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To: Chief, Ecological Effect Branch
Hazard Evaluation Division

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

Attached find the protocol review requested for:

Chemical: Goal

Reg. No.: 707-145

Protocol Type: field monitoring

Use Pattern: soybeans, corn, bearing fruit

Date in: 5/5/81	TAIS (Level II)	Days
Date out: MAY 11 1981	80	1

PR #: 4

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REVIEW OF PROTOCOL FOR FIELD MONITORING STUDIES OF OXYFLUORFEN [GOAL] #707-145

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THRU: Dr. Willa Garner, Chief
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Background

Oxyfluorfen [2-Chloro-1-(3-ethoxy-4-nitrophenoxy)-4-(trifluoromethyl) benzene] is a contact herbicide, currently registered under 3(c)(7) for weed control in soybeans, peanuts, rice, corn, cotton, and fruit trees. Use pattern is post-emergence broadcast before crop emergence or directed to the weeds after crop emergence [cotton, soybeans, and corn], at a maximum dosage of 2 lbs ai/A. Known formulations are 2EC, 1 G and 2G. Oxyfluorfen is not readily absorbed by plant roots and is not readily metabolized by plants.

Microbial degradation of oxyfluorfen is not a major factor. Photodegradation in water is rapid, however, in soil it is very slow. Oxyfluorfen is insoluble in water (0.1 ppm), but soluble in most organic solvents. It is adsorbed strongly on soils but not readily desorbed. It shows negligible leaching and is very resistant to removal by rain. The half life is 30-40 days.

Field Monitoring Program

We have the following comments on the proposed 1981 field monitoring program for Goal:

(a) Additional water and sediment samples must be collected on day of sufficient rainfall to cause significant runoff from treated fields. In arid regions, or areas of insufficient rainfall, a field with a sprinkler irrigation system may be chosen for the purpose. At least one-acre inch of irrigation water must be applied prior to sampling.

(b) Soil samples must extend to deeper soil profile than the proposed 2 cm. We recommend the same sampling techniques under item 15 of Goal PD 1-2-3 (see enclosure).

(c) In reporting, describe use pattern to include: use method, dosage, spray volume, if use was pre- or post-emergence, incorporation if any, type of implements, and use site. Additionally, reports must include percent soil moisture on day of application, and if the day was clear or cloudy.

Recommendations

In addition to the above comments (a,b, c), we recommend that Rohm and Haas Company follow the Goal PD 1-2-3 of 1980 which is outlined in more detail than the proposed 1981 program (see attached Appendix D, pages 107-109).

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Appendix D

Field Monitoring[a/] during the Conditional Registration Period

Preliminary field monitoring and exposure modeling indicate that harmful residues of oxyfluorfen may accrue in aquatic habitats. The registrant is, therefore, requested by the Agency to submit the results of field monitoring studies within the first two years of the conditional registration period.

The purpose of the field studies will be to determine the tendency of lethal pesticide residues to be transported away from the site of application. Chemical analyses of water courses and aquatic habitats adjacent to the treated fields will provide some indication of pesticide movement. Because oxyflourfen may be detrimental to nontarget plants at residue levels below the analytical detection limit, the Agency requests that the productivity and density of aquatic plants adjoining the treated fields also be monitored. These productivity and density parameters will be compared to those for similar plant populations adjacent to untreated fields. The comparison will form a field bioassay to determine the presence or absence of herbicidal pesticide residues.

The field study sites should be selected within the soybean, corn, and bearing fruit and nut use pattern areas. Each study site should adjoin a small limnetic habitat containing submerged aquatic plants including members of the grass family (Gramineae). Submerged aquatic plant populations in untreated watersheds should also be located within close commuting distances. One of the soybean field study sites should be located within the Chesapeake Bay Drainage area, as persistent herbicides have been implicated in the apparent depletion of submerged aquatic vegetation in the bay.

The registrant may wish to augment the natural rainfall with irrigation at any or all of the study sites. An abnormally low natural rainfall might otherwise necessitate that the studies be repeated.

It is well known that good soil management practices can reduce the runoff of sediment-bound pesticides. If such practices are used during this field runoff study, they should be practices already in general use or practices which could be readily understood by agricultural workers after having read label instructions. That is, if this field study indicates that certain management practices are required to reduce runoff to safe levels, then those practices should be described and required by future Goal labels.

a/ Due to the expected stability of oxyfluorfen the registrant will be expected to monitor for the parent chemical only. If metabolites are present they will be expected to be below the detection limit of the analytical method. The detection limit should be 0.01 ppm.

Specific items to be included in the registrants's field study protocol for each use pattern include:

Meteorological

1. Pan evaporation - daily
2. Temperature monitoring - continuous
3. Rainfall monitoring - continuous
   (rainwater itself should be analyzed for oxyfluorfen)
4. Volume of runoff water - per runoff event.

Soil

5. Soil profile description to one meter - once per season
6. Soil density - once per season
7. Soil organic matter content - once per season
8. Soil moisture holding capacity - once per season
9. Soil infiltratin rate - once per season

Biological

10. Comparison of the productivity and density of indigenous submerged aquatic plant populations growing adjacent to treated fields to the productivity and density of such populations growing adjacent to untreated fields. The protocol for this comparison should include an estimation of the real differences that can be detected by the test at the 95% confidence level. Pesticide residue analyses of hydrosoil surrounding the roots of these plants should be provided monthly.

Pesticide Residues. (10% of these analyses should be duplicated by mass spectrometry where appropriate).

11. Hydrosoil concentrations - Measurements in top 5 cm may-be combined with hydrosoil measurements described under "Biological" above, where appropriate - monthly.

12. Benthic invertebrate's tissue residue (oligochaetes, burrowing mayflies, chironomids) - monthly.

13. Concentration of dissolved residues in runoff - per rainfall event.

14. Concentration of sediment-bound residues - per rainfall event (Analyses of spiked samples should be submitted to demonstrate percentage recovery.)

15. Treated soil pesticide concentrations - should be measured from 0 to 8cm in 2cm increments monthly. (Analyses of spiked samples should be submitted for each sampling interval to demonstrate percentage recovery.)

16. Total discharge of bound and unbound pesticide from treated fields. - estimated monthly.

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Some references may be of aid to the registrant when writing the protocol. Field plot statistical design is discussed, generally, by LeClerq et al. (1962). Specific runoff monitoring protocols were detailed by the Agency (U.S. Environmental Protection Agency, 1978) as were collecting techniques for benthic organisms (U.S. Environmental Protection Agency, 1973).

The above study should extend for one year after the last appplication of Goal.

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