Shaughnessy No.: 057201
Date Out of EAB: JUL 27 1988

To: John Tice
Acting Product Manager #16
Insecticide-Rodenticide Branch
Registration Division (TS-767C)

From: Emil Regelman, Supervisory Chemist
Environmental Chemistry Review Section #3
Exposure Assessment Branch/HED (TS-769C)

Through: Paul F. Schuda, Chief
Exposure Assessment Branch/HED (TS-769C)

Attached, please find the EAB review of . . .

Reg./File # : 241-212

Chemical Name : Phorate

Type Product : Insecticide

Product Name : Thimet

Company Name : American Cyanamid Company

Purpose : Review of a field dissipation study (164-1) which was included in EAB's Science Chapter of Phorate (7/25/88).

Date Received: 5/5/88 Action Code: 660

Date Completed: 7/27/88 EAB # (s): 80745

Monitoring Study Requested: _____ Total Reviewing time: 2 days

Monitoring Study Volunteered: _____

Deferrals to: _____ Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch

1/29

1. CHEMICAL: Common name:

Phorate

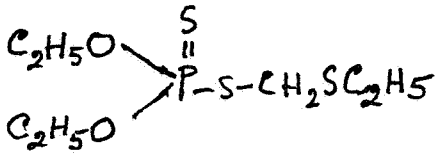
Chemical name:

Phosphorothioic acid, 0,0-diethyl S-(ethylthio)methyl ester

Trade name(s):

Thimet, AAstar, Agrimet, Geomet, Granutox, Phorate-10G, Rampart, Thimenox

Structure:



Formulations:

0.2%-20% G

Physical/Chemical properties:

Molecular formula: $C_7H_{17}O_2PS_3$.
Molecular weight: 260.4.
Physical state: Clear liquid.
Solubility: 50 mg/L in water at room temperature.

2. TEST MATERIAL:

20% G.

3. STUDY/ACTION TYPE:

Addendum to the SRR.

4. STUDY IDENTIFICATION:

Higham, J.W., M. Roman and K. T. Shimel. 1988. Thimet phorate (CL 35,024/20-G): Residues of CL 35,024 and its metabolites in soil. Prepared and submitted by American Cyanamid Co., Princeton, NJ. (40586506-A)

Higham, J.W., S. Martin, and K. Shimel. 1987. Thimet phorate (CL 35,024): Validation of GC Method M-1743.1 for the separate determination of CL 35,024 and related compounds (CL 4,259, CL 18,177, CL 18,161 and CL 18,162) in soil. Prepared and submitted by American Cyanamid Co., Princeton, NJ. (40586506-C)

2

Roman, M., S. Martin, and M. Weis. 1988. CL 35,024 phorate (20-G): Residues of CL 35,024 and its metabolites in soil (corn, BAND; IA, 1987) (C-3013). Unpublished study prepared and submitted by American Cyanamid Co., Princeton, NJ. (40586506-B)

5. REVIEWED BY:

P. Datta, Ph.D.
Chemist
EAB/HED/OPP
Review Section #3

Signature: PDatta

Date: 7/27/88

6. APPROVED BY:

Emil Regelman
Supervisory Chemist
EAB/HED/OPP
Review Section #3

Signature: Elder

Date: JUL 27 1988

7. CONCLUSIONS:

EAB cannot accept this study on field dissipation (164-1) because the registrant did not include some pertinent information from the (otherwise) acceptable study. The pertinent information required to justify this study are: (1) information on the length of frozen storage of experimental soil samples prior to analysis; (2) a frozen storage stability study for phorate and its major degradates in soil to validate the storage of the experimental samples; and, (3) field maintenance practices data/information during this field dissipation study.

8. RECOMMENDATIONS:

EAB recommends RD inform American Cyanamid Company to provide information noted in the Conclusions Section of this review.

Note: The review of this study has already been included in the EAB's Science Chapter of the phorate SRR completed on 7/25/88.

9. BACKGROUND:

On 4/11/88, American Cyanamid Company submitted a study on field dissipation for phorate. THIMET 20 G (phorate a.i.) was applied in a 7-inch band at 1.3 lbs a.i./A to corn planted in silt loam soil in Geneseo, Illinois.

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES:

See attached individual DER.

11. COMPLETION OF ONE-LINER:

See attached one-liner.

12. CBI APPENDIX:

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

DYNAMAC
CORPORATION

PHORATE ADDENDUM

Final Report

Task 1: Review and Evaluation of Individual Studies

Contract No. 68-01-6679

JUNE 10, 1988

Submitted to:
Environmental Protection Agency
Arlington, VA 22202

Submitted by:
Dynamac Corporation
Enviro Control Division
The Dynamac Building
11140 Rockville Pike
Rockville, MD 20852

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DATA EVALUATION RECORD

PHORATE STUDY 11

CHEM 057201 Phorate

BRANCH EAB

FORMULATION--04--GRANULAR (G)

FICHE/MASTER ID 40586506-A
Higham, J.W., M. Roman and K. T. Shimel. 1988. Thimet phorate (CL 35,024/20-G): Residues of CL 35,024 and its metabolites in soil. Prepared and submitted by American Cyanamid Co., Princeton, NJ.

