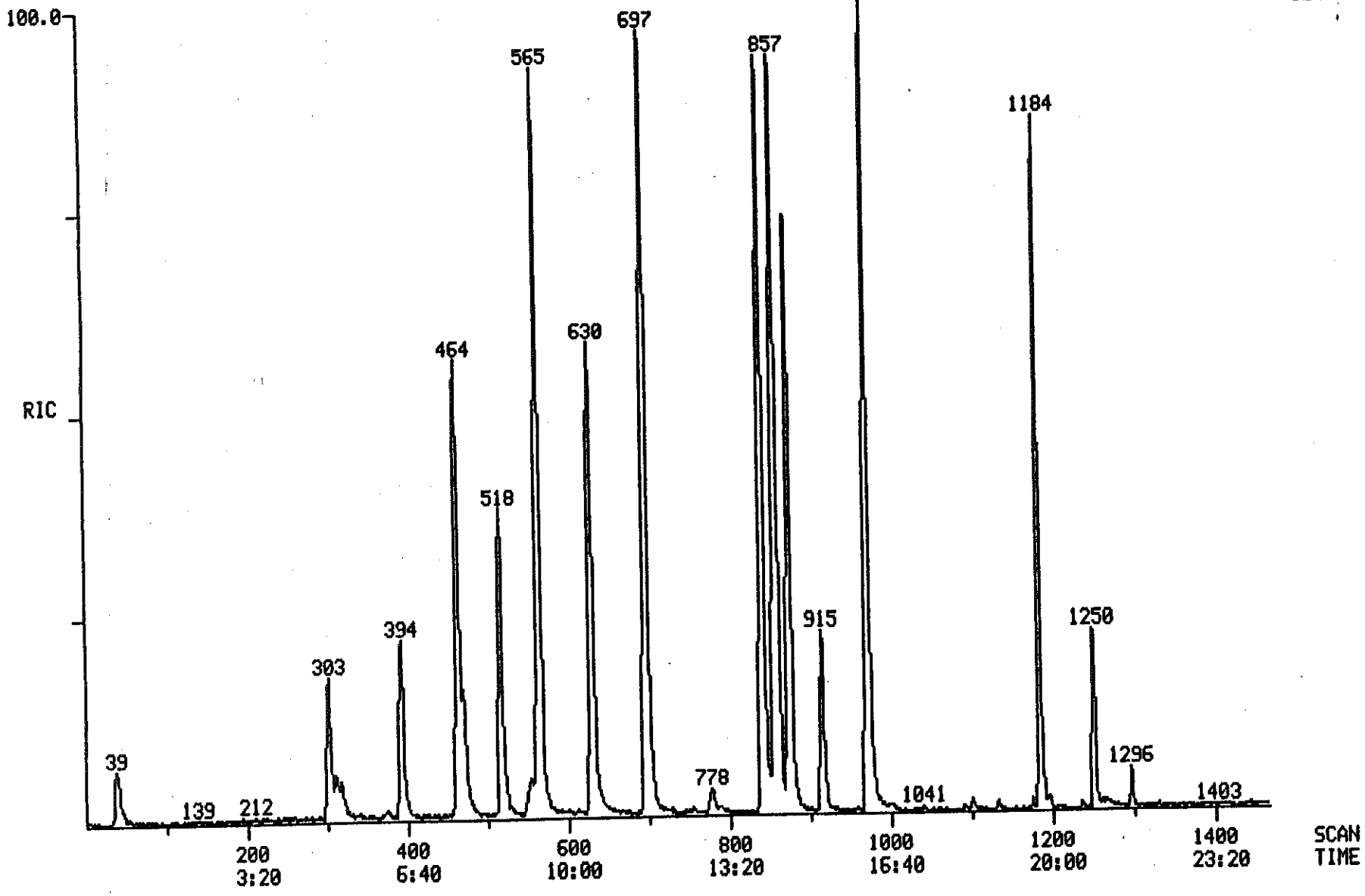
000154

RIC
07/14/92 14:16:00
SAMPLE: -50PPB WATER AP9 STD
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
RANGE: G 1,1464 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F1091 #4
CALI: 071492CF #3

SCANS 1 TO 1464

52416.



PROCEDURE: TCA DIAGNOSTIC REPORT 7/14/92 14:49:13
DATA FILE: F1091
REFERENCE: 11TABLE
NAME LIST: LLNL INITIALIZATION OPTION: 2 PROCESSING OPTION: 3 000155
REPORT: IS01

< ---- STANDARDS ----- >				< --- PLUS UNKNOWNS --- >				< - LIST NAMES - >
PROC	USED	POSS	RMS	PROC	USED	POSS	RMS	STANDARD/UNKNOWN
1	1	1	0	5	4	4	33	IS01/TC01
3	3	1	137	6	6	2	102	IS02/TC02
1	1	1	0	3	1	1	0	IS03/TC03

12 COMPOUNDS PROCESSED, 9 FOUND

< COMPOUND >			< ---------- SEARCH ---------- >						< SAT >		< ------ CHRO ------- >			
NO	LIB	ENTRY	REF	PRED	SEL	DELTA	PEAKS	FIT	PEAKS		M/Z	TOP	DELTA	PEAKS
1	V1	1	-464	464	464	.	1	996	.		128	464	.	1
2	V1	85	-304	303	303	.	2	980	.		76	303	.	1
3	V1	30	-313	312	312	.	2	996	.		40	312	.	1
4	V1	135	-395	394	394	.	1	986	.		53	394	.	1
5	V1	75	-463	463	.	.	.	.	.		54	463	.	1
6	V2	1	-563	564	565	1	1	993	.		114	565	.	1
7	V3	1	-840	841	841	.	1	1000	.		117	841	.	1
8	V1	120	-473	473	472	-1	1	982	.		41	472	.	1
9	V1	125	-555	555	555	.	1	967	.		41	554	-1	1
10	V2	28	-629	630	630	.	2	999	.		41	630	.	1
11	V2	85	-868	869	.	.	.	.	.		131	.	.	.
12	V3	45	-1196	1197	.	.	.	.	.		157	.	.	.

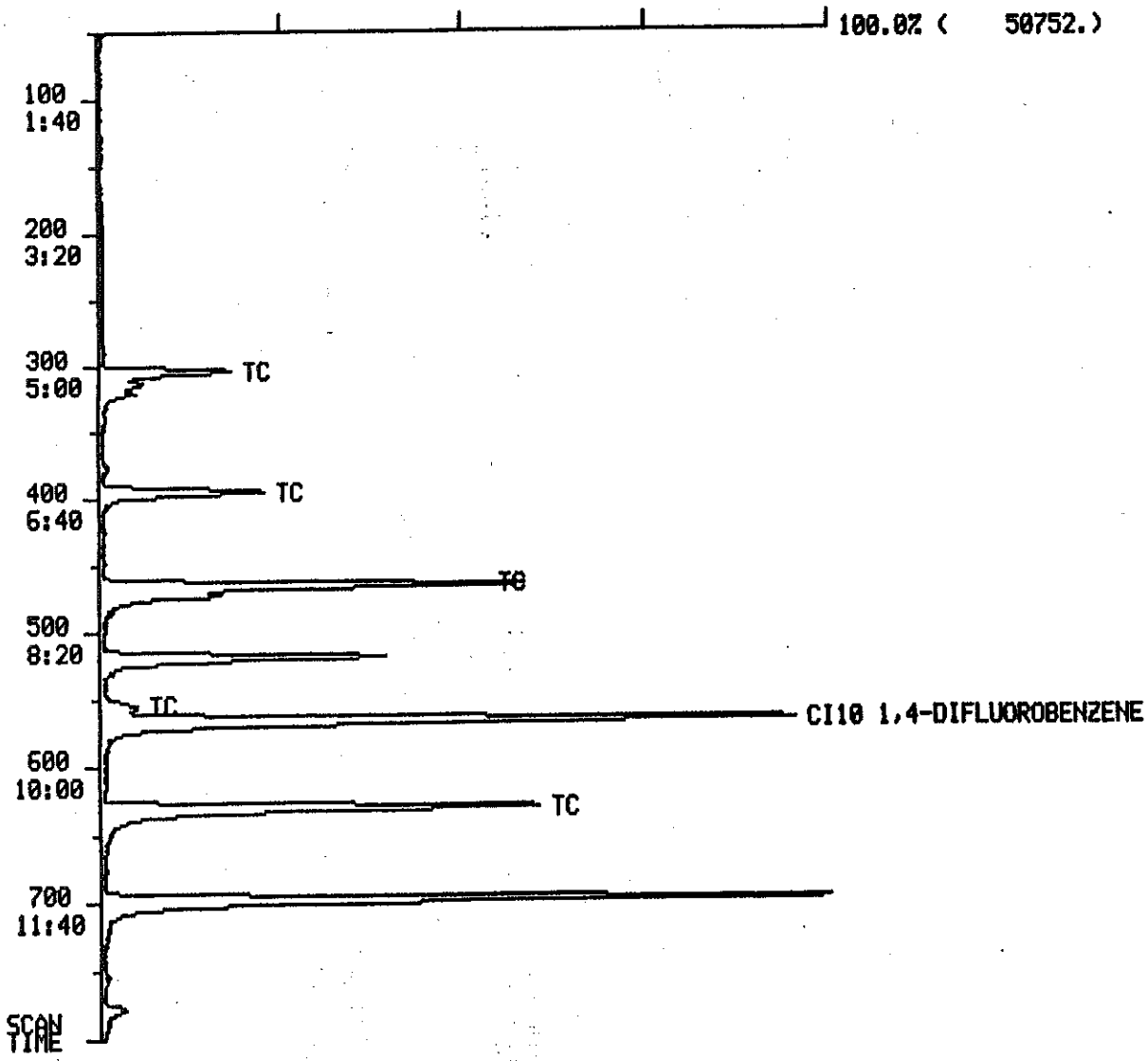
RMAL QUANTITATION SUMMARY FILE: F1091
COMPOUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

NO	LIBRARY ENTRY	NAME	MASS	SCAN	REF	AREA	UNITS: RRF	UG/L AMOUNT
1	V1# 1	CI01 BROMOCHLOROMETHANE	128	464	1	24750.	1.000	50.000
2	V2# 1	CI10 1,4-DIFLUOROBENZENE	114	565	2	123919.	1.000	50.000
3	V3# 1	CI20 CHLOROBENZENE-D5	117	841	3	91243.	1.000	50.000
4	V1# 30	V002 ACETONITRILE	40	312	1	3327.	0.024	278.647
5	V1# 75	PROPIONITRILE (ETHYLCYAN	54	463	1	1444.	0.042	69.723
6	V1# 85	ALLYL CHLORIDE (3-CHLORO	76	303	1	6806.	0.566	24.278
7	V1#120	V017 METHACRYLONITRILE	41	472	1	11925.	0.545	44.194
8	V1#125	ISOBUTANOL	41	554	1	6469.	0.028	459.209
9	V1#135	CHLOROPRENE (2-CHLORO-1,	53	394	1	24658.	0.965	51.597
10	V2# 28	METHYL METHACRYLATE	41	630	2	53349.	0.269	80.114
11	V2# 85	V024 1,1,1,2-TETRACHLORO	131		2	NOT FOUND		
12	V3# 45	V028 1,2-DIBROMO-3-CHLOR	157		3	NOT FOUND		

