

RD
2-4-94

DP Barcode :D180920; D181392; D179011; ~~D181392;~~
and D172932 ~~D172932~~
PC Code No :084301- 001471
EEB Out : FEB 4 1994

To: Linda Deluise
Product Manager 52 (Tom Myers)
Special Review and Reregistration Division (7508W)

From: Anthony F. Maciorowski, Chief
Ecological Effects Branch/EFED (7507C)

Attached, please find the EEB reviews of four studies for the herbicide Propanil:

Reg./File # : _____
Chemical Name : N-BUTYI-N-ETHYL- α,α,α -TRIFLUORO-2,6-DINITRO-P-TOLUIDINE
Type Product : Herbicide
Product Name : Benfluralin (Benefin)
Company Name : Elanco
Purpose : Evaluation DERS (Data table attached).
Action Code : 627 Date Due : _____
Reviewer : Alvaro A. Yamhure Date in EEB: _____

GUID. LINE	STUDY TYPE	PREVIOUS MRID NO.
71-4	Acute avian dietary (duck)	421455-01
72-1(b)	Fresh water fish (Bluegill)	423908-01
72-1(d)	Fresh water fish (R. trout)	424192-01
141-1	Acute honey bee	416138-12
72-2(b)	Acute aquatic invert. (Daph)	423908-02
122-2	Growth and repr. aquat. plants	416138-09
72-3(c)	Acute marine invert. shrimp	416138-04
72-4(a)	Early life-stage fish (trout)	416138-05
72-1(a)	Acute bluegill	416138-01
72-3(a)	Acute sheepshead minnow	416138-02
72-3(b)	Shell growth oyster	416138-03
72-4(b)	Fresh water invert. life-cycle	416138-06
71-4(a)	Avian reprod. quail	421455-02
122-1(a)	Tier I seed emergence	416138-08
123-1(A)	Tier II seed emergence	416138-10
123-1(b)	Tier II vegetative vigor	416138-11

Handwritten notes or initials at the bottom right of the page.

Acute Tox- Trout

MRID 424192-01

DP BARCODE: D181392

REREG CASE # 2030

CASE: 814851
SUBMISSION: S423141

DATA PACKAGE RECORD
BEAN SHEET

DATE: 08/07/92
Page 1 of 1

*** CASE/SUBMISSION INFORMATION ***

CASE TYPE: REREGISTRATION ACTION: 627 GENERIC DATA SUBMISSION
CHEMICALS: 084301 Benfluralin 100.00 %

ID#: 084301-001471
COMPANY: 001471 DOW ELANCO
PRODUCT MANAGER: 52 LINDA DELUISE 703-308-8065 ROOM: CS1 3F3
PM TEAM REVIEWER: TOM MYERS 703-308-8074 ROOM: CS1 4N1
RECEIVED DATE: 08/07/92 DUE OUT DATE: 11/05/92

*** DATA PACKAGE INFORMATION ***

DP BARCODE: 181392 EXPEDITE: N DATE SENT: 08/07/92 DATE RET.: / /
CHEMICAL: 084301 Benfluralin
DP TYPE: 999 Miscellaneous Data Package
ADMIN DUE DATE: 11/05/92 CSF: N LABEL: N

ASSIGNED TO	DATE IN	DATE OUT
DIV : EFED	08/10/92	/ /
BRAN: EEB	08/11/92	/ /
SECT:	/ /	/ /
REVR :	/ /	/ /
CONTR:	/ /	/ /

*** DATA REVIEW INSTRUCTIONS ***

Please review the following ecological effects study for the chemical Benfluralin (Benefin):

Guideline 72-1(d) Acute Tox Trout - TEP MRID 42419201

*** ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION ***

DP BC	BRANCH/SECTION	DATE OUT	DUE BACK	INS	CSF	LABEL
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DP BARCODE: D172932

REREG CASE # 2030

CASE: 814851
SUBMISSION: S409405

DATA PACKAGE RECORD
BEAN SHEET

DATE: 01/08/92
Page 1 of 1

* * * CASE/SUBMISSION INFORMATION * * *

CASE TYPE: REREGISTRATION ACTION: 627 GENERIC DATA SUBMISSION
CHEMICALS: 084301 N-Butyl-N-ethyl-a,a,a-trifluoro-2,6-dinitro-p-tolu 100.00 %
ID#: 084301-001471 **BENEFIN**
COMPANY: 001471 ELANCO PRODUCTS CO.
PRODUCT MANAGER: 52 CHRISTINE RICE 703-308-8177 ROOM: CS1 3F3
PM TEAM REVIEWER: TOM MYERS 703-308-8074 ROOM: CS1 4N1
RECEIVED DATE: 01/08/92 DUE OUT DATE: 04/07/92

