KK(S) 4-25-84

D-7667 Linuron

Reviewable

Shaugh. No. 035506

EAB Log Out Date: 4/25/84

Init. 25 APR 19E

To: R Taylor
Product Manager 25
Registration Division (TS-767C)

From: Joseph C. Reinert JCR
Chief, Section #2, EAB
Hazard Evaluation Division

Attached, please find the human exposure review of:

Reg./File No.: 352-326

Chemical: Linuron

Type Product: Herbicide

Product Name:

Company Name:

Submission Purpose(s): Human Exposure

ZBB Code: other

Action Code: 400

Date In: 1/23/84

EAB#: 4172

Date Completed 4/25/84

TAIS (Level II) Days

42 10

Deferrals To:

_____ Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch

1/5

Data Evaluation Record

PROPRIETA...

1. Chemical: Linuron

2. Citation: Potential Linuron Exposure During Mixer/Loader and Sprayer Operations by R.F. Holt and R.A. Guinivan, Wilmington, DE. December, 1983.

3. Type of Application: Ground Spraying of Soybeans

4. Type of Formulation: Not specified in document

5. Reviewed/Prepared by:

Anne R. Keller
Chemist
Exposure Assessment Branch, HED

Signature Anne R. Keller

Date 3-26-84

6. Approved by:

Joseph C. Reinert
Chief, Review Section #2
Exposure Assessment Branch
Hazard Evaluation Division

Signature J. Reinert

Date 3/26/84

7. Topic: Exposure of mixer/loaders and applicators to linuron during ground spraying of pre-emergence herbicide to soybeans

8. Conclusion:

°Study evaluated potential dermal exposure during ground spraying to soybeans.

°Three subjects were measured during one application.

°There are so many omissions in the data as presented that the study is not acceptable for evaluation of exposure.

9. Materials and Methods:

The registrant did a dermal and respiratory exposure monitoring study of mixer/loaders and applicators during ground spraying of soybeans with "Lorox" L (linuron). "Lorox" L was used at the rate of ten pints containing five pounds of linuron mixed and sprayed on ten acres of soybeans, using standard commercial equipment and techniques.

Test subjects were three soybean farmer/applicators, each of whom made one application to ten acres of soybeans. All samplings were collected under actual use conditions with separate samplings for mixing/loading and spraying operations.

Dermal exposure was monitored using procedures detailed by Durham and Wolfe (1962). Two 16-in^2 gauze pads (12 ply gauze steri-pads) overlaying filter paper were bound on all four edges with 1-in. masking tape. The pads were taped to the clothing, one on each shoulder (facial exposure), in upper center of chest and back, on both forearms, thighs and lower legs. In one of the three use sites, pads were also placed under the clothing at each forearm. Cotton gloves were worn by all workers to assess exposure to the hands.

Respiratory exposure was determined with a personnel air pump and polyurethane foam trapping media with gauze backing. The system monitored air in the worker's "breathing-zone" at a constant rate of 2 liters/minute.

No information is given on the analytical method or the inclusion of controls, e.g. spiked samples. Calculations were made for a 70 kg person. The results obtained were averaged, despite ten-fold wide variation in levels detected. Other parameters used in the calculations, e.g. area of various body surfaces, were not listed.

10. Results and Discussion:

The attached Table summarizes the results.

It was stated that the herbicide is applied only once per year, and thus these values represent yearly exposure for the 10-acre application studies. However it is difficult to accept these values as representative of an applicator's yearly exposure since it is unlikely that a farmer would have only one 10-acre plot of soybeans.

A total of three individuals were monitored for one application each. The farmers were assumed to be wearing a short sleeved shirt, long trousers, no hat, and no gloves. A figure is given for the exposure if protective gloves and long sleeves were worn. No explanation is given of the method of determining reduction in exposure using protective clothing, and only one set of samples for determination of breakthrough was included, and that set gave values too low to detect.

The amount of time spent in the operation is given for each case, but this is not extrapolated to actual time spent to treat the acreage in a normal farm.

I conclude that the data presented are not acceptable for evaluation of exposure.

TABLE OF RESULTS: EXPOSURE MONITORING OF LINURON, GROUND APPLICATION TO SOYBEANS.

Trial	Duration of Application (min)		Wind Speed (mph)	DERMAL EXPOSURE (ug/kg/hr)*				RESPIRATORY EXPOSURE (ug/kg/hr)*	
				Unprotected		With Protection			
	Mixing	Spraying		Mixer	Sprayer	Mixer	Sprayer	Mixer	Sprayer
A	6	25	0-5	6.1	8.3	0	1.6	--*	--*
B	14	44	5-8	27.9	12.3	0.86	0.71	<0.0007	<0.0007
C	7	54	5-8	51.7	22	5.1	4.4	<0.0007	0.0171
			Average	28.6	14.2	2.0	2.2	<0.0007	0.0086

*Samples lost during analysis.

Summary of raw data used to calculate the dermal samples:

Trial A: Mixer/loader: All values for dermal sampling areas were below detection limit except hands.

Spraying: Four of eight areas sampled gave less than the detection liimit.

Trial B: Mixer/loader: Face, forearms and hands gave detectable values; values for hands were more than four times the value in Trial A.

Spraying: Face, forearms and hands gave detectable values; values for hands were almost two times the value in Trial A.

Trial C: Mixer/loader: Linuron was measured at all sites sampled; values for hands were approximately six times the value in Trial A.

Spraying: Face, forearms and hands gave detectable values; values for hands were approximately 2.5 times the value in Trial A.