000157

DATA FROM FILE: F1091 SCANS 50 TO 800 ACQUIRED: 07/14/92 14:16:00
CALI: F1091 #3

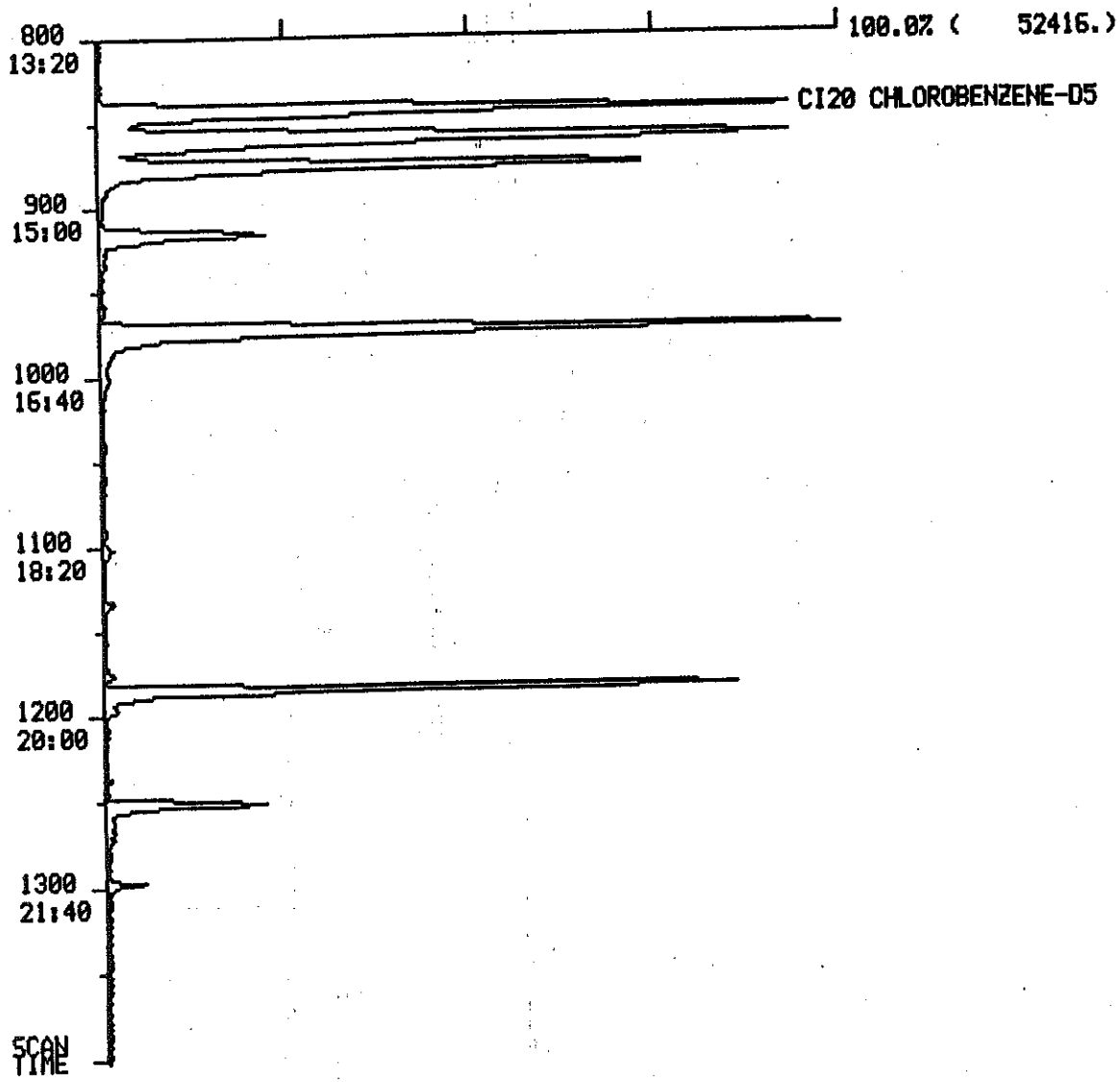
SAMPLE: -50PPB WATER AP9 STD
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M



000158

DATA FROM FILE: F1091 SCANS 800 TO 1400 ACQUIRED: 07/14/92 14:16:00
CALI: F1091 #3

SAMPLE: -50PPB WATER AP9 STD
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M



RMAL QUANTITATION SUMMARY FILE: F1091
COMPOUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

NO	LIBRARY ENTRY	NAME	MASS	SCAN	REF	AREA	UNITS: RRF	UG/L AMOUNT
1	V1# 1	CI01 BROMOCHLOROMETHANE	128	464	1	24750.	1.000	50.000
2	V2# 1	CI10 1,4-DIFLUOROBENZENE	114	565	2	123919.	1.000	50.000
3	V3# 1	CI20 CHLOROBENZENE-D5	117	841	3	91243.	1.000	50.000
4	V1# 30	V002 ACETONITRILE	40	312	1	3327.	0.013	500.001
5	V1# 75	PROPIONITRILE (ETHYLCYAN	54	463	1	1444.	0.058	50.000
6	V1# 85	ALLYL CHLORIDE (3-CHLORO	76	303	1	6806.	0.550	25.000
7	V1#120	V017 METHACRYLONITRILE	41	472	1	11925.	0.482	50.000
8	V1#125	ISOBUTANOL	41	554	1	6469.	0.026	500.000
9	V1#135	CHLOROPRENE (2-CHLORO-1,	53	394	1	24658.	0.996	50.000
10	V2# 28	METHYL METHACRYLATE	41	630	2	53349.	0.215	100.000
11	V2# 85	V024 1,1,1,2-TETRACHLORO	131	857	2	48424.	0.391	50.000
12	V3# 45	V028 1,2-DIBROMO-3-CHLOR	157	1183	3	26924.	0.148	100.000

QC LOT #: 14JUL92F DATE ANALYZED: 07/14/92

000160

METHOD: 624
ORGANICS BY GC/MS
SCS (SURROGATE CONTROL SAMPLES)
VOA, AQUEOUS QC

	DATA FILE	RUN FACTOR
ANALYST: MEB INSTRUMENT: F MATRIX: AQUEOUS	F1092	1.00

SAMPLE #	SAMPLE #	SAMPLE #	SAMPLE #	SAMPLE #
-2	-1			
4				
6				
7				
5				
3				

COMPOUND	SPIKE CONC. UG/L	MEASURED CONC. UG/L	ACCURACY PERCENT RECOVERY	ACCURACY CONTROL LIMITS
CS15 1,2-DICHLOROETH	50.0	50.7	101	82-112
CS10 BROMOFLUOROBENZ	50.0	45.9	92	83-113
CS05 TOLUENE-D8	50.0	46.4	93	90-112

NOTE: 80% OF ANALYTES MUST BE WITHIN CONTROL LIMITS
100% OF ANALYTES ARE WITHIN CONTROL LIMITS

SUPERVISOR APPROVAL :

NCR -7MS 7/15/92

NCR -9MSD 7/15/92

Sample: F1092 Performance Check: F1089 Elapsed Time: 1:18:00 000161
Sample: F1092 Calibration Stds.: F1090, F1091,

Data Reduced by : MEB Date: 7/14/92 Data File: F1092
Data Reviewed by: _____ Date: _____

Enseco GC/MS
Target Compound Data Summary Sheet

Sample: CLP, ,,VBLK ,LOW,WATER,BL071492,VOA,BLANK ,
Conditions: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
Date Analyzed: 07/14/92 14:49:00 Units: UG/L
Analyst: MEB Run Factor: 1.00
Quan List Threshold: 1.00 Surrogate Vol.: 0.00500

Surrogate Spike Recoveries
VOA, AQUEOUS QC

Compound	Surrogate Amount (ug) Spiked	Measured	% Recovery Measured	QC limits
S05 TOLUENE-D8	0.2500	0.2320	92.8	90 112
S10 BROMOFLUOROBENZ	0.2500	0.2295	91.8	83 113
S15 1,2-DICHLOROETH	0.2500	0.2535	101.	82 112

Target Compounds: VOAAP9

Scan #	Concentration Quan List UG/L	Sample UG/L	Compound
		BDL	V001 DICHLORODIFLUOROMETHANE
		BDL	C010 CHLOROMETHANE
		BDL	C020 VINYL CHLORIDE
		BDL	C015 BROMOMETHANE
		BDL	C025 CHLOROETHANE
		BDL	V007 TRICHLOROFLUOROMETHANE
		BDL	V003 DICHLOROFLUOROMETHANE
		BDL	C045 1,1-DICHLOROETHENE
		BDL	C040 CARBON DISULFIDE
		BDL	C035 ACETONE
		BDL	C030 METHYLENE CHLORIDE
		BDL	V012 TRANS-1,2-DICHLOROETHENE
		BDL	C050 1,1-DICHLOROETHANE
		BDL	C125 VINYL ACETATE
		BDL	V011 CIS-1,2-DICHLOROETHENE
		BDL	C110 2-BUTANONE
		BDL	C060 CHLOROFORM
		BDL	C115 1,1,1-TRICHLOROETHANE
		BDL	C120 CARBONTETRACHLORIDE
		BDL	C165 BENZENE
		BDL	C065 1,2-DICHLOROETHANE
		BDL	C150 TRICHLOROETHENE
		BDL	C140 1,2-DICHLOROPROPANE
		BDL	V019 1,4-DIOXANE
		BDL	C130 BROMODICHLOROMETHANE
		BDL	V023 2-CHLOROETHYL VINYL ETHER
		BDL	C143 CIS-1,3-DICHLOROPROPENE
		BDL	C205 4-METHYL-2-PENTANONE
		BDL	C230 TOLUENE
		BDL	C172 TRANS-1,3-DICHLOROPROPENE
		BDL	C160 1,1,2-TRICHLOROETHANE
		BDL	C220 TETRACHLOROETHENE
		BDL	C210 2-HEXANONE
		BDL	C155 DIBROMOCHLOROMETHANE
		BDL	V022 1,2-DIBROMOETHANE
		BDL	C235 CHLOROBENZENE
		BDL	C240 ETHYLBENZENE
		BDL	V032 M+P XYLENES
		BDL	V029 O-XYLENE
		BDL	C245 STYRENE
		BDL	C180 BROMOFORM
		BDL	C225 1,1,2,2-TETRACHLOROETHANE
		BDL	V002 ACETONITRILE
		BDL	V004 IODOMETHANE
		BDL	V005 ACROLEIN
		BDL	V006 ACRYLONITRILE
		BDL	PROPIONITRILE (ETHYLCYANIDE)
		BDL	ALLYL CHLORIDE (3-CHLOROPROPENE)
		BDL	V016 DIBROMOMETHANE
		BDL	V017 METHACRYLONITRILE
		BDL	ISOBUTANOL

~~631~~	~~1.207~~		~~1.21~~	METHYL METHACRYLATE 41
		BDL		V024 1,1,1,2-TETRACHLOROETHANE
		BDL		V025 1,2,3-TRICHLOROPROPANE
		BDL		V027 ETHYL METHACRYLATE
		BDL		V026 T-1,4-DICHLORO-2-BUTENE
~~1184~~	~~2.914~~		~~2.91~~	V028 1,2-DIBROMO-3-CHLOROPROPANE

000162

```
lame List: HEDR1              Entry #   1 of   1
ile Name: F1092

 1)Format: VOACLP                          ( 2)Case:
 3)Sample ID: VBLK                         ( 4)Level: LOW
 5)Matrix: WATER                           ( 6)Lab Sample ID: BL071492
 7)Fraction: VOA                           ( 8)Type: BLANK
 0)Analyst: MEB                            (11)Quan List Units: 1.00UG/L
12)Purge Volume: 5.00ML                    (13)Extract Dilution: NA
14)Extract Volume: NA                      (15)Extract Vol. Used: NA
16)Sample Amount: 5.00ML                   (17)Percent Moisture: NA
19)Run Factor: 1.00UG/L                    (20)SURROGATE VOLUME:: 0.00500L

/14/92    14:49:29
   Acquisition started

quire                          Run 3:F1092                Starting
/14/92 14:49:00 +  0:00        Free sectors: 13268        Scan: 0 of 1464
mple: CLP, ,,VBLK ,LOW,WATER,BL071492,VOA,BLANK ,
nds.: 1.00UG/L *5.00ML *100%/NA *(NA/NA )/5.00ML  NA M
rmula: 1.00UG/L0.00500L        Instrument: I50F           Weight:     0.000
bmitted by:  RMAL              Analyst: MEB               Acct. No: VOACLP

                 *** GC not ready and being equilibrated ***
 Desc.: VN                                   Elapsed time :   0.0 Min
q.  Temp     Rate      Time (minutes)
   (DegC)  (C/min)  period     total      Injector A    :  220 Deg C
  -20--18    2.0      1.0       1.0       GC oven       :  116 Deg C
  -18-102    7.0     17.1      18.1       Transfer-line:  202 Deg C
  102-202   30.3      3.3      21.4       Ion source    :  184 Deg C
lve A : closed        Valve B : closed
                 *** Instrument parameters ***
    Post acquisition state ->   Filament : Off  Multiplier : Off
DE: EI (+) Centroid + Temp - Sequence: VO ( 1 time window. )

quence Window #  1
                 Number of cycles:      1
                 Filament is ON
                 Multiplier is ON
an descriptor: VO        Mass intervals:  1       Positive ion mode.
 al scan time:  1.000  s                          Master rate:      8

W:   3  MFW:  70  MA:  50  TH:   1  BL:   0
nt #   Lo mass   Hi mass      Time
 1      36.511   300.590     1.000

  Calibration table:       3:071492CF

  Interface number            0
  Instrument type             Q
  Full scale mass          1170  u
  Zero scale mass             1  u
  Intensity/ion               2
  Peak width               1000.  mmu
  Offset at low mass          0  mmu
  Offset at high mass         0  mmu
  Voltage settling time(ms)   4

rrent instrument parameters.
                   Positive ion mode   Negative ion mode
 Resolution (high)      123.00              0.00
 Resolution (low)       125.00              0.00
 Quad offset             -2.00              0.00
 Quad programming        -1.00              0.00
 Lens offset            -40.00              0.00
 Lens programming         0.00              0.00
 Ext offset              -4.50              0.00
 Ext programming          0.00              0.00
 Collector               30.00              0.00
 Ion offset               4.00              0.00
```

