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SHAUGHNESSEY NO.

REVIEW NO.

100601

EEB BRANCH REVIEW

27

DATE: IN 2-8-83 OUT 8-25-83

FILE OR REG. NO. 3125-283, 3125-236, 3125-237

PETITION OR EXP. PERMIT NO. \_\_\_\_\_

DATE OF SUBMISSION 1-31-83

DATE RECEIVED BY HED 6-15-83

RD REQUESTED COMPLETION DATE 8-26-83

EEB ESTIMATED COMPLETION DATE 8-19-83

RD ACTION CODE/TYPE OR REVIEW 316/Amendment

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

DATA ACCESSION NO(S). \_\_\_\_\_

PRODUCT MANAGER NO. H. Jacoby (21)

PRODUCT NAME(S) Nemacur 15G

COMPANY NAME Mobay Chemical Company

SUBMISSION PURPOSE Proposed Conditional Registration of Tobacco,  
Nonbearing Apples, Cherries, and Peaches

SHAUGHNESSEY NO. \_\_\_\_\_ CHEMICAL, & FORMULATION \_\_\_\_\_ % A.I. \_\_\_\_\_

100601 Ethyl-3-methyl-4-(methylthio)phenyl (1-methylethyl) \_\_\_\_\_

\_\_\_\_\_ phosphoramidate \_\_\_\_\_ \*

\_\_\_\_\_ Inert ingredients \_\_\_\_\_ \*

Total \_\_\_\_\_ \*

\* See attached product labels (Appendix 1)

100. PESTICIDE USE

The registrant is requesting that Nemacur (3EC, 10G, and 15G) formulations be conditionally registered as a nematocide for use on tobacco, non-bearing apples, cherries, and peaches.

100.1 APPLICATION RATES/METHODS/DIRECTIONS

Proposed ammendments to existing product (10G/15G/3EC) labels are available in Appendix I.

101. CHEMICAL PHYSICAL PROPERTIES

See previous reviews by Gessner 12/3/80; Regelman (EFB) 1/19/83.

101.3 PRECAUTIONARY LABEL STATEMENTS

This product is toxic to fish, birds, and other wildlife. Keep out of lakes, streams or ponds. Bird feeding in treated areas may be killed. In cleaning equipment or disposal of wastes, do not contaminate water.

103. TOXICOLOGICAL PROPERTIES

103.1 Mammals: See attached Toxicological "one liner" (Appendix II)

103.2 Birds / Fish / Aquatic Invertebrates

See previous reviews by Bowen 3/9/83, Rabert 9/28/82, Gessner 12/3/80, Touart 12/28/79, and Gavin 1/10/76.

Fish and wildlife data obtained since the last review are listed below (Personnel communication Dr. Elwood F. Hill, Patuxent Wildlife Research Center. March 14, 1983):

<u>Study</u>	<u>Species</u>	<u>Formulation</u>	<u>Results</u>	<u>95% C.I.</u>
Avian Acute	bobwhite	90% A.I.	1.0 mg/kg	(0.7 - 13.0)
Avian Acute	bobwhite	15% Granular	2.4 mg/kg	(1.2 - 4.6)

103.5 Agriculatural Use Profile

Nemacur's active ingredient (fenamiphos) is currently registered for use on soybeans (71,586,000 acres), peanuts (1,549,700 acres), and cotton (13,947,000 acres). Nemacur registrations to date provide

for a potential usage on approximately 87,082,700 acres. The proposed registration for tobacco (877,113 acres) and non-bearing apples (507,348 acres), cherries (119,112 acres), and peaches (249,819 acres) could theoretically result in a 2% increase in overall usage of this product in the United States.

These data indicate that the proposed registration would represent a minimal increase in acreage. It is important to note, however, that the proposed orchard uses (876,229 acres) deviate significantly from past crop registrations and will result in the exposure of new populations of non-target organisms.

#### TOBACCO USE

Initial soil preparation begins in the early spring with the turning under of immature small grain cover crops (i.e., barley, wheat, rye). Such crops are planted following the previous year's harvest for the purpose of increasing available nutrients and soil stability. Applications of nematicide are made to bare soil some time later and just prior to the transplanting of tobacco seedlings. Acreage (average size of farm) devoted to the commercial production of tobacco is unusually small, as individual field range from 1-5 acres in size. Tobacco fields are usually surrounded by hedge rows, other agricultural crops, woodlots, streams, and drainage ditches.

Registration of Nemacur for use on tobacco would result in the use of this product in 18 states and could involve between 957,650 and 1,086,350 acres. A complete breakdown of potential acreage by state is shown in Appendix V.

#### ORCHARD USE

Non-bearing fruit trees are those that will not bear fruit for one year after application, including newly planted and established trees. Any fruit that may form on treated trees during this one-year period must be destroyed and not used for human or animal consumption. A complete break-down of potential acreage by state is shown in Appendix V. No additional data are available on the use of granular and/or liquid nematicides on non-bearing deciduous fruit trees.

104.

HAZARD ASSESSMENT

INTRODUCTION

The hazards to non-target mammalian and avian species posed by granular fenamiphos are based upon the average weight of one (1) 15-G granule and the LD<sub>50</sub> for the most sensitive organisms tested. Hazards outlined for the 3EC formulations are based upon the minimum labeled rate (10 lbs. A.I./A un-incorporated) for orchard use and the LC<sub>50</sub> of the most sensitive species tested. Aquatic hazards are based upon estimated aquatic concentrations resulting from contaminated rainwater runoff and the LC<sub>50</sub> for the most sensitive aquatic organism tested. Toxicological extrapolations across species lines do not include the possibility of species hypersensitivity to fenamiphos.

The registrant (Mobay Chemical Corporation) proposes to apply Nemacur to tobacco, non-bearing apples, cherries and peaches at the rate of 66 to 133 pounds formulated product (9.9 to 20.0 AI/A) per acre. The product is to be incorporated mechanically 2 to 4 inches deep or by sprinkler irrigation (1 to 2 inches of water) applied immediately following application. Use rates may not exceed 133.3 pound formulation/acre per planting site. See Appendix I for 3EC and 10G/15G product labels.

The Ecological Effects Branch would also like to emphasize the fact that the process of incorporation only serves to reduce the potential for non-target wildlife exposure not, eliminate it. Recent research has shown that even the most modern farm equipment (i.e., John Deere 7,000, etc.) cannot cover all of the granules applied. Erbach and Tollefson (1981) using commercially available equipment found that 5 % of the granules applied remained on the soil surface. Under these conditions, 1-2 granules of pesticide/cm of treated row would be available to non-target wildlife. Fink (1980) also examined the degree with which corn planters could incorporate granular pesticides. Counts conducted immediately after incorporation revealed that both row areas ( $\bar{X}$  = 70 granules/sq ft.) and end row turn areas ( $\bar{X}$  = 344 granules/sq ft.) contained large numbers of exposed granules. Balcomb et al. (1982) also reported seeing exposed granules while conducting field searches for non-target mortalities. Field studies with fenamiphos and other granular pesticides have documented that non-target birds and mammals can ingest lethal doses of granular pesticides during the course of their normal feeding activities (Balcomb et al. 1982; Bunyan et al. 1981; Lamb, 1982; Carlisle, 1982).

The fact that some granules remain on the soil surface even after incorporation is important because fenamiphos formulations are of such high toxicity that the quantity left poses a toxicological hazard to non-target wildlife. Agency sponsored field studies also indicate

that adequately incorporated granules can still pose a hazard to bird species that typically probe the soil surface for worms and grubs. Balcomb et al. (1982) noted that the majority of pesticide related mortality occurred in robins, a species seen to repeatedly probe treated areas for earthworms. Observations of this nature suggest that birds feeding in treated areas can ingest a lethal dose of incorporated granules.

### Mammalian Exposure

#### TOXICITY DATA

End-use formulations of fenamiphos (15G) are highly toxic to mammals (rat LD50 range from 10 to 61 mg/kg). The toxicity of Nema-cur sulfoxide (95%), one of the two principle metabolites is higher than the parent material (LD50 range between 3.7 and 4.1 mg/kg). Results from 5 acute oral studies are provided in TOX "one-liner" data summary sheet (See Appendix II). No data are available on the chronic effects of this chemical on non-target mammals.

#### HAZARDS FROM GRANULAR (10G/15G) FORMULATIONS

Exposure to mammals is expected to occur through the accidental ingestion of granules during the process of feeding and/or grooming. A rat LD50 of 10 mg/kg was used to establish a mammalian restricted use classification trigger (1/5 LD50) of 2.0 mg/kg. The toxicological hazards posed by fenamiphos granules to four (4) species of mammals known to frequent agricultural areas are delineated in Table 1. These calculations indicate that ingestion of a relatively large number (157-164) of granules are required to exceed estimated restricted use triggers for larger (1100 - 454 g.) mammals. Smaller (<200 g.) could feasibly ingest enough granules (12-28) to exceed their respective triggers. However, considering that the major route of exposure is expected to occur accidentally mammals that can exceed their LD50 by ingesting a small number of 10 or 15-G granules would be the species most likely affected. Maximum weight calculations for this most susceptible group are shown below:

Animal				
Weight =	(Granule Weight (mg) X Percent Active) X 1000			
(g)	LD50			
		1	5	10
		Granule	Granules	Granules
15G= Animal				
Weight =	(0.093 mg X .15) X 1000 =	1.39 g	6.95 g	13.9 g
(g)	10.0 mg/kg			

Table 1.

Fenamiphos (10G/15G) Hazard to Four Species of Non-Target Mammals.

\*\*\*\*\*

Species	Body Weight (g)	Mg/Animal (g)\$\$	Number of Granules Equal to			
			LD50 <sup>1/</sup>		1/5 LD50 <sup>3/</sup>	
			10G	15G	10G	15G
Rat - ††	200	2.0	215.0	142.8	43.0	28.5
Eastern Cottontail (Adult)	1100	11.0	1,182.0	785.7	236.5	157.1
Weaned Young 20 days old	85	0.85	91.3	60.7	18.2	12.1
Grey Squirrel (Adult-Female)	520	5.2	559.1	371.4	111.8	74.2
Weaned Young 10 weeks old	200	2.0	215.0	142.8	43.0	28.5
Delmarva Fox <u>2/</u> Squirrel (Adult Female)	795	7.95	854.8	567.8	170.9	113.5
Weaned Young 8-10 weeks old	454	4.54	488.2	324.2	97.6	64.8

\*\*\*\*\*

†† - Rat LD<sub>50</sub>=10.0 mg/kg (Emperical Data; See Appendix II).

1/ - Weight of one (1) 15G granule = 0.093 mg (Bowen/Balcomb, Beltsville Lab. 7/24/81).

Weight of one (1) 10G granule = estimated to be same as 15G formulation.

Weight of Fenamiphos in one granule = 0.093 mg x 15% = 0.0139 mg/granule.  
= 0.093 mg x 10% = 0.0093 mg/granule.

\$\$ - Mg/Animal = Rat LD<sub>50</sub> X Animal Weight (kg) = 10.0 mg/kg x 0.085 kg = 0.85 mg/kg.

Number of 15-G granules required to equal LD<sub>50</sub> =  $\frac{0.85 \text{ mg/kg}}{0.014 \text{ mg/Fenamiphos/granule}}$  = 60.7 granules

2/ - Weight data obtained via telephone conversations with Gary Taylor (301-827-8612) and Dr. Vagan Flyger (454-4641) of the Delmarva Fox Squirrel Recovery Team.

