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TO: Chief, Ecological Effects Branch
Hazard Evaluation Division

FROM: Dr. Willa Garner
Chief, Review Section No. 1
Environmental Fate Branch, HED

29 JAN 1982

Attached find environmental fate information and/or EEC(s) requested for:

Chemical: Profenofos

Product Name. Curacron 6E

Use Pattern for EEC Calculations: EXAMS model determinations for aquatic systems adjacent to cotton

Date in: 12/24/81

Date out: 29 Jan 82

EEC/EFB#: 82-1

1. Introduction

This is an assessment of the spray drift data and EXAMS model output provided by Ciba Geigy for Curacron 6E (Profenofos). There is a concern that Curacron, which may be applied by aircraft to cotton, may drift or be otherwise carried into adjacent bodies of water.

2. General Directions

Curacron 6E (59.6% ai; 6 lbs ai/gal profenofos) is used to control cotton bollworm, tobacco budworm, cotton leaf perforator, beet armyworm and cotton boll weevil. Up to 6 lb ai/acre may be applied per season and not within 14 days of harvest. Curacron is a larvicide and is effective through ingestion.

Curacron may be applied in a minimum of 1 gal of carrier per acre.

3. Spray Application

Application of Curacron by aircraft to cotton at 1 lb ai/acre up to 6 times at 5 to 7 day intervals can give 0.60 ppm in the top 3" of soil under the cotton. This only occurs if there is a heavy rain within 24 hours of application. Normally less than 0.25 ppm will be found in the top 3" of soil immediately following sixth application. Profenofos stays on the foliage of the plant material to which it is applied because of a high absorption coefficient. The percentage of leaf runoff is small (on the order of less than 10%).

Up to 0.1 ppm has been observed in cotton fields where other rotational crops are grown for a period of 54 weeks.

It should be noted that because profenofos binds readily to clay particles and organic matter (Kom = 875), that the concentration of profenofos may be greater than values provided above.

4. Spray Drift

Because Curacron is an ingested insecticide or larvacide, it can be applied using larger drops than insecticides that rely on dermal contact. Therefore, spray draft data supporting the registration of a chemical such as a contact herbicide may be used for this chemical.

The spray drift provided using AAtrex, Galacron, and Dual have been deemed adequate to determine the downwind concentrations for Curacron.

The downwind drift concentrations for 6" of water have been determined by Ciby Geigy to be:

Distance Downwind - ft	Concentration - ppb Minimum	Average	Maximum
0		735*	
50	48.7	163.9	279.1
100	11.8	44.8	77.7
200	0.0	13.8	27.6
300	0.0	4.9	9.1
500	0.0	2.2	4.3

* Theoretical

The above values are for a full field application of 1 lb. ai/acre. The specified 300 foot buffer zone would yield about 5 ppb or .007 lb ai/acre or .0073 kg ai/ha.

5. EXAMS and Estimate Exposure

Given the compound inputs provided on the accompanying table and an estimated load rate parameters for a pond, an oligotrophic lake, and eutrophic lake, the following evaluation can be made. This evaluation is made using the EPA-Athens EXAMS model.

6. Conclusions

Though this calculation is not entirely accurate, the information provided in the accompanying table may be of use to ascertain an approximate environmental concentration for these three general systems. The evaluation is not entirely accurate because the EXAMS model is for long duration point source inputs whereas drift in reality is a very short term input. Therefore, the concentrations found in the environment may be greater than the maximum EEC's given above.

The EECs given in the table on pages 29 and 30 of Ciba Geigy's report are in error and should be changed to those values given in the accompanying table.

The seven tables from the EXAMS model will replace the respective tables in the Ciba Geigy report. This matter has been discussed with Dr. Larry Ballentine of Ciba-Geigy and meets with concurrent approval.

Robert W. Holst, Ph.D.
Plant Physiologist
Environmental Fate Branch/HED (TS-769)

Exposure Analysis for Profenofos

	Pond	Oligotrophic Lake	Eutrophic Lake
Input (kg/hr)	1.43×10^{-4}	8.39×10^{-4}	3.7×10^{-2}
Size (ha)	1	35	35
Maximum concentration in water column			
(mg/L)	5.9×10^{-6}	4.4×10^{-5}	1.2×10^{-4}
(ppb)	5.9×10^{-3}	4.4×10^{-2}	0.12
Maximum concentration in the water of the sediment pores			
(mg/L)	5.83×10^{-6}	4.1×10^{-5}	9.7×10^{-5}
Maximum concentration in the sediment			
(mg/kg)	1.1×10^{-2}	8.1×10^{-2}	7.3×10^{-2}
Degradation			
Period (hours)	72	576	12
Water column loss (%)	97	91	99
Sediment loss (%)	4	18	<1
Self-purification period (months)	9	13	10
Maximum EEC (ppb)	5.9×10^{-3}	4.4×10^{-2}	1.2×10^{-1}