Ion programming 1.00 0.00
Rod polarity Reverse Normal
Electron multiplier voltage: 1390.
Filament emission current: 750.
Electrometer range: 10 ^-7
Electrometer zero: 128.0

alyzer Fore Pressure .....: 0.027 Torr
parator/Source Pressure .....: 0.389 Torr

/14/92 15:21:29
ACQUISITION COMPLETED
Scans 1 to 1464 Centroid

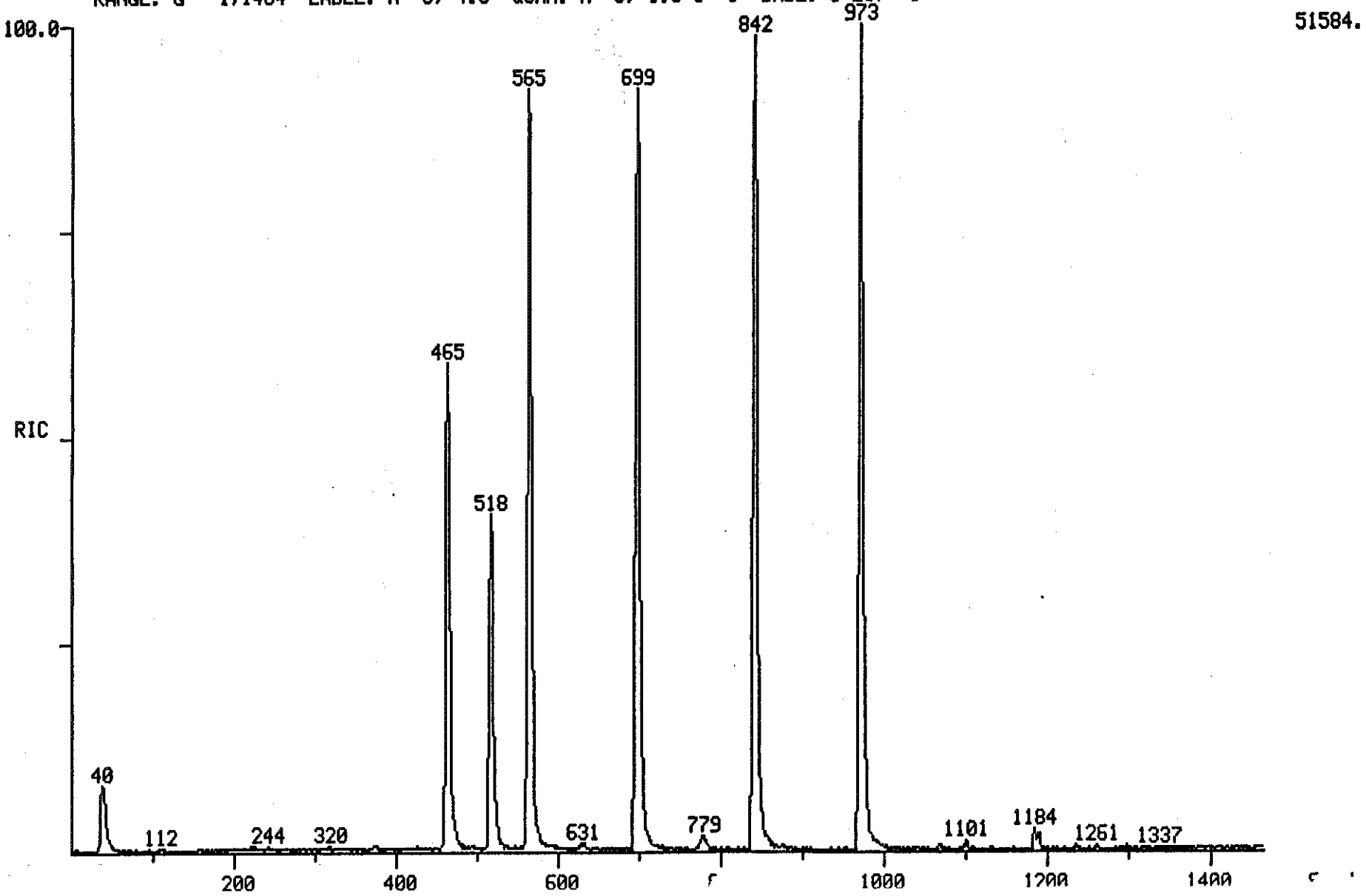
de	Scans	Secs	Out of	%	Peaks per scan	per sec
ntroid	1464	0.6	1464.0	0.0	4777. 3.	3.

000165

RIC
07/14/92 14:49:00
SAMPLE: CLP, ,,VBLK ,LOW,WATER,BL071492,VOA,BLANK ,
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
RANGE: G 1,1464 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F1092 #4
CALI: 071492CF #3

SCANS 1 TO 1464



OCEDURE: TCA DIAGNOSTIC REPORT 7/14/92 15:27:26
TA FILE: F1092
FERENCE: 11TABLE
ME LIST: LLNL INITIALIZATION OPTION: 2 PROCESSING OPTION: 3
REPORT: ISO1

000166

--- STANDARDS ----- ><				--- PLUS UNKNOWNS --- ><				- LIST NAMES - >
DC	USED	POSS	RMS	PROC	USED	POSS	RMS	STANDARD/UNKNOWN
1	1	1	0	11	1	1	0	ISO1/TCO1
1	1	1	0	11	1	1	0	ISO2/TCO2
1	1	1	0	4	2	2	73	ISO3/TCO3
3	3	2	79	13	4	1	65	ISO4/TCO4
3	3	1	79	13	4	1	58	ISO5/TCO5
3	3	1	79	9	3	1	79	ISO6/TCO6
1	1	1	0	11	2	1	0	ISO7/TCO7
1	1	1	0	3	2	1	0	ISO8/TCO8

64 COMPOUNDS PROCESSED, 8 FOUND

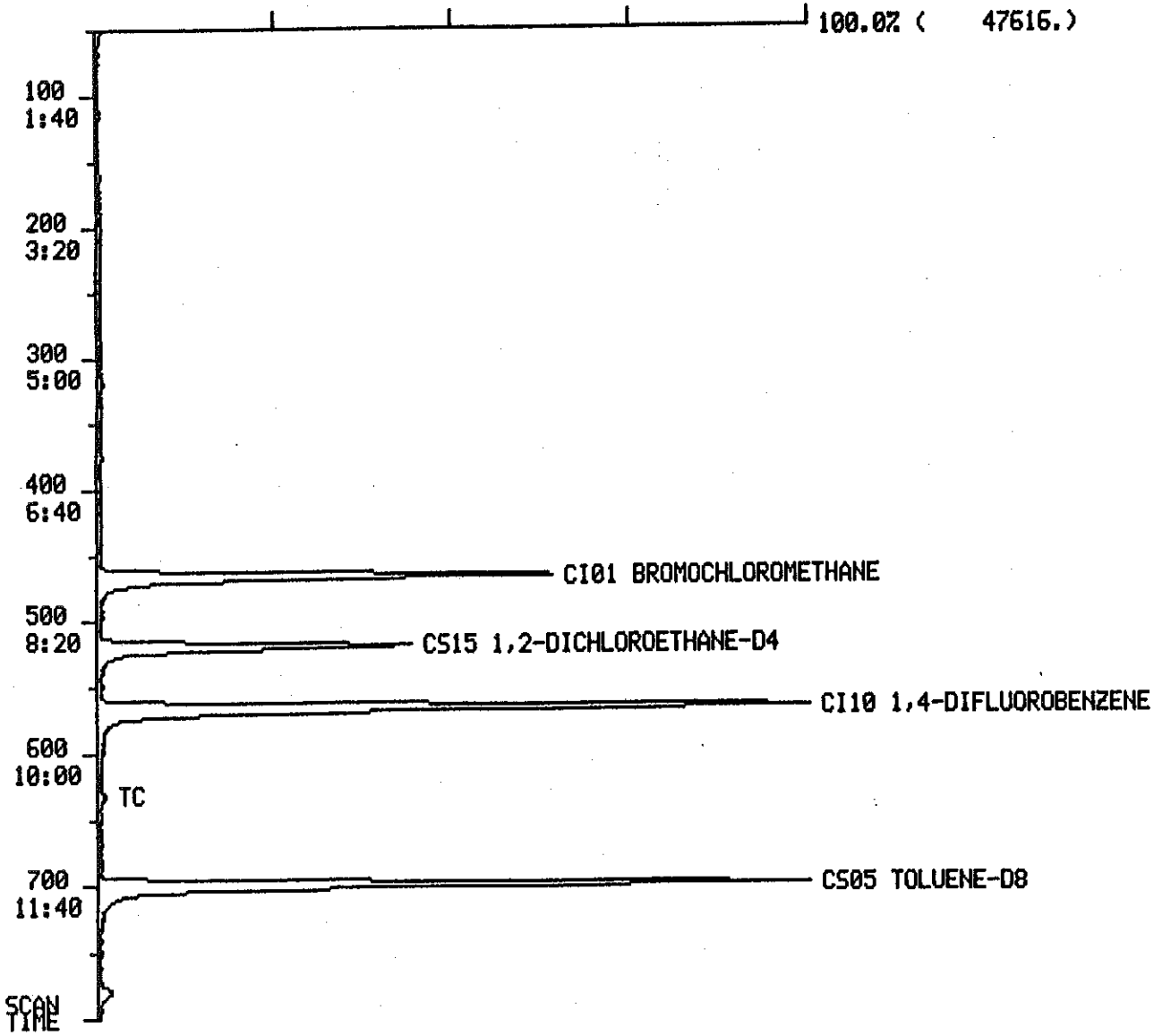
COMPOUND ><				SEARCH				>< SAT ><		CHRO		
O	LIB	ENTRY	REF	PRED	SEL	DELTA	PEAKS	FIT	PEAKS	M/Z	TOP	DELTA	PEAKS
1	V1	1	-463	465	465	.	1	994	.	128	465	.	1
2	V1	20	-62	62	.	.	.	.	.	85	.	.	.
3	V1	10	-82	82	.	.	.	.	.	50	.	.	.
4	V1	25	-99	99	.	.	.	.	.	62	.	.	.
5	V1	15	-142	143	.	.	.	.	.	94	.	.	.
6	V1	35	-161	162	.	.	.	.	.	64	.	.	.
7	V1	70	-195	196	.	.	.	.	.	101	.	.	.
8	V1	32	-206	207	.	.	.	.	.	67	.	.	.
9	V1	80	-254	255	.	.	.	.	.	96	.	.	.
0	V1	65	-257	258	.	.	.	.	.	76	.	.	.
1	V1	55	-258	259	.	.	.	.	.	56	.	.	.
2	V1	40	-260	261	.	.	.	.	.	142	.	.	.
3	V1	50	-286	287	.	.	.	.	.	43	.	.	.
4	V1	85	-303	304	.	.	.	.	.	76	.	.	.
5	V1	30	-312	313	.	.	.	.	.	40	.	.	.
6	V1	45	-318	319	.	.	.	.	.	84	318	.	1
7	V1	95	-344	345	.	.	.	.	.	96	.	.	.
8	V1	60	-354	356	.	.	.	.	.	53	.	.	.
9	V1	90	-386	388	.	.	.	.	.	63	.	.	.
0	V1	135	-394	396	.	.	.	.	.	53	.	.	.
1	V2	25	-410	412	.	.	.	.	.	43	.	.	.
	V1	94	-443	445	.	.	.	.	.	96	.	.	.
	V1	98	-458	460	461	1	2	807	.	72	.	.	.
4	V1	75	-463	466	.	.	.	.	.	54	.	.	.
5	V2	1	-564	566	565	-1	1	994	.	114	565	.	1
6	V3	1	-840	842	842	.	2	998	.	117	842	.	1
7	V1	120	-472	473	.	.	.	.	.	41	.	.	.
8	V1	100	-480	481	.	.	.	.	.	83	.	.	.
9	V2	15	-484	485	.	.	.	.	.	97	.	.	.
0	V2	20	-497	498	.	.	.	.	.	117	.	.	.
1	V1	2	-517	518	518	.	1	996	.	65	518	.	1
2	V2	60	-518	519	.	.	.	.	.	78	.	.	.
3	V1	110	-524	525	.	.	.	.	.	62	.	.	.
4	V1	125	-554	555	.	.	.	.	.	41	.	.	.
5	V2	45	-582	583	.	.	.	.	.	130	.	.	.
6	V2	35	-601	603	.	.	.	.	.	63	.	.	.
7	V1	115	-610	612	.	.	.	.	.	174	.	.	.
8	V1	130	-624	626	.	.	.	.	.	88	.	.	.
9	V2	28	-630	632	.	.	.	.	.	41	631	.	1
0	V2	30	-635	637	.	.	.	.	.	83	.	.	.
1	V2	75	-673	675	.	.	.	.	.	63	.	.	.
2	V2	40	-678	680	.	.	.	.	.	75	.	.	.
3	V3	2	-697	699	699	.	1	971	.	98	698	-1	1
4	V3	10	-702	704	.	.	.	.	.	43	.	.	.
5	V3	35	-703	705	.	.	.	.	.	92	.	.	.
6	V2	65	-737	739	.	.	.	.	.	75	.	.	.
7	V2	55	-753	755	.	.	.	.	.	97	.	.	.
8	V3	20	-754	756	.	.	.	.	.	164	.	.	.
9	V3	38	-755	757	.	.	.	.	.	41	.	.	.
0	V3	15	-787	789	.	.	.	.	.	43	.	.	.
1	V2	50	-787	789	.	.	.	.	.	129	.	.	.
2	V2	70	-791	793	.	.	.	.	.	107	.	.	.
3	V3	40	-844	846	.	.	.	.	.	112	.	.	.
4	V2	85	-857	859	.	.	.	.	.	131	.	.	.
5	V3	50	-861	863	.	.	.	.	.	106	.	.	.
6	V3	75	-875	877	.	.	.	.	.	106	.	.	.
	V3	60	-915	916	.	.	.	.	.	106	.	.	.
	V3	55	-919	920	.	.	.	.	.	104	.	.	.
7	V2	80	-935	936	.	.	.	.	.	173	.	.	.
0	V3	3	-972	973	973	.	1	983	.	95	973	.	1
1	V2	90	-1000	1001	.	.	.	.	.	75	.	.	.
2	V3	25	-1001	1002	.	.	.	.	.	83	.	.	.
3	V3	30	-1006	1008	.	.	.	.	.	53	.	.	.
4	V3	45	-1183	1184	1184	.	1	954	.	157	1184	.	1