3/ - Restricted use classification trigger of 1/5 LD<sub>50</sub>.

$$10G = \frac{\text{Animal Weight (g)}}{(g)} = \frac{(0.093 \text{ mg} \times .10) \times 1000}{10.0 \text{ mg/kg}} = 0.93 \text{ g} \quad 4.65 \text{ g} \quad 9.3 \text{ g}$$

In conclusion, registration of fenamiphos for an 1,753,000 additional acres will result in a minimal increase in exposure, but not in acute risks to non-target mammals. More specifically, mortalities are expected to result from the accidental ingestion of granules and as such, the likelihood of a mammalian species ingesting a lethal dose will increase in areas where granules are not immediately or properly incorporated. Mortalities are expected to occur primarily in very small mammals (< 13.9 grams) and to be heaviest during the first week following product application. The hazard to mammalian wildlife should be significantly reduced following rainfall or irrigation of incorporated areas.

#### Avian Exposure

##### AVAILABLE TOXICITY DATA

Fenamiphos (90% AI) is highly toxic to upland game birds (bobwhite LD50 = 1.6 mg/kg) and to waterfowl (mallard LD50 = 1.68 mg/kg). No observable effect levels (NOEL's) have been determined for both the mallard duck (14-weeks NOEL = 2 ppm) and bobwhite quail (25-weeks NOEL = 8 ppm). A fourteen (14) week exposure of 8 ppm has been shown to significantly effect developing bobwhite embryos. No data are available on the subacute toxicity of sulfoxide and sulfone metabolites to non-target avian species.

Avian 8-day subacute bioassays were unable to demonstrate a no observable effect level (NOEL) for fenamiphos on upland game birds and waterfowl. Bioassays conducted on bobwhite and mallard duck suggest that short term NOEL's are < 46.4 ppm and <10 ppm, respectively.

The effects of fenamiphos on upland game birds under field use conditions were tested on two previous occasions. Abstracts of these studies are presented below:

Bobwhite quail were tested in a 14-day field study on soil to evaluate the toxic effects of Nemacur 3 under simulated field conditions. The test substance was applied at rates of 6, 10, and 20 pounds AI/acre and immediately incorporated to a depth of 2 to 3 inches. Under the conditions of this study Nemacur had no significant effect on mortality, weight gain, clinical signs, gross lesions or brain cholinesterase activity (Author's Abstract).

The toxicity of Nema-cur 3 to resident birds was tested in a 41-day orchard field study. The compound was broadcast at 23.8 lbs AI/acre during the late spring and not incorporated. Under these conditions it represents a hazard to those species which forage on the ground in the treated areas. Significant (0.9 inches) rainfall appears to eliminate the hazard (Author's Abstract).

#### ENVIRONMENTAL FATE DATA

Nema-cur 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. Nema-cur generally converts to sulfoxide and sulfone phenols within three (3) weeks, but residues of (20 lbs/a.i.) Nema-cur and its metabolites have been found in a soil sample 2 years after the last application. These soil residues were noted to be tightly bound to soil particles in heavier soils. Hydrolysis is not a mode of soil degradation as Nema-cur binds to soil molecules. Because of this some runoff occurs (Cook, R.W. EFB 10/03/73).

Fenamiphos and its soil metabolites are readily absorbed by plants. Data characterizing soil photolysis are not currently available but have been requested by the Environmental Fate Branch (Fletcher 01/19/83).

#### HAZARDS FROM GRANULAR (10G/15G/3EC) FORMULATIONS

Exposure to birds is expected to occur primarily through the accidental ingestion of covered and uncovered granules during the normal feeding process. A bobwhite quail acute study ( $LD_{50} = 2.4 \text{ mg/kg}$ ) was used to establish a restricted use classification trigger ( $1/5 LC_{50}$ ) of  $0.48 \text{ mg/kg}$ .\*\*

The extent to which fenamiphos granules could pose a hazard to non-target birds is demonstrated in Table 2. These calculations suggest that birds weighing as much as 200 grams could exceed their no effect trigger by ingesting as few as 7 granules of the 15% formulation. However, birds that most likely affected would be those species that could exceed their  $LD_{50}$  by ingesting a relatively small number of granules. Calculations for maximum weight (g) for birds likely to exceed their  $LD_{50}$  are shown below:

#### Footnote \*\*

Fenamiphos single dose oral  $LD_{50}$  easily exceeds the Agency's proposed granular classification trigger ( $LD_{50} < 50 \text{ mg/kg}$ ) for a restricted use pesticide.



Table 2. Fenamiphos (10G/15G) Hazard to Seven Species of Non-Target Birds.  
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Species	Body Weight (g)	MG/ Animal (g)§§	Number of Granules Equal to			
			LD50 <sup>1/</sup>		1/5 LD50 <sup>3/</sup>	
			15G	10G	15G	10G
Bobwhite <sup>®</sup> (adult)	200	0.48	34.3	51.6	6.9	10.3
Bobwhite (14-day)	30	0.07	5.1	7.7	1.0	1.5
Robin	80	0.19	13.7	20.6	2.7	4.1
Mourning Dove	100	0.24	17.1	25.8	3.4	5.2
House Sparrow	20	0.048	3.4	5.2	0.7	1.0
Redwing- Blackbird	50	0.12	8.6	12.9	1.7	2.5
Grasshopper Sparrow	13.9	0.033	2.4	3.6	0.48	0.7
Attwater's <sup>2/</sup> Prairie Chicken (adult)	1000	2.4	171.4	258.1	34.3	51.6
Prairie Chicken (14-day)	50	0.12	8.6	12.9	1.7	2.5

\*\*\*\*\*

<sup>®</sup> Bobwhite LD50 = 2.4 mg/kg of 15G formulation (See Section 103.2).

<sup>1/-</sup> Weight of one 15G granule = 0.093 mg (Bowen/Balcomb, Beltsville Lab. 7/24/81.

- Weight of one 10G granule estimated to be same as 15G formulation.

Weight of Fenamiphos in one granule = 0.093 mg X 15% = 0.0139 mg/granule.

= 0.093 mg X 10% = 0.0093 mg/granule.

§§ - Mg/Animal = bobwhite LD50 X Animal Weight (kg) = 2.4 mg/kg X 0.200 kg =  
= 0.48 mg/kg.

Number of 15-G granules required =  $\frac{0.48 \text{ mg/animal}}{0.014 \text{ mg/Fenamiphos/granule}}$  = 34.28 granules  
required to equal LD50

<sup>2/-</sup> Weight data obtained via telephone conversations with Wayne Shifflet (713-234-3021 Refuge Manager, Attwater's Prairie Chicken Refuge, Aransas, Texas.

<sup>3/-</sup> Restricted use classification trigger of 1/5 LD50.

Animal Weight = (g)	$\frac{(\text{Granule Weight [mg]} \times \text{Percent Active}) \times 1000}{\text{LD}_{50}}$	1	5	10
		<u>Granules</u>	<u>Granules</u>	<u>Granules</u>
For 15G =	$\frac{(0.093 \text{ mg} \times .15) \times 1000}{2.4 \text{ mg/kg}}$	5.7 g	28.9 g	57.9 g
For 10G =	$\frac{(0.93 \text{ mg} \times 0.10) \times 1000}{2.4 \text{ mg/kg}}$	3.9 g	19.3 g	39.0 g

Both Red-winged Blackbirds (*Agelaius phoeniceus*) were orally dosed with fenamiphos 15G granules at EPA's Beltsville Laboratory (Balcomb and Bowen 11/20/80). Twenty-four (24) hour mortality data are presented below:

Number of Granules	Red-Winged Blackbird	House Sparrow
5	2 of 5 birds dosed died (40% mortality)	Not tested
10	3 of 5 birds dosed died (60% mortality)	Not tested

Results from these studies not only document the acute toxicity of the formulated product to small birds but also serve to reinforce the estimated avian hazards cited in Table 2 since empirical and estimated toxicity data for Red-wings are in concurrence. Formulated product testing cited earlier (Section 103.2) also substantiates the toxicity of the 15G formulation to upland game birds.

#### HAZARD FROM LIQUID (3 EC) FORMULATION

Fenamiphos (90% AI) is highly toxic to upland game birds (bobwhite  $LC_{50}$  = 38 ppm; Japanese quail  $LC_{50}$  = 59 ppm) and moderately toxic to waterfowl (mallard  $LC_{50}$  = 316 ppm). No observable effect levels (NOEL's) have been determined for both the mallard duck (14-weeks NOEL = 2 ppm) and bobwhite quail (25-weeks NOEL = 8 ppm). No data are available on the subacute toxicity of sulfoxide and sulfone metabolites to non-target avian species.

A bobwhite quail feeding study ( $LC_{50}$  = 38 ppm) was used to establish a restricted use classification trigger ( $1/5 LC_{50}$ ) of 7.6 ppm. The extent to which non-target birds could be exposed to Nemacur 3EC residues is examined in Table 1A-C (See Appendix III). Exposure estimates are based upon one (1) application at the minimum labeled rate of 10 lbs AI/acre and the assumption that incorporation does not entirely eliminate the availability of all contaminated dietary items. Comparisons between total estimated daily pesticide body burdens and restricted use triggers ( $1/5 LC_{50}$ ) determined for eight species of non-target birds suggest the following:

1. That small upland game birds feeding on dietary items contaminated by fenamiphos residues could exceed the 7.6 ppm/day restricted use trigger by a factor of 59 times. (Table 1; 14-day bobwhite).
2. That small (<50 g.) insectivorous birds (14-day old bobwhite, Carolina wren, etc.) are likely to be exposed at the highest fenamiphos residues (Tables 1B and 1C).
3. That seed eating birds (mourning dove) should be exposed to lower fenamiphos residues (Table 1B).
4. Total estimated exposure from both plant and animal dietary items exceeds the avian 8-day subacute NOELS for both bobwhite (<10 ppm) and mallard (<46.4 ppm).

The duration of 3EC residues on potential avian food items cannot be determined with the registrant's existing data base. Mortalities occurring in the orchard field study cited earlier do suggest, however, that lethal residues exist for 7 to 8 days following product application. The lack of persistence data prohibits EEB from commenting on the potential effects of fenamiphos on avian reproduction. Field soil photolysis studies requested by EFB are needed to predict the extent and duration of fenamiphos residues on avian dietary items (See also Section 107.5 EEB's Conclusions).

The effects of fenamiphos on upland game birds under actual field use conditions has never been adequately tested. Small pen and orchard field studies cited earlier will not support the proposed registration. Rates of application and use sites in both studies do not reflect the agricultural practices or labeled rates for tobacco and orchard uses and such, do not adequately reflect avian hazards associated with the proposed action. Nevertheless, some of the observations recorded do provide useful information. The fact that test mortalities were limited to the first two days in the 14-day small pen study is believed to be dependent upon supplemental food, incorporation, and the relatively heavy body weight (150-200 g.) of the test subjects used (See Table 1B; Granular Hazard for Adult Quail). The large scale avian mortality observed during the orchard field study only demonstrates the increased hazard associated with un-incorporated broadcast spray applications.

