T.E
10-23-92

DP Barcode : D172758
PC Code No : 108501
EEB Out : OCT 23 1992

To: Walter Waldrop
Product Manager 71
Special Review and Reregistration Division (H7508W)

From: Douglas J. Urban, Acting Chief
Ecological Effects Branch/EFED (H7507C)

Attached, please find the EEB review of...

Reg./File # : 108501
Chemical Name : Pendimethalin
Type Product : Herbicide
Product Name : Prowl
Company Name : American Cyanamide
Purpose : Review of plant data for reregistration.

Action Code : 627 Date Due : 05/01/92
Reviewer : Tracy L. Perry

EEB Guideline/MRID Summary Table: The review in this package contains an evaluation of the following:

GDLN NO	MRID NO	CAT	GDLN NO	MRID NO	CAT	GDLN NO	MRID NO	CAT
71-1(A)			72-2(A)			72-7(A)		
71-1(B)			72-2(B)			72-7(B)		
71-2(A)			72-3(A)			122-1(A)		
71-2(B)			72-3(B)			122-1(B)		
71-3			72-3(C)			122-2		
71-4(A)			72-3(D)			123-1(A)		
71-4(B)			72-3(E)			123-1(B)		
71-5(A)			72-3(F)			123-2	42137101	Y
71-5(B)			72-4(A)			124-1		
72-1(A)			72-4(B)			124-2		
72-1(B)			72-5			141-1		
72-1(C)			72-6			141-2		
72-1(D)						141-5		

Y=Acceptable (Study satisfied Guideline)/Concur
P=Partial (Study partially fulfilled Guideline but additional information is needed
S=Supplemental (Study provided useful information but Guideline was not satisfied)
N=Unacceptable (Study was rejected)/Nonconcur

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

OCT 23 1992

OFFICE OF
PESTICIDES AND TOXIC
SUBSTANCES

MEMORANDUM

SUBJECT: Pendimethalin: Review of Tier 2 Aquatic Plant Study.

FROM: Douglas Urban, Acting Branch Chief
Ecological Effects Branch
Environmental Fate and Effects Division (H7507C) 10/21/92

TO: Walter Waldrop, PM 71
Reregistration Branch
Special Review and Reregistration Division (H7508W)

As part of the reregistration process for the herbicide Pendimethalin, American Cyanamid Company has submitted the following Tier 2 aquatic plant study:

> Hughes, J.S., M.M. Alexander, and J.D. Wisk. 1991. Effect of AC 92,553 on Growth of Duckweed, Lemna gibba. Conducted by Malcolm Pirnie, Inc., Tarrytown, NY. MRID No. 421371-01.

This study was found to be scientifically sound and meets the guideline requirements for a Tier 2 non-target aquatic plant study.

Please find all applicable data requirements for pendimethalin and their statuses in the attached table. If you have any questions, please contact Tracy Perry at 305-6451 or Henry Craven at 305-5320.

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Date: 10/07/92
Case No: 819421
Chemical No: 108501

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,C,D	YES	00059739	NO
71-1(b) Acute Avian Oral, Quail/Duck	(TEP)	-	-	-	-
71-2(a) Acute Avian Diet, Quail	(TGAI)	A,B,C,D	YES	00026674	NO
71-2(b) Acute Avian Diet, Duck	(TGAI)	A,B,C,D	YES	00026675	NO
71-3 Wild Mammal Toxicity	(TGAI)	-	-	-	-
71-4(a) Avian Reproduction Quail	(TGAI)	-	-	-	-
71-4(b) Avian Reproduction Duck	(TGAI)	-	-	-	-
71-5(a) Simulated Terrestrial Field Study	(TEP)	-	-	-	-
71-5(b) Actual Terrestrial Field Study	(TEP)	-	-	-	-
72-1(a) Acute Fish Toxicity Bluegill	(TGAI)	A,B,C,D	YES	00106764	NO
72-1(b) Acute Fish Toxicity Bluegill	(TEP)	D	YES	00037927, FAOPEN01	NO
72-1(c) Acute Fish Toxicity Rainbow Trout	(TGAI)	A,B,C,D	YES	00160764	NO
72-1(d) Acute Fish Toxicity Rainbow Trout	(TEP)	D	YES	FAOPEN01, 00037927	NO
72-2(a) Acute Aquatic Invertebrate Toxicity	(TGAI)	A,B,C,D	YES	FAOPEN05	NO
72-2(b) Acute Aquatic Invertebrate Toxicity	(TEP)	D	YES	260404	NO
72-3(a) Acute Estu/Mari Tox Fish	(TGAI)	A,D	YES	FAOPEN02	NO
72-3(b) Acute Estu/Mari Tox Mollusk	(TGAI)	A,D	YES	FAOPEN03	NO
72-3(c) Acute Estu.Mari Tox Shrimp	(TGAI)	A,D	YES	FAOPEN03	NO

* In Bibliographic Citation column indicates study may be upgradeable

1.Composition: TGAI = 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. THIS STUDY IS REQUIRED IN ORDER TO SUPPORT THE RICE USE.

4. MRID No. 42137101 (LEMNA GIBBA) AND 42372204 (SELENASTRUM CAPRICORNUTUM) HAVE BEEN CLASSIFIED AS CORE. THREE ADDITIONAL AQUATIC PLANT STUDIES ARE OUTSTANDING: SKELETONEMA, NAVICULA, ANABAENA.

5. TIER III FIELD TESTING IS RESERVED PENDING RECEIPT AND REVIEW OF TIER II TESTS.

DATA EVALUATION RECORD

1. **CHEMICAL:** Pendimethalin.
Shaughnessey No. 108501.