IAL QUANTITATION SUMMARY FILE: F1092
)MPOUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

	LIBRARY ENTRY		NAME	MASS	SCAN	REF	AREA	UNITS: RRF	UG/L AMOUNT
IO	V1#	1	CI01 BROMOCHLOROMETHANE	128	465	1	25756.	1.000	50.000
	V2#	1	CI10 1,4-DIFLUOROBENZENE	114	565	2	121220.	1.000	50.000
3	V3#	1	CI20 CHLOROBENZENE-D5	117	842	3	102236.	1.000	50.000
4	V3#	2	CS05 TOLUENE-D8	98	698	3	103725.	1.093	46.423
5	V3#	3	CS10 BROMOFLUOROBENZENE	95	973	3	59164.	0.631	45.866
6	V1#	2	CS15 1,2-DICHLOROETHANE-	65	518	1	45053.	1.726	50.685
7	V1#	20	V001 DICHLORODIFLUOROMET	85		1	NOT FOUND		
8	V1#	10	C010 CHLOROMETHANE	50		1	NOT FOUND		
9	V1#	25	C020 VINYL CHLORIDE	62		1	NOT FOUND		
0	V1#	15	C015 BROMOMETHANE	94		1	NOT FOUND		
1	V1#	35	C025 CHLOROETHANE	64		1	NOT FOUND		
2	V1#	70	V007 TRICHLOROFLUOROMETH	101		1	NOT FOUND		
3	V1#	32	V003 DICHLOROFLUOROMETHA	67		1	NOT FOUND		
4	V1#	80	C045 1,1-DICHLOROETHENE	96		1	NOT FOUND		
5	V1#	65	C040 CARBON DISULFIDE	76		1	NOT FOUND		
6	V1#	50	C035 ACETONE	43		1	NOT FOUND		
7	V1#	45	C030 METHYLENE CHLORIDE	84		1	NOT FOUND		
8	V1#	95	V012 TRANS-1,2-DICHLOROE	96		1	NOT FOUND		
9	V1#	90	C050 1,1-DICHLOROETHANE	63		1	NOT FOUND		
0	V2#	25	C125 VINYL ACETATE	43		2	NOT FOUND		
1	V1#	94	V011 CIS-1,2-DICHLOROETH	96		1	NOT FOUND		
2	V1#	98	C110 2-BUTANONE	72		1	NOT FOUND		
3	V1#	100	C060 CHLOROFORM	83		1	NOT FOUND		
4	V2#	15	C115 1,1,1-TRICHLOROETHA	97		2	NOT FOUND		
5	V2#	20	C120 CARBONTETRACHLORIDE	117		2	NOT FOUND		
6	V2#	60	C165 BENZENE	78		2	NOT FOUND		
7	V1#	110	C065 1,2-DICHLOROETHANE	62		1	NOT FOUND		
8	V2#	45	C150 TRICHLOROETHENE	130		2	NOT FOUND		
9	V2#	35	C140 1,2-DICHLOROPROPANE	63		2	NOT FOUND		
0	V1#	130	V019 1,4-DIOXANE	88		1	NOT FOUND		
1	V2#	30	C130 BROMODICHLOROMETHAN	83		2	NOT FOUND		
2	V2#	75	V023 2-CHLOROETHYL VINYL	63		2	NOT FOUND		
1	V2#	40	C143 CIS-1,3-DICHLOROPRO	75		2	NOT FOUND		
4	V3#	10	C205 4-METHYL-2-PENTANON	43		3	NOT FOUND		
5	V3#	35	C230 TOLUENE	92		3	NOT FOUND		
6	V2#	65	C172 TRANS-1,3-DICHLOROP	75		2	NOT FOUND		
7	V2#	55	C160 1,1,2-TRICHLOROETHA	97		2	NOT FOUND		
8	V3#	20	C220 TETRACHLOROETHENE	164		3	NOT FOUND		
9	V3#	15	C210 2-HEXANONE	43		3	NOT FOUND		
0	V2#	50	C155 DIBROMOCHLOROMETHAN	129		2	NOT FOUND		
1	V2#	70	V022 1,2-DIBROMOETHANE	107		2	NOT FOUND		
2	V3#	40	C235 CHLOROBENZENE	112		3	NOT FOUND		
3	V3#	50	C240 ETHYLBENZENE	106		3	NOT FOUND		
4	V3#	75	V032 M+P XYLENES	106		3	NOT FOUND		
5	V3#	60	V029 O-XYLENE	106		3	NOT FOUND		
6	V3#	55	C245 STYRENE	104		3	NOT FOUND		
7	V2#	80	C180 BROMOFORM	173		2	NOT FOUND		
8	V3#	25	C225 1,1,2,2-TETRACHLORO	83		3	NOT FOUND		
9	V1#	30	V002 ACETONITRILE	40		1	NOT FOUND		
0	V1#	40	V004 IODOMETHANE	142		1	NOT FOUND		
1	V1#	55	V005 ACROLEIN	56		1	NOT FOUND		
2	V1#	60	V006 ACRYLONITRILE	53		1	NOT FOUND		
3	V1#	75	PROPIONITRILE (ETHYLCYAN	54		1	NOT FOUND		
4	V1#	85	ALLYL CHLORIDE (3-CHLORO	76		1	NOT FOUND		
5	V1#	115	V016 DIBROMOMETHANE	174		1	NOT FOUND		
6	V1#	120	V017 METHACRYLONITRILE	41		1	NOT FOUND		
7	V1#	125	ISOBUTANOL	41		1	NOT FOUND		
8	V1#	135	CHLOROPRENE (2-CHLORO-1,	53		1	NOT FOUND		
9	V2#	28	METHYL METHACRYLATE	41	631	2	630.	0.215	1.207
0	V2#	85	V024 1,1,1,2-TETRACHLORO	131		2	NOT FOUND		
1	V2#	90	V025 1,2,3-TRICHLOROPROP	75		2	NOT FOUND		
2	V3#	38	V027 ETHYL METHACRYLATE	41		3	NOT FOUND		
3	V3#	30	V026 T-1,4-DICHLORO-2-BU	53		3	NOT FOUND		
4	V3#	45	V028 1,2-DIBROMO-3-CHLOR	157	1184	3	879.	0.148	2.914

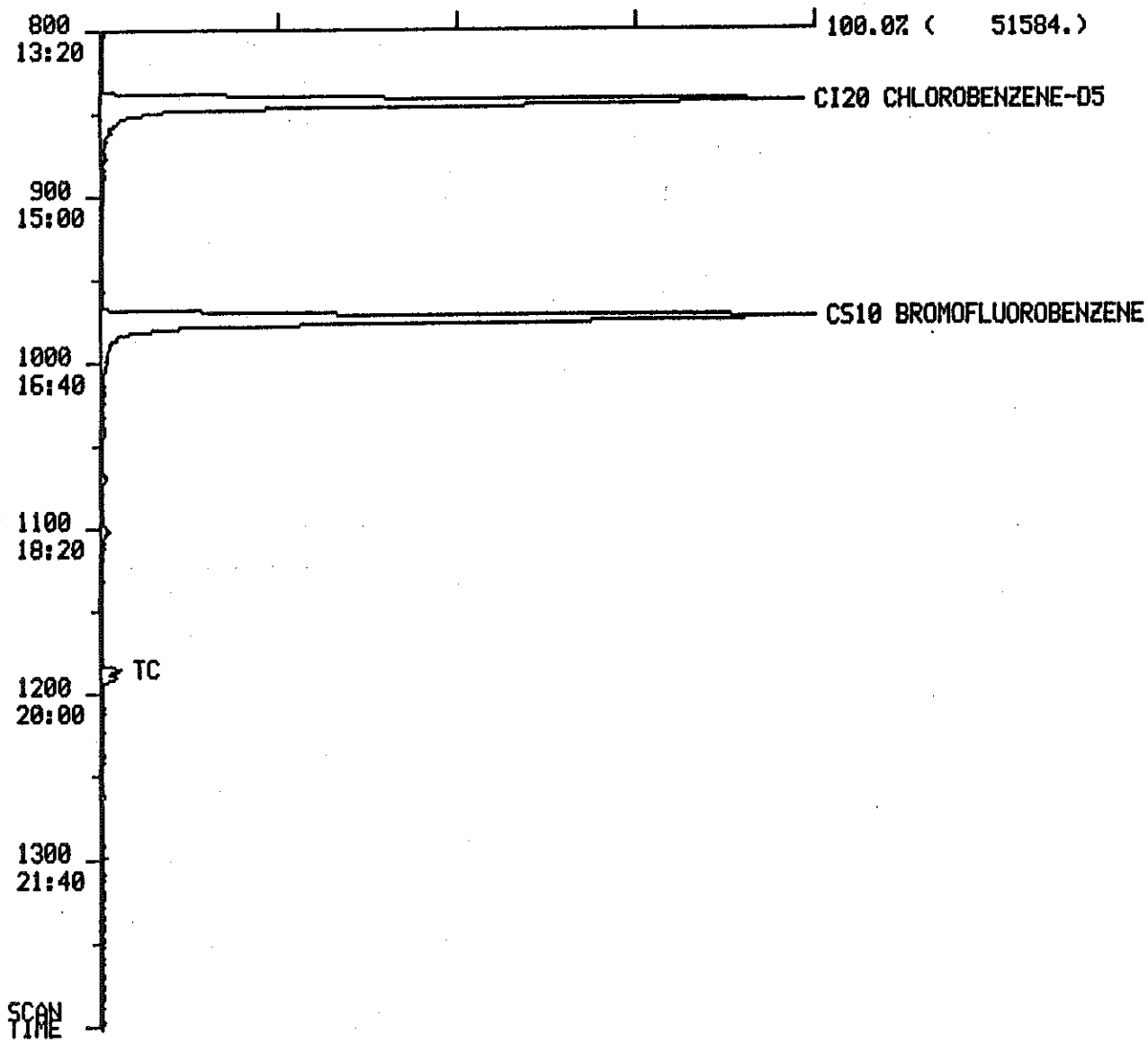
000168

DATA FROM FILE: F1092 SCANS 50 TO 800 ACQUIRED: 07/14/92 14:49:00
CALI: F1092 #3
SAMPLE: CLP, ,,VBLK ,LOW,WATER,BL071492,VOA,BLANK ,
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M



000169

DATA FROM FILE: F1092 SCANS 800 TO 1400 ACQUIRED: 07/14/92 14:49:00
CALI: F1092 #3
SAMPLE: CLP, ,,VBLK ,LOW,WATER,BL071492,VOA,BLANK ,
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M