As indicated earlier, the use of fenamiphos in deciduous fruit tree orchards deviates significantly from previously registered uses. This factor, in conjunction with the extent to which all three formulations are expected to impact small (<100 grams) birds, suggests the need for end-use field studies that could be used to quantify the impact of this pesticide on non-target avian species. However, the minimal increase in acreage (<0.4%) associated with non-bearing trees (see Appendix V) makes the need for such a request questionable. Given this situation, EEB will not request an end-use field study. EEB will, however, continue to collect information on this product and will re-consider the ~~need~~ for end-use field studies at the time of product re-registration.

In conclusion, registration of fenamiphos (3EC/10G/15G) for an additional 1,753,392 acres will result in a minimal increase in exposure, and acute risk to non-target birds. More specifically mortalities are expected to result from the ingestion of pesticide granules and/or contaminated dietary items and, as such, the likelihood of an avian species ingesting a lethal dose of fenamiphos will increase in areas where the product is not immediately or properly incorporated. Avian mortalities are expected to occur primarily in small birds (< 100 grams) and to be heaviest during the first week following product application. The hazard to non-target avian wildlife will be significantly reduced following rainfall or irrigation of incorporated areas.

The Ecological Effects Branch wants to emphasize, however, that fenamiphos's existing data base cannot be used to determine the extent of avian mortalities that will occur under actual use conditions. Field soil photolysis data are needed to determine the duration of non-target exposure and could possibly eliminate the need for future end-use field studies.

## Aquatic Exposure

### TOXICITY DATA

Fenamiphos is highly toxic to fish and extremely toxic to freshwater invertebrates. A 96-hour bluegill sunfish  $LC_{50}$  of 9.5 ppb was used to establish a restricted use classification trigger (1/10  $LC_{50}$ ) of 0.95 ppb for warmwater fishes. A Daphnia magna  $LC_{50}$  of 1.6 ppb was used to establish a restricted use classification trigger (1/10  $LC_{50}$ ) of 0.16 ppb for freshwater invertebrates. No data are available on the chronic toxicity of fenamiphos to freshwater fish or aquatic invertebrates.

### ENVIRONMENTAL FATE DATA

As indicated earlier, Nemacur is soluble (ca 400 ppm) in water and readily adsorbs to soil molecules and as such, can contaminate rainwater runoff and/or irrigation return flow waters. The half life of Nemacur in water (pH 7) was noted to be about 5 days. EEC's for fenthamiphos residues in lotic and lentic ecosystems are presented in Appendix VI. Runoff calculations are based upon on the Registrant's own data (petition #26849) and the input data for the Exposure Analysis Modeling System (hereinafter known as EXAMS 50).

### HAZARD FROM GRANULAR (10G/15G/B5) AND LIQUID (3EC) FORMULATIONS

Exposure to non-target aquatic organisms is expected to occur via runoff (i.e., rainwater, irrigation return flow waters) and/or spray drift (See recommended label changes 107.3). Comparison of the above fish and invertebrate triggers to estimated EAC's suggests the following:

1. Non-target fishes and aquatic invertebrates indigenous to small streams and ponds (worst case situation) would be exposed to fenamiphos residues that are well below the restricted use classification triggers determined earlier.
2. EXAMS 50 data also indicates that the duration of exposure (5 half lives or 97% removal) is less than 64 hours for all four cases of input load.

In conclusion, the registration of fenamiphos as a nematicide for use on will provide for a minimal increase in exposure, but not acute risks to non-target fish and aquatic invertebrates. More specifically, aquatic organisms indigenous to water sheds adjacent to or immediately downstream from target areas could be exposed to sublethal fenamiphos residues. However, the available data indicate that such exposures should be short in duration and sufficiently diluted so as avoid any adverse impact.

#### 104.1.2 Endangered Species Considerations

Available toxicity data suggests that the Labeled use of nemacur could pose an acute hazard to federally protected species. Endangered species non-effect triggers are outlined below:

$$\text{Mammalian} \quad 1/10 \text{ LD}_{50} = \frac{10}{10} = 1 \text{ mg/kg}$$

$$\text{Avian} \quad 1/10 \text{ LC}_{50} = \frac{38}{10} = 3.8 \text{ ppm}$$

$$1/10 \text{ LD}_{50} = 2.4/10 = 0.24 \text{ mg/kg}$$

$$\text{Fish} \quad 1/20 \text{ LC}_{50} = \frac{9.5}{20} = 0.475 \text{ ppb}$$

$$\text{Invertebrate} \quad 1/20 \text{ LC}_{50} = \frac{171.9}{20} = 0.08 \text{ ppb}$$

Comparisons between the above fish and invertebrate triggers and EEC's for both lotic and lentic aquatic ecosystems (Appendix VI) were used to predict potential effects on federally protected species. Results of this examination reveal that all projected EEC's are well below no-effect triggers calculated for fish and aquatic invertebrates.

As demonstrated earlier (See Avian Exposure), fenamiphos can represent a hazard to small upland game birds. Because of this potential hazard, all states involved in tobacco and/or deciduous orchard culture were examined for listed avian species that would be particularly vulnerable to Nemacur. Telephone conversations with OES/Washington based endangered species representative, Dr. Jay Shepard [FTS 235-1975], reveals that the likelihood of such an adverse exposure occurring is remote since all federally protected bird species residing in or migrating through the areas of concern have specific dietary habits, habitat requirements, and/or seasonal migration patterns that would preclude their exposure to fenamiphos residues.

In conclusion, the Registration of fenamiphos on tobacco and deciduous fruit trees will provide for a minimal increase in exposure and no acute risks to federally protected fish and wildlife.

107.0 Conclusions

107.2 Classification

Used as directed all three formulations (3EC/10G/15G) pose an acute hazard to non-target avian species. These data in conjunction with the relatively large acreages for which this product is currently registered, indicate that all formulations of Nemacur should be classified as "Restricted Use" chemicals based upon their hazard to non-target birds. EEB recommends that this classification change be made of the time of product re-registration.

Labeling

107.3 The available toxicity data have demonstrated that Nemacur's active ingredient (fenamiphos) is very highly toxic to fish and wildlife. These data, in conjunction with the relatively high labeled rates of application, indicate that spray drift occurring from the 3EC formulation could pose an acute hazard to non-target organisms. In an effort to minimize the likelihood of this occurring, EEB recommends that the following statement be added to the registrant's 3EC Product Label:

"Do not apply when weather conditions favor drift from target area."

107.5 Data Requests

In order to completely assess the duration of fenamiphos residues on avian dietary items, EEB requires the field soil photolysis data requested by the Environmental Exposure Branch (Fletcher memo 01/19/83).

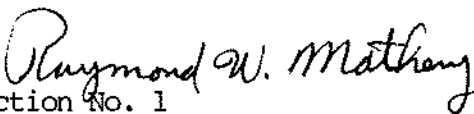
107.6 EEB FINDINGS

EEB has completed an incremental risk assessment (3(c)(7) finding) of the proposed conditional registration of NEMACUR 3EC/10G/15G on tobacco, non-bearing apples, cherries, and peaches. Based on the available data EEB concludes that the proposed use provides for a minimal increase in exposure, but there are acute risks to nontarget avian species.



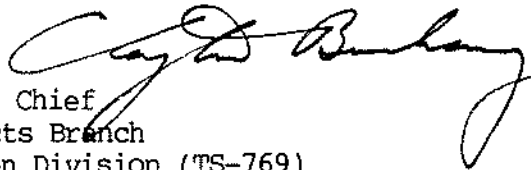
Charles A. Bowen II  
Fisheries Biologist, Section No. 1  
Ecological Effects Branch  
Hazard Evaluation Division (TS-769)

Date: 08/25/83



Raymond Matheny  
Head Review Section No. 1  
Ecological Effects Branch  
Hazard Evaluation Division (TS-769)

Date: 8/25/83



Clayton Bushong, Chief  
Ecological Effects Branch  
Hazard Evaluation Division (TS-769)

Date: 8/26/83



APPENDIX I

PRODUCT LABELS

## U.S. LABEL

Reason to Issue: To propose use on non-bearing fruit trees. 7/27/76 Draft: To revise geographical restriction and add band widths for band applications: limit use to apples, peaches and cherries. 11/4/76 Draft: To restrict use of any fruit forming on treated trees for 1 year after treatment. 6/17/77 Draft: Revise as required by EPA. 4/30/79 Draft: To delete single tree application and geographic limitations. 1/17/83 Draft: Revise incorporation statements; add grazing restrictions and maximum dosage/year.

Date of Draft: 1/17/83 (Pre-Reg.) (H)  
Supersedes Pre-Reg. Draft Dated: 4/30/79

EPA Reg. No. 3125-283

® NEMACUR 3

## EMULSIFIABLE SYSTEMIC NEMATICIDE

## ACTIVE INGREDIENT:

Ethyl 3-methyl-4-(methylthio)phenyl  
(1-methylethyl)phosphoramidate ... 35%

## AMENDMENT

To Previously Registered Labeling

Add the Following:

## RECOMMENDED APPLICATIONS

CROP	PEST	GALLONS NEMACUR 3	REMARKS
<u>NON-BEARING FRUIT*</u>			
Deciduous Fruit Trees (apple, peach and cherry trees)	Nematodes	3-1/3 to 6-2/3 10-20	<u>BROADCAST APPLICATION:</u> Apply specified dosage in 20 to 40 gallons of water per acre as a spray to the soil surface. Incorporate immediately 2 to 4 inches deep.
		3-1/3 to 6-2/3 10-20	<u>BAND APPLICATION:</u> Apply specified dosage in 20 to 40 gallons of water per treated acre as a spray to the soil surface with equipment properly calibrated to apply the product in a band covering the feeder root system of the tree. Incorporate immediately 2 to 4 inches deep.

\*Non-bearing fruit trees are those that will not bear fruit for one year after application, including newly planted and established trees. Any fruit that may form on treated trees during this one-year period must be destroyed and not used for human or animal consumption.

Incorporation of this product may be accomplished by mechanical incorporation 2 to 4 inches deep, or by sprinkler irrigation applied immediately following application (1-2 inches of water).

U.S. LABEL

Reason to Issue: Add claims for nematode control on tobacco. 4/26/77 Draft: To add "Note". 1/22/79 Draft: To revise in line with EPA comments. 1/17/83 Draft: Revised format. 1/31/83 Draft: Add pest column.

Date of Draft: 1/31/83 (Pre-Reg.) (H)  
Supersedes Pre-Reg. Draft Dated:  
1/17/83

EPA Reg. No. 3125-283

Rec 89031/89032

® NEMACUR 3

EMULSIFIABLE SYSTEMIC NEMATOCIDE

ACTIVE INGREDIENT:

Ethyl 3-methyl-4-(methylthio)phenyl  
 (1-methylethyl)phosphoramidate ... 35%

AMENDMENT

To Previously Registered Labeling

Add the Following:

RECOMMENDED APPLICATIONS

CROP	PEST	Dosage NEMACUR 3 GALS./ACRE	REMARKS
FIELD CROPS			
Tobacco (Not for use on shade- grown tobacco)	Nematodes	1-1/3 to 2  4 - 6 lbs	Apply as a water emulsion spray over the entire area to be treated using a minimum of 20 gallons of water per acre to insure uniform distribution. Incorporate to a depth of 2 to 4 inches by disking or tilling. Where a range in rates is recommended use the high rate in fields with high populations of nematodes or in fields having a history of serious nematode damage. Plant crop in the usual manner.

