029001

Date Out EAB: OCT 29 1987

To: G. Werdig
Product Manager 50
Registration Division (TS-767)

From: Patrick Holden, Manager PWH
Ground-Water Program
Exposure Assessment Branch
Hazard Evaluation Division (TS-769)

Attached please find the environmental fate review of:

Reg./File No.:

Chemical: 1,3-dichloropropene

Type Product:

Product Name:

Company Name: DOW Chemical

Submission Purpose: Ground-Water-Data-Call-In

ACTION CODE: 495

Date In: 3/25/87

EAB # 70169

Date Completed:

TAIS (level II)	Days
	3.0

Deferrals To:

_____ Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch

Monitoring study requested by EAB: / /

Monitoring study voluntarily conducted by registrant: / /

REGISTRATION DIVISION DATA REVIEW RECORD

Confidential Business Information — Does Not Contain National Security Information (E.O. 12065)

1114 FED 1-12-87

1. CHEMICAL NAME 1,3-Dichloropropene

2. IDENTIFYING NUMBER	3. ACTION CODE	4. ACCESSION NUMBER
029001	495	400259

TO BE COMPLETED BY PM

5. RECORD NUMBER: 187,787

6. REFERENCE NUMBER:

7. DATE RECEIVED (EPA): 12/8/86

8. STATUTORY DUE DATE:

9. PRODUCT MANAGER (PM): S.Lewis/G.Werdig

10. PM TEAM NUMBER: 50

TO BE COMPLETED BY PCB

11. DATE SENT TO HED/TSS: 01-12-87

12. PRIORITY NUMBER: 20

13. PROJECTED RETURN DATE: 03-25-87

14. CHECK IF APPLICABLE

- ☐ Public Health/Quarantine
- ☐ Minor Use
- ☐ Substitute Chemical
- ☐ Part of IPM
- ☐ Seasonal Concern
- ☐ Review Requires Less Than 4 Hours

AH

15. INSTRUCTIONS TO REVIEWER

A. HED
- ☐ Total Assessment - 3(c)(5)
- ☐ Incremental Risk Assessment - 3(c)(7) and/or E.L. Johnson memo of May 12, 1977.

B. SPRD (Send Copy of Form to SPRD PM)
- ☐ Chemical Undergoing Active RPAR Review
- ☐ Chemical Undergoing Active Registration Standards Review

C. ☐ BFSD
D. ☐ TSS/RD
E. ☐ Other

F. INSTRUCTIONS

Review of 162-2. Also does this also satisfy data requirement 162-3? ~~Could you please~~ let me know about data requirement 162-3 ASAP.

16. RELATED ACTIONS

17. 3(c)(1)(D)
- ☐ Use Any or All Available Information
- ☐ Use Only Attached Data
- ☐ Use Only the Attached Data for Formulation and Any or All Available Information on the Technical or Manufacturing Chemical.

18. REVIEWS SENT TO
- ☐ TB
- ☐ EEB
- ☐ EF
- ☐ PL
- ☐ RCB
- ☐ EFB
- ☐ CH
- ☐ BFSD

19. To	TYPE OF REVIEW	NUMBER OF ACTIONS: Registration	Petition	EUP	SLN	Sec. 18	Inert	MNR. USE	Other
HED	TOXICOLOGY								
HED	ECOLOGICAL EFFECTS								
HED	RESIDUE CHEMISTRY								
HED	X ENVIRONMENTAL DATE Catherine Eiden								
RD/TSS	CHEMISTRY								
RD/TSS	EFFICACY								
RD/TSS	PRECAUTIONARY LABELING								
BFSD	ECONOMIC ANALYSIS								

20. ☐ Label Submitted with Application Attached

21. ☐ Confidential Statement of Formula

22. ☐ Representative Labels Showing Accepted Uses Attached

23. Date Returned to RD (to be completed by HED)

24. Include an Original and 4 (four) Copies of This Completed Form for Each Branch Checked for Review.

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DOW CHEMICAL U.S.A.

P.O. BOX 1706
MIDLAND, MICHIGAN 48640

December 5, 1986

400259-00

Ms. Susan T. Lewis
Data Call In Branch
Registration Division (TS-767C)
Office of Pesticide Programs
U.S. Environmental Protection Agency
Crystal Mall No. 2, Room 728
1921 Jefferson Davis Highway
Arlington, VA 22202

Dear Ms. Lewis:

Subject: Special Data Call-In Notice for Ground Water, Toxicology, Residue and Related Data for 1,3-Dichloropropene Dated July 5, 1984.