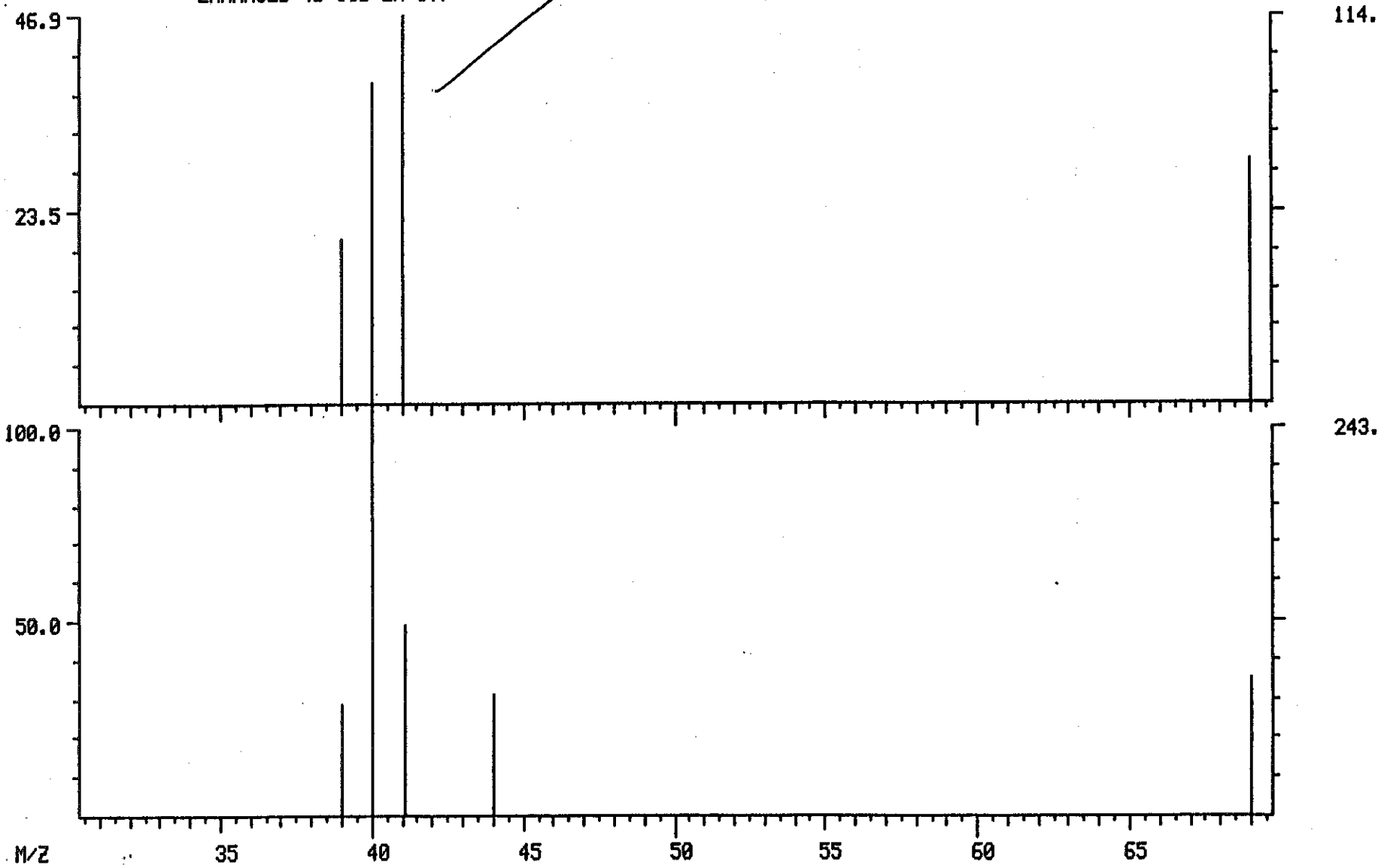


0001170

DUAL MASS SPECTRUM
07/14/92 14:49:00 + 10:31
SAMPLE: CLP, ,,VBLK ,LOW,WATER,BL071492,VOA,BLANK ,
CONDS.: V2#28 M/Z 41 METHYL METHACRYLATE 41
TEMP: 47 DEG. C
ENHANCED (S 15B 2N 0T)

DATA: F1092 #631
CALI: 071492CF #3

BASE M/Z: 41/ 40
RIC: 329./ 592.

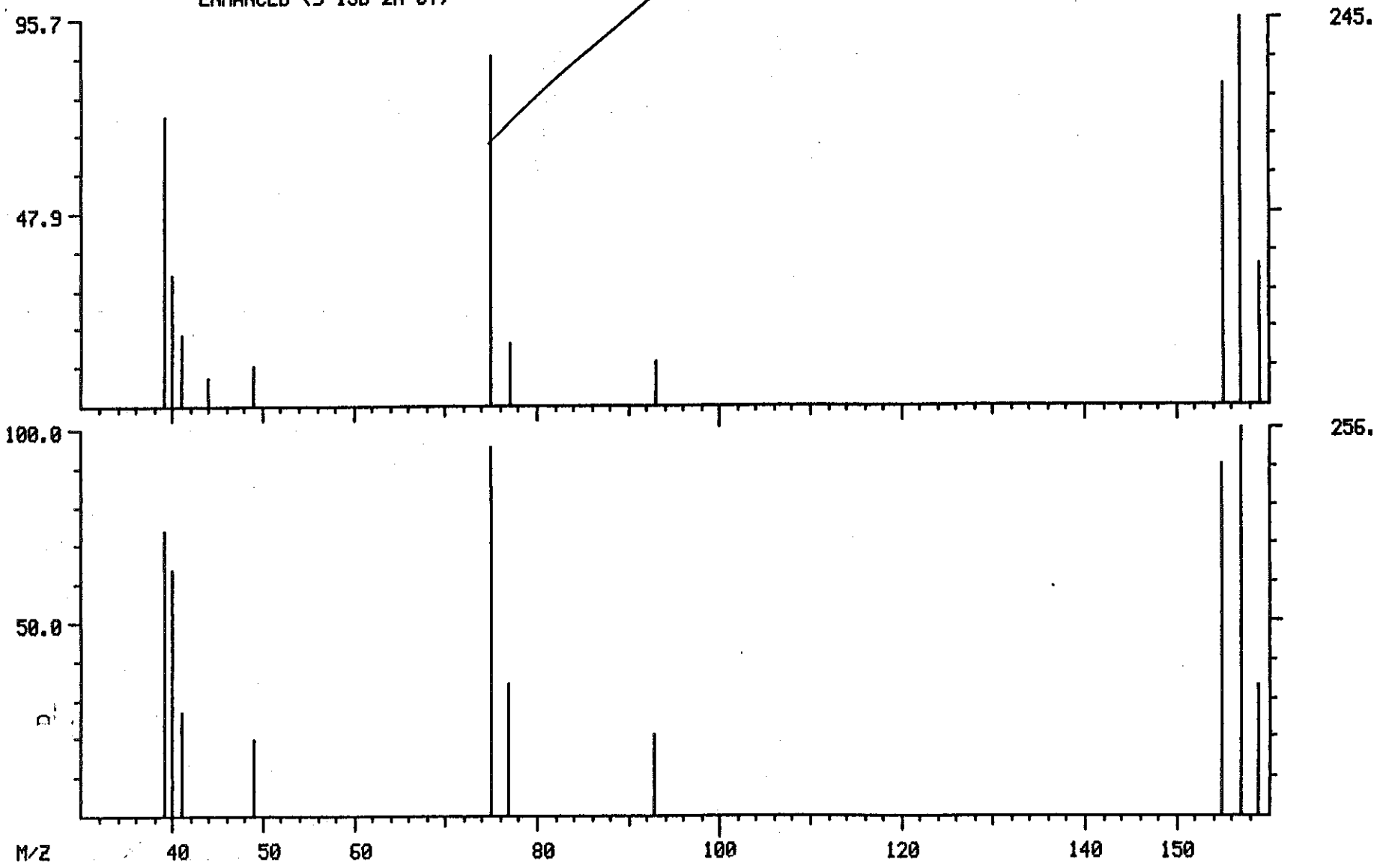


000171

DUAL MASS SPECTRUM
07/14/92 14:49:00 + 19:44
SAMPLE: CLP, ,,VBLK ,LOW,WATER,BL071492,VOA,BLANK ,
CONDS.: V3#45 M/Z 157 V028 1,2-DIBROMO-3-CHLOROPROPANE
TEMP: 145 DEG. C
ENHANCED (S 15B 2N 0T)

DATA: F1092 #1184
CALI: 071492CF #3

BASE M/Z: 157/ 157
RIC: 1180./ 1428.



TIC SELECTION REPORT

DATA FILE: F1092

THE FOLLOWING PEAKS WERE REJECTED BECAUSE AT LEAST 40 % OF THEIR SIZE WAS ACCOUNTED FOR BY TARGET COMPOUNDS ELUTING WITHIN 6 SCANS OF THE PEAK TOP.

SCAN	SIZE	AMOUNT
465	153532.	50.000
518	105672.	21.534
565	245362.	50.000
698	263732.	53.743
842	253996.	50.000
973	266712.	52.503
1184	3949.	0.777
1189	3210.	0.632

TOTAL NUMBER OF UNIDENTIFIED PEAKS WITH SIZE GREATER THAN 0 % OF THE CLOSEST INTERNAL STANDARD THAT DOES NOT HAVE INTERFERENCES = 1

INTERNAL STANDARDS THAT HAVE RIC SIZE LESS THAN 50 % OR GREATER THAN 200 % OF THE ESTIMATED RIC SIZE ARE CONSIDERED TO HAVE INTERFERENCES AND WILL NOT BE USED FOR QUANTITATION.

#	INTERNAL STANDARD	RIC SIZE	PERCENT OF ESTIMATED RIC SIZE	SCAN
1	CI01 BROMOCHLOROMETHANE	153532.	103	465
2	CI10 1,4-DIFLUOROBENZENE	245362.	121	565
3	CI20 CHLOROBENZENE-D5	253996.	105	842

* INDICATES INTERFERENCE

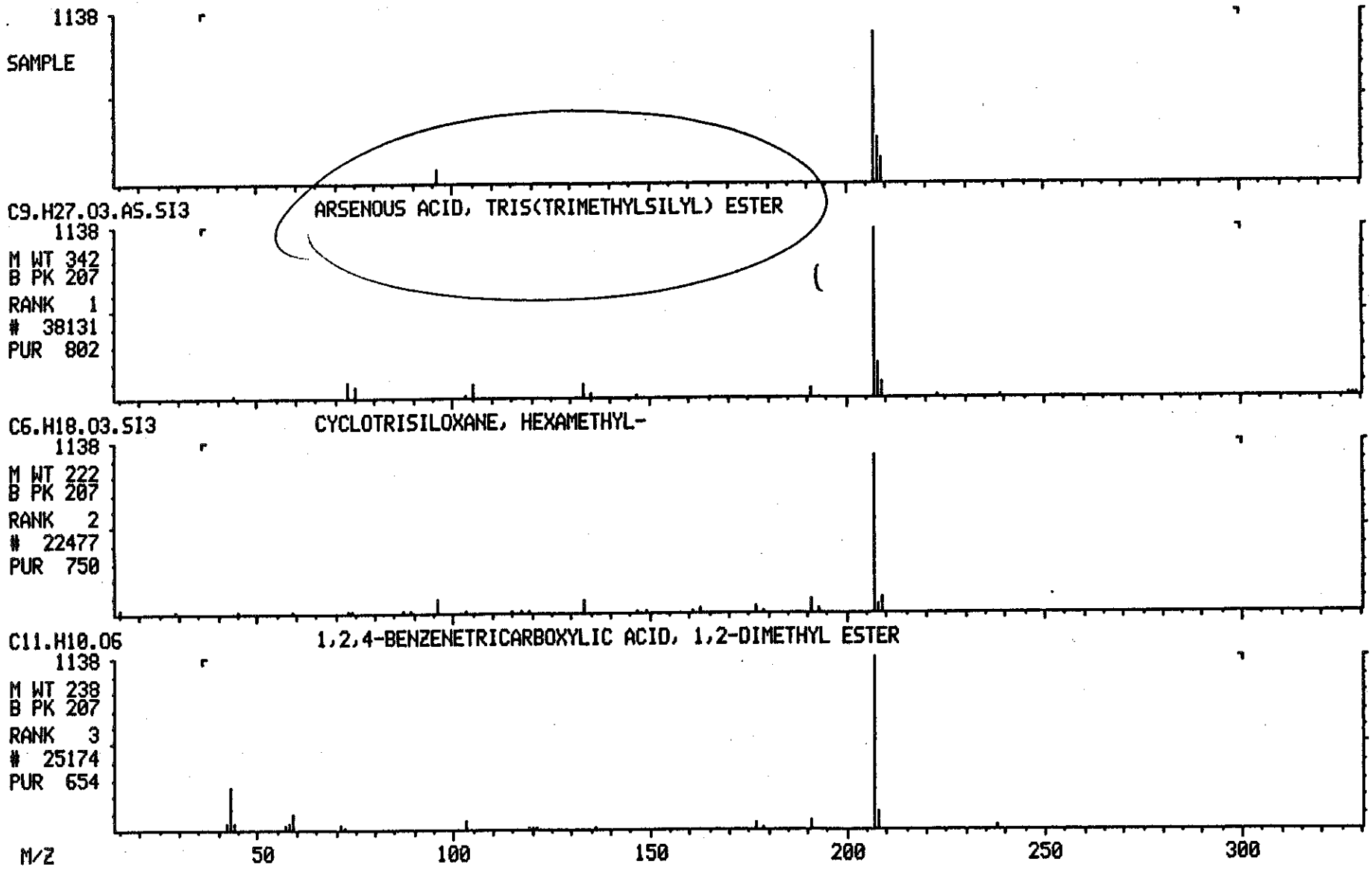
SIZE = AREA

000173

MID LIBRARY SEARCH (LIBRARYNB)
07/14/92 14:49:00 + 12:59
SAMPLE: CLP, ,,VBLK ,LOW,WATER,BL071492,VOA,BLANK ,
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
ENHANCED (S 15B 2N 0T)

DATA: F1092 # 779
CALI: 071492CF # 3

BASE M/Z: 207
RIC: 605.



