Shaughnessy No.: 068103 & 029001

Date Out of EFGWB: SEP - 8 1989

To: Susan Lewis
Acting Product Manager #21
Fungicide-Herbicide Branch
Registration Division (H7505C)

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

Thru: Henry Jacoby, Acting Chief
Environmental Fate and Ground Water Branch/EFED (H7507C)

Attached, please find the EFGWB review of . . .

Reg./File # : 45639-90

Chemical Names: Methyl isothiocyanate & 1,3 -dichloropropene

Type Product : Nematicide/Fungicide/Herbicide/Insecticide

Product Name : Vorlex

Company Name : NOR-AM Chemical Company

Purpose : Acknowledge FIFRA data audit conducted by EPA @ NOR-AM Chemical Co., Exton, PA, of a soil dissipation study of Vorlex (164-1, MRID# 402938-01).

Date Received: 5/31/89 EFGWB # (s): 90611

Action Code : 354 Total reviewing time: 0.5 days

Deferrals to:

_____ Ecological Effects Branch, EFED

_____ Science Integration and Policy Staff, EFED

_____ Non-Dietary Exposure Branch, HED

_____ Dietary Exposure Branch, HED

_____ Toxicology Branch I, HED

_____ Toxicology Branch II, HED

1. CHEMICAL: Common names:

Methyl isothiocyanate & 1,3-dichloropropene

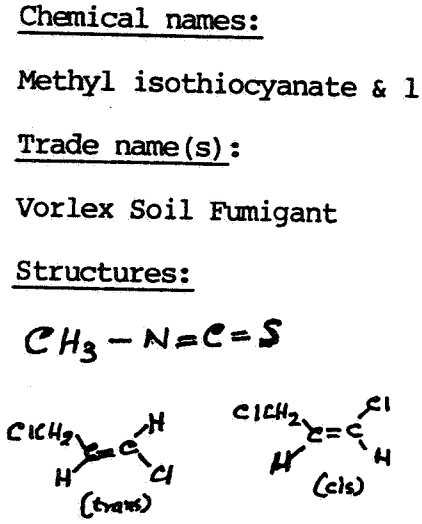
Chemical names:

Methyl isothiocyanate & 1,3-dichloropropene

Trade name(s):

Vorlex Soil Fumigant

Structures:




Formulation:

A mixture of 20% (w/w) methyl isothiocyanate and 40% (w/w) 1,3-dichloropropene and other chlorinated hydrocarbons.

Physical/Chemical properties:

Methyl isothiocyanate

| | | |
|---|---|---|
| Molecular formula | : | $C_2H_3NS$. |
| Molecular weight | : | 73.11 |
| Physical state | : | straw-colored liquid. |
| Solubility | : | 7600 ppm @ 25°C |
| Vapor Pressure | : | 20 Torr @ 20°C |

1,3- dichloropropene

| | | |
|---|---|---|
| Molecular formula | : | $C_3H_4Cl_2$. |
| Molecular weight | : | 111.0 |
| Physical State | : | Colorless to straw-colored liquid |
| Vapor pressure | : | 22 mm Hg at 20° C. |
| Solubility | : | Water -0.1 |

2. TEST MATERIAL:

Vorlex

3. STUDY/ACTION TYPE:

Acknowledge FIFRA data audit conducted by EPA @ NOR-AM Chemical CO., Exton, PA, of a soil dissipation study of Vorlex (164-1,MRID# 402938 01).

4. STUDY IDENTIFICATION:

N/A.

5. REVIEWED BY:

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

Signature: PKDatta

Date: 9/8/89

6. APPROVED BY:

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

Signature:

Date: SEP - 8 1989

7. CONCLUSIONS:

Since there were no Good Laboratory Practice (GLP) deficiencies found in this FIFRA data audit conducted by the Agency, EFGWB acknowledges that there should not be any impact on the data evaluation record (DER) of the soil dissipation study of Vorlex (164-1, MRID# 402938 01) to support registration under 40 CFR 158.290. This study has not been reviewed to date.

8. RECOMMENDATION:

RD should inform OCM/LDIAD/OPTS that the registration status of Vorlex will not be affected by this audit since it did not identify any GLP deficiencies.

9. BACKGROUND:

On 4/24/89, Owen F. Beeder, Lab Audit Coordinator of the Project Coordination Section, Registration Support Branch/RD, requested PM #21/RD review the final FIFRA data audit report on the soil dissipation study of Vorlex (Methyl isothiocyanate & 1,3-dichloropropene) [164-1, MRID# 40293801) of 4/26-29/88. This FIFRA data audit was conducted by the Office of Compliance and Monitoring (OCM)/LDIAD/OPTS on 4/26-29/88 under 40 CFR Part 160, Good Laboratory Practice Standards.

