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OFFICE OF  
PREVENTION, PESTICIDES  
AND TOXIC SUBSTANCES

**MEMORANDUM**

**SUBJECT:** RH7592 Registration Standard

**FROM:** Anthony F. Maciorowski, PhD, Chief  
Ecological Effects Branch  
Environmental Fate and Effects Division *Anthony F. Maciorowski*

**TO:** Cynthia Giles-Parker, PM 22  
Registration Division

Attached are the Disciplinary Review, Topical Summary, and Data Requirements for the Ecological Effects Chapter of RH7592 (Fenbuconazole) Registration Standard (DP Barcode D1710101, D171018, D166369, D166375).



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REQUIREMENT IS FULFILLED BY THESE

**RH7592 (FENBUCONAZOLE)**

**Ecological Effects**  
**Topical Summaries**

**Effects on Birds**

Five studies were received and reviewed under this topic. All five studies were acceptable for use in a risk assessment.

<u>Author</u>	<u>Date</u>	<u>MRID No.</u>
Fletcher, D.W.	1988	410312-31
Fletcher, D.W.	1988	410312-32
Fletcher, D.W.	1988	410312-33
Beavers, J.B., et al.	1991	418750-05
Beavers, J.B., et al.	1991	418750-06

To establish the toxicity of RH7592 to birds, the following tests are required using the technical grade material (TGAI):

A. One avian single-dose oral study on either a waterfowl species (preferably mallard duck) or an upland game species (preferably bobwhite quail).

B. Two subacute dietary studies: one study on a species of upland game bird (preferably bobwhite quail) and one study on a species of waterfowl (preferably mallard duck).

**Avian acute oral toxicity:**

<u>Data Requirements</u>	<u>Test</u>	<u>Bibliographic</u>	<u>Validation</u>	<u>Results</u>
71-1 Avian Oral-Bobwhite Quail	96.7% a.i.	410312-31	Core	LD <sub>50</sub> >2150 mg/kg

This data indicates that RH7592 is practically non-toxic to upland game species on an acute oral basis. The guideline requirement for an avian acute oral study is fulfilled.

**Avian subacute dietary:**

<u>Data Requirements</u>	<u>Test</u>	<u>Bibliographic</u>	<u>Validation</u>	<u>Results</u>
71-2 Avian Dietary-Bobwhite	96.7% a.i.	410312-33	Core	LC <sub>50</sub> =4050 ppm
-Mallard	96.7% a.i.	410312-32	Core	LC <sub>50</sub> =2013 ppm

These data indicate that RH7592 is slightly toxic to birds on a

dietary basis. The guideline requirement is fulfilled by these studies.

Avian reproduction:

Avian reproduction tests are required for a pesticide when: birds may be subjected to repeated or continuous exposure, the pesticide is stable in the environment, the pesticide is stored or accumulated in plant or animal tissues, or reproduction in terrestrial vertebrates may be adversely affected based on information from mammalian reproduction studies.

Avian reproduction studies are required to support registration of RH7592 because, environmental fate data indicate that RH7592 is quite stable and may be persistent in the environment (under aerobic conditions up to 367 days and under anaerobic conditions up to 655 days).

The acceptable avian reproduction studies for use in a risk assessment are listed below:

Data Requirements	Test	Bibliographic	Validation	Results
71-4 Avian Reproduction-Bobwhite	96.7% a.i.	418750-05	Core	NOEC=150 ppm
-Mallard	96.7% a.i.	418750-06	Core	NOEC=150 ppm

The results for mallard duck reproduction indicate significant reductions in female body weight gain and in food consumption at the 600 ppm concentration. In addition at 600 ppm, although not significant, there were decreases in male body weights, reduced egg production, and reduced egg hatchability.

The results for bobwhite quail reproduction using nominal dietary concentrations of RH7592 at 30, 150, and 600 ppm found a slight decrease in egg-shell thickness at the 600 ppm level, which was attributed to treatment exposure. No additional effects were found in any treatment level for mortality, behavior, or food consumption.

Precautionary Labeling

The available toxicity data indicates that precautionary labeling for birds on RH7592 products may be required.

Effects on Freshwater Fish

Four studies were received and reviewed under this topic. Three of the four studies were acceptable for use in a risk assessment.

<u>Author</u>	<u>Date</u>	<u>MRID No.</u>
Swigert, J.P.	1988	410312-35
Swigert, J.P.	1988	410735-06
Sword, M.C. & J.L. Stratton	1991	420410-01
Rhodes, J.E., et al.	1991	418750-08

To establish the toxicity of RH7592 to freshwater fish, the following test is required using technical grade active ingredient (TGAI):

A. Two 96-hour studies with both coldwater and warmwater species of fish. The preferred coldwater species is rainbow trout and the preferred warmwater species is bluegill sunfish.

### Freshwater Fish Acute Toxicity

<u>Data Requirements</u>	<u>Test</u>	<u>Bibliographic</u>	<u>Validation</u>	<u>Results</u>
72-1 Freshwater Fish-Trout	96.7% a.i.	410312-35	Core	LC <sub>50</sub> =1.50 ppm
-Bluegill	96.7% a.i.	410735-06	Core	LC <sub>50</sub> =0.68 ppm

These results indicate that RH7592 is moderately toxic to coldwater species and highly toxic to warmwater species of fish. The guideline requirements are fulfilled for acute toxicity testing on freshwater fish.

### Fish Early Life Stage Test

Data from fish early life stage tests are required to support the registration of an end-use product that is expected to be transported to water from the intended use site when certain conditions, including any of the following apply:

\* Any EC<sub>50</sub>/LC<sub>50</sub> value in acute tests is less than 1 mg/L. The bluegill sunfish value was 0.68 mg/L.

\* The EEC in water is equal to or greater than 0.01 of any EC<sub>50</sub> or LC<sub>50</sub> from acute testing. When applied at maximum rate (0.125), expected residues for direct application to a 6 inch water basin after 7 repeat applications, (10 day intervals) the FATE model used by EEB indicates the EEC value to be 0.67 ppm.

\* The EEC is less than 0.01 of EC<sub>50</sub>/LC<sub>50</sub> values and the pesticide is persistent in water. RH7592 was stable to hydrolysis at pH 5, 7, and 9.

Data from fish early life stage studies are required to support

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registration of RH7592.

The studies under this topic may be used in a risk assessment:

Data Requirements	Test	Bibliographic	Validation	Results
72-4 Freshwater Fish Early Life Stage-				
Fathead Minnow	96.7% a.i.	420410-01	Core	MATC >0.082 & <0.16 ppm
Fathead Minnow	96.7% a.i.	418750-08	Supplemental	LOEC=0.26 ppm

### Freshwater Fish Life-Cycle

No studies were evaluated under this topic.

Data from fish life-cycle tests are required to support the registration of an end-use product that is expected to be transported to water from the intended use site when any of the following conditions apply:

- \* If the estimated EEC is > 1/10 of the no effect level in the fish early life stage or invertebrate life cycle test.
- \* If studies of other organisms indicate that the reproductive physiology of the fish may be affected.

Data from a fish life-cycle test <sup>is</sup> required, as results from the fish early life stage indicate a EEC > 1/10 the NOEL.

### Precautionary Labeling

Based on the above results, a precautionary statement for fish is required for technical RH7592.

This pesticide is highly toxic to fish. Do not apply directly to water, or to areas below the mean high water mark. Drift and runoff from treated areas may be hazardous to aquatic organisms in adjacent aquatic sites. Do not contaminate water when disposing of equipment washwaters and rinsates.

### Effects on Freshwater Invertebrates

Two studies were evaluated under this topic. Both are acceptable to use in a risk assessment.

<u>Author</u>	<u>Date</u>	<u>MRID No.</u>
Burgess, D.	1988	410735-07
Blakemore, G.C. & D. Burgess	1991	418750-07

To establish the toxicity of RH7592 to aquatic invertebrates, the

following test is required using technical grade active ingredients (TGAI).

A. 48-hour acute study using TGAI. Test organisms should be first instar Daphnia magna.

The acceptable study for acute toxicity of TGAI RH7592 to freshwater invertebrates is listed below:

Data Requirements	Test	Bibliographic	Validation	Results
72-2 Freshwater Invertebrate <u>Daphnia magna</u>	96.7% a.i.	410735-07	Core	EC <sub>50</sub> =23 ppm

These results indicate that RH7592 is moderately toxic to freshwater invertebrates.

Aquatic Invertebrate Life Cycle Test

Data from an aquatic invertebrate life cycle test are required to support the registration of an end-use product that is expected to be transported to water from the intended use site when certain conditions, including the following, apply:

\* Any EC<sub>50</sub>/LC<sub>50</sub> value in acute tests is less than 1 mg/L. The bluegill sunfish value was 0.68 mg/L.

\* The EEC in water is equal to or greater than 0.01 of any EC<sub>50</sub> or LC<sub>50</sub> from acute testing. When applied at maximum rate (0.125), expected residues for direct application to a 6 inch water basin after 7 repeat applications, (10 day intervals) the FATE model used by EEB indicates the EEC value to be 0.67 ppm.

\* The EEC is less than 0.01 of EC<sub>50</sub>/LC<sub>50</sub> values and the pesticide is persistent in water. RH7592 was stable to hydrolysis at pH 5, 7, and 9.

Data from an invertebrate life cycle are required to support registration of RH7592.

Although the study under this topic is classified as supplemental it may be used in a risk assessment:

Data Requirements	Test	Bibliographic	Validation	Results
72-4 Freshwater Invertebrate Life Cycle- <u>Daphnia magna</u>	96.7% a.i.	418750-07	Supplemental	MATC >0.078 & <0.15 ppm geometric MATC=0.11 ppm

The guideline requirements are fulfilled for toxicity testing on

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freshwater invertebrates.

### Precautionary Labeling

Based on the above results, a precautionary statement for aquatic invertebrates may be required for technical RH7592.