DATA REDUCED BY: MEB DATE: 7/14/92 DATA FILE: F1092
DATA REVIEWED BY: ____ DATE: ____

ENSECO TIC REPORT (PAGE 1)

MPLE: CLP, ,,VBLK ,LOW, RUN FACTOR: 1.00
DITIONS: 1.00UG/L *5.00ML *100%/NA ANALYST: MEB

#	SCAN	Q	C	CONCENTRATION IN SAMPLE (UG/L)	CAS #	COMPOUND
.	779		1	1.2	55429-29-3	ARSENOUS ACID, TRIS(TRIMETHYLSILYL

ATA FILE: F1092

000175

ENSECO TIC REPORT (PAGE 2)

NCENTRATION = AREA(TIC)*CONC(IS)/AREA(IS)

#	FIT	PURITY	INT. STD.	RT	RRT	AREA	HEIGHT	AMOUNT AS ANALYZED (UG/L)	LIB	LIB #
1	827	802	3	12:59	0.925	6307.	764.	1.242	NB	38131.

Sample: F1101 Performance Check: F1089 Elapsed Time: 7:31:00
Sample: F1101 Calibration Stds.: F1090, F1091,

Data Reduced by : Date: 7/15/92
Data Reviewed by: Date: 7/16/92

Data File: F1101

000176

Enseco GC/MS
Target Compound Data Summary Sheet

Sample: -3 WATER AP9-AP
Conditions: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
Date Analyzed: 07/14/92 21:02:00
Analyst: EG
Quan List Threshold: 1.00

Units: UG/L
Run Factor: 1.00
Surrogate Vol.: 0.00500

Surrogate Spike Recoveries
VOA, AQUEOUS, V LIBRARIES

Compound	Surrogate Amount (ug) Spiked	Measured	% Recovery Measured	QC limits
CS05 TOLUENE-D8	0.2500	0.2405	96.2	88 110
CS10 BROMOFLUOROBENZ	0.2500	0.2335	93.4	86 115
CS15 1,2-DICHLOROETH	0.2500	0.2835	113.	76 114

Target Compounds: VOAAP9

Scan #	Concentration Quan List UG/L	Sample UG/L	Compound
	BDL		V001 DICHLORODIFLUOROMETHANE
	BDL		C010 CHLOROMETHANE
	BDL		C020 VINYL CHLORIDE
	BDL		C015 BROMOMETHANE
	BDL		C025 CHLOROETHANE
	BDL		V007 TRICHLOROFLUOROMETHANE
	BDL		V003 DICHLOROFLUOROMETHANE
	BDL		C045 1,1-DICHLOROETHENE
	BDL		C040 CARBON DISULFIDE
	BDL		C035 ACETONE
317	1.303	1.30 BDL	C030 METHYLENE CHLORIDE
	BDL		V012 TRANS-1,2-DICHLOROETHENE
	BDL		C050 1,1-DICHLOROETHANE
	BDL		C125 VINYL ACETATE
	BDL		V011 CIS-1,2-DICHLOROETHENE
	BDL		C110 2-BUTANONE
	BDL		C060 CHLOROFORM
	BDL		C115 1,1,1-TRICHLOROETHANE
	BDL		C120 CARBONTETRACHLORIDE
	BDL		C165 BENZENE
	BDL		C065 1,2-DICHLOROETHANE
	BDL		C150 TRICHLOROETHENE
	BDL		C140 1,2-DICHLOROPROPANE
	BDL		V019 1,4-DIOXANE
	BDL		C130 BROMODICHLOROMETHANE
	BDL		V023 2-CHLOROETHYL VINYL ETHER
	BDL		C143 CIS-1,3-DICHLOROPROPENE
	BDL		C205 4-METHYL-2-PENTANONE
	BDL		C230 TOLUENE
	BDL		C172 TRANS-1,3-DICHLOROPROPENE
	BDL		C160 1,1,2-TRICHLOROETHANE
	BDL		C220 TETRACHLOROETHENE
	BDL		C210 2-HEXANONE
	BDL		C155 DIBROMOCHLOROMETHANE
	BDL		V022 1,2-DIBROMOETHANE
	BDL		C235 CHLOROBENZENE
	BDL		C240 ETHYLBENZENE
	BDL		V032 M+P XYLENES
	BDL		V029 O-XYLENE
	BDL		C245 STYRENE
	BDL		C180 BROMOFORM
	BDL		C225 1,1,2,2-TETRACHLOROETHANE
	BDL		V002 ACETONITRILE
	BDL		V004 IODOMETHANE
	BDL		V005 ACROLEIN
	BDL		V006 ACRYLONITRILE
	BDL		PROPIONITRILE (ETHYLCYANIDE)
	BDL		ALLYL CHLORIDE (3-CHLOROPROPENE)
	BDL		V016 DIBROMOMETHANE
	BDL		V017 METHACRYLONITRILE
	BDL		ISOBUTANOL

BDL	METHYL METHACRYLATE	41
BDL	V024 1,1,1,2-TETRACHLOROETHANE	
BDL	V025 1,2,3-TRICHLOROPROPANE	
BDL	V027 ETHYL METHACRYLATE	
BDL	V026 T-1,4-DICHLORO-2-BUTENE	
BDL	V028 1,2-DIBROMO-3-CHLOROPROPANE	

Name List: HEDR1 Entry # 1 of 1
File Name: F1101

000178

(1)Format: VOAIND
(2)PROJECT: 23727
(3)SAMPLE: 3
(4)MATRIX: WATER
(5)COMMENT: AP9-AP
(10)Analyst: EG
(11)Quan List Units: 1.00UG/L
(12)Purge Volume: 5.00ML
(13)Extract Dilution: NA
(14)Extract Volume: NA
(15)Extract Vol. Used: NA
(16)Sample Amount: 5.00ML
(17)Percent Moisture: NA
(19)Run Factor: 1.00UG/L
(20)SURROGATE VOLUME:: 0.00500L

7/14/92 21:02:31
Acquisition started

cquire Run 3:F1101 Starting
7/14/92 21:02:00 + 0:00 Free sectors: 11955 Scan: 0 of 1464
ample: 23727-3 WATER AP9-AP
onds.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
ormula: 1.00UG/L0.00500L Instrument: I50F Weight: 0.000
ubmitted by: RMAL Analyst: EG Acct. No: VOAIND

*** GC not ready and being equilibrated ***
C Desc.: VN Elapsed time : 0.0 Min

eq. #	Temp (DegC)	Rate (C/min)	Time (minutes) period	total			
1	-20--18	2.0	1.0	1.0	Injector A	:	220 Deg C
2	-18-102	7.0	17.1	18.1	GC oven	:	117 Deg C
3	102-202	30.3	3.3	21.4	Transfer-line	:	203 Deg C
					Ion source	:	183 Deg C

alve A : closed Valve B : closed
*** Instrument parameters ***
Post acquisition state -> Filament : Off Multiplier : Off
ODE: EI (+) Centroid + Temp - Sequence: VO (1 time window.)

equence Window # 1
Number of cycles: 1
Filament is ON
Multiplier is ON
can descriptor: VO Mass intervals: 1 Positive ion mode.
otal scan time: 1.000 s Master rate: 8

W: 3 MFW: 70 MA: 50 TH: 1 BL: 0

nt #	Lo mass	Hi mass	Time
1	36.511	300.590	1.000

Calibration table: 3:071492CF

Interface number	0	
Instrument type	Q	
Full scale mass	1170	u
Zero scale mass	1	u
Intensity/ion	2	
Peak width	1000.	mmu
Offset at low mass	0	mmu
Offset at high mass	0	mmu
Voltage settling time(ms)	4	

urrent instrument parameters.

	Positive ion mode	Negative ion mode
Resolution (high)	123.00	0.00
Resolution (low)	125.00	0.00
Quad offset	-2.00	0.00
Quad programming	-1.00	0.00
Lens offset	-40.00	0.00
Lens programming	0.00	0.00
Ext offset	-4.50	0.00
Ext programming	0.00	0.00
Collector	30.00	0.00
Ion offset	4.00	0.00

000179

Ion programming	1.00	0.00
Rod polarity	Reverse	Normal

Electron multiplier voltage: 1390.
Filament emission current: 750.
Electrometer range: 10 ^-7
Electrometer zero: 128.0

OM

nalyzer Fore Pressure .....: 0.028 Torr
eparator/Source Pressure .....: 0.389 Torr

7/14/92 21:34:24
ACQUISITION COMPLETED
Scans 1 to 1464 Centroid

ode	Scans	Secs	Out of	%	Peaks per scan	per sec
entroid	1464	0.5	1464.0	0.0	4287. 3.	3.

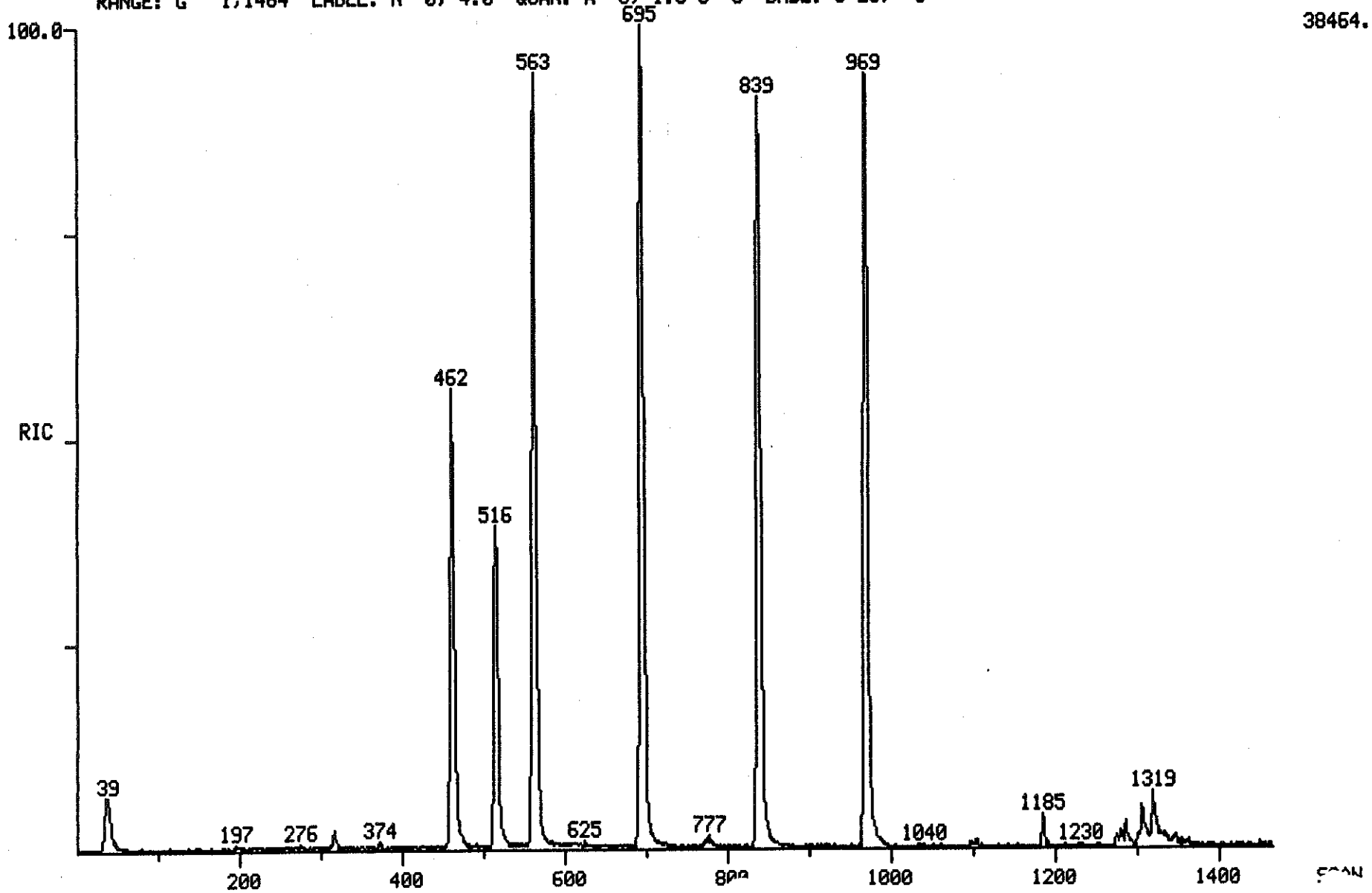
MET

000180

RIC
07/14/92 21:02:00
SAMPLE: 23727-3 WATER AP9-AP
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M
RANGE: G 1,1464 LABEL: N 0, 4.0 QUAN: A 0, 1.0 J 0 BASE: U 20, 3

