Cover Sheet for

ENVIRONMENTAL CHEMISTRY METHOD

Pestcide Name: Dienochlor

MRID #: 413034-08

Matrix: Soil

Analysis: GC/ECD

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ANALYTICAL METHOD

SANDOZ CROP PROTECTION CORPORATION

Location: 1300 E. TOUHY AVE. DES PLAINES, IL

● DEVELOPMENT ○ QUALITY CONTROL

Method Number AM-0810
Addendum
Supersedes
Approved TBAB Date 10-5-87

Reviewed ____ Date ____
Reviewed ____ Date ____
Reviewed ____ Date ____
Reviewed ____ Date ____

DETERMINATION OF DIENOCHLOR (PENTAC®) IN SOIL

1. Summary

1.1 Fifty gram subsamples of soil are treated with aqueous sodium chloride to break down the soil structure.

1.2 The subsamples are extracted with 1:2 isopropanol/ toluene.

1.3 Aliquots of the extracts are partitioned with deionized water to remove the isopropanol.

1.4 Ten milliliter aliquots of the toluene extracts are dried with anhydrous sodium sulfate.

1.5 The toluene extracts are analyzed by gas chromatography using electron capture detection (ECD).

2. Accuracy and Precision

2.1 Recoveries from fortified check samples of three soil types are listed in Table 1. Average recoveries ranged from 93.0 ± 8.2% to 107.0 ± 5.0%.

3. Safety

3.1 The oral LD_{50} of dienochlor in rats is greater than 1000 mg/kg.

3.2 Normal laboratory precautions are required for safe handling of dienochlor.

3.3 Hexane, isopropanol, and toluene are flammable and should not be used near heat, sparks, or open flames.

3.4 All solvents should be used only in well ventilated laboratories.

3.5 Protective gloves should be worn during extraction and analysis.

3.6 Disposal of samples and standards must be done in compliance with on-site safety policies and procedures.

4. Apparatus

4.1 Bottles, screw cap with Polyseal® liner, 8-oz, amber.

4.2 Centrifuge, International Equipment Company, Serial No. 71154-M.

4.3 Distillation receiver, 15-mL.

4.4 Pipets, Pasteur, 9", disposable.

4.5 Platform Shaker, Eberbach Corp., Ann Arbor, MI.

5. Reagents

5.1 Hexane - "Distilled in Glass", Burdick and Jackson, Muskegan, MI 49442.

5.2 Isopropyl Alcohol - Baker Resi-Analyzed, J.T. Baker Chemical Co., Phillipsburg, N.J. 08865.

5.3 Sodium chloride - reagent grade.

5.4 Sodium sulfate - anhydrous, granular, reagent grade.

5.5 Toluene - Baker Resi - Analyzed, J.T. Baker Chemical Co., Phillipsburg, N.J. 08865.

6. Standard

6.1 Dienochlor (1,1',2,2',3,3',4,4',5,5'-decachloro bis-2,4-cyclopentadien-1-yl) - Sandoz Crop Protection Analytical Reference Standard.

6.2 Dienochlor is sensitive to light. Standard solutions must be stored in amber or foil wrapped glassware at 0°C.

7. Procedure

7.1 Extraction

7.1.1 Weigh 50 g of soil subsample into a tared 8-oz amber glass bottle.

7.1.2 To fortify for recovery determination,

add appropriate volume of fortifying solution, e.g. 1.0 mL of a 10^{-8} g/mL solution to 50 g sample (0.2 ppm) and allow solvent to evaporate.

7.1.3 Add 30 mL of 5% NaCl solution and shake for 15 minutes on a platform shaker. Longer shaking may be necessary to breakup the larger clays.

7.1.4 Add 50 mL of isopropanol and 100 mL of toluene and shake for 2 hours on the platform shaker.

7.1.5 Centrifuge sample for 5 minutes.

7.1.6 Transfer a 20-mL aliquot of the organic extract to an 8-oz. amber glass bottle containing 100 mL deionized water and shake for 1 minute.

7.1.7 Centrifuge sample for 5 minutes.

7.1.8 Transfer a 10-mL aliquot of the toluene extract to a Kuderna-Danish receiver and add about 0.1 g of anhydrous sodium sulfate. Shake well. The extracts are now ready for GC analysis.

8. Analysis

8.1 Preparation of Standards

8.1.1 Prepare a stock solution containing 100.0 mg dienochlor/100 mL toluene in a 100-mL volumetric flask (10^{-6} g/uL).

8.1.2 Transfer a 1.0-mL aliquot of the stock solution (10^{-6} g/uL) to a 100-mL volumetric flask and bring to the mark with hexane. This standard (10^{-8} g/uL) will be used for fortifying check samples.

8.1.3 Prepare a range of standards for GC/EC quantitation by diluting aliquots of the appropriate standards to 50 or 100 mL with toluene as follows:

Standard	Aliquot	Final Volume	Concentration of Final Solution
10^{-8} g/uL	1 mL	100 mL	10^{-10} g/uL
10^{-10} g/uL	25 mL	50 mL	5×10^{-11} g/uL
10^{-10} g/uL	10 mL	50 mL	2×10^{-11} g/uL
10^{-10} g/uL	5 mL	50 mL	10^{-11} g/uL

8.2 Gas Chromatographic Conditions

The following gas chromatographic conditions were used during method development. Other conditions may be used provided that dienochlor is separated from sample interferences and the response is linear over the range of interest.

8.2.1 Instrument: Hewlett-Packard, Model 5880, equipped with Electron Capture Detector (^{63}Ni) and H-P model 7671 autosampler.

8.2.2 Column: 30 m x 0.53 mm (I.D.) fused silica with methyl silicone (SE-30) bonded

phase - 0.88 um film thickness (HP-1).

8.2.3 Oven Temperature: 170°C isothermal for 5 minutes.

8.2.4 Injector Temperature: 250°C

8.2.5 Detector Temperature: 350°C

8.2.6 Carrier Gas: helium, inlet pressure: 5 psi (4.5 mL/min).

8.2.7 Make-up Gas: 5% argon/methane at 30 mL/min.

8.2.8 Dienochlor Retention Time: 3.4 min.

8.3 Quantitation

8.3.1 Prepare a standard curve by injecting a fixed volume of standard solutions of ranging concentrations (ng/uL) and plotting peak height versus concentration injected on a log-log graph paper. (Inject 2.0-uL aliquots of 10^{-10}, 5×10^{-11}, 2×10^{-11}, and 10^{-11} g/uL standards).

8.3.2 Determine the concentration of dienochlor in an injected aliquot of sample from the peak height and the standard curve.

8.3.3 Calculate the concentration of

dienochlor in the sample using the following expression:

$$ppm = C_s \times \frac{V_s}{W_s}$$

Where:

ppm = Concentration of dienochlor in the sample in parts per million (ng/mg).