### Effects on Estuarine and Marine Organisms

No studies were evaluated under this topic.

Data describing the acute toxicity of the pesticide to estuarine and marine organisms are required to support the registration of an end-use product 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.

The proposed use pattern for RH7592 is on stone fruits and pecans, which are grown in coastal counties. Therefore, the following studies are required to establish the toxicity of RH7592 to Estuarine and Marine Organisms:

- A. 96-hour LC<sub>50</sub> study on an estuarine/marine species of shrimp using TGAI of RH7592.
- B. 96-hour LC<sub>50</sub> study on an estuarine/marine species of fish using TGAI of RH7592.
- C. 48-hour EC<sub>50</sub> study with oyster embryolarvae or a 96-hour EC<sub>50</sub> oyster shell deposition study using the TGAI of RH7592.

### Effects on Non-Target Insects

One acute honey bee study was submitted and evaluated under this topic. The study is listed below:

<u>Author</u>	<u>Date</u>	<u>MRID No.</u>
Atkins, E.L.	1988	410312-38

The minimum data requirement for establishing toxicity to honey bees Aphis mellifera are:

- A. Honey bee acute toxicity study using the technical grade active ingredient (TGAI).

The acceptable acute toxicity study for honey bees is listed below:



Data Requirements	Test	Bibliographic	Validation	Results
141-1 Non-Target Insects -Honey bee	96.7% a.i.	410312-38	Core	LD <sub>50</sub> >292.18 ug/bee

These results indicate that RH7592 is relatively non-toxic to honey bees, when administered as a dusting powder. The guideline requirements are fulfilled for acute toxicity testing on non-target insects.

### Precautionary Labeling

The available acute toxicity data indicate that precautionary labels for honey bees are not required.

### Effects on Non-Target Plants

One study was evaluated under this topic. The following study was considered supplemental, however information derived from the study may be used in a risk assessment:

<u>Author</u>	<u>Date</u>	<u>MRID No.</u>
Burgess, D. & J.W. Blasberg	1991	418750-09

The minimum data requirements for determining toxicity to non-target plants are listed below:

- A. Aquatic Plant Growth study using Technical Grade Active Ingredient (TGAI).
- B. Seed Germination/Seedling Emergence using TGAI.
- C. Vegetative Vigor using TGAI.

The only submitted study is listed below:

Data Requirements	Test	Bibliographic	Validation	Results
123-2 Growth & Reproduction of Aquatic Plants-Tier 2 <u>Selenastrum capricornutum</u>	96.7% a.i.	418750-09	Supplemental	EC <sub>50</sub> =0.41 ppm

The data requirements for Non-Target Plants can be fulfilled with the submission of a core Tier 2 study. Additional studies may be required pending the results of the above required study.

### Precautionary Labeling

Based on the above supplemental study precautionary labeling may be required for aquatic plants.

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## Ecological Effects Disciplinary Review

### I. Ecological Effects Profile

#### A. Terrestrial Studies

An LD<sub>50</sub> greater than 2150 mg/kg was determined for bobwhite quail given a single oral dose of RH7592 (MRID 410312-31). Therefore, RH7592 can be considered practically non-toxic to bobwhite quail on an acute basis.

NOECs?  
Results from the 8-day subacute dietary LC<sub>50</sub> for mallard ducks and bobwhite quail were determined to be greater than 2013 mg/kg and 4050 mg/kg, respectively (MRID 410312-32, 410312-33). These results indicate that RH7592 is slightly toxic to mallard ducks and bobwhite quail on a dietary basis.

Avian Reproduction Studies indicate that no reproductive impairment was shown to occur in mallard ducks at a dietary dose of 150 ppm technical RH7592 (MRID 418750-06). No reproductive impairment was shown to occur in bobwhite quail at a dietary dose of 150 ppm (MRID 418750-05).

An acute oral LD<sub>50</sub> performed on rats (MRID 410312-07) indicated that RH7592 is practically nontoxic to mammals (LD<sub>50</sub> > 2000 mg/kg). A three month feeding study (MRID 410735-02) produced a NOEL of 20 ppm. In addition, a two-generation reproduction study (MRID 410312-15) on rats indicated the NOEL of 80 ppm.

#### B. Aquatic Studies

Two studies were submitted on the acute toxicity of freshwater fish. The LC<sub>50</sub> value for rainbow trout was 1.5 mg/L, indicating that the TGAI (technical grade active ingredient) of RH7592 is moderately toxic to coldwater fish species (MRID 410312-35). In addition, the LC<sub>50</sub> value for bluegill sunfish was 0.68 mg/L, indicating the TGAI of RH7592 is highly toxic to warmwater fish species (MRID 410735-06).

Results from fish early life stage studies using rainbow trout suggest that the MATC of TGAI RH7592 to this species was greater than 0.082 mg/L and less than 0.16 mg/L (MRID 420410-01).

The 48-hour  $EC_{50}$  for Daphnia magna freshwater invertebrates was 2.3 mg/L (MRID 410735-07).

The results from the freshwater invertebrate life cycle study using TGAI of RH7592 suggests the MATC to be greater than 0.078 and less than 0.15 mg/L (MRID 418750-07).

#### C. Effects on Non-Target Insects

These results indicate that RH7592 is relatively non-toxic to honey bees, when administered as a dusting powder. The  $LD_{50}$  was greater than 292.2 ug/bee, indicating that RH7592 is practically non-toxic to honey bees.

#### D. Effects on Non-Target Plants

A study performed on Selenastrum capricornutum for a Tier 2 aquatic plant growth and reproduction study determined the 120-hour LOEC and  $EC_{50}$  to be 0.09 and 0.41 mg/l, respectively. However, the study was unable to determine an NOEC and therefore, deemed supplemental.

## II. Ecological Hazard Assessment

### Submission Purpose and Pesticide Use

Rohm and Haas is requesting a Section 3 Registration for RH7592. RH7592 is a protectant or presymptomatic infection treatment used for control of fungal diseases: Mycosphaerella caryigena (downy spot), M. dendroides (leaf blotch), Septoria caryea (Septoria leaf spot), Cladosporium carygenum in pecans and Monolinia spp. (blossom blight and brown rot), Circoospora circumscissa and Coccomyces hiemalis (leaf spot), Venturia cerasi (fruit spot), Cladosporium carpophilum (scab), and Tranzschelia pruni-spinosae (prune rust) in stone fruit. This registration request is for use on stone fruits (apricots, cherries, nectarines, peaches, plums, and prunes), dried prunes, and pecans. Applications are recommended to begin early to mid summer and continue throughout the growing season. It is formulated as a flowable concentrate which contains 2 lb a.i./gallon. According to the proposed labels (see attachment) the maximum allowable rate for a single application is 0.125 lb a.i./A, with multiple applications (10 day interval) up to 1 lb a.i./A. RH7592 is to be applied by ground equipment, however specific application methods were not specified. EEB along with EFGWB are assuming that ground application includes conventual orchard (airblast or mist blower) methods. In addition, EEB notes that for an EUP on stone fruits (DP Barcode 169204) and an EUP and Section 3 Registration on apples (DP Barcodes 182264 and 182867) for RH7592 indicates both ground and aerial applications would be utilized.

### Environmental Persistence

RH7592 is moderately persistent with surface degradation half-life ranging from 79 days for soil photolysis to 367 days for aerobic soil metabolism. Degradation of RH7592 at depth will also occur slowly as the compound was stable to hydrolysis at pH 5, 7, and 9 and degraded in soil under anaerobic conditions with half-lives of 451-655 days. RH7592 and its degradates appear to be slightly mobile to immobile in soil with  $K_d$ 's ranging from 5 to 115. The principle route of dissipation appears to be adsorption to soil, with increased adsorption associated with higher organic matter content. According to EFGWB RH7592 residues may accumulate in soil with repeated applications over multiple growing seasons. Its persistence and relative lack of mobility indicates that it could reach surface water via runoff following rainfall or irrigation.

### Estimated Environmental Concentrations

According to the RH7592 label, approximately 2 lbs of active ingredient are contained in each gallon of RH7592 2F. The maximum rate of application is 0.125 active ingredient per acre.

A presumption of no risk to non-target organisms is calculated from acute toxicity studies using  $EEC < 1/5$  the  $LD_{50}$  and  $LC_{50}$ 's for terrestrial organisms and  $EEC < 1/10$  the  $LC_{50}$  and  $EC_{50}$ 's for aquatic organisms. For endangered species the  $EEC < 1/10$  the  $LD_{50}$  and  $LC_{50}$ 's for terrestrial organisms and  $EEC < 1/20$  the  $LC_{50}$  and  $EC_{50}$ 's for aquatic organisms. For EEC's above these values risk can be presumed.

### Terrestrial Exposure

Therefore, the maximum estimated environmental concentrations after the first application of RH7592 on various types of vegetation in ppm (Hoerger and Kanaga, 1972) are as follows:

PPM Residue on the Basis of  
RH7592 Dosage of 0.125 lb per Acre

Plant Category	Upper limit	Typical limit
Short Grass	30	16
Long Grass	14	12
Leaves & Leafy Crops	16	4
Forage Crops	7	4
Pods Containing Seeds	2	0.4
Grain	1	0.4
Fruit	0.9	0.2

**Potential Risk from Exposure to RH7592 on Terrestrial Vegetation  
to Both Non-Target Organisms and Endangered Species**

<b>Terrestrial Study</b>	<b>Non-Target Risk Level</b>	<b>Endangered Species Risk Level</b>
Avian Oral (Bobwhite Quail)	1/5 LD <sub>50</sub> > 430 ppm	1/10 LD <sub>50</sub> > 215 ppm
Avian Dietary -- Mallard Duck	1/5 LC <sub>50</sub> = 403 ppm	1/10 LC <sub>50</sub> = 201 ppm
-- Bobwhite Quail	1/5 LC <sub>50</sub> = 810 ppm	1/10 LC <sub>50</sub> = 405 ppm
Avian Reproduction -- Mallard Duck	NOEC = 150 ppm	
-- Bobwhite Quail	NOEC = 150 ppm	
Mammalian Oral (rat)	1/5 LD <sub>50</sub> = 400 ppm	1/10 LC <sub>50</sub> = 200 ppm
Mammalian Reproduction -- rat	NOEL = 80 ppm	

As RH7592 has shown to be persistent in the environment and the label recommends multiple applications at 10 day intervals (up to 1 lb active ingredient per season) using mist blowers or airblast methods, a daily accumulated residue model (EEB's FATE Computer Model) was run on both short grass and pods containing seeds data. The results from these models (see attachments) compared to the risk criteria above indicate that maximum residue levels for short grass (225 ppm) exceed acute and chronic levels of concern for endangered terrestrial species associated with stone fruits and pecans. In addition, the short grass residue results exceed the NOEC level for both avian and mammalian reproduction.

