Date Out EFB: DEC 4 1981

To: Product Manager 41 Stubbs
TS-767

From Dr. Willa Garner
Chief, Review Section No. 1
Environmental Fate Branch

Attached please find the environmental fate review of:

Reg./File No.: 81-TX-08

Chemical: Aldicarb

Type Product: Insecticide

Product Name: Temik

Company Name: Union Carbide

Submission Purpose: Monitoring from use on Grapefruit

ZBB Code: 18

ACTION CODE: 512

Date in: 11/24/81

EFB# 76

Date Completed:

TAIS 60 Days 3

Deferrals To:

_____ Ecological Effects Branch

_____ Residue Chemistry Branch

_____ Toxicology Branch

1.0 INTRODUCTION

Union Carbide is requesting review of soil and water residue from use of aldicarb 15 G (Reg. No. 264-330) to grapefruit grown in Texas which was granted under Sec. 18 of FIFRA (#81-TX-08). The one year exemption terminated on 10/1/81.

2.0 BACKGROUND

Aldicarb [2-methyl-2-(methylthio) propionaldehyde O-(methylcarbamoyl) oxime] is a registered insecticide/nematocide that is currently used on several crops, mainly oranges, peanut, potatoes, cotton, sugarcane, dry beans, sugar beets, and sweet potatoes at rates of up to 10 lbs ai/A/year (Reg. Nos. 264-330 and 331 for aldicarb 15G and 10G respectively). The chemical in its granular formation can be applied and incorporated 2-3 inches below the surface. Aldicarb is stable to hydrolysis at pH 5-7 and temperature of 15-25°C, however, the reaction at pH $\geq$8 is much faster with a half-life of 8 days. On the other hand, the biodegradation half-lives for aldicarb and its two major metabolites, aldicarb sulfoxide and aldicarb sulfone are 14.5 days, 60-90 days and > 90 days respectively.

Aldicarb has high water solubility (7800 ppm), and very low partition coefficient (K_d<4). It leaches into the soil and contaminates ground water. The 1980 ground water monitoring data showed aldicarb contamination to the ground water in New York, Maine, Wisconsin, and Missouri, possible leaching in Florida, Virginia, and Georgia has not been confirmed by Union Carbide. For these reasons, decisions on aldicarb uses should be handled on a case-by-case basis.

3.0 DISCUSSION OF DATA

Data submitted were generated by Union Carbide for the Texas Department of Agriculture, entitled: "Final Report, Section 18 Emergency Exemption for use of Aldicarb 15G on grapefruit; R. V. Brown, Commissioner, Texas Dept. of Agr., dated 11/12/81." Item #11 of the EPA mailgram of 2/25/81, stated the following provision: "Monitoring for residues of aldicarb and its metabolites in water shall be conducted in the Laguna Madre Bay and in the Laguna Atacosa National Wildlife Refuge. OPP staff will work with the Texas Officials to develop details of this program."

According to the EPA letter of 3/30/81, Mr John Basietto of the EEB/EPA, contacted Mr. David Ivie and Mr. Jack Bowmer of the Texas Department of Agriculture and it was agreed that the monitoring performed by Union Carbide last year was a fine model and should be followed to fulfill the requirements this year (this report was submitted on 1/15/81 and reviewed by the EFB on 4/1/81).

For control of citrus nematodes, aldicarb 15 G was applied at 10 lbs ai/A following label directions and use pattern (Reg. No. 264-330). Bimonthly water samples (well and surface water) were taken from sites # 101, 102, 103, and 104 (see Table 1), beginning in April and continuing through September 17, 1981. Analysis of all water samples reflected no detectable aldicarb residues in either ground or surface water. The sensitivity of the analytical technique, as determined from spiked water samples, indicated recovery from 85 to 100%. No soil residue data were submitted (see Table 1 for results).

4.0 CONCLUSION

4.1 Data Gaps

The results of the analysis for aldicarb residues in surface and well water in the grapefruit growing areas of Texas conducted under Section 18 of FIFRA (#81-TX-08), ~~although~~ were negative; however, sampling and analysis were deficient and do not conform to the agreement drawn between the EPA and Union Carbide (through the Texas Department of Agriculture, See EPA letter of 3/30/81).

Sampling and analysis should have been conducted in a manner similar to the 1980 national monitoring program. Data from Texas were deficient in the followings:

1. Analysis for aldicarb residues (parent and metabolites) in fresh soil samples (solid plus liquid) taken to a depth sufficient to account for the extent of leaching.

2. Analysis for aldicarb residues (parent and metabolites in ground water.

3. Analysis for aldicarb residues (parent and metabolites) in soil (adsorbed) and in soil solution (desorbed) at and below the root zone area.

4. The data should have contained information on both tile drain effluents and drainage routes from immediately post application (April-May) to the end ~~beginning~~ of the monitoring (September).

