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EEB BRANCH REVIEW

DATE: IN 11/24/81 OUT 12/4/81

FILE OR REG. NO. 264-330 264-331

PETITION OR EXP. PERMIT NO.

DATE DIV. RECEIVED 11/24/81

DATE OF SUBMISSION

RD COMPLETION DATE 2/4/82

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

RD ACTION CODE . 336 RESUBMISSION / AMENDMENT- NEW FOOD USE

PRODUCT MANAGER J. Ellenburger (12)

PRODUCT NAME(S) Temik 15G

COMPANY NAME UNION CARBIDE

SUBMISSION PURPOSE MONITORING STUDY

SHAUGHNESSEY NO.	CHEMICAL, & FORMULATION	% A.I.
098301	Aldicarb (2-methyl-2-(methylthio) propion- aldehyde-0-(methylcabamoyl) oxime	15

Introduction

On February 25, 1981, the Environmental Protection Agency approved the Texas Department of Agriculture request for an Emergency Specific Exemption (Section 18) to use Aldicarb (Temik 15G, EPA Registration Number 254-330) granules to control citrus nematodes in grapefruit orchards in the lower valley of Texas. The product was to be used at a maximum of 67 pounds per acre in bands incorporated or shank injected. Maximum amount of product authorized was 1,601,300 pounds.

Prior to the Agency granting this exemption the Ecological Effects Branch (EE8) expressed concern over the possible effect of contaminated runoff (rainwater, irrigation return flow waters) on the brown shrimp fishery in Laguna Madre Bay. As such, an environmental monitoring program was imposed upon the registrant (Texas Department of Agriculture) as a condition of the Emergency Exemption. The main environmental components concerned were ground and surface waters with special concern for the Laguna Atascosa Wildlife Refuge and water therein, as well as the Arroyo Colorado which subsequently flows in the Laguna Madre. Results of this monitoring study were submitted to the Agency on November 11, 1981.

Product Application

Information provided by Union Carbide show sales of [REDACTED] lbs, somewhat less than the amounts authorized primarily because producers chose to use less than the maximum specified on the label. Most applications (approximately 95%) were applied at 33-36 pounds of product per acre. The 1981 tonnage reflects use on both oranges and grapefruit compared with 1980 sales of approximately [REDACTED] pounds used on oranges under federal label authority. Poundage used reflects treatment of approximately 30,000 acres or slightly less than 50% of the total 70,421 citrus acres. The majority (70-80%) of the Aldicarb used on citrus in the counties of Hidalgo, Willacy, and Cameron was applied during March and April of 1981 (Taylor 1981). Union Carbide production figures indicate that the 1981 emergency exemption resulted in a significant increase [REDACTED] in product utilization.

Monitoring Protocol

As required by protocol*, bimonthly samples were taken at all water sample locations beginning in April and continuing through September. At the second sample date in April, duplicate samples were taken. Sampling sites were located as indicated on Figure 1 and more explicitly on Figure 2. It should be noted that surface water flow is from the southwest in a northeasterly direction. Site 101 is the location of the well from which ground water samples were taken. The well was selected because citrus orchards were treated on all sides of the well, the furthest field from the well being approximately 100 yards in distance. Site 102 is where water samples were taken from the Laguna Atascosa, while 103 is the site where water samples were taken from the major drainage area into the Laguna Atascosa. Site 104 is the location where water samples were pulled from the Arroyo Colorado which has its beginning in the southwest part of Cameron County

* Monitoring Aldicarb residues in soil and water, 1980.

and subsequently ends where it enters the Laguna Madre. In addition to the water samples, the registrant also obtained three commercial brown shrimp samples to check for Aldicarb residues.

Results

Analyses of all water samples reflected no detectable Aldicarb residues in either ground water or surface water (Table 1). The sensitivity of the analytical technique was 1 ppb. Brown shrimp samples also contained no detectable Aldicarb residues (Table 2.). The sensitivity of the analytical technique was 10 ppb (Lucas, 1981).

Data Adequacy

All citrus (oranges and grapefruit) grown within the study were irrigated from waters pumped from the Rio Grande River. Feeder canals supplying water were above ground level and as such should not be contaminated by runoff or irrigation return flow (flushing) waters. Runoff from citrus grown within this watershed is disposed of by one of two methods. Citrus groves located in the northern half of Hidalgo county channel runoff waters into naturally occurring "arroyos" (20-2500 acres in size) or oxbow lakes (Davis, 1981). Runoff occurring from groves located in the southern portions of Hidalgo and Cameron Counties is discharged into a network of drainage ditches. Canals such as the Arroyo Colorado subsequently drain into the Laguna Madre Bay (Sample Site 103). On the average, groves contributing runoff water are approximately 45-60 air miles from the Bay.