Aquatic Exposure

Based on the maximum label rate and the proposed application methods (mist blower and airblast), it is assumed that there may be inadvertent direct application to waterways. Therefore, using the maximum label rate (0.125 a.i./A), the estimated residues in aquatic environments are as follows:

**I. Direct Application Model**

This model is used when aquatic habitat is in close proximity to the target site; assumes direct application to a 6 inch and 6 foot body of water.

Application rate (lbs a.i./A) X 734 ppb (or 61 ppm) = EEC

Calculation for 6 inch water layer:

0.125 lbs a.i./A X 734 ppb = 91.75 ppb (0.0918 ppm)

Calculation for 6 foot body of water:

0.125 lbs a.i./A X 61 ppb = 7.6 ppb (0.0076 ppm)

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## II. Spray Drift Model

This model is used when application methods include aerial sprays, mist blowers, aerial fogs, etc. and aquatic habitat is distinctly separate from target site and label restricts direct treatment; assumes drift into a 6 inch layer of water or pounds lost to adjacent aquatic habitat.

Application rate (lbs a.i./A) X 5% drift = drift loading

$$0.125 \text{ lbs a.i./A} \times 0.05 = 6.25^{-03} \text{ lbs}$$

$$(\text{drift loading}) \times 734 \text{ ppb} = \text{EEC}$$

$$6.25^{-03} \text{ lbs} \times 734 \text{ ppb} = 4.59 \text{ ppb} (0.0046 \text{ ppm})$$

## III. Runoff Model

For pesticide active ingredients with high binding affinities (e.g., water solubility < 1 ppm; or octanol-water partition coefficient > 1000.

Application rate (lbs a.i./A) X (1% loss rate) X (10 acre basin) = runoff loading

$$0.125 \text{ lbs a.i./A} \times 0.01 \times 10 \text{ acres} = 0.012 \text{ lbs}$$

## IV. Indirect Exposure Model

Assumes total loading into a 6 acre\*foot water body.

(spray drift loading + runoff loading) X 61.2 ppb = EEC

$$(6.25^{-03} \text{ lbs} + 0.012 \text{ lbs}) \times 61.2 \text{ ppb} = 1.12 \text{ ppb} (0.0012 \text{ ppm})$$

### Potential Risk from Exposure to RH7592 In Freshwater Bodies of Water Both Non-Target Organisms and Endangered Species

Aquatic Study	Non-Target Risk Level	Endangered Species Risk Level
Freshwater Fish -- Rainbow Trout	1/10 LC <sub>50</sub> = 0.15 ppm	1/20 LC <sub>50</sub> = 0.075 ppm
-- Bluegill Sunfish	1/10 LC <sub>50</sub> = 0.068 ppm	1/20 LC <sub>50</sub> = 0.034 ppm
Fish Early Life-Stage -- Fathead Minnow	MATC > 0.082 & < 0.16 ppm	
Freshwater Invertebrate		
-- <u>Daphnia magna</u>	1/10 LC <sub>50</sub> = 0.23 ppm	1/20 LC <sub>50</sub> = 0.12 ppm
Invertebrate Life-Cycle -- <u>Daphnia magna</u>	MATC > 0.078 & < 0.15 ppm	

After the first application residues in water (direct exposure to 6 inches of water) exceed levels of risk for both non-target and endangered species of warmwater fish.

As RH7592 has shown to be persistent in the environment and the label recommends multiple applications at 10 day intervals (up to 1 lb active ingredient per season) using mist blowers or airblast methods, a daily accumulated residue model (EEB's FATE Model) was run on residue models for direct application in 6 inch and 6 foot bodies of water, and spray drift application model. Results from these models (see attachments) compared to the risk criteria above indicate residue levels exceed acute levels of concern for non-target as well as endangered fish species in the 6 inch bodies of water. In both the 6 foot body of water model and spray drift model, residues will exceed levels of risk for only endangered warmwater fish species.

To complete an aquatic risk assessment data are, for fish life-cycle and estuarine species. At this time (3/26/93) no data have been received for data requirements 72-5 and 72-3. In addition, another aquatic plant study needs to be submitted, as no NOEC was deduced from the study submitted (MRID 418750-09).

### Endangered Species

As stated above with the proposed application and use rates on short grass exceed levels of concern for endangered terrestrial species associated with stone fruits and pecans. In addition, for aquatic exposure results from EEB's FATE model indicate residue levels will exceed levels of concern for aquatic endangered fish species in 6 inch bodies of water. In both the 6 foot body of water model and spray drift model, residues will exceed levels of risk for endangered warmwater fish species. Therefore, a Section 7 consultation with the Fish and Wildlife Service will need to be done (see Table 1 for a partial list of potential affected endangered species).

### Adequacy of Toxicity Data

The following list of studies are needed to complete EEB's ecological risk assessments on RH7592.

- 72-3 96-hour LC<sub>50</sub> study on an estuarine/marine species of shrimp using TGAI of RH7592.
- 96-hour LC<sub>50</sub> study on an estuarine/marine species of fish using TGAI of RH7592.
- 48-hour EC<sub>50</sub> study with oyster embryolarvae or a 96-hour EC<sub>50</sub> oyster shell deposition study using the TGAI of RH7592.
- 72-5 Fish full life-cycle using TGAI of RH7592.
- 123-2 Growth and Reproduction of Aquatic Plants - Tier 2 using the TGAI of RH7592.

In addition, due to the persistence of RH7592 and the proposed use patterns, to appropriately estimate the effects of spray drift on surrounding habitats EEB recommends that EFGWB requests the following data:

- 201-1 Droplet Size Spectrum
202-1 Drift Field Evaluation

Precautionary Labeling

It is recommended that the following statement be included on the label:

This pesticide is highly toxic to fish. Do not apply directly to water, or to areas below the mean high water mark. Drift and runoff from treated area may be hazardous to aquatic organisms in adjacent aquatic sites. Do not contaminate water when disposing of equipment washwaters and rinsates.

Conclusions

EEB does not have sufficient data to complete an ecological risk assessment (see data requirements listed in above section). EEB is requiring the registrants provide data on estaurine species, because of the proposed use sites and application rates. These data are also needed to determine levels of concern for endangered freshwater mussels. In addition, a fish life-cycle study is also needed to determine levels of concern prior to starting the Section 7 Consultation process.

Based on the available toxicity data submitted by the registrant and the known persistence of RH7592 in the environment, RH7592 will have both acute and chronic effects on birds, mammals, and warmwater fish species. With respect to potential adverse effects to avian reproduction, a violation of the Migratory Bird Treaty Act may ensue. In addition, use of RH7592 exceeds the levels of concern to endangered species both terrestrial and freshwater fish. Therefore, a Section 7 Consultation with the Fish and Wildlife Service will need to be done, unless mitigation measures are proposed to alleviate levels of concern.

Reviewed by: Regina Hirsch, Wildlife Biologist, Ecological Effects Branch, Environmental Fate and Effects Division. Signature: R. Hirsch, Date: 3/31/93

Approved by: Les Touart, Section Head, Ecological Effects Branch, Environmental Fate and Effects Division. Signature: L. Touart, Date: 3/31/93

Approved by: Anthony F. Maciorowski, PhD, Chief, Ecological Effects Branch, Environmental Fate and Effects Division. Signature: A. Maciorowski, Date: 3/31/93



**TABLE 1**  
**PARTIAL LIST OF ENDANGERED SPECIES**  
**FOUND IN STONE FRUIT AND PECAN ORCHARDS**

STATE <sup>1</sup>	USE SITE <sup>2</sup>	ENDANGERED SPECIES	SPECIES NAME
GA	S.F./Pecans	Amber darter	<i>Percina antesella</i>
AZ, MI	S.F./Pecans	American peregrine falcon	<i>Falco peregrinus anatum</i>
AZ	S.F./Pecans	Apache trout	<i>Oncorhynchus gilae</i>
AZ	S.F./Pecans	Arizona agave	<i>Agave arizonica</i>
AZ	S.F./Pecans	Arizona hedgehog cactus	<i>Echinocereus triglochidiatus arizonicus</i>
AZ	S.F./Pecans	Arizona cliffrose	<i>Purshia subintegra</i>
AZ	S.F./Pecans	Beautiful shiner	<i>Cyprinella formosa</i>
GA	S.F./Pecans	Black-spored quillwort	<i>Isoetes melanospora</i>
AZ, GA, MI, MS	S.F./Pecans	Bald eagle	<i>Haliaeetus leucocephalus</i>
MS	S.F./Pecans	Bayou darter	<i>Etheostoma rubrum</i>
AZ	S.F.	Brady pincushion cactus	<i>Pediocactus bradyi</i>
AZ	S.F./Pecans	Bonytail chub	<i>Gila elegans</i>
MS	S.F./Pecans	Brown pelican	<i>Pelecanus occidentalis</i>
AZ	S.F./Pecans	Cochise pincushion cactus	<i>Coryphantha robbinsorum</i>
AZ	S.F./Pecans	Colorado squawfish	<i>Ptychocheilus lucius</i>
MS	S.F./Pecans	Curtus mussel	<i>Pleurobema curtum</i>
AZ	S.F./Pecans	Desert pupfish	<i>Cyprinodon macularius</i>
AZ	S.F./Pecans	Desert tortoise	<i>Gopherus agassizii</i>
MI	S.F.	Dwarf lake iris	<i>Iris lacustris</i>