A

U.S. LABEL

Reason to Issue: To propose use on non-bearing fruit trees. 7/27/76 Draft:  
 To revise geographical restriction; limit use to apples, peaches and cherries.  
11/4/76 Draft: To restrict use of any fruit forming on treated trees for 1 year after treatment. 6/17/77 Draft:  
 Revise as required by EPA. 4/30/79 Draft: To specify depth of incorporation and delete single tree application and geographic limitations. 1/17/83 Draft: Revise incorporation statements; add grazing restrictions and maximum dosage/year.

Date of Draft: 1/17/83 (Pre-Reg.) (H)  
 Supersedes Pre-Reg. Draft Dated: 4/30/79

EPA Reg. No. 3125-237

® NEMACUR

10% Granular

SYSTEMIC NEMATICIDE

ACTIVE INGREDIENT:

Ethyl 3-methyl-4-(methylthio)phenyl  
 (1-methylethyl)phosphoramidate ... 10%

AMENDMENT

To Previously Registered Labeling

Add the Following:

RECOMMENDED APPLICATIONS

CROP	PEST	POUNDS NEMACUR 10% G	REMARKS
<u>NON-BEARING FRUIT*</u>			
Deciduous Fruit Trees (apple, peach and cherry trees)	Nematodes	100 to 200	<u>BROADCAST APPLICATION:</u> Apply specified dosage per acre with equipment properly calibrated to insure uniform distribution. Immediately incorporate granules into the top 2 to 4 inches of soil following application.
		100 to 200	<u>BAND APPLICATION:</u> Apply specified dosage per <u>treated</u> acre with equipment properly calibrated to apply the product uniformly in a band covering the <u>feeder root system</u> of the tree. Immediately incorporate the granules into the top 2 to 4 inches of soil following application.

\*Non-bearing fruit trees are those that will not bear fruit for one year after application, including newly planted and established trees. Any fruit that may form on treated trees during this one-year period must be destroyed and not used for human or animal consumption.

## U.S. LABEL

Reason-to Issue: Add claims for nematode control on tobacco. 5/14/76 Draft: To revise "Directions for Use" and "Remarks". 4/26/77 Draft: Revise "Remarks" and add "Note". 1/22/79 Draft: To revise in line with EPA comments. 1/17/83 Draft: Revised format. 1/31/83 Draft: Add pest column.

Date of Draft: 1/31/83 (Pre-Reg.) (H)  
Supersedes Pre-Reg. Draft Dated: 1/17/83

EPA Reg. No. 3125-287

not send

® NEMACUR

10% Granular

## ACTIVE INGREDIENT:

Ethyl 3-methyl-4-(methylthio)phenyl  
(1-methylethyl)phosphoramidate ... 10%

## AMENDMENT

To Previously Registered Labeling

Add the Following:

## RECOMMENDED APPLICATIONS

CROP	PEST	Dosage NEMACUR 10% G LBS./ACRE	REMARKS
FIELD CROPS			
Tobacco (Not for use on shade- grown tobacco)	Nema- todes	40 to 60	Distribute the granules uniformly over the entire area to be treated and immediately incorporate to a depth of 2 to 4 inches by disking or tilling to insure uniform distribution. Where a range in rates is recommended use the high rate in fields with high populations of nematodes or in fields having a history of serious nematode damage.

## U.S. LABEL

Reason to Issue: To propose use on non-bearing fruit trees. 7/27/76 Draft:  
 To revise geographical restriction; limit use to apples, peaches and cherries. 11/4/76 Draft: To restrict use of any fruit forming on treated trees for 1 year after treatment. 6/17/77 Draft: Revise as required by EPA. 4/30/79 Draft: To specify depth of incorporation and delete single tree application and geographic limitations. 1/17/83 Draft: Revise incorporation statements; add grazing restrictions and maximum dosage/year.

Date of Draft: 1/17/83 (Pre-Reg.) (H)  
 Supersedes Pre-Reg. Draft Dated: 4/30/79

EPA Reg. No. 3125-236-AA

® NEMACUR

15% Granular

SYSTEMIC NEMATICIDE

## ACTIVE INGREDIENT:

Etbyl 3-methyl-4-(methylthio)phenyl  
 (1-methylethyl)phosphoramidate ... 15%

## AMENDMENT

To Previously Registered Labeling

Add the Following:

## RECOMMENDED APPLICATIONS

CROP	PEST	POUNDS NEMACUR 15% G	REMARKS
<u>NON-BEARING FRUIT*</u>			
Deciduous Fruit Trees (apple, peach and cherry trees)	Nematodes	66.7 to 133.3	<u>BROADCAST APPLICATION:</u> Apply specified dosage per acre with equipment properly calibrated to insure uniform distribution. Immediately incorporate granules into the top 2 to 4 inches of soil following application.
		66.7 to 133.3	<u>BAND APPLICATION:</u> Apply specified dosage per treated acre with equipment properly calibrated to apply the product uniformly in a band covering the feeder root system of the tree. Immediately incorporate the granules into the top 2 to 4 inches of soil following application.

\*Non-bearing fruit trees are those that will not bear fruit for one year after application, including newly planted and established trees. Any fruit that may form on treated trees during this one-year period must be destroyed and not used for human or animal consumption.

U.S. LABEL

Reason to Issue: Add claims for nematode control on tobacco. 5/14/76 Draft: To revise "Directions for Use" and "Remarks". 4/26/77 Draft: Revise "Remarks" and add "Note". 1/22/79 Draft: To revise in line with EPA comments. 1/17/83 Draft: Revised format. 1/31/83 Draft: To correct dosage; add pest column.

Date of Draft: 1/31/83 (Pre-Reg.) (H)  
Supersedes Pre-Reg. Draft Dated: 1/17/83

EPA Reg. No. 3125-286

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® NEMACUR

15% Granular

ACTIVE INGREDIENT:

Ethyl 3-methyl-4-(methylthio)phenyl  
(1-methylethyl)phosphoramidate ... 15%

AMENDMENT  
To Previously Registered Labeling

Add the Following:

RECOMMENDED APPLICATIONS

CROP	PEST	Dosage NEMACUR 15% G LBS./ACRE	REMARKS
FIELD CROPS			
Tobacco (Not for use on shade- grown tobacco	Nematodes	26-2/3 to 40	Distribute the granules uniformly over the entire area to be treated and immediately incorporate to a depth of 2 to 4 inches by disking or tilling to insure uniform distribution. Where a range in rates is recommended use the high rate in fields with high populations of nematodes or in fields having a history of serious nematode damage.

*at Planting*

APPENDIX II

SUMMARY OF MAMMALIAN  
TOXICITY DATA



## EPA

## Accession

## Study/Lab/Study #/Date

## Material

## No.

## Results:

LD<sub>50</sub>, LC<sub>50</sub>, PIS, NOEL, LEL

## CORE Grade/

## Doc. No.

Acute Oral LD <sub>50</sub> - Rat Mobay Report No. 41329 August 1974	15% Granular	099496	Male 45.0 mg/kg - non fasted	I	Minimum 002590
			Female 61.0 mg/kg - non fasted		
			Male 10.0 mg/kg - fasted 24 hour		
			Female 14.0 mg/kg - fasted 24 hour		
			Female 22.0 mg/kg - fasted 15 hour		
Acute Oral LD <sub>50</sub> - Rat Mobay Report No. 44531 April 1975	Technical 88%	099496	Male 2.7 mg/kg	I	Minimum 002590
			Female 3.0 mg/kg		
	Desiosopropyl Nema-cur Sul- foxide 95%	099496	Male 4.1 mg/kg		
			Female 3.7 mg/kg		
	Desethyl Nema-cur 80%	099496	Male > 1000 and < 5000 mg/kg		
			Female approx. 1000 mg/kg		

### APPENDIX III

ESTIMATED FENAMIPHOS EXPOSURE  
(MG/KG/DAY) AND MG/ANIMAL/DAY) FOR  
SEVEN SPECIES OF NON-TARGET BIRDS.

Table 1A. Calculated LC50 values and estimated fenamiphos exposure (MG/KG/DAY and MG/ANIMAL/DAY) for seven species of non-target birds.

SPECIES	BODY WGT. (GMS.)	FOOD CONS. (GMS.)	F. CONS./ B. WGT (%)	CALCULATED LC50 (PPM)	6/ TOXICANT <sup>4</sup> / MG/KG/DAY	CONSUMED <sup>5</sup> / MG/ANIMAL/DAY	1/5 CALCULATED LC50 <sup>7</sup> / LC10
1. Bobwhite Quail (Young)	30.0 <sup>1</sup> / <sub>1</sub>	6.0 <sup>2</sup> / <sub>2</sub>	20.0	38.0 <sup>3</sup> / <sub>3</sub>	7.6	0.2	7.6 3.3
2. Bobwhite Quail (Adult)	170.00	15.20	8.94	85.0	7.6	1.3	17.0 7.3
3. Robin	81.10	8.11	10.00	75.9	7.6	0.6	15.2 6.5
4. Mourning Dove	100.00	11.20	11.20	67.9	7.6	0.8	13.6 5.8
5. Eastern Cowbird	50.00	7.00	14.00	54.3	7.6	0.4	10.9 4.7
6. Field Sparrow	13.90	4.60	33.10	23.0	7.6	0.1	4.6 2.0
7. Grasshopper Sparrow	13.90	4.60	33.10	23.0	7.6	0.1	4.6 2.0
8. Carolina Wren	19.00	6.50	34.20	22.2	7.6	0.1	4.4 1.9

1/ Milligrams body WGT. (Average weight) 17 day old birds.

2/ Average 5-day food consumption, 17 day old birds.

3/ LC50 determined by registrant's testing facility.

4/  $\text{MG/KG/Day} = \text{LC50 (ppm)} \times \frac{\text{F. Con. (g)}}{\text{B. WGT. (g)}}$

5/  $\text{MG/ANIMAL/DAY} = \text{MG/KG/DAY} \times \text{Body weight (kg)}.$

6/  $\text{LC50 (ppm)} = \frac{\text{MG/KG/Day}}{\text{F. Con. (g)} / \text{B. WGT (g)}}$

7/ Restricted use trigger 1/5 LC50.

8/ 1/5 LC10 represents the theoretical no-effect level for federally threatened and endangered species (Slope = 3.50034).

Table 1B. Dietary contamination and total estimated fenamiphos (10 lbs A.I./A) residues for eight species of non-target birds.

SPECIES	CALCULATED LC50 (PPM)	1/5 CALC. LC50 (PPM)	2/ FOOD CONSUMED Animal (%)	3/ Plant	MAXIMUM EXPECTED RESIDUES <sup>4</sup> /		ADJUSTED RESIDUES <sup>5</sup> /	Plant	Both Plant/Animal	TOTAL RESIDUES (PPM)
					Animal	Plant	Animal			
Bobwhite Quail (14-Day)	38.0	7.6	80%	20%	580 ppm (k)	7/ 120 ppm (k)	464.0 ppm <sup>8</sup> /	24.0 ppm	9/ 488.0 ppm	
			Beetles	Seeds:						
			Weevils	Ragweed						
Bobwhite Quail (Adult)	170.0	34.0	27%	73%	580.0 ppm (k)	120 ppm (k)	156.6 ppm	87.6 ppm	244.2 ppm	
			Beetles	Seeds:						
			Weevils	Ragweed						
Robin	75.9	15.2	40%	60%	580.0 ppm (k)	120 ppm (k)	232.0 ppm	72.0 ppm	304.0 ppm	
			Caterpillars	Seeds/						
			Beetles	Fruits:						
Mourning Dove	67.9	13.6	Weevils	Cherry						
			Earthworms	Dogwood						
			Etc.	Holly						
			0%	100%	580.0 ppm (k)	120 ppm (k)	0.0 ppm	120 ppm	120.0 ppm	
				Seeds:						
				Corn						
				Pigweed						
				Etc.						

