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

DEC 2

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: Benefin Registration Standard

FROM: Charles R. Lewis *Charles R Lewis 11/30/88*
Ecological Effects Branch
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THRU: Douglas J. Urban, Section Head *Douglas J Urban 11/30/88*
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THRU: James W. Akerman, Chief *Jim Akerman 12/2/88*
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TO: Robert J. Taylor, PM 25
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Attached are the Data Evaluation Records, Topical Summaries, and Disciplinary Reviews with Data Requirements for the Ecological Effects Chapter of the Benefin Registration Standard.

Attachments

cc: J. Heckman (MSS)
I. Sunzenauer (SIPS)

Benefin
Ecological Effects Topical Summaries

Effects on Birds

Six studies in five documents were evaluated under this topic. All studies were acceptable for use in a hazard assessment.

<u>Author</u>	<u>Date</u>	<u>ID No.</u>
West	1977	234214
West	1977	234214
Tucker	1984	160000
Broddle	1973	24273
Seacat	1985	160875

In order to establish the toxicity to birds, the following tests are required using the technical grade material: Two subacute dietary studies on one species of waterfowl (preferably mallard duck) and one species of upland game bird (preferably bobwhite quail or ring-necked pheasant); and an avian single-dose oral study on one species (preferably mallard duck or bobwhite quail).

The acceptable acute oral studies for use in a hazard assessment are listed below:

<u>Species</u>	<u>% ai</u>	<u>LD₅₀ mg/kg</u>	<u>Author</u>	<u>Date</u>	<u>ID No.</u>	<u>Fulfills Requirement</u>
Mallard duck	97.2	> 2000	Tucker	1984	160000	Yes
Mallard duck	unknown	> 2000	Broddle	1973	24273	Partially ^{1/}
Mallard duck	97.3	> 2000	Seacat	1985	160805	Yes
Bobwhite quail ?	?	> 2000	Broddle	1973	24273	Partially ^{1/}

^{1/}Percent active ingredient not provided.

There is sufficient information to characterize the material on an acute oral basis as practically nontoxic.

The Guidelines requirement has been satisfied.

The acceptable subacute dietary toxicity studies for use in a hazard assessment are listed below:

<u>Species</u>	<u>% ai</u>	<u>LD₅₀ mg/kg</u>	<u>Author</u>	<u>Date</u>	<u>ID No.</u>	<u>Fulfills Requirement</u>
Bobwhite quail	96.4	> 5000	West	1977	234214	Yes
Mallard duck	96.4	> 5000	West	1977	234214	Yes

There is sufficient information to characterize the material on a subacute dietary basis as practically nontoxic to birds.

The avian subacute dietary Guidelines requirement has been satisfied by the evaluated documents.

Avian reproduction tests are required for an end-use product (EP) when birds may be subjected to repeated or continuous exposure, the product is stable in the environment, stored or accumulated in plant or animal tissues, or reproduction in terrestrial vertebrates may be adversely affected based on information from mammalian reproduction studies. Insufficient data are presently available to determine if this test will be required.

Precautionary Labeling

Labeling is not required at this time.

Effects on Fish

Three studies in three documents were evaluated under this topic. All were acceptable for use in a hazard assessment.

<u>Author</u>	<u>Date</u>	<u>ID No.</u>
Mayer	1986	40098001
Kehr	1977	234214
Koenig	1985	257844

The minimum data required for establishing the acute toxicity to fish are the results from two 96-hour studies with the technical grade material. The studies should be performed on one coldwater species (preferably rainbow trout) and one warmwater species (preferably bluegill sunfish).

The following toxicity studies are acceptable for use in a hazard assessment:

<u>Species</u>	<u>% ai</u>	<u>LC50 ppm</u>	<u>Author</u>	<u>Date</u>	<u>ID No.</u>	<u>Fulfills Requirement</u>
Bluegill sunfish	96.4	0.065	Kehr	1977	234214	Yes
Rainbow trout	97.3	0.081	Koenig	1985	257844	Yes
Goldfish	Tech.	0.81	Mayer	1986	40098001	No ^{1/}

1/Unacceptable test species.

There is sufficient information to characterize the material as highly to very highly toxic to freshwater fish.

The Guidelines requirement for the technical grade active ingredient (TGAI) has been satisfied.

