

100601
SHAUGHNESSEY NO.

20
REVIEW NO.

EEB BRANCH REVIEW

DATE: IN 9-9-80 OUT 12-3-80

FILE OR REG. NO. _____

PETITION OR EXP. PERMIT NO. 38412-EUP-1

DATE DIV. RECEIVED 9-8-80

DATE OF SUBMISSION 7-3-80

DATE SUBMISSION ACCEPTED _____

TYPE PRODUCT(S): (I), D, H, F, N, R, S Insecticide

DATA ACCESSION NO(S). _____

PRODUCT MANAGER NO. Wilson (21)

PRODUCT NAME(S) Nemacur 3E

COMPANY NAME Mobay Chemical Corporation

SUBMISSION PURPOSE Extension request for EUP on pineapples (Hawaii only)

SHAUGHNESSEY NO.	CHEMICAL & FORMULATION	%A.I.
<u>100601</u>	<u>Fenamiphos</u>	<u>35%</u>
_____	_____	_____

Nemacur 3E

100 Pesticide Label Information

100.1 Pesticide Use

Experimental use for nematode control in pineapples in Hawaii.

100.2 Formulation

Nemacur 3 Emulsifiable Concentrate
35% active ingredient

100.3 Application Methods, Directions, Rates

PEST	GALLONS OF NEMACUR 3	REMARKS
Nematodes	3-1/3 to 6-2/3	PREPLANT SOIL APPLICATION: Apply specified dosage (10 to 20 lbs. active ingredient) per acre as a preplant broadcast treatment. Thoroughly incorporate the chemical to a depth of 4 to 6 inches into the soil using suitable tillage equipment. <u>POSTPLANT BROADCAST APPLICATION:</u> - <u>PLANT CROP.</u> Apply specified dosage (1 to 3 lbs. active ingredient) in 50 to 250 gallons of water per acre as a broadcast spray, or through drip irrigation. Begin applicaions 1 to 3 months after planting. Make additional applications at interval of 1 to 3 months as needed. Do not apply within 30 days before harvest. NOTE: A preplant soil applicaton using NEMACUR 3, NEMACUR 15% Granular or a soil fumigant according to label directions should be made in addition to postplant broadcast applications of NEMACUR 3. Do not apply more than a total of <u>40 lbs.</u> active ingredient of NEMACUR per acre to the plant crop regardless of formulation or method of application. - <u>FIRST RATOON CROP.</u> Apply specified dosage in 50 to 250 gallons of water per acre as a broadcast spary or through drip irrigation. Make the first application immediately following crop harvest. Make additional application at intervals of 1 to 3 months as needed. Do not apply within 30 days before harvest. NOTE: Do not apply more than a total of 30 lbs. active ingredient (10 gallons of NEMACUR 3) per acre to the first ratoon crop.
IMPORTANT: Do not feed or graze treated pineapple fields.		

PROPOSED EXPERIMENTAL PROGRAM

(1) Identification of Participants

The experimental programs for NEMACUR 3E will be supervised and monitored by the following Research Department Head from each of the cooperating plantations:

- a. Anthony Hepton, Ph.D.
Castle & Cooke Foods
P.O. Box 3380
Honolulu, Hawaii 96801
(808) 536-3411
- b. Mr. George Yamane
Del Monte Corporation
P.O. Box 100
Kunia, Oahu, Hawaii 96759
(808) 621-5658
- c. David D.F. Williams, Ph.D.
Maui Pineapple Company, Ltd.
P.O. Box 187
Kahului, Maui, Hawaii 96732
(808) 877-3351

(2) Pesticide Quantities and Total Acreage

- a. Nematicur 3E, Total Requested: 9,382 gallons of formulation
28,146 pounds active ingredient
- b. A total of 100 acres of pineapple to be treated under the EUP extension for a period of three years.
- c. All experimental programs under these permits will be conducted only in the State of Hawaii.

(3) Proposed Program - Details

Nematicur 3E is expected to be used in experiments aimed at controlling nematodes on pineapple; especially the reniform and rootknot nematodes. The material will be tested in pineapple fields on the islands of Oahu, Maui, Molokai and Lanai on specifically controlled plots monitored by the Participants named in subsection (1) of this Section.