Enclosed are three copies of an anaerobic soil metabolism study* of 1,3-dichloropropene (1,3-D) as required under provisions of the subject Notice. Although the study is intended to satisfy the requirements of 40 CFR 158.130, Guidelines Reference No. 162-2, it is believed to fulfill the requirements of Guidelines Reference No. 162-3 as well. If the Agency's evaluation of the study acknowledges this to be true, please advise us accordingly since a 162-3 study of 1,3-D is required by the Registration Standard for this chemical dated September 18, 1986.

We trust that the above study will be found to be acceptable; however, if questions arise please do not hesitate to contact me by telephone at (517) 636-6384.

Sincerely,

Robert W. Morgan
Manager, Regulatory Planning
Agricultural Products Department

kks

Enclosures

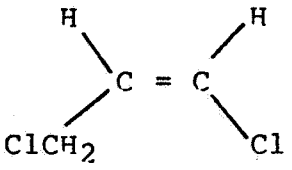
cc: Ms. Lois A. Rossi, EPA

*McCall, P.J. 1986. Anaerobic Soil Degradation of 1,3-Dichloropropene. Agricultural Products Department, Dow Chemical U.S.A., Midland, MI. November 19.

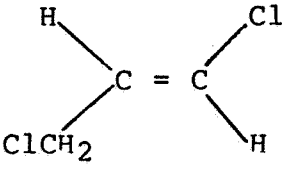
1. Chemical

Chemical name: 1,3-dichloropropene
Common name: Telone II, 1,3-D

Structure:



cis



trans

2. Test Material:

C^{14}-labelled 1,3-D (cis/trans = 60/40) specific activity = 1.15 mCi/mmol, 91% pure was used. C^{14}-labelled cis/trans 3-chloro-2-propene-1-ol, and c^{14}-labelled propionic acid were used.

3. Study/Action Type:

An anaerobic soil metabolism study was submitted for the ground-water-data-call-in.

4. Study Identification:

Anaerobic Soil Degradation of 1,3-D, by P.J. McCall, November 19, 1986, Accession no. 400259-01.

5. Reviewed by:

Catherine Eiden, Chemist
Ground-Water Team

Catherine Eiden
October 14, 1987

6. Approved by:

Matthew Lorber, Acting Team Leader
Ground-Water Team

7. Conclusion:

The study is acceptable for the purposes of the ground-water-data-call-in leaching assessment.

The study indicates that 1,3-D and its degradates are non-persistent in anaerobic soil/water systems in the laboratory. It also indicates that 1,3-D has an affinity for the water phase, indicating its mobility. The study does help to explain the appearance of 1,3-D in a limited number of ground waters in the U.S. (N.Y. and Florida).

This study satisfies requirement 162-3.

8. Recommendations:

Continue with the small-scale retrospective ground-water monitoring study started in January 1987 in cooperation with the registrant in an effort to resolve the leaching question asssociated with 1,3-D.

9. Background:

1,3-D is a soil fumigant used for its nematicidal action. The chemical was placed into special review in 1986. At this time a ground-water concern was noted based on fate data and limited findings of 1,3-D in ground water. As part of the Registration Standard, a ground-water monitoring requirement was imposed. This requirement was not specified until January - March 1987, after the guidance document on ground-water monitoring studies was formulated.

10. Discussion of Individual Studies:

A. Study Identification

Anaerobic Soil Degradation of 1,3-D, P.J. McCall, November 19, 1986, Accession no. 400259-01.

B. Materials and Methods

C^{14}-labelled 1,3-D at 1.1 ppm was applied to two soils: a Catlin silty-clay loam (14% sand, 52% silt, 34% clay, 1.9% organic carbon, pH = 5.9; and Cecil sandy loam (70% sand, 14% silt, 16% clay, 0.95% organic carbon, pH = 5.7). The soils were microbially active.

Trapping procedures for volatiles were included as part of the study set-up. The system used incubator flasks with side-arm attachments fitted with Waters C-18 Sep-Pack cartridges.

Twenty grams of each soil type were incubated individually in the flasks with 0.2 g of alfalfa to ensure a lively population of microbes before the soil was covered with water and the system purged with N_2 gas to provide anaerobic conditions. The flasks were stored for 8 weeks in the dark at 25°C after the initiation of anaerobic conditions. Then 1,3-D from a stock solution of 1.1 ppm was added to the system. The flasks were again purged with N_2 gas and incubated at 15 and 25°C. Therefore, four systems in total were studied, two soils at two different temperatures of incubation.