Data from testing with the applicant's EP or a typical end-use product (TEP) are required when the LC₅₀ or EC₅₀ of the TGAI is equal to or less than the maximum expected environmental concentration (MEEC) or the estimated environmental concentration (EEC) in the aquatic environment when the EP is used as directed or the product is applied directly to water.

The EEC following an application of benefin at the maximum rate is expected to exceed the LC₅₀ for fish. Testing with the TEP is required.

The Guidelines requirement has not been satisfied.

Fish Early Life Stage

No studies were evaluated under this topic.

Data from fish early life stage tests are required to support the registration of an EP if the LC₅₀ is < 1.0 mg/L. Fish early life stage testing is required for benefin.

The Guidelines requirement has not been satisfied.

Precautionary Labeling

Based on the above data, precautionary statements for fish are required.

Effects on Freshwater Invertebrates

Two studies in two documents were evaluated under this topic. Both were acceptable for use in a hazard assessment.

<u>Author</u>	<u>Date</u>	<u>ID No.</u>
Koenig	1985	257844
Mayer	1986	40098001

The minimum data required to establish the acute toxicity to freshwater invertebrates is a 48-hour aquatic study with the technical material. The test organisms should be first instar Daphnia magna or early instar amphipods, stoneflies, or mayflies.

The following toxicity studies are acceptable for use in a hazard assessment:

<u>Species</u>	<u>% ai</u>	<u>LC50 ppm</u>	<u>Author</u>	<u>Date</u>	<u>ID No.</u>	<u>Fulfills Requirement</u>
<u>Daphnia magna</u>	97.3	>0.1	Keonig	1985	257844	No ^{1/}
<u>Gammarus fasciatus</u>	Tech.	4.0	Mayer	1986	40098001	Yes

1/ Test material not soluble.

There is sufficient information available to characterize the material as highly to moderately toxic to aquatic invertebrates.

The Guidelines requirement for the TGAI has been satisfied.

Data from testing with the applicant's EP or TEP are required if the LC50 of the TGAI is equal to or less than the EEC in the freshwater environment when the EP is used as directed. Use of benefin on turf is expected to result in the EEC exceeding the LC50.

Aquatic Invertebrate Life Cycle

No studies were evaluated under this topic.

Data from a life cycle test are required to support the registration of the EP if any aquatic invertebrate LC50 value is less than 1.0 mg/L.

The Guidelines requirement for aquatic invertebrate life cycle testing has not been satisfied.

Precautionary Labeling

A toxicity statement is required.

Effects on Estuarine and Marine Organisms

No studies were evaluated under this topic.

Data on the acute toxicity to estuarine and marine organisms are required to support the registration of an EP intended for direct application to the estuarine or marine environment or if it is expected to enter this environment in significant concentrations because of its expected use or mobility pattern.

Testing on marine/estuarine species will be required for tobacco, forest trees, turf, alfalfa, clover, and peanuts (crops

associated with more than 300,000 acres located in coastal counties).

The Guidelines requirement for estuarine and marine organism testing has not been satisfied.

Precautionary Labeling

No toxicity statement is required at this time.

Effects on Beneficial Insects

One study was evaluated under this topic and is acceptable for use in a hazard assessment.

<u>Author</u>	<u>Date</u>	<u>ID No.</u>
Atkins	1975	00036935

The minimum data requirement to establish the acute toxicity to honey bees is an acute oral LD₅₀ study with the technical material.

The following study is acceptable for use in a hazard assessment:

<u>Species</u>	<u>% ai</u>	<u>LD₅₀ value</u>	<u>Author</u>	<u>Date</u>	<u>ID No.</u>	<u>Fulfills Requirement</u>
Honey bee <u>Apis mellifera</u>	Tech.	> 14.50 ug/bee	Atkins	1975	00036935	Yes

Benefin may be characterized as practically nontoxic to honey bees. The Guidelines requirement has been satisfied.

Precautionary Labeling

Based on the above data, no toxicity statement is required.

Plant Protection

No studies were evaluated under this topic.

In general, herbicides intended for use on terrestrial food crops do not require submission of nontarget plant data unless they are: 1) highly soluble; 2) volatile (vapor pressure > 1.0 x 10⁻⁵ mmHg at 25 °C); or 3) applied with aerial equipment.

Benefin is not very soluble in water (0.1 ppm at 25 °C) and the vapor pressure is 7.8 x 10⁻⁵ mmHg at 25 °C; however, the herbicide may be applied by aerial equipment for weed control in peanuts (J.G. Saulmon, QUA, September 19, 1988). Therefore, Tier I vegetative vigor, Tier II seed germination/seedling emergence, and Tier I aquatic plant growth testing are required. In

addition, the aerial application requires submission of drift studies.