* * * DATA PACKAGE INFORMATION * * *

DP BARCODE: 172932 EXPEDITE: N DATE SENT: 01/08/92 DATE RET.: / /
CHEMICAL: 084301 N-Butyl-N-ethyl-a,a,a-trifluoro-2,6-dinitro-p-toluidine (No)
DP TYPE: 999 Miscellaneous Data Package
ADMIN DUE DATE: 04/07/92 CSF: N LABEL: N

ASSIGNED TO	DATE IN	DATE OUT
DIV : EFED	01/14/92	/ /
BRAN: EEB	01/17/92	/ /
SECT:	/ /	/ /
REVR :	/ /	/ /
CONTR:	/ /	/ /

* * * DATA REVIEW INSTRUCTIONS * * *

Please review the following two ecotox studies for the chemical Benefin (Benfluralin).

Guideline 71-4(a) MRID 42145502 Avian Repro. - Quail
Guideline 71-4(b) MRID 42145501 Avian Repro. - Mallard

* * * ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION * * *

DP BC	BRANCH/SECTION	DATE OUT	DUE BACK	INS	CSF	LABEL
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DP BARCODE: D179011

REREG CASE # 2030

CASE: 814851
SUBMISSION: S418979

DATA PACKAGE RECORD
BEAN SHEET

DATE: 06/05/92
Page 1 of 1

* * * CASE/SUBMISSION INFORMATION * * *

CASE TYPE: REREGISTRATION ACTION: 627 GENERIC DATA SUBMISSION
CHEMICALS: 084301 Butyl-N-ethyl-a,a,a-trifluoro-2,6-dinitro-p-toluid 100.00 %

ID#: 084301-001471
COMPANY: 001471 ELANCO PRODUCTS CO.
PRODUCT MANAGER: 52 LINDA DELUISE 703-308-8065 ROOM: CS1 3F3
PM TEAM REVIEWER: TOM MYERS 703-308-8074 ROOM: CS1 4N1
RECEIVED DATE: 06/05/92 DUE OUT DATE: 09/03/92

* * * DATA PACKAGE INFORMATION * * *

DP BARCODE: 179011 EXPEDITE: N DATE SENT: 06/05/92 DATE RET.: / /
CHEMICAL: 084301 Butyl-N-ethyl-a,a,a-trifluoro-2,6-dinitro-p-toluidine (Note
DP TYPE: 999 Miscellaneous Data Package
ADMIN DUE DATE: 09/03/92 CSF: N LABEL: N

ASSIGNED TO	DATE IN	DATE OUT
DIV : EFED	06/10/92	/ /
BRAN: EEB	06/10/92	/ /
SECT:	/ /	/ /
REVR :	/ /	/ /
CONTR:	/ /	/ /

* * * DATA REVIEW INSTRUCTIONS * * *

Attached are two addendums for the avian (quail and mallard) reproduction studies conducted with Benefin (Benfluralin).

Addendum MRID 42300502 goes with original MRID 42145502 for guideline 71-4(a) Avian Repro. - quail.

Addendum MRID 42300501 goes with original MRID 42145501 for guideline 71-4(b) Avian Repro. - mallard.

* * * ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION * * *

DP BC	BRANCH/SECTION	DATE OUT	DUE BACK	INS	CSF	LABEL
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DP BARCODE: D180920

REREG CASE # 2030

CASE: 814851
SUBMISSION: S422390

DATA PACKAGE RECORD
BEAN SHEET

DATE: 07/24/92
Page 1 of 1

*** CASE/SUBMISSION INFORMATION ***

CASE TYPE: REREGISTRATION ACTION: 627 GENERIC DATA SUBMISSION
CHEMICALS: 084301 Benfluralin 100.00 %

ID#: 084301-001471
COMPANY: 001471 ELANCO PRODUCTS CO.
PRODUCT MANAGER: 52 LINDA DELUISE 703-308-8065 ROOM: CS1 3F3
PM TEAM REVIEWER: TOM MYERS 703-308-8074 ROOM: CS1 4N1
RECEIVED DATE: 07/24/92 DUE OUT DATE: 10/22/92