FOOTNOTES IN TABLE 1C.

FOOTNOTES FOR TABLE 1B AND 1C

- 1/ Refer to table 1A (Footnote 6) for an explanation of how the "calculated LC<sub>50</sub>'s" were obtained.
- 2/ Application of Sec. 102.11(c)(2)(iii)(B) criterion of Sec. 3 Regulations.
- 3/ This information is taken from:  
Martin, Alexander C., et al., American Wildlife and Plants; A Guide to Wildlife Food Habits, Dover Publ., Inc., N.Y., 195.
- 4/ Based upon a 10.0 lb. active ingredient per acre, application to expected food items using following references:  
(a) Hoerger, F.D. and E.E. Kenaga, Pesticide Residues on Plants. Correlation of Representative Data as a Basis for Estimation of Their Magnitude in the Environment. Environmental Quality, Academic Press, New York, I: 9-28, 1972.  
(b) Kenaga, E.E., Factors to be Considered in the Evaluation of the Toxicity of Pesticides to Birds in Their Environment, Environmental Quality and Safety, Academic Press, N.Y., II: 166-181, 1973.
- 5/ Residue values adjusted to reflect % animal/plant matter consumed. Examples:  

(a) Bobwhite Quail, Adult:	(b) Robin, Adult:
580.0 ppm x 0.27 (27%) = 156.6 ppm	580.0 ppm x 0.40 (40%) = 232.0 ppm
120 ppm x 0.73 (73%) = 87.6 ppm	120.0 ppm x 0.60 (60%) = 72.0 ppm
- 6/ Reflects total residues expected in the diet: animal or plant alone or a total of animal and plant food items. Examples  

(a) Robin, Adult:	(b) Mourning Dove, Adult:
232.6 + 72.0 = 304.0 ppm total for animal and plant foods.	120 ppm total expected in food items consumed (i.e., 1.00 (100%) x 120.0 ppm = 120 ppm).
- 7/ (k) refers to maximum expected residues as per (4)(a), and (b) above.
- 8/ This is the maximum expected residue value for daily pesticide burden occurring from animal items.
- 9/ Daily pesticide burden occurring from ingested plant items.



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

MAY 20 1983

OFFICE OF  
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

TO: Charles A. Bowen  
Ecological Effects Branch  
Hazard Evaluation Division (TS-769)

SUBJECT: REC's for Fenamiphos (Dannacur) EPA Registration No.  
3125-283/3125-286

THRU: Carolyn K. Offutt, Chief (100-1-1177)  
Environmental Processes and Guidelines Section  
Exposure Assessment Branch  
Hazard Evaluation Division (TS-769)

You requested on April 29, 1983, estimated environmental concentrations (REC's) for two different formulations (3EC and 10G/15G) of Fenamiphos in both lentic and lotic environments. The models we use do not currently differentiate the amount of runoff from various formulations. In general, the runoff model inputs use the application rate (lb a.i./A) of the active ingredients in the formulation.

As per the discussion in my office we agreed (1) to use the lowest and highest calculated average runoff values per inch of rainfall based on Mobay's runoff study (pesticide petition #26849) and (2) to provide exposure analyses via EXAMS50 (steady-state simulation) model using four different drift loads (DRFLD) which are calculated from the lowest and the highest average runoff values after application of fenamiphos at the rate of 20 lb a.i./A and 6 lb a.i./A.

Runoff Calculation

The calculated runoff values based on Mobay's study (petition #26849) and the input data for the EXAMS50 drift load (DRFLD) are shown in Table 1.

The results of the Exposure Analysis Modeling System (EXAMS50) for fenamiphos in the lentic and the lotic environments are shown in Table 2 and 3 respectively.

Under the steady-state assumption of the EXAMS50 model, the maximum concentration in the water and in the sediment is a linear function of the amount of input load, entered as drift, to the small pond of 15 hectares and small river flowing adjacent to a crop field.

The maximum concentrations in the lentic water are 1.6 ppt and 0.65 ppt for 1% and 0.4% runoff at the application rate of 20 lbs a.i./A, and 0.49 ppt and 0.19 ppt for 1% and 0.4% runoff at the application rate of 6 lbs a.i./A. The maximum concentrations in lentic sediment deposition on a dry weight basis are 1.4 ppt and 0.55 ppt for 1% and 0.4% runoff at the application rate of 20 lbs a.i./A, and 0.17 ppt for 1% and 0.4% runoff at the application rate of 6 lbs a.i./A. The recovery time (2 half-lives or 75% removal) is 12 hours and self-purification (5 half-lives or 97% removal) is 64 hours in all four cases of the input load.

The maximum concentrations in the lotic water are 0.02 ppt and 0.0086 ppt for 1% and 0.4% runoff at the application rate of 20 lbs a.i./A, and 0.0065 ppt and 0.0026 ppt for 1% and 0.4% runoff at the application rate of 6 lbs a.i./A. The maximum concentrations in the lotic sediment deposition on a dry weight basis are 0.00062 ppt and 0.00025 ppt for 1% and 0.4% runoff at 20 lbs a.i./A and 0.00019 ppt and 0.000074 ppt for 1% and 0.4% runoff at the application rate of 6 lbs a.i./A. The recovery time (2 half-lives or 75% removal) is 12 hours and self-purification (5 half-lives or 97% removal) is 2 hours in all four cases of the input load.

As per our discussion you agreed with me that the fenamiphos (Nemacur) registration package has the following important data gaps: (1) rate of photolysis, (2) rate of neutral hydrolysis, (3) rate of oxidation, (4) octanol-water partition ratio, (5) runoff experimental data for the soil-incorporated pesticide (6) all environmental fate and process data pertaining to the major metabolites or degradation products (sulfoxide and sulfone).

I hope that you will be able to use these estimated EEC's from the EXAMS50 steady-state version in the final phase of the ecological effects part of the fenamiphos Registration review.



P.R. Datta, Chemist  
Exposure Assessment Branch/HED (TS-769)

TABLE 1

Daily Runoff Data for Fenamiphos (Nemacur)  
from Mobay's Petition #26849

Application Rate	Ranges of Average Runoff Values *	
	0.4%	1.0%
20 lb/A	0.08 lb/A/day $1.50 \times 10^{-3}$ kg/A/hr (EXAMS50)	0.2 lb/A/day $3.76 \times 10^{-3}$ kg/A/hr (EXAMS50)
6 lb/A	0.024 lb/A/day $0.45 \times 10^{-3}$ kg/A/hr (EXAMS 50)	0.06 lb/A/day $1.13 \times 10^{-3}$ kg/A/hr (EXAMS50)

\* Based on the runoff study using three different soils (sandy loam, silt loam and organic silt loam). After 37 days of treatment, the percent of the applied Nemacur in the runoff water for per inches of rainfall (irrigation) was 0.4 for sandy loam, 1.0% for silt loam, 0.76% for organic silt loam. The runoff water was collected at 10 ft from the base of treated plots with a slope of 8.3%. Therefore, the range of average runoff values was assumed to be 0.4% to 1.0% of the applied Nemacur.



TABLE 2

Exposure Analysis Modeling System (EXAMS50) for fenamiphos  
(NEMACUR) in the Lentic (Pond) Environment

EXAMS50 Parameters	Application Rates			
	20 lb a.i./A		6 lb a.i./A	
	Drift Load (DRFLD)		Drift Load (DRFLD)	
	low runoff $1.5 \times 10^{-3}$ kg/hr	high runoff $3.76 \times 10^{-3}$ kg/hr	low runoff $0.45 \times 10^{-3}$ kg/hr	high runoff $1.13 \times 10^{-3}$ kg/hr
Maximum conc. in water	$6.5 \times 10^{-7}$ mg/l	$1.6 \times 10^{-6}$ mg/l	$1.9 \times 10^{-7}$ mg/l	$4.9 \times 10^{-7}$ mg/l
Maximum conc. in sediment deposit (dry wt)	$5.5 \times 10^{-7}$ mg/kg	$1.4 \times 10^{-6}$ mg/kg	$1.7 \times 10^{-7}$ mg/kg	$4.1 \times 10^{-7}$ mg/l
Total Steady State Accumulation	$1.3 \times 10^{-5}$ kg	$3.3 \times 10^{-5}$ kg	$4.0 \times 10^{-6}$ kg	$1.0 \times 10^{-5}$ kg
Recovery (75% removed)	12 hours	12 hours	12 hours	12 hours
Selfpurifica- tion	64 hours	64 hours	64 hours	64 hours

TABLE 3

Exposure Analysis Modeling System (EXAMS50) for fenamiphos  
(Nemacur) in the Lotic (River) Environment

EXAMS 50	Application Rates			
	20 lb a.i./A		6 lb a.i./A	
	Drift Load (DRFLF)		Drift Load (DRFLD)	
	low runoff	high runoff	low runoff	high runoff
Parameters	$1.5 \times 10^{-3} \text{ kg/hr}$	$3.76 \times 10^{-3} \text{ kg/hr}$	$0.45 \times 10^{-3} \text{ kg/hr}$	$1.3 \times 10^{-3} \text{ kg/hr}$
Maximum conc. in water	$8.6 \times 10^{-9} \text{ mg/l}$	$2.1 \times 10^{-8} \text{ mg/l}$	$2.6 \times 10^{-9} \text{ mg/l}$	$6.5 \times 10^{-9} \text{ mg/l}$
Maximum conc. in sediment deposit (dry wt)	$2.5 \times 10^{-10} \text{ mg/kg}$	$6.2 \times 10^{-10} \text{ mg/kg}$	$7.4 \times 10^{-11} \text{ mg/kg}$	$1.9 \times 10^{-10} \text{ mg/kg}$
Total Steady State Accumulation	$2.6 \times 10^{-6} \text{ kg}$	$6.5 \times 10^{-6} \text{ kg}$	$7.8 \times 10^{-7} \text{ kg}$	$2.0 \times 10^{-6} \text{ kg}$
Recovery (75% removal)	12 hours	12 hours	12 hours	12 hours
Selfpurifica- tion	2 hours	2 hours	2 hours	2 hours

AERL-ESB MODEL OF FATE OF ORGANIC TOXICANTS IN AQUATIC ECOSYSTEMS  
 CHEMICAL: FENAMIPHOS(NEMACUR). PRD 5/13/ 83.  
 ECOSYSTEM: Unspecified Environment

---

TABLE 1.1. SH2 (NEUTRAL MOLECULE, SPECIES #1) INPUT DATA.

