July 26, 78

Date: 7-26-78

To: Product Manager 12 (Sanders)

Through: Dr. Gunter Zweig, Chief
Environmental Fate Branch

Through: Mr. James Conlon, Acting Director
Hazard Evaluation Division

From: Review Section #1 RWC
Environmental Fate Branch

Attached please find the environmental fate review of:

File Symbol

Reg. No. 464-448

EUP No.

PP No. 6F1830, 6F1777

EEE BRANCH REVIEW

DATE: IN ____ OUT ____ IN 12/5/77 OUT 7/10/78 IN ____ OUT ____

FISH & WILDLIFE ENVIRONMENTAL CHEMISTRY EFFICACY

FILE OR REG. NO. 464-448

PETITION OR EXP. PERMIT NO. 6F1830, 6F1777

DATE DIV. RECEIVED ?

DATE OF SUBMISSION ?

DATE SUBMISSION ACCEPTED 3 cld, ?, ?

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

PRODUCT MGR. NO. I2 (Sanders)

PRODUCT NAME(S) Lorsban 4E

COMPANY NAME Dow

SUBMISSION PURPOSE *resubmission of amended registration application - sorghum (6F1830)

CHEMICAL & FORMULATION CHLOROPYRIFOS ((0,0 - diethyl O - (3,5,6 - trichloro - 2 - pyridyl) phosphorothioate)). Dursba

*also almonds, apples, pears, plums, prunes (6F1777)

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1.0 Introduction

1.1 This is a resubmission of two petitions with new and referenced data.

2.0 Directions for Use

2.1 For sorghum, see our evaluation of 464-448 dated October 12, 1976 (6F1830)

2.2 For almonds, apples, pears, plums and prunes see our evaluation of 464-448 dated October 12, 1976 (6F1777).

3.0 Discussion of Data

3.1 The referenced data was previously reviewed in our evaluations of PP 3F1306 dated February 15, 1973 and May 2, 1974. Per Dr. Rogoff's memo of August 12, 1977, previously reviewed data is not being rereviewed or validated at this time.

3.2 Review of New Data

3.2.1 Photolysis of Pesticides on Soil Surfaces, R. Hautala, 6F1830, acc #096642, appendix A, ref. 1. Dursban was not studied.

3.2.2 The Photodegradation of 3, 5, 6 - Trichloro - 2 - Pyridinol (Dursban Pyridinol) and the Photodimerization and Photoisomerization of 2 - Pyridone and its Monochloro Derivatives; Dilling, Tefertiller and Mitchell, 6F1830, acc #096642.

Irradiation of the degradate Dursban pyridinol by UV light > 295 mμ gave products where a chlorine was substituted by an $Et^{+}O-$ or an -OH. A di-ring compound and HCl were also formed.

Irradiation in water gave an unidentified polar mixture.

Dilute aqueous solutions (10^{-4}M) in diffuse room light showed 25% degradation in 28 days.

In hexane under UV light, there was 98% degradation in 300 hours with formation of 2 groups of products hexane insoluble and a hexane soluble oil.

Photolysis of simpler pyridones was also studied to aid in the elucidation of the photolysis of Dursban pyridinol. Formation of isomers, dimers and ammonium chloride was found.

3.2.3 Chlorpyrifox Leaching. L. Krueger; acc #096642, PP6F1830, appendix B. ref. 4

Chlorpyrifos, was added to 18" columns of greenhouse potting soil in different formulations and leached with 4 inches of water.

No significant leaching was found.

3.2.4 A 45- Day Leaching Test on Triclopyr ((3,5,6 - Trichloro - 2 - Pyridinyl) Oxy) Acetic Acid; J. Hamaker, PP6F1830 acc #096642.

This herbicide degrades to Dursban pyridinol in soil with a halflife of 18 days.

Aged and unaged Triclopyr was subjected to leaching at ½ inch/day for 45 days.

