114402
SHAUGHNESSEY NO.

11
REVIEW NO.

EEB BRANCH REVIEW

DATE: IN 3- 4-81 OUT 5/14/81

FILE OR REG. NO. 707 - 149 and 707 - 150

PETITION OR EXP. PERMIT NO. 9F2158

DATE OF SUBMISSION 2-26-81

DATE RECEIVED BY HED 3- 4-81

RD REQUESTED COMPLETION DATE 5-14-81

EEB ESTIMATED COMPLETION DATE

RD ACTION CODE/ TYPE OF REVIEW 335 / Amended - Food Use

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

DATA ACCESSION NO(S). No Data Submitted or Referenced

PRODUCT MANAGER NO. R. Mountford (23)

PRODUCT NAME(S) Blazer 2L (707-149) and Blazer 2S (707-150)

COMPANY NAME Rohm & Haas Company

SUBMISSION PURPOSE Conditional Registration - Peanuts - Weed Control

SHAUGHNESSEY NO.	CHEMICAL, & FORMULATION	% A.I.
114402	Sodium Salt of Acifluorfen	
	Sodium 5-[2-chloro-4-(trifluoromethyl)	
	phenoxy]-2-nitrobenyzoate	
	Blazer 2L (707-149)	20.4 %
	Blazer 2S (707-150)	21.4 %

100 Pesticide Label Information

100.1 Pesticide Use

Add use on peanuts for weed control of numerous broadleaf and grass species to previous labeling for soybeans.

100.2 Formulation Information

Sodium Acifluorfen -- Blazer® 2L Herbicide --- 20.4 % Liquid Conc.
Blazer® 2S Herbicide --- 21.4 % Soluble Conc.

100.3 Application Methods, Directions, Rates

INERT INGREDIENT INFORMATION IS NOT INCLUDED

Identical use information was given for the two products except that Blazer® 2S contained an [redacted] while Blazer® 2L was to be mixed with a surfactant before postemergence use.

APPLICATION --- PREEMERGENCE AND CRACKING STAGE

For weed control from a preemergence and cracking stage treatment use 4 to 8 pints (1.0 to 2.0 lb active) of Blazer 2L (or Blazer 2S) per acre. The use of a surfactant in not necessary in preemergence applications. The highest rate is used where dense or severe weed populations are known to exist.

Blazer 2L (or Blazer 2S) should be applied by ground equipment using standard herbicide sprayers equipped flat fan nozzles. Spray equipment should be calibrated to deliver a minimum of 20 gallons of spray mixture per acre. Fields to be treated should be well worked with smooth seedbeds. Flood tip nozzles are not recommended. Application should follow seeding.

APPLICATION --- POSTEMERGENCE

For postemergence control of most weed species, a use rate of 2 pints (0.5 lb active) per acre on a broadcast or overall basis is recommmended. For postemergence use (Blazer 2L) add a suitable nonionic surfactant, cleared for application on growing crops, at a rate of 1 to 2 pints per 100 gallons of water. If leaf stage exceeds the maximum listed, then use up to 4 pints (1.0 lb active) of Blazer per acre in a single spray or two applications of 2.0 pints (0.5 lb active) per acre with a one week interval between application.

Blazer should be applied by ground equipment using standard hebicide sprayers equipped with hollow cone or flat fan nozzles. Spray equipment should be calibrated to deliver 20 gallons of spray mixture per acre. A spray pressure of 40 to 60 psi at the nozzle tip is recommended. The high gallonage and high pressure will insure necessary coverage of weeds. For further information on optimum spray pressures for specific nozzles, refer to manufactures' charts for recommendations.

Cultivation before or during the Blazer application is not recommended. Cultivation may put weeds under stress thus making control more difficult to obtain. Timely cultivation 7 days after applying Blazer will usually assist in weed control.

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SPRAY NOZZLE TIPS UTILIZING LOW PRESSURE (flood type) TO DELIVER COARSE SPRAYS ARE NOT RECOMMENDED.