FICHE/MASTER ID 40586506-C
Higham, J.W., S. Martin, and K. Shimel. 1987. Thimet phorate (CL 35,024): Validation of GC Method M-1743.1 for the separate determination of CL 35,024 and related compounds (CL 4,259, CL 18,177, CL 18,161 and CL 18,162) in soil. Prepared and submitted by American Cyanamid Co., Princeton, NJ.

SUBST. CLASS = S

DIRECT RVW TIME = 5

REVIEWED BY: W. Higgins TITLE: Staff Scientist

EDITED BY: K. Patten K. Patten TITLE: Task Leader

APPROVED BY: W. Spangler W. Spangler TITLE: Program Manager

ORG: Dynamac Corporation
Rockville, MD
TEL: 468-2500

APPROVED BY: P. Datta
TITLE: Chemist
ORG: EAB/HED/OPP
TEL: 557-9733

SIGNATURE: P R Datta 7/27/88

CONCLUSIONS:

Field Dissipation - Terrestrial

This study provides supplemental information towards the registration of phorate. However, this study does not fulfill EPA Data Requirements for Registering Pesticides because samples were stored frozen but freezer storage stability data were not provided.

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SUMMARY OF DATA BY REVIEWER:

Phorate dissipated with a half-life of 9-15 days from the upper 3 inches of two field plots (30 X 102 feet) of silt loam soil in Illinois following the application of phorate (Thimet, 20% G) at 1.3 lb ai/A in May, 1987. The calculated half-life was 19 days. Phorate declined from a maximum of 0.75 ppm at 3 days posttreatment to <0.05 ppm by 59 days posttreatment in the 0- to 3-inch soil depth. At all other soil depths (down to 18 inches), phorate concentrations were <0.05 ppm throughout the study. In the 0- to 3-inch soil depth, maximum concentrations of phorate sulfoxide (CL 18,177) and phorate sulfone (CL 18,161) were 0.73 ppm (day 30 posttreatment) and 0.42 ppm (day 30 posttreatment), respectively, and declined to 0.05 and 0.26 ppm by day 180 posttreatment. Phorate sulfoxide and phorate sulfone were <0.05 ppm at all other soil depths. Phoratoxon (CL 4,259) was <0.05 ppm at all sampling intervals.

DISCUSSION:

1. Soil samples were frozen at -10°F to -20°F for an unspecified time prior to analysis; however, freezer storage stability data were not provided.

2. Field maintenance practices during the studies were not described.

3. Rainfall totaled 28.9 inches at 180 days posttreatment. Air and soil (4-inch depth) temperatures from May through October, 1987, ranged from 26-107°F and 38-88°F, respectively.

MATERIALS AND METHODS

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MATERIALS AND METHODS:

Phorate (Thimet, 20% G) was applied in 7-inch bands at 1.3 lb ai/A to silt loam soil (17.2% sand, 56.2% silt, 26.6% clay, 3.5% organic matter, pH 5.5, CEC 19 meq/100 g) in Geneseo, IL, on May 12, 1987. The field plot (30 x 102 feet, 1% slope, 30-35 feet to the water table) was planted to corn just prior to treatment. Soil samples (0- to 3-, 3- to 6-, 6- to 9-, 9- to 12-, 12- to 15-, and 15- to 18-inch depths) were taken prior to treatment, immediately posttreatment, and at 3, 9, 15, 30, 59, 90, 120 and 180 days posttreatment. Samples were frozen (-10 to -20°F) until analysis.

Soil samples were screened (mesh size unspecified), mixed, and analyzed by American Cyanamid Method M-1743.1. Soil samples were extracted by shaking with 10% aqueous acetone. CL 35,024 and its degradates were partitioned into methylene chloride after dilution of the extract with water and addition of sodium chloride to avoid emulsion formation. The methylene chloride was evaporated and the residue was dissolved in acetone. These samples were analyzed by GC with flame photometric detection. The detection limit was 0.05 ppm.

Phorate EFB Review

Page _____ is not included in this copy.

Pages 10 through 14 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 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.

✓ 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.

PERTINENT DATA TABLES AND FIGURES

DATA EVALUATION RECORD

PHORATE STUDY 2

CHEM 057201 Phorate

BRANCH EAB

FORMULATION--04--GRANULAR (G)

FICHE/MASTER ID 40586506-B
Roman, M., S. Martin, and M. Weis. 1988. CL 35,024 phorate (20-G): Residues of CL 35,024 and its metabolites in soil (corn, BAND; IA, 1987) (C-3013). Unpublished study prepared and submitted by American Cyanamid Co., Princeton, NJ.