2. **TEST MATERIAL:** Pendimethalin (AC 92,553); N-(1-ethylpropyl)3,4-dimethyl-2,6-dinitrobenzenamine; CAS No. 40487-42-1; Lot No. AC6539-77A; 92.98% active ingredient; a yellow to orange-brown solid.

3. **STUDY TYPE:** Growth and Reproduction of Aquatic Plants - Tier 2. Species Tested: Duckweed (*Lemna gibba*).

4. **CITATION:** Hughes, J.S., M.M. Alexander, and J.D. Wisk. 1991. Effect of AC 92,553 on Growth of Duckweed, *Lemna gibba*. Laboratory Project ID B400-31-1. Conducted by Malcolm Pirnie, Inc., Tarrytown, NY. Submitted by American Cyanamid Company, Princeton, NJ. EPA MRID No. 421371-01.

5. **REVIEWED BY:**

Mark A. Mossler, M.S.
Agronomist
KBN Engineering and
Applied Sciences, Inc.

Signature: Mark Mossler
Date: 4/9/92

6. **APPROVED BY:**

Pim Kosalwat, Ph.D.
Senior Scientist
KBN Engineering and
Applied Sciences, Inc.

Signature: P. Kosalwat
Date: 4/9/92

Henry T. Craven, M.S.
Supervisor, EEB/EFED
USEPA

Signature: Henry T. Craven
Date: Tracy L. Perry 10/20/92

7. **CONCLUSIONS:** This study is scientifically sound and meets the guideline requirements for a Tier 2 non-target aquatic plant study. Based on mean measured concentrations, the 14-day NOEC, LOEC, and EC_{50} for *L. gibba* exposed to pendimethalin were 5.6, 12.2, and 12.5 µg ai/l, respectively.

8. **RECOMMENDATIONS:** N/A.

9. **BACKGROUND:**

At test termination, dry weight of each replicate was determined by placing the plants in a beaker and drying at 70°C for 3 hours in a vacuum oven. The beakers were dried, cooled, and weighed repeatedly until a constant weight was achieved.

The pH was measured at test initiation (initial solutions) and termination (replicates combined). The temperature in the incubator was recorded manually daily and continually with a recording device.

Samples were taken at test initiation (initial solutions) and termination (replicates combined) for analysis of the test material by gas chromatography (GC).

E. **Statistics:** All calculations were based on mean measured concentrations. The 14-day EC values and associated 95% confidence intervals were computed using weighted least squares non-linear regression of the log of test concentration against the day-14 frond counts or weights (expressed as inhibition compared to pooled control data). The no-observed-effect concentration (NOEC) was estimated using analysis of variance (ANOVA) and Dunnett's Test. The level of significance was $p \leq 0.05$.

12. **REPORTED RESULTS:** The measured concentrations ranged from 102 to 114% of nominal at test initiation and from 5 to 25% on day 14 (Table 3, attached). Results from the quality control samples demonstrated approximately 60% recovery which indicated that the plants may have reduced the test concentrations by compound uptake or adsorption. The mean measured concentrations were 1.5, 2.8, 5.6, 12.2, and 25.4 µg ai/l.

Frond counts and percent inhibition for each concentration after fourteen days are given in Tables 4 and 5 (attached). Percent inhibition increased with increasing toxicant concentration. Algal contamination was evident in some of the test vessels. Since this phenomenon occurred across all control and test treatment, it was not believed to have impacted the study results. Analysis of the 7-day frond counts (taken before algal contamination was observed) corroborated the EC values derived from the day-14 frond counts.

Based on day-14 frond counts, the EC_{25} was calculated to be 7.8 µg ai/l with a 95% confidence interval of 5.4-11.2 µg

C. **Discussion/Results:** The results of the stability test indicated that this test compound is somewhat unstable over the test period. The reviewer believes that solution renewal would have been appropriate at three day intervals for this test. However, the mean measured concentrations presented represent conservative estimates of exposure concentrations. Therefore, this study is scientifically sound and meets the guideline requirements for a Tier 2 non-target aquatic plant study. Based on mean measured concentrations, the 14-day NOEC, LOEC, and EC_{50} for *L. gibba* exposed to pendimethalin were 5.6, 12.2, and 12.5 µg ai/l, respectively.

D. **Adequacy of the Study:**

(1) **Classification:** Core.

(2) **Rationale:** N/A.

(3) **Repairability:** N/A.

15. **COMPLETION OF ONE-LINER:** Yes, 4-6-92.

Pendimethalin

Page _____ is not included in this copy.

Pages 8 through 9 are not included in this copy.

The material not included contains the following type of information:

_____ Identity of product inert ingredients.

_____ Identity of product inert impurities.

_____ Description of the product manufacturing process.

_____ Description of product quality control procedures.

_____ Identity of the source of product ingredients.

_____ Sales or other commercial/financial information.

_____ A draft product label.

_____ The product confidential statement of formula.

_____ Information about a pending registration action

X FIFRA registration data.

_____ The document is a duplicate of page(s) _____

_____ The document is not responsive to the request.

The information not included is generally considered confidential by product registrants. If you have any questions, please contact the individual who prepared the response to your request.

lemna frond number

Estimated EC Values and Confidence Limits

Point	Conc.	Lower 95% Confidence Limits	Upper 95% Confidence Limits
EC 1.00	3.5584		
EC 5.00	5.1880		
EC10.00	6.3432		
EC15.00	7.2649		
EC50.00	12.8909		
EC85.00	22.8737		
EC90.00	26.1975		
EC95.00	32.0305		
EC99.00	46.6992		