

Shaughnessy No.: 090301

Date Out of EFGWB: OCT 25 1989

To: Joanne Edwards
Product Manager #74
Reregistration Branch
Special Review and Reregistration Division (H7508C)

From: Emil Regelman, Supervisory Chemist
Review Section #2
Environmental Fate & Ground Water Branch (H7507C)

Thru: Henry Jacoby, Acting Chief
Environmental Fate & Ground Water Branch
Environmental Fate & Effects Division (H7507C)

Attached, please find the EFGWB review of...

Reg./File # : 352-361

Common Name : Methomyl

Type Product : Insecticide

Product Name : Lannate

Company Name : E.I. du Pont de Nemours and Company, Inc.

Purpose : Review waiver request for laboratory volatility study (\$163-2)

Date Received : 9/11/89

EFGWB #(s) : 90765

Action Code(s): 660

Total EFGWB review Time: 1.5 days

Deferrals to: ☐ Ecological Effects Branch, EFED
☐ Science Integration & Policy Staff, EFED
☐ Non-Dietary Exposure Branch, HED
☐ Dietary Exposure Branch, HED
☐ Toxicology Branch, I, HED
☐ Toxicology Branch, II, HED

1. CHEMICAL: Common name:

Methomyl

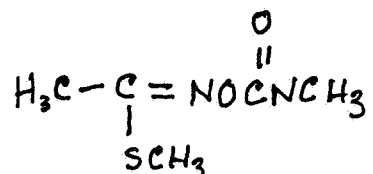
Chemical name:

S-Methyl-N-[(methylcarbamoyl)oxy]thioacetimidate

Trade name(s):

Lannate, Lanox 90, Lanox 216, Nu-Bait II, Nudrin,
SD 14999

Structure:



Formulations:

90% WP, 1.8 lb ai/gallon SC/L

Physical/Chemical properties:

Molecular formula : C₅H₁₀N₂O₂S.
Molecular weight : 162.2
Physical state : White crystalline solid.
Melting point : 78-79°C.
Solubility : Water, 5.8 g/100 g.
Methanol, 100 g/100 g.

2. TEST MATERIAL:

N/A.

3. STUDY/ACTION TYPE:

Review waiver request for laboratory volatility study (§163-2)
by the registrant (Du Pont).

4. STUDY IDENTIFICATION:

"Vapor Pressure of Methomyl". Unpublished report (ID # AMR-1268-88)
of E. I. du Pont de Nemours & Company, Inc., August 18, 1989.
MRID #412097-01

5. REVIEWED BY:

Padma R. Datta, Ph.D.
Chemist
Review Section #2
EFGWB/EFED/OPP

Signature: PRDatta

Date: 10/20/89

6. APPROVED BY:

Emil Regelman
Supervisory Chemist
Review Section #2
EFGWB/EFED/OPP

Signature: ERegelman

Date: OCT 25 1989

7. CONCLUSIONS:

The measured and calculated physical and chemical properties of methomyl listed below indicate that a laboratory volatility study (§163-2) will not be required. (For details refer to "Vapor Pressure of Methomyl" submitted by E. I. du Pont de Nemours & Company Inc., AMR-1268-88, 1989), MRID #412097-01.

Measured Data:

1. Vapor pressure of methomyl is 5.6×10^{-6} mm Hg. (Gas saturation in conjunction with high performance liquid chromatographic method). This method measures accurately the vapor pressure of a chemical without interferences. [For details, refer to OTS Chemical Fate Test Guidelines]. The Vapor pressure of Methomyl (5.6×10^{-6} mm Hg) is slightly higher than the cutoff point of vapor pressure (1×10^{-6} mm Hg) for requiring a volatility study in Subdivision N of the Guidelines.
2. Water solubility of methomyl is high (5.8 g/100 g water at 25°C).
3. Henry's Law constant of methomyl is 2.1×10^{-11} atm-m³/mole. A chemical is considered non-volatile when the Henry's Law constant is less than 1×10^{-7} atm-m³/mole. (For details, refer to Lyman, et al. "Handbook of Chemical Property Estimation Methods," McGraw-Hill, 1982, page 15.) Therefore, it is reasonable to consider methomyl in aqueous solution is non-volatile.
4. Soil absorption coefficient ($K_{oc} = 72$ ml/g) and octanol/water coefficient ($\log K_{ow} = 1.24$) indicate a minimal effect of soil organic matter on volatilization of methomyl. (For details, see "Physical and Chemical Property data base" submitted by Du Pont to the Agency.