No seasonal use pattern is involved. Nematode infestation in Hawaii is constant, and the experimental programs will be conducted on a year-round basis. Replicates number 4 to 6 in many experiments.

Methods and Timing of Applications:

a. Nemacur 3E:

10-20 lbs. a.i. per acre applied as a preplant broadcast treatment and incorporated into the soil with tillage equipment. Special emphasis is to be given to postplant application through drip irrigation. Timing of applications for pineapple on a 3-year cycle are as follows:

(All applications are given at an average of 1.8 lbs. active ingredient, 25 ppm per acre)

1. Bi-monthly applications for 6 months.
2. Bi-monthly for 12 months.
3. Bi-monthly for another 12 months, followed by an additional 6 months following plant crop harvest.

(4) Program Objectives

Experiments involving Nemacur 3E will continue to address themselves to nematode control in the pineapple crop. Data concerning yield, performance, phytotoxicity, residue and environmental impact will be collected and analyzed.

Information gathered will include nematode counts before treatment, periodic counts in treated plots, and in fumigated plots. Yield and residue data will be collected for plant crop and ratoon crops according to treatment regime.

100.4 Target Organisms

Nematodes - especially the reniform and rootknot nematodes.

100.5 Precautionary Labeling

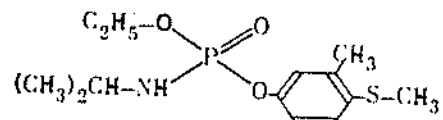
This pesticide is extremely toxic to fish and wildlife. Use with care when applying in areas frequented by wildlife or adjacent to any body of water.

101 Physical and Chemical properties

101.1 Chemical Name

Ethyl-3-methyl-4-(methylthio)phenyl(1-methylethyl)phosphoramidate

101.2 Structural Formula



101.3 Common Name

Fenamiphos

101.4 Trade Name

Nemacur

101.5 Molecular Weight

303

101.6 Physical State

Tan, Waxy Solid

101.7 Solubility

Soluble in most organic solvents.

Water: Ca 400 ppm.

102 Behavior in the Environment

The following information was extracted from an Environmental Chemistry Review dated 10/3/73 (R.W. Cook). A current review is not available.

102.1 Soil

Nemacur adsorbs to soil particles but can leach in soils which have a low adsorption coefficient. These would tend to be light soils with less organic matter or fine clay particles. Nemacur generally converts to sulfoxide and sulfone phenols within 3 weeks, but residues of (20 lbs. a.i.) Nemacur and its metabolites have been found in a soil sample 2 years after the last application. These residues were noted to be tightly bound to soil particles in heavier soils. Hydrolysis is not a mode of soil degradation as Nemacur binds to soil molecules. Because of this some runoff occurs.

102.2 Water

The half life of nemacur in water (pH 7) was noted to be about 5 days. The degradation products of hydrolysis were not identified.

102.3 Plant

Nemacur and its soil metabolites sulfoxide and sulfone are absorbed by plants. The metabolites undergo further thiooxidation, followed by hydrolysis. (INFORMATION: EDD GROSS, PESTICIDE PET. #3F1399 (Sulfoxide and sulfone phenols constitute the major residue in plants, perhaps as much as 10 x the level of the original cholinesterase inhibitor. These phenols seem to bear similarity to

the hydrolysis products of Fenthion)]. It should also be noted here that technical nemacur is comprised of impurities

Information on photodegradation is not available.

103.0 Toxicological Properties

Avian Dietary LC₅₀

	<u>LC₅₀ (95% C.I.)</u>	<u>Category</u>
Bobwhite Quail (Tech)	36(31-45) ppm	Core
Mallard Duck (Tech)	316(221-457) ppm	Core
Japanese Quail (Tech)	59(49-71) ppm	Supplemental

Fish Acute LC₅₀

	<u>LC₅₀ (95% C.I.)</u>	<u>Category</u>
Rainbow Trout (Tech)	72.1 ppb	Core
Bluegill Sunfish (Tech)	17.7 ppb	Core
Bluegill Sunfish (Tech)	9.5(6.8-15) ppb	Core
Bluegill Sunfish Sulfoxide	2653(1000-4600) ppb	Core
Bluegill Sunfish Sulfone	1173(1000-1500) ppb	Core