MWT= 303.0	SOL = 450.0	VAPR= 1.000E-05	HENRY= .0
KVO= .0	ESOL= .0	EVPR= .0	EHEN = .0
KPS= 1.950	KPR = .0	KOC = .0	KOW = .0
KAH1= 3.200	EAH1= .0	KNH1= .0	ENH1= .0
KAH2= .0	EAH2= .0	KNH2= .0	ENH2= .0
KAH3= .0	EAH3= .0	KNH3= .0	ENH3= .0
KBH1= 12.30	EBH1= .0	KOX1= .0	EOX1= .0
KBH2= .0	EBH2= .0	KOX2= .0	EOX2= .0
KBH3= .0	EBH3= .0	KOX3= .0	EOX3= .0
KBACW1= 1.160E-03	OTW1= .0	KBACSI= .0	OTS1= .0
KBACW2= .0	OTW2= .0	KBACSI2= .0	OTS2= .0
KBACW3= .0	OTW3= .0	KBACSI3= .0	OTS3= .0
KDP= .0	RFLAT= .0	LAMAX= 0.0	
QUANT1= .0	QUANT2= .0	QUANT3= .0	
ABSORPTION SPECTRUM (ABS): .0 .0 .0 .0 .0 .0			
.0	.0	.0	.0
.0	.0	.0	.0
.0	.0	.0	.0
.0	.0	.0	.0
.0	.0	.0	.0
.0	.0	.0	.0

# APPENDIX V

## POTENTIAL TOBACCO AND DECIDUOUS FRUIT TREE ACREAGE BY STATE

Calculations used to estimate acreages for non-bearing fruit trees in U.S.

	<u>total trees</u>	<u>Non-bearing trees</u>	
Cherries	9,611,152	1,862,853	19%
Apples	38,384,482	8,758,928	22%
Peaches	24,462,556	4,559,845	19%

1,753,392 (acres in U.S.) X 20% = 350,678

$\frac{350,678}{87,082,700} = 0.4\%$

Table 26. Tobacco: 1974

	All farms			Forms with sales of \$2,500 and over				
	Farms	Acres	Quantity harvested (pounds)	Farms	Acres	Quantity harvested (pounds)	Irrigated	
							Forms	Acres
United States .....	197 764	877 113	1 733 365 121	151 017	842 041	1 673 560 673	8 755	89 401
<b>Regions</b>								
Northeast .....	1 900	16 928	29 504 999	1 853	16 841	29 386 424	83	3 661
North Central .....	13 528	27 688	54 585 374	9 782	25 527	50 944 272	138	337
South .....	183 336	832 497	1 649 274 748	139 382	799 673	1 593 229 977	8 534	85 403
West .....	-	-	-	-	-	-	-	-
<b>Divisions</b>								
New England .....	160	6 524	10 547 543	156	6 518	10 537 370	68	3 575
Middle Atlantic .....	1 740	10 404	18 957 456	1 697	10 324	18 849 054	15	86
East North Central .....	11 847	25 571	49 982 584	9 184	23 467	46 452 470	123	260
West North Central .....	681	2 118	4 402 790	598	2 060	4 491 872	15	77
South Atlantic .....	77 795	603 200	1 168 667 129	65 535	592 450	1 152 021 474	6 417	76 538
East South Central .....	105 511	229 094	480 457 927	73 819	207 020	441 059 141	2 117	8 866
West South Central .....	30	203	149 692	28	203	149 362	-	-
Mountain .....	-	-	-	-	-	-	-	-
Pacific .....	-	-	-	-	-	-	-	-
<b>New England</b>								
Maine .....	-	-	-	-	-	-	-	-
New Hampshire .....	-	-	-	-	-	-	-	-
Vermont .....	-	-	-	-	-	-	-	-
Massachusetts .....	51	1 568	2 604 070	48	1 563	2 596 855	21	1 135
Rhode Island .....	-	-	-	-	-	-	-	-
Connecticut .....	109	4 956	7 943 473	108	4 955	7 940 515	47	2 440
<b>Middle Atlantic</b>								
New York .....	-	-	-	-	-	-	-	-
New Jersey .....	1	12	(10)	-	-	-	-	-
Pennsylvania .....	1 739	10 392	(10)	1 697	10 324	18 849 054	15	86
<b>East North Central</b>								
Ohio .....	5 290	10 277	19 949 002	3 770	9 094	18 001 699	14	24
Indiana .....	4 229	6 098	12 776 278	3 282	5 458	11 627 750	106	232
Illinois .....	-	-	-	-	-	-	-	-
Michigan .....	1	1	1 400	-	-	-	-	-
Wisconsin .....	2 327	9 195	17 255 904	2 132	8 915	16 823 021	3	4
<b>West North Central</b>								
Minnesota .....	9	33	65 300	9	33	65 300	-	-
Iowa .....	-	-	-	-	-	-	-	-
Missouri .....	664	2 070	4 502 718	582	2 013	4 393 830	15	77
North Dakota .....	-	-	-	-	-	-	-	-
South Dakota .....	-	-	-	-	-	-	-	-
Nebraska .....	-	-	-	-	-	-	-	-
Kansas .....	8	15	34 772	7	14	32 672	-	-
<b>South Atlantic</b>								
Delaware .....	-	-	-	-	-	-	-	-
Maryland .....	2 463	20 459	24 050 946	2 083	19 749	23 404 244	150	1 839
Virginia .....	15 903	67 308	122 370 907	11 398	53 618	116 350 651	1 483	14 405
West Virginia .....	1 166	1 227	1 995 331	381	689	1 186 121	4	10
North Carolina .....	44 023	366 841	714 135 918	38 522	362 202	706 522 044	3 119	38 227
South Carolina .....	6 632	71 099	146 343 457	5 867	70 315	145 287 632	122	1 789
Georgia .....	6 408	65 048	137 298 822	6 203	64 816	136 987 753	1 152	14 387
Florida .....	1 200	11 217	22 471 748	1 081	11 060	22 283 029	387	5 880
<b>East South Central</b>								
Kentucky .....	71 037	179 075	388 147 707	53 709	166 445	365 142 710	1 627	7 597
Tennessee .....	34 419	49 486	91 360 581	20 056	40 042	74 967 068	489	1 249
Alabama .....	54	533	949 319	53	533	949 043	1	20
Mississippi .....	1	(2)	320	1	(2)	320	-	-
<b>West South Central</b>								
Arkansas .....	5	3	3 786	3	3	3 456	-	-
Louisiana .....	25	201	145 906	25	201	145 906	-	-
Oklahoma .....	-	-	-	-	-	-	-	-
Texas .....	-	-	-	-	-	-	-	-
<b>Mountain</b>								
Montana .....	-	-	-	-	-	-	-	-
Idaho .....	-	-	-	-	-	-	-	-
Wyoming .....	-	-	-	-	-	-	-	-
Colorado .....	-	-	-	-	-	-	-	-
New Mexico .....	-	-	-	-	-	-	-	-
Arizona .....	-	-	-	-	-	-	-	-
Utah .....	-	-	-	-	-	-	-	-
Nevada .....	-	-	-	-	-	-	-	-
<b>Pacific</b>								
Washington .....	-	-	-	-	-	-	-	-
Oregon .....	-	-	-	-	-	-	-	-
California .....	-	-	-	-	-	-	-	-
Alaska .....	-	-	-	-	-	-	-	-
Hawaii .....	-	-	-	-	-	-	-	-

Table 11. Fruits and Nuts: 1974—Continued

Farms With Sales  
of \$2,500 and  
Over

## Cherries (lb)

	Total			Nonbearing age		Bearing age		Harvested	
	Farms	Acres	Trees or vines	Farms	Trees or vines	Farms	Trees or vines	Farms	Quantity
U.S., total.....	3 838	61 002	5 353 281	1 328	1 060 265	3 503	4 293 016	3 213	260 391 032
Alabama.....	3	1	74	3	74	—	—	—	—
Arkansas.....	4	1	35	2	101	2	13 797	25	1 389 031
California.....	42	245	15 360	20	1 563	28	47 472	60	2 461 027
Colorado.....	68	522	52 207	13	4 735	64	101	—	—
Georgia.....	3	—	33	2	(0)	1	13 573	25	822 634
Idaho.....	27	175	14 828	4	1 255	25	282	6	2 500
Illinois.....	19	6	354	9	72	10	1 734	9	61 531
Indiana.....	30	43	1 979	15	245	17	436	4	4 505
Iowa.....	10	13	736	7	300	4	1 790	16	25 545
Kansas.....	48	42	2 235	19	445	30	—	—	—
Kentucky.....	23	9	337	15	73	9	264	3	12 510
Maryland.....	28	42	3 785	10	317	19	3 468	14	195 361
Michigan.....	1 942	43 141	3 725 343	728	754 785	1 883	2 970 558	1 815	195 248 726
Minnesota.....	8	2	144	2	(0)	6	101	6	940
Missouri.....	24	12	710	10	442	16	14 004	11	466 320
Montana.....	14	245	24 435	7	10 431	11	50 375	7	50 375
Nebraska.....	11	21	2 114	7	778	7	864	3	6 450
New Jersey.....	6	9	922	3	58	5	(0)	4	3 040
New Mexico.....	7	3	210	1	(0)	375	390 332	331	17 103 990
New York.....	403	5 534	490 672	118	100 340	—	—	—	—
North Carolina.....	8	2	74	6	43	5	31	3	1 420
North Dakota.....	5	6	478	1	101	4	(0)	3	4 192
Ohio.....	96	316	25 743	24	4 639	81	21 104	68	983 217
Oklahoma.....	42	25	1 145	18	375	29	770	14	1 334
Oregon.....	154	2 010	158 581	30	27 860	146	130 721	131	6 500 950
Pennsylvania.....	255	2 252	205 532	69	37 028	227	168 504	198	12 341 517
South Dakota.....	6	3	154	1	101	5	101	5	1 565
Tennessee.....	20	4	256	14	229	7	27	2	(0)
Texas.....	30	7	439	20	346	12	93	4	123
Utah.....	183	2 314	247 806	53	70 342	176	177 466	165	9 128 817
Vermont.....	3	5	285	1	101	3	101	2	101
Virginia.....	30	49	3 011	10	198	20	2 813	12	87 442
Washington.....	69	340	29 371	11	2 156	62	27 215	56	2 844 755
West Virginia.....	13	124	8 049	5	1 234	11	6 815	10	376 790
Wisconsin.....	196	3 471	335 423	69	39 696	188	295 727	182	10 242 814
All other.....	10	7	419	1	101	9	101	6	3 870

