8-29-91

Shaughnessy Number: 081901

Date out of EFGWB: AUG 29 1991

To: S. Lewis
Product Manager 23
Registration Division (H7505C)

From: Akiva Abramovitch, Section Head
Environmental Fate Review Section #3
Environmental Fate and Ground Water Branch
Environmental Fate and Effects Division (H7507C)

Thru: Hank Jacoby, Chief
Environmental Fate and Ground Water Branch
Environmental Fate and Effects Division (H7507C)

Hank Jacoby

Attached, please find the EFGWB review of...

Reg./File #: 050534-00008

Chemical Name: Chlorothalonil

Type Product: fungicide

Product Name: Bravo 500

Company Name: ISK Biotech

Purpose: request to delete rotational crop restriction

Date Received: 03/27/91

EFGWB#(s): 91-0491

Total Reviewing Time (decimal days): _____

Deferrals to:

___ Ecological Effects Branch, EFED

___ Science Integration and Policy Staff, EFED

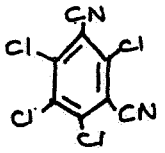
___ Non-Dietary Exposure Branch, HED

X Dietary Exposure Branch, HED

X Toxicology Branch

CHEMICAL:

chemical name: 2,4,5,6-tetrachloro-1,3-benzenedicarbonitrile
common name: Chlorothalonil
trade name: Bravo, Clortosip, Daconil 3787, Exotherm Termil.
structure:
CAS #:
Shaughnessy #: 081901



2. TEST MATERIAL:

3. STUDY/ACTION TYPE:

4. STUDY IDENTIFICATION:

5. REVIEWED BY:
Typed Name: E. Brinson Conerly-Perks
Title: Chemist, Review Section 3
Organization: EFGWB/EFED/OPP

E.B. Conerly-Perks 7/19/91

6. APPROVED BY:
Typed Name: Akiva Abramovitch
Title: Section Head, Review Section 3
Organization: EFGWB/EFED/OPP

Akiva Abramovitch AUG 27 1991

7. CONCLUSIONS:

The package received contained no environmental fate data. The rationale the applicant presents to justify removal of rotational crop restrictions is based on economic and toxicological concerns, which are not within the purview of EFGWB. EFGWB has no information to add at this time.

8. RECOMMENDATIONS:

No specific recommendations at this time. EFGWB defers to TOX Branch and DEB.

9. BACKGROUND:

The data requirements are summarized below.

Hydrolysis -- fulfilled -- MRID # 00405-39 -- stable at pH 5 and 7; 10% degrades in 30 days at pH 9; 2,4,5,6-tetra-Cl-isophthalimide the only degradate

Aqueous Photolysis -- <u>not fulfilled</u> -- MRID#s 000872-81, 401834-18, 000405-40, 1899 Reg. Std. -- additional data are required -- MRID# 401834-18 could be made acceptable, and indicates stability to photolysis

Soil Photolysis -- <u>not fulfilled</u> -- (MRID# 001437-51, 1988 Reg. Std.)

Aerobic Soil Metabolism -- <u>not fulfilled</u> -- the study (per Guidelines subpart N) must establish patterns of disappearance of parent; appearance and disappearance of degradates; identity of degradates

Anaerobic Soil Metabolism -- fulfilled by acceptable anaeroabic aqueous metabolism study (10/23/85, also HLB 4/22/86, MRID# 0014790-75)

Anaerobic Aquatic Metabolism -- fulfilled -- (10/23/85, HLB 4/22/86, MRID# 001479-75) -- $t_{\frac{1}{2}}$ 5-15 days

Leaching/Adsorption/Desorption -- fulfilled (8/1/86, MRID#s 001151-05, -001537-10) -- low leachability in lab, but findings in ground water triggered monitoring requirements. k_{ads} 3 (sand) to 29 (silt) in batch studies.]

Terrestrial Field Dissipation -- partially fulfilled (MRID # 000872-96, 1988 Reg. Std.). Other studies which have recently been reviewed are as follows:

Fresno, CA -- MRID# 415648-29. This study is unacceptable for several reasons listed below. These data are considered to be of uncertain value and should not be used to predict the environmental behavior of chlorothalonil and its degradates. These data do not serve to define a pattern or time course for the dissipation of chlorothalonil under field conditions. Soil sampling may not have gone deep enough to define the extent of leaching of chlorothalonil and its degradates. Analyses were done on composited samples (and sampling variation thereby minimized), and therefore, EFGWB cannot assess the "inherent" precision and accuracy of the procedures. The study author reported a half-life of 58 days for chlorothalonil in the upper 12 inches of soil using selected data, but since values were arbitrarily discarded, the calculated half-life is considered to be of questionable validity.