Aquatic Invertebrate LC₅₀

	<u>LC₅₀ (95% C.I.)</u>	<u>Category</u>
Daphnia magna (Tech)	1.6(1.3-1.9) ppb	Supplemental

104.0 Hazard Assessment

104.1 Discussion

Nemacur is very highly toxic to avian and aquatic species. It degrades to the sulfoxide and sulfone, which are also toxic. Nemacur is persistent in the environment and is systemic in nature. The persistence and repeat applications of Nemacur do present a potential hazard. The following calculations indicate that adverse effects to wildlife can be expected, based on residues from a single application.

I. Expected Residues

	<u>Initial</u>
Large invertebrates	1100
Small invertebrates	240
Leafy crops	2500
Soil unincorporated	422

II. Body Weight and Food Consumption Data

	<u>Ave. Wt. (g)</u>	<u>Ave. Daily Food Consumption</u>
Bobwhite quail	190 g	15.2 g
Mallard	1200 g	50.0 g
White-footed mouse	30 g	4.5 g
Meadow vole	70 g	7.0 g

III. Converting LD₅₀ Data from mg/kg to mg/animal equivalent

	<u>LD₅₀ (mg/kg)</u>	<u>mg/animal</u>
Bobwhite quail	3.6	0.68
Mallard	15.8	18.96
White-footed mouse	4.75	0.1425
Meadow Vole	4.75	0.3325

IV. Potential Acute Exposure ^a

<u>Species</u>	<u>Lg. Inverts.</u>	<u>Sm. Inverts.</u>	<u>Leafy Crops</u>
Bobwhite	16.72	3.64	38.0
Mallard	55.0	12.0	125.0
White-footed mouse	4.95	1.08	11.25
Meadow vole	7.7	1.68	17.50

a. based upon: $\frac{\text{expected residue (ppm)} \times \text{avg. daily food consum.}}{1000}$

V. Potential Acute Exposure vs. Toxicity

<u>Species</u>	<u>Exposure (mg)</u>	<u>Toxicity (mg/animal)</u>
Bobwhite	16.72 (Lg. Inverts.) 3.64 (Sm. Inverts.) 38.0 (Leafy Crops)	> 0.68
Mallard	55.0 (Lg. Inverts.) 125.0 (Leafy Crops) 12.0 (Sm. Inverts.)	> 18.96
White-footed Mouse	4.95 (Lg. Inverts.) 1.08 (Sm. Inverts.) 11.25 (Leafy Crops)	> 0.1425
Meadow Vole	7.70 (Lg. Inverts.) 1.68 (Sm. Inverts.) 17.50 (Leafy Crops)	> 0.3325

The attached graphs show what residue levels are expected following multiple applications of Nemacur at label rates. Red lines indicate residues remaining from previous application(s).