## Sweet Cherries (lb)

U.S., total.....	5 140	58 110	4 257 871	1 673	802 597	4 665	3 455 274	4 201	250 098 743
Alabama.....	5	1	33	3	(0)	2	101	1	101
Arkansas.....	6	23	1 420	5	101	1	(0)	—	—
California.....	614	12 763	1 002 710	278	253 252	530	749 458	484	50 304 899
Idaho.....	81	252	19 125	23	2 599	67	16 526	46	510 164
Illinois.....	5	2	76	3	101	2	(0)	1	(0)
Indiana.....	73	854	65 802	9	5 260	67	60 542	59	3 526 982
Iowa.....	15	4	124	6	55	9	69	7	1 440
Kansas.....	20	18	688	7	269	13	419	4	29 140
Kentucky.....	9	4	214	4	12	5	202	5	2 185
Michigan.....	14	5	238	6	119	9	119	5	2 220
Minnesota.....	7	2	46	4	12	3	34	1	101
Missouri.....	25	46	3 199	7	111	21	3 088	19	173 737
Montana.....	1 080	13 240	1 002 345	318	174 561	1 024	827 784	933	49 968 876
Nebraska.....	6	6	374	14	239	7	135	3	225
New Jersey.....	20	6	63 915	52	12 640	80	51 275	79	2 541 669
New Mexico.....	83	661	54	4	54	—	—	—	(0)
New York.....	4	3	1 455	—	—	6	1 455	9	143 500
North Carolina.....	6	17	3 857	5	1 067	13	2 790	9	5 154 006
Ohio.....	16	52	127 211	75	15 398	350	111 813	273	5 154 006
Oklahoma.....	369	2 051	196	4	144	6	52	2	(0)
Oregon.....	10	4	9 943	37	2 164	54	7 779	44	418 578
Pennsylvania.....	76	145	343	6	126	12	217	5	11 030
Tennessee.....	18	6	873 315	258	149 268	784	724 047	725	58 041 422
Texas.....	819	14 972	37 116	70	12 819	174	24 297	138	1 297 860
Utah.....	212	581	113	11	101	1	(0)	—	(0)
Virginia.....	12	2	1 545	7	823	5	93 472	195	6 040 219
Washington.....	11	21	108 233	42	14 761	213	607	6	28 022
West Virginia.....	218	1 364	921 791	16	1 182	10	767 945	1 137	71 360 771
Wisconsin.....	25	35	4 638	382	153 846	1 170	4 548	11	377 964
All other.....	1 247	10 822	5 870	6	137	13	5 733	5	157 400
	17	75	93	6	39	8	54	1	(0)

## Grapes (rams, fresh)

U.S., total.....	14 208	712 804	355 024 522	3 893	54 898 698	13 303	300 125 824	12 804	3 821 999
Alabama.....	33	55	11 441	9	1 386	26	10 055	10	5
Arizona.....	36	4 116	1 963 143	10	218 340	31	1 744 803	30	13 629
Arkansas.....	136	2 809	1 491 907	36	256 903	122	1 235 004	111	7 122
California.....	8 333	607 011	294 683 142	1 801	45 936 819	8 074	248 746 323	7 992	3 451 305
Colorado.....	32	93	45 228	11	12 901	23	32 327	17	19
Connecticut.....	6	12	5 506	1	(0)	4	(0)	2	101
Delaware.....	5	17	8 477	—	—	6	8 477	5	28
Florida.....	28	61	19 578	8	8 071	23	11 507	12	26
Georgia.....	111	715	230 271	47	73 049	85	157 222	58	1 010
Idaho.....	19	262	139 988	6	35 604	18	104 384	14	848
Illinois.....	34	85	41 992	22	21 421	18	20 571	8	88
Indiana.....	68	377	170 869	28	19 792	55	151 077	43	570
Iowa.....	25	37	11 932	8	814	18	11 118	13	75
Kansas.....	44	71	31 589	22	26 298	24	5 291	14	24
Kentucky.....	51	42	16 802	28	8 743	31	8 059	25	52
Michigan.....	14	11	5 295	6	1 950	10	3 345	5	1
Minnesota.....	35	67	33 683	14	15 065	29	18 618	23	107
Mississippi.....	13	36	19 633	6	10 699	10	8 934	9	38
Massachusetts.....	1 013	15 761	7 810 044	270	898 857	975	6 911 187	919	41 734
Montana.....	10	3	674	7	450	4	224	4	1

Table 11. Fruits and Nuts: 1974

Farms With Sales  
of \$2,500 and  
OverDwarf and Semidwarf  
Apples (lb)

	Total			Nonbearing age		Bearing age		Harvested	
	Farms	Acres	Trees or vines	Farms	Trees or vines	Farms	Trees or vines	Farms	Quantity
U.S., total.....	9 222	146 785	17 728 300	5 234	6 046 824	7 018	11 681 476	6 450	1 399 001 493
Alabama.....	42	360	48 459	19	7 101	49	41 358	42	1 507 371
Arizona.....	14	46	5 115	6	641	12	4 474	7	364 850
Arkansas.....	62	650	76 611	29	28 665	43	47 946	31	1 936 359
California.....	243	4 425	571 122	112	122 350	178	448 772	172	49 853 243
Colorado.....	147	1 694	231 170	71	97 161	113	134 009	90	6 924 664
Connecticut.....	86	1 145	124 614	51	46 152	68	78 462	65	10 976 544
Delaware.....	8	206	20 932	4	6 359	7	14 573	5	3 801 777
Florida.....	5	10	928	5	(0)	1	(0)	1	(0)
Georgia.....	111	2 366	269 058	72	131 473	73	137 585	58	9 061 136
Idaho.....	96	1 927	221 644	58	92 482	78	129 162	72	17 975 869
Illinois.....	232	3 039	276 778	129	64 423	147	212 355	124	22 225 388
Indiana.....	185	2 400	218 693	107	74 925	139	143 768	125	20 886 761
Iowa.....	88	730	89 233	53	27 854	61	61 379	57	3 762 880
Kansas.....	98	556	52 427	58	17 166	52	35 261	37	2 361 648
Kentucky.....	181	1 030	114 473	98	49 561	119	64 912	98	3 892 190
Maine.....	79	1 034	116 517	52	64 473	52	52 044	49	6 200 583
Maryland.....	78	973	93 316	49	35 987	59	57 329	53	6 245 695
Massachusetts.....	114	1 888	185 930	65	68 705	91	117 225	89	20 835 239
Michigan.....	1 006	16 794	1 777 482	544	683 383	734	1 094 099	690	107 348 721
Minnesota.....	63	945	102 697	47	34 534	40	68 163	36	7 469 536
Mississippi.....	19	46	5 075	14	3 990	10	1 185	5	13 522
Missouri.....	127	1 800	158 404	68	52 589	87	105 815	72	12 054 972
Montana.....	10	81	8 570	6	6 518	7	2 052	6	128 040
Nebraska.....	24	93	5 118	10	6 675	16	4 443	16	302 560
Nevada.....	4	4	295	3	(0)	2	(0)	1	(0)
New Hampshire.....	46	953	126 914	34	36 782	33	90 132	31	13 422 744
New Jersey.....	111	2 132	196 328	50	43 483	98	152 845	93	26 204 253
New Mexico.....	57	517	52 343	37	26 260	43	26 083	27	935 757
New York.....	769	19 632	2 193 439	501	772 845	578	1 420 594	552	157 985 555
North Carolina.....	439	6 119	619 587	228	168 242	340	451 345	309	52 755 217
North Dakota.....	5	6	1 003	1	(0)	4	(0)	1	(0)
Ohio.....	437	4 378	478 081	234	124 312	347	353 769	312	29 132 198
Oklahoma.....	62	429	44 870	27	7 934	46	36 936	24	1 592 524
Oregon.....	326	2 072	251 999	160	75 540	263	176 459	233	30 187 561
Pennsylvania.....	533	7 511	774 545	297	235 580	413	538 965	381	66 734 013
Rhode Island.....	18	130	10 141	8	3 540	15	6 601	14	2 016 950
South Carolina.....	65	1 587	182 220	28	36 415	56	145 805	51	11 320 621
South Dakota.....	9	28	5 829	7	4 263	8	1 566	8	218 899
Tennessee.....	138	947	92 065	82	43 952	82	48 113	64	6 218 292
Texas.....	66	378	44 408	48	37 820	31	6 588	20	108 774
Utah.....	165	1 524	195 312	103	98 749	114	96 563	99	8 450 402
Vermont.....	26	617	59 707	19	26 479	17	33 228	17	4 536 009
Virginia.....	380	10 140	1 043 540	201	318 895	297	724 645	279	87 936 076
Washington.....	2 097	38 572	6 080 146	1 227	2 076 464	1 742	4 003 682	1 694	552 398 090
West Virginia.....	114	2 627	240 211	74	82 020	91	158 191	88	16 968 697
Wisconsin.....	216	2 243	260 836	137	108 734	162	152 102	152	13 747 333

## Standard Apples (lb)

U.S., total.....	15 227	360 563	20 656 182	4 515	2 712 104	14 189	17 944 078	13 004	4 519 830 927
Alabama.....	87	426	27 333	35	9 931	68	11 402	44	1 228 523
Arizona.....	28	126	5 385	4	1 954	26	3 431	11	93 500
Arkansas.....	76	1 240	66 862	32	19 863	59	46 999	46	7 736 957
California.....	733	18 181	1 270 202	204	90 991	693	1 179 211	655	333 365 497
Colorado.....	266	4 708	353 222	61	28 382	254	324 840	211	32 997 990
Connecticut.....	150	3 360	157 652	24	6 065	147	145 587	142	36 396 838
Delaware.....	15	582	34 332	6	6 954	15	27 378	12	10 092 456
Florida.....	6	13	514	1	(0)	5	(0)	3	(0)
Georgia.....	109	1 270	73 257	45	12 579	83	60 478	65	12 415 531
Idaho.....	156	3 672	279 214	39	22 356	149	256 858	143	54 259 394
Illinois.....	296	6 682	346 403	118	40 619	264	305 784	236	63 444 151
Indiana.....	287	4 211	196 747	119	38 215	260	158 532	242	36 097 367
Iowa.....	180	1 516	67 317	83	11 081	164	56 236	157	10 414 917
Kansas.....	145	1 588	71 308	88	11 364	130	59 944	95	10 764 200
Kentucky.....	233	1 480	85 000	97	29 451	187	55 549	143	8 114 802
Louisiana.....	6	9	589	4	92	3	497	1	(0)
Maine.....	146	5 403	281 934	37	37 637	142	244 297	134	63 487 617
Maryland.....	172	6 000	292 690	55	33 182	161	259 508	149	68 474 219
Massachusetts.....	229	6 414	291 055	38	29 097	223	261 958	213	74 492 305
Michigan.....	1 746	47 888	2 230 702	351	257 586	1 686	7 973 116	1 579	496 888 073
Minnesota.....	198	3 143	203 060	125	63 816	171	139 244	157	25 372 995
Mississippi.....	34	60	2 601	16	1 727	20	474	12	203 388
Missouri.....	223	4 874	244 566	102	41 455	171	203 111	136	47 378 807
Montana.....	53	180	8 071	17	1 155	44	6 916	33	317 921
Nebraska.....	44	331	17 049	37	3 858	51	13 191	44	1 495 619
Nevada.....	17	55	2 581	12	405	15	2 176	7	118 300
New Hampshire.....	67	3 145	119 614	13	7 730	66	111 884	64	41 128 376
New Jersey.....	230	7 015	398 914	47	26 827	221	372 087	203	85 458 333
New Mexico.....	130	1 919	88 210	28	11 985	124	76 225	74	4 881 417
New York.....	1 312	55 505	2 457 468	271	197 744	1 276	2 259 724	1 217	657 335 762
North Carolina.....	614	10 449	567 448	235	67 228	564	500 220	524	106 099 149
North Dakota.....	27	136	6 509	17	2 780	24	3 729	20	213 400
Ohio.....	741	10 249	437 354	171	40 528	701	396 826	640	85 773 505
Oklahoma.....	105	1 385	83 768	47	39 113	68	44 655	24	2 600 030
Oregon.....	515	4 839	351 240	121	31 263	490	319 977	453	105 913 783
Pennsylvania.....	1 122	29 712	1 570 465	256	162 819	1 062	1 407 646	982	277 701 539
Rhode Island.....	22	389	15 341	5	219	22	15 122	22	4 655 345
South Carolina.....	72	1 166	68 167	16	3 213	66	64 954	61	6 018 057
South Dakota.....	32	156	6 722	17	2 969	24	3 753	21	767 500
Tennessee.....	234	1 794	89 121	130	23 909	176	65 212	146	6 736 255
Texas.....	151	270	13 044	82	5 241	79	7 803	48	309 926
Utah.....	230	2 208	146 418	32	12 241	223	134 177	182	18 753 442
Vermont.....	111	4 488	219 031	23	36 455	104	182 576	101	46 455 513
Virginia.....	636	24 437	1 142 248	187	107 264	590	1 034 984	540	284 176 349

Table 11. Fruits and Nuts: 1974—Continued

Forms With Sales  
of \$2,500 and  
OverStandard Apples  
(lb.)—Con.Washington .....  
West Virginia .....  
Wisconsin .....  
Wyoming .....