TIMING

For best postemergence control of susceptible weeds, apply Blazer 2L (or 2S) when seedling weeds are in the 2 to 4 leaf stage and actively growing. Application of Blazer after the weeds exceed maximum leaf stage of development listed in the weed table is not recommended. Thorough spray coverage of weeds is essential for maximum postemergence activity. More than one postemergence application may be necessary to achieve control of subsequent weed flushes.

USE RESTRICTIONS (Pertinent to EEB)

Do not apply more than 4 pints (1.0 lb active) per acre of Blazer 2L (or 2S) per growing season from postemergence applications or a total of 8 pints (2.0 lb active) per acre from combined pre and postemergence applications.

Avoid drift to all other crops and non-target areas.

Blazer herbicide requires a six hour rain-free period for best postemergence results. Do not apply if rain is threatening.

Do not use during periods of dry weather when crop and weeds are under stress and not actively growing.

100.4 Target Organism(s)

Weed control for numerous broadleaf and grass species which are also currently listed on the registered soybean labels.

100.5 Precautionary Labeling

Hazard to humans and domestic animals.

DANGER

Corrosive, causes eye damage. Harmful if swallowed, inhaled or absorbed through the skin. Do not get in eyes. Wear goggles or face shield when handling. Avoid breathing vapor or spray mist and contact with skin or clothing.

In case of contact, immediately remove contaminated clothing and shoes. Flush eyes or skin with copious amounts of water for at least 15 minutes. Call a physician. Wash thoroughly after using and before eating or smoking. Wash contaminated clothing with soap and hot water before reuse. If swallowed induce vomiting.

ENVIRONMENTAL HAZARDS

Keep out of lakes, ponds, or streams. Do not contaminate water by cleaning of equipment or disposal of wastes. Do not apply when weather conditions favor drift from target area.

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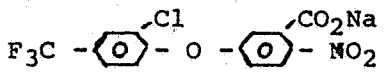
101 Chemical and Physical Properties (See EFB review 1/3/80)

101.1 Chemical Name:

Sodium 5-[2-chloro-4-(trifluoromethyl)-phenoxy]-2-nitrobenzoate

101.2 Structural Formula



101.3 Common Name: Sodium Acifluorfen

101.4 Trade Name: Blazer

101.5 Molecular Weight: 383.65

101.5 Physical State

Form and color:	brown, aqueous, viscous solution with a faint odor
pH:	8.5 ± 0.5
Melting Point:	about -10° C (45% a.i.)
Boiling Point:	100°C
Vapor Concentration:	24 mm at 25°C (technical product)

101.6 Solubility

Acetone	> 50 %	Ethyl acetate	> 50 %
Benzene	1 %	Hexane	< 1 %
Carbon tetrachloride	< 1 %	Methanol	> 50 %
Chloroform	< 1 %	Methylene Chloride	< 1 %
DMF		Water	miscible
DMSO	> 50 %	Xylene	< 1 %
Ethanol	> 50 %		

102 Behavior in the Environment (See EFB review 1/3/80)

102.1

Soil (half-life of free acid)	Sandy loam soil	Silty loam soil
Aerobic	1 to 2 months	2 to 6 months
Anaerobic	less than 10 days	less than 10 days
Photodegradation		about 57 days

Leaching Study - Fresh sodium acifluorfen residues leach readily in soil, while aged soil residues do not leach. High leaching rates were reported in tests on five soil types that resulted in 83 to 98 percent of the residues being present in the leachate which had passed through a 12-inch column in 60 hours following application of 20 acre inches of water. Leaching data for the five soil types indicated that leaching was inversely related to the amount of organic present in the soil with leaching occurring more rapidly in sandy soils than in high organic soils. Soil adsorption/ desorption data also supported that conclusion, since adsorption of residues increased with increasing amounts of organic matter.

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Field Dissipation Study - The half-life of residues in a field study was from 4 to 7 weeks and data indicated a build-up of detectable residues in soil following yearly applications.

