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Date out of EFGWB: OCT - 6 1992

TO: B. Briscoe/K. Davis
Product Manager #51
Special Review and Reregistration Division (H7508W)

FROM: Paul Mastradone, Ph.D., Chief
Environmental Chemistry Review Section #1
Environmental Fate and Ground Water Branch

THRU: Hank Jacoby, Chief
Environmental Fate and Ground Water Branch
Environmental Fate and Effects Division (H7507C)

Handwritten signatures: "C. ... For" and "Hank Jacoby"

Handwritten note: "6 Oct 92"

Attached, please find the EFGWB review of ...
Reg./File #: 241-

Chemical Name: Tetrahydro-5,5-dimethyl-2(1H)-pyrimidinone(3-(4-trifluoromethyl)-phenyl)-1-(2-(4-trifluoromethyl)phenyl)ethenyl)-2-propenylidene)-hydrazone

Type Product: Insecticide

Common Name: Hydramethylnon

Company Name: American Cyanamid Company

Purpose: To review request for time extension

Action Code: 610 EFGWB #(s): 92-1025 Total Review Time: 0.8 days

EFGWB Guideline/MRID Summary Table : The review in this package contains									
161-1		162-1		163-3		165-1		166-1	
161-2		162-2		164-1		165-2		166-2	
161-3		162-3		164-2		165-3		166-3	
161-4		162-4		164-3		165-4		167-1	
201-1		163-1		164-4		165-5		167-2	
202-1		163-2		164-5					

1. CHEMICAL:

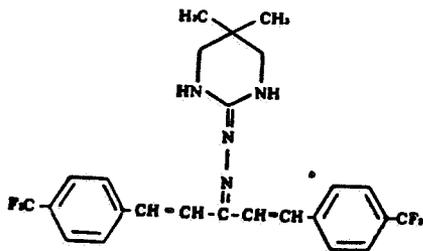
Chemical name: Tetrahydro-5,5-dimethyl-2(1H)-pyrimidinone(3-(4-trifluoromethyl)phenyl)-1-(2-(4-trifluoromethyl)phenyl)-ethenyl)-2-propenylidene)hydrazone

CAS no.: 67485-29-4

Common name: Hydramethylnon

Trade name: AMDRO

Chemical structure:



Physical/Chemical properties of active ingredient:

Physical characteristics: Yellow-tan, free-flowing granules with an odor of vegetable oil

Molecular formula: C₂₅H₂₄N₄F₆

Molecular weight: 494.48

Melting point:

Vapor Pressure: 2 X 10⁻⁸ mm Hg

Solubility: Insoluble in water (7-9 ppb)

Log Octanol/water partition coefficient: 2.31

2. TEST MATERIAL:

N/A

3. STUDY/ACTION TYPE:

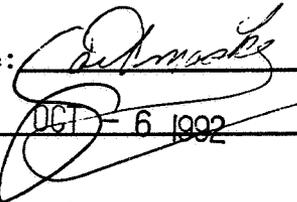
To review request for time extension.

4. STUDY IDENTIFICATION:

Athur, J.J. CORRESPONDENCE TO K. DAVIS: HYDRAMETHYLNON, LIST B CASE 2585.
American Cyanamid Company, Princeton, NJ; 31 March 1992.

5. REVIEWED BY:

Gail Maske
Chemist, Review section #1
OPP/EFED/EFGWB

Signature: 

Date: OCT - 6 1992

6. APPROVED BY:

Paul Mastradone
Chief
Review section #1
OPP/EFED/EFGWB

Signature:  FOR

Date: OCT - 6 1992

7. CONCLUSIONS:

The registrant, American Cyanamid, is requesting a time extension of two years to complete the soil dissipation study. This request is based on the registrant's inability to validate the method for hydramethylnon extraction from soil and thus complete the analytical phase of the study. Two field dissipation studies were initiated in 1990. However, because of the extended storage time in the freezer for the 1990 samples, the registrant intends to repeat the field portion of the study in 1992.

Although a time extension request seems reasonable, EFGWB believes that it is not possible to evaluate the legitimacy of the request in the absence of additional information on the soil extraction scheme. This information, which is also required to assess whether a two-year extension is warranted, is critical in assessing the lability of hydramethylnon soil residues. More importantly, the extraction problems may indicate that soil binding is a route of dissipation. Since a new field study is underway, EFGWB believes that soil samples from this study should be extracted and analyzed as soon as possible, and the results submitted promptly. Please note that acceptable data from at least two sites are required to fulfill the terrestrial field dissipation data requirement.