On 5/31/89, PM #21/RD requested EFGWB/EFED review this FIFRA data audit report. EFGWB reviewed this data audit report and acknowledged its findings and reported that this soil dissipation study of Vorlex (164-1, MRID# 40293801) has not been reviewed to date.

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:

N/A.

11. COMPLETION OF ONE-LINER:

See attached one-liner.

12. CBI APPENDIX:

N/A.

$CH_3-N=C=S$

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



Common Name: **METHYL ISOTHIOCYANATE** Date: 07/28/89
Chem. Name : MIXTURE OF METHYL ISOTHIOCYANATE and 1,3-DICHLOROPROPENE
:
Shaugh. # : 68103 CAS Number: 556-61-6
Type Pest. : SOIL FUMIGANT
Formulation: LIQUID 20% (W/W) METHYL ISOTHIOCYANATE & 40% 1,3-DCP et al
Uses : SOIL FUMIGANT FOR USE ON POTATOES, TOBACCO, VEGETABLES,
: AND ORNAMENTALS
:

Empir. Form: $C_2H_3NS$ VP (Torr). 20
Mol. Weight: 73.11 Log Kow :
Solub.(ppm). 7600 @ C Henry's :

Hydrolysis (161-1)
pH 5:[#] 6.5 DAYS
pH 7:[#] 20.6 DAYS
pH 9:[#] 5.7 DAYS
pH :[#] 1973 WORK SHOWS 54 DAYS
pH :[ ] AT pH 7.2 AND 88 DAYS AT
pH :[ ]

Photolysis (161-2, -3, -4)
Air :[ ]
Soil :[ ]
Water:[ ]
:[ ]
:[ ]

oil (162-1)
1.[ ]
2.[ ]
3.[ ]
4.[ ]
5.[ ]
6.[ ]
7.[ ]

Anaerobic Soil (162-2)
1.[#] 19 DAYS IN LOAMY SAND SOIL
2.[ ]
3.[ ]
4.[ ]
5.[ ]
6.[ ]
7.[ ]

Aerobic Aquatic (162-4)
1.[ ]
2.[ ]
3.[ ]
4.[ ]

Anaerobic Aquatic (162-3)
1.[#] 19 DAYS IN ANAEROBIC LmSd
2.[ ] (FLOODED PLUS NITROGEN)
3.[ ]
4.[ ]

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

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Common Name: **METHYL ISOTHIOCYANATE** Date: 07/28/89

**VOLATILITY STUDIES (163-2,3)**

[ ] Laboratory.
[ ] Field:

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

Terrestrial Field (164-1)
1.[ ]
2.[ ]
3.[ ]
4.[ ]
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.[ ]
2.[ ]

Field Rotational Crops (165-2)
1.[ ]
2.[ ]

Irrigated Crops (165-3)
1.[ ]
2.[ ]

Fish (165-4)
1.[ ]
2.[ ]

Non-Target Organisms (165-5)
1.[ ]
2.[ ]



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Common Name: **METHYL ISOTHIOCYANATE** Date: 07/28/89