Large Invertebrates

1000

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600

500

400

300

200

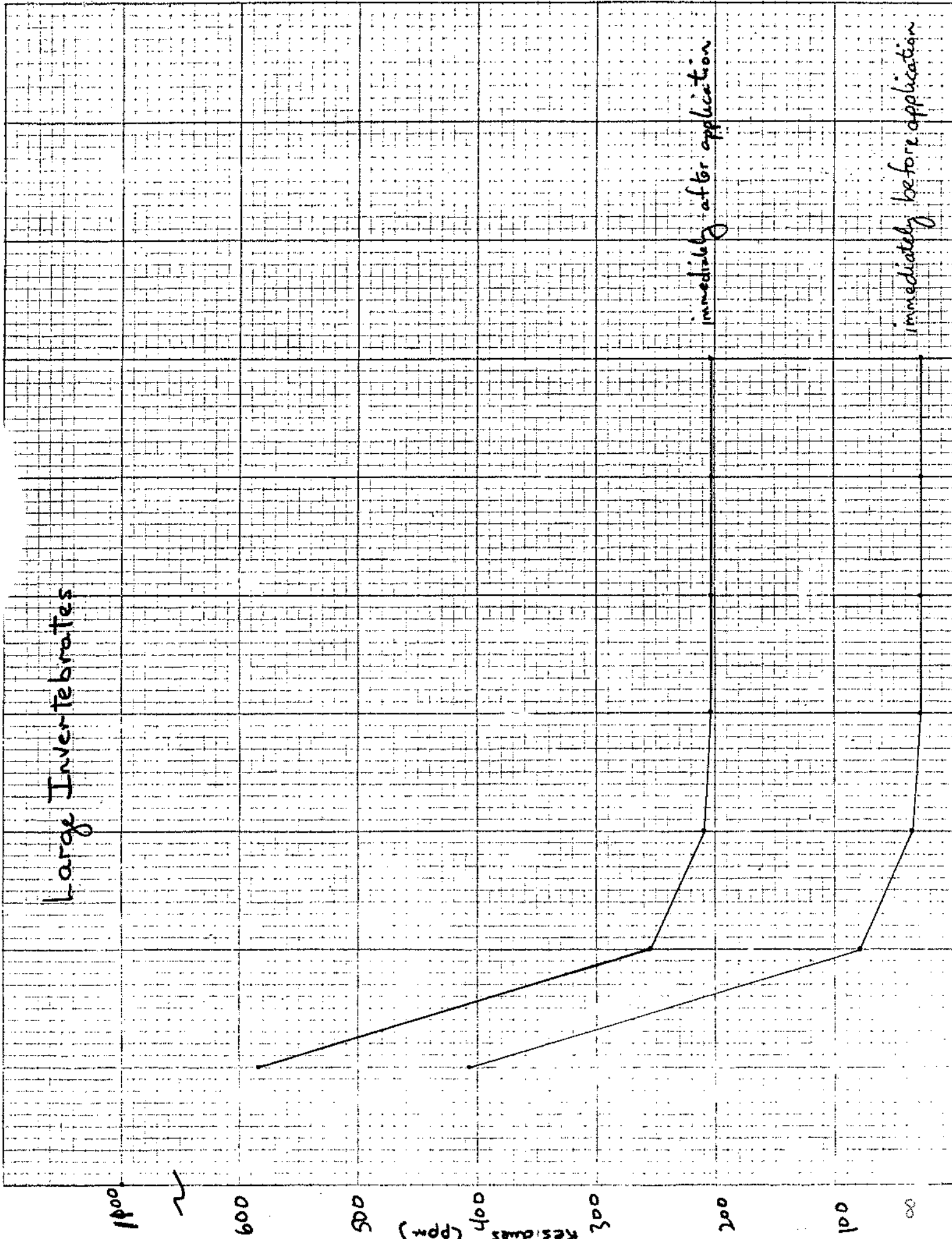
100

0

Residues (ppm)

immediately after application

immediately before application



Leaves + Leafy Crops

Residues (ppm)