C_s = Concentration of dienochlor in the injected aliquot (ng/uL) - from standard curve.

V_s = Volume of final sample extract in milliliters taking into account all dilutions. If not diluted, this volume represents the 10-mL aliquot of the toluene extract from 7.1.8.

W_s = Weight of sample taken for analysis in grams. This weight represents the gram equivalent in the 10-mL aliquot of the toluene extract from 7.1.8.

9. References

9.1 Work was done by L. J. Formanski. This work is recorded in notebook #4931, pp 52-97.

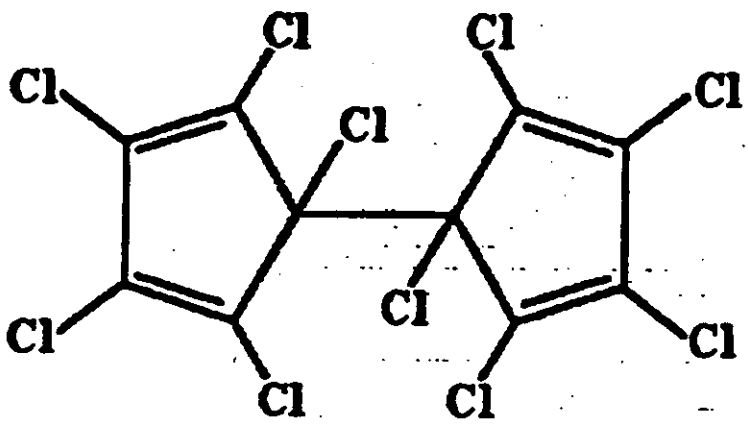
9.2 The structure of dienochlor is presented in Figure 1.

10. Representative Calibration Curve and Chromatograms

Figure 2 Representative Calibration Curve
3 Representative Chromatogram of Dienochlor Standard (0.1 ng/uL)
4 Representative Chromatogram of Dienochlor Standard (0.05 ng/uL)
5 Representative Chromatogram of Dienochlor Standard (0.01 ng/uL)
6 Representative Chromatogram of a Silt Clay Soil Check
7 Representative Chromatogram of a Silt Clay Soil Check Fortified at 0.2 ppm Dienochlor
8 Representative Chromatogram of a Sandy Clay Loam Soil Check
9 Representative Chromatogram of a Sandy Clay Loam Soil Check Fortified at 0.2 ppm Dienochlor
10 Representative Chromatogram of a Kenyon Loam Soil Check
11 Representative Chromatogram of a Kenyon Loam Soil Check Fortified at 0.2 ppm Dienochlor

Table 1. Recoveries of Dienochlor from Soil Fortified at 0.2 ppm.

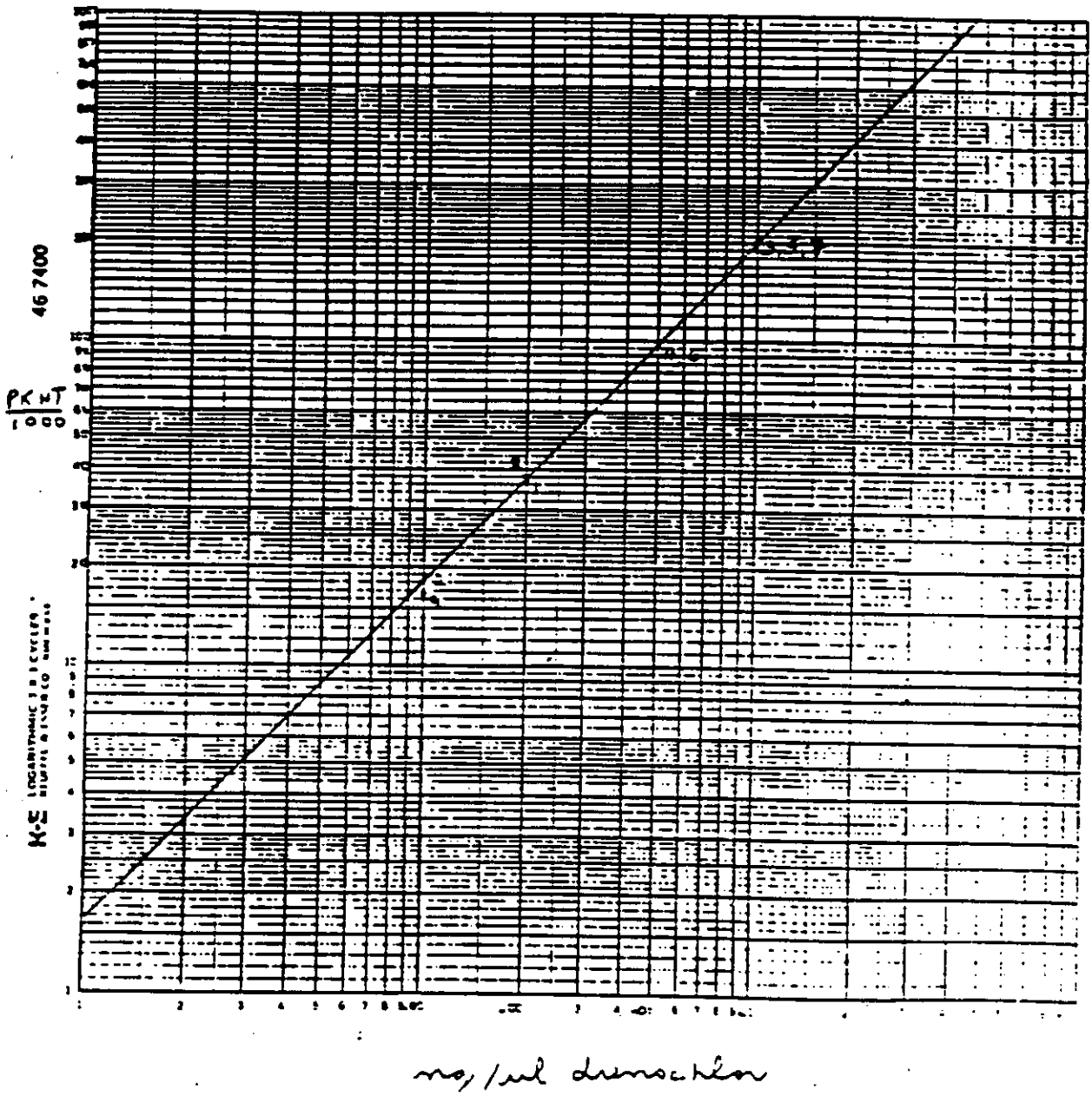
Soil	% Recoveries	Ave. and Std. Dev.
Kenyon Loam	91, 102, 86	93 ± 8.2
Sandy Clay Loam	106, 102, 112	107 ± 5.0
Silt Clay	106, 111, 109, 98, 104, 98	104 ± 5.5