**GROUND WATER STUDIES (158.75)**

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

**DEGRADATION PRODUCTS**

1. METHYLAMINE
2. N,N'-DIMETHYLTHIOUREA
3. MONOMETHYLTHIOUREA
4.
5.
6.
7.
8.
9.
10.

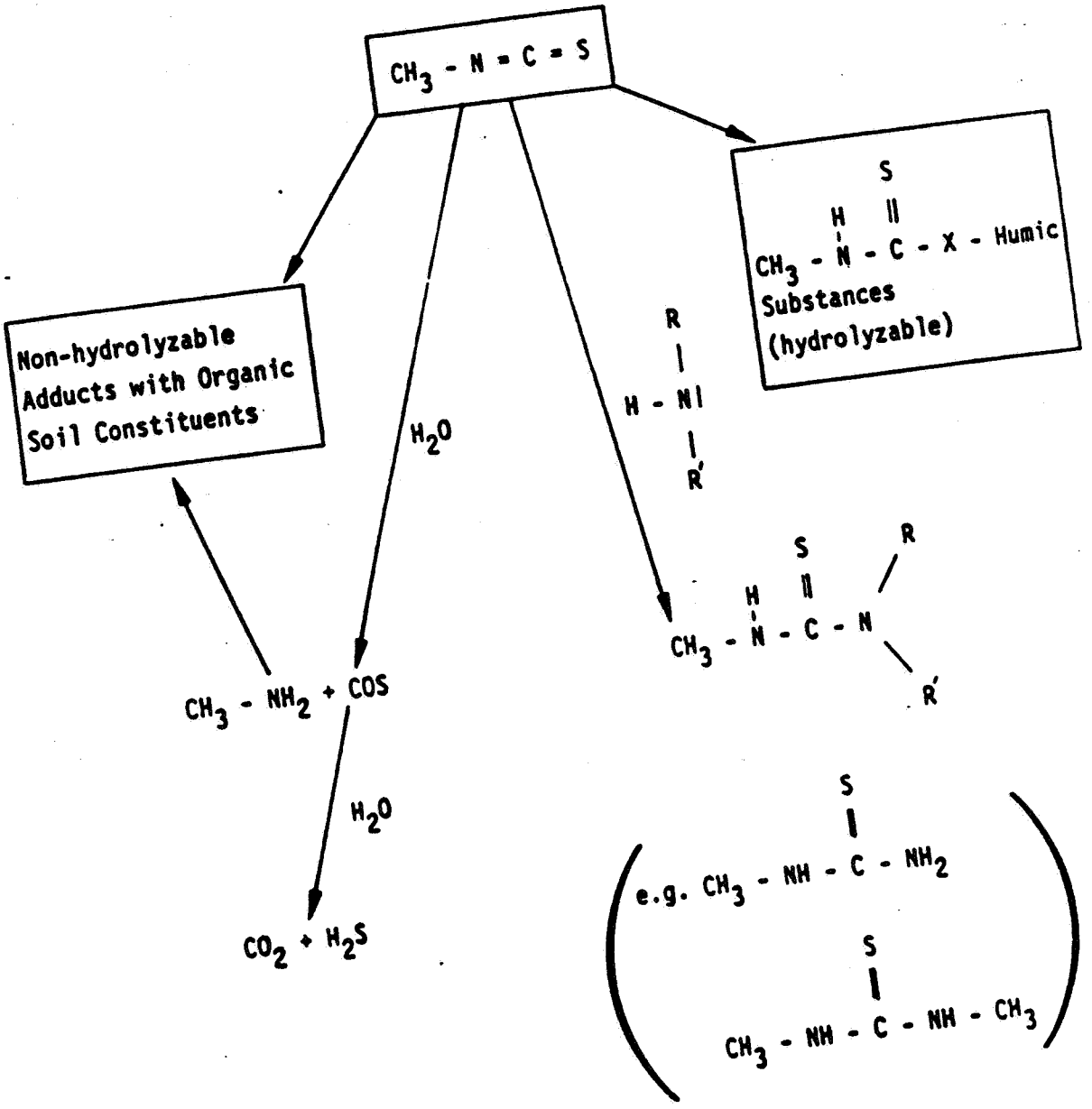
**COMMENTS**

THERE IS A GREAT DISPARITY IN THE HYDROLYSIS DATA.

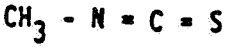
SOIL Koc = 10.

References: EPA REVIEWS
Writer : J. HANNAN

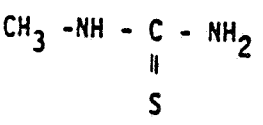
FIGURE 14: PROPOSED PATHWAY OF DEGRADATION OF MITC IN SOIL UNDER ANAEROBIC CONDITIONS