Furthermore, it appears that several laboratory studies have not been submitted for review. EFGWB believes tht the results of acceptable laboratory studies are required for proper planning of field studies.

See DISCUSSION

ENVIRONMENTAL FATE ASSESSMENT

This environmental fate assessment of hydramethylnon is based on previously acceptable data (prior to 1989). These data which were found supplemental

in Phase IV, will be replaced with new studies. Presently there are two data requirements, confined rotational crop accumulation and accumulation in fish, which are considered fulfilled.

Based on supplemental data, hydramethylnon appears to be insoluble in water ($\approx 7-9$ ppb), moderately persistent (hydrolysis- $t_{1/2}$ =11 to 33 days depending on pH, aerobic soil metabolism- $t_{1/2}$ =90 days, anaerobic soil metabolism- $t_{1/2}$ =120 days) under some environmental conditions, and immobile ($R_f=0.00$ in 4 soils). However, hydramethylnon photodegrades in water and on soil with shorter half-lives (42 minutes and 5 to 7 days, respectively). In addition, the terrestrial field dissipation half-life was 18 hours. Furthermore, hydramethylnon does not appear to accumulate in rotational crops. However, it does appear to accumulate in fish (1300X in whole fish, 780X in fillet, and 1900X in viscera) with slow depuration observed. Therefore, photodegradation appears to be the main degradation pathway. Binding to soil appears to be a major route of dissipation, as well.

In summary, based on hydramethylnon's low application rate, rapid degradation when exposed to light, low mobility in soils, and low solubility in water, it should not be persistent or mobile under most environmental conditions. Therefore, ground-water and surface water contamination is not expected to be a concern.

8. RECOMMENDATIONS:

The registrant should be informed of the following:

- a. There are sufficient data to support the time extension request for the terrestrial field dissipation study.³
- b. The status of the Environmental Fate Data Requirements for hydramethylnon for terrestrial food and non-food uses is summarized below:

<u>Environmental Fate Data Requirements</u>	<u>Status of data Requirement</u>	<u>MRID No.</u>
Degradation Studies-lab		
161-1 Hydrolysis	Not Submitted	
161-2 Photodegradation in water	Not Submitted	
161-3 Photodegradation on soil	Not Submitted	
161-1 Photodegradation in air	Waived	
	(JAH;01/04/91)Phase IV	
Metabolism Studies-lab		
162-1 Aerobic soil	Not Submitted	
162-2 Anaerobic soil ¹		
162-3 Anaerobic aquatic	Not Submitted	
Mobility Studies		
163-1 Leaching, Adsorption/Desorption	Not Submitted	

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Con't--	Environmental Fate <u>Data Requirements</u>	Status of data <u>Requirement</u>	<u>MRID No.</u>
163-2	Volatility-Lab	Waived (JAH;01/04/91) Phase IV	
163-3	Volatility-field	Waived (JAH;01/04/91) Phase IV	
Dissipation Studies-field			
164-1	Soil	Not Submitted	
164-5	Soil, long-term	Reserved ²	
Accumulation Studies			
165-1	Rotational crops-confined	Fulfilled (JAH;01/04/91)	00061706
165-4	in Fish	Fulfilled (WGM;01/02/91)	00101611
Spray Drift Studies			
201-1	Droplet size spectrum	Not Submitted	
202-1	Drift Field evaluation	Not Submitted	

¹ The registrant has committed to submitting an anaerobic aquatic metabolism study in lieu of the anaerobic soil metabolism study.

² The long-term terrestrial field dissipation data requirement is reserved pending evaluation of an acceptable field dissipation study.

³ NOTE TO PM: A schedule of progress reports and new expected completion dates for the new studies may need to be determined.

9. BACKGROUND:

Hydramethylnon, an amidinohydrazone, is used as an insecticide to control fire ants, harvester ants, big-headed ants, and cockroaches. It has been registered for use on terrestrial food and feed crops, i.e., agricultural crops, pastures, and rangeland; ornamental and shade trees; ornamental herbaceous plants; and ornamental lawns and turfs.

Hydramethylnon is used in bait boxes or can be applied by ground spray, aerial spray, or by hand. The maximum application rate, formulated as a bait with 0.88 to 1.65% ai, is 0.033 lbs ai/A.

The toxicity class of hydramethylnon is III. EEB considers hydramethylnon to be highly toxic to fish, moderately toxic to aquatic invertebrates, and slightly toxic to birds.