*** DATA PACKAGE INFORMATION ***

DP BARCODE: 180920 EXPEDITE: N DATE SENT: 07/24/92 DATE RET.: / /
CHEMICAL: 084301 Benfluralin
DP TYPE: 999 Miscellaneous Data Package
ADMIN DUE DATE: 10/22/92 CSF: N LABEL: N

ASSIGNED TO	DATE IN	DATE OUT
DIV : EFED	07/28/92	/ /
BRAN: EEB	07/28/92	/ /
SECT:	/ /	/ /
REVR :	/ /	/ /
CONTR:	/ /	/ /

*** DATA REVIEW INSTRUCTIONS ***

Please review the following two ecological effects studies for the chemical benfluralin (benefin):

Gdln 72-1(b) MRID 42390701 Fish Tox - Bluegill TEP
Gdln 72-2(b) MRID 42390702 Invertebrate Tox - Daphnia TEP

*** ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION ***

DP BC	BRANCH/SECTION	DATE OUT	DUE BACK	INS	CSF	LABEL
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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

FEB 4 1994

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

Subject: The Ecological Effects Branch (EEB) has evaluated sixteen studies for the chemical Benefin (chemical code 084301). DP Barcodes D180920; D181392; D179011; D181392 and D172932.

From: Anthony F. Maciorowski, Chief
Ecological Effects Branch
Environmental Fate and Effects Division
7507C

To: Linda Deluise, PM 52
(Tom Myers)
Special Review and Reregistration Division
7508W

Please find herein attached the Ecological Effects Branch (EEB) reviews of the Benefin studies managed under the above mentioned DP Barcode. Further, find herein attached a data table of the EEB's status for the data requirements for Benefin. The following chart lists the corresponding MRID numbers for studies submitted that were categorized as CORE:

GUID. NO.	STUDY TYPE	MRID NO.	GRADE
71-4	Avian reproduction (Duck)	421455-01	CORE
72-1(b)	Fresh water fish (Bluegill)	423908-01	CORE
72-1(d)	Fresh water fish (Rainbow trout)	424192-01	CORE
141-1	Honey bee acute	416138-12	CORE
72-2(b)	Aquatic invertebrate acute (Daphnia)	423908-02	CORE



122-2	Growth and reproduction of aquatic plants	416138-09 CORE
72-3(c)	Acute toxicity marine invertebrate - shrimp	416138-04 CORE
72-4(a)	Early life-stage fresh water fish - trout	416138-05 CORE

The following chart lists the corresponding MRID numbers for studies submitted that were categorized as SUPPLEMENTAL or INVALID and the reasons for the categorization:

GUID. NO.	STUDY TYPE	MRID NO.	GRADE
72-1(a)	Fresh water fish acute (Bluegill)	416138-01	SUPPLEMENTAL
72-3(a)	Estuarine fish acute toxicity - sheepshead minnow	416138-02	SUPPLEMENTAL
72-3(b)	Estur./Marine mollusk (C. virginica)	416138-03	SUPPLEMENTAL
72-4(b)	Fresh water invertebrate Flow-thru life-cycle	416138-06	SUPPLEMENTAL
71-4(a)	Avian reproduction (Quail)	421455-02	SUPPLEMENTAL
122-1(a)	Seedling emergence Tier I	416138-08	SUPPLEMENTAL
123-1(a)	Seedling emergence Tier II	416138-10	INVALID
123-1(b)	Vegetative vigor Tier II	416138-11	INVALID

The supplemental or invalid categorizing of the above listed studies was based on the following conclusions:

1. MRID No. 416138-01

CITATION: Cocke, P.J., and G.R. Koenig. 1990. The Acute Toxicity of Benfenin to Bluegill (*Lepomis macrochirus*) in a Static-Renewal Test System. Study No. F00990. Performed by Lilly Research Laboratories, Greenfield, IN. Submitted by DowElanco. EPA MRID No. 416138-01.

