10-9-91

ECOLOGICAL EFFECTS BRANCH REVIEW

Chemical: F6285 (FMC 97285) (F6285 4F Herbicide)

100 Submission Purpose and Label Information

100.1 Submission Purpose and Pesticide Use

FMC Corporation is applying for an Experimental Use Permit to evaluate F6285 4F Herbicide for control of grasses and broadleaf weeds on soybeans. The active ingredient of the formulation is F6285, also referred to as FMC 97285. F6285 4F is a 4 pound per gallon (39.6% a.i. by weight) flowable formulation of F6285.

Also included for review as part of this submission were six wildlife toxicology studies on F6285 technical which are required for registration of this chemical.

100.2 Formulation Information

Refer to attached photocopies of labels.

100.3 Application Methods, Directions, Rates

Refer to attached photocopies of labels.

100.4 Target Organisms

Grasses:

Barnyardgrass (Echinochloa crus-galli)
Bermudagrass (Cynodon dactylon)
Broadleaf signalgrass (Brachiaria platyphylla)
Crabgrass, large (Digitaria sanguinalis)
Crabgrass, smooth (Digitaria ischaemum)
Crabgrass, Southern (Digitaria ciliaris)
Cupgrass, Southwestern (Eriochloa gracilis)
Cupgrass, wooly (Eriochloa villosa)
Foxtail, giant (Setaria faberi)
Foxtail, green (Setaria viridis)
Foxtail, robust purple (Setaria viridis)
Foxtail, yellow (Setaria lutescens)
Goosegrass (Eleusine indica)
Johnsongrass (Sorghum halepense)
Junglerice (Echinochloa colunum)
Nutsedge, purple (Cyperus rotundus)
Nutsedge, yellow (Cyperus esculentus)
Panicum, fall (Panicum dichotomiflorum)
Panicum, Texas (Panicum tesanum)
Red rice (Oryza sativa)
Field sandbur (Cenchrus incertus)
Shattercane (Sorghum bicolor)
Wild proso millet (Panicum miliaceum)

Broadleaf Weeds:

Carpetweed (Mollugo verticillata)
Common purslane (Portulaca oleraceae)
Common ragweed (Ambrosia artemisiifolia)

Cocklebur (Xanthium strumarium)
Florida beggarweed (Desmodium tortuosum)
Florida pusley (Richardia scabra)
Hemp sesbania (Sebania exaltata)
Hophornbeam copperleaf (Acalphya ostryifolia)
Jerusalem artichoke (Helianthus tubersosus)
Jimsonweed (Datura stramonium)
Lambsquarters (Chenopodium album)
Morninglories (Ipomoea spp. and Jacquemontia tamnifolia)
Nightshade, black (Solanum nigrum)
Pennsylvania smartweed (Polygonum pensylvanicum)
Pigweed, redroot (Amaranthus retroflexus)
Pigweed, smooth (Amaranthus hybridus)
Poinsettia, wild (Euphorbia heterophylla)
Prickly sida (Sida spinosa)
Redvine (Brunnichia ovata)
Sicklepod (Cassia obtusifolia)
Spurge, prostrate (Euphorbia humistrata)
Spurge, spotted (Euphorbia maculata)
Spurred anoda (Anoda cristata)
Tropic croton (Croton glandulosus)
Velvetleaf (Abutilon theophrasti)
Venice mallow (Hibiscus trionum)

The performance of F6285 4F herbicide on other grasses and weeds will be evaluated when those weeds occur in the plots.

100.5 Precautionary Labeling

Refer to attached photocopies of labels.

101 Hazard Assessment

101.1 Discussion

It is proposed that this permit be issued from April 1, 1992 to April 1, 1993. There will be a single application at planting. Application may be either preemergence or soil incorporated to a depth of 1 to 3 inches. Plots will range in size from 0.5 to 10 acres with 1 to 4 replicates. Each state participating in the program will have 1 to 10 plots. Specific states and treated acreage proposed are shown below.

State	Acres treated	Pounds of technical	Gal. product
Alabama	10	5.0	1.25
Arkansas	10	5.0	1.25
Delaware	5	2.5	.625
Florida	10	5.0	1.25
Georgia	10	5.0	1.25
Illinois	10	5.0	1.25
Indiana	10	5	1.25
Iowa	10	5	1.25
Kansas	5	2.5	.625

Kentucky	10	5.0	1.25
Louisiana	10	5.0	1.25
Maryland	5	2.5	.625
Michigan	5	2.5	.625
Minnesota	10	5.0	1.25
Mississippi	10	5.0	1.25
Missouri	10	5.0	1.25
Nebraska	5	2.5	.625
New Jersey	5	2.5	.625
North Carol.	10	5.0	1.25
Ohio	10	5.0	1.25
Oklahoma	5	2.5	.625
Pennsylvania	5	2.5	.625
South Carol.	10	5.0	1.25
South Dakota	5	2.5	.625
Tennessee	10	5.0	1.25
Texas	5	2.5	.625
Virginia	5	2.5	.625
Wisconsin	5	2.5	.625
TOTAL	220	110.0	27.5

101.2 Likelihood of Adverse Effects to Nontarget Organisms

Terrestrial Species

Ecological effects toxicity data for F6285 technical are as follows:

Avian acute oral LD_{50}:
Quail LD_{50} >2250 mg/kg - "practically non-toxic"
NOEL = 1350 mg/kg based on abnormal behavior observed in one bird at 2250 mg/kg.
Category: Core.