GA, MS	S.F./Pecans	Eastern indigo snake	<i>Drymarchon corais couperi</i>
MI	S.F.	Eastern prairie fringed orchid	<i>Platanthera leucophaea</i>
GA	S.F./Pecans	Florida torreya	<i>Torreya taxifolia</i>
GA	S.F./Pecans	Fringed campion	<i>Silene polypetala</i>
AZ	S.F./Pecans	Gila topminnow	<i>Poeciliopsis occidentalis</i>
MS	S.F./Pecans	Gopher tortoise	<i>Gopherus polyphemus</i>
MS	S.F./Pecans	Gray bat	<i>Myotis grisescens</i>
AZ, MI	S.F./Pecans	Gray wolf	<i>Canis lupus</i>
GA, MS	S.F./Pecans	Green sea turtle	<i>Chelonia mydas</i>
GA	Pecans	Harperella	<i>Ptilimnium nodosum</i>
MS	S.F./Pecans	Hawksbill sea turtle	<i>Eretmochelys imbricata</i>
MI	S.F.	Houghton's goldenrod	<i>Solidago houghtonii</i>
AZ	S.F./Pecans	Hualapai Mexican vole	<i>Microtus mexicanus hualpaiensis</i>
AZ	S.F.	Humpback chub	<i>Gila cypha</i>
GA, MI, MS	S.F./Pecans	Indiana bat	<i>Myotis sodalis</i>
AZ	S.F./Pecans	Jaguarundi	<i>Felis yagouaroundi tolteca</i>
MS	S.F./Pecans	Judge Tait's mussel	<i>Pleurobema taitianum</i>
AZ	S.F./Pecans	Kearney's blue-star	<i>Amsonia kearneyana</i>
GA, MS	S.F./Pecans	Kemp's (atlantic) Ridley sea turtle	<i>Lepidochelys kempii</i>
MI	S.F.	Kirtland's warbler	<i>Dendroica kirtlandii</i>
GA	S.F./Pecans	Large-flowered skullcap	<i>Scutellaria montana</i>
MS	S.F./Pecans	Least tern	<i>Sterna antillarum</i>

GA	Pecans	Leatherback sea turtle	<i>Dermochelys coriacea</i>
GA	S.F./Pecans	Little amphianthus	<i>Amphianthus pusillus</i>
AZ	S.F.	Little Colorado spinedace	<i>Lepidomeda vittata</i>
AZ	S.F./Pecans	Loach minnow	<i>Tiaroga cobitis</i>
GA, MS	S.F./Pecans	Loggerhead sea turtle	<i>Caretta caretta</i>
MS	S.F./Pecans	Marshall's mussel	<i>Pleurobema marshalii</i>
AZ	S.F./Pecans	Masked bobwhite	<i>Colinus virginianus ridgwayi</i>
GA	S.F./Pecans	Mat-forming quillwort	<i>Isoetes tegetiformans</i>
GA	Pecans	Michaux's sumac	<i>Rhus michauxii</i>
MS	S.F./Pecans	Mississippi sandhill crane	<i>Grus canadensis pulla</i>
GA	S.F./Pecans	Mohr's Barbara's buttons	<i>Marshallia mohrii</i>
AZ	S.F./Pecans	Mount Graham red squirrel	<i>Tamiasciurus hudsonicus grahamensis</i>
AZ	S.F./Pecans	Navajo sedge	<i>Carex specuicola</i>
AZ	S.F./Pecans	Nichol's turk's head	<i>Echinocactus horizonthalonius</i>
AZ	S.F./Pecans	Northern aplomado falcon	<i>Falco femoralis septentrionalis</i>
MS	S.F./Pecans	Pallid sturgeon	<i>Scaphirhynchus albus</i>
AZ	S.F.	Peebles Navajo cactus	<i>Pediocactus peeblesianus</i>
MS	S.F./Pecans	Penitent mussel	<i>Epioblasma penita</i>
GA	S.F.	Persistent trillium	<i>Trillium persistens</i>

GA	S.F./Pecans	Peter's mountain mallow	<i>Iiamna corei</i>
GA, MI, MS	S.F./Pecans	Piping plover	<i>Charadrius melodus</i>
MI	S.F.	Pitcher's thistle	<i>Cirsium pitcheri</i>
GA, MS	S.F./Pecans	Pondberry	<i>Lindera melissifolia</i>
MS	S.F./Pecans	Price's potato bean	<i>Apios priceana</i>
GA, MS	S.F./Pecans	Red-cockaded woodpecker	<i>Picoides borealis</i>
GA	S.F./Pecans	Relict trillium	<i>Trillium reliquum</i>
MS	S.F./Pecans	Ringed sawback turtle	<i>Graptemys oculifera</i>
AZ	S.F./Pecans	Sanborn's long-nosed bat	<i>Leptonycteris sanborni</i>
AZ	S.F.	San Francisco peaks groundel	<i>Senecio franciscanus</i>
AZ	S.F.	Sentry milk-vetch	<i>Astragalus cremnophylax</i>
GA	S.F./Pecans	Shortnose sturgeon	<i>Acipenser brevirostrum</i>
AZ	S.F./Pecans	Siler pincushion cactus	<i>Pediocactus sileri</i>
GA, MI	S.F.	Small whorled pogonia	<i>Isotria medeoloides</i>
GA	S.F./Pecans	Snail darter	<i>Percina tanasi</i>
AZ	S.F./Pecans	Sonoran pronghorn	<i>Antilocapra americana sonoriensis</i>
AZ	S.F./Pecans	Spikedace	<i>Meda fulgida</i>
AZ	S.F./Pecans	Tumamoc globe-berry	<i>Tumamoca macdougalii</i>
AZ	S.F./Pecans	Virgin river chub	<i>Gila robusta semidnuda</i>
GA	Pecans	Virginia spiraea	<i>Spiraea virginiana</i>
GA	S.F./Pecans	West Indian (Florida) manatee	<i>Trichechus manatus</i>

AZ	S.F./Pecans	Whooping crane	<i>Grus americana</i>
GA	S.F./Pecans	Wood stork	<i>Mycteria americana</i>
AZ	S.F./Pecans	Woundfin	<i>Plagopterus argentissimus</i>
AZ	S.F./Pecans	Yaqui catfish	<i>Ictalurus pricei</i>
AZ	S.F./Pecans	Yaqui chub	<i>Gila purpurea</i>
MS	S.F./Pecans	Yellow-blotched map turtle	<i>Graptemys flavimaculata</i>
AZ	S.F./Pecans	Yuma clapper rail	<i>Rallus longirostris yumanensis</i>

<sup>1</sup> States: AZ=Arizona; GA=Georgia; MI=Michigan; MS=Mississippi

<sup>2</sup> S.F. = Stone Fruits (Apricots, Peaches, Cherries, etc.)

Date: 03/29/93  
 Case Nos: 6510  
 Chemical No: 129011

REGISTRATION  
 DATA REQUIREMENTS FOR  
 ECOLOGICAL EFFECTS BRANCH  
 FENBUICONAZOLE

Data Requirements	Composition <sup>1</sup>	Use Pattern <sup>2</sup>	Does EPA Have Data To Satisfy This Requirement? (Yes, No)	Bibliographic Citation (MRID, date study was reviewed)	Must Additional Data Be Submitted under FIFRA3(c)(2)(B)?
<b>6 Basic Studies in Bold</b>					
<b>71-1(a) Acute Avian Oral, Quail</b>	TGAI (96.7%)	A,B	Yes	410312-31, 11/27/89	No
71-1(b) Acute Avian Oral, Quail/Duck	(TEP)	--	--	-----	No
<b>71-2(a) Acute Avian Diet, Quail</b>	TGAI (96.7%)	A,B	Yes	410312-33, 11/27/89	No
<b>71-2(b) Acute Avian Diet, Duck</b>	TGAI (96.7%)	A,B	Yes	410312-32, 11/27/89	No
71-3 Wild Mammal Toxicity	---	--	No	---	No
71-4(a) Avian Reproduction, Quail	---	A,B	Yes	418750-05, 3/26/93	No <sup>3</sup>
71-4(b) Avian Reproduction, Duck	---	A,B	In review	418750-06, 3/26/93	No <sup>3</sup>
71-5(a) Simulated Terrestrial Field Study	---	--	No	---	No
71-5(b) Actual Terrestrial Field Study	---	--	No	---	No
<b>72-1(a) Acute Fish Toxicity Bluegill</b>	TGAI (96.7%)	A,B	Yes	410735-06, 11/27/89	No
72-1(b) Acute Fish Toxicity Bluegill	(TEP)	--	No	---	No
<b>72-1(c) Acute Fish Toxicity Rainbow Trout</b>	TGAI (96.7%)	A,B	Yes	410312-35, 11/27/89	No
72-1(d) Acute Fish Toxicity Rainbow Trout	(TEP)	--	No	---	No
<b>72-2(a) Acute Aquatic Invertebrate Toxicity</b>	TGAI (96.7%)	A,B	Yes	410735-07, 11/28/89	No
72-2(b) Acute Aquatic Invertebrate Toxicity	(TEP)	--	No	---	No
<b>72-3(a) Acute Estu/Marl Tox Fish</b>	TGAI	A,B	No	---	Yes <sup>3</sup>
<b>72-3(b) Acute Estu/Marl Tox Mollusk</b>	TGAI	A,B	No	---	Yes <sup>3</sup>
<b>72-3(c) Acute Estu/Marl Tox Shrimp</b>	TGAI	A,B	No	---	Yes <sup>3</sup>