CONCLUSIONS: This study is scientifically but does not meet the requirements for a static-renewal acute toxicity study

using freshwater fish. The measured concentrations substantially decreased during each 24-hour renewal period. Given the low solubility and vapor pressure of Benefin, initial ("New") concentrations probably decreased very rapidly under test conditions so that the mean measured concentrations used in calculating the LC₅₀ (0.013; 5.3; 6.8; 11.7; and 21.4 mg/l) were too high an estimate of the actual exposures to which the test organisms were subjected for the longest periods of time. The actual concentrations and length of time periods during which the test organisms were exposed are not well established.

The NOEC was calculated to be 0.013 mg/l mean measured concentration but again, in reality, it was probably considerably lower than this value. However, given the reasonable efforts made by the laboratory in dealing with the technical grade of a difficult-to-test compound when in an aqueous solution, the test is accepted as supplemental and the NOEC value obtained (0.013 mg/l) can be used in risk assessment. The LC50 value is too uncertain to be of use. **The added value of repeating MRID No. 416138-01 (Static renewal bluegill sunfish toxicity test) is low because of the difficulties encountered in dealing with aqueous solutions of Benefin (95.9 % a.i.) given its affinity for glass, its low water solubility and vapor pressure characteristics. Further, MRID No. 423908-01 which is another acute bluegill sunfish toxicity test but with Benefin's typical end use product (Balan 20.1% a.i.), proved satisfactory and rendered toxicity values lower than those obtained using a much higher a.i. concentration (or LC50 0.42 ppm of a.i.), its values appear to be more reliable and useful for risk assessment. Therefore this test (MRID No. 416138-01) is rated as supplemental and its results partially useful for risk assessment purposes.**

2. MRID No. 416138-02

CITATION: Sousa, J.V. 1990. (Benefin) - Acute Toxicity to Sheepshead Minnow (*Cyprinodon variegatus*) Under Flow-Through Conditions. Prepared by Springborn Laboratories, Inc., Wareham, MA. SLI Report No. 90-08-3416. Study #1982.1289.6104.505. Submitted by DowElanco Products Company. EPA MRID No. 416138-02.

CONCLUSIONS: This study is scientifically sound but does not meet the requirements for a flow-through acute toxicity study using estuarine fish. The initial test concentrations decreased considerably during the 96-hour exposure period. This decrease in solubility was probably enhanced by the sea water. This large decrease in test concentrations made it very difficult to determine the actual concentrations to which

(the reported values were >0.79 mg a.i./l for the 96-hour LC_{50} and 0.16 mg a.i./l for the NOEC) . This study is rated to be **supplemental** and its data can be used to assess risk. A replacement test would have **medium value** and would be useful in decreasing the degree of uncertainty. The NOEC level, in the absence of more reliable data, suggests that Benefin is likely to be very toxic to the test species.

3. MRID No. 416138-03

CITATION: Dionne, E. 1990. (Benefin) - Acute Toxicity to Eastern Oysters (*Crassostrea virginica*) Under Flow-Through Conditions. SLI Report No. 90-07-3355. Performed by Springborn Laboratories, Inc., Wareham, MA. Submitted by DowElanco Products Company. EPA MRID No. 416138-03.

CONCLUSIONS: This study is scientifically sound but does not meet the guideline requirements for a 96-hour flow-through mollusc shell deposition study. Control and solvent control oysters demonstrated lower shell growth - under 2.0 mm - than should be expected (i.e., 1.7 and 1.4 mm, respectively) by test termination. In addition, the measured concentrations increased considerably during the 96-hour exposure. Under these test conditions the actual concentrations to which the test organisms were exposed could not be properly determined. Under the conditions of the test, the reported 96-hour EC_{50} was 103 μ g a.i./l and the NOEC 44 μ g a.i./l (mean measured concentrations). These toxicity levels classify benefin as highly toxic to *Crassostrea virginica*. This test is rated as **supplemental** and the data obtained can be used for risk assessment purposes. A replacement test would be of **low value** because the limited shell growth problems encountered are likely to be repeated with no appreciable gain in the determination of the levels at which Benefin is toxic to this type of bivalve. This is specially true given the apparent high toxicity of Benefin (0.1 ppm a.i.).

4. MRID No. 416138-06.

CITATION: Mohr, R.R., P.J. Cocke, and G.R. Koenig. 1990. The Chronic Toxicity of Benefin to *Daphnia magna* in a Flow-Through Life-Cycle Test. Study No. C01090. Performed by Lilly Research Laboratories, Greenfield, IN. Submitted by DowElanco. EPA MRID No. 416138-06.

