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EEE BRANCH REVIEW

DATE: IN 6/7/77 OUT 6/10/77 IN _____ OUT _____ IN _____ OUT _____

FISH & WILDLIFE ENVIRONMENTAL CHEMISTRY EFFICACY

FILE OR REG. NO. 239-1721

PETITION OR EXP. PERMIT NO. _____

DATE DIV. RECEIVED _____

DATE OF SUBMISSION _____

DATE SUBMISSION ACCEPTED _____

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

PRODUCT MGR. NO. P. Critchlow

PRODUCT NAME(S) Dibrom 14 Concentrate

COMPANY NAME Chevron

SUBMISSION PURPOSE 24(c) registration (State of Florida)

CHEMICAL & FORMULATION 1, 2 dibromo-2,2dichloroeythl dimethyl phosphate 85%

100.0 Pesticidal Use

Mosquito adulticide

Purpose of Submission

Section 24(c) Registration. State of Florida requests the addition of aerial fogging to the present label.

100.1 Application Methods/Directions

Directions:

Adult Mosquito Control in Residential Areas, Municipalities, Tidal Marshes, Swamps. Woodlands, Livestock Pastures, Feed Lots, and Pastures including Dairy Cattle. It is not necessary to avoid buildings, dairy barns, feed or forage areas. Treat shrubbery and vegetation where mosquitoses may rest. Shrubbery and vegetation around stagnant pools, marshy areas, swamps, residential areas, municipalities, woodlands, pastures, and farm buildings may be treated.

Presently Registered Aerial Applications:

1) Conventional Spray - 0.05 to 0.10 lbs. a.i./acre using no. 2 fuel oil or diesel oil as a carrier.

2) Ultra Low Volume - 0.11 lbs. a.i./acre applied undiluted.

Proposed Addition:

Adult Mosquito Control - Aerial Fogging - Residential Areas, Municipalities, Tidal Marshes, Swamps, Woodlands, and Livestock Ranges - Apply 16 fl. oz. per acre of a 5% v/v solution of DIBROM 14 Concentrate in fuel oil as a thermal fog by injection into an FAA approved exhaust system. This is equivalent to 0.0872 lb. actual DIBROM per acre. To avoid drift, aerial fogging should be done when wind is 5 mph or less and thermal activity is low.

100.3 Precautionary Labeling

This product is toxic to fish, birds, and other wildlife. Keep out of lakes, streams, and ponds. Direct application to water is prohibited. Do not apply when weather conditions favor drift from areas treated. Do not contaminate any body of water by cleaning of equipment or disposal of wastes. Apply this product only as specified on this label.

This product is highly toxic to bees exposed to direct treatment or residues on crops. Protective information may be obtained from your Cooperative Agricultural Extension Service.

101.0 Chemical and Physical Properties

101.1 Chemical Name

1,2-dibromo-2,2-dichloroethyl dimethyl phosphate

101.2 Common Name

Dibrom, Naled

103.0 Toxicological Properties

No data were submitted or referenced with this submission. Refer to reviews by Norm Cook (August 11, 1976) and Scot Fredericks (February 19, 1976) for data on Dibrom and review by R. W. Felthousen (July 29, 1976) for data on its degradate - DDVP.

104.0 Hazard Assessment

104.1 Discussion

Aerial fogging at 0.0872 lbs. active/acre will result in residues of 64 ppb in six inches of water and less than 20 ppm on vegetation. Areas to be treated which will result in exposure of non-target organisms include woodlands, livestock ranges, and areas around swamps and tidal marshes. All these application sites support a diversity and abundance of terrestrial fauna and/or are adjacent to areas rich in freshwater or estuarine species.

Dibrom is acutely toxic to avian species when ingested directly, but significantly less toxic when ingested as a part of the diet. Fish and aquatic invertebrates are adversely affected by Dibrom at very low levels and on the basis of laboratory toxicity studies, the concentration of Dibrom in waters adjacent to aerially treated areas would be expected to exceed the LC_{50} of certain invertebrates. Hazards to aquatic invertebrate fauna are further aggrevated due to the fact that Dirbrom degrades (in water) to DDVP within about 24-hours and DDVP is up to 50 - 160 X more acutely toxic to invertebrates than Dibrom. Avian species are also more sensitive to DDVP.

While direct application of Dribrom to water is prohibited, the treatment of areas around swamps and tidal marshes would unavoidably result in contamination of aquatic habitat via drift. Therefore, based upon the acute toxicity of Dibrom (and its degradate, DDVP) to aquatic invertebrates, the presently registered use of Dibrom as an aerially applied mosquito adulticide falls into RPAR. It should be noted that invertebrate species likely to be affected in Florida include such commercially and recreationally important forms as shrimp, crab, clam, and oyster.

The specific issue to be addressed in the evaluation of this registration [24(c)], is whether a thermal fogging application of Dibrom will increase the potential for hazards to non-target organisms compared to a conventional aerial spray application. The registrant has suggested that thermal fogging "allows better control of placement and accurate monitoring, thus, the opportunity to stop application to prevent drift." The proposed label states that inorder "to avoid drift, aerial fogging should be done when wind is 5 mph or less and thermal activity is low." However, no data have been provided to support these claims.

Conversations with Mr. Phil Hutton (Efficacy Section, EEB) and Dr. Frank Murphy (Dept. Entomology, University of Delaware) revealed that the probability of drift from treated areas is significantly greater when thermal fogging is employed (compared to conventional aerial spray). Furthermore, Dr. Murphy felt that the increased efficacy of thermal fogging, shown under laboratory conditions, would be negated by the increased loss of material from the target site via drift.

Thermal fogging results in the application of product as a very fine mist (particle size less than 5 microns vs. conventional spray droplet of 100-300 microns) which behaves almost like a gas, rather than a liquid droplet. As a result, gravity is not a large influence on the particles, so that winds over 2 mph. and thermal wind currents serve to keep the product suspended in the air, thus enabling transport to non-target sites. Due to the low wind speed (> 2 mph.) at which drift becomes a problem and the difficulty in detecting thermal currents and inversions, it is unreasonable to expect a pilot to be able to monitor thermal fogging applications accurately enough to suspend operations before drift becomes a problem.

Aerial thermal fogging operations may also pose hazards resulting dermal and eye irritation as well as inhalation of the misted

product. These routes of exposure would impact upon mammalian and avian species in particular, as indicated by the fact that Dibrom produces severe eye and dermal irritation in rabbits. Among the avian species that could be affected are several endangered species including the Brown Pelican, Dusky Seaside Sparrow, and Florida Everglade Kite. Telephone conversations with several individuals in Florida familiar with the status of the above species did not reveal any specific problems that would be expected from the proposed use or any documented accident cases involving Dibrom.

105.0 Conclusions

It is the opinion of the Environmental Safety Staff that based upon the acute toxicity of Dibrom to certain aquatic fauna, the presently registered use of Dibrom as an aerially applied mosquito adulticide may result in unacceptable adverse environmental effects and thus falls into R.P.A.R., and that the proposed aerial thermal fogging application of Dibrom poses even greater environmental hazards.

The conclusion that thermal fogging poses additional hazards is based upon the following:

(1) As a thermal fog, Dibrom will be more susceptable to drift from wind and thermal air currents;

(2) Drift cannot be adequately monitored by the pilot in order to suspend operations when necessary; and

(3) As a thermal fog, the probability of avian and mammalian exposure to Dibrom (via eye and dermal contact as well as inhalation) is increased.

FSB HTC

Fred Betz
Fish and Wildlife Section
EEEB

June 10, 1977