

US EPA ARCHIVE DOCUMENT

6-15-77

EEE BRANCH REVIEW

DATE:	IN _____	OUT _____	IN <u>6/15/77</u>	OUT <u>6/15/77</u>	IN _____	OUT _____
	FISH & WILDLIFE		ENVIRONMENTAL CHEMISTRY		EFFICACY	

FILE OR REG. NO. 38338-FUP-1

PETITION OR EXP. PERMIT NO. \_\_\_\_\_

DATE DIV. RECEIVED \_\_\_\_\_

DATE OF SUBMISSION \_\_\_\_\_

DATE SUBMISSION ACCEPTED \_\_\_\_\_

TYPE PRODUCT(S): (I, D, H, F, N, R, S) \_\_\_\_\_

PRODUCT MGR. NO. L. Zink

PRODUCT NAME(S) Methoxychlor 2E

COMPANY NAME Idaho Woolgrowers Association Rsch. Committee

SUBMISSION PURPOSE Streams and irrigation canal treatment

CHEMICAL & FORMULATION Methoxychlor

1.0 Introduction

1.1 2,2-Bis(p-methoxyphenyl)-1,1,1-trichloroethane 88% and related compounds 12%, Marlite, CAS 72-43-5, Ent 1716.

1.2 Percent Active

25%

1.3 Black Fly Larvae Control

1.4 Other Environmental Reviews

4F1467	8/8/74
8F0680	1/9/68, 12/30/68
9F0768	9/5/70
38338-EUP	2/19/76

1.5 A total of 1480 lbs (370 lbs. active ingredient) are to be shipped. This is an increase of 480 lbs. requested for last EUP# 38338, 2/19/76.

1.6 This review was interrupted by reregistration reviews from 5/12/79 to 6/13/77.

2.0 Directions for Use

The Black Fly Control Program in Idaho is based on controlling larval generations in irrigation canals. Six treatments will be applied to irrigation canals in eastern Idaho and 10-12 treatments in southcentral Idaho. Dates of application and number of exact treatments were not given. Material will be applied at a metered flow rate of 0.3 ppm (not stated whether active ingredient or formulated product) to irrigation water for a period of 15'. A proposed label was not submitted with the EUP package.

3.0 Discussion of Data

Registrant submitted environmental chemistry data by reference (open scientific literature) for 1977 Black Fly Control Program.

3.1 Hydrolysis

Data not submitted. The applicant is soliciting this information from DuPont Chemical Company at the present time. It should be noted that the registrant did not cite hydrolysis data submitted in the EUP package. A referenced paper by Zepp and Wolfe, et al, 1976 indicates that methoxychlor decomposes very slowly in

distilled water at 20°C (half-life >200 days). At 25°C the half-life is about 500 days and is pH independent in the range of pH5-9.

3.2 Degradation in Soil and Water

Abstracts of several studies were cited but the referenced articles (raw data) were not included with the EUP application. We must have the raw data before we can evaluate adverse effects to the environment.

3.3 Fish Accumulation

3.3.1 Applicant cited references by Reinbold et. al, 1971; Gardner and Bailey, 1975; and Burdick, et. al, 1968. The raw data for these references were not included in the EUP package; consequently, we cannot evaluate the data.

3.3.2 Effects of a Single Injection of Methoxychlor Black-fly Larvicide on Insect Larvae in a 161-Km (100-mile) Section of the North Saskatchewan River by F. J. H. Fredeen. Can. Ent. 107: 807-817 (1975).

This is an effects study and is not an environmental chemistry study.

3.3.3 Tests with Single Injections of Methoxychlor Black Fly (Diptera: Simuliidae) Larvicides in Large Rivers by F. J. H. Fredeen. Can. Ent. 106: 285-305 (1974).

This is an effects study and is not an environmental chemistry study.

3.3.4 Residues of Methoxychlor and Other Chlorinated Hydrocarbons in Water, Sand, and Selected Farina Following Injections of Methoxychlor Black Fly Larvicide into the Saskatchewan River, 1972 by F. J. H. Fredeen, et. al. Pest. Mon. J. 8,4: 241-246 (1975).