CONCLUSIONS: This study is scientifically sound but does not meet the requirements for a chronic, flow-through toxicity test using the freshwater invertebrate, *Daphnia magna*. The design of the test vessels appears to have been unusual and may have allowed neonate daphnids to escape, leading to

inaccurate reproduction data. Under the conditions of the study, the MATC was >15.5 and <30.8 $\mu\text{g/l}$ mean measured concentrations, based on significantly affected reproduction. The geometric mean MATC was 21.8 $\mu\text{g/l}$ mean measured concentration. Because of the apparent deficiencies **this study is classified as supplemental but may be upgraded to CORE** if the registrant provides certified raw data that proves that no neonates escaped from the test vessels during testing.

5. MRID No. 421455-02

CITATION: Murray, A.G., J.L. Seacat, and D.W. Grothe. 1991. The Toxicity of Benefin to Bobwhite in a One-Generation Reproduction Study. Laboratory Project No. A00690. Prepared by Toxicology Research Laboratories, Lilly Research Laboratories, Greenfield, Indiana. Submitted by DowElanco, Indianapolis, Indiana. EPA MRID No. 421455-02.

CONCLUSIONS: This study is scientifically sound but does not fulfill the guideline requirements for an avian reproduction study. The mean measured dietary concentrations of benefin (96 ppm, 295 ppm, and 990 ppm) had no effects upon mortality or behavior in bobwhite quail during the 23-week exposure period. A high percentage of eggs cracked in the control prevents adequate analysis of this parameter. The ratio of two-week survivors/eggs set was significantly affected at all test levels (96, 295, and 990 ppm) and a treatment-related trend was obvious for the ratios of hatchlings/eggs set, two-week survivors/hatchlings, two-week survivors/eggs set, and viable embryos/eggs set. Therefore, an NOEC for bobwhite quail exposed to benefin could not be determined by this study. **A replacement test would be of medium value and useful** in helping lower the degree of uncertainty about the risk posed by Benefin to avian species similar to the bobwhite quail. The information already obtained can be used to assist in the determination of risk. **This study is graded to be supplemental.**

6. MRID No. 416138-08

CITATION: Waldrep, T.W. 1989. Influence of Benefin on the Germination of Seeds of Ten Crop Plants. Laboratory Report ID. No. 61989010. Conducted and submitted by DowElanco, Greenfield, IN. EPA MRID No. 416138-08.

CONCLUSIONS: This study is scientifically sound, but does not meet the guideline requirements for a Tier 1 seed germination non-target plant phytotoxicity test. The criteria used to judge seed germination was not given and division of seeds into abnormal and normal groups was not presented. This study

is rated to be **SUPPLEMENTAL** and a replacement test would have **very high value**. This study could be upgraded to core if a certified narrative of all missing criteria used to judge germination and the results obtained from discriminating between normal and abnormal seed for this specific test are sent to EEB.

7. CITATION: Waldrep, T.W. 1989. Influence of Benefin Preemergence Spray on Seedling Emergence and Vegetative Vigor of Ten Crop Plants. Laboratory Report ID. No. 61989015. Conducted and submitted by DowElanco, Greenfield, IN. EPA MRID No. 416138-10.

CONCLUSIONS: This study is not scientifically sound and does not meet the guideline requirements for a Tier 2 seedling emergence non-target plant phytotoxicity test. Multiple species were planted per tray, leading to competition between species. This study is rated as **invalid** and a replacement study would have **very high value**.

8. CITATION: Waldrep, T.W. 1989. Influence of Benefin Postemergence Spray on the Vegetative Vigor of Ten Crop Plants. Laboratory Report ID. No. 61989011. Conducted and submitted by DowElanco, Greenfield, IN. EPA MRID No. 416138-11.

CONCLUSIONS: This study is not scientifically sound and does not meet the guideline requirements for a Tier 2 vegetative vigor non-target plant phytotoxicity test. Multiple species were planted per tray, leading to competition between species. Cucumber was the most sensitive species with respect to plant height and weight based on the author's EC_{25} values. Based on visual effects, corn was the most sensitive species with respect to phytotoxicity. The NOEC, LOEC, EC_{25} , and EC_{50} for cucumber height (the most sensitive species parameter) were 0.50, 1.0, 0.75, and 3.24 lb ai/A, respectively. This study is rated to be **INVALID** and a replacement study would have a **very high value**.