\* In Bibliographic Citation column indicates study may be upgradeable

REGISTRATION  
DATA REQUIREMENTS FOR  
ECOLOGICAL EFFECTS BRANCH  
FENBUCONAZOLE

Date: 03/29/83  
Case Nos: 6510  
Chemical No: 129011

Data Requirements	Composition <sup>1</sup>	Use Pattern <sup>2</sup>	Does EPA Have Data To Satisfy This Requirement? (Yes, No)	Bibliographic Citation (MRID, date study was reviewed)	Must Additional Data Be Submitted under FIFRA3(c)(2)(B)?
72-3(d) Acute Estu/Mari Tox Fish	(TEP)	—	No	—	No
72-3(e) Acute Estu/Mari Tox Mollusk	(TEP)	—	No	—	No
72-3(f) Acute Estu/Mari Tox Shrimp	(TEP)	—	No	—	No
72-4(a) Early Life-Stage Fish	TGAI	A,B	Yes	418750-08, 420410-01, 3/22/83	No <sup>4</sup>
72-4(b) Live-Cycle Aquatic Invertebrate	TGAI	A,B	Yes	418750-07, 3/22/83	No <sup>4</sup>
72-5 Life-Cycle Fish	TGAI	A,B	No	—	Yes <sup>5</sup>
72-6 Aquatic Org. Accumulation	—	—	No	—	No
72-7(a) Simulated Aquatic Field Study	TGAI	—	No	—	No
72-7(b) Actual Aquatic Field Study	TGAI	—	No	—	No
122-1(a) Seed Germ./Seedling Emerg.	TGAI	—	No	—	No
122-1(b) Vegetative Vigor	TGAI	—	No	—	No
122-2 Aquatic Plant Growth	TGAI	A,B	No	418750-09, 3/22/83	Yes
123-1(a) Seed Germ./Seedling Emerg.	TGAI	—	No	—	No
123-1(b) Vegetative Vigor	TGAI	—	No	—	No
123-2 Aquatic Plant Growth	TGAI	—	No	—	No
124-1 Terrestrial Field Study	—	—	No	—	No
124-2 Aquatic Field Study	—	—	No	—	No
141-1 Honey Bee Acute Contact	TGAI (96.7%)	A,B	Yes	410312-38, 11/27/89	No
141-2 Honey Bee Residue on Foliage	—	—	No	—	No
141-5 Field Test for Pollinators	—	—	No	—	No

\* In Bibliographic Citation column indicates study may be upgradeable

1. Composition: TGA|=Technical grade of the active ingredient; PAIRA=Pure active ingredient, radiolabeled; TEP=Typical end-use product

2. Use Patterns: A=Terrestrial Food Crop; B=Terrestrial Feed Crop; C=Terrestrial Non-Food Crop; D=Aquatic Food Crop; E=Aquatic Non-Food Outdoor; F=Aquatic Non-Food Industrial; G=Aquatic Non-Food Residential; H=Greenhouse Food Crop; I=Greenhouse Non-Food Crop; J=Forestry; K=Outdoor Residential; L=Indoor Food; M=Indoor Non-Food; N=Indoor Medical; O=Indoor Residential; Z=Use Group for Site 00000

3. Required due to fenbuconazole's persistence in the environment and proposed use pattern, use on crops that are generally in coastal countries.

4. Chronic testing is triggered by RH 7592's persistence in the aquatic environment-- the half-life from photolysis in water is 1283 days and the compound is stable to hydrolysis at pH range of 5-9. Further, the LC<sub>50</sub> for the acute toxicity to warmwater fish is < 1 ppm. The data provided are adequate to satisfy 72-4a.

5. Based on EEC's which exceed 1/10 NOEC from the 72-4a studies and extreme persistence, a Fish Full Life-Cycle study is required.



DAILY ACCUMULATED PESTICIDE RESIDUES—MULTP. APPL.

Chemical name ----- fenbuconazole-short grass  
 Initial concentration (ppm) ---- 30  
 Half-life ----- 367  
 A number of application ----- 8  
 Application interval ----- 10  
 Length of simulation (day) ---- 365

DAY RESIDUE (PPM)

0	30	51	171.4636	104	210.873	157	190.7866	210	172.6136
1	29.94339	52	171.1401	105	210.4751	158	190.4266	211	172.2878
2	29.88689	53	170.8172	106	210.0779	159	190.0673	212	171.9628
3	29.8305	54	170.4949	107	209.6815	160	189.7087	213	171.6383
4	29.77421	55	170.1732	108	209.2859	161	189.3507	214	171.3144
5	29.71803	56	169.8521	109	208.891	162	188.9934	215	170.9912
6	29.66196	57	169.5316	110	208.4968	163	188.6368	216	170.6685
7	29.60599	58	169.2117	111	208.1034	164	188.2809	217	170.3465
8	29.55012	59	168.8924	112	207.7107	165	187.9256	218	170.0251
9	29.49437	60	198.5737	113	207.3188	166	187.571	219	169.7043
10	59.43872	61	198.199	114	206.9276	167	187.2171	220	169.384
11	59.32656	62	197.825	115	206.5372	168	186.8638	221	169.0644
12	59.21462	63	197.4518	116	206.1475	169	186.5112	222	168.7454
13	59.10288	64	197.0792	117	205.7585	170	186.1593	223	168.427
14	58.99137	65	196.7073	118	205.3702	171	185.808	224	168.1092
15	58.88005	66	196.3362	119	204.9827	172	185.4574	225	167.792
16	58.76895	67	195.9657	120	204.5959	173	185.1075	226	167.4754
17	58.65806	68	195.5959	121	204.2099	174	184.7582	227	167.1594
18	58.54737	69	195.2268	122	203.8245	175	184.4096	228	166.844
19	58.4369	70	224.8585	123	203.4399	176	184.0616	229	166.5292
20	88.32664	71	224.4342	124	203.0561	177	183.7143	230	166.2149
21	88.15998	72	224.0107	125	202.6729	178	183.3677	231	165.9013
22	87.99362	73	223.588	126	202.2905	179	183.0217	232	165.5882
23	87.82759	74	223.1661	127	201.9088	180	182.6763	233	165.2758
24	87.66186	75	222.745	128	201.5278	181	182.3316	234	164.9639
25	87.49646	76	222.3247	129	201.1476	182	181.9876	235	164.6527
26	87.33136	77	221.9052	130	200.768	183	181.6442	236	164.342
27	87.16658	78	221.4865	131	200.3892	184	181.3014	237	164.0319
28	87.00209	79	221.0686	132	200.0111	185	180.9593	238	163.7224
29	86.83794	80	220.6515	133	199.6337	186	180.6179	239	163.4134
30	116.6741	81	220.2351	134	199.257	187	180.2771	240	163.1051
31	116.4539	82	219.8196	135	198.881	188	179.9369	241	162.7973
32	116.2342	83	219.4048	136	198.5057	189	179.5974	242	162.4901
33	116.0149	84	218.9908	137	198.1312	190	179.2585	243	162.1836
34	115.796	85	218.5776	138	197.7573	191	178.9203	244	161.8775
35	115.5775	86	218.1651	139	197.3842	192	178.5827	245	161.5721
36	115.3594	87	217.7535	140	197.0117	193	178.2457	246	161.2672
37	115.1417	88	217.3426	141	196.64	194	177.9094	247	160.9629
38	114.9244	89	216.9325	142	196.269	195	177.5737	248	160.6592
39	114.7076	90	216.5232	143	195.8986	196	177.2386	249	160.3561
40	144.4912	91	216.1146	144	195.529	197	176.9042	250	160.0535
41	144.2185	92	215.7068	145	195.16	198	176.5704	251	159.7515
42	143.9464	93	215.2998	146	194.7918	199	176.2372	252	159.45
43	143.6748	94	214.8936	147	194.4242	200	175.9047	253	159.1492
44	143.4037	95	214.4881	148	194.0574	201	175.5728	254	158.8489
45	143.1331	96	214.0833	149	193.6912	202	175.2415	255	158.5491
46	142.863	97	213.6794	150	193.3257	203	174.9108	256	158.25
47	142.5935	98	213.2762	151	192.9609	204	174.5808	257	157.9514
48	142.3244	99	212.8738	152	192.5968	205	174.2513	258	157.6533
49	142.0558	100	212.4721	153	192.2334	206	173.9226	259	157.3559
50	171.7878	101	212.0712	154	191.8707	207	173.5944	260	157.0589
		102	211.671	155	191.5087	208	173.2668	261	156.7626
		103	211.2716	156	191.1473	209	172.9399	262	156.4668

263 156.1716  
264 155.8769  
265 155.5827  
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325 138.9142  
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332 137.0898  
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334 136.5729  
335 136.3152  
336 136.058  
337 135.8012  
338 135.545  
339 135.2893  
340 135.034  
341 134.7792  
342 134.5249  
343 134.271  
344 134.0177  
345 133.7648  
346 133.5124  
347 133.2605  
348 133.009  
349 132.758  
350 132.5075  
351 132.2575  
352 132.008  
353 131.7589  
354 131.5102  
355 131.2621  
356 131.0144  
357 130.7672  
358 130.5205  
359 130.2742  
360 130.0284  
361 129.783  
362 129.5381  
363 129.2937  
364 129.0497  
365 128.8063

Maximum residue  
----- 224.8585  
Average residue  
-----  
161.3608

**DAILY ACCUMULATED PESTICIDE RESIDUES—MULTP. APPL.**

Chemical name ----- fenbuconazole-pods (nuts)  
 Initial concentration (ppm) ---- 1.5  
 Half-life ----- 367  
 A number of application ----- 8  
 Application interval ----- 10  
 Length of simulation (day) ---- 365

