MEMORANDUM

SUBJECT: Exposure Assessment for Lindane Use on Bedbugs and for Control of Clothes Moths

FROM: David Jaquith
Special Review Section
Exposure Assessment Branch
Hazard Evaluation Division (TS-769C)

TO: Valerie Bael
Special Review Branch
Registration Division (TS-767C)

THRU: Michael Firestone, Acting Chief
Special Review Section
Exposure Assessment Branch
Hazard Evaluation Division (TS-769C)

Special Review Branch (SRB) has requested EAB to estimate the potential exposures of individuals during and after application of lindane for bedbugs and for treatment of clothing for moth control. Labels for 3 products were submitted with the request.

A. Bedbugs - Applicator

1) Assumptions

a) An average applicator weighs 70 kg and has a respiratory volume of 1.7 cubic meters per hour.

b) An applicator wears a long sleeve shirt, long trousers, and shoes. These garments are assumed to offer 50 percent protection. Gloves and a respirator are not required by the labels for these products.

c) Five gallons of a 0.1 percent solution are applied monthly using a compressed air hand sprayer.

d) The formulated product contains 1.63 pounds of active ingredient per gallon (EPA Reg No. 550-112). In order to prepare 5 gallons of treatment solution, 3.2 ounces of the formulated product are used.

e) The insecticide is applied to cracks, crevices and other hiding places. The bedding and mattress are thoroughly treated with the spray solution.

2) Surrogate Study - Heath, J.L. and T.D. Spittler (1985) Determination of the Technique of Using a Compressed Air Sprayer That Optimizes Applicator Safety and Cockroach Control Efficacy. Pest Management 4(2) pp 12-18.

a) Dormitory rooms treated with a 0.5 percent solution of chlorpyrifos.

b) Different types of compressed air sprayers and different conditions of pressure and distance from the target were used.

c) Dermal Exposure, measured by patches outside of the clothing was 140 ug/kg/pound of active ingredient applied (ai). Hand exposure was 3.2×10^2 ug/kg/lb ai.

d) Respiratory Exposure was 4.1 ug/kg/lb ai.

3) Calculation of Exposure

$$\text{Amount of material Handled (lb ai)} = \frac{1.63 \text{ lb}}{\text{gallon}} \times \frac{3.2 \text{ oz}}{\text{treat.}} \times \frac{1 \text{ gal}}{128 \text{ oz}}$$

$$= 0.041 \text{ lb ai}$$

Dermal Exposure (ug/kg/treatment) $= [140 \text{ ug/kg/lb ai} \times 0.5 + 3.2 \times 10^2 \text{ ug/kg/lb ai}] \times 0.041 \text{ lb ai}$

$$= 16 \text{ ug/kg/treatment}$$

Respiratory Exposure (ug/kg/treatment) $= 4.1 \text{ ug/kg/lb ai} \times 0.041 \text{ lb ai/treatment}$

$$= 0.17 \text{ ug/kg/treatment}$$

B. Bedbug treatment - Resident Exposure

The insecticide is to be applied thoroughly to mattresses and bedding. EAB has no data with which to estimate the exposure of individuals who later use bedding treated with this material and has no experience with this unusual exposure scenario. EAB suspects that there may be both appreciable dermal and respiratory exposure to these individuals but knows of no technology that would allow quantification of this exposure at this time.

C. Treatment for Clothes Moth Control

The labels for these products specify a 0.5 percent solution for the treatment of clothing for clothes moth control. It is also required that any clothing be dry cleaned before it is worn. Therefore, EAB's assessment did not include any potential exposure to individuals wearing clothing that had been treated with lindane solution. The assessment addressed applicator exposure only. It was assumed that a compressed air sprayer was used for clothing treatment and that 5 gallons of spray are prepared and applied at a time. All other assumptions were the same as those used for treatment for bedbugs. Sixteen ounces of the formulated product would be required to prepare 5 gallons of finished spray. The total amount of active ingredient handled would be:

$$\text{Amount of Lindane (lb ai)} = \frac{1.63 \text{ lbs ai}}{\text{gallon}} \times \frac{16 \text{ oz}}{\text{treat.}} \times \frac{1 \text{ gallon}}{128 \text{ oz.}}$$

$$= 0.20 \text{ lbs ai}$$

Dermal Exposure (ug/kg/treatment) = [140 ug/kg/lb ai x 0.5

+ 3.2 x 10^2 ug/kg/lb ai] x 0.20 lb ai

= 78 ug/kg/treatment)   6.078 ~/kg

Respiratory Exposure (ug/kg/treatment) = 4.1 ug/kg/lb ai x 0.20 lb ai/treatment

= 0.82 ug/kg/treatment)

It must be noted that EAB has no reliable usage data with which to support these exposure assessments. Therefore, any risk analyses based on these assessments must be evaluated very cautiously.