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EE BRANCH REVIEW

IN 1/30/80 OUT 2/6/80

FILE OR REG. NO. _____

PETITION OR EXP. PERMIT NO. _____

DATE DIV. RECEIVED _____

DATE OF SUBMISSION _____

DATE SUBMISSION ACCEPTED _____

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

DATA ACCESSION NO(S). _____

PRODUCT MGR. NO. D. Stubbs

PRODUCT NAME(S) TEMIK, 15G (aldicarb)

COMPANY NAME Texas Dept. of Agriculture

SUBMISSION PURPOSE Section 18 - grapefruit , Texas

CHEMICAL & FORMULATION 2-methyl-2-(methythio) propionaldehyde O-(Methylcarbamoyl)oxime
Aldicarb
[redacted]

100 Section 18 - Emergency Use Permit

100.1 Nature and Scope of the Emergency

Due to the October 29th, 1979 suspension order by EPA for all uses of 1,2,-dibromo-3-chloropropane (DBCP), the State of Texas claims that grapefruit producers are left with only one registered alternative, i.e., aldicarb, for the control of citrus nematodes (Tylenchulus semipenetrans). The present "emergency" affects 47,000 acres committed to grapefruit orchards. The average number of trees per acre is 118, for a total of approximately 5,640,000 trees (however, not all of the acreage will actually be treated).

The Texas Dept. of Agriculture claims that nematode control is necessary to avoid losses to producers of between $226 per acre, per year, up to $338 per acre, per year. Use of aldicarb (TEMIK, 15G) is expected to result in an increase in production of at least 100 lbs. per tree per year.

This emergency exemption covers 50% of 47,000 grapefruit orchard acres (i.e., 23,900 acres or 2,820,200 trees) for a one-time use at 67 lbs. TEMIK per acre (10 lbs. a.i. per acre) for a total of 1,601,300 lbs. TEMIK, 15G (168,205 lbs. active ingredient).

100.2 Target Organism

Citrus nematode, Tylenchulus semipenetrans

100.3 Application Methods, Directions, Rates

The section 18 application specifies that the label directions for oranges will be used. The amended label calls for controlling citrus nematodes on oranges with 67 lbs. TEMIK, 15G per acre or 100 lbs. of TEMIK, 10G per acre. The granules are to be placed on two sides of the tree row in a 2-4 foot wide continuous band at the outer edge of the dripline, incorporated 2-3 inches into the soil and followed by irrigation. OR, applied on a 2-4 foot wide band at the outer edge of the dripline around the tree, incorporated 2-3 inches into the soil and followed with irrigation.

100.4 Environmental Hazards Statement

(From the label for oranges)

TOXIC TO FISH, BIRDS AND WILDLIFE

"Birds feeding on treated areas may be killed. Keep out of any body of water. Do not contaminate water when cleaning equipment or disposing of wastes. Apply this product only as specified on this label."

100.5 Purpose of Submission

Emergency exemption for use of TEMIK, 15G aldicarb pesticide on grapefruits, pursuant to Section 18 of the FIFRA, as amended.

100.6 Treatment Area

Cameron County, Hidalgo County, and Willacy County, all in gulf coastal Texas.

101.0 Chemical and Physical Properties

101.1 Chemical Name

2-methyl-2(methythio) propionaldehyde-o-(methylcarbamoyl)oxime

101.2 Common Name

TEMIK, Aldicarb, UC 21149

102.0 Behavior in the Environment

(see review by L. Turner 5/18/78 and addendum)

Aldicarb will metabolize in clay, fine sand, clay loam, and muck soils. Half lives varied (<1 week to 56 days) depending on pH, moisture, organic content, soil particle size. Leaching is confirmed for the parent and toxic sulfoxide. Aldicarb sulfoxide and sulfone had half lives of one week and two weeks, respectively.

Hydrolysis occurred at 80° and 100°C. No photolysis information is available.

Aldicarb is metabolized uniformly in plants to the toxic sulfoxide.

Ancillary studies indicate laying hens to have nitrile sulfoxide, oxime sulfone, oxime nitrile, and thirteen unknowns in their feces when fed aldicarb and aldicarb sulfone.

103.0 Toxicological Properties

103.1 References from Toxicology Branch

No reference were available, however conversations with Tox. Branch personnel indicate that they (Tox. Branch) are reassessing their position with respect to tolerances of aldicarb in light of recent findings in New York State concerning aldicarb contamination of well water, following use on potatoes. Tox. Branch will defer to EFB and EEB on whether TEMIK in Texas will leach into ground water (Tox. Branch personnel, pers. comm.).