**DAY RESIDUE (PPM)**

0	1.5	51	8.573182	104	10.54365	157	9.539331	210	8.630678
1	1.49717	52	8.557005	105	10.52375	158	9.521332	211	8.614393
2	1.494345	53	8.540859	106	10.5039	159	9.503364	212	8.598138
3	1.491525	54	8.524743	107	10.48408	160	9.485434	213	8.581914
4	1.488711	55	8.508658	108	10.46429	161	9.467535	214	8.565721
5	1.485902	56	8.492603	109	10.44455	162	9.44967	215	8.549558
6	1.483098	57	8.476578	110	10.42484	163	9.43184	216	8.533426
7	1.480299	58	8.460582	111	10.40517	164	9.414042	217	8.517324
8	1.477506	59	8.444619	112	10.38554	165	9.39628	218	8.501253
9	1.474718	60	9.928685	113	10.36594	166	9.378551	219	8.485212
10	2.971936	61	9.90995	114	10.34638	167	9.360853	220	8.469202
11	2.966328	62	9.891252	115	10.32686	168	9.34319	221	8.453221
12	2.960731	63	9.872588	116	10.30737	169	9.325559	222	8.437271
13	2.955144	64	9.853959	117	10.28792	170	9.307965	223	8.421349
14	2.949568	65	9.835366	118	10.26851	171	9.290401	224	8.405461
15	2.944003	66	9.816808	119	10.24914	172	9.272871	225	8.389599
16	2.938448	67	9.798284	120	10.2298	173	9.255373	226	8.37377
17	2.932903	68	9.779795	121	10.21049	174	9.237909	227	8.357968
18	2.927369	69	9.761341	122	10.19123	175	9.220479	228	8.342198
19	2.921845	70	11.24292	123	10.172	176	9.203081	229	8.326457
20	4.416332	71	11.22171	124	10.1528	177	9.185716	230	8.310745
21	4.407999	72	11.20054	125	10.13365	178	9.168382	231	8.295064
22	4.399681	73	11.1794	126	10.11453	179	9.151083	232	8.279413
23	4.39138	74	11.15831	127	10.09544	180	9.133817	233	8.26379
24	4.383094	75	11.13725	128	10.07639	181	9.116582	234	8.248197
25	4.374823	76	11.11624	129	10.05738	182	9.099379	235	8.232634
26	4.366568	77	11.09526	130	10.0384	183	9.082209	236	8.2171
27	4.358329	78	11.07433	131	10.01946	184	9.065073	237	8.201595
28	4.350105	79	11.05343	132	10.00055	185	9.047967	238	8.18612
29	4.341897	80	11.03257	133	9.981684	186	9.030895	239	8.170673
30	5.833704	81	11.01176	134	9.962849	187	9.013855	240	8.155255
31	5.822696	82	10.99098	135	9.94405	188	8.996847	241	8.139867
32	5.81171	83	10.97024	136	9.925286	189	8.97987	242	8.124508
33	5.800743	84	10.94954	137	9.906559	190	8.962927	243	8.109178
34	5.789798	85	10.92888	138	9.887866	191	8.946014	244	8.093876
35	5.778874	86	10.90826	139	9.869208	192	8.929133	245	8.078605
36	5.767969	87	10.88767	140	9.850587	193	8.912285	246	8.06336
37	5.757086	88	10.86713	141	9.831999	194	8.895469	247	8.048146
38	5.746222	89	10.84662	142	9.813447	195	8.878683	248	8.032959
39	5.73538	90	10.82616	143	9.794929	196	8.861931	249	8.017803
40	7.224558	91	10.80573	144	9.776448	197	8.845209	250	8.002675
41	7.210926	92	10.78534	145	9.758001	198	8.828519	251	7.987573
42	7.197319	93	10.76499	146	9.739588	199	8.81186	252	7.972502
43	7.183739	94	10.74468	147	9.721211	200	8.795234	253	7.957459
44	7.170183	95	10.7244	148	9.702869	201	8.778637	254	7.942443
45	7.156655	96	10.70417	149	9.684559	202	8.762074	255	7.927457
46	7.143152	97	10.68397	150	9.666286	203	8.745541	256	7.912499
47	7.129673	98	10.66381	151	9.648046	204	8.729038	257	7.897568
48	7.116219	99	10.64369	152	9.629842	205	8.712566	258	7.882666
49	7.102792	100	10.6236	153	9.611671	206	8.696127	259	7.867793
50	8.58939	101	10.60356	154	9.593536	207	8.679718	260	7.852947
		102	10.58355	155	9.575432	208	8.663341	261	7.838129
		103	10.56358	156	9.557366	209	8.646994	262	7.823339

263 7.808577  
264 7.793843  
265 7.779137  
266 7.764459  
267 7.749809  
268 7.735185  
269 7.720589  
270 7.706022  
271 7.691481  
272 7.676967  
273 7.662482  
274 7.648023  
275 7.633593  
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285 7.490772  
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310 7.145299  
311 7.131817  
312 7.118359  
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314 7.091521  
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322 6.985178  
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324 6.958842  
325 6.945711  
326 6.932605  
327 6.919524

328 6.906468  
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331 6.867446  
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333 6.841553  
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342 6.726243  
343 6.713551  
344 6.700884  
345 6.688239  
346 6.675619  
347 6.663023  
348 6.65045  
349 6.637902  
350 6.625377  
351 6.612875  
352 6.600398  
353 6.587943  
354 6.575513  
355 6.563105  
356 6.550721  
357 6.538361  
358 6.526023  
359 6.513709  
360 6.501418  
361 6.489151  
362 6.476906  
363 6.464685  
364 6.452487  
365 6.440312

Maximum residue  
----- 11.24292  
Average residue  
-----  
8.068044

DAILY ACCUMULATED PESTICIDE RESIDUES—MULTP. APPL.

Chemical name ----- RH7592-6pond  
 Initial concentration (ppm) ----- 9.000001E-02  
 Half-life ----- 367  
 A number of application ----- 8  
 Application interval ----- 10  
 Length of simulation (day) ----- 365

*Direct Application*

DAY RESIDUE (PPM)

	51	.5143909	104	.6326189	157	.5723599	210	.5178407	
	52	.5134204	105	.6314252	158	.5712798	211	.5168636	
0	9.000001E-02	53	.5124516	106	.6302338	159	.570202	212	.5158884
1	8.983018E-02	54	.5114847	107	.6290446	160	.569126	213	.5149149
2	8.966068E-02	55	.5105195	108	.6278576	161	.5680521	214	.5139433
3	.0894915	56	.5095562	109	.626673	162	.5669803	215	.5129736
4	8.932264E-02	57	.5085947	110	.6254905	163	.5659104	216	.5120056
5	.0891541	58	.5076351	111	.6243102	164	.5648426	217	.5110395
6	8.898587E-02	59	.5066772	112	.6231323	165	.5637768	218	.5100752
7	8.881796E-02	60	.5957211	113	.6219565	166	.562713	219	.5091127
8	8.865037E-02	61	.5945971	114	.6207829	167	.5616513	220	.5081522
9	8.848309E-02	62	.5934752	115	.6196115	168	.5605914	221	.5071933
10	.1783162	63	.5923553	116	.6184425	169	.5595337	222	.5062363
11	.1779797	64	.5912376	117	.6172755	170	.5584779	223	.5052811
12	.1776438	65	.590122	118	.6161107	171	.5574241	224	.5043276
13	.1773087	66	.5890085	119	.6149481	172	.5563724	225	.503376
14	.1769741	67	.5878971	120	.6137878	173	.5553225	226	.5024262
15	.1766402	68	.5867878	121	.6126296	174	.5542746	227	.5014782
16	.1763069	69	.5856805	122	.6114737	175	.5532288	228	.5005319
17	.1759742	70	.6745755	123	.61032	176	.5521849	229	.4995875
18	.1756421	71	.6733026	124	.6091683	177	.551143	230	.4986448
19	.1753107	72	.6720321	125	.6080188	178	.550103	231	.4977039
20	.2649799	73	.670764	126	.6068716	179	.549065	232	.4967648
21	.2644799	74	.6694984	127	.6057265	180	.548029	233	.4958275
22	.2639809	75	.6682351	128	.6045835	181	.546995	234	.4948919
23	.2634828	76	.6669742	129	.6034427	182	.5459628	235	.4939581
24	.2629856	77	.6657157	130	.6023041	183	.5449326	236	.493026
25	.2624894	78	.6644595	131	.6011676	184	.5439044	237	.4920957
26	.2619941	79	.6632058	132	.6000332	185	.5428781	238	.4911672
27	.2614997	80	.6619543	133	.5989011	186	.5418538	239	.4902404
28	.2610063	81	.6607054	134	.5977771	187	.5408313	240	.4893154
29	.2605138	82	.6594586	135	.596643	188	.5398108	241	.4883921
30	.3500223	83	.6582143	136	.5955172	189	.5387922	242	.4874705
31	.3493618	84	.6569724	137	.5943936	190	.5377756	243	.4865507
32	.3487026	85	.6557328	138	.593272	191	.5367609	244	.4856327
33	.3480446	86	.6544954	139	.5921525	192	.535748	245	.4847163
34	.3473879	87	.6532605	140	.5910352	193	.5347371	246	.4838017
35	.3467324	88	.6520278	141	.58992	194	.5337282	247	.4828888
36	.3460782	89	.6507975	142	.5888069	195	.532721	248	.4819776
37	.3454251	90	.6495695	143	.5876958	196	.5317159	249	.4810682
38	.3447734	91	.6483438	144	.586587	197	.5307126	250	.4801604
39	.3441228	92	.6471205	145	.5854801	198	.5297111	251	.4792544
40	.4334735	93	.6458994	146	.5843753	199	.5287117	252	.4783501
41	.4326556	94	.6446806	147	.5832727	200	.527714	253	.4774475
42	.4318392	95	.6434641	148	.5821721	201	.5267183	254	.4765467
43	.4310244	96	.64225	149	.5810736	202	.5257245	255	.4756474
44	.430211	97	.6410382	150	.5799771	203	.5247324	256	.4747499
45	.4293993	98	.6398286	151	.5788828	204	.5237423	257	.4738541
46	.4285891	99	.6386213	152	.5777905	205	.5227541	258	.47296
47	.4277804	100	.6374163	153	.5767003	206	.5217677	259	.4720676
48	.4269732	101	.6362136	154	.5756121	207	.5207832	260	.4711768
49	.4261675	102	.6350131	155	.574526	208	.5198005	261	.4702878
50	.5153634	103	.6338149	156	.5734419	209	.5188197	262	.4694004

263 .4685147  
264 .4676306  
265 .4667483  
266 .4658675  
267 .4649885  
268 .4641111  
269 .4632354  
270 .4623613  
271 .4614889  
272 .4606181  
273 .4597489  
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275 .4580156  
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299 .4377179  
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303 .4344236  
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305 .4327857  
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310 .428718  
311 .427909  
312 .4271016  
313 .4262957  
314 .4254913  
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324 .4175305  
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326 .4159563  
327 .4151715

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334 .4097187  
335 .4089456  
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342 .4035746  
343 .4028131  
344 .402053  
345 .4012944  
346 .4005372  
347 .3997814  
348 .3990271  
349 .3982741  
350 .3975226  
351 .3967725  
352 .3960239  
353 .3952766  
354 .3945308  
355 .3937863  
356 .3930433  
357 .3923016  
358 .3915614  
359 .3908226  
360 .3900851  
361 .3893491  
362 .3886144  
363 .3878811  
364 .3871493  
365 .3864187

Maximum residue

----- .6745755

Average residue

-----  
.4840826

DAILY ACCUMULATED PESTICIDE RESIDUES—MULTP. APPL.

