

Date out: ~~3/02/99~~  
 5/14/99 *SM*

Chemical Code: 029001  
 DP Barcode: D249586, D252742  
 D-16053  
 SK-1, 3-Dichloropropene

**ENVIRONMENTAL FATE AND GROUND WATER BRANCH**

*(KPP)*

To: Lisa Nisenson, #62  
 Special Review and Reregistration Division (7508W)

*4-14-99*

Thru: Elizabeth Behl, Chief  
 Fate and Monitoring Branch/EFED (7507C) *Elizabeth Behl*

Attached, please find the EFGWB review of..

Common Name:	1,3-Dichloropropene	Trade name:	Telone II
Company Name:	DowElanco		
HD #:	029001		
Purpose:	Review sixth and seventh progress reports for small-scale prospective ground-water monitoring study in Wisconsin.		

Type Product:	Action Code:	EFGWB #(s):	Review Time:
Nematicide	820	NA	2 days

**STATUS OF STUDIES IN THIS PACKAGE:**

**STATUS OF DATA REQUIREMENTS  
 ADDRESSED IN THIS PACKAGE:**

Guideline #	MRID	Status
166-1	447124-01	A

Guideline #	Status
166-1	P

<sup>1</sup>Study Status Codes: A=Acceptable U=Upgradeable C=Ancillary I=Invalid.  
<sup>2</sup>Data Requirement Status Codes: S=Satisfied P=Partially satisfied N=Not satisfied R=Reserved  
 W=Waived.  
 NA=Not Available.

*1816*

1. CHEMICAL: Dichloropropene

Chemical name: 1,3-Dichloropropene  
Common name: Telone II; Telone C-17; 1,3-D

2. TEST MATERIAL:

Soil, soil-pore water, ground water, air.

3. STUDY/ACTION TYPE:

Review sixth and seventh progress reports for Wisconsin small-scale prospective monitoring study.

4. STUDY IDENTIFICATION:

Title: Environmental fate of 1,3-Dichloropropene in a Cold Climate - Progress Report #6

Author(s): B. Douglas, M. Pottinger, S. Alexander, J. Zabik, S. Dolder  
Date: July 14, 1998

Date Sent to EFED: 9/17/98

Title: Environmental fate of 1,3-Dichloropropene in a Cold Climate - Progress Report #7

Author(s): M. Pottinger, S. Alexander, B. Douglas, J. Zabik, S.C. Dolder  
Date: November 10, 1998

Date Sent to EFED: 2/01/99

Submitted for: DowElanco  
9330 Zionsville Road  
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5. REVIEWED BY:

Jim Carleton  
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6. APPROVED BY:

Elizabeth Behl  
Chief  
OPP/EFED/FMB

Signature: \_\_\_\_\_

Date: \_\_\_\_\_

7. CONCLUSIONS:

The seventh progress report for the small-scale ground-water monitoring study in Wisconsin has been submitted by the registrant. The report covers the results from pre-application sampling to 666 days post-application (through May 1998). Included in the report are reviews of agronomic activities at the site, climatological data, soil moisture and temperature conditions, and an analysis of the hydrogeology of the site.

Previous progress reports covering the period through 337 days after treatment (DAT 337) indicated that 1,3-D and its two metabolites, 3-chloroallyl alcohol and 3-chloroacrylic acid, were found in soil, ground water, and surface water (Carleton, 2/24/98). By DAT 211, 1,3-D, 3-chloroallyl alcohol, and 3-chloroacrylic acid were detected in all 8 of the shallow onsite wells (screened interval ~15 to 20 ft.) in the water table aquifer at concentrations up to 579 ppb, 2737 ppb, and 1092 ppb, respectively. These were also detected in downgradient offsite shallow and deep wells at concentrations up to 84 ppb, 194 ppb, and 153 ppb, respectively. Detections of the contaminant 1,2-D were found in all of the onsite shallow and deep wells, and the downgradient shallow and deep wells. Concentrations in the onsite wells ranged up to 3.9 ppb; concentrations in the offsite wells ranged up to 0.9 ppb.