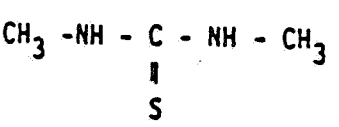
Methylisothiocyanate



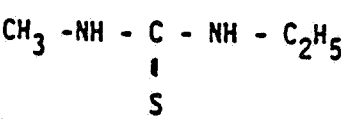
Monomethylthiourea



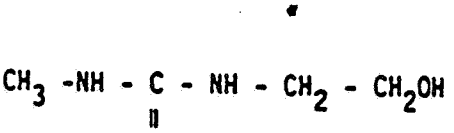
N,N'-Dimethylthiourea



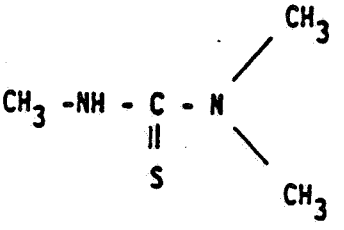
N,N'-Ethyl-methylthiourea



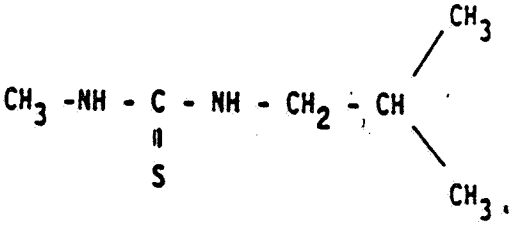
N,N'-2-Hydroxyethyl-methylthiourea



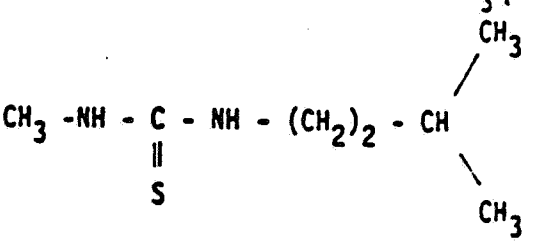
N,N'-Dimethyl-methylthiourea



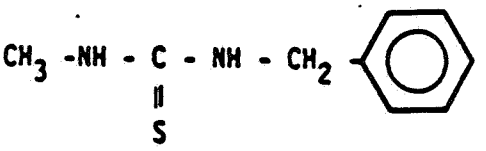
N,N'-Isobutyl-methylthiourea



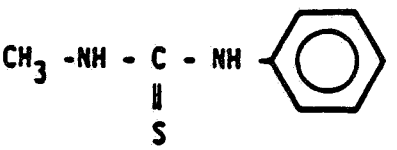
N,N'-Isopentyl-methylthiourea

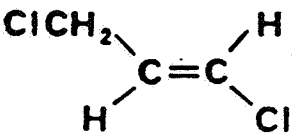


N,N'-Benzyl-methylthiourea

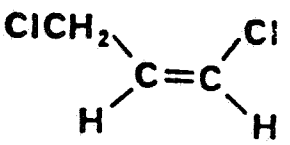


N,N'-Phenyl-methylthiourea






(trans)




(cis)

ENVIRONMENTAL FATE & [illegible]
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY



Common Name: **DICHLOROPROPENE** Date: 07/27/89
Chem. Name : 1,3-DICHLOROPROPENE
:
Shaugh. # : 29001 CAS Number: 542-75-6
Type Pest. : NEMATICIDE, FUNGICIDE; INSECTICIDE, HERBICIDE
Formulation: SINGLE ACTIVE INGREDIENT, 94% RTU
Uses : SOIL FUMIGANT, APPLIED PRIOR TO PLANTING TERRESTRIAL-FOOD
: AND NON-FOOD USE SITES.
:

Empir. Form: $C_3H_4Cl_2$
Mol. Weight: 110.9
Solub.(ppm): 2500 (OR 1000) @ 20 C

VP (Torr): 27.3
Log Kow : 25.00
Henry's : 1.8E-3

Hydrolysis (161-1)
pH 5:[*] 3-5 DAYS AT 30 C
pH 7:[*] 3-5 DAYS AT 30 C
pH 9:[*] 3-5 DAYS AT 30 C
pH :[ ] pH5.5, 2 C, 90-100 DAYS
pH :[ ] " 15 C, 11-13 DAYS
pH :[ ] " 29 C, 2 DAYS

Photolysis (161-2, -3, -4)
Air :[*] 0.5-3.3 DAYS W/GE SUNLAMP
Soil :[*] RAPID
Water:[ ]
:[ ]
:[ ]
:[ ]

## MOBILITY STUDIES (163-1)

Soil Partition (Kd)
1.[#] LOAMY SAND .23
2.[#] SAND .32
3.[#] CLAY 0.42 AND 1.09
4.[ ] AVG MAX Koc VALUES WERE 20 FOR
5.[ ] SAND, 25 FOR LOAMY SAND, AND
6.[ ] 41 AND 42 FOR TWO CLAY SOILS

Rf Factors
1.[#] IN 30 CM COLUMNS OF SAND,
2.[ ] LOAMY SAND, AND FLA. CLAY,
3.[ ] LEACHED WITH >25" WATER, 1.9-
4.[ ] 4.6% APPL RADIO. REMAINED IN
5.[ ] SOILS AND 70-84% WAS IN
6.[ ] LEACHATE.