*Direct Application*

Chemical name ----- RH7592-6 foot pond  
 Initial concentration (ppm) ---- 8.000001E-03  
 Half-life ----- 367  
 A number of application ----- 8  
 Application interval ----- 10  
 Length of simulation (day) ---- 365

DAY RESIDUE (PPM)

0	8.000001E-03	51	4.572364E-02	104	.0562328	157	5.087643E-02	210	4.603029E-02
1	7.984905E-03	52	4.563736E-02	105	5.612669E-02	158	5.078044E-02	211	4.594343E-02
2	7.969839E-03	53	4.555125E-02	106	5.602078E-02	159	5.068462E-02	212	4.585674E-02
3	.0079548	54	.0454653	107	5.591508E-02	160	5.058898E-02	213	4.577022E-02
4	7.939791E-03	55	4.537951E-02	108	5.580957E-02	161	5.049352E-02	214	4.568385E-02
5	7.92481E-03	56	4.529388E-02	109	5.570427E-02	162	5.039825E-02	215	4.559765E-02
6	7.909855E-03	57	4.520842E-02	110	5.559916E-02	163	5.030315E-02	216	4.551161E-02
7	7.894931E-03	58	4.512311E-02	111	5.549425E-02	164	5.020824E-02	217	4.542574E-02
8	7.880033E-03	59	4.503798E-02	112	5.538953E-02	165	.0501135	218	4.534002E-02
9	7.865165E-03	60	5.295299E-02	113	5.528502E-02	166	5.001894E-02	219	4.525447E-02
10	1.585032E-02	61	5.285307E-02	114	.0551807	167	4.992455E-02	220	4.516908E-02
11	1.582041E-02	62	5.275334E-02	115	5.507658E-02	168	4.983035E-02	221	4.508384E-02
12	1.579056E-02	63	.0526538	116	5.497265E-02	169	4.973633E-02	222	4.499878E-02
13	1.576077E-02	64	5.255445E-02	117	5.486893E-02	170	4.964248E-02	223	4.491387E-02
14	1.573103E-02	65	5.245529E-02	118	5.476539E-02	171	4.954881E-02	224	4.482912E-02
15	1.570135E-02	66	5.235631E-02	119	5.466206E-02	172	4.945532E-02	225	4.474454E-02
16	1.567172E-02	67	5.225751E-02	120	5.455892E-02	173	.049362	226	.0446601
17	1.564215E-02	68	5.215891E-02	121	5.445597E-02	174	4.926886E-02	227	4.457584E-02
18	1.561263E-02	69	5.206049E-02	122	5.435322E-02	175	4.917589E-02	228	4.449173E-02
19	1.558317E-02	70	5.996226E-02	123	5.425066E-02	176	.0490831	229	4.440778E-02
20	2.355377E-02	71	5.984912E-02	124	5.414829E-02	177	4.899049E-02	230	4.432398E-02
21	2.350933E-02	72	5.973619E-02	125	5.404612E-02	178	4.889805E-02	231	4.424034E-02
22	2.346497E-02	73	5.962347E-02	126	5.394414E-02	179	4.880578E-02	232	4.415687E-02
23	2.342069E-02	74	5.951097E-02	127	5.384235E-02	180	4.871369E-02	233	4.407355E-02
24	.0233765	75	5.939868E-02	128	5.374076E-02	181	4.862177E-02	234	4.399039E-02
25	2.333239E-02	76	.0592866	129	5.363935E-02	182	4.853003E-02	235	4.390738E-02
26	2.328836E-02	77	5.917473E-02	130	5.353814E-02	183	4.843846E-02	236	4.382453E-02
27	2.324442E-02	78	5.906307E-02	131	5.343712E-02	184	4.834706E-02	237	4.374184E-02
28	2.320056E-02	79	5.895163E-02	132	5.333629E-02	185	4.825583E-02	238	.0436593
29	2.315679E-02	80	5.884039E-02	133	5.323565E-02	186	4.816478E-02	239	4.357692E-02
30	3.111309E-02	81	5.872936E-02	134	.0531352	187	.0480739	240	.0434947
31	3.105438E-02	82	5.861855E-02	135	5.303493E-02	188	4.798318E-02	241	4.341262E-02
32	3.099579E-02	83	5.850794E-02	136	5.293487E-02	189	4.789264E-02	242	4.333071E-02
33	.0309373	84	5.839755E-02	137	5.283499E-02	190	4.780228E-02	243	4.324895E-02
34	3.087893E-02	85	5.828735E-02	138	5.273529E-02	191	4.771208E-02	244	4.316735E-02
35	3.082066E-02	86	5.817737E-02	139	5.263578E-02	192	4.762205E-02	245	4.308589E-02
36	.0307625	87	5.806759E-02	140	5.253646E-02	193	4.753219E-02	246	4.300459E-02
37	3.070446E-02	88	5.795802E-02	141	5.243733E-02	194	4.744251E-02	247	4.292345E-02
38	3.064652E-02	89	5.784866E-02	142	5.233839E-02	195	4.735298E-02	248	4.284245E-02
39	.0305887	90	5.773951E-02	143	5.223963E-02	196	4.726363E-02	249	4.276162E-02
40	3.853098E-02	91	5.763056E-02	144	5.214106E-02	197	4.717445E-02	250	4.268093E-02
41	3.845827E-02	92	5.752182E-02	145	5.204267E-02	198	4.708544E-02	251	.0426004
42	3.838571E-02	93	5.741328E-02	146	5.194447E-02	199	4.699659E-02	252	4.252001E-02
43	3.831327E-02	94	5.730495E-02	147	5.184646E-02	200	4.690791E-02	253	4.243978E-02
44	3.824098E-02	95	5.719682E-02	148	5.174864E-02	201	4.681941E-02	254	.0423597
45	3.816883E-02	96	.0570889	149	5.165099E-02	202	4.673106E-02	255	4.227977E-02
46	.0380968	97	5.698117E-02	150	5.155353E-02	203	4.664289E-02	256	4.219999E-02
47	3.802492E-02	98	5.687365E-02	151	5.145625E-02	204	4.655487E-02	257	4.212037E-02
48	3.795317E-02	99	5.676634E-02	152	5.135916E-02	205	4.646703E-02	258	4.204089E-02
49	3.788155E-02	100	5.665923E-02	153	5.126225E-02	206	4.637935E-02	259	4.196156E-02
50	4.581008E-02	101	5.655232E-02	154	5.116552E-02	207	4.629184E-02	260	4.188238E-02
		102	5.644561E-02	155	5.106898E-02	208	4.620449E-02	261	4.180336E-02
		103	.0563391	156	5.097261E-02	209	4.611731E-02	262	4.172448E-02

263	4.164574E-02	328	3.683449E-02
264	4.156717E-02	329	.036765
265	4.148873E-02	330	3.669562E-02
266	4.141045E-02	331	3.662638E-02
267	4.133231E-02	332	3.655727E-02
268	4.125432E-02	333	3.648829E-02
269	4.117648E-02	334	3.641944E-02
270	4.109878E-02	335	3.635072E-02
271	4.102123E-02	336	3.628213E-02
272	4.094383E-02	337	3.621367E-02
273	4.086657E-02	338	3.614533E-02
274	4.078946E-02	339	3.607714E-02
275	.0407125	340	3.600906E-02
276	4.063567E-02	341	3.594111E-02
277	.040559	342	.0358733
278	4.048247E-02	343	3.580561E-02
279	4.040608E-02	344	3.573804E-02
280	4.032984E-02	345	3.567061E-02
281	4.025374E-02	346	.0356033
282	4.017778E-02	347	3.553613E-02
283	4.010198E-02	348	3.546907E-02
284	.0400263	349	3.540214E-02
285	3.995078E-02	350	3.533534E-02
286	.0398754	351	3.526867E-02
287	3.980016E-02	352	3.520212E-02
288	3.972506E-02	353	.0351357
289	.0396501	354	.0350694
290	3.957528E-02	355	3.500323E-02
291	3.950061E-02	356	3.493718E-02
292	3.942607E-02	357	3.487126E-02
293	3.935168E-02	358	3.480546E-02
294	3.927743E-02	359	3.473979E-02
295	3.920332E-02	360	3.467423E-02
296	3.912934E-02	361	.0346088
297	3.905551E-02	362	.0345435
298	3.898182E-02	363	3.447833E-02
299	3.890826E-02	364	3.441326E-02
300	3.883485E-02	365	3.434833E-02
301	3.876157E-02		Maximum residue
302	3.868843E-02		-----
303	3.861543E-02		5.996226E-02
304	3.854256E-02		Average residue
305	3.846984E-02		-----
306	3.839725E-02		4.302956E-02
307	.0383248		
308	3.825248E-02		
309	.0381803		
310	3.810826E-02		
311	3.803635E-02		
312	3.796459E-02		
313	3.789295E-02		
314	3.782145E-02		
315	3.775008E-02		
316	3.767885E-02		
317	3.760776E-02		
318	.0375368		
319	3.746596E-02		
320	3.739527E-02		
321	3.732471E-02		
322	3.725428E-02		
323	3.718399E-02		
324	3.711382E-02		
325	.0370438		
326	3.697389E-02		
327	3.690413E-02		



DAILY ACCUMULATED PESTICIDE RESIDUES—MULTP. APPL.