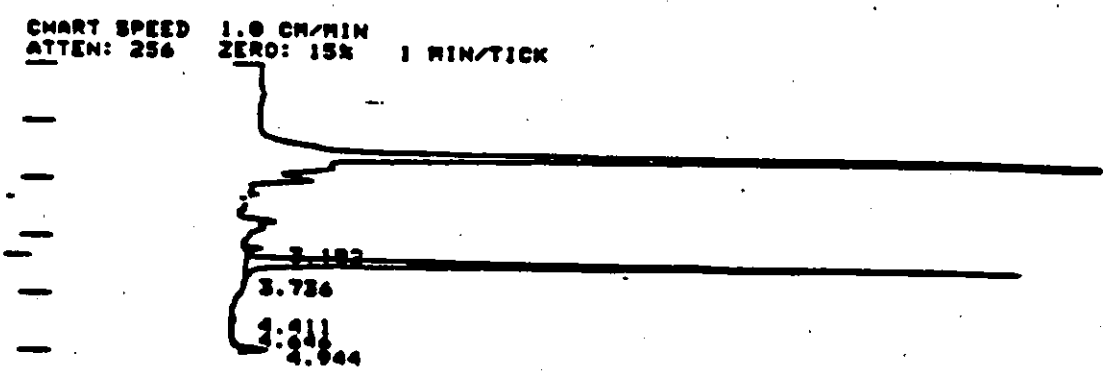


Dienochlor

Figure 1. Molecular structure of Dienochlor.

Figure 2. Representative calibration curve for the determination of dienochlor in soil. The numbers by the data points represent the order of injection of the standards. The standards were interspersed with the study samples.





TITLE: DIENOCHLOR IN SOIL 10:42 12 JUN 87

CHANNEL NO: 4 SAMPLE: E-10 METHOD: DIENOCHLOR

PEAK NO	PEAK NAME	RESULT FACTOR	TIME (MIN)	TIME OFFSET	HEIGHT COUNTS	SEP CODE	WI/2 (SEC)
2	DIENOCHLO	0.004940	3.392	-0.008	202437	BB	3.95
TOTALS:				-0.008	202437		

UNIDENT AREA: 13119

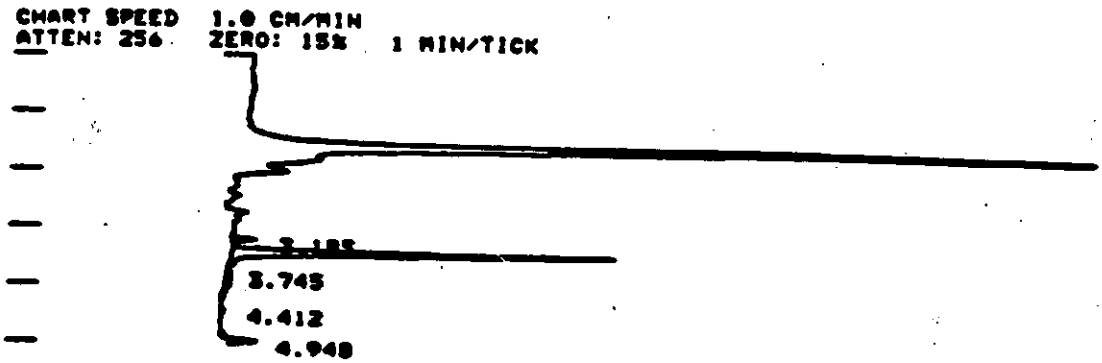
DETECTED PKS: 6 REJECTED PKS: 0

AMT STD: 0.10000

NOISE: 105.6 OFFSET: -828

ERRORS:
FACTOR NOT UPDATED

Figure 3. Representative GC/EC/FSOT chromatogram of a 0.10 ng/uL dienochlor standard solution; 2.0 uL injected.



TITLE: DIENOCHLOR IN SOIL 18:15 12 JUN 87

CHANNEL NO: 4 SAMPLE: SE-11 METHOD: DIENOCHLOR

PEAK NO	PEAK NAME	RESULT FACTOR	TIME (MIN)	TIME OFFSET	HEIGHT COUNTS	SEP CODE	W1/2 (SEC)
2	DIENOCHLO	0.005087	3.394	-0.006	98287	BB	3.85
TOTALS:				-0.006	98287		

UNIDENT AREA: 15643

DETECTED PKS: 6 REJECTED PKS: 0

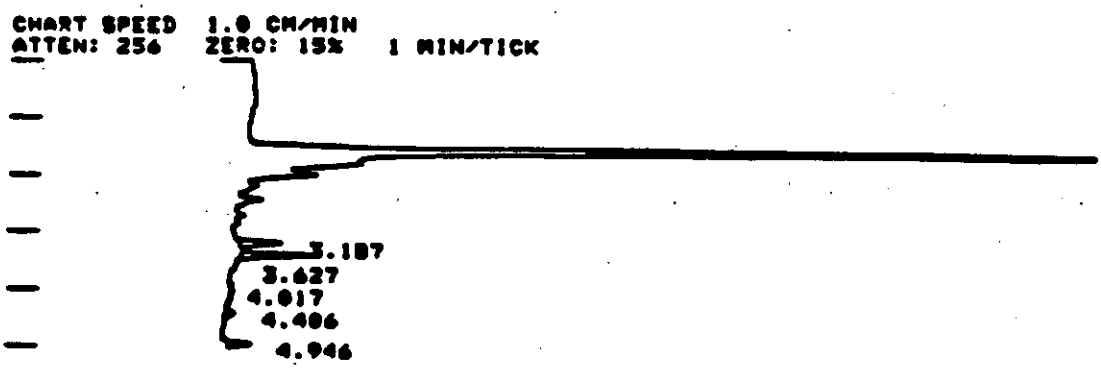
AMT STD: 0.05000

ISE: 185.6 OFFSET: -660

ERRORS:
FACTOR NOT UPDATED

127

Figure 4. Representative GC/EC/FSOT Chromatogram of a 0.050 ng/uL dienochlor standard solution; 2.0 uL injected.



