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UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PESTICIDES AND TOXIC
SUBSTANCES

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MEMORANDUM

SUBJECT: Review of a New Aerobic Soil Metabolism in Support of EUP for F6285 4F Herbicide (Methanesulfonamide)

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Conclusions:

1. EFGWB has completed the review of an EUP, requested by FMC Corporation, for the use of F6285 4F soybean herbicide in 1995. This EUP calls for the use of 2,000 lbs a.i. on 4,000 acres in 29 states.

2. The registrant has previously submitted a complete Environmental Fate data package to support an EUP for the use of F6285 (110 lbs a.i. on 220 acres) in 1992. Based on the submitted data on Hydrolysis, Aerobic Soil Metabolism, and Leaching-Adsorption/Desorption, EFGWB concluded that the chemical is very persistent, highly mobile, and has a strong potential to leach into ground water or move offsite to surface water. Therefore, EFGWB recommended that in order to minimize the risk to the

environment, the proposed EUP label be modified to include the ground-water and surface water advisories.

3. EFGWB is concerned that the label submitted with this EUP request does not reflect the label amendment previously recommended.

4. The persistent nature of F6285 has been further confirmed by the additional aerobic soil metabolism study (Curry, 1993) which was submitted to support the new EUP.

Recommendations:

1. Since F6285 has strong potential to leach into ground water or move offsite to surface water, EFGWB recommends that the proposed EUP label be modified to contain the following advisories:

   Ground-water label advisory:

   "This chemical has a potential to leach through soil into ground water under certain conditions as a result of agricultural use. The use of this chemical in areas where soils are permeable, particularly where the water table is shallow, may result in ground-water contamination."

   Surface water advisory:

   "Substantial surface water contamination may occur in areas with poorly draining soils and little or no buffers or in areas where drainage systems flow directly to surface water."

2. For the full registration of the chemical, the registrant must address EFGWB's concerns about the chemical's potential to leach into ground water and run off to surface water. The registrant must also provide sufficient data to allow a complete assessment of the fate of the chemical in the environment.

Background:

Introduction:

F6285 is a herbicide currently being developed by FMC Corporation for control of annual grass, and annual and perennial broadleaf weeds on soybeans. It can be preplant soil-incorporated applied, or preemergence surface applied at a rate of 0.25-0.5 lbs a.i. per acre. If treatments are to be incorporated, incorporate to a depth of 1-3 inches. Only one application per season is allowed.

Experimental Use Permit (EUP):

The registrant has submitted an EUP request for F6285 in which 2,000

lbs a.i. will be used on 4,000 acres in 1995. The proposed test sites are located in 29 states to represent soybeans. The area to be treated in each state ranges from 20 acres in Florida to 300 acres in Arkansas, Illinois, and Mississippi (Attachment I). The test substance will be applied at a rate of 0.25-0.5 lbs a.i. per acre. The main objectives of the experimental program for F6285 4F are: (1) to test its efficacy under a range of environmental conditions; (2) to evaluate the tank mix combination; (3) to collect data on yield and crop tolerance under commercial use conditions; (4) to evaluate rotation to winter wheat, corn, cotton, rice, and other crops; and (5) to propose appropriate tolerances for soybeans and other rotational crops.

Discussions:

The registrant has previously submitted a complete Environmental Fate data package to support an EUP for the use of F6285 (110 lbs a.i. on 220 acres) in 1992. Based on the submitted data on Hydrolysis, Aerobic Soil Metabolism, and Leaching-Adsorption/Desorption, EFGWB concluded that the chemical is very persistent, highly mobile, and has a strong potential to leach into ground water or move offsite to surface water. Therefore, EFGWB recommended that in order to minimize the risk to the environment, the proposed EUP label be modified to include the ground-water and surface water advisories.