The current progress reports indicate that since DAT 337, residues of 1,3-D and its metabolites in ground water have continued to decline. Concentrations of the contaminant 1,2-D have fluctuated somewhat, but have only declined slightly, if at all. Total residues (1,3-D + 3-chloroallyl alcohol + 3-chloroacrylic acid) in the vadose zone, previously as high as 38,000 ppb, have declined to less than 2 ppb in all cases.

The data show clearly that the pesticide in this study moved through the vadose zone and into groundwater much faster than did the bromide tracer. This unusual result may be partially a function of the method of application (injection of the pesticide into the subsurface), and may also be indicative that vapor phase diffusion was a more important downward transport process in this case than advective movement of dissolved pesticide.

The depth to ground water ranged from about 15 to 22 feet among the eight monitoring wells throughout the 9 acre site, with a consistent flow direction from the southeast toward the northwest. During the monitoring period, the depth to ground water at each well generally varied by less than two feet.

## 8. RECOMMENDATIONS:

- 1) Because residues of 1,2-D appear to be persisting in the groundwater at the study site, FMB recommends that sampling and analysis for 1,2-D in groundwater continue for another three months. Because 1,3-D and its degradates have declined to near or below detection limits in all wells, the registrant may choose to forego analyzing the samples for these compounds.
- 2) The registrant should prepare and submit to the Agency a detailed final report on the study after the additional sampling and analysis have been completed.
- 3) A complete set of conclusions and recommendations will be developed following a review of the final study report.

## 9. BACKGROUND:

Detections of 1,3-D were seen in a small-scale retrospective study conducted by the registrant for the Agency in Nebraska. Trace levels of 1,3-D were also seen in another study in Washington. Because of the concern for 1,3-D leaching in cold climates, the Agency requested that the registrant conduct a small-scale prospective ground-water monitoring study in a northern climate. The Wisconsin study site was selected to be representative of use sites in cold climates with leaching-vulnerable conditions, *i.e.* sandy soils and shallow groundwater. The study in Wisconsin was initiated on February 2, 1996.

## 10. DISCUSSION:

A small-scale prospective study is being conducted to monitor the fate of 1,3-dichloropropene and its degradates under vulnerable conditions in a cold climate. Telone II Soil Fumigant (formulated as 94 percent 1,3-D and 6 percent inerts) was applied to a potato field in Portage County, Wisconsin on September 9, 1996. Telone was injected to a depth of approximately 18 inches below the surface at a rate of 283 lbs a.i./acre (28 gallons per acre). The potassium bromide tracer was applied on September 7 and 8, 1996 at a rate of approximately 133.4 lbs/acre.

The test site is a 9-acre area with a 1-acre control plot. The soil is Plainfield loamy sand. Depth to the water table ranges from 15 to 22 feet; ground-water flow is to the northwest.

## **RESULTS**

**Climatological Data.** The target moisture input for the first month after application was 14.38 cm, which is 130 percent of the historical monthly average precipitation for the months of September and October measured between 1983 and 1992. Of this amount, most (about 9 cm) of this was input as irrigation during the first 35 days after application. Between days 32 and 62 after application, approximately 9 centimeters of water (126 percent of the ten year

monthly average input for this time of year) was added, mostly consisting of precipitation. From November through April, no irrigation was applied to the site, and monthly precipitation never exceeded 5.65 centimeters. Irrigation was resumed in May. During the study period (9/96 to 5/98), monthly evapotranspiration ranged from 0.05 to 17.02 centimeters. Monthly total precipitation and irrigation ranged from 0.30 to 15.77 centimeters during this time, with an average during the whole period of 5.56 centimeters. Soil temperature ranged from 0.6 to 6.5°C on November 10, 1996, and ranged from -0.23 to 2.23°C on January 14, 1997.