The 1981 monitoring study differed significantly from the registrant's 1980 study since it (1) includes samples collected during Aldicarb's application and (2) samples were collected bimonthly for a approximately six (6) months after the final application. Data collected during the 1981 study indicated that Aldicarb's use on citrus did not contribute detectable residues to the waters or invertebrate fauna of the Laguna Madre Bay. The fact that no residues were detected in shrimp or water samples collected from the Arroyo Colorado (Site 103) is believed to be particularly noteworthy since this location would represent a potential worst case location.

The lack of detectable residues could be attributed to the following:

1. The alkaline condition of the ground water in the area sampled. 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.
2. Only a portion of the study area contributes runoff to waters of the Laguna Madre Bay.
3. The distance with which citrus groves are located from Laguna Madre Bay

Conclusions

Data collected during the registrant's 1981 monitoring study indicate that Aldicarb's use on citrus (grapefruit and oranges) grown in the lower valley Texas did not contribute detectable residues to the waters or invertebrate fauna of Laguna Madre Bay, Texas. EEB will defer^{to} the Environmental Fate Branch (EFB) on matters of groundwater contamination and protocol acceptability.

Charles A. Bowen II 12/8/81

Charles A. Bowen II
Fish and Wildlife Biologist
Ecological Effects Branch / HED

Raymond Matheny 12/9/81

Raymond Matheny
Head, Section I
Ecological Effects Branch / HED

Clayton Bushong 12/9/81

Clayton Bushong
Chief,
Ecological Effects Branch / HED

References Cited

Davis, Jim. 1981. Personal communication. November 1981.
Texas Department of Agriculture. (512-475-3681)

Lucus, Wilford. 1981. Personal communication, November 1981.
Texas Department of Agriculture. (512-787-8866)

Taylor, J.L. 1981. Personal communication, November 1981.
Union Carbide Sales Representative. (512-682-7077)

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

<u>Date</u>	<u>Lab #</u>	<u>Site:</u>	<u>101*</u>	<u>102**</u>	<u>103***</u>	<u>104****</u>
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.

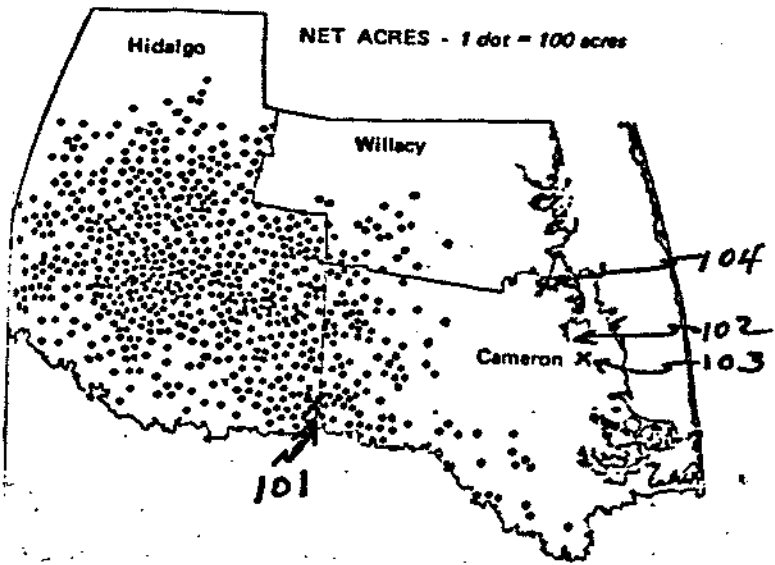
*****Duplicate Samples

TABLE III. Results of Analysis of Commercial Brown Shrimp Samples from the Laguna Madre and/or the Arroyo Colorado for Aldicarb Residues.