Avian dietary LC_{50} (upland gamebird):
Quail LC_{50} >5620 ppm - "practically non-toxic"
NOEL = 5620 ppm
Category: Core

Avian dietary LC_{50} (waterfowl):
Mallard LC_{50} >5620 ppm - "practically non-toxic"
NOEL = 3160 ppm due to a reduction in body weight gain from days 0-5 at 5620 ppm.
Category: Core

Mammal acute oral toxicity studies:
Laboratory rat LD_{50}=2855 mg/kg for both sexes combined (3034 mg/kg for males and 2689 mg/kg for females)

A laboratory rat LD_{50} for F6285 4F **formulated product** was 2084 mg/kg for females.

Aquatic Organisms

Acute Freshwater Fish Toxicity:

Warmwater: Bluegill sunfish LC_{50}=93.8 mg/L "slightly toxic". NOEL - not determined. Category: Core

Coldwater: Rainbow trout LC_{50}>120 mg/L "practically non-toxic". NOEL = 120 mg/L. Category: Core.

Acute Freshwater Invertebrate Toxicity:

Daphnia magna: EC_{50}=60.4 mg/L "slightly toxic". NOEC = 14.1 mg/L based on abnormal behavior. Category: Core.

Environmental Fate and Residues

Hydrolysis: The hydrolysis of F6285 was studied at a nominal concentration of 10 ppm in buffers at pH 5,7 and 9. The 30 day study indicated no significant degradation of the parent compound, and the calculated half-lives were: 143 days at pH 5 (acetate buffer), 207-375 days at pH 7 (HEPES, TRIS buffers), and 348 days at pH 9 (borate buffer). F6285 appears to be hydrolytically stable between pH 5-9.

Adsorption-desorption: A batch equilibrium study was conducted with 4 soil types at 25°C to predict movement of F6285 through soil. Adsorption Kd values ranged from 0.153-0.767 and adsorption Koc values ranged from 29-77, which indicates potential mobility of the herbicide in soils.

Soil metabolism: F6285 was studied in a sandy loam, a silty loam and a silty clay loam at 3.3 ppm in the dark at 24°C. Half-lives were 81 days in the silt loam, 114-122 days in the sandy loam and 167 days in the silty clay loam. Bound residues increased throughout the study , accounting for 43% of total radioactive residues at 195 days. The major accumulating metabolite was F6285 3-carboxylic acid and this accounted for 24% of the total radioactive residues at 90 days. F6285 3-hydroxymethyl was 33% of the total radioactive residues at 33 days.

The Estimated Environmental Concentrations of F6285 based on a maximum application rate of 0.5 lb a.i./acre applied as a preemergence spray are as follows:

Vegetation Residues[1] (Maximum expected values

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[1]Hoerger, F.D. and E.E. Kenaga. 1972. Pesticide Residues on Plants: Correlation of Representative Data as a Basis for Estimation of Their Magnitude in the Environment. Environmental Quality. Academic Press, New York, I:9-28.

immediately after application)		
Short rangegrass	130 ppm	
Long grass	55 ppm	
Leafy crops	62 ppm	
Forage (and small insects)		28 ppm
Legumes and pods (large insects)		6.2 ppm
Fruits 3.6 ppm		

Soil Residues[2]

0.1 inch	11.0 ppm
1.0 inch	1.1 ppm
6.0 inches	0.18ppm

Water (direct application)[2]

0.5 feet	367.0 ppb
1 foot	183.7 ppb
6 feet	30.6 ppb

Water (runoff) (See Attachment A) 3.05 ppb
(if soil incorporated 1 inch, EEC = 1.22 ppb)

Risk assessment

A. Effects on terrestrial organisms:

Avian: Based on the acute toxicity data, F6285 does not appear to pose a concern for avian species for the proposed use, as the exposure is expected to be well below the avian NOELs of 2250 mg/kg acute and 3160 dietary.

Mammalian: The exposure is expected to be well below the rat LD_{50} of 2855 mg/kg (TGAI) and 2084 (TEP). Therefore, is no concern for mammalian species.