**Hydrogeologic Conditions at Site.** Depth to ground water on January 6, 1998 ranged from 17.51 to 21.48 feet below the surface, while water table elevation across the 9-acre site varied by approximately 2 feet. Since application, depth to the water table has generally fluctuated less than 2 feet in any single well. The average linear horizontal flow velocity on January 6, 1998 was estimated at 0.27 ft/day ( $9.7 \times 10^{-5}$  cm/sec), using an assumed soil porosity of 0.35.

**Bromide in Surface Soil.** Samples were taken from two depths: 0-12 inches, and 12-24 inches below ground surface. Preliminary results showed that bromide was detected on application day in all samples at the 0-12 inch depth, and one sample at the 12-24 inch depth. By day 14 after application, bromide was detected in most samples at the 12-24 inch depth. Between DAT 21 and 61, there was a general decline in bromide concentration at both depths. By DAT 276 bromide was detected in only four out of 10 samples at the 0-12 inch depth, and two of 10 samples at the 12-24 inch depth. No further soil analyses after DAT 276 were provided in the report.

**Bromide in Soil Pore Water.** Preliminary results showed increasing bromide concentrations in most lysimeters at the 3 foot depth, in 2 of 8 lysimeters at the 6 foot depth, and in 1 of 8 of each of the lysimeters at the 9 and 12 foot depths, respectively, by DAT 62. This suggested the front was starting to move through the unsaturated zone. Between DAT 62 and 666, lysimeter bromide data was periodically unavailable due to "low soil moisture and/or frozen conditions", however, maximum concentrations at all depths were generally observed between DAT 182 and 303, after which a gradual decline took place.

**1,3-D and 1,2-D in Surface Soil.** Through DAT 42, preliminary results showed generally higher concentrations in the samples from the 0-12 inch depth than in the samples from the 12-24 inch depth. On DAT 61, concentrations were higher in the 12-24 inch depth than the 0-12 inch depth. The maximum concentration in any sample (29 µg/g) occurred 3 days after application at the 12-24 inch depth. Concentrations declined to less than 20 µg/kg at both depths by DAT 276. No further soil analyses after DAT 276 were provided in the report.

**1,3-D, 1,2-D, and Degradates in Soil Pore Water.** Preliminary results showed detections of 1,3-D and 1,2-D in lysimeters at the 3, 6, 9, and 12 foot depths by 3 days after application. Concentrations generally increased, then leveled off by 42 days after application. At 62 days after application, a substantial increase in concentrations occurred. After DAT 62, although lysimeter data was periodically unavailable due to "low soil moisture and/or frozen conditions",

concentrations declined through DAT 666.

**1,3-D and Degradates in Ground Water.** 1,3-D was detected in all of the onsite shallow and deep wells (16 wells) at concentrations ranging up to 579 ppb. The highest 1,3-D concentrations in the shallow wells were seen in the sampling round which took at DAT 91. The degradates 3-chloroacrylic acid and 3-chloroallyl alcohol were detected at concentrations up to 1092 ppb (DAT 91) and 2737 ppb (DAT 127), respectively. Concentrations of 1,3-D declined to less than 1 ppb in all wells by DAT 603. Concentrations of both degradates were below the limit of detection (0.015 ppb) by DAT 666.

**1,2-D in Ground Water.** Detections of the contaminant 1,2-D were found in all of the onsite shallow and deep wells, and the downgradient shallow and deep wells. Concentrations in the onsite wells ranged up to 4.1 ppb (DAT 303), after which residues fluctuated, but were still detectable in all onsite wells on DAT 666, at concentrations up to 1.2 ppb.

**QA/QA samples.** No field spike sample results were included in the report. No explanation for their absence was provided in the report. Field blank results showed occasional detections of 1,3-D and 1,2-D below the limit of quantitation (0.05 ppb), and one detection of 1,3-D at 1.2 ppb on DAT 5.

**D-16053**

Pages 7-16 have been classified as "B", an Affirmation of Non-Multinational Status must be submitted.