Data submitted for the terrestrial food crop uses of benefin will also satisfy the requirements for the terrestrial nonfood uses.

The Guidelines requirement has not been satisfied.

Precautionary Labeling

"Drift or runoff may be hazardous to nontarget plants" should be added to the label. Results of phytotoxicity testing may require a modification of this statement.

I. ECOLOGICAL EFFECTS PROFILE

Manufacturing Use

A. Avian Studies

Tucker, Broddle, and Seacat (1984, 160000; 1973, 24273; 1985, 160875) all reported LD₅₀ values for the mallard duck (Anas platyrhynchos) and bobwhite quail (Colinus virginianus) of > 2000 mg/kg. Benefin may be characterized as practically nontoxic on an acute oral basis.

Subacute tests by West (1974, 234214) indicated LC₅₀ values of > 5000 ppm for both the mallard duck Anas platyrhynchos and bobwhite quail Colinus virginianus. Benefin may be characterized as practically nontoxic on a subacute basis.

B. Aquatic Studies

Kehr (1977, 234214) reported a 96-hour LC₅₀ for bluegill sunfish Lepomis macrochirus of 0.065 ppm; Koenig (1985, 257844) using the rainbow trout Salmo gairdneri reported an LC₅₀ of 0.081 ppm and Mayer (1986, 40098001) indicated the 96-hour LC₅₀ for the goldfish Carassius auratus was 0.81 ppm. Benefin may be characterized as highly to very highly toxic to freshwater fish.

Koenig (1985, 257844) using the aquatic invertebrate Daphnia magna found that the 48-hour LC₅₀ was > 0.1 ppm while Mayer (1986, 40098001) cited an LC₅₀ of 4.0 ppm for Gammarus fasciatus. Benefin may be characterized as moderately to highly toxic to aquatic invertebrates.

C. Insect Studies

Atkins (1975, 00036935) observed an LD value of 7.1 when the honey bee Apis mellifera was exposed to 14.5 ug/bee.

Benefin may be characterized as practically nontoxic to honey bees.

II. ECOLOGICAL EFFECTS HAZARD ASSESSMENT

Benefin (Balan) is currently registered as a preemergent herbicide for control of grasses and broadleaf weeds in alfalfa, birdsfoot trefoil, clover (red, alsike, ladino), lettuce, peanuts, tobacco (burley, dark), ornamental plants and forest trees, and turfgrass.

Rates of application range from 1.1 to 1.5 lb ai/A for terrestrial food and nonfood crops, 2.0 to 3.0 lb ai/A for ornamental plants and forest trees, and 0.4 to 3.0 lb ai/A for turf.

For all uses except turf, incorporation following application is required. Benefin may also be applied by aerial equipment for weed control in peanuts.

Ecological Effects Branch (EEB) has an extremely limited data base from the Exposure Assessment Branch (EAB) on the fate of benefin in the environment. In a review dated July 8, 1985, S. Hong, EAB, indicated that benefin was stable to hydrolysis under environmental conditions but is metabolized in aerobic soil with a half-life range of 2.5 to 8.2 weeks depending on soil type. Soil binding was the major route of dissipation. No additional fate data are available. Only a preliminary assessment can be prepared.

General Toxicology (from EEB review by F. Betz, November 11, 1976)

<u>Organism</u>	<u>Test</u>	<u>Result</u>	<u>Material</u>	<u>Reference</u>
Mouse	Oral LD50	> 5 g/kg	Technical	090606
Rat, adult M	Oral LD50	> 10 g/kg	Technical	090606
Rat, adult F	Oral LD50	> 10 g/kg	Technical	090606
Rat, weanling	Oral LD50	> 7 g/kg	Technical	090606
Rat, newborn < 24 hours	Intragastric LD50	0.79 ± 0.08 g/kg	Technical	090606
Dog, mongrel M	Oral LD50	> 2 g/kg	Technical	090606
Dog, mongrel F	Oral LD50	> 2 g/kg	Technical	090606
Rabbit, M	Oral LD50	> 2 g/kg	Technical	090606
Rabbit, F	Oral LD50	> 2 g/kg	Technical	090606
Rabbit	Dermal LD50	> 0.2 g/kg	Technical	090606
Rabbit	Ocular	No irritation 1 mg as 1% suspension, no effects	Technical	090606
Rat	Inhalation LD50	> 1.33 mg/L/hr no effects	Technical	090606