B. Effects on aquatic organisms: The expected exposure of F6285 to aquatic organisms is below the NOELs for both rainbow trout (120 mg/L) and Daphnia magna (14.1 mg/L). Therefore, there is no concern for aquatic organisms with the proposed use of F6285.

C. Endangered species consideration: There is no concern for endangered terrestrial or aquatic wildlife species for the proposed use. Since F6285 is an herbicide, there is a possible risk for endangered plant species; however, there is no specific concern for endangered plant species at this time due to the minimal drift incurred during application of F6285 to soybean crops.

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[2]Urban, D. and N. Cook. 1986. Ecological Risk Assessment. EPA-540/9-85-001).

101.4 Adequacy of Toxicity Data

The following ecological effects data were included in this submission to support the Experimental Use Permit for F6285 on soybeans:

Campbell, S., Steven P. Lynn and Gregory J. Smith. F6285: An acute oral toxicity study with the Northern bobwhite. Prepared by Wildlife International, 305 Commerce Dr., Easton, MD. MRID #419116-17.

The study is scientifically sound and is classified as core. The LD_{50} was >2250 mg/kg, classifying F6285 as "practically nontoxic" to bobwhite. The NOEL was 1350 mg/kg. The study fulfills Guidelines Requirements Reference No. 71-1.

Beavers, Joann B., Jennie Grimes and Gregory J. Smith. F6285: A dietary study with the Northern bobwhite. Prepared by Wildlife International, 305 Commerce Dr., Eaton, MD. MRID #419116-18.

The study is scientifically sound and is classified as core. The LC_{50} was >5620 ppm, classifying F6285 as "practically non-toxic" to bobwhite. The NOEL was 5620 ppm.

Beavers, Joann B., Jennie Grimes and Gregory J. Smith. F6285: A dietary study with the mallard. Prepared by Wildlife International, 305 Commerce Dr., Eaton, MD. MRID #419116-19.

The study is scientifically sound and is classified as core. The LC_{50} was >5620 ppm, classifying F6285 as "practically non-toxic" to the mallard. The NOEL was 3160 ppm based on a reduction in body weight gain seen at 5620 ppm.

Graves, William C. and Gregory T. Peters. F6285: A 96-hour flow-through acute toxicity test with the bluegill, Lepomis macrochirus. Prepared by Wildlife International, 305 Commerce Dr., Eaton, MD. MRID #419116-21.

The study is scientifically sound and is classified as core. The LC_{50} was 93.8, classifying F6285 as "slightly toxic" to bluegill.

Graves, William C. and Gregory T. Peters. F6285: A 96-hour flow-through acute toxicity test with the rainbow trout, Oncorhynchus mykiss. Prepared by Wildlife International, 305 Commerce Dr., Eaton, MD. MRID #419116-20.

The study is scientifically sound and is classified as core. The LC_{50} was >120 mg/L, classifying F6285 as "practically non-toxic" to rainbow trout. The NOEL was 120 mg/L. The study fulfills Guidelines Requirements Reference No. 72-1.

Holmes, Catherine and Gregory T. Peters. F6285: A 48-hour flow-through acute toxicity test with the cladoceran Daphnia magna. Performed by Wildlife International, 305 Commerce Dr., Easton, MD. MRID #419116-22.

The study is scientifically sound and is classified as core. With an EC_{50} of 60.4 mg/L, F6285 is classified as "slightly toxic" to daphnia. The NOEL was 14.1 mg/L based on abnormal effects seen at levels >14.1 mg/L. The study fulfills Guidelines Requirements Reference No. 72-2.

101.5 Adequacy of Labeling

Environmental hazards labeling is adequate for use under Experimental Use Permit.

102 Conclusions

EEB has completed a hazard assessment for the use of F6285 as F6285 4F to control broadleaf weeds and grasses in soybeans. EEB has determined that minimal environmental concerns exist from the proposed use. Data are sufficient to support the Experimental Use Permit; however, for full registration, additional data requirements must be fulfilled:

123-1 Tier II Seed germination/seedling emergence
123-1 Tier II Vegetative vigor
123-2 Tier II Aquatic plant growth

These data are required because of the potential for widespread use and long halflife in soil.

The following data requirements may apply in support of full registration, but are reserved pending complete fate review:

71-4 Avian reproduction
72-4 Fish early life stage and aquatic invertebrate life cycle
72-3 Acute LC_{50} for marine/estuarine organisms

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Literature Cited

Hoerger, Fred and Eugene E. Kenaga. 1972. Pesticide Residues on Plants: Correlation of Representative Data as a Basis for Estimation of Their Magnitude in the Environment. Environmental Quality. Academic Press, New York, I: 9-28.

U.S. EPA 1986. Hazard Evaluation Division Standard Evaluation Procedure - Ecological Risk Assessment. United States Environmental Protection Agency, Office of Pesticide Programs, Washington, D.C. EPA 540/9-85-001. 96pp.