Calculated:

5. The maximum methomyl volatilization rate was calculated from Jury et al.'s model by using the highest rate of application allowed by the label (1.5 lb a.i./A) and assuming that the applied methomyl remained in the top 1 mm of soil surface. The calculated volatilization rate of methomyl was found to be 4.2×10^{-4} kg/ha/d or 1.8×10^{-4} ug/cm²/hr.

The possibility exist that the volatilization rate will change depending on the degree of incorporation of methomyl into soil and abnormal soil moisture content but should not exceed the maximum reported here (1.8×10^{-4} ug/cm²/hr). This methomyl volatilization rate was calculated by a model of pesticide dissipation which predicts patterns of volatilization rate based on physical and chemical properties of a chemical and mobility mechanisms. (For details refer to a series of publications by Jury et al., in the J. Environ. Qual., 13, p 567-568, 1984.)

It appears that methomyl should not be volatile under the parameters set forth to conduct a laboratory volatility study in Subdivision N of the Pesticide Assessment Guidelines. Since data from such a study will not add any new information re methomyl's volatilization rate, EFGWB have no objection to the Agency's granting the requested waiver from the methomyl laboratory volatility study (§163-2).

8. RECOMMENDATIONS:

SRRD should inform the registrant (Du Pont) that the laboratory volatility study (§163-2) is no longer required to support data requirements for continued registration. As explained in the conclusion section, EFGWB has no objection to the Agency granting this requested waiver by Du pont.

9. BACKGROUND:

On 8/20/89, E. I. du Pont de Nemours & Company Inc., responded to comments re the laboratory volatility study (§163-2) data requirements of methomyl cited in the Methomyl Registration Standard (Second Round Review), case No. 0028, issued by the Agency in April 1989. In a letter, 8/24/89, Du Pont requested a waiver for the laboratory volatility study (§163-2) by submitting a recently determined vapor pressure (5.6×10^{-6} mm Hg) which is one-tenth the previously submitted value (V.P. = 5.0×10^{-5} mm Hg) for methomyl and slightly higher than the vapor pressure (1×10^{-6}) which triggers the data requirement for a laboratory volatility study (§163-2) as cited in Subdivision N of the Pesticide Assessment Guidelines. Du Pont has also submitted data from other pertinent studies including the maximum calculated volatilization rate of methomyl (1.8×10^{-4} ug/ cm²/hr) utilizing Jury et al.'s model to support waiver of this study.

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:

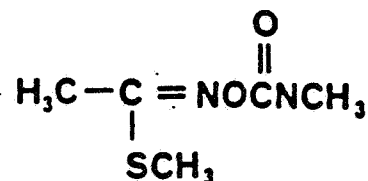
N/A.

11. COMPLETION OF ONE-LINER:

See attached one liner.

12. CBI APPENDIX:

All data reviewed here are considered CBI by the registrant and must be treated as such.



ENVIRONMENTAL FATE & GROUND WATER BRANCH
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY

Page 1

Common Name: **METHOMYL** Date: 04/06/89
Chem. Name : S-METHYL-N-[(METHYLCARBAMOYL)OXY]-THIOACETIMIDATE
:
Shaugh. # : 90301 CAS Number: 16752-77-5
Type Pest. : Insecticide
Formulation: GRANULAR; DUST; WATER SOL. POWDER;
Uses : FIELD CROPS; VEGETABLES; FRUITS; ORNAMENTALS
:
:

Empir. Form: $\text{C}_5\text{H}_{10}\text{O}_2\text{N}_2\text{S}$ VP (Torr): 5.0E-5
Mol. Weight: 162.2 Log Kow : 0.3
Solub.(ppm): 40,000 (58,000 @ 20 C Henry's :

Hydrolysis (161-1)	Photolysis (161-2, -3, -4)
pH 5:[*] STABLE	Air :[#] NO DECOMP IN SUN, 120 DA
pH 7:[*] STABLE	Soil :[*] SiClLm, SUNLIGHT, 34 DAYS
pH 9:[*] 30 DAYS	Water:[*] 1 DAY IN ARTIF. LIGHT, AT
pH10:[] 3 HRS	: [] 25 C, pH 5.
pH 1:[] 21 HRS	: []
pH 4:[*] STABLE	: []

