Shaughnessy #: 078003

Date Out of EAB: JAN 22 1986

Signature:

To: A. Castillo
Product Manager # 32
Registration Division (TS-767)

From: Joseph C. Reinert, Ph.D., Chief
Special Review Section
Exposure Assessment Branch
Hazard Evaluation Division (TS-769C)

Attached please find the EAB review of:

Reg./File No.: 464-236

Chemical: Sulfuryl fluoride

Type Product: fumigant

Product Name: VIKANE

Company Name: Dow Chemical Co.

Submission Purpose: Protocol Review

ZBB Code: 11/19/85

ACTION CODE: 660

Date Completed: 1/22/86

EAB # 6111

Monitoring Requested:

TAIS (level II) Days

Monitoring Voluntarily Done

3

Deferrals To:

_____ Ecological Effects Branch

_X_ Residue Chemistry Branch

_____ Toxicology Branch

1.0 Introduction

Dow Chemicals Company has submitted for Agency review a protocol for an exposure study on Vikane® as fumigant. The study is designed to address the concerns shown in the reregistration guidance document for sulfuryl fluoride.

1.1 Chemical Properties

Sulfuryl fluoride, SO_2F_2, is produced by Dow Chemical Company and marketed under the registered tradename Vikane. The product is an odorless and colorless gas at 25°C, practically insoluble in water and slightly soluble in organic solvents and vegetable oils. Its properties include a high vapor pressure and nonflammability. It is stable to heat and reactive with strong bases.

1.2 Formulation and Use Pattern

Vikane is marketed as a gas in 125 pound pressurized cylinders and is intended for use as a structural fumigant of dwellings by professional application to control existing infestations of drywood termites, carpet beetles, cockroaches, moths and rodents in dwellings, buildings, construction materials, furnishings and vehicles (except aircraft).

2.0 Testing Requirements in the Registration Standard

The recommendation for the use of sulfuryl fluoride to fumigate dwellings where food and furnishings are likely to be exposed is of concern with respect to the residual deposit likely to be available for human exposure. Several concerns were expressed in the Registration Standard.

2.1 Toxicology Concerns

Sulfuryl fluoride residues were reported to be detectable 40 days post fumigation in concentrations greater than 1 ppm in a number of non-food items [results of a range-finding study published in 1962 by Meikle and Stewart and in unpublished submissions from the company (1,2)].

Toxicology Branch raised the question of the potential hazard to the occupants from the residues deposited and asked that:

1. The nature of the residues on household items be characterized.

2. The residues deposited as a result of structural fumigation be determined quantitatively at 1x and 10x the use concentration.

2.2 Residue Chemistry Concerns

In addition, sulfuryl fluoride at a concentration of 35 mg per liter penetrates 4-mil polyethylene sheeting at a rate of 6.2 mg per square meter per hour (3). Toxicology Branch commented that this permeability of sulfuryl fluoride lends support to the removal of food-stuffs from the dwelling prior to fumigation rather than to store the commodity in polyethylene plastic bags during fumigation, as stated on the label.

However, Residue Chemistry stated that residue data will be required to show that polyethylene plastic of the thickness specified does in fact offer the impermeable barrier to sulfuryl fluoride sufficient enough to seal foods, feeds, drugs and medicinals.

3.0 Discussion of the Protocol

The protocol submitted by Dow Chemical includes studies designed to determine the residues and degradates of sulfuryl fluoride on food and non-food items remaining over a period of time after fumigation. These studies are residue studies. Hence the protocol should be reviewed by Residue Chemistry Branch.

EAB is concerned with the study planned to determine transient residues in air, volatilized from food and non-food surfaces. We have examined the method reported in the literature and find that it has been designed to identify the sulfuryl fluoride specifically, and the ion chromatographic method of determination has the capability to detect the low levels of sulfuryl fluoride collected by either personal air samplers or area samplers. The method of trapping of the analyte with charcoal adsorbent tubes followed by solvent desorption and hydrolysis has also been validated by the registrant for these studies (Bouyocos et al.,4).

Note that this is not the type of study which is useful for risk assessment purposes (a personal monitoring study would be), and that EAB did not request this fixed location study.

4.0 RECOMMENDATIONS

The protocol should be evaluated by Residue Chemistry Branch for all residue studies planned.

Anne R. Keller

Anne R. Keller, Chemist
Exposure Assessment Branch
Hazard Evaluation Division (TS-769C)

REFERENCES

1. Meikle, R.; Stewart, D. (1962) The residue potential of sulfuryl fluoride, methyl bromide, and methanesulfonyl fluoride in structural fumigation. Agricultural and Food Chemistry 10(5): 393-397.

2. Unpublished submission received 1962 under unknown administration No.; submitted by Dow Chemical U.S.A., Midland, MI; CDL:121956-A). MRID No. 0010496.

3. Meikle, R.; Stewart, D. and Globus, O. A. (1963): Drywood Termite Metabolism of Vikane Fumigant as Shown by Labeled Pool Technique. J. Agri. Food Chem. 11 (1) 226-230 (No MRID number).

4. Bouyoucos, S. A., Melcher, R. G., and Vaccaro, J. R. (1983): Collection and Determination of Sulfuryl Fluoride in Air by Ion Chromatography. Am. Ind. Hyg. Assoc. J. 44(1):57-61.