4.2 Observations From Previous Reviews

(a) Observations from the 1980 national monitoring program for aldicarb, we noted that in Florida and Wisconsin, Union Carbide did not begin their first sampling before 120 days after application and their second sampling before 60-90 days after the first sampling. This means that about 180 days have elapsed from application to second sampling, at which time aldicarb metabolites were found to contaminate the saturated zone (80-212 ppb in the 6-8 feet zone of the soil profile). Samplings from Texas, ~~although~~ were conducted within the same time frame; however, it could have missed the areas where aldicarb residues were actually present and did not show in surface runoff or deeper well samples.

(b) Data submitted in support of the Section 18 exception indicated the presence of two major bands in the soil profile. One at the surface and one located at the 4-8 foot level The top band, contained 5-12 ppb and the lower band contained 2-5 ppb. Water samples from (100 foot depth) were found to contain from 2-3.5 ppb of aldicarb. Surface water samples taken from drainage areas near the treated site were found to contain 3-6 ppb. Surface water samples from the Laguna Madre Bay were found to contain no detectable levels of aldicarb except one sample, which contained 1 ppb.

4.3 Future Data Submission

In addition to complying with data gaps shown under 4.1 above, future data submissions should include:

(a) Soil characteristics and composition, also percent organic matter in the upper one foot and in the 6-8' of soil profile.

(b) The recharge rate including irrigation water (negative recharge, if any, should be indicated).

(c) Distance from treated field to each well sampled. Also, well depth and water depth in each.

(d) Method of analysis (UCC or IRD).

(e) Characterization and quantification of aldicarb and major metabolites.

5.0 RECOMMENDATIONS

Union Carbide did not carry out a monitoring program under the provision agreed upon with the EPA personnel. Accordingly, we will not concur with future emergency exempetions or registration of aldicarb for use on grapefruit grown in Texas unless a salvage monitoring program is carried out for this year's exemption (#81-TX-08), and a detailed monitoring program is drawn between Union Carbide and the Environmental Fate Branch personnel for future exemptions (See conclusion under 4.0 above).

Sami Malak

Sami Malak, Chemist
Review Section #1
Environmental Fate Branch/HED

TABLE I . Results of Well and Surface Water Analysis for Aldicarb Residues Prior to, as well as Posttreatment Time Samples.

Date	Lab #	Site: 101*	102**	103***	104****
4-2-81	850-853	0	0	0	0
4-16-81*****	838-841	0	0	0	0
4-16-81*****	834-837	0	0	0	0
5-14-81	846-849	0	0	0	0
5-29-81	842-845	0	0	0	0
6-11-81	71-74	0	0	0	0
6-25-81	75-78	0	0	0	0
7-9-81	79-82	0	0	0	0
7-23-81	83-86	0	0	0	0
8-6-81	87-90	0	0	0	0
8-20-81	91-94	0	0	0	0
9-3-81	95-98	0	0	0	0
9-17-81	99-102	0	0	0	0

*Site 101: From [redacted] Well near Cameron/Hidalgo County line, south of the headwaters of the Arroyo Colorado.

**Site 102: At the Ospray Overlook at Laguna Atascosa in Laguna Atascosa National Wildlife Refuge.

***Site 103: From the major drainage way into the Laguna Atascosa at State Highway 106.

****Site 104: In the Arroyo Colorado downstream from State Highway 1847 at Sanchez Bait Stand. The Arroyo Colorado is the major drainage from the citrus area into the Laguna Madre.

*****Duplicate Samples

PRIVACY ACT EXEMPTION

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF PESTICIDES AND TOXIC SUBSTANCES

MAR 30 1981

Mr. David A. Ivie
TX Department of Agriculture
Post Office Box 12847
Austin, Texas 78711

Dear Mr. ~~Ivie~~ Dave:

On February 24, 1981, your Agency was granted a specific exemption for use of Temik (aldicarb) in grapefruit orchards to control the citrus nematode. Item 11 of the authorizing telegram requires that monitoring for residues of aldicarb and its metabolites be conducted in the Laguna Madre Bay and in the Laguna Atacosa National Wildlife Refuge.

On March 12, 1981, Mr. John Bascietto of the Ecological Effects Branch, Hazard Evaluation Division, EPA, contacted you and Mr. Jack Bowmer concerning the required monitoring program. It was agreed in that conversation that the monitoring performed by Union Carbide last year was a fine model and should be followed to fulfill the requirements this year. [The report detailing this program was submitted to EPA on January 15, 1981, and was entitled "Monitoring Aldicarb Residues in Soil and Water, 1980. A Report to E.P.A."] Sampling, it was agreed, would begin as soon as possible (April) to coincide with the first aldicarb applications to citrus. Additionally, pre-application sampling will be done and several samples will be taken from the surface water resources of the Laguna Atacosa National Wildlife Refuge. It was indicated that Union Carbide would most likely carry out the monitoring and your Agency would duplicate the lab analyses.

The results of this program must be submitted to EPA as soon as available but no later than November 1981. It should be noted that data developed from this program would not necessarily satisfy section 3 requirements for obtaining EPA registration of this use.

Any questions concerning this program shouuld be referred to Mr. John Bascietto at (703) 557-0320.

Sincerely yours,

Edwin L. Johnson
Deputy Assistant Administrator
for Pesticide Programs (TS-766C)

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