MOBILITY STUDIES (163-1)

Soil Partition (Kd)	Rf Factors
1.[*] FOR 4 SOILS, INCLUDING SdLm	1.[#] IN LIGHT TEXTURED SOILS METH.
2.[] AND SiLm, Kads RANGED FROM .86	2.[] WILL NOT LEACH MORE THAN 11"
3.[] TO .98, AND Kdes RANGED FROM	3.[] AND 15" IN 3- AND 5-MONTHS.
4.[] .5 TO 2.8.	4.[*] SdLm-SiClLm-SiLm; 0.64-0.93
5.[]	5.[*] SdLm-SiLm-Si; 0.46-0.82
6.[]	6.[]

METABOLISM STUDIES (162-1,2,3,4)

Aerobic Soil (162-1)	Anaerobic Soil (162-2)
1.[*] SdLm 15-30 DAYS	1.[*] TOTAL CONVERSION TO CO2 IN
2.[*] MUCK AND SiLm 45 DAYS	2.[] ABOUT 8 DAYS
3.[*] IN STERILE FLANAGAN SiLm, 89%	3.[]
4.[] STILL PRESENT AFTER 45 DAYS	4.[]
5.[*] AT 4 PPM, IN SiLm, IN DARK, AT	5.[]
6.[] 25 C AND 70% WHC; 30-45 DAYS	6.[]
7.[]	7.[]

Aerobic Aquatic (162-4)

1.[]
2.[]
3.[]
4.[]

Anaerobic Aquatic (162-3)

1.[]
2.[]
3.[]
4.[]

[*] - Acceptable Study. [#] = Supplemental Study

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ENVIRONMENTAL FATE & GROUND WATER BRANCH
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY

Page 2

Common Name: METHOMYL

Date: 04/06/89

VOLATILITY STUDIES (163-2,3)

[] Laboratory:

[] Field:

DISSIPATION STUDIES (164-1,2,3,5)

Terrestrial Field (164-1)

- 1.[*] IN SiLm 98% METHOMYL DISSIPATES WITHIN 1 MONTH; IN LmSd 85%
- 2.[] DISSIPATES AFTER 5 MONTHS; NO RESIDUE IN MUCK AFTER 7-32 DA.
- 3.[*] AT 4 LBS AIA, DECREASED FROM 91% AT DAY 0 TO 55% AT DAY 15,
- 4.[] AND TO 33% AT 30 DAYS IN SdLm SOIL IN A GREENHOUSE.
- 5.[]
- 6.[]

Aquatic (164-2)

- 1.[]
- 2.[]
- 3.[]
- 4.[]
- 5.[]
- 6.[]

Forestry (164-3)

- 1.[]
- 2.[]

Other (164-5)

- 1.[]
- 2.[]

ACCUMULATION STUDIES (165-1,2,3,4,5)

Confined Rotational Crops (165-1)

- 1.[*] AT APPL RATE 4X MAX USE, BEETS AND CABBAGE PLANT-
- 2.[] ED 30- AND 120 DAYS LATER, CONTAINED .04-.15 PPM

Field Rotational Crops (165-2)

- 1.[]
- 2.[]

Irrigated Crops (165-3)

- 1.[]
- 2.[]

Fish (165-4)

- 1.[*] 96-HR LC50 FOR WARMWATER FISH = 1.05-1.88 PPM; FOR COLDWATER
- 2.[] FISH = 1.6 PPM.

Non-Target Organisms (165-5)

- 1.[*] 48-HR LC50 FOR DAPHNIA = 31.7 PPB.
- 2.[]

ENVIRONMENTAL FATE & GROUND WATER BRANCH
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY

Page 3

Common Name: **METHOMYL**

Date: 04/06/89

GROUND WATER STUDIES (158.75)

1. [#] IN NEW YORK, 9PPB; IN NEW JERSEY, 1-2 PPB; IN FLA, 12 PPB
2. []
3. []

DEGRADATION PRODUCTS

1. ACETONITRILE
2. CO₂
3. (METHOMYL per se IS THE ONLY RESIDUE OF CONCERN IN PLANTS)
4. S-METHYL-N-HYDROXYTHIOACETIMIDATE
5. METHOMYL OXIME
- 6.
- 7.
- 8.
- 9.
- 10.