TITLE: DIENOCHLOR IN SOIL 17:21 12 JUN 87

CHANNEL NO: 4 SAMPLE: E-11 METHOD: DIENOCHLOR

AK NO	PEAK NAME	RESULT FACTOR	TIME (MIN)	TIME OFFSET	HEIGHT COUNTS	SEP CODE	W1/2 (SEC)
2	DIENOCHLO	0.005468	3.393	-0.007	10287	BB	4.00
TOTALS:				-0.007	10287		

UNIDENT AREA: 20682

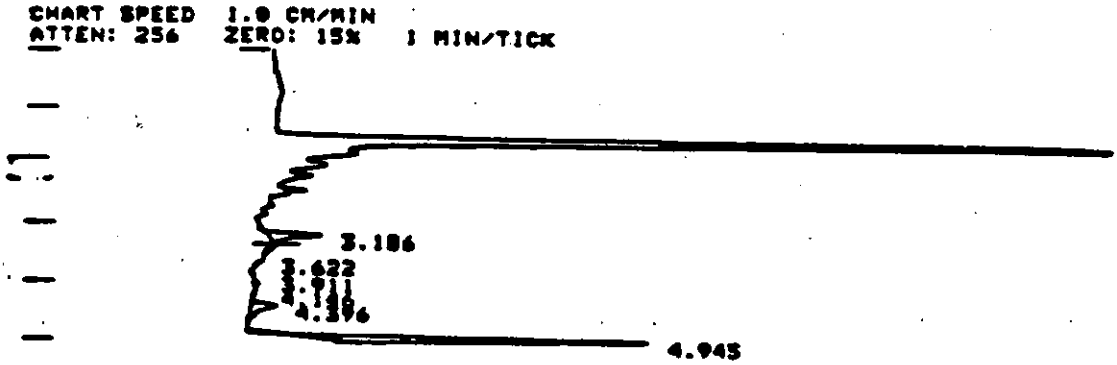
DETECTED PKS: 8 REJECTED PKS: 1

AMT STD: 0.01000

NOISE: 105.6 OFFSET: -473

ERRORS:
FACTOR NOT UPDATED

Figure 5. Representative GC/EC/FSOT chromatogram of a 0.010 ng/uL dienochlor standard solution; 2.0 uL injected.



141.

TITLE: DIENOCHLOR IN SOIL 17:07 12 JUN 87

CHANNEL NO: 4 SAMPLE: SCK 6/12 METHOD: DIENOCHLOR

PEAK NO	PEAK NAME	RESULT	TIME (MIN)	TIME OFFSET	HEIGHT COUNTS	SEP CODE	W1/2 (SEC)
2	DIENOCHLO	0.0019	3.359	-0.041	366	BB	1.10
TOTALS:		0.0019		-0.041	366		

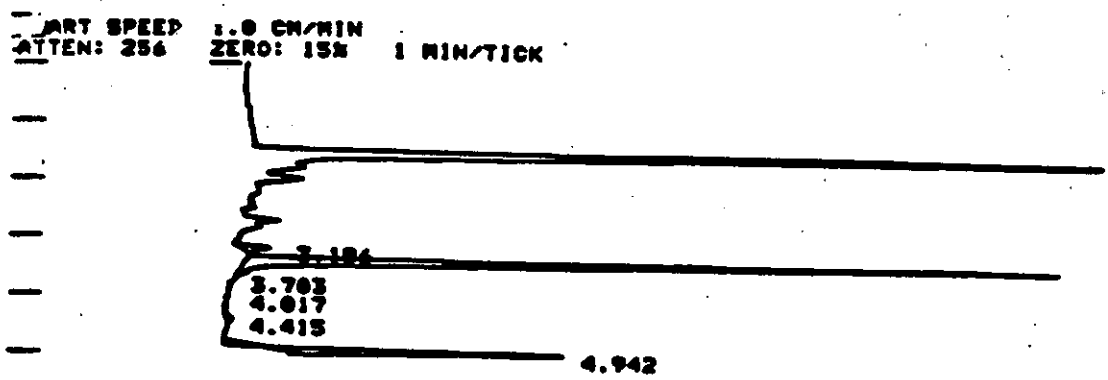
UNIDENT AREA: 104999

DETECTED PKS: 8 REJECTED PKS: 0

DIVISOR: 2.00000 MULTIPLIER: 10.0000

NOISE: 105.6 OFFSET: -277

Figure 6. Representative GC/EC/FSOT chromatogram of a silt clay soil check sample; 0.5 ng equiv./uL injected; <0.005 ng/uL detected; <0.01 ppm dienochlor.



TITLE: DIENOCHLOR IN SOIL 19:23 12 JUN 87

CHANNEL NO: 4 SAMPLE: CK+11 6/12 METHOD: DIENOCHLOR

PEAK NO	PEAK NAME	RESULT	TIME (MIN)	TIME OFFSET	HEIGHT COUNTS	SEP CODE	W1/2 (SEC)
2	DIENOCHLO	1.0951	3.392	-0.008	211002	BB	3.85
TOTALS:		1.0951		-0.008	211002		

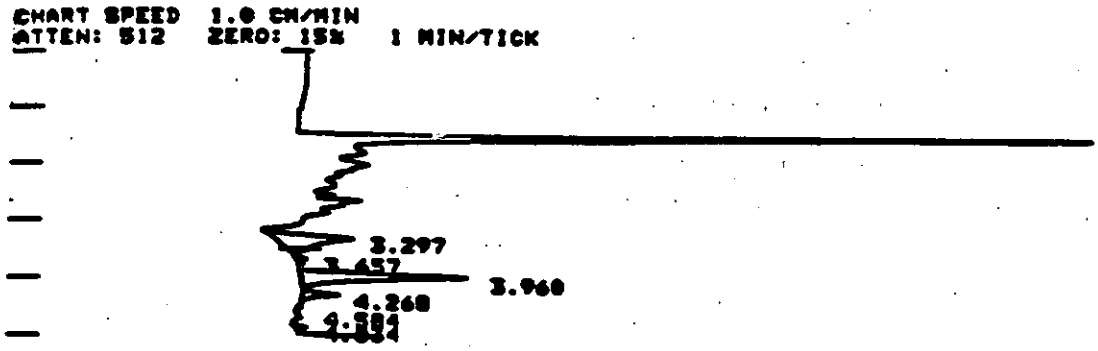
UNIDENT AREA: 81389

DETECTED PKS: 9 REJECTED PKS: 2

DIVISOR: 2.00000 MULTIPLIER: 10.0000

NOISE: 105.6 OFFSET: -1294

Figure 7. Representative GC/EC/FSOT chromatogram of a silt clay soil check sample fortified at 0.2 ppm dienochlor; 0.5 mg equiv./uL injected; 0.104 ng/uL detected; 0.208 ppm dienochlor (104% recovery).