Terrestrial Hazard

Benfen has been characterized as practically nontoxic to avian species on both an acute and subacute basis. At a maximum application rate of 3.0 lb ai/A, the following residue levels could be expected immediately after application:

<u>Substrate</u>	<u>Residue/ppm</u>
Short rangelgrass	720.0
Long grass	330.0
Leaves and leafy crops	375.0
Forage (alfalfa and clover)	174.0
Pod containing seeds	36.0
Fruit	21.0

These values are significantly below the LC₅₀ values for avian species (mallard duck and bobwhite quail > 5000 ppm) and would not be expected to have adverse effect.

Data for the honey bee (LD₅₀ > 14.5 ug/bee) indicate that benfen would not be expected to have an adverse effect.

Aquatic Hazard

Benfen, with a 96-hour LC₅₀ of 0.065 ppm for the bluegill sunfish Lepomis macrochirus, 0.081 ppm for rainbow trout Salmo gairdneri, and 0.81 ppm for goldfish Carassius auratus, has been characterized as highly to very highly toxic to freshwater fish.

Assuming an inadvertent direct application, during aerial application, to a pond 0.5 foot deep at a maximum application of 1.5 lb ai/A for peanuts, residues would be 1.1 ppm. This concentration is above the LC₅₀ values for fish and would be considered hazardous.

EEB lacks sufficient data to run our exposure model, therefore the following scenerio was utilized to estimate runoff: Benfen applied to 10 acres of turf at 3.0 lb ai/A, assuming 1-percent runoff, would produce concentrations of 0.22 ppm. This EEC is above the LC₅₀ values for both bluegill sunfish (0.065 ppm) and rainbow trout (0.081 ppm) and could be considered hazardous. (10 A x 3.0 lb ai/A -1% runoff = 0.3 lb ai in 0.5 foot water = 0.22 ppm).

Based on the data available, use of benfen could pose a significant threat to freshwater fish.

Available data for the aquatic invertebrate Gammarus fasciatus, LC₅₀ 4.0 ppm, has resulted in a characterization of moderately toxic. Using the same scenarios for aquatic invertebrates that were used for fish, benfen use would not be hazardous. (LC₅₀ = 4.0 ppm, runoff EEC = 0.22 ppm, direct application EEC = 1.1 ppm)

Plant Hazard

No studies are available on the effect of benefin to nontarget plants. Based on the label and the QUA, the herbicide affects physiological growth processes associated with seed germination. Therefore, movement of benefin from the site of application by drift or runoff could adversely affect the germination of nontarget plants. The potential hazard to both terrestrial and aquatic nontarget plants from foliar exposure is unknown.

A. Endangered Species

1. Avian

Using the endangered species trigger of 1/2* the LC₅₀ value of the most sensitive test species and the EEC for short rangelgrass at an application rate of 3.0 lb ai/A, the level of concern would not be exceeded.

$$\begin{aligned} 1/2 >5000 \text{ ppm} &= 2500 \text{ ppm} & \text{Maximum EEC} &= 720 \text{ ppm} \\ & & 720/2500 &= 0.29 \end{aligned}$$

Endangered birds are not expected to be adversely affected.

2. Aquatic

Using 1/20 the LC₅₀ for freshwater fish, the concern level to endangered species would be exceeded.

$$\begin{aligned} 1/20 0.065 \text{ ppm} &= 0.003 \text{ ppm} & \text{Maximum EEC} &= 0.22 \text{ ppm} \\ & & 0.22/0.003 &= 73.3 \end{aligned}$$

Endangered fish exposed to benefin may be expected to be adversely affected.

For endangered aquatic invertebrates, the concern level would be exceeded.

$$\begin{aligned} 1/20 4.0 \text{ ppm} &= 0.2 \text{ ppm} & \text{Maximum EEC} &= 0.22 \text{ ppm} \\ & & 0.22/0.2 &= 1.1 \end{aligned}$$

Endangered aquatic invertebrates may be expected to be adversely affected.

* To determine hazard, EEB is currently using 1/2 the LC₅₀ rather than 1/10 the LC₅₀ when the LC₅₀ is >5000 ppm and the LD₅₀ is >2000 mg/kg.