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

Aerobic Soil (162-1)

| | SOIL | %OM | C | pH | T1/2DA |
|---|---|---|---|---|---|
| 1.[#] | | | | | |
| 2.[ ] | SPIER SL | 11.6 | 15 | ? | 22 |
| 3.[ ] | SPIER SL | 11.1 | 15 | ? | 37 |
| 4.[ ] | HAREN SL | 3.6 | 15 | 5.0 | 22 |
| 5.[ ] | BOGERCIE SL | 3.6 | 20 | 5.6 | 25 |
| 6.[ ] | CLAY | 1.1 | 20 | 6.8 | 3 |
| 7.[ ] | CLAY | 1.8 | 20 | 7.2 | 8 |

Anaerobic Soil (162-2)

| | SOIL | TEMP | T 1/2 |
|---|---|---|---|
| 1.[*] | | | |
| 2.[ ] | SILT CLAY LOAM | 15 C | 9.1 DA |
| 3.[ ] | " " " | 25 C | 2.4 DA |
| 4.[ ] | SANDY LOAM | 15 C | 7.7 DA |
| 5.[ ] | " " | 25 C | 2.4 |
| 6.[ ] | | | |
| 7.[ ] | | | |

Aerobic Aquatic (162-4)
1.[ ]
2.[ ]
3.[ ]
4.[ ]

Anaerobic Aquatic (162-3)
1.[*] AT pH 6.9-7.5, T1/2=20 DAYS
2.[ ]
3.[ ]
4.[ ]

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

Common Name: **DICHLOROPROPENE** Date: 07/27/89

**VOLATILITY STUDIES (163-2,3)**

[ ] Laboratory:
[ ] Field:

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

Terrestrial Field (164-1)
1.[#] 1,3-D APPLIED AT 342 LB AIA DECLINED FROM A MAX OF 130,000
2.[ ] PPB IN .30-.45 M LAYER, IMMEDIATELY AFTER TREATMENT, TO
3.[ ] <10 PPB (DETECTION LIMIT) IN ANY SOIL LAYER AT 71 DAYS; THIS
4.[ ] WAS IN A FIELD PLOT OF SAND SOIL IN CALIFORNIA.
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.[ ]
2.[ ]

Field Rotational Crops (165-2)
1.[ ]
2.[ ]

Irrigated Crops (165-3)
1.[ ]
2.[ ]

Fish (165-4)
1.[ ]
2.[ ]

Non-Target Organisms (165-5)
1.[ ]
2.[ ]

Common Name: **DICHLOROPROPENE** Date: 07/27/89

**GROUND WATER STUDIES (158.75)**

1.[ ] 1,3-D NOT DETECTED BETWEEN 0 AND 170 DAYS POSTTREATMENT IN
2.[ ] FOUR WELLS LOCATED IN AND AROUND A FIELD PLOT OF SAND SOIL
3.[ ] TREATED AT 342 LBS AIA.

**DEGRADATION PRODUCTS**

1. NONE DETECTED IN LEACHED COLUMN STUDIES
2. 3-CHLOROALLYL ALCOHOL, IN FIELD DISSIPATION STUDIES, DECLINED
3. FROM MAX OF 410 PPB IN THE .66-.81 M LAYER AT 7 DAYS POST-TREAT-
4. MENT TO <10 PPB IN ANY SOIL LAYER AT 71 DAYS.
5. PROPIONIC ACID AND AN UNKNOWN (CONTG. AN ALCOHOL OR CARBOXYL)
6.
7.
8.
9.
10.

**COMMENTS**

IN ANAEROBIC STUDIES, 1,3-D HAS AN AFFINITY FOR THE WATER PHASE OVER THE ORGANIC PHASE.

1,3-D EXPOSED TO 275 W GE SUNLAMP DEGRADED; T 1/2 = .5 TO 3.3 DA

WELLS 65-1200 FEET IN SO. CAL. HAD NO 1,3-D OR CHLOROALLYL ALC..

WELLS IN SUFFOLK CO.(NY) HAD DETECTABLE 1,3-D AND 1,2-D 68 DAYS AFTER FUMIGATION OF FIELD WITH 140 L/HA; CONC PEAKED AT 83 DAYS AND PERSISTED FOR 138 DAYS.

DESPITE 7000 GAL SPILL IN CALIF, 1,3-D DECREASED TO <100 PPM IN 0-12"DEPTH 5.5 MOS LATER, AND WAS NEVER FOUND IN WELLS NEARBY.

References: EPA REVIEWS
Writer : J. HANNAN

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