TITLE: DIENOCHLOR IN SOIL 8:51 24 JUN 87

CHANNEL NO: 4 SAMPLE: SCL CK METHOD: DIENOCHLOR

PEAK NO	PEAK NAME	RESULT	TIME (MIN)	TIME OFFSET	HEIGHT COUNTS	SEP CODE		W1/2 (SEC)
1	DIENOCHLO	0.2189	3.297	-0.133	40627	BB	?	15.75
TOTALS:		0.2189		-0.133	40627			

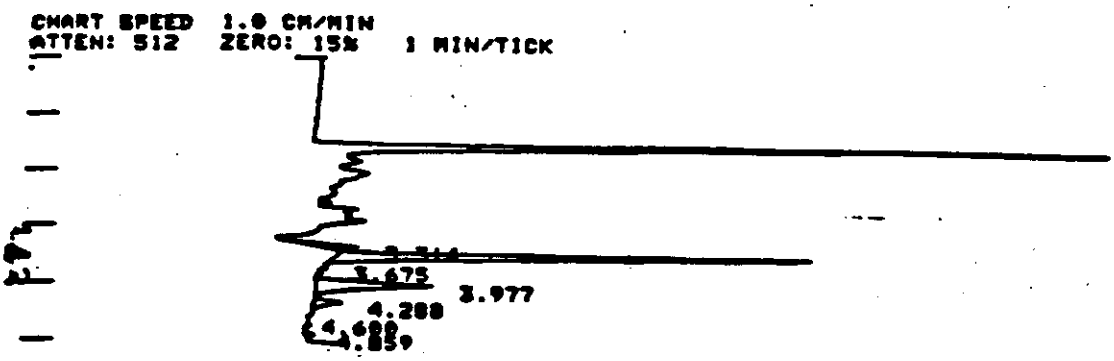
UNIDENT AREA: 121971

DETECTED PKS: 9 REJECTED PKS: 0

DIVISOR: 2.00000 MULTIPLIER: 10.0000

NOISE: 247.7 OFFSET: 8365

Figure 8. Representative GC/EC/FSOT chromatogram of a sandy clay loam soil check sample; 0.5 mg equiv./uL injected; < 0.005 ng/uL detected; <0.01 ppm dienochlor.



TITLE: DIENOCHLOR IN SOIL 10:00 24 JUN 87

CHANNEL NO: 4 SAMPLE: SCL CK+III METHOD: DIENOCHLOR

PEAK NO	PEAK NAME	RESULT	TIME (MIN)	TIME OFFSET	HEIGHT COUNTS	SEP CODE	W1/2 (SEC)
2	DIENOCHLO	1.2730	3.464	0.034	245278	BB	4.65
TOTALS:		1.2730		0.034	245278		

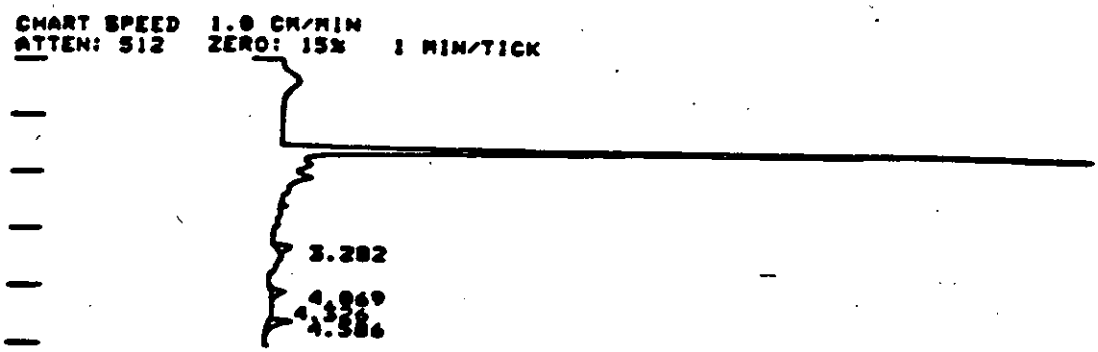
UNIDENT AREA: 102573

DETECTED PKS: 10 REJECTED PKS: 0

DIVISOR: 2.00000 MULTIPLIER: 10.0000

NOISE: 247.7 OFFSET: 8666

Figure 9. Representative GC/EC/FSOT chromatogram of a sandy clay loam soil check sample fortified at 0.2 ppm dienochlor; 0.5 mg equiv./uL injected; 0.112 ng/uL detected; 0.224 ppm dienochlor (112% recovery).



TITLE: DIENOCHLOR IN SOIL 15:31 23 JUN 87

CHANNEL NO: 4 SAMPLE: KLS CK METHOD: DIENOCHLOR

PEAK NO	PEAK NAME	RESULT	TIME (MIN)	TIME OFFSET	HEIGHT COUNTS	SEP CODE		W1/2 (SEC)
2	DIENOCHLO	0.0069	3.467	-0.013	1331	BB	?	15.65
TOTALS:		0.0069		-0.013	1331			

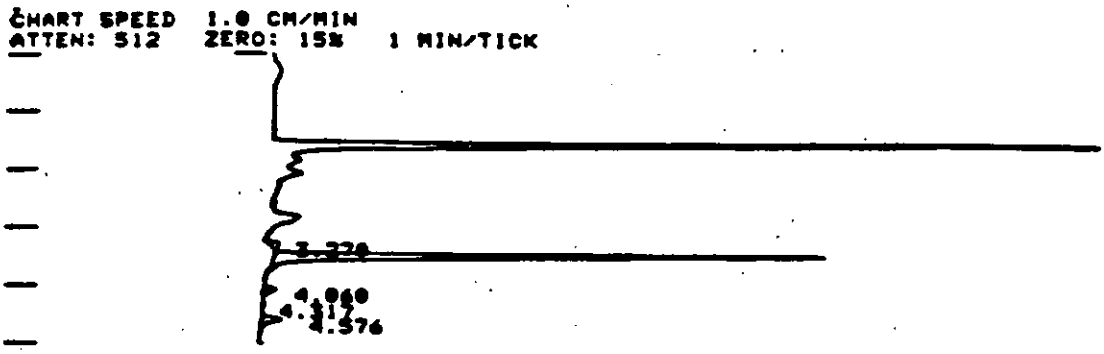
UNIDENT AREA: 27570

DETECTED PKS: 6 REJECTED PKS: 0

DIVISOR: 2.00000 MULTIPLIER: 10.0000

NOISE: 165.1 OFFSET: 3991

Figure 10. Representative GC/EC/FSOT chromatogram of a Kenyon loam soil check sample; 0.5 mg equiv./uL injected; < 0.005 ng/uL detected; <0.01 ppm dienochlor.