The registrant has submitted another EUP request in which 2,000 lbs a.i. will be used on 4,000 acres in 1995. The registrant has submitted another aerobic soil metabolism study (Curry, 1993) to support the new EUP. The proposed label submitted with this EUP request does not reflect the label amendment previously recommended by EFGWB. Results from this study reconfirm the persistence of F6285 reported in the previously-reviewed aerobic soil metabolism study (Singer and Schocken, 1991). F6285 3-carboxylic acid was the major degradate detected in both aerobic soil metabolism studies. This currently-submitted aerobic soil metabolism study is scientifically sound and provides additional information to support the Aerobic Soil Metabolism (162-1) data requirement. Results from this study are summarized below:

> "F6285 degraded very slowly with half-lives of 534-555 days (approximately 1.5 years) in sandy loam and silty clay loam soils incubated in the dark at 24.7-25.7°C and 75% of field capacity for 365 days. F6285 3-carboxylic acid, the major accumulating degradate, reached a maximum of 10.8% of the recovered at the end of the study. A second major degradate, 5'-desmethylsulfonyl-F6285, reached a maximum of 5.9% of the recovered 90 days after treatment. Less than 3% of the recovered were identified as 3-hydroxymethyl-F6285 or 3-desmethyl-F6285. Material balances were 85-107%."

Since data from laboratory studies have shown that F6285 is moderately water soluble (400 ppm), very stable to hydrolysis ($t_{1/2}$ = 143-375 days at pH 5, 7, and 9; Kabler and Williamson, 1991), very persistent to microbial degradation in soils under aerobic conditions ($t_{1/2}$ = 114-555 days; Singer and Schocken, 1991; Curry, 1993), and highly mobile (K_d = 0.2-0.8 or K_{oc} = 26-7711; Dykes, 1990), it is reasonable to believe that this chemical has the potential to migrate vertically to ground water and/or horizontally to surface water in the field under the proposed EUP. Therefore, EFGWB recommends that the proposed label be revised to include the ground-water and surface water advisories in order to minimize the potential impact on ground water and surface water under the experimental use.

References:

Curry, S.J. 1993. Aerobic soil metabolism of F6285. Performed and submitted by FMC Corporation, Princeton, NJ. (MRID 42932117)

Dykes, J. 1990. Soil adsorption/desorption with ^{14}C-F6285. Performed by ABC Laboratories. Submitted by FMC Corporation, Princeton, NJ. (MRID 41911604)

Kabler, K., and K. Williamson. 1991. Hydrolysis as a function of pH at 25 C of ^{14}C-F6285. Performed by ABC Laboratories. Submitted by FMC Corporation, Princeton, NJ. (MRID 41928202)

Singer, S.S., and M.J. Schocken. 1991. Degradation studies: Aerobic soil metabolism of F6285, a new herbicide. Performed and submitted by FMC Corporation, Princeton, NJ. (MRID 41928203)

ATTACHMENT I

SECTION G-2
STATES OF USE, ACREAGE TO BE TREATED,
AMOUNT OF CHEMICAL TO BE USED,
FMC STATE CONTACTS

I. DISTRIBUTION AND USE

State	Acres to be Treated	Pounds of Technical	Gallons of Product
Alabama	100	50	12.5
Arkansas	300	150	37.5
Delaware	50	25	6.25
Florida	20	10	2.50
Georgia	100	50	12.50
Illinois	300	150	37.50
Indiana	250	125	31.25
Iowa	200	100	25.00
Kansas	200	100	25.00
Kentucky	100	50	12.50
Louisiana	150	75	18.75
Maryland	75	37.5	9.375
Michigan	100	50	12.5
Minnesota	200	100	25.0
Mississippi	300	150	37.5
Missouri	250	125	31.25
Nebraska	150	75	18.75
New Jersey	50	25	6.25
North Carolina	100	50	12.5
North Dakota	50	25	6.25
Ohio	150	75	18.75
Oklahoma	100	50	12.50
Pennsylvania	100	50	12.5
South Carolina	80	40	10.0
South Dakota	100	50	12.5
Tennessee	150	75	18.75
Texas	150	75	18.75
Virginia	75	37.5	9.375
Wisconsin	50	25	6.25
U.S. Total:	4000	2000	500

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