A seine was used to collect fish 6 days before pesticide injection. Overnight gill net sets were used for collecting fish on the remaining four sampling times (5 days pretreatment, 8 days, 9 days, and 17 weeks posttreatment). All fish samples were wrapped in aluminum foil, frozen in solid CO<sub>2</sub>, and stored at -18°C until analysis.

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Fish specimens were filleted and edible muscle tissues were analyzed. Pooled 20g samples from 4-5 fish were first analyzed and then positive samples were analyzed separately by a GLC/MS system. Any sample showing more than 0.1 ppm was analyzed further by TLC according to the method of Kovacs. About 100 fish were extracted and cleaned, and the extract was injected into a GLC/MS system. Recorded spectra were compared with those of reference methoxychlor.

No methoxychlor residues were found in any pretreatment fish except perhaps goldeye. After injection of 0.309 ppm methoxychlor about 21-22 km upstream from the fish-collecting site, methoxychlor was detected in 66% of the goldeye at a level of 1.5-0.02 ppm. Methoxychlor was not detected in other fish species after 8-9 days posttreatment or in any fish, including goldeye, 17 weeks posttreatment.

#### Conclusions on Fish Accumulation Studies

The first two referenced studies (3.3.2 and 3.3.3) are not environmental chemistry data.

In the third referenced study (3.3.4), the following deficiencies are noted:

- 1) The experiments were not run with sunfish or channel catfish which are sensitive to water quality.
- 2) The system employed cannot be classified as either a flow-through or a static system in that methoxychlor was injected only once into the river. A flow-through system using a constant concentration of pesticide and a static system with ambient concentration of residues from treated soil must be used to determine accumulation of residues in fish and contamination of the food web.
- 3) An insufficient number of fish, soil, and water samples were taken, and residues were not measured in the whole body fish and in the viscera at each sample interval. An adequate number of samples are needed to evaluate the potential of methoxychlor accumulation in fish. Suggested sampling times for fish, water, and soil are indicated in the following protocol for fish accumulation study.

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#### Conclusions

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- 4.1 We have insufficient environmental chemistry data on this pesticide to assess hazards to the environment.
- 4.2 Hydrolysis data was not submitted with this EUP application.
- 4.3 Soil and water metabolism studies were referenced, but the raw data was not submitted with the EUP application.
- 4.4 Fish accumulation studies that were referenced are not EC data and/or are not scientifically acceptable.

5.0 Recommendations

- 5.1 We again do not concur with the proposed use of methoxychlor for experimental use on black fly larvae. Data in support of this EUP are deficient in several respects. The following required studies for this EUP were not submitted or were scientifically inadequate to make a hazard assessment:
  - 5.1.1 Hydrolysis data was not submitted. Pesticides and their degradation products may adversely affect non-target organisms and may contaminate the food web. Hydrolysis data is needed to support this EUP application.
  - 5.1.2 Raw data for the referenced soil and water metabolism studies were not submitted. It is necessary to know the fate of methoxychlor in soil and in water. Metabolism studies are needed to determine the nature and availability of pesticide residues to irrigated crops and to help in assessment of potential disposal and reentry hazards. Metabolic transformation of methoxychlor in soil and water must be investigated to determine the potential of adverse effects on non-target organisms.
  - 5.1.3 Raw data for fish accumulation references cited by Burdick, et. al, 1968; Reinbold, et. al, 1971; Gardner and Bailey, 1975, were not submitted with the EUP application. We cannot evaluate these studies without the raw data.

The first two referenced studies by F. J. H. Fredeen [Can. Ent. 107: 807-817 (1975) and Can. Ent. 106: 285-305 (1974)] are not environmental chemistry data.