102.2 Water (half-life of free acid)

Hydrolysis	Stable
Photodegradation	2 weeks

102.3 Plant

Crop rotation studies indicated that RH-6201 residues are taken-up and may be found up to the following concentrations in the following plants: carrot tops (0.1 ppm - planted four months after treatment); kale (0.2 ppm - planted 2 months after treatment); and winter wheat (0.15 ppm - planted 3 months after treatment).

Residues above the indicated concentrations were not found in the following rotational crops: barley, collards, and corn (<0.05 ppm - planted four months after treatment); turnips (0.08 ppm - planted 2 months after treatment); lettuce, turnips, cotton, and corn (<0.06 ppm - planted 11 months after treatment); and lettuce, turnips, oats, and corn (<0.04 ppm - planted 10 to 12 months after treatment).

102.4 Animal

Results of an intermittent flow-through, C-14 bioaccumulation study on bluegill sunfish indicated a low level of residue accumulation (7 fold) in whole body tissues after 30 days exposure to 0.5 ppm in water with 85% eliminated after 2 weeks of depuration. Since the accumulation levels were low, no effort was made to identify the source of the C-14 residues.

A bioaccumulation study was also conducted on channel catfish, but the study was considered invalid, because the fish were infected with parasites and that stress may have had an unknown effect on accumulation. The study was also inadequate because the test results were rendered inconclusive when the test was terminated before the residue levels peaked in whole body tissue samples.

102.5 Microorganisms

Growth of an alga, Nostoc sp.; five bacteria, Azotobacter vinelandii, Nitrobacter agilis, Nitrosomonas europea, Psuedomonas aeruginosa, and P. fluorscens, and two fungi, Asperigillus foetidus, and Chaetomium globosum was not observed to be inhibited at the highest concentration of RH-6201 tested (1000 ppm). No growth of two bacteria, Bacillus subtilis and Streptomyces albus, was observed at the highest RH-6201 level (1000 ppm), and growth of the bacteria, Cellulmonas sp., was prevented at 500 ppm. The most sensitive organism tested was a bacterium, Clostridium pasterianum, for which 125 ppm was found to prevent growth.

103 Toxicological Properties (See Steven's review 5/1/79)

103.1 Mammal (Reference: Toxicology review 2/25/77).

Test	Species	Formulation	Results
Acute Oral	Rat (male)	39.6 %	3.33 mg/kg
Subacute Oral	Rat		NOEL 30-50 ppm
Eye Irratation	Rabbit		Severe irritation

103.2 Fish and Wildlife (Steven's review 5/1/79 and respective DER's)

	Test Type	Species	Formulation	Toxicity	NOEL	Status
103.2.1	Avian Acute Oral LD50	Mallard	39.8% Technical	4187 mg/kg (3149-5567)	2,150	Core
103.2.2	Avian Dietary LC50	Mallard	39.8% Technical	>10,000 ppm	4,640	Core
		Bobwhite	39.8% Technical	>10,000 ppm	10,000	Core
103.2.3	96-Hour Fish LC50	Rainbow Trout	39.8% Technical	54 mg/l (42-70)		Core
		Bluegill	39.8% Technical	31 mg/l (22-43)		Core
		Bluegill Sunfish	42.4% Technical	>32 mg/l	*	Suppl.
		Channel Catfish	42.4% Technical	188 mg/l (155.7-226.9)	100	Core
103.2.4	48-Hour Aquatic Invertebrate LC50	Daphnia magna	39.8% Technical	28.1 mg/l (15.4-51.5)		Core
	96-Hour Aquatic Invertebrate LC50	Freshwater Clam (Elliptio complanata)	42.4% Technical	149.7 mg/l (127.2-176.3)	100	Suppl.

*Flow-through test for bluegill did not measure test concentrations.

103.3 Additional Terrestrial Laboratory Tests

103.3.1	Avian Reproduction	Mallard	39.8% Technical	>100 ppm	100	Core
		Bobwhite	39.8% Technical	**	20	Core

** In the bobwhite quail reproduction study the 100 ppm dietary level of RH-6201 resulted in statistically significant lower ($P < 0.05$) incidence of of 11-day embryo viability than controls, conversely the 20 ppm test group yielded statistically higher results than controls for the same parameter. No other satistically significant results were observed in parental birds or reproductive effects.