5

10. DISCUSSION:

The registrant, American Cyanamid, is requesting a 2 year time extension to conduct additional terrestrial field dissipation studies and to develop hydramethylnon soil extraction methods. The registrant completed the field portion of two field dissipation studies in 1990. However, the analytical portions of these studies are incomplete because of a hydramethylnon soil extraction problem. It appears that hydramethylnon is not readily extractable from the soil because it has a high binding affinity. This analytical problem prevented residue extraction from soil samples taken in the 1990 field dissipation studies. These samples have been stored frozen for two years and hence residue storage stability may pose an analytical problem. Therefore, the registrant is initiating two new field dissipation studies in 1992. They also plan on analyzing the 1990 dissipation soil samples after an acceptable soil extraction method is found.

EFGWB believes the analytical problems experienced in detecting hydramethylnon residues in soil may indicate a possible route of dissipation... soil binding. At this time, EFGWB believes that hydramethylnon residue identification is necessary to establish dissipation of the parent compound and its degradates. The extent of soil residue analysis is dependent on data obtained from aerobic soil metabolism studies. However, it is impossible to evaluate the legitimacy of the time extension without additional information on the types of soil residue extraction schemes. This information is critical in assessing the lability of the hydramethylnon soil residues.

11: COMPLETION OF ONE-LINER:

See attached one-liner.

12: CBI APPENDIX:

N/A

Environmental Fate & Effects Division
 PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
 HYDRAMETHYLNON

Last Update on March 19, 1992

[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

LOGOUT	Reviewer:	Section Head:	Date:
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Common Name:HYDRAMETHYLNON

Smiles Code:

PC Code # :118401

CAS #:67485-29-4

Caswell #:

Chem. Name :

Action Type:INSECTICIDE

Trade Names:AMDRO

(Formul'tn): .88% AI FIRE ANT BAIT; 1.65% AI COCKROACH BAIT

Physical State:

Use :CONTROL OF IMPORTED FIRE ANTS, HARVESTER ANTS, AND BIG-
 Patterns :HEADED ANTS.
 (% Usage) :
 :

Empirical Form: $C_{25}H_{24}N_4F_6$
 Molecular Wgt.: 494.48 Vapor Pressure: 2.00E -8 Torr
 Melting Point : °C Boiling Point: °C
 Log Kow : 2.31 pKa: @ °C
 Henry's : E Atm. M3/Mol (Measured) 2.60E -7 (calc'd)

Solubility in ...	Comments			
Water	5.00E -2	ppm	@25.0	°C
Acetone	E	ppm	@	°C
Acetonitrile	E	ppm	@	°C
Benzene	E	ppm	@	°C
Chloroform	E	ppm	@	°C
Ethanol	E	ppm	@	°C
Methanol	E	ppm	@	°C
Toluene	E	ppm	@	°C
Xylene	E	ppm	@	°C
	E	ppm	@	°C
	E	ppm	@	°C

Hydrolysis (161-1)

[S] pH 5.0:24-33 DAYS
 [S] pH 7.0:10-11 DAYS
 [S] pH 9.0:11-12 DAYS
 [] pH :
 [] pH :
 [] pH :

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Photolysis (161-2, -3, -4)

[S] Water: 42 MINUTES

[] :
[] :
[] :

[S] Soil : 5-7 DAYS

[] Air :

Aerobic Soil Metabolism (162-1)

[S] 90 DAYS (NO DEGRADATION AFTER

[] THAT, PERHAPS BECAUSE MICROBI-
[] AL POPULATIONS DECLINED)

[]
[]
[]
[]

Anaerobic Soil Metabolism (162-2)

[S] 120 DAYS

[]
[]
[]
[]
[]
[]

Anaerobic Aquatic Metabolism (162-3)

[]
[]
[]
[]
[]
[]
[]

Aerobic Aquatic Metabolism (162-4)

[]
[]
[]
[]
[]
[]
[]

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Soil Partition Coefficient (Kd) (163-1)

[]
[]
[]
[]
[]
[]

Soil Rf Factors (163-1)

[S] 0.00 IN 4 SOILS
[]
[]
[]
[]
[]

Laboratory Volatility (163-2)

[]
[]

Field Volatility (163-3)

[]
[]

Terrestrial Field Dissipation (164-1)

[S] T1/2=18 HOURS, PROBABLY DUE TO DECOMPOSITION BY LIGHT AND
[] THE RAPID FORAGING BY ANTS.
[]
[]
[]
[]
[]
[]
[]
[]
[]