FICHE/MASTER ID 40586506-C
Higham, J.W., S. Martin, and K. Shimel. 1987. Thimet phorate (CL 35,024): Validation of GC Method M-1743.1 for the separate determination of CL 35,024 and related compounds (CL 4,259, CL 18,777, CL 18,161 and CL 18,061) in soil. Prepared and submitted by American Cyanamid Co., Princeton, NJ.

SUBST. CLASS = S

DIRECT RVW TIME = 5

REVIEWED BY: W. Higgins TITLE: Staff Scientist

EDITED BY: K. Patten TITLE: Task Leader

APPROVED BY: W. Spangler TITLE: Program Manager

ORG: Dynamac Corporation
Rockville, MD
TEL: 468-2500

APPROVED BY: P. Datta
TITLE: Chemist
ORG: EAB/HED/OPP
TEL: 557-9733

SIGNATURE:

CONCLUSIONS:

Field Dissipation - Terrestrial

This study provides supplemental information towards the registration of phorate. However, this study does not fulfill EPA Data Requirements for Registering Pesticides because samples were stored frozen but freezer storage stability data were not provided.

SUMMARY OF DATA BY REVIEWER:

In the 0- to 3-inches soil depth of two field plots (6 rows x 190 feet) of silt loam soil in Iowa treated with phorate (Thimet, 20% G) at 1.0 lb ai/A in May, 1987, phorate declined from 10.2 ppm immediately posttreatment to 5.34 ppm by day 7, to 0.25 ppm by day 30, and to <0.05 ppm by day 92. The calculated half-life was 12 days. Phorate was <0.05 ppm in the 3- to 6-, 6- to 9-, and 9- to 12-inch sampling depths at all sampling intervals. In the 0- to 3-inch soil depth, phorate sulfoxide (CL 18,177) declined from a maximum of 2.92 ppm at 7 days posttreatment to 0.18 ppm at 180 days posttreatment. Phorate sulfoxide was <0.05 ppm at all other sampling depths and intervals except for day 30 in the 6- to 9-inch depth (0.06 ppm). In the 0- to 3- inch depth, phorate sulfone (CL 18,161) reached a maximum of 1.93 ppm at 60 days posttreatment and declined to 0.13 ppm by day 180. In the 3- to 6-inch depth, phorate sulfone reached a maximum of 0.16 ppm at 180 days. Phorate sulfone was <0.05 ppm at all sampling intervals at the lower depths except at day 30 in the 6- to 9-inch depth (0.07 ppm). Phoratoxon (CL 4,259) was <0.05 ppm at all sampling intervals.

DISCUSSION:

1. The concentration of phorate in the 0- to 3-inch soil depth immediately posttreatment (10.2 ppm) is much greater than would be expected based on the reported application rate (1 lb ai/A). The expected concentration would be approximately 1 ppm, based on the assumption that the top 3 inches of an acre would weigh 1 million pounds. The high concentration may be due to miscalculation of application rate, uneven application of pesticide, or the band application method used. The registrant does not address this problem.

2. Soil samples were frozen at -10°F to -20°F for an unspecified time prior to analysis; however, freezer storage stability data were not provided.

2. Field maintenance practices during the studies were not described.

3. Cumulative rainfall was 15.4 inches at 180 days posttreatment. Air and soil (4-inch depth) temperatures from May through October, 1987 were 25-104°F and 40-112°F, respectively.

MATERIALS AND METHODS

MATERIALS AND METHODS:

Phorate (Thimet, 20% G) was applied in 7-inch bands at 1.0 lb ai/A to silt loam soil (14% sand, 60% silt, 26% clay, 3.2% organic matter, pH 5.6, CEC 16.7 meq/100 g) in Danville, Iowa, on May 28, 1987. The field plot (6 rows x 190 feet, 1% slope, 30 to 35 feet to the water table) was planted to corn just prior to treatment. Soil samples (0- to 3-, 3- to 6-, 6- to 9-, and 9- to 12-inch depths) were taken prior to treatment, immediately posttreatment, and at 3, 7, 15, 30, 60, 92, 120 and 180 days posttreatment. Samples were frozen (-10 to -20°F) until analysis.

Soil samples were screened (mesh size unspecified), mixed, and analyzed by American Cyanamid Method M-1743.1. Soil samples were extracted by shaking with 10% aqueous acetone. CL 35,024 and its degradates were partitioned into methylene chloride after dilution of the extract with water and addition of sodium chloride to avoid emulsion formation. The methylene chloride was evaporated and the residue was dissolved in acetone. These samples were analyzed by GC with flame photometric detection. The detection limit was 0.05 ppm.

Pesticide EAB review

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