Conclusions

1) Between days 12-45, 75-82% of the activity in the aged and unaged studies appears in the leachate.

2) Dursban pyridinol, the primary soil metabolite of Dursban, does leach.

3.2.5 Organic Chemicals in the Soil Environment, vol. 1, pgs 64-132; PP 6F1830, acc #096642.

This is ancillary data with no Dursban data.

3.3 The following information/studies are ancillary with no Dursban data.

3.3.1 ~~3.2.5~~ Organic Chemicals in the Soil Environment, vol. 1, pgs 61-132, PP 6F1830, acc #096642.

3.3.2 Movement of Picloram in Soil Columns, R. Grover, PP6F1930, Acc #096642, appendix B, ref. 9.

3.3.3 Adsorption and Movement of Lindane in Soils, Kay and Elrick, PP6F1830 acc #096642, appendix B, ref. 10.

3.3.4 Solution and Adsorbed Fluometuron Concentration Distribution in a Water-Saturated Soil: Experimental and Predicted Evaluation, Hornsby and Davidson; PP6F1830, acc #096642, appendix B, ref. 11.

3.3.5 Mobility of Dicamba, Picloram and 2,4-D in Soil Columns; Grover; PP6F1830, acc #096642, appendix B, ref. 12.

3.3.6 Short Theory, Techniques and Practical Importance of Leaching and Adsorption Studies - An Introductory Lecture, Gerber and Guth; PP6F1830, acc #096642, appendix B, ref. 13.

4.0 Conclusions

4.1 From the new and previously reviewed data, we know the photolytic fate of chlorpyrifos in solution and in the vapor phase. We also know the fate in soil (aerobic, dark). Degradation pathways under those conditions are very similar - hydrolysis to the chloropyridinol which is dechlorinated to diols and triols that dimerize or undergo ring cleavage to form carbon dioxide, ammonium chloride and other inorganics with perhaps some low molecular weight polar compounds as formic acid.

A major difference in the photolytic degradation pathway of chlorpyrifos on soil is not expected. Also, judging from the proposed sorghum use pattern of 0.25 lb. ai/A (not exceeding 3X/year) to sorghum with 30-50% of the seed heads in bloom, most of the chlorpyrifos will be intercepted by the plants and that reaching the soil (via application or weathering) would not be exposed to full sunlight due to shading by the sorghum. Therefore, in the sorghum use, photolysis on the soil will not be a major degradation route and soil photolysis data will not significantly add to the elucidation of the environmental fate of chlorpyrifos for this use.

4.2 As a result of the July 11, 1977 meeting (see record in the EC file), a photolysis study on surfaces is not needed for 6F1830 and 6F1777.

4.3 The decline curves studies (field dissipation) data gap is noted as being submitted and previously reviewed and accepted on May 2, 1974. See our evaluation of 464-448 dated October 12, 1976, section 3.4.1 (6F1830).

4.4 The laboratory leaching study on degradates (aged leaching study) data gap was previously submitted and reviewed in our evaluation of PP3F1306 dated May 2, 1974. Also note the new data reviewed herein, section 3.2.4.

4.5 Rotational crop study - Data was previously submitted and reviewed in our evaluation of 464-448, 449 and 523 dated February 5, 1976.

5.0 Recommendations

5.1 With regard to the anaerobic soil study requirement for the sorghum use - we note from the July 11, 1977 meeting that the registrant planned to start an anaerobic study in August 1977. The study should have been submitted by now since almost a year has passed. We need the study to understand the anaerobic fate of chlorpyrifos. We do not need the anaerobic study for the orchard uses under PP 6F1777.

5.2 Per Dr. Rogoff's memo of August 12, 1977, previously reviewed data is not being rereviewed or validated at this time.

RW Cook 7-24-78

Samuel M. Creeger July 26, 1978

Samuel M. Creeger
July 10, 1978
Environmental Chemistry Section
EEE Branch