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103.3.2 Terrestrial Phytotoxicity

No data available

103.3.3 Toxicity to Beneficial Insects

No data available

103.4 Additional Aquatic Laboratory Tests

103.4.1 Toxicity to Estuarine And Marine Animals

	Test Type	Species	Formulation	Toxicity	NOEL	Status
	96-Hour Marine Invertebrate LC50	Grass Shrimp	42.4% Technical	446.4 mg/l (368.3- 540.9)	180	Core
		Fiddler Crab	39.8%	> 1000 mg/l	1,000	Suppl.
103.4.2	48-Hour Oyster Embryo-larvae LC50	Eastern Oyster (larvae)	42.4% Technical	74.0 mg/l (47.8- 114.5)	< 18	Core

103.4.4 Toxicity and Residue Studies (See EFB review 1/3/80)

The intermittent flow-through, bluegill bioaccumulation study discussed in Section 102.4 indicated that C-14 residues from acifluorfen were accumulated in whole body tissue only at low levels (7 fold) following 30 days exposure at 0.5 ppm and that these residues were quickly lost during depuration (85 percent in two weeks).

103.5 Field Studies

No field studies on fish or wildlife were available.

103.5.1 Spray Drift Studies

A spray drift study has been reviewed and found acceptable by R. Holst (1/12/81).

104 Hazard Assessment

104.1 Discussion

The proposed label directions of both products (Reg. No. 707-149 and 707-150) for weed control use on peanuts indicate that sodium acifluorfen may be applied at a maximum annual rate of 2.0 lb active per acre per season. The amount may be applied after planting as a single preemergence application or as a combination of two or three applications (one preemergent application at 1.0 lb active per acre and/or one or two postemergent applications of 0.5 lb active per acre per treatment at one week intervals). While the single preemergent

application of 2.0 lb active per acre would yield the highest residue levels, the three separate treatments might produce a more prolonged, low-level exposure. The single preemergent application of 2.0 lb a. i./A would probably be the worst case exposure situation for both acute and chronic exposures. Since the spray interval is fairly short (3 to 5 weeks) compared to the persistence of this chemical (half-lives of 1 to 6 months in aerobic soil and 2 weeks in water), three applications probably would not produce much difference in the chronic exposure levels.

Following the above treatment sequences, the maximum expected initial residues for various food sources and environments would be as indicated in the following table.

Application Rates (lb active/acre)	Residues (ppm) Grasses Short	Grasses Long	Weeds & Seeds	Soil	Water Depth 6"	Water Depth 4'
Preemergence						
1.0	240	110	58	22	0.73	0.091
2.0	480	220	116	44	1.47	0.184
Postemergence						
0.5	120	55	29	11	0.37	0.046
Maximum Annual Total						
2.0	480	220	116	44	1.47	0.184

104.2 Likelihood of Adverse Effects to Non-target Organisms

According to Wildlife Utilization of Croplands (Gusey and Maturgo, 1973, Shell Oil Company) peanut fields are utilized by a wide variety of avian and mammalian species. From the expected initial residue levels and known toxicity levels, it is improbable that the proposed application of 2.0 lb active per acre per season will pose an acute hazard to terrestrial wildlife. While residues on potential food sources are well below known lethal levels for all terrestrial species, the caustic chemical effects found in laboratory animals would be of concern, except that few if any animals will remain in recently planted fields being spray-treated by ground equipment.