Samples were taken at 0,3,7,13,30,and 63 days and analyzed for 1,3-D, degradates and volatiles. Soil/water aliquots were centrifuged for 15 minutes at 2000 rpm. The water layer was removed and analyzed for C^{14} material, soils and vapor traps were analyzed. The water was analyzed by liquid scintillation chromatography (LSC). The C-18 Sep-Packs were eluted with methanol (MeOH) and the eluate was analyzed by LSC. The soils were extracted with phosphoric acid and diethylether. The ether layer was removed after centrifugation. Soil samples were extracted in this manner three times in total, the ether layers combined and analyzed by LSC. The acid phase was analyzed by LSC, also.

The soil samples were then exhaustively extracted with sodium hydroxide (NaOH) and the basic extracts were analyzed by LSC. As a final step in providing a mass balance, the soil samples were dried and combusted to determine the unextractable C^{14} residues. The $^{14}CO_2$ generated during the experiment was trapped and analyzed. A thorough materials balance procedure.

The identification of the parent and degradate compounds was carried out using HPLC. Three different column set-ups were used for analysis: a Water C-18 reverse phase Radial Pack Column, a Hamilton PRP-1 reverse phase column, and a Hamilton PRP-X100 "SAX" ion exchange column. Water and ether extracts from the soil/water systems were analyzed for C-14 activity by passage through a Packard Model 7140 Trace Radioactivity Monitor (RAM) or by collection and LSC.

Degradate identification indicated two polar compounds eluting at 5 and 14 minutes on the PRP-1 column used. They were subsequently analyzed by GC/MS for further identity clarification. Concentrated water samples were injected onto the PRP-1 system after concentration by rotary evaporation. The 14 minute eluates were partitioned with ether and dried with Na_2SO_4, concentrated and analyzed on GC/MS. The 5 minute eluate was acidified to pH 2 and partitioned four times with diethylether. The ether aliquot was passed through a Wollen basic alumina column for clean-up. The column was eluted with acetone. The acetone washings and ether passing through the clean-up were discarded. The column was then eluted with $NaHCO_3$, which removed all C-14 activity from the column. The column eluate was acidified, partitioned with ether and analyzed by GC/MS.

C. Reported Results:

As can be seen in Table 1 (attached) 1,3-D was reported as being found primarily in the water extract. A degradation product was also found in the HPLC eluate from the water extract. This degradation product was identified as 3-chloro-2-propene-1-ol (chloroallyl alcohol).

1,3-D and some polar products were identified from the ether extracts. The 5 and 14 minute eluates containing the polar degradates were identified as propionic acid and an unknown degradate. After exhuastive GC/MS and chromatographic procedures, the compound's identity was no longer pursued. The compound was believed to be a fragmentary component containing an alcohol or carboxyl group.

In summary, 1,3-D degrades under anaerobic conditions to chloroallyl alcohol, propionic acid and an unknown polar degradate. The data indicate good mass balance in all four soil/water systems, between 103-67% recovery of C-14 material for all systems up to 63 days. The percentage recovery decreases with time of incubation, because of the production and loss of small volatile compounds such as ethane and methane. As can be seen, the percentage recovery maintained > 86% through the first 30 days of sampling and then decreased up to 63 days of incubation. 1,3-D has an affinity for the water phase over the organic phase.

D. Study Author Conclusions:

It is stated in the submitted report that 1,3-D was recovered mostly from the water phase versus the organic phase.

1,3-D decreased steadily to < 8% by day 30 in all four water/soil systems. The chloroallyl alcohol degradate initially increased to a maximum of 20% in one of the systems at day 13 and decreased in all systems to between 0-6%. The propionic acid and the unknown showed the greater persistence, comprising 15-26% of the C-14 activity at day 63. CO_2 was not identified as a degradate in the anaerobic system.

The half-life of 1,3-D was 9.1 and 2.4 days in the Catlin silty clay loam at 15 and 25°C, respectively; and 7.7 and 2.4 days in the Cecil sandy loam at 15 and 25°C, respectively. From the results it appears that CO_2 generation was negligible and the majority of the degradation reaction was hydrolytic.

E. Reviewer Discussion:

1,3-D is not persistent in anaerobic systems, neither is its main degradate chloroallyl alcohol; however, the propionic acid may degrade more slowly than the parent and alcohol degradate. Although one polar degradate remains unidentified, all reasonable efforts were made to identify it. EAB concludes, the identification was not feasible. The slower degradation of the polar degradate accounted for 2.8 and 3.0 % of applied C-14 material at day 63. The increase in 'post' and NaOH activity indicates soil incorporation of the carbon molecules of 1,3-D. Whether or not the addition of alfalfa to the soil enhanced anaerobic degradation or not is open to question, but no reason to reject this study's usefulness.

1,3-D has an affinity for the water phase over the organic phase, indicating 1,3-D's mobility.

11. One-Liner:

Not applied to one-liner.

12. CBI:

No CBI included in this package.