2500

2000

1500

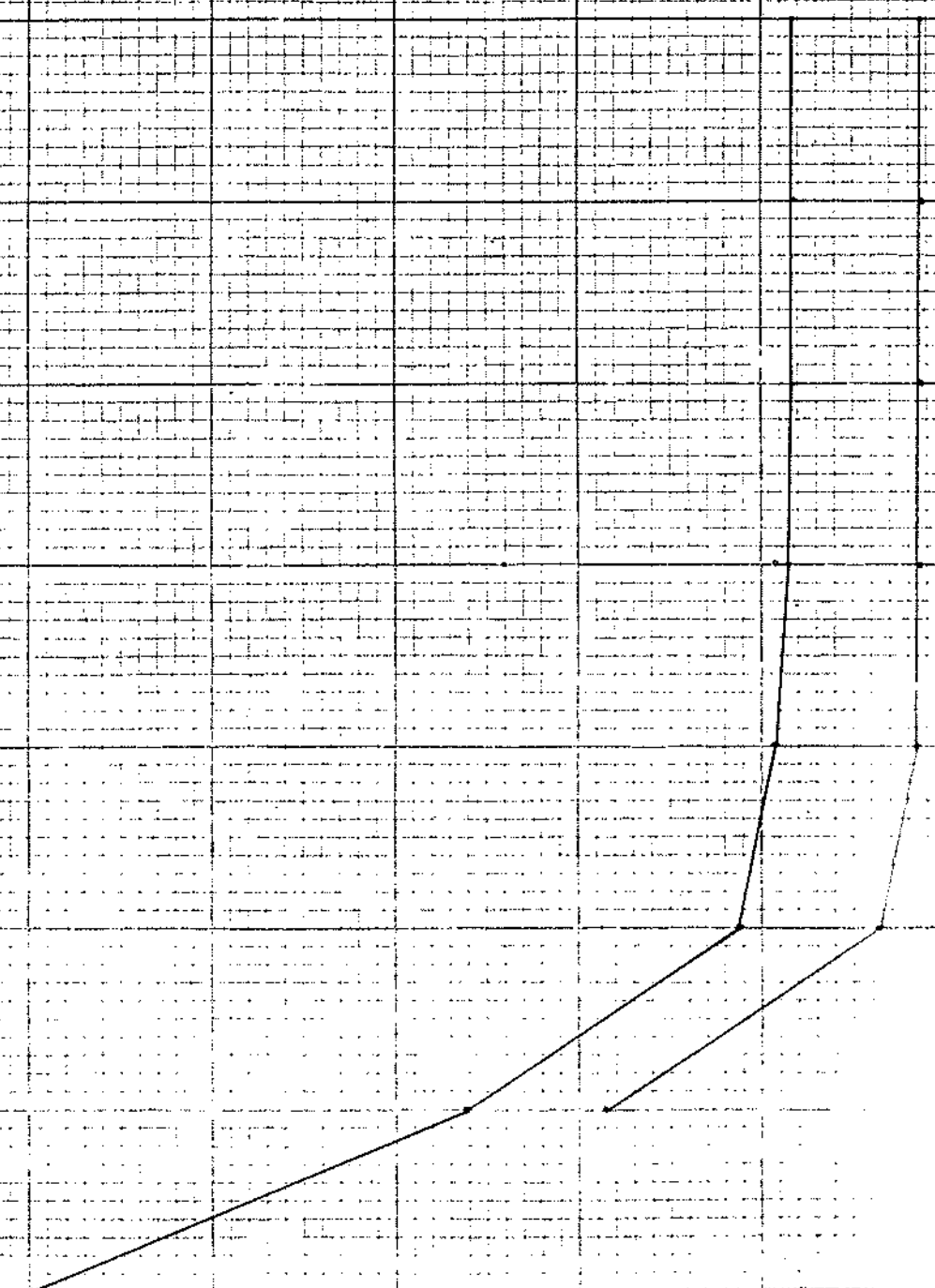
1000

500

0

immediately after application

immediately before application



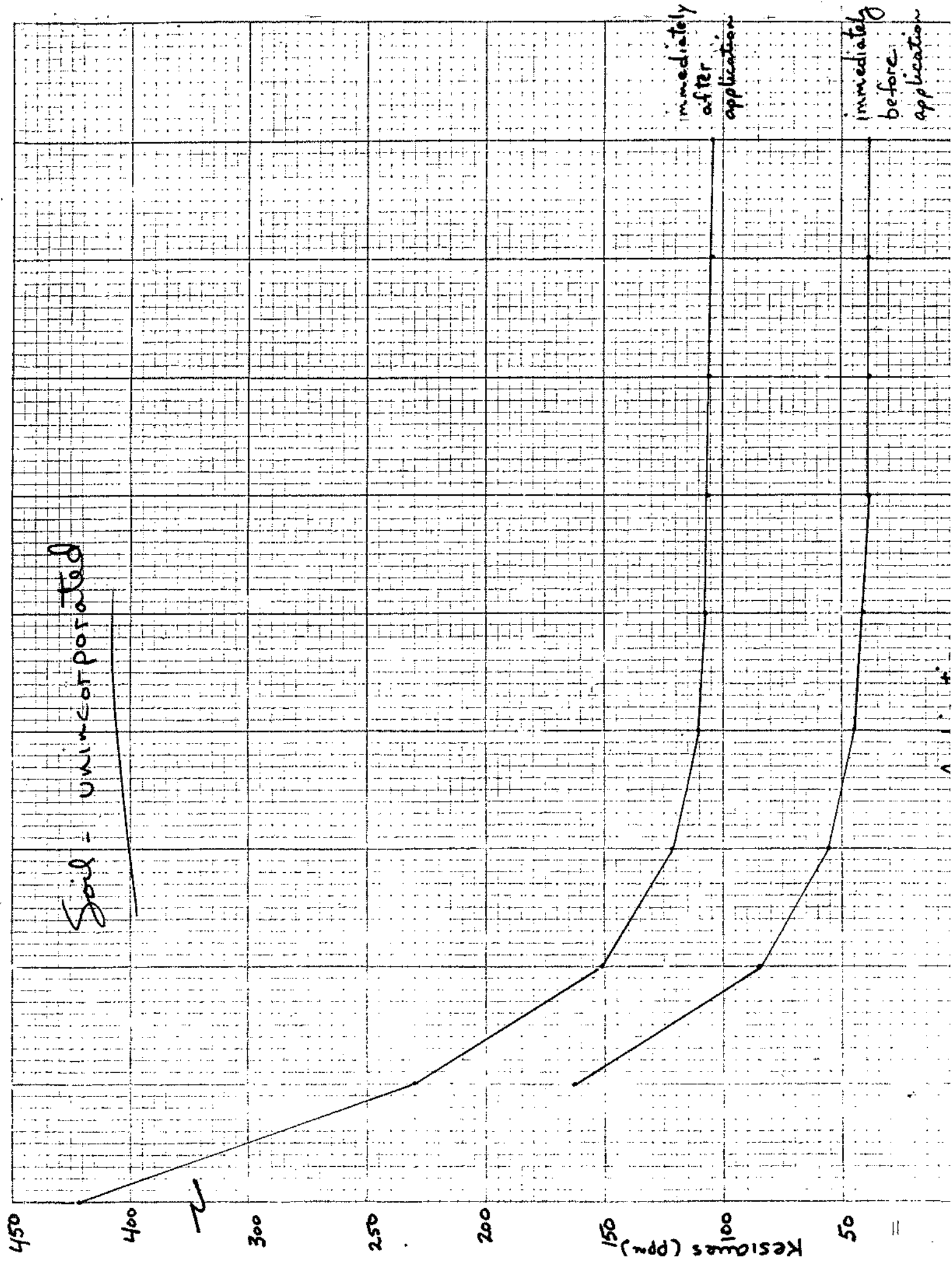
Soil-incorporated

Residues (ppm)

immediately after application

immediately before application





The environment in and around pineapple fields should include a variety of nontarget organisms, particularly along field edges, roadsides and drainage ditches. The multiple applications and persistence of Nemacur cause concern about possible reproductive effects, especially to avian species, and further testing along these lines may be required prior to registration.

107 Conclusions

107.5 Data Requests

Prior to consideration for registration the following studies are required.

- 1) an avian acute oral LD₅₀ study for bobwhite quail or mallard duck
- 2) an aquatic invertebrate LC₅₀
(preferably on first instar daphnids)
- 3) field or monitoring study, to be determined in conjunction with personnel of the Ecological Effects Branch.

107.6 Special Notes

The registrant has requested 9,382 gallons of Nemacur 3E under the present submission. The original EUP request, of which this is to be an extension, only required 3,450 gallons of Nemacur 3E. If the experimental use program were conducted at maximum label rates, a total of 3,000 gallons of Nemacur 3E could be applied to 100 acres over the proposed 3-year period. Confusion regarding the amount of active ingredient required for the experimental use program should be settled prior to the extension of this EUP. Ecological Effects Branch completed this review with the understanding that only Nemacur 3E is to be used in the experimental use program. A second review will be necessary if Nemacur 15G is to be included in this EUP.

107.7 Recommendations

The requested EUP for the use of Nemacur on pineapples is of particular concern to the Ecological Effects Branch because of Nemacur's high toxicity to avian and aquatic species. Therefore, it is the opinion of this Branch that the extension of this EUP should be contingent upon the Pineapple Grower's Association of Hawaii agreeing to conduct a field or monitoring study. The registrant should contact personnel of the Ecological Effects Branch concerning acceptable test procedures.

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