UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

COPY

DATE: April 2, 1980

SUBJECT: Re-evaluation of EUP-41326-1, PP 8G2026 and PPA 845174 (Aldicarb use in/on Grapefruit in Texas) and EUP-35586-1, PP 7G1900 (Aldicarb use in/on Hops in Washington State)

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TO: Frank Sanders, Section Head
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Thru: Dr. Jack Zweig, Chief
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Introduction

We have reviewed your request to re-evaluate EUP-41326-1 and EUP-35586-1 per memo dated March 27, 1980 (Frank Sanders to Jack Zweig). This review is in lieu of the denial for a Section 18 in Texas. The EUP-41326-1 was previously reviewed by EFB (S. Cohen March 12, 1980) and was approved for use in Texas on a limited acreage (90) with no monitoring requirement.

Background

Aldicarb* (2-methyl-2-(methylthio) propionaldehyde O - (methyl-carbamoyl) oxime) is a registered insecticide/ nematicide that is currently used on oranges. Directions for use on oranges call for one application per season of 10 lbs. ai/A just prior to or during spring flush of foliage growth. The chemical can be applied either: 1) in band application along the dripline of the tree (on both sides), incorporated 2-3 inches below the surface, 2) applied in irrigation furrows using 2 shanks per furrow, with prompt and thorough irrigation after treatment.

Personal communications with Survey and Analysis Division lists the following soil series and characteristics that are typical for orchid groves in Texas.

*formulated product Temik

Capability	Soil Series	Characteristics
A.	Delfina fine sandy loam	pH 6.6 - 7.8 seasonal high water table percolation of 2 - 6.3 in./hr.
B.	Willacy fine sandy loam	same as above
C.	Camergo silty loam	pH 7.9 - 8.4 perched water table common after rain or irrigation percolation 0.6 - 2.0 in./hr.

It is noted that many of these fields are tile-drained which serve to discharge irrigation water applied to the orchards. The tile drains can be either deep tilled or shallow tilled. The tiles drain into discharge drainage ditches. The composition of these ditches is generally soil and they flow into a common discharge basin.

Geology

The Rio Grande Valley, Texas, is underlaid by two aquifer systems from which groundwater resources can be withdrawn.

These systems are identified by the Texas Water Development Board as, the Rio Grande Valley Alluvium Aquifer and the Gulf Coast Aquifer. The Rio Grande Valley Aquifer is proximate to the Rio Grande River. The groundwater quality varies considerably and where water is potable the wells are deep (exceeding 60 feet). Irrigation water and/or the majority of drinking water comes from the Rio Grande River.

The water balance that is used for irrigation purposes exceeds the evaptranspiration and evaoptransporation potential. The groundwater in the area tends to be not potable and of not good quality for irrigation use on citrus. The excess from the water balance is drained away from the citrus groves by the tile drain systems, which carries the excess eastward to Rio Hondo and eventual communal drainage basin near Harlington, with eventual discharge into the Gulf of Mexico. The drainage water is not used again for irrigation. The two groundwater aquifers are interconnected and are slow flowing, with eventual discharge into the Gulf of Mexico.

Nitrate data from areas that have extensive tile-drain systems indicate that upwards of 35% of the applied nitrates were removed from a field by such systems within two months after application.

From the results of the monitoring data in Long Island it can be observed that there is a correlation between nitrate pollution and aldicarb pollution. Similar movement could be expected in Texas where the soils are sandy in nature. A recent paper (Elgind, et al. 1978) which evaluated aldicarb in citrus soils confirms this hypothesis (C. 30% discharge).

Environmental Chemistry

Aldicarb is stable to hydrolysis at acid (pH 5.0) and neutral (pH 7.0) aqueous solution. The reaction in basic (pH 9.0) aqueous solution is faster with an estimated half-life of 80 days. No data has been submitted for pH 8.0 (which is the stated pH of groundwater in Texas where the Section 18 is proposed); however, an estimated half-life would be from 160-200 days.

Aldicarb degradation in soils is dependent on soil type (pH), moisture levels, temperature, clay content, and time. In soils that are dry aldicarb is most stable, exhibiting a half-life of greater than 56 days. The degradation products are notably persistent in coarser textured soils.

Aldicarb does not compete with water for adsorption sites on monmorillonite clays. The compound is weakly bonded to water molecules adhering to external adsorbate surfaces. The compound is readily displaced by water. At low humidities the compound bonds directly to the saturating metal ion near the adsorption.

Aldicarb is unstable near acidic clay surfaces with extensive degradation in Almonmorillonite systems.

Aldicarb is rapidly carried deeper into the soil profile during periods of heavy rainfall or irrigation.

During reduced conditions the adsorption capacity is increased, thereby slowing the movement of aldicarb, but not eliminating it.

Recommendations

1. To sufficiently gather transformation and translocation data for aldicarb in Texas we agree the EUP-41326-1 should be expanded ~~and~~ b&s should not exceed 1,000 acres.

2. a) Monitoring data for both movement of aldicarb through the soil profile and effluent residue concentration of the discharge water from the tile drains will have to be obtained. We submit a reference that may be useful in setting up such a program (Review Nematology. 1(2): 207-215 (1978). D.W. Elgind, S.D. Van Gundy and R.H. Small).

b) Actual migration of residues discharged (via tile drains) will have to be monitored as they are carried away from the field by the discharge ditch.

3. Monitoring of shallow wells near the treated field (whether potable or irrigation or other) will have to be monitored for residues.

4. Characterization of agricultural methods of application, precipation and/or irrigation applied water, general soil characteristics, and ground or surface quality will have to be monitored and reported.

5. We suggest that a protocol be submitted for EPA approval.

6. We have not reviewed EUP-38586-1 previously and information concerning the use is lacking. We agree to the extension on the condition that aspects of the Texas EUP are initiated for the Washington State EUP request.

cc: R. Cook
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