With regard to acute mammalian toxicology, previous EEB reviews refer the reader to "review by J. Edmundson 8/7/74," however this reviewer found no such review in EEB files on aldicarb. EEB review of R. Felthousen 1/19/79 (appendix VI) indicates the following data:

Mouse	LC_{50} = .008 mg
Rat	LD_{50} = .024 mg

103.2 Minimum Requirements

see review of L. Turner, 5/18/78

103.3 Additional Terrestrial Laboratory Tests

see review of L. Turner, 5/18/78

103.4 Additional Aquatic Laboratory Tests

see review of L. Turner, 5/18/79

104.0 Hazard Assessment

104.1 Discussion

Currently TEMIK is registered for use on cotton, peanuts, potatoes, sugar beets, oranges, dried beans, pecans, soybeans, ornamentals and (in Louisiana only) on sugarcane and sweet potatoes.

Available data indicate that aldicarb is very highly toxic to birds and mammals. Principal wildlife species likely to utilize citrus orchards are small passerine birds, microtine, cricetine, and sciurid rodents.

The likelihood of exposure of nontarget organisms to TEMIK aldicarb pesticide from this use is great. The availability of aldicarb per square foot exceeds the estimated avian LD_{50} (see reviews of Turner and Felthousen, aldicarb files). The proposed section 18 would present similar hazards as those attendent to

use of aldicarb as a nematicide for oranges. Granules are to be soil incorporated 2-3 inches deep and followed by irrigation. As per addendum to review of L. Turner 5/18/78, dated 7/26/78, "working into the soil is unacceptable to reduce avian hazard; shanking is acceptable if followed by immediate irrigation of a specified amount." The zero-hour surface residues following application as per label directions are 28 mg/ft^2 (see previous reviews). Post-application irrigation is necessary, presumably to carry the pesticide from the granules into the soil and then upward, rendering the granule less toxic, and somewhat reducing the acute avian hazard. The degree of the reduction of hazard is unknown because of lack of data on post-irrigation residues.

It is known that aldicarb leaches in sandy soils. Since grapefruit trees are grown in sandy soils the potential for leaching is great. The amount of downward movement of pesticide after irrigation is dependent upon amount of seasonal rainfall, depth of local water table, and recharge rates, among other factors. The Environmental Fate Branch (EFB) will be assessing this problem for the Texas grapefruit use in the near future. EEB defers to EFB in determining: 1) the degree of leaching; 2) the potential for, and degree of ground water contamination with aldicarb pesticide parent, the toxic aldicarb sulfoxide, and aldicarb sulfone.

That possibility that ground water contamination with aldicarb pesticide may be a serious human health problem has been demonstrated by the current problems attendent with use of TEMIK on potatoes on Long Island (EPA, Scientific Advisory Panel meeting, 2/1/80). In light of this, the extent to which aldicarb's use constitutes a hazard to nontarget aquatic organisms cannot be assessed until EFB completes its assessment of the leaching and ground water contamination questions in Texas, particularly with respect to the Rio Grande River Valley.

104.2 Likelihood of Exposure to Nontarget Organisms

Field studies have repeatedly shown that granular aldicarb caused nontarget mortality, especially to avian species. Most bird deaths are probably due to ingestion of granules as grit. Although great care may be taken to soil incorporate these granules (as per label directions) a certain number invariably remains on the soil surface. This becomes an acute hazard to birds and mammals when applicators fail to disc under spills at row ends. Failure to follow label directions and/or faulty equipment could result in large quantities of granules being exposed on the soil surface.

Data suggest that smaller birds are more susceptible than larger ones to ingesting the granules. Citrus orchards are high use habitats for numerous species of songbirds and as such, mortality to these species is expected.

As stated above the likelihood of exposure of nontarget aquatic organisms cannot be assessed at this time.

104.3 Endangered Species Considerations

No endangered species have been identified as being at risk of exposure to aldicarb residues in the specified use pattern, i.e., citrus orchard (grapefruits), in Cameran, Hidalgo, and Willacy counties, Texas. However, several species of snails and a mussel have been proposed for listing and may be at risk from exposure, particularly if EFB finds that leaching and ground water contamination are real possibilities in Texas citrus orchards. Final analysis of the endangered aquatic species hazard assessment cannot be accomplished until EFB resolves this question. Consultation with Bob Carsell, EFB, confirms that, once in water supplies, aldicarb will remain for an undetermined period of time.

105.0 Conclusions

The Ecological Effects Branch does not concur with the issuance of an emergency exemption for use of TEMIK, 15G aldicarb pesticide on grapefruit orchards in Texas.

Basic questions concerning aquatic nontarget and endangered species cannot be addressed, nor a hazard assessment completed until the Environmental Fate Branch has reviewed the proposed section 18, and comments on questions of ground water contamination with aldicarb and subsequent possible contamination of surface waters, i.e., local lakes, ponds, streams, the Rio Grande River Valley, and the Laguna Madre Bay.

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