Donalsonville, GA -- MRID# 451648-28. The study is unacceptable. The data do not serve to define a pattern or time-course for the dissipation of chlorothalonil under field conditions because they are too randomly variable. Soil was only sampled through day 29 following the tenth application, except for samples taken at 222 days posttreatment. The depth of soil sampling was insufficient to define the extent of leaching of chlorothalonil and its degradates. Chlorothalonil was detected to a depth of 12-inches. It dissipated with an observed half-life of 14-29 days from the upper 12 inches of a plot of sandy loam soil that was treated at 10-day intervals with chlorothalonil (Bravo 720, 6 lb/gal FIC) at 1.12 lb ai/A/application ten times (total 11.2 lb ai/A). The degradates were 4-hydroxy-2,5,6-trichloroisophthalo nitrile (SDS-3701), 2-hydroxy-5-cyano-3,4,6-trichlorobenzamide (SDS-47525), 3-carboxy-2,5,6-trichlorobenzamide (SDS-46851), 3-cyano-2,4,5-trichlorobenzamide (SDS-47523/SDS-47524), 3-cyano-2,4,5,6-tetrachlorobenzamide (SDS-19221). The manufacturing impurities HCB and PCNB were isolated as deep as the 9- to 12-inch depth. Per the authors PCBN levels were related to the level of chlorothalonil residues present, but the levels of HCB were not. In addition, pretreatment samples taken from the two treated plots contained detectable residues of HCB (0.003-0.006 ppm).

Greenfield, CA -- MRID# 415648-30. This study is unacceptable. The cultural practices employed during the course of the study compromised study results. It is highly probable that these practices (cultivation, disking, and chiseling) resulted in movement of chlorothalonil residues to lower soil depths. Because the surface soil layers were mixed during the course of the study, the concentration of pesticide may have been diluted by bringing pesticide-free soil from lower horizons, and may have increased the rate of dissipation by aerating the soil and presenting new nutrient sources to the microbial population. Study results may also have been compromised by soil sampling procedures used -- samples may have been contaminated by the sampling process itself. Soil was not sampled deeply enough to define the extent of leaching of chlorothalonil and its degradates. At both treated plots, chlorothalonil residues were detected in the 12- to 15-inch depth, the lowest soil depth sampled. The soil should have been sampled to depths (preferably two sampling depths) at which residues were nondetectable. From selected data, the study author calculated a half-life of 40 days for chlorothalonil. The arbitrary exclusion of data used to calculate the half-life causes the resulting half-life to be of questionable value.

Accumulation in Confined Rotational Crop -- MRID # 410302-11 -- lettuce, carrots, and wheat grown as confined rotational crops. Some uptake and concentration were detected at an exaggerated rate of application (4 x the maximum single application). Closely related metabolites accounted for ca. 1/3 of total radioactivity observed in the plants. Remaining labelled material may derive from the soil "carbon pool".

Accumulation in Field Rotational Crops -- partially fulfilled (Kenyon and Ballee, no MRID#. This field crop accumulation study is not acceptable to completely fulfill the data requirement because the soil was not analyzed at planting time. Therefore, it is not certain that residues were available for uptake, or at what level. For these reasons, the study can only be considered supplemental. Under these experimental conditions, no uptake was observed..

Previously reviewed MRID#s 415648-32 through -46 cannot be used to fulfill data requirements at this time because the data were not presented in a reviewable format. In order for this study to be reevaluated, the registrant must provide summarized soil residue data, complete site characteristics, and meteorological data. In addition, the lengths of time the samples were stored frozen and acceptable freezer storage stability data must be provided. An ancillary Study - Freezer Storage Stability -- MRID#s 415648-20 through -27 cannot be used to fulfill data requirements because the experimental design used was not appropriate for determining the freezer storage stability of chlorothalonil and its degradates in the various plant matrices.

Laboratory Accumulation - Fish -- MRID #s 409745-31 and 409745-24 taken together -- Maximum bioconcentration factors reported for total[^{14}C]-in bluegill sunfish exposed to 0.06 ppm [^{14}C]clethodim for 28 days at 21°C were 0.7-2.1X for edible tissues, 3.0-4.0X for non-edible tissues, and 2.3-3.6X for whole fish.

10. DISCUSSION OF INDIVIDUAL TESTS OR STUDIES: n.a.

11. COMPLETION OF ONE-LINER: no new information

12. CBI APPENDIX: n.a.; a copy of the review of 5/2 is attached for convenience