Plants

3. Based on the information provided in the QUA, the two uses that could provide a route of exposure for endangered plants are runoff from turf use and drift from aerial application on peanuts. However, no endangered plants have been currently identified with those uses.

B. Precautionary Statements

1. Manufacturing Use

This pesticide is toxic to fish. Do not discharge effluent containing this product into lakes, streams, ponds, estuaries, oceans, or public waters unless this product is specifically identified in an NPDES permit. Do not discharge effluent containing this product to sewer systems without previously notifying the sewage treatment plant authority. For guidance, contact your State Water Board or Regional Office of the EPA.

2. End-Use - Liquid

This pesticide is toxic to fish. Drift or runoff from treated areas may be hazardous to aquatic organisms and nontarget plants. Do not apply directly to water or wetlands (swamps, bogs, marshes, and potholes). Do not contaminate water when disposing of equipment rinsate.

3. End-Use - Granular

This pesticide is toxic to fish. Runoff from treated areas may be hazardous to aquatic organisms and nontarget plants. Do not apply directly to water or wetlands (swamps, bogs, marshes, and potholes). Do not contaminate water when disposing of equipment rinsate. Material that is spilled on the soil should be collected.

4. Endangered Species

Preliminary calculations on the potential hazard of benfen use to endangered aquatic species indicate that the concern level has been exceeded and that these species may be expected to be adversely affected. However, because of the limited EAB data base and need for additional EEB data, consultation with the U.S. Fish and Wildlife Service will not be initiated at this time. Following a review of required data, consultation may be necessary. Labeling is deferred until all data are available.

Abbreviated Reviews

<u>Author</u>	<u>ID No.</u>
Forbis	4045206
Arthur	137308
Barrows	24269
Hamelink	145756
Francis	145757
Christenson	27401
Gilbert	24228

Table A
Benefin Generic Data Requirements

Data Requirement	Composition <u>1/</u>	Use Pattern <u>2/</u>	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA Section 3(c)(2)(B)? Time
<u>§158.145 Wildlife and Aquatic Organisms</u>					
<u>Avian and Mammalian Testing</u>					
71-1 - Avian Oral LD50	TGAI	A, B, G	Yes	160000 160875 24273 <u>3/</u>	No
71-2 - Avian Dietary LC50	TGAI	A, B, G	Yes	234214	No
a. Upland Game Bird	TGAI	A, B, G	Yes	234214	No
b. Waterfowl					
71-3 - Wild Mammal Toxicity	TGAI	A, B, G	N/A <u>5/</u>		No
71-4 - Avian Reproduction	TGAI	A, B, G	No		Reserved <u>4/</u>
71-5 - Simulated and Actual Field Testing - Mammals and Birds	TEP	A, B, G	No		Reserved <u>4/</u>
<u>Aquatic Organism Testing</u>					
72-1 - Freshwater Fish LC50	TGAI	A, B, G	Yes	234214	No
a. Warmwater	TGAI	A, B, G	Yes	257844	No
b. Coldwater	TEP	A, B, G	No		Yes 9 Months
c. Warmwater	TEP	A, B, G	No		Yes 9 Months
e. Coldwater					
72-2 - Acute LC50 Freshwater Invertebrates	TGAI TEP	A, B, G A, B, G	Yes No	40098001	No Yes 9 Months
72-3 - Acute LC50 Estuarine and Marine Organisms	TGAI	A, B, G	No		Yes <u>6/</u> 12 Months

Table A
Benefin Generic Data Requirements (cont'd)

Data Requirement	Composition <u>1/</u>	Use Pattern <u>2/</u>	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA Section 3(c)(2)(B)?	Time
<u>§158.145 Wildlife and Aquatic Organisms</u>						
<u>Aquatic Organism Testing (cont'd)</u>						
72-4 - Fish and Early Life Stage and Aquatic Invertebrate Life Cycle	TGAI	A, B, G	No		Yes	12 Months
72-5 - Fish Life Cycle	TGAI	A, B, G	No		Yes	12 Months
72-6 - Aquatic Organism Accumulation	TGAI	A, B, G	No		Yes ^{11/}	
72-7 - Simulated or Actual Field Testing for Aquatic Organisms	TEP	A, B, G	No		Reserved ^{4/}	
<u>§158.150 Plant Protection</u>						
121-1 - Target Area Phytotoxicity	TEP	A, B, G	N/A ^{5/}		No	
<u>Nontarget Area Phytotoxicity</u>						
<u>TIER I</u>						
121-1 - Seed Germination/Seedling Emergence ^{9/}	TGAI	A, B, G	No		No	
122-1 - Vegetative Vigor	TGAI	A, B, G	No		Yes	9 Months
122-2 - Aquatic Plant Growth ^{10/}	TGAI	A, B, G	No		Yes	9 Months