COMMENTS

IN PLANTS, METHOMYL IS ABSORBED BY ROOTS AND TRANSLOCATED TO LEAVES.
SLIGHTLY TOXIC TO AVIAN WILDLIFE.

DEGRADATION IN SOIL IS PRIMARILY A MICROBIAL PROCESS.

REPEATED APPLICATIONS WITHIN 19 DAY PERIOD MAY RESULT IN PROLONGED
PERIOD OF REDUCED NITRIFICATION.

CAN BE A HAZARD TO HONEYBEES AND OTHER BENEFICIAL INSECTS.

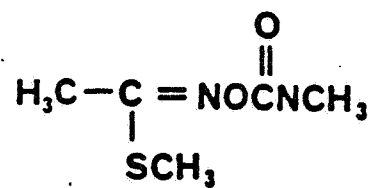
HEALTH ADVISORY LEVEL IS 175 PPB.

ADSORPTION IS DIRECTLY RELATED TO ORG. CONTENT OF SOIL; ADSORPTION
TO ORG. MATTER IS SIMILAR TO THAT OF TERBACIL.

SOIL K_{oc} = 28 (ESTIMATE).

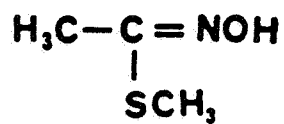
References: EPA REVIEWS

Writer : J. HANNAN

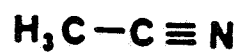


Methomyl

S-Methyl-N-[(methylcarbamoyl)oxy]thioacetimidate



S-Methyl-N-hydroxythioacetimidate



Acetonitrile



E. I. DU PONT DE NEMOURS & COMPANY
INCORPORATED

WALKER'S MILL, BARLEY MILL PLAZA
P.O. BOX 80038
WILMINGTON, DELAWARE 19880-0038

August 24, 1989

AGRICULTURAL PRODUCTS DEPARTMENT

Ms. Joanne S. Edwards
Review Manager
Registration Branch
Special Review and Reregistration Division (H7508C)
U.S. Environmental Protection Agency
Office of Pesticide Programs (H7504C)
Document Processing Desk (RS-0028)
Room 266A, Crystal Mall 2
1921 Jefferson Davis Highway
Arlington, VA 22202

Subject: Methomyl Registration Standard, case No. 0028
Du Pont 90-Day Response dated August 20, 1989.
Laboratory Volatility Response.

Dear Ms. Edwards:

In our 90-day response to the Methomyl Registration Standard, we inadvertently omitted our comments on laboratory volatility. These comments should have appeared on page 95 under "Comments on Environmental Fate Requirements 158.290" in Exhibit F.4.

Our comments on laboratory volatility are provided as an attachment to this letter. The vapor pressure study referenced in this response was included in the August 20, 1989 submission.

I apologize for any inconvenience this has caused.

Sincerely,

Diane M. Stanley, PhD
Registration & Regulatory Affairs

DMS/kas

cc: Mr. Dennis Edwards
Registration Division (H7505C)
Office of Pesticide Programs
U.S. EPA
Document Processing Desk (RS-0028)
Room 266A, Crystal Mall 2
1921 Jefferson Davis Highway
Arlington, VA 22202

Laboratory Data Integrity Program
Office of Compliance Monitoring (EN-34)
U.S. EPA
401 M St., S.W.
Washington, DC 20460

1 Low volume
methyl
data was used

COMMENTS ON ENVIRONMENTAL FATE REQUIREMENTS 158.290

162.3 Anaerobic Aquatic 123/5D

Anaerobic aquatic metabolism studies are required to support aquatic use patterns for methomyl. Currently, labels on Du Pont methomyl products only contain one aquatic crop use, watercress. Du Pont does not choose to conduct anaerobic aquatic metabolism studies to support this use.

According to Du Pont data, there are only about 50 acres of field-grown watercress in current production in the U.S. Almost all of this acreage is in the Southeast. The remainder of the watercress crop is container-grown.

As such, we are requesting that the Agency grant a waiver of this requirement based upon methomyl's limited use on only one aquatic crop and the fact that the crop in question is of extremely low acreage. We do not believe that the extensive aquatic requirements in this Standard are in keeping with the Agency's policy of making minor use requirements commensurate with the anticipated extent of use and degree of exposure in the environment.