TITLE: DIENOCHLOR IN SOIL 17:55 23 JUN 87

CHANNEL NO: 4 SAMPLE: KLS CK+11 METHOD: DIENOCHLOR

PEAK NO	PEAK NAME	RESULT	TIME (MIN)	TIME OFFSET	HEIGHT COUNTS	SEP CODE	W1/2 (SEC)
2	DIENOCHLO	1.4760	3.479	-0.001	284397	BB	3.90
TOTALS:		1.4760		-0.001	284397		

UNIDENT AREA: 21697

DETECTED PKS: 5 REJECTED PKS: 0

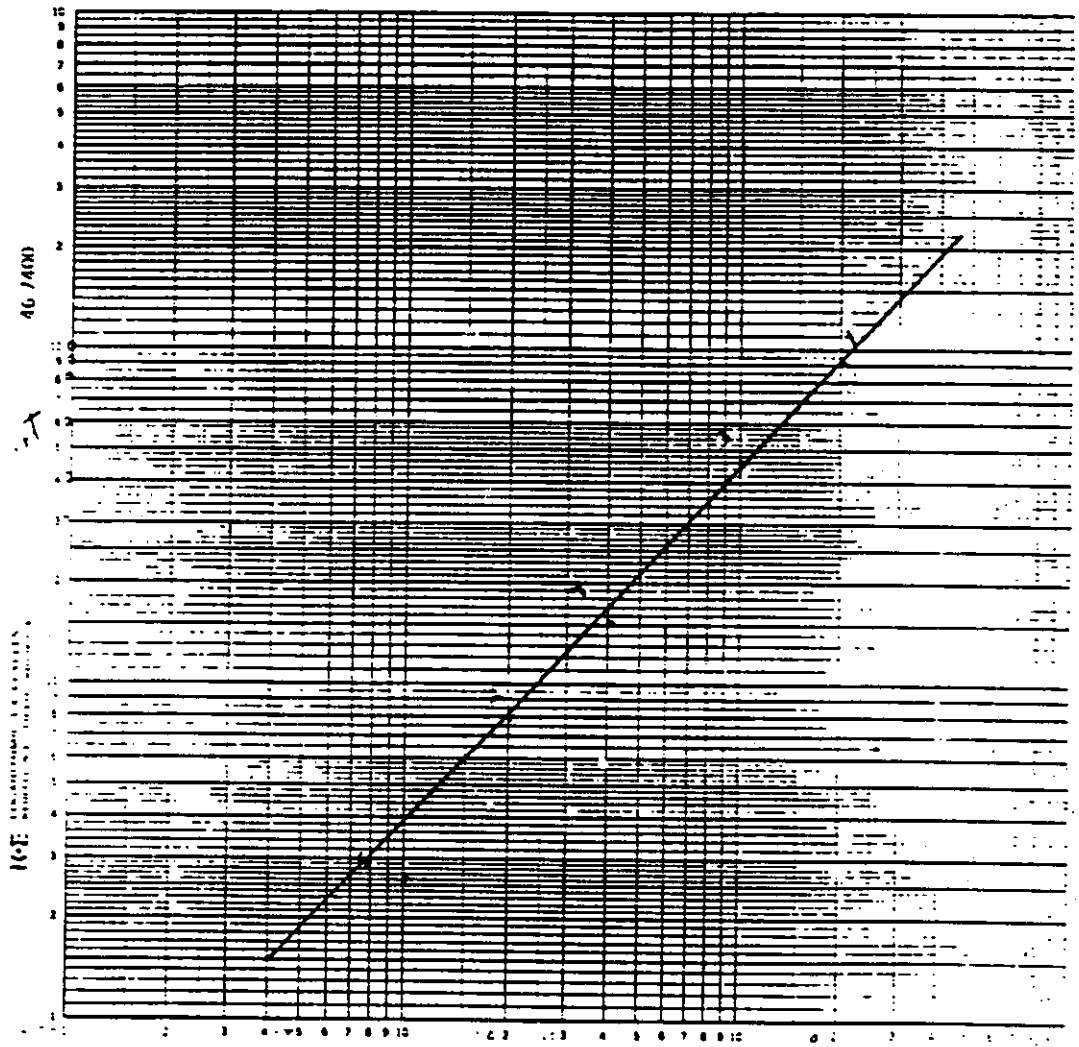
DIVISOR: 2.00000 MULTIPLIER: 10.0000

NOISE: 165.1 OFFSET: 2685

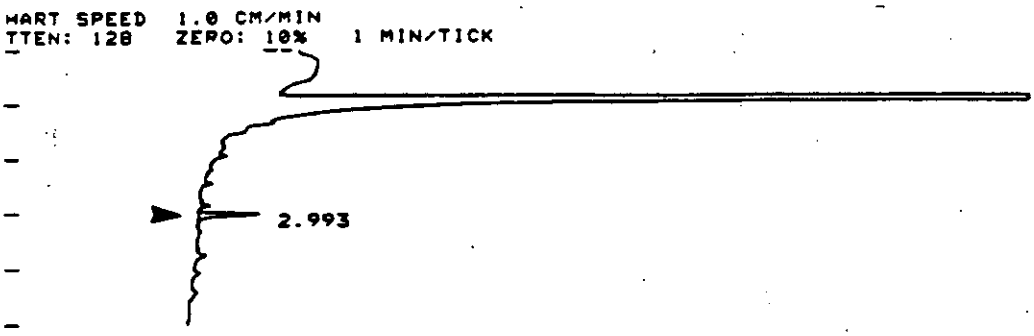
Figure 11. Representative GC/EC/FSOT chromatogram of a kenyon loam soil check sample fortified at 0.2 ppm dienochlor; 0.5 mg equiv./uL injected; 0.102 ng/uL detected; 0.204 ppm dienochlor (102% recovery).

APPENDIX V

REPRESENTATIVE STANDARD CURVE AND SAMPLE CHROMATOGRAMS



Typical standard curve for dienochlor GC analysis.
The numbers by the data points represent the order of injection of the standards. Standards were interspersed with samples during analysis.



TITLE: DIENOCHLOR/SOIL/GEORGIA 13:57 23 JUN 88

CHANNEL NO: 1 SAMPLE: E-11 METHOD: DI

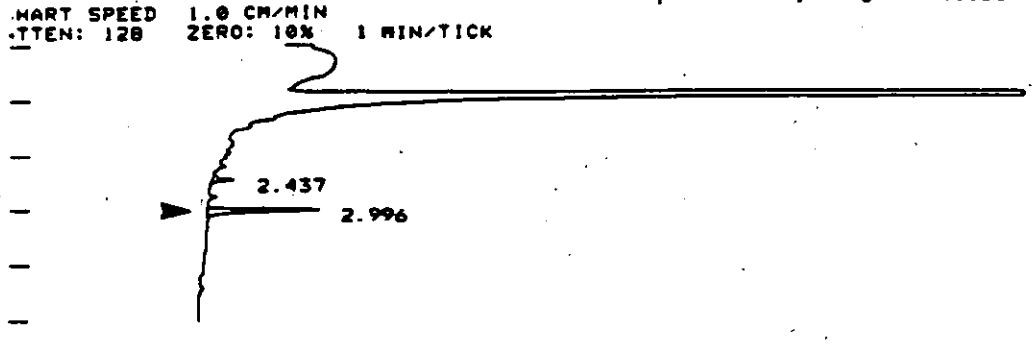
PEAK NO	PEAK NAME	RESULT	TIME (MIN)	TIME OFFSET	HEIGHT COUNTS	SEP CODE	W1/2 (SEC)
1	DIENOCHLOR	100.0000	2.993	0.003	7953	BB	3.20
TOTALS:		100.0000		0.003	7953		

DETECTED PKS: 1 REJECTED PKS: 0

MULTIPLIER: 1.00000

NOISE: 4792.9 OFFSET: 5522

Typical chromatogram of dienochlor standard; 2.0 ul injection of a 0.01 ng/ul standard.