AS WE DISCUSSED ABOVE, THE VALIDITY/RATING (CORE, SUPPLEMENTAL OR INVALID) OF THE VARIOUS ECOLOGICAL EFFECTS TESTS PRESENTED BY THE REGISTRANT, WE ALSO INDICATED WHAT THEIR REPLACEMENT VALUE LEVEL WOULD BE TO OPP/EEB FOR RISK ASSESSMENT PURPOSES. THE FOLLOWING ARE GENERIC DEFINITIONS OF THE THREE DIFFERENT DATA REPLACEMENT VALUE LEVELS BUT PLEASE DO REFER EITHER TO THE ACCOMPANYING MEMORANDUM TEXT FOR EACH STUDY OR THE INDIVIDUAL DATA EVALUATION REVIEWS (DER):

A LOW REPLACEMENT VALUE IS ASSIGNED WHEN, IN EEB'S OPINION, THERE IS A LOW PROBABILITY THAT A NEW TEST WILL EFFECTIVELY CHALLENGE/CHANGE SIGNIFICANTLY PREVIOUS ASSUMPTIONS, PREVIOUSLY-DETERMINED LEVELS OF

RISK AND/OR DECREASE THE OVERALL LEVEL OF UNCERTAINTY OF ADVERSE EFFECTS WHEN OTHER, CORE, SCIENTIFICALLY SOUND AND SIMILAR TYPE OF TESTS TO THE ONE UNDER CONSIDERATION ARE IN THE DATA BASE AND/OR WHEN TOGETHER WITH THE TEST AT HAND MAY GIVE SUFFICIENT, ALTHOUGH NOT NECESSARILY COMPLETE INFORMATION ON DOSE/RESPONSE TO ASSIST THE RISK ASSESSMENT PROCESS.

A MEDIUM REPLACEMENT VALUE IS GIVEN TO A TEST WHEN, IN EEB'S OPINION, THE NEW RESULTS HAVE SOME PROBABILITY OF ALTERING PREVIOUS ASSUMPTIONS OR LEVELS OF RISK, REDUCE THE LEVEL OF UNCERTAINTY AS FAR AS RISK IS CONCERNED AND/OR BECAUSE IT IS LIKELY TO BE A VALUABLE ADDITION TO THE TOXICOLOGICAL DATA BASE THAT WOULD OTHERWISE BE SOMEHOW INCOMPLETE FOR THIS TYPE OF TEST AND THEREFORE VULNERABLE TO SOUND SCIENTIFIC CHALLENGE.

A HIGH REPLACEMENT VALUE IS GIVEN TO A TEST WHEN, IN EEB'S OPINION, WITHOUT A NEW TEST IT WOULD BE IMPOSSIBLE AND SCIENTIFICALLY INCORRECT TO MAKE ASSUMPTIONS AND A DETERMINATION OF THE LEVEL OF RISK INVOLVED. FURTHER, WITHOUT A REPLACEMENT TEST THE LEVEL OF UNCERTAINTY WILL REMAIN HIGH AND THE ECOTOXICOLOGICAL DATA BASE WILL BE INCOMPLETE AND TOTALLY VULNERABLE TO SCIENTIFIC CHALLENGE.

Should you require further information, please contact Alvaro A. Yamhure of the EEB staff at (703) 305-6179.

Date: 2/2/94 (D180920; D181392; D179011; D181392; D171932)
 Case No: 814851
 Chemical No: 084301 Benfenin