DATA: F1101 #4
CALI: 071492CF #3

SCANS 1 TO 1464



ROCEDURE: TCA DIAGNOSTIC REPORT 7/14/92 21:35:14
ATA FILE: F1101
EFERENCE: 11TABLE
AME LIST: LLNL INITIALIZATION OPTION: 2 PROCESSING OPTION: 3 000181
REPORT: ISO1

---- STANDARDS ----- ><				--- PLUS UNKNOWNS --- ><				- LIST NAMES - >
ROC	USED	POSS	RMS	PROC	USED	POSS	RMS	STANDARD/UNKNOWN
1	1	1	0	11	1	1	0	ISO1/TCO1
1	1	1	0	11	2	1	0	ISO2/TCO2
1	1	1	0	4	2	1	143	ISO3/TCO3
3	3	1	0	13	4	1	58	ISO4/TCO4
3	3	1	0	13	4	1	60	ISO5/TCO5
3	3	1	0	9	3	1	0	ISO6/TCO6
1	1	1	0	11	2	1	0	ISO7/TCO7
1	1	1	0	3	1	1	0	ISO8/TCO8

64 COMPOUNDS PROCESSED, 8 FOUND

COMPOUND ><				---------- SEARCH ---------- ><				SAT ><	------ CHRO ------- >			
NO	LIB	ENTRY	REF	PRED	SEL	DELTA	PEAKS	FIT	PEAKS	M/Z	TOP	DELTA	PEAKS
1	V1	1	-463	462	462	.	1	998	.	128	463	1	1
2	V1	20	-62	62	.	.	.	.	.	85	.	.	.
3	V1	10	-82	82	.	.	.	.	.	50	.	.	.
4	V1	25	-99	99	.	.	.	.	.	62	.	.	.
5	V1	15	-142	142	.	.	.	.	.	94	.	.	.
6	V1	35	-161	161	.	.	.	.	.	64	.	.	.
7	V1	70	-195	195	.	.	.	.	.	101	.	.	.
8	V1	32	-206	206	.	.	.	.	.	67	.	.	.
9	V1	80	-254	253	.	.	.	.	.	96	.	.	.
10	V1	65	-257	256	.	.	.	.	.	76	.	.	.
11	V1	55	-258	257	.	.	.	.	.	56	.	.	.
12	V1	40	-260	259	.	.	.	.	.	142	.	.	.
13	V1	50	-286	285	.	.	.	.	.	43	.	.	.
14	V1	85	-303	302	.	.	.	.	.	76	.	.	.
15	V1	30	-312	311	.	.	.	.	.	40	.	.	.
16	V1	45	-318	317	317	.	1	926	.	84	317	.	1
17	V1	95	-344	343	.	.	.	.	.	96	.	.	.
18	V1	60	-354	353	.	.	.	.	.	53	.	.	.
19	V1	90	-386	385	.	.	.	.	.	63	.	.	.
20	V1	135	-394	393	.	.	.	.	.	53	.	.	.
21	V2	25	-410	409	.	.	.	.	.	43	.	.	.
22	V1	94	-443	441	.	.	.	.	.	96	.	.	.
23	V1	98	-458	456	455	-1	1	810	.	72	.	.	.
24	V1	75	-463	461	.	.	.	.	.	54	.	.	.
25	V2	1	-564	563	563	.	1	992	.	114	563	.	1
26	V3	1	-840	839	839	.	1	1000	.	117	838	-1	1
27	V1	120	-472	471	.	.	.	.	.	41	.	.	.
28	V1	100	-480	479	.	.	.	.	.	83	.	.	.
29	V2	15	-484	483	.	.	.	.	.	97	.	.	.
30	V2	20	-497	496	.	.	.	.	.	117	.	.	.
31	V1	2	-517	516	515	-1	1	996	.	65	515	.	1
32	V2	60	-518	517	.	.	.	.	.	78	.	.	.
33	V1	110	-524	523	.	.	.	.	.	62	.	.	.
34	V1	125	-554	553	.	.	.	.	.	41	.	.	.
35	V2	45	-582	581	.	.	.	.	.	130	.	.	.
36	V2	35	-601	600	.	.	.	.	.	63	.	.	.
37	V1	115	-610	609	.	.	.	.	.	174	.	.	.
38	V1	130	-624	623	.	.	.	.	.	88	.	.	.
39	V2	28	-630	629	.	.	.	.	.	41	.	.	.
40	V2	30	-635	634	.	.	.	.	.	83	.	.	.
41	V2	75	-673	672	.	.	.	.	.	63	.	.	.
42	V2	40	-678	677	.	.	.	.	.	75	.	.	.
43	V3	2	-697	696	695	-1	1	967	.	98	695	.	1
44	V3	10	-702	701	.	.	.	.	.	43	.	.	.
45	V3	35	-703	702	.	.	.	.	.	92	.	.	.
46	V2	65	-737	736	.	.	.	.	.	75	.	.	.
47	V2	55	-753	752	.	.	.	.	.	97	.	.	.
48	V3	20	-754	753	.	.	.	.	.	164	.	.	.
49	V3	38	-755	754	.	.	.	.	.	41	.	.	.
50	V3	15	-787	786	.	.	.	.	.	43	.	.	.
51	V2	50	-787	786	.	.	.	.	.	129	.	.	.
52	V2	70	-791	790	.	.	.	.	.	107	.	.	.
53	V3	40	-844	843	.	.	.	.	.	112	.	.	.
54	V2	85	-857	856	.	.	.	.	.	131	.	.	.
55	V3	50	-861	860	.	.	.	.	.	106	.	.	.
56	V3	75	-875	873	.	.	.	.	.	106	.	.	.
57	V3	60	-915	913	.	.	.	.	.	106	.	.	.
58	V3	55	-919	917	.	.	.	.	.	104	.	.	.
59	V2	80	-935	933	.	.	.	.	.	173	.	.	.
60	V3	3	-972	969	969	.	1	982	.	95	970	1	1
61	V2	90	-1000	997	.	.	.	.	.	75	.	.	.
62	V3	25	-1001	998	.	.	.	.	.	83	.	.	.
63	V3	30	-1006	1005	.	.	.	.	.	53	.	.	.
64	V3	45	-1183	1182	.	.	.	.	.	157	.	.	.

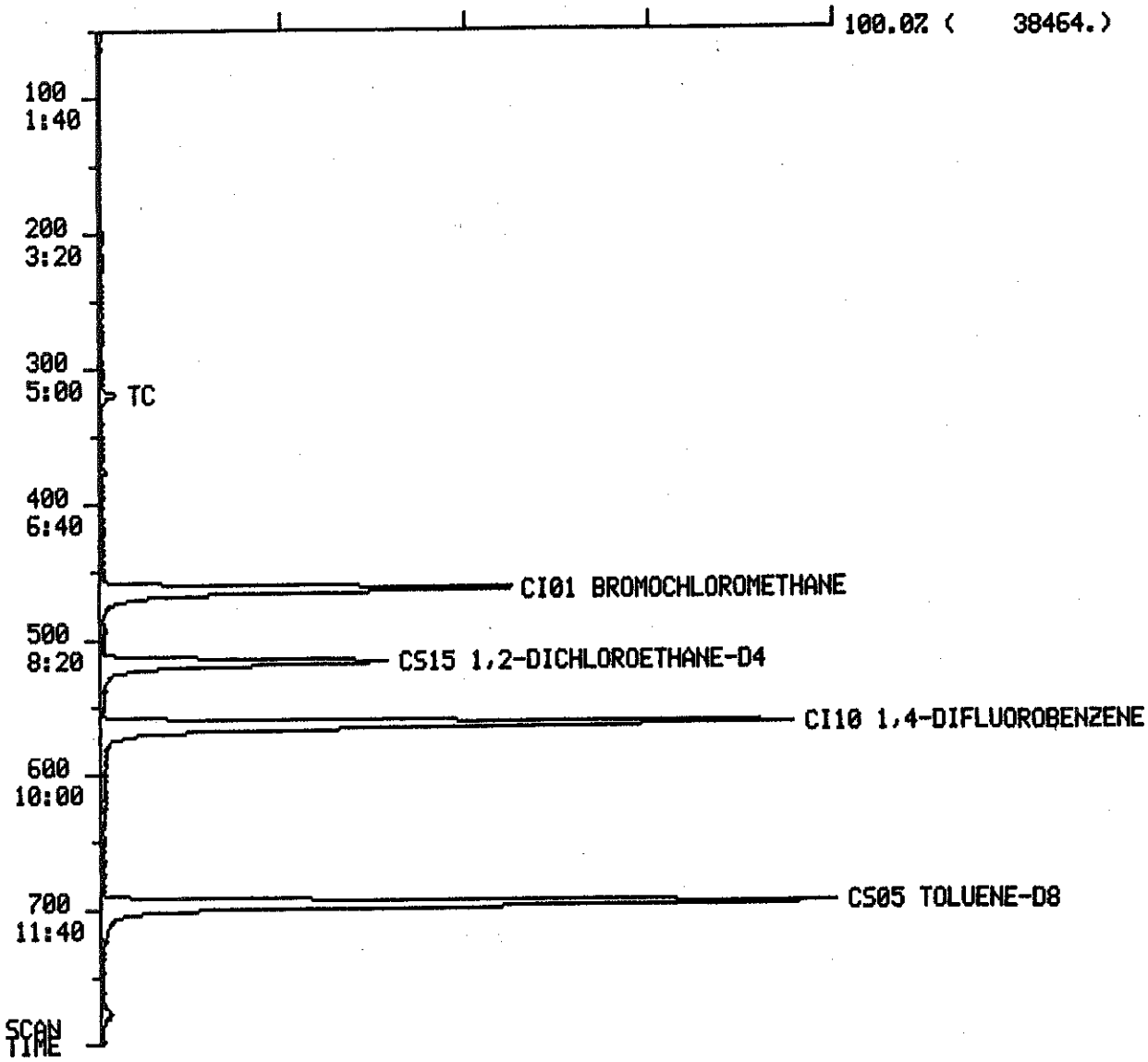
MAL QUANTITATION SUMMARY FILE: F1101
OMPOUNDS WITH AMOUNTS LESS THAN 1.00 REPORTED AS NOT FOUND