Aquatic Dissipation (164-2)

[]
[]
[]
[]
[]
[]

Forestry Dissipation (164-3)

[]
[]

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Long-Term Soil Dissipation (164-5)

[]
[]

Accumulation in Rotational Crops, Confined (165-1)

[V] Did not accumulate over a 90 day rotation interval
[] no leafy crop tested

Accumulation in Rotational Crops, Field (165-2)

[]
[]

Accumulation in Irrigated Crops (165-3)

[]
[]

Bioaccumulation in Fish (165-4)

[V] BLUEGILL SUNFISH BCF: WHOLE FISH 1300 X; FILLET 780 X;
[] VISCERA 1900 X. DEPURATION WAS GRADUAL.

Bioaccumulation in Non-Target Organisms (165-5)

[]
[]

Ground Water Monitoring, Prospective (166-1)

[]
[]
[]
[]

Ground Water Monitoring, Small Scale Retrospective (166-2)

[]
[]
[]
[]

Ground Water Monitoring, Large Scale Retrospective (166-3)

[]
[]
[]
[]

Ground Water Monitoring, Miscellaneous Data (158.75)

[]
[]
[]

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PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
HYDRAMETHYLNON

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[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

Field Runoff (167-1)

[]
[]
[]
[]

Surface Water Monitoring (167-2)

[]
[]
[]
[]

Spray Drift, Droplet Spectrum (201-1)

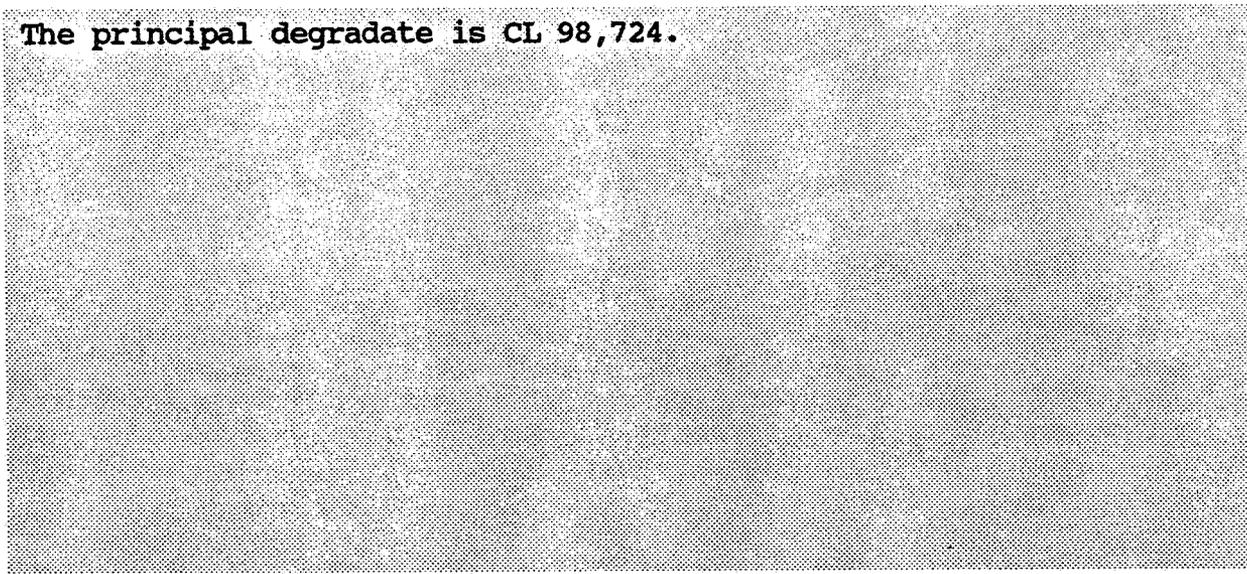
[]
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[]

Spray Drift, Field Evaluation (202-1)

[]
[]
[]
[]

Degradation Products

The principal degradate is CL 98,724.



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Comments

The vapor pressure of 2E-8 was measured at 45 C.
In an aged soil column leaching study, 72% of the applied radioactivity was still in the treated layer of soil after 45 days. Less than 0.2% of the radioactivity was in the leachate, indicating that neither Amdro nor its degradates leach.
Toxic to fish.
At an appl. of 6 gm AIA, there is no effect on dehydrogenase or Alkaline phosphatase enzymes.

References: EPA REVIEWS
Writer : PJH