PHASE IV
 DATA REQUIREMENTS FOR
 ECOLOGICAL EFFECTS BRANCH

Data Requirements	Composition ¹	Use Pattern ²	Does EPA Have Data To Satisfy This Requirement? (Yes, No)	Bibliographic Citation	Must Additional Data Be Submitted under FIFRA3(c)(2)(B)?
6 Basic Studies in Bold					
71-1(a) Acute Avian Oral, Quail/Duck	TGAI	A,B,G	YES	160000; 160875; 24273 ³	NO
71-1(b) Acute Avian Oral, Quail/Duck	(TEP)				
71-2(a) Acute Avian Diet, Quail	TGAI	A,B,G	YES	234214	NO
71-2(b) Acute Avian Diet, Duck	TGAI	A,B,G	YES	234214	NO
71-3 Wild Mammal Toxicity					
71-4(a) Avian Reproduction Quail	TGAI	A,B,G	SEE FOOTNOTE	421455-02	SEE FOOTNOTE 4
71-4(b) Avian Reproduction Duck	TGAI	A,B,G	" "	421455-01	" " 4
71-5(a) Simulated Terrestrial Field Study					
71-5(b) Actual Terrestrial Field Study					
72-1(a) Acute Fish Toxicity Bluegill	TGAI	A,B,G	" "	416138-01	" " 4
72-1(b) Acute Fish Toxicity Bluegill	(TEP)	A,B,G	YES	423908-01	NO
72-1(c) Acute Fish Toxicity Rainbow Trout	TGAI	A,B,G	YES	234214	NO
72-1(d) Acute Fish Toxicity Rainbow Trout	(TEP)	A,B,G	YES	424192-01	NO
72-2(a) Acute Aquatic Invertebrate Toxicity	TGAI	A,B,G	YES	40098001	NO
72-2(b) Acute Aquatic Invertebrate Toxicity	(TEP)	A,B,G	YES	423908-02	NO
72-3(a) Acute Estu/Mari Tox Fish	TGAI	A,B,G	SEE FOOTNOTE	416138-02	SEE FOOTNOTE 4
72-3(b) Acute Estu/Mari Tox Mollusk	TGAI	A,B,G	" "	416138-03	" " 4
72-3(c) Acute Estu.Mari Tox Shrimp	TGAI	A,B,G	YES	416138-04	NO

* In Bibliographic Citation column indicates study may be upgradeable

Date: 2/2/94 (D180920; D181392; D179011; D181392; D171932)
 Case No: 814851
 Chemical No: 084301 Benfenin

PHASE IV
 DATA REQUIREMENTS FOR
 ECOLOGICAL EFFECTS BRANCH

Data Requirements	Composition ¹	Use Pattern ²	Does EPA Have Data To Satisfy This Requirement? (Yes, No)	Bibliographic Citation	Must Additional Data Be Submitted under FIFRA3(c)(2)(B)?
72-3(d) Acute Estu/Mari Tox Fish	(TEP)				
72-3(e) Acute Estu/Mari Tox Mollusk	(TEP)				
72-3(f) Acute Estu/Mari Tox Shrimp	(TEP)				
72-4(a) Early Life-Stage Fish	TGAI	A,B,G	YES	416138-05	NO
72-4(b) Live-Cycle Aquatic Invertebrate	TGAI	A,B,G	SEE FOOTNOTE	416138-06	SEE FOOTNOTE 4
72-5 Life-Cycle Fish					
72-6 Aquatic Org. Accumulation					SEE EFB DATA TABLE
72-7(a) Simulated Aquatic Field Study					
72-7(b) Actual Aquatic Field Study					
122-1(a) Seed Germ./Seedling Emerg.	TGAI	A,B,G	SEE FOOTNOTE	416138-08	SEE FOOTNOTE 4
122-1(b) Vegetative Vigor					
122-2 Aquatic Plant Growth	TGAI	A,B,G	YES	416138-09	NO
123-1(a) Seed Germ./Seedling Emerg.	TGAI	A,B,G	SEE FOOTNOTE	416138-10	YES (SEE 5)
123-1(b) Vegetative Vigor					
123-2 Aquatic Plant Growth	TGAI	A,B,G	SEE FOOTNOTE	416138-11	YES (see 5)
124-1 Terrestrial Field Study					
124-2 Aquatic Field Study					
141-1 Honey Bee Acute Contact	TGAI	A,B,G	YES	416138-12	NO

1. Composition: TGAI = Technical grade of the active ingredient; TEP = Typical end-use product
 2. Use Patterns: A = Terrestrial Food Crop; B = Terrestrial Non-Food Crop; C = Terrestrial Feed Crop; D = Aquatic Food Crop; E = Aquatic Non-Food Outdoor; F = Aquatic Non-Food Industrial; G = Aquatic Non-Food Residential.
 3. The percent active ingredient (a.i.) was not provided for study No. 24273.
 4. These studies were rated as supplemental because they were found to be scientifically correct but had a variety of problems which adversely affected the results obtained. For further detail on the problem areas see the attached memorandum for D180920 of 1/94 or the individual DERs. The results are useable for risk assessment purposes.
 5. These studies were found to be scientifically incorrect and can not be used in risk assessment.

* In Bibliographic Citation column indicates study may be upgradeable