NO	LIBRARY ENTRY	NAME	MASS	SCAN	REF	AREA	UNITS: RRF	UG/L AMOUNT
1	V1# 1 CI01	BRCMOCHLOROMETHANE	128	463	1	18404.	1.000	50.000
2	V2# 1 CI10	1,4-DIFLUOROBENZENE	114	563	2	94677.	1.000	50.000
3	V3# 1 CI20	CHLOROBENZENE-D5	117	838	3	71966.	1.000	50.000
4	V3# 2 CS05	TOLUENE-D8	98	695	3	75720.	1.093	48.143
5	V3# 3 CS10	BROMOFLUOROBENZENE	95	970	3	42389.	0.631	46.684
6	V1# 2 CS15	1,2-DICHLOROETHANE-	65	515	1	35998.	1.726	56.675
7	V1# 20 V001	DICHLORODIFLUOROMET	85		1	NOT FOUND		
8	V1# 10 C010	CHLOROMETHANE	50		1	NOT FOUND		
9	V1# 25 C020	VINYL CHLORIDE	62		1	NOT FOUND		
10	V1# 15 C015	BROMOMETHANE	94		1	NOT FOUND		
11	V1# 35 C025	CHLOROETHANE	64		1	NOT FOUND		
12	V1# 70 V007	TRICHLOROFLUOROMETH	101		1	NOT FOUND		
13	V1# 32 V003	DICHLOROFLUOROMETHA	67		1	NOT FOUND		
14	V1# 80 C045	1,1-DICHLOROETHENE	96		1	NOT FOUND		
15	V1# 65 C040	CARBON DISULFIDE	76		1	NOT FOUND		
16	V1# 50 C035	ACETONE	43		1	NOT FOUND		
17	V1# 45 C030	METHYLENE CHLORIDE	84	317	1	731.	1.524	1.303
18	V1# 95 V012	TRANS-1,2-DICHLOROE	96		1	NOT FOUND		
19	V1# 90 C050	1,1-DICHLOROETHANE	63		1	NOT FOUND		
20	V2# 25 C125	VINYL ACETATE	43		2	NOT FOUND		
21	V1# 94 V011	CIS-1,2-DICHLOROETH	96		1	NOT FOUND		
22	V1# 98 C110	2-BUTANONE	72		1	NOT FOUND		
23	V1#100 C060	CHLOROFORM	83		1	NOT FOUND		
24	V2# 15 C115	1,1,1-TRICHLOROETHA	97		2	NOT FOUND		
25	V2# 20 C120	CARBONTETRACHLORIDE	117		2	NOT FOUND		
26	V2# 60 C165	BENZENE	78		2	NOT FOUND		
27	V1#110 C065	1,2-DICHLOROETHANE	62		1	NOT FOUND		
28	V2# 45 C150	TRICHLOROETHENE	130		2	NOT FOUND		
29	V2# 35 C140	1,2-DICHLOROPROPANE	63		2	NOT FOUND		
30	V1#130 V019	1,4-DIOXANE	88		1	NOT FOUND		
31	V2# 30 C130	BROMODICHLOROMETHAN	83		2	NOT FOUND		
32	V2# 75 V023	2-CHLOROETHYL VINYL	63		2	NOT FOUND		
33	V2# 40 C143	CIS-1,3-DICHLOROPRO	75		2	NOT FOUND		
34	V3# 10 C205	4-METHYL-2-PENTANON	43		3	NOT FOUND		
35	V3# 35 C230	TOLUENE	92		3	NOT FOUND		
36	V2# 65 C172	TRANS-1,3-DICHLOROP	75		2	NOT FOUND		
37	V2# 55 C160	1,1,2-TRICHLOROETHA	97		2	NOT FOUND		
38	V3# 20 C220	TETRACHLOROETHENE	164		3	NOT FOUND		
39	V3# 15 C210	2-HEXANONE	43		3	NOT FOUND		
40	V2# 50 C155	DIBROMOCHLOROMETHAN	129		2	NOT FOUND		
41	V2# 70 V022	1,2-DIBROMOETHANE	107		2	NOT FOUND		
42	V3# 40 C235	CHLOROBENZENE	112		3	NOT FOUND		
43	V3# 50 C240	ETHYLBENZENE	106		3	NOT FOUND		
44	V3# 75 V032	M+P XYLENES	106		3	NOT FOUND		
45	V3# 60 V029	O-XYLENE	106		3	NOT FOUND		
46	V3# 55 C245	STYRENE	104		3	NOT FOUND		
47	V2# 80 C180	BROMOFORM	173		2	NOT FOUND		
48	V3# 25 C225	1,1,2,2-TETRACHLORO	83		3	NOT FOUND		
49	V1# 30 V002	ACETONITRILE	40		1	NOT FOUND		
50	V1# 40 V004	IODOMETHANE	142		1	NOT FOUND		
51	V1# 55 V005	ACROLEIN	56		1	NOT FOUND		
52	V1# 60 V006	ACRYLONITRILE	53		1	NOT FOUND		
53	V1# 75	PROPIONITRILE (ETHYLCYAN	54		1	NOT FOUND		
54	V1# 85	ALLYL CHLORIDE (3-CHLORO	76		1	NOT FOUND		
55	V1#115 V016	DIBROMOMETHANE	174		1	NOT FOUND		
56	V1#120 V017	METHACRYLONITRILE	41		1	NOT FOUND		
57	V1#125	ISOBUTANOL	41		1	NOT FOUND		
58	V1#135	CHLOROPRENE (2-CHLORO-1,	53		1	NOT FOUND		
59	V2# 28	METHYL METHACRYLATE	41		2	NOT FOUND		
60	V2# 85 V024	1,1,1,2-TETRACHLORO	131		2	NOT FOUND		
61	V2# 90 V025	1,2,3-TRICHLOROPROP	75		2	NOT FOUND		
62	V3# 38 V027	ETHYL METHACRYLATE	41		3	NOT FOUND		
63	V3# 30 V026	T-1,4-DICHLORO-2-BU	53		3	NOT FOUND		
64	V3# 45 V028	1,2-DIBROMO-3-CHLOR	157		3	NOT FOUND		

000183

DATA FROM FILE: F1101 SCANS 50 TO 800 ACQUIRED: 07/14/92 21:02:00
CALI: F1101 #3

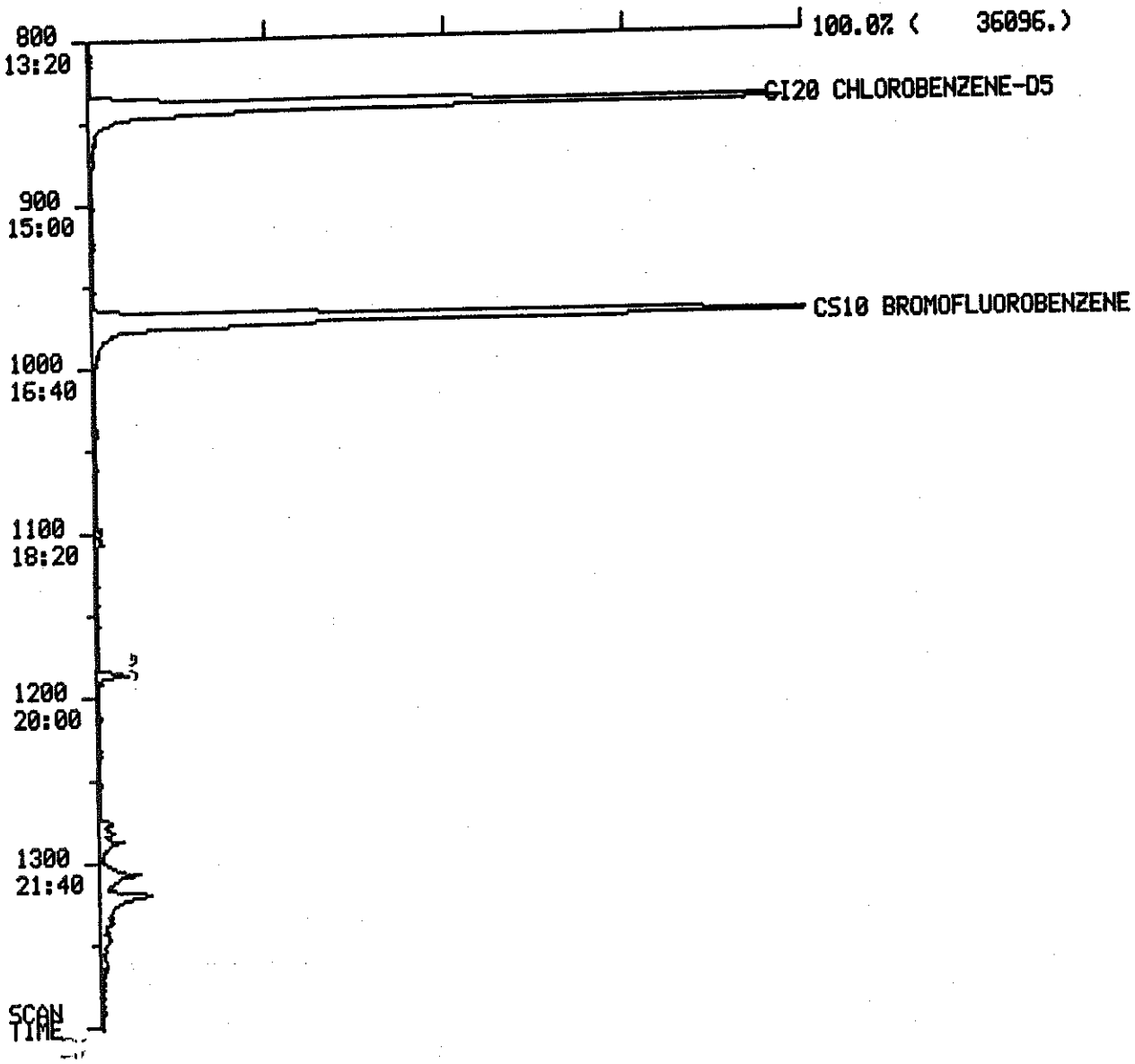
SAMPLE: 23727-3 WATER AP9-AP
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M



000184

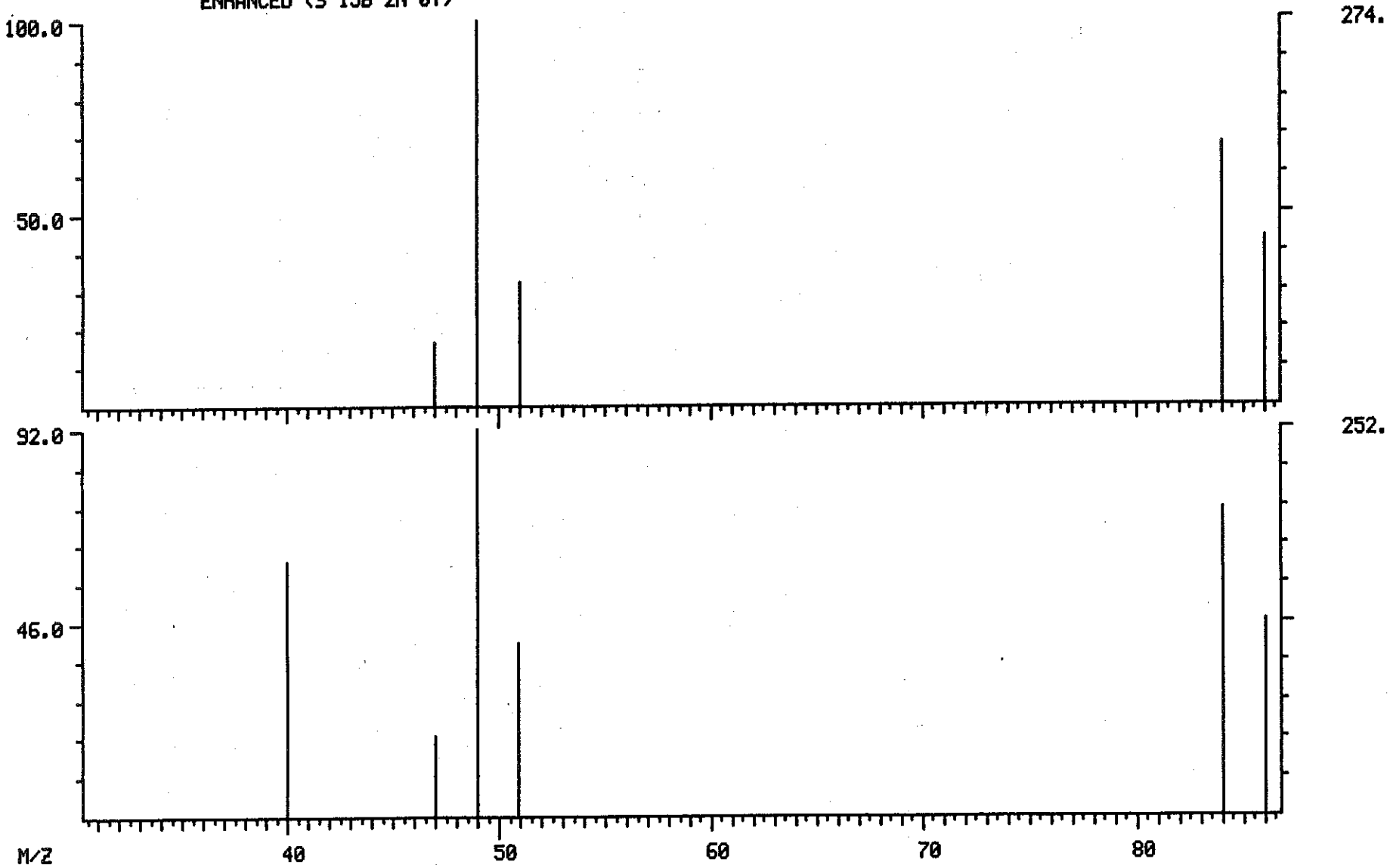
DATA FROM FILE: F1101 SCANS 800 TO 1400 ACQUIRED: 07/14/92 21:02:00
CALI: F1101 #3

SAMPLE: 23727-3 WATER AP9-AP
CONDS.: 1.00UG/L *5.00ML *100%/NA *(NA/NA)/5.00ML NA M



000185

DUAL MASS SPECTRUM
07/14/92 21:02:00 + 5:17
SAMPLE: 23727-3 WATER AP9-AP
CONDS.: V1#45 M/Z 84 C030 METHYLENE CHLORIDE
TEMP: 11 DEG. C
ENHANCED (S 15B 2N 0T)

DATA: F1101 #317
CALI: 071492CF #3

BASE M/Z: 49/ 49
RIC: 712./ 910.