Chemical name ----- RH7592 *Spray Drift*  
 Initial concentration (ppm) ---- .005  
 Half-life ----- 367  
 A number of application ----- 8  
 Application interval ----- 10  
 Length of simulation (day) ---- 365

DAY RESIDUE (PPM)

0	.005	51	2.857727E-02	104	.0351455	157	3.179777E-02	210	2.876892E-02
1	4.990566E-03	52	2.852335E-02	105	3.507917E-02	158	3.173777E-02	211	2.871464E-02
2	4.981149E-03	53	2.846953E-02	106	3.501299E-02	159	3.167788E-02	212	2.866046E-02
3	4.97175E-03	54	2.841581E-02	107	3.494692E-02	160	3.161811E-02	213	2.860638E-02
4	4.962369E-03	55	2.836219E-02	108	3.488098E-02	161	3.155845E-02	214	.0285524
5	4.953006E-03	56	2.830868E-02	109	3.481516E-02	162	.0314989	215	2.849853E-02
6	4.943659E-03	57	2.825526E-02	110	3.474947E-02	163	3.143947E-02	216	2.844475E-02
7	4.934331E-03	58	2.820194E-02	111	.0346839	164	3.138015E-02	217	2.839108E-02
8	4.92502E-03	59	2.814873E-02	112	3.461845E-02	165	3.132093E-02	218	2.833751E-02
9	4.915728E-03	60	3.309562E-02	113	3.455313E-02	166	3.126183E-02	219	2.828404E-02
10	9.906452E-03	61	3.303317E-02	114	3.448794E-02	167	3.120285E-02	220	2.823067E-02
11	9.887759E-03	62	3.297084E-02	115	3.442286E-02	168	3.114397E-02	221	.0281774
12	9.869102E-03	63	3.290863E-02	116	3.435791E-02	169	.0310852	222	2.812423E-02
13	9.850479E-03	64	3.284653E-02	117	3.429308E-02	170	3.102655E-02	223	2.807117E-02
14	9.831893E-03	65	3.278455E-02	118	3.422837E-02	171	.030968	224	.0280182
15	9.813341E-03	66	3.272269E-02	119	3.416379E-02	172	3.090957E-02	225	2.796533E-02
16	9.794824E-03	67	3.266094E-02	120	3.409932E-02	173	3.085125E-02	226	2.791256E-02
17	9.776342E-03	68	3.259932E-02	121	3.403498E-02	174	3.079303E-02	227	2.785989E-02
18	9.757895E-03	69	.0325378	122	3.397076E-02	175	3.073493E-02	228	2.780733E-02
19	9.739482E-03	70	3.747641E-02	123	3.390665E-02	176	3.067694E-02	229	2.775486E-02
20	1.472111E-02	71	.0374057	124	3.384268E-02	177	3.061905E-02	230	2.770248E-02
21	1.469333E-02	72	3.733512E-02	125	3.377882E-02	178	3.056128E-02	231	2.765021E-02
22	.0146656	73	3.726467E-02	126	3.371508E-02	179	3.050361E-02	232	2.759804E-02
23	1.463793E-02	74	3.719435E-02	127	3.365147E-02	180	3.044605E-02	233	2.754597E-02
24	1.461031E-02	75	3.712417E-02	128	3.358797E-02	181	3.038861E-02	234	2.749399E-02
25	1.458274E-02	76	3.705412E-02	129	3.352459E-02	182	3.033126E-02	235	2.744211E-02
26	1.455523E-02	77	.0369842	130	3.346134E-02	183	3.027403E-02	236	2.739033E-02
27	1.452776E-02	78	3.691442E-02	131	.0333982	184	3.021691E-02	237	2.733865E-02
28	1.450035E-02	79	3.684476E-02	132	3.333518E-02	185	3.015989E-02	238	2.728706E-02
29	1.447299E-02	80	3.677524E-02	133	3.327228E-02	186	3.010298E-02	239	2.723557E-02
30	1.944568E-02	81	3.670585E-02	134	.0332095	187	3.004618E-02	240	2.718418E-02
31	1.940899E-02	82	3.663659E-02	135	3.314683E-02	188	2.998949E-02	241	2.713289E-02
32	1.937237E-02	83	3.656746E-02	136	3.308429E-02	189	.0299329	242	2.708169E-02
33	1.933581E-02	84	3.649846E-02	137	3.302186E-02	190	2.987642E-02	243	2.703059E-02
34	1.929933E-02	85	3.642959E-02	138	3.295955E-02	191	2.982004E-02	244	2.697959E-02
35	1.926291E-02	86	3.636085E-02	139	3.289736E-02	192	2.976378E-02	245	2.692868E-02
36	1.922656E-02	87	3.629225E-02	140	3.283529E-02	193	2.970762E-02	246	2.687787E-02
37	1.919029E-02	88	3.622377E-02	141	3.277333E-02	194	2.965156E-02	247	2.682715E-02
38	1.915407E-02	89	3.615541E-02	142	3.271149E-02	195	2.959561E-02	248	2.677653E-02
39	1.911793E-02	90	3.608719E-02	143	3.264976E-02	196	2.953977E-02	249	2.672601E-02
40	2.408186E-02	91	.0360191	144	3.258816E-02	197	2.948403E-02	250	2.667558E-02
41	2.403642E-02	92	3.595114E-02	145	3.252667E-02	198	.0294284	251	2.662525E-02
42	2.399107E-02	93	.0358833	146	.0324653	199	2.937287E-02	252	.026575
43	.0239458	94	3.581559E-02	147	3.240404E-02	200	2.931744E-02	253	2.652486E-02
44	2.390061E-02	95	3.574801E-02	148	3.234289E-02	201	2.926212E-02	254	2.647481E-02
45	2.38552E-02	96	3.568056E-02	149	3.228186E-02	202	2.920691E-02	255	2.642486E-02
46	.0238105	97	3.561323E-02	150	3.222095E-02	203	.0291518	256	2.637499E-02
47	2.376557E-02	98	3.554603E-02	151	3.216015E-02	204	2.909679E-02	257	2.632523E-02
48	2.372073E-02	99	3.547896E-02	152	3.209947E-02	205	2.904189E-02	258	2.627556E-02
49	2.367597E-02	100	3.541201E-02	153	.0320389	206	2.898709E-02	259	2.622598E-02
50	.0286313	101	3.534519E-02	154	3.197845E-02	207	2.893239E-02	260	2.617649E-02
		102	.0352785	155	3.191811E-02	208	.0288778	261	.0261271
		103	3.521194E-02	156	3.185788E-02	209	2.882332E-02	262	.0260778

263	2.602859E-02	328	2.302156E-02
264	2.597948E-02	329	2.297812E-02
265	2.593046E-02	330	2.293476E-02
266	2.588153E-02	331	2.289149E-02
267	2.583269E-02	332	2.284829E-02
268	2.578395E-02	333	2.280518E-02
269	.0257353	334	2.276215E-02
270	2.568674E-02	335	.0227192
271	2.563827E-02	336	2.267633E-02
272	2.558989E-02	337	2.263354E-02
273	2.554161E-02	338	2.259083E-02
274	2.549341E-02	339	2.254821E-02
275	2.544531E-02	340	2.250566E-02
276	2.539729E-02	341	.0224632
277	2.534937E-02	342	2.242081E-02
278	2.530154E-02	343	.0223785
279	.0252538	344	2.233628E-02
280	2.520615E-02	345	2.229413E-02
281	2.515859E-02	346	2.225206E-02
282	2.511112E-02	347	2.221008E-02
283	2.506373E-02	348	2.216817E-02
284	2.501644E-02	349	2.212634E-02
285	2.496924E-02	350	2.208459E-02
286	2.492212E-02	351	2.204292E-02
287	.0248751	352	2.200133E-02
288	2.482816E-02	353	2.195981E-02
289	2.478131E-02	354	2.191838E-02
290	2.473455E-02	355	2.187702E-02
291	2.468788E-02	356	2.183574E-02
292	.0246413	357	2.179454E-02
293	.0245948	358	2.175341E-02
294	2.454839E-02	359	2.171236E-02
295	2.450207E-02	360	.0216714
296	2.445584E-02	361	.0216305
297	2.440969E-02	362	2.158969E-02
298	2.436363E-02	363	2.154895E-02
299	2.431766E-02	364	2.150829E-02
300	2.427178E-02	365	2.146771E-02
301	2.422598E-02		Maximum residue
302	2.418027E-02		-----
303	2.413464E-02		3.747641E-02
304	.0240891		Average residue
305	2.404365E-02		-----
306	2.399828E-02		2.689347E-02
307	.023953		
308	.0239078		
309	2.386269E-02		
310	2.381766E-02		
311	2.377272E-02		
312	2.372787E-02		
313	2.368309E-02		
314	.0236384		
315	.0235938		
316	2.354928E-02		
317	2.350485E-02		
318	.0234605		
319	2.341623E-02		
320	2.337204E-02		
321	2.332794E-02		
322	2.328393E-02		
323	2.323999E-02		
324	2.319614E-02		
325	2.315237E-02		
326	2.310868E-02		
327	2.306508E-02		