## Clingstone Peaches (lb.)

U.S., total.....

Alabama.....

Arizona.....

Arkansas.....

California.....

Colorado.....

Connecticut.....

Florida.....

Georgia.....

Idaho.....

Illinois.....

Indiana.....

Iowa.....

Kansas.....

Kentucky.....

Louisiana.....

Maine.....

Maryland.....

Massachusetts.....

Michigan.....

Mississippi.....

Missouri.....

Nebraska.....

Nevada.....

New Hampshire.....

New Jersey.....

New Mexico.....

New York.....

North Carolina.....

Ohio.....

Oklahoma.....

Oregon.....

Pennsylvania.....

South Carolina.....

Tennessee.....

Texas.....

Utah.....

Virginia.....

West Virginia.....

All other.....

Freestone Peaches (lb.)

U.S., total.....

Alabama.....

Arizona.....

Arkansas.....

California.....

Colorado.....

Connecticut.....

Delaware.....

Florida.....

Georgia.....

Idaho.....

Illinois.....

Indiana.....

Iowa.....

Kansas.....

Kentucky.....

Louisiana.....

Maine.....

Maryland.....

Massachusetts.....

Michigan.....

Mississippi.....

Missouri.....

Nebraska.....

Nevada.....

New Hampshire.....

New Jersey.....

New Mexico.....

New York.....

North Carolina.....

Ohio.....

Oklahoma.....

Oregon.....

Pennsylvania.....

Rhode Island.....

South Carolina.....

Tennessee.....

Texas.....

Utah.....

Virginia.....

West Virginia.....

Wisconsin.....

All other.....

	Total			Nonbearing age		Bearing age		Harvested	
	Farms	Acres	Trees or vines	Farms	Trees or vines	Farms	Trees or vines	Farms	Quantity
Washington.....	2 494	57 345	5 251 819	800	1 014 993	2 455	4 236 826	2 404	1 116 171 187
West Virginia.....	230	13 884	670 949	98	74 525	221	596 424	209	122 061 122
Wisconsin.....	469	6 647	348 027	167	43 189	435	304 838	396	56 265 064
Wyoming.....	8	16	659	2	101	7	101	3	54 500
Clingstone Peaches (lb.)									
U.S., total.....	3 438	102 136	10 284 260	1 168	1 607 348	2 941	8 676 912	2 531	1 494 730 730
Alabama.....	86	774	79 388	32	13 013	69	66 375	57	2 475 514
Arizona.....	10	487	47 579	5	26 745	7	20 834	6	173 707
Arkansas.....	83	1 508	113 075	24	20 921	72	92 154	61	4 794 871
California.....	1 376	66 186	6 850 852	406	795 104	1 333	6 055 746	1 310	1 345 346 422
Colorado.....	16	60	5 065	2	10	15	10	12	248 250
Connecticut.....	10	24	1 658	5	74	8	1 584	8	190 226
Florida.....	22	2 933	277 682	10	108 902	20	168 780	10	3 100 104
Georgia.....	147	12 308	1 296 519	73	329 885	117	966 634	92	43 419 017
Idaho.....	4	7	643	—	—	4	643	4	25 500
Illinois.....	35	301	24 618	14	5 148	25	19 470	7	459 850
Indiana.....	18	90	6 255	10	2 017	12	4 238	9	144 440
Iowa.....	3	1	40	2	(0)	2	(0)	1	(0)
Kansas.....	31	77	4 020	16	2 198	18	1 622	4	70 990
Kentucky.....	65	270	24 284	32	7 092	36	17 192	23	1 343 284
Louisiana.....	38	321	30 445	9	4 233	34	26 212	28	2 037 740
Maine.....	4	2	153	1	(0)	3	(0)	3	23 700
Maryland.....	21	30	1 917	9	471	14	1 446	13	169 610
Massachusetts.....	11	18	1 318	4	424	8	894	8	201 950
Michigan.....	339	3 084	313 305	65	42 798	311	270 507	280	19 030 894
Mississippi.....	34	86	6 589	16	2 919	23	3 670	15	186 130
Missouri.....	53	398	35 750	33	10 981	36	24 769	16	1 069 600
Nebraska.....	6	2	126	5	(0)	1	(0)	—	—
Nevada.....	4	1	76	1	(0)	3	(0)	2	(0)
New Hampshire.....	4	2	210	1	(0)	3	(0)	2	(0)
New Jersey.....	28	559	54 118	7	2 515	23	51 603	19	6 899 763
New Mexico.....	13	11	609	5	318	9	291	6	2 660
New York.....	64	471	41 831	17	6 123	56	35 708	45	2 551 666
North Carolina.....	63	946	86 897	26	23 840	47	63 057	33	3 671 138
Ohio.....	47	198	17 112	14	3 001	38	14 111	27	698 810
Oklahoma.....	65	514	44 255	39	17 480	37	26 775	6	22 690
Oregon.....	33	77	6 331	13	940	28	5 391	22	310 924
Pennsylvania.....	75	1 088	92 106	19	26 289	60	65 817	55	8 494 165
South Carolina.....	125	4 789	469 582	53	103 151	106	366 431	98	32 738 547
Tennessee.....	45	227	19 859	31	3 982	21	15 877	17	2 427 200
Texas.....	287	3 081	205 887	120	29 785	203	176 102	116	3 138 942
Utah.....	20	43	4 298	6	2 130	14	2 168	11	160 600
Virginia.....	60	618	62 260	18	2 079	45	60 181	35	3 792 820
West Virginia.....	71	445	49 617	20	11 511	61	38 106	55	5 004 780
Wisconsin.....	15	79	6 530	2	(0)	14	(0)	12	200 600
All other.....	7	21	1 401	3	535	5	866	5	92 126
Freestone Peaches (lb.)									
U.S., total.....	8 858	147 683	14 178 296	3 410	2 952 497	7 660	11 225 799	6 473	1 106 929 122
Alabama.....	149	2 085	204 579	55	43 697	121	160 882	106	6 914 819
Arizona.....	33	318	32 467	10	8 148	29	24 319	20	1 198 827
Arkansas.....	179	2 960	253 229	67	52 864	146	200 365	98	9 187 123
California.....	1 339	24 546	2 641 317	431	508 632	1 238	2 132 685	1 191	420 647 842
Colorado.....	216	2 584	326 120	72	51 589	207	274 531	195	20 407 673
Connecticut.....	80	570	50 690	27	8 902	78	41 788	75	3 787 966
Delaware.....	19	333	26 187	5	4 810	18	21 377	15	1 756 650
Florida.....	25	1 444	207 188	12	78 124	15	129 064	10	948 400
Georgia.....	173	10 646	1 073 126	71	234 095	151	839 031	125	38 414 658
Idaho.....	79	1 175	113 607	25	20 450	72	93 157	66	10 548 152
Illinois.....	214	2 840	213 930	98	45 937	158	167 993	62	4 232 807
Indiana.....	117	1 290	110 840	79	37 943	78	72 897	50	3 548 382
Iowa.....	10	14	1 060	7	311	7	749	4	30 600
Kansas.....	139	1 243	93 605	58	20 315	97	73 290	38	1 849 842
Kentucky.....	165	1 111	92 605	76	21 788	117	70 817	74	4 224 003
Louisiana.....	59	1 134	99 432	39	25 031	52	74 401	45	4 573 226
Maine.....	131	2 899	262 841	51	49 429	123	213 412	109	22 518 542
Maryland.....	62	324	25 924	25	7 018	56	18 906	45	1 249 606
Massachusetts.....	869	8 288	826 292	329	164 976	389	661 316	726	46 807 770
Michigan.....	75	778	63 423	34	15 650	61	47 773	44	1 563 411
Mississippi.....	177	2 600	199 517	95	63 104	132	136 413	71	5 196 094
Missouri.....	13	6	416	8	371	7	45	3	70
Nebraska.....	5	2	198	1	(0)	5	(0)	2	(0)
Nevada.....	19	54	4 532	9	1 540	13	2 992	12	408 840
New Hampshire.....	273	12 431	1 201 168	105	160 129	266	1 041 039	249	93 460 756
New Jersey.....	47	106	8 407	13	1 057	36	7 350	18	460 675
New Mexico.....	353	2 038	198 313	159	53 593	289	144 720	263	11 018 731
New York.....	176	3 091	307 942	70	48 769	147	259 173	122	11 917 468
North Carolina.....	471	3 469	306 568	185	59 963	402	246 605	336	16 921 763
Ohio.....	144	1 201	96 675	77	17 709	90	78 966	17	284 329
Oklahoma.....	220	1 630	143 576	71	23 682	198	119 894	169	10 412 219
Oregon.....	699	10 643	982 330	250	178 809	641	805 521	575	85 075 004
Pennsylvania.....	11	79	4 610	4	330	11	4 280	10	597 690
Rhode Island.....	347	24 728	2 272 154	151	597 059	318	1 675 095	306	158 284 254
South Carolina.....	110	839	71 158	57	20 005	76	51 153	50	1 927 305
Tennessee.....	559	5 452	359 172	225	76 866	419	282 306	276	10 455 128
Texas.....	241	1 694	180 240	86	49 002	227	131 238	207	8 891 414
Utah.....	317	4 522	420 327	107	72 879	276	347 448	249	30 959 303
Virginia.....	424	3 163	416 434	118	73 899	392	342 535	346	29 993 608
West Virginia.....	107	3 343	285 172	46	55 675	99	229 497	92	26 204 902
Wisconsin.....	3	1	107	2	(0)	1	(0)	2	(0)
All other.....	7	10	818	6	(0)	2	(0)	2	(0)

1974 Census of Agriculture—State Misc Data



APPENDIX VI

EAB EXPOSURE ASSESSMENT FOR FENAMIPHOS.

Shough. No. 100601

EAR Log Out Date: MAY 20 1983

Init.: [Signature] for RVM

To: Jacoby/Beavers  
Product Manager #21  
Registration Division (TS-767)

From: Carolyn K. Offutt [Signature]  
Head, Environmental Processes and Guidelines Section  
Exposure Assessment Branch, HED (TS-769)

Attached, please find the estimated environmental concentration review of:

Reg./File No.: 3125-283, 3125-237, 3125-236

Chemical: Fenamiphos

Type Product: I

Product Name: Nemacur

Company Name: \_\_\_\_\_

Submission Purpose: EEC

ZRB Code: other

Action Code: 316

Date In: 4/27/83

EPR#: 3333-3335, 3366- 3368

Date Completed: \_\_\_\_\_

TAIS (Level II)            Days           

Deferrals To:                                  61                                  10

           Ecological Effects Branch

           Residue Chemistry Branch

           Toxicology Branch