TITLE: DIENOCHLOR/SOIL/GEORGIA 16:37 23 JUN 88

CHANNEL NO: 1 SAMPLE: 2711 METHOD: DI

PEAK NO	PEAK NAME	RESULT	TIME (MIN)	TIME OFFSET	HEIGHT COUNTS	SEP CODE	WI/2 (SEC)
2	DIENOCHLOR	84.5937	2.996	0.006	15336	BB	3.20
TOTALS:		84.5937		0.006	15336		

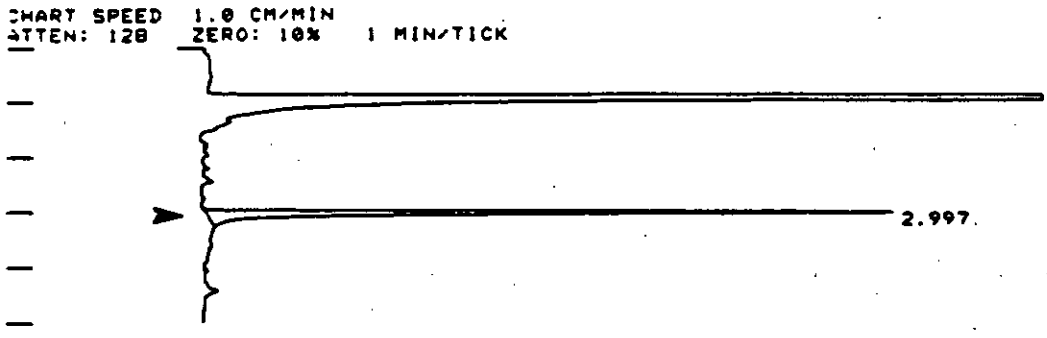
UNIDENT AREA: 2793

DETECTED PKS: 2 REJECTED PKS: 0

MULTIPLIER: 1.00000

NOISE: 1790.6 OFFSET: 5894

Typical chromatogram of dienochlor standard; 2.0 ul injection of a 0.02 ng/ul standard.



TITLE: DIENOCHLOR SOIL GEORGIA 12:57 23 JUN 85

CHANNEL NO: 1 SAMPLE: E-10 METHOD: DI

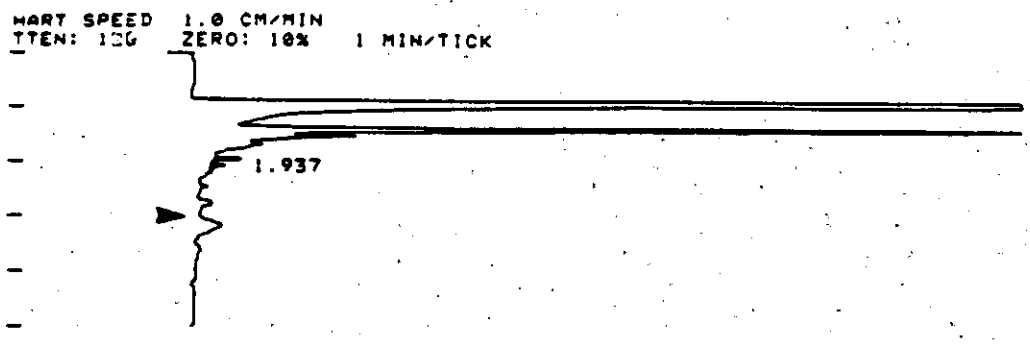
PEAK NO	PEAK NAME	RESULT	TIME (MIN)	TIME OFFSET	HEIGHT COUNTS	SEP CODE	WIDTH (SEC)
1	DIENOCHLOR	100.0000	2.997	0.007	93337	BB	3.35
TOTALS:		100.0000		0.007	93337		

DETECTED PKS: 1 REJECTED PKS: 0

MULTIPLIER: 1.00000

NOISE: 4752.9 OFFSET: 475

Typical chromatogram of dienochlor standard; 2.0 ul injection of a 0.1 ng/ul standard.



TITLE: DIENOCHLOR/SOIL/GEORGIA 13:05 23 JUN 86

CHANNEL NO: 1 SAMPLE: 75-77CP(0-10 METHOD: DI

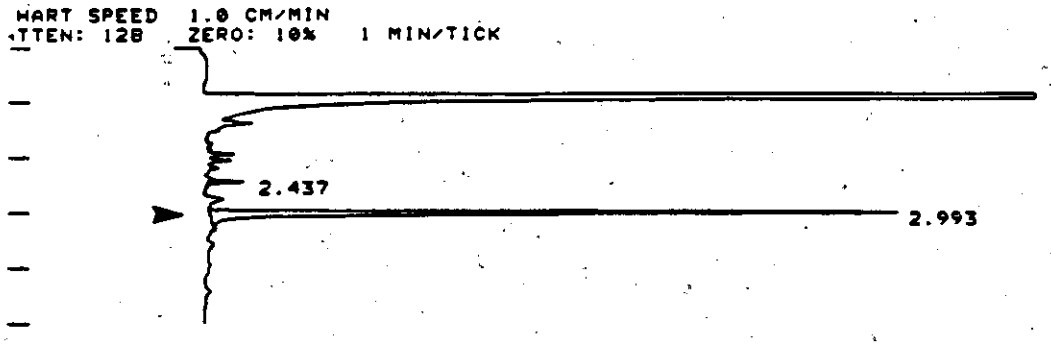
PEAK NO	PEAK NAME	RESULT	TIME (MIN)	TIME OFFSET	HEIGHT COUNTS	SEP CODE	WIDTH (SEC)
1		100.0000	1.937		3690	BB	2.32
TOTALS:		100.0000			3690		

DETECTED PKS: 1 REJECTED PKS: 0

MULTIPLIER: 1.00000

NOISE: 4792.9 OFFSET: 408

Typical chromatogram of check soil (75-77).