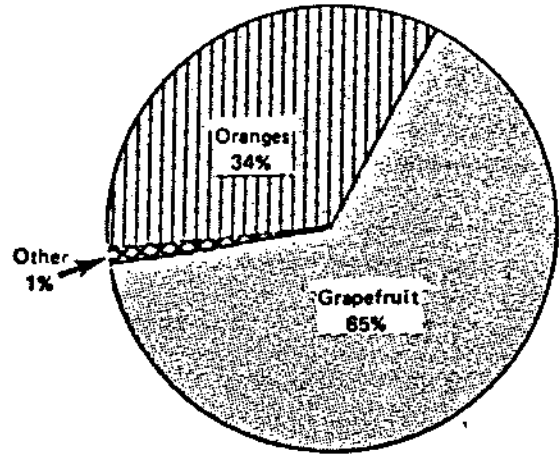
<u>Date</u>	<u>Lab #</u>	<u>Commercial Brown Shrimp Samples Aldicarb Detected</u>
4-2-81	103	0
6-2-81	104	0
9-17-81	105	0

FIGURE 1.

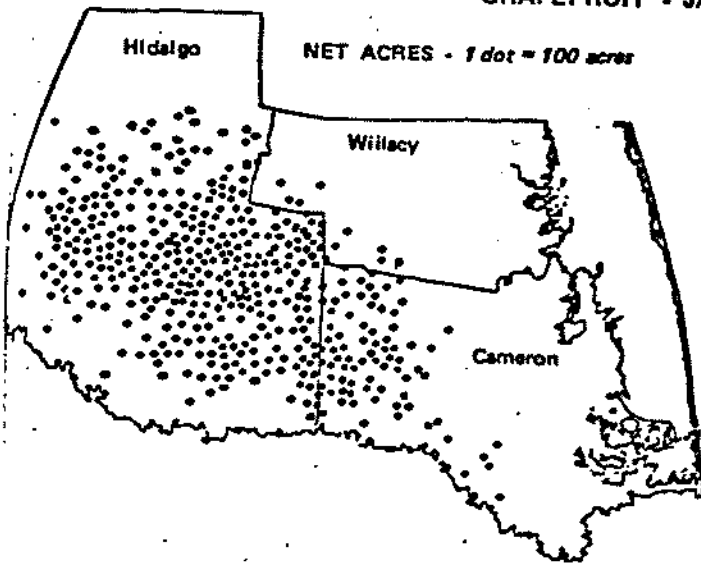
ALL CITRUS - JANUARY 1, 1981



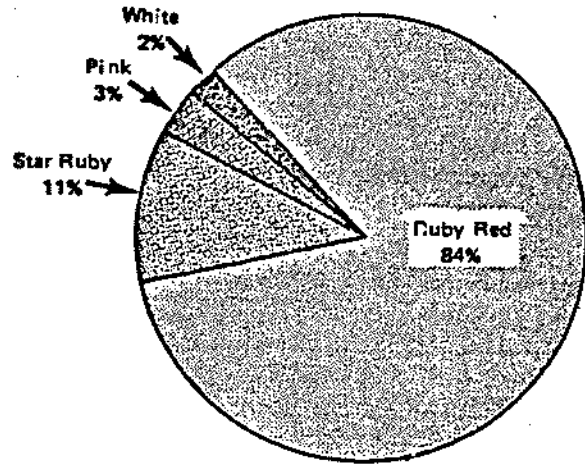
PERCENT OF TREES BY TYPE



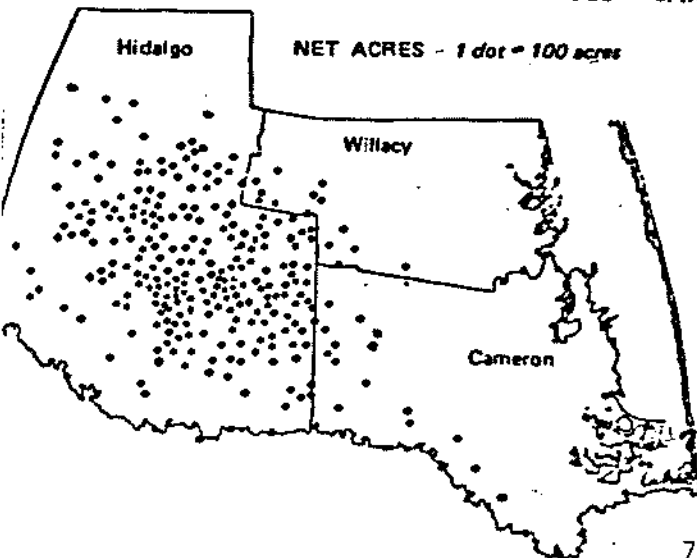
GRAPEFRUIT - JANUARY 1, 1981



PERCENT OF TREES BY VARIETY



ORANGES - JANUARY 1, 1981



PERCENT OF TREES BY VARIETY