Table A
Benefin Generic Data Requirements (cont'd)

Data Requirement	Composition <u>1/</u>	Use Pattern <u>2/</u>	Does EPA Have Data To Satisfy This Requirement? (Yes, No, or Partially)	Bibliographic Citation	Must Additional Data Be Submitted Under FIFRA Section 3(c)(2)(B)? Time
<u>TIER II</u>					
123-1 - Seed Germination/ Seedling Emergence	TGAI	A, B, G	No		Yes 9 Months
123-1 - Vegetative Vigor	TGAI	A, B, G	No		Reserved <u>12/</u>
123-2 - Aquatic Plant Growth	TGAI	A, B, G	No		Reserved <u>12/</u>
<u>TIER III</u>					
124-1 - Terrestrial Field	TEP	A, B, G	No		Reserved <u>8/</u>
124-2 - Aquatic Field	TEP	A, B, G	No		Reserved <u>8/</u>

1/ Composition: TGAI Technical Grade Active Ingredient; TEP = Typical End-Use Product.

2/ The use patterns are coded as follows: A = Terrestrial, Food Crop; B = Terrestrial, Nonfood; C = Aquatic, Food Crop; D = Aquatic, Nonfood; E = Greenhouse, Food Crop; F = Greenhouse, Nonfood; G = Forestry; H = Domestic Outdoor; I = Indoor.

3/ Percent active ingredient not provided.

4/ Reserved pending receipt and review of fate data.

5/ Not currently a requirement.

6/ Required for use on tobacco, turf, forest trees, alfalfa, clover, and peanuts.

7/ Testing required for products having the following percent active ingredient: 60.2, 59.6, 55.49, 54.6, 53.9 MIAs 16.3.

8/ Reserved pending results of Tier II.

9/ Data are available in the open literature on the phytotoxicity of benefin to germinating plants, therefore testing should be conducted at the Tier II level to establish EC50 values.

10/ Where the herbicide is applied to terrestrial sites, only the algae Selenastrum capricornutum is required.

11/ See EAB Data Table.

12/ Reserved pending results of Tier I.

TABLE A
GENERIC DATA REQUIREMENTS FOR BENEFIN

Data Requirement	Composition	Use Pattern	Does EPA Have Data To Satisfy This Require- ment? (Yes, No, or Partially).	Biblio- graphic Citation	Must Additional Data Be Sub- mitted Under FIFRA Section 3(c)(2)(B)?
158.155 Nontarget Insect					
<u>NONTARGET INSECT TESTING - POLLINATORS:</u>					
41-1 - Honey bee acute contact LD50	TGAI	A,B,G	YES	00036935	NO
41-2 - Honey bee - Toxicity of residues on foliage	TEP	A,B,G	NO		NO ^{1/}
41-4 - Honey bee subacute feeding study	[Reserved] ^{2/}				
41-5 - Field testing for pollinators	TEP	A,B,G	NO		NO ^{1/}
<u>NONTARGET INSECT TESTING - AQUATIC INSECTS</u>					
42-1 - Acute toxicity to aquatic insects	[Reserved] ^{3/}				
42-2 - Aquatic insect life- cycle study	[Reserved] ^{3/}				
42-3 - Simulated or actual field testing for aquatic insects	[Reserved] ^{3/}				
43-1 <u>NONTARGET INSECT</u> thru <u>TESTING-PREDATORS</u> 43-3 <u>AND PARASITES</u>	[Reserved] ^{3/}				

Composition: TGAI = Technical grade of the active ingredient; TEP = Typical end-use product. The use patterns are coded as follows: A = Terrestrial, Food Crop; B = Terrestrial, Non-Food; C = Aquatic, Food Crop; D = Aquatic, Non-Food; E = Greenhouse, Food Crop; F = Greenhouse, Non-Food; G = Forestry; H = Domestic Outdoor; I = Indoor.

- 1/ As data from the acute contact test indicate low toxicity, no further testing is required.
- 2/ Reserved pending development of test methodology.
- 3/ Reserved pending Agency decision as to whether the data requirement should be established.