UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

MAR 2 1 1990

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: REVIEW OF A PROTOCOL TO ASSESS POSTAPPLICATION EXPOSURE TO CHLORPYRIFOS APPLIED IN RESIDENCES (HED PROJECT #0-0697)

TO: D. Edwards, PM 12
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Please find below the NDEB review of ....

HED Project #: 0-0697

RD or SRRD Record #: 259735

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Deferral to: _____ Biological Analysis Branch/BEAD

_____ Science Analysis & Coordination Branch

_____ TB - Insecticide/Rodenticide Support Section

_____ TB - Herbicide/Fungicide/Antimicrobial Support Section

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1.0 INTRODUCTION

DowElanco has submitted a protocol, "Evaluation of Dislodgable Residues and Absorbed Doses of Chlorpyrifos Following Indoor Broadcast Applications of Chlorpyrifos Based Emulsifiable Concentrate" for evaluation by the Non-Dietary Exposure Branch. The data from the study would be used to support the continued registration of indoor uses of chlorpyrifos. The study has not been required by the Agency, but is the result of DowElanco's initiative to develop protocols to monitor residential exposure to pesticides and to increase the company's understanding of their pesticide, chlorpyrifos.

2.0 CONCLUSION

The Non-Dietary Exposure Branch has evaluated the DowElanco protocol for a study to monitor the postapplication exposure to chlorpyrifos applied indoors as a broadcast spray. NDEB concludes that the protocol is acceptable as a research study protocol. Because of the lack of existing guidelines for assessing exposure to pesticides used in residences, NDEB reserves the right to require additional exposure data should toxicity concerns for chlorpyrifos warrant. As discussed in Section 4.0, NDEB views the protocol as an excellent first step in developing methodology for assessing residential pesticide exposure.

3.0 PROPOSED STUDY DESIGN

The study is designed to monitor human postapplication exposure to chlorpyrifos applied indoors to residences. Two houses will be used in the study and three bedrooms and the living room of each house will be treated with Dursban LO. The application will be a broadcast to the carpet/floor using the label prescribed 0.5% concentration at one gallon per 1600 ft^2. A PCO will do the application.

The study consists of two segments. One segment will be the physicochemical evaluation of the dissipation rate of chlorpyrifos from the treated surfaces. The second segment will monitor the absorbed dose of chlorpyrifos via biological monitoring of the chlorpyrifos metabolite, 3, 5, 6 - trichloro-2-pyridinol.

The physicochemical evaluation will consist of placing 4" x 4" gauze sponges and aluminum foil randomly in at least one room of each of the two treated houses. The gauze sponges will represent

carpet and the aluminum foil will represent hardwood floors and ceramic tile. Two samples each of the sponges and the foil will be removed from each of the rooms at 0, 1, 2, 4, 8, 12, 24, and 48 hours postapplication and analyzed for total chlorpyrifos residues. In addition, two gauze sponges and two foil squares will be placed in each room to be treated one day prior to application. The dosimeters will be removed after eight hours and analyzed for background levels of chlorpyrifos.

Wipe testing will be used to monitor for dislodgable levels of chlorpyrifos from the treated carpets. A drag system, comprised of a 3" x 3" x 3/4" piece of plywood that holds a 8.5 lb lead sphere, will be dragged 48" over a 10 - 15 second interval. A 4" x 4" cotton gauze sponge will be placed on the bottom of the plywood to collect the dislodgable material. This will be equivalent to covering one square foot (3" x 48"). The pressure on the carpet per square area exerted by the drag system is similar to that exerted by a 10 kg child on all fours. Pre-exposure evaluations will be conducted on untreated surfaces on the day prior to treatment to determine background levels. Four drag trials will be conduct at each time interval. The time intervals will be 2, 4, 8, 12, 24, and 48 hours post application.

The second segment of the study will monitor internal dosage by biological monitoring. Six volunteers will collect prestudy urine on the day prior to study initiation. The volunteers will also collect their urine over the five days following the start of the study. Blood will be drawn on two separate days prior to study initiation to develop baseline plasma and RBC cholinesterase activity. Additional samples will be taken at 24 and 48 hours after study initiation. The volunteers will be placed in bathing suits and follow a prescribed schedule of activities. The activities are designed to mimic the movement of children on the floor. Five separate activity patterns will be done by each volunteer and comprise a total of four hours. The human activity monitoring will begin two hours after application is completed and end four hours later. The activities will occur in three rooms in each house with one volunteer per room.

In addition to the biological monitoring, hand rinses will be conducted at the end of the activity session. The amount of chlorpyrifos found in the hand rinse will be assumed to be totally available for oral ingestion by hand sucking and therefore will comprise the oral component of the total dosage.

Air sampling of chlorpyrifos will be conducted in the physiochem rooms with an air flow rate of 1 liter/minute and a 60 minute duration for each

sampling period. Air sampling will occur one day prior to application, upon completion of application, 1, 2, 4, 8, 12, 24, and 48 hours after application. In one activity room per house air sampling will be conducted at 2, 8, and 24 hours after application. The sampling height will be 15" off the floor.

4.0 DISCUSSION

The Non-Dietary Exposure Branch appreciates DowElanco's efforts to explore possible study methodologies to monitor for postapplication dermal exposure to pesticides used in residences. NDEB views the study protocol as a responsible and innovative first step in attempting to understand human dermal exposure to pesticides applied in homes. NDEB intends to review the data resulting from this study and to make suggestions for improvements in the protocol design based on the data. Possible suggestions may occur regarding the number of rooms tested, number of houses studied, timing of the activity routines, and the possibility of studying the number of times and direction the drag system should be dragged over the same surface area to maximize recovery of dislodgable carpet residues.

It is NDEB's intention to see that protocol's such as the DowElanco protocol evolve toward protocols that the Agency can utilize in a guideline for assessing residential exposure to pesticides. This protocol is a much appreciated first step.

cc: SACB
Chlorpyrifos File
Circulation
Correspondence File