In the third referenced study by F. J. H. Fredeen, et. al, Pest. Mon. J., 8,4: 241-246 (1975), the following deficiencies are noted although we realize the study was not run for this purpose:

- 1) The experiments were not run with sunfish or channel catfish which are sensitive to water quality.
- 2) The system employed cannot be classified as either a flow-through or a static system in that methoxychlor was injected only once into the river. A flow-through system using a constant concentration of pesticide and a static system with ambient concentration of residues from treated soil must be used to determine accumulation of residues in fish and contamination of the food web.
- 3) An insufficient number of fish, soil, and water samples were taken, and residues were not measured in the whole body fish and in the viscera at each sample interval. An adequate number of samples are needed to evaluate the potential of methoxychlor accumulation in fish. Suggested sampling times for fish, water, and soil are indicated in the following protocol for fish accumulation study:

P.M. Note: We defer to fish and wildlife to determine the significance of the data.

5.2 The following protocol are given to benefit further pesticide studies required for this EUP.

5.2.1 Hydrolysis

Studies are conducted in darkness using radioisotopic or other comparable techniques at different pH values (acidic, neutral or basic) at two concentrations, and two temperatures. Aliquots in duplicate should be taken at four sampling time intervals, with at least one observation made after one-half of the pesticide is hydrolyzed or thirty days, whichever is shorter. A material balance, half-life estimate and identification of degradation products for the pesticide must be provided. Studies in distilled water provide an upper limit estimate for persistence of pesticides in the aquatic environment. Hydrolysis in natural waters may be carried out to supplement studies in distilled water.

5.2.2 Aerobic Soil Metabolism

These studies determine the rate, type, and degree of metabolism of the pesticide residues in a sandy loam, loam, silt loam, or other textured soil appropriate to the intended application sites. Radiolabeling in one or more positions in the pesticide molecule is required to assure adequate coverage of chemical

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transformations. Where radiolabeling will be of little benefit, comparable techniques are required. Residues comprising more than ten percent of initial application or 0.01 ppm should be identified. A material balance, including nonextractable residues, must be provided. The experimental dose rate must approximate field application rate. Treated soil must be maintained at temperatures of 18 to 30°C at or below 75% of 0.33 bar moisture. Collect data until a ninety percent loss of the pesticide occurs and until patterns of formation and decline of metabolic products are established. Preferred sampling times are at pre-treatment; 0, 1, 2, and 7 days, 2 and 3 weeks and 1, 2, 3, 4, 6, 9, and 12 months. The study need not be conducted for more than one year for terrestrial crop and non-crop uses, and terrestrial/aquatic uses.

(v) Aerobic Aquatic Metabolism

Pesticides are exposed to aerobic conditions in water during the period of dispersal throughout the aquatic environment. The aerobic and anaerobic aquatic metabolism studies permit a comparison of rates and formation of metabolites. The study is required for all pesticides employed for aquatic uses and indirect aquatic uses which result in discharges into the aquatic environment. The metabolism of radiolabeled chemicals is studied in water representative of that found at or near the intended use sites at a rate equivalent to the anticipated rate of application or discharge into the aquatic environment. These studies are to continue until decline curves have been established or to thirty days.

5.2.3 Fish Accumulation Study

Radioisotopic or comparable techniques are employed. Two exposure systems are required: Flow-through (with constant concentration of aqueous solution of pesticide) and static (with ambient concentration of residues from treated soil). Sunfish are preferred in flow-through and catfish are required in the static system.

For the static system, sandy loam soil is treated at use rate and aged under aerobic conditions for two to four weeks prior to initiation of fish exposure. Exposure duration is 30 days with sampling at 0, 1, 3, 7, 10, 14, and 30 days of exposures.

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Fish and water samples are taken on 0, 1, 3, 7, 10, and 14 days of depuration. Soil and water samples are also obtained prior to fish exposure interval. The amount and identity of the residue is determined for water, soil, whole body fish, edible tissue, and viscera or carcass at each sample interval.

- 5.3 Environmental Chemistry data, as given in Section 3 of the regulations, will be required to support registration. (See attached sheet for data requirements for different use patterns.)

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6/15/77

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6/15/77

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