

US EPA ARCHIVE DOCUMENT

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Date Out EAB:

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

From: Samuel Creeger, Chief *HJM for SMC*  
Environmental Chemistry Review Section 1  
Exposure Assessment Branch  
Hazard Evaluation Division (TS-769)

Attached please find the environmental fate review of:

Reg./File No.: \_\_\_\_\_

Chemical: Methyl Bromide and Chloropicrin

Type Product: Nematocide

Product Name \_\_\_\_\_

Company Name: Great Lakes Chemical Corporation

Submission Purpose: Response to Ground Water Data Call In: Review

Protocol.

ZBB Code: other

ACTION CODE: 495

Date In: 4/2/85

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Deferrals To:

\_\_\_\_\_ Ecological Effects Branch

\_\_\_\_\_ Residue Chemistry Branch

\_\_\_\_\_ Toxicology Branch

## INTRODUCTION

This review is in response to the request by Great Lakes Chemical Corporation for an expedited review of the study protocols for individual adsorption studies on methyl bromide and chloropicrin. Great Lakes Chemical Corporation had previously sent in protocols for other studies, which did not include the adsorption studies.

## DISCUSSION

1. Both adsorption and desorption will be studied on four soil types as per the Guidelines for each chemical separately.
2. The study design is adequate for sampling of the gas phase of the chemicals evolved during the sorption equilibration process.
3. The amount of residual pesticide remaining on the soils after the desorption process will be determined.
4. The stock solutions for each of the chemicals will be checked for stability.
5. The study design includes several blanks without soil to be handled exactly as those with soils.
6. The sorption flasks will be constantly stirred.
7. Equilibration time will be 48 hours; the solutions will be checked at 6 and 24 hours, as well.
8. No mention is made of maintaining a constant temperature within the sorption flasks.
9. It appears that the actual study design only calls for one concentration of chloropicrin (250 ppm) and one for methyl bromide (150 ppm) to be used for the individual sorption experiments.
10. The study design calls for letting the desorption flasks settle for 48 hours after mixing to allow for soil particle settling.

## CONCLUSIONS

Items 1-6 in the Discussion section above are adequate for the purposes of the sorption/desorption studies. As regards the other items:

8. The sorption/desorption studies should be maintained at a constant temperature, preferably ambient room temperature around 25°C.
9. The study design calls for only one concentration of the chemicals, 250 ppm for chloropicrin and 150 ppm for MeBr. A range of concentrations should be used in order to generate a Freundlich isotherm and the soil-water sorption coefficients. The range should encompass the concentrations encountered in the field after application of the chemicals. Taking pounds a.i./acre of application as 200 for chloropicrin, and calculating this as ppm we find:

for a 10 cm deep soil profile over an acre, the volume of soil would be  $3.9 \times 10^8 \text{ cm}^3$ , and the average density of soil being  $1.33 \text{ g/cm}^3$ , then there is  $5.2 \times 10^5 \text{ kg}$  of soil in an acre of soil 10 cm deep.

for 200 pounds of chemical we have 90.91 kg of chemical, which equals  $9.1 \times 10^7 \text{ mg}$  of chemical.

therefore, the application of  $9.1 \times 10^7 \text{ mg}$  chemical to  $5.2 \times 10^5 \text{ kg}$  of soil equals approximately 175 ppm of chemical on the soil.

This indicates that the sorption/desorption studies should be performed with a range of concentrations encompassing this application rate. At least five points should be included in the isotherm. A range of concentrations, 10-250 ppm, is suggested.

10. The use of a centrifuge for quicker settling of the soil particles in the desorption studies is an alternative to waiting for 48 hours before sampling the soil, water and gas phase of the study flasks.

#### RECOMMENDATIONS

1. Maintain a constant temperature during the sorption/desorption studies, preferably around 25°C.
2. Run the sorption/desorption studies at several concentrations encompassing the application rate, at least five concentrations between 10-250 ppm for both MeBr and chloropicrin.
3. Consider using a centrifuge to reduce the time of soil particle settling after the desorption study.

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