If a waiver is not granted, Du Pont will remove watercress from our labels. Revised labeling would be submitted in the 9-month response providing that we receive the Agency's decision in time. We have alerted IR-4 to the possibility that the watercress use may be lost in the event that they choose to work with the Agency to maintain the use.

162.4 Aerobic Aquatic 124/5D

We request a waiver of the aerobic aquatic metabolism requirement for the reasons presented for 162-3. If a waiver is not granted, we will remove watercress from our labels.

163-2 Lab Volatility

164-1 Aquatic Sediment 125/5D

We request a waiver of the aquatic sediment requirement for the reasons presented for 162-3. If a waiver is not granted, we will remove watercress from our labels.

165-3 Accumulation in Irrigated Crops 126/NT

Permanent irrigation

This requirement is mistakenly identified as 165-4 in Table A.

We request a waiver of the accumulation in irrigated crops requirements for the reasons presented for 162-3. If a waiver is not granted, we will remove watercress from our labels.

165-5 Accumulation in Aquatic Non-Target Organisms 129/NT.

Table A does not identify this requirement with a particular use pattern. We believe this requirement is generally associated with aquatic use, "C". Therefore, we request a waiver of the accumulation in aquatic non-target organisms requirement for the reasons presented in 162-3. If a waiver is not granted, we will remove watercress from our labels.

Groundwater Monitoring

Small scale retrospective groundwater field monitoring studies are required for Methomyl.

We have obtained agreement from Rhone-Poulenc Ag. Co. to rely upon their groundwater monitoring study entitled, "Field Research Studies on the Movement and Degradation of Thiodicarb and Its Metabolite, Methomyl" (MRID 40532201 and MRID 40643001) for submission in fulfillment of the methomyl groundwater monitoring requirement. A copy of the letter from Rhone-Poulenc authorizing the Agency to access this study on our behalf is attached as an appendix to this exhibit.

After the Agency has had an opportunity to review the study, we hereby request a meeting with the Agency to discuss the applicability of the Rhone-Poulenc data to the methomyl groundwater monitoring requirement. Groundwater specialists from Du Pont and Rhone-Poulenc are prepared to meet at the Agency's earliest convenience to discuss any questions you may have about the data. Please notify us when such a meeting is appropriate.

COMMENTS ON DRIFT FIELD EVALUATION.158.440

201-1 Droplet Size Spectrum and Drift Field Evaluation

Spray drift droplet spectrum and drift field evaluation data are required for methomyl.

Du Pont contends that this requirement can be satisfied by existing droplet spectrum and spray drift studies for oxamyl. These data were submitted to the Agency on August 15, 1988 and January 23, 1989 in response to similar requirements for the reregistration of oxamyl (Case No. 108). The studies are entitled "Spray Drift Evaluation for Du Pont Vydate® L Insecticide" (Du Pont Report APD-88-1MK) (MRID 40790002) and "Supplement 1 to Spray Drift Evaluation of Du Pont Vydate® L Insecticide" (Supplement 1 to Du Pont Report APD-88-1MK) (MRID 40970901).

Both methomyl and oxamyl are carbamate insecticides. The oxamyl studies used Vydate® L (24%) which is a formulation very similar to Lannate® L (24%) the major Du Pont methomyl liquid formulation. Directions for application of both products are almost identical, especially with regard to aerial application, and both products are approved for use on a variety of the same fruit, vegetable and field crops.

The Vydate® studies were carried out according to the Pesticide Assessment Guidelines, Subdivision R, Pesticide Spray Drift Evaluation (EPA-540/9-84-002) with the purpose of determining the off-target movement of aerially-applied Vydate® L. Applications approximated commercial conditions under high and low wind speeds using both water and oil as spray carriers. Treatment rates were similar to those recommended for Lannate® L applied by air.

The Vydate® studies showed that there was little potential for drift to contaminate off-target crops or water located downwind of the applications, although certain weather conditions can increase drift potential. Our Lannate® labels contain statements to avoid application when conditions favoring drift exist.

We request that the Agency evaluate the existing Vydate® droplet spectrum and drift studies as surrogates for methomyl. If further data are required for methomyl, we believe it would be prudent to await the recommendations of the EPA-ARI-NACA group currently addressing drift requirements before beginning new studies. In that way we would be certain that any new data developed would meet Agency needs.