TITLE: DIENOCHLOR/SOIL/GEORGIA 13:14 23 JUN 88

CHANNEL NO: 1 SAMPLE: 75-77CK+ METHOD: DI

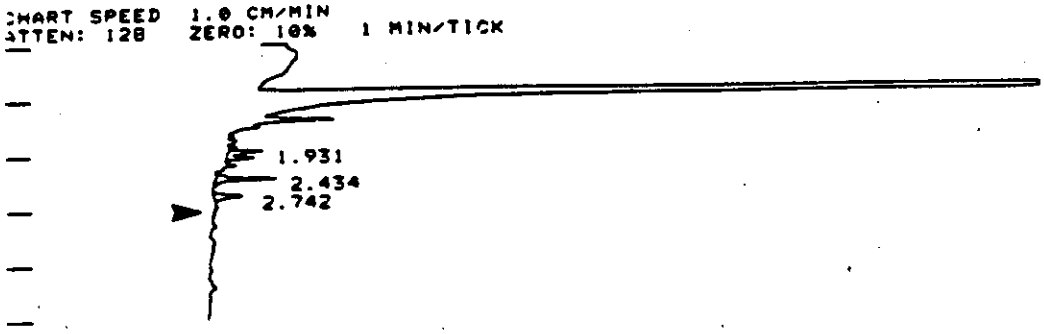
PEAK NO	PEAK NAME	RESULT	TIME (MIN)	TIME OFFSET	HEIGHT COUNTS	SEP CODE	WID (SEC)
1		4.7446	2.437		4670	BB	2.2
2	DIENOCHLOR	95.2554	2.993	0.003	93757	BB	3.1
TOTALS:		100.0000		0.003	98427		

DETECTED PKS: 2 REJECTED PKS: 0

MULTIPLIER: 1.00000

NOISE: 4792.9 OFFSET: 510

Typical chromatogram of ck soil (75-77, 20-30 cm); fortified at 0.20 ppm dienochlor.



TITLE: DIENOCHLOR/SOIL/GEORGIA 17:27 23 JUN 88

CHANNEL NO: 1 SAMPLE: 78-80(20-30) METHOD: DI

PEAK NO	PEAK NAME	RESULT	TIME (MIN)	TIME OFFSET	HEIGHT COUNTS	SEP CODE	WIDTH (SEC)
TOTALS:		0.0000			0		

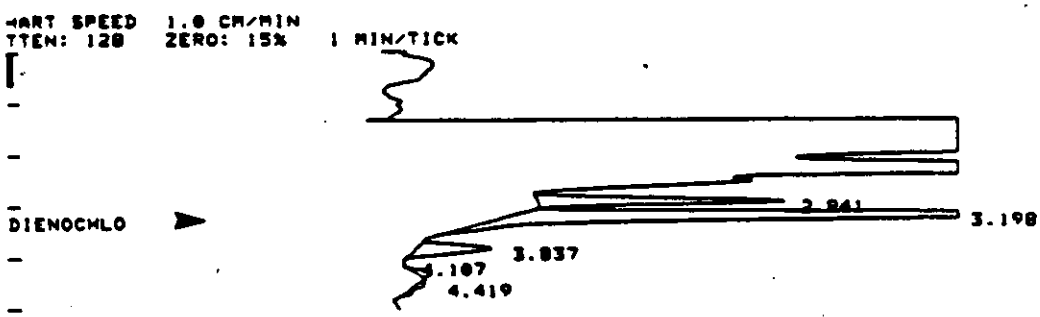
UNIDENT AREA: 204:4

DETECTED PKS: 4 REJECTED PKS: 0

MULTIPLIER: 1.00000

NOISE: 1790.6 OFFSET: 4462

Typical chromatogram of treated soil (78-80, 20-30 cm); 2.0 mg eq./ul injected, no dienochlor was detected.



ITLE: DIENOCHLOR/SOIL(TURF):GEORGIA TRT 24-26 (0-10c) 15:29 2 MAR 88

HANNEL NO: 3 SAMPLE: ~~01-250H10-00~~ METHOD: D

EAK NO	PEAK NAME	RESULT	TIME (MIN)	TIME OFFSET	HEIGHT COUNTS	SEP CODE	W1/2 (SEC)
2	DIENOCHLO	0.4585	3.198	0.000	113842	BB	8.3
OTALS:		0.4585		0.000	113842		

NIDENT AREA: 49911

ETECTED PKS: 6 REJECTED PKS: 1

IVISOR: 2.00000 MULTIPLIER: 12.5000

OISE: 338.7 OFFSET: 9544

OTES:

Typical chromatogram of treated soil (24-26, 0-10 cm); 0.087 ppm dienochlor detected.

APPENDIX VI

SAMPLE CALCULATIONS

Appendix VI. Sample Calculations

A. Residue Level Calculation From Gas Chromatographic Results

To determine the concentration of analyte in an injected aliquot of extract, the peak height in the sample chromatogram is compared to the standard curve obtained from a series of standards of known and similar concentration injected during the same GC run. The corresponding concentration of analyte is interpolated from this standard curve.

The concentration of analyte residue in the sample is then determined using this aliquot concentration and the following expression:

$$\text{ppm (ng/mg)} = \frac{C_e\ (\text{ng}/\mu\text{L}) \times V_s\ (\mu\text{L})}{W_s\ (\text{mg})}$$

Where:

ppm = Concentration of analyte in the sample in parts per million (ng of analyte/mg of substrate)

V_s = Volume of final sample extract in microliters taking into account all dilutions and or aliquots used.

W_s = Weight of sample taken for analysis, in milligrams.

C_e = Concentration of residue in extract (ng/µL) determined from the standard curve.

A sample calculation is shown below using a 50 gm sample, 10 ml final volume and a final analyte concentration of 0.50 ng/µl.

V_s = 10 ml, (or 10,000 µl)

W_s = 50 mg, (or 50,000 mg)

C_e = 0.50 ng/µl

$$\text{ppm} = 0.50 \times \frac{10{,}000\ \mu\text{l}}{50{,}000\ \text{mg}}$$

$$\text{ppm} = 0.50 \times 0.20$$

$$\text{ppm} = 0.50$$

B. Calculation of Residue Per Soil Core From a PPM Measurement

Residue per soil core was calculated from the ppm values obtained from the 0-10 cm, 10-20 cm, 20-30 cm etc. soil core segments for each sampling interval and the volume and weight of the soil contained within the core segments.

Dimensions of a soil core, (0.9 inch diameter by 10 cm length).

Volume of a cylinder (V) = Pi r^2 H

Pi= 3.14
r = radius of the cylinder
= 0.9 inch diameter/2 x 2.54 cm/in
= 1.143 cm
H = height of the cylinder
= 10 cm for each soil core

V = 3.14 x $(1.143\ cm)^2$ x 10 cm
= 41.04 cm^3

The bulk density of the soil was 1.52 grams/cm^3.

Using a ppm value determined for day 3 (0.022 ppm) in the 0-10 cm core segment gives a value of 0.022 µg per gram of soil.

µg/soil core = ppm (µg/g) x Bulk Density x Volume of Core Segment

= 0.022 µg/g x 1.52 g/cm^3 x 41.04 cm^3/core
= 1.37 µg/10 cm core segment

This value is the total ug detected at day 3 (see Table III, page 15 this report). No residue was seen in the 10-20 cm or 20-30 cm segments.