Acute adverse effects to aquatic species are unlikely at recommended application rate of 2.0 lb active per acre. Neither accidental direct application nor post-treatment transport to the aquatic environment will produce concentrations acutely lethal to fish or aquatic invertebrates according to all available toxicity data. In a runoff model designed to represent an area typical of peanut cultivation, the concentration of acifluorfen in the adjacent pond following runoff from all areas in the drainage basin treated at the maximum application rate of 2.0 lb active per acre, was calculated to be 0.2 ppm based on the following assumptions (5 percent acifluorfen in runoff was selected and should not be considered excessive given its solubility

in water, its demonstrated ability to leach, and the increased runoff potential due to the scarcity of vegetative cover, only young weeds and/or peanut plants, at the time of pesticide application):

Type of habitat -- small pond surrounded by peanut fields
Size of drainage basin -- 50 acres (maximum)
Surface area of pond -- 2.6 acres
Depth of pond -- 4 feet
Weight of water in pond -- 28,250,577 pounds
Application rate -- 2.0 lb active per acre over all 50 acres
Total amount of toxicant applied to drainage basin -- 100 pounds
Percent toxicant in runoff -- 5.0 percent
Toxicant level in lake after runoff -- .0.2 ppm
Toxicant concentration in runoff -- 0.71 ppm
1/2 LC50 value of most sensitive aquatic species -- 14 to 16 ppm.
(daphnia - 28 ppm and bluegill - 31 ppm)

Chronic hazard of acifluorfen to fish and wildlife may be an important concern considering its persistence in soils and water. Terrestrial residue levels presenting the highest exposure to feeding animals would be found on short grasses and would be equivalent to an initial level of 480 ppm. Given the half-life degradation rates in soil of 1 to 6 months, sufficient acifluorfen residues could be available in dietary concentrations to exceed the effect levels (100 ppm) identified in the bobwhite quail reproduction study. However, it is unlikely that such a chronic exposure will exist because the initial residues will be reduced by three factors other than degradation (supplemental feeding on untreated food sources, dilution via the rapid growth of the young plants, and the reduction of the soluble residues following subsequent rainfall).

Chronic effects of acifluorfen in the aquatic environment remain an unknown entity. Two earlier reviews expressed concern about its transport and its persistence in water. Steven's review (5/1/79) requested that a daphnia life-cycle study be submitted, but the request was withdrawn in the ammended review (6/18/79), because R. Carsel in EFB indicated that "little or no leaching is expected to occur", which we now know to be grossly in error. Rosenkranz's review (4/10/80) was aware of both its strong leaching properties and its persistence in water, but deferred requesting for additional aquatic testing because EFB had requested monitoring studies (Creeger's review, 1/5/80) and she felt that "The monitoring data requested by EFB should provide sufficient data for the final assessment". According to the EFB review (5/5/81) for this label amendment to add peanuts conducted by Herbert L. Manning, no additional data were submitted. Therefore, we assume that monitoring data is not available to complete the aquatic hazard assessment for this review.

Available data indicate that transport of acifluorfen residues to the aquatic environment may be expected and that its half-life in water is about 2 weeks (photodegradation). Consequently, the criteria for requesting chronic aquatic testing have been met per Section 163.72-4 (a)(1)(iii)(C) in the Proposed Guidelines for Registration of Pesticides published in Part II of the Federal Register on July 10, 1978.

104.3 Endangered Species Considerations

The distribution of peanuts throughout the southern U. S. corresponds to the range of numerous endangered species. From the available toxicity data, the proposed use on peanuts would not appear to present an acute hazard to any endangered species, but the absence of chronic aquatic data precludes an evaluation of the potential chronic hazard to the numerous endangered freshwater fish species found in this area.

104.4 Adequacy of Toxicity Data

The six basic studies have been submitted and were found to be acceptable in support of this registration on peanuts. Other studies on estuarine species, two avian reproduction tests, and a fish bioaccumulation study were also found acceptable and essential in evaluation of potential hazards. Since EFB deferred to EEB the request for repetition of the catfish accumulation study, EEB concludes that the test would not appear to be necessary, since-catfish is the species of choice when concerns are expressed about exposure to chemicals which adhere strongly to sediments. Available data on water/soil partitioning indicate that this chemical should partition about equally between water and sediments, therefore no additional catfish study need be required, because catfish would not be expected to be exposed to higher residue concentrations than those experienced in the bluegill study.

Given the persistence and strong leaching properties of this chemical and the fact that little vegetation is present at the application site to hinder runoff, EEB requests that additional chronic aquatic testing be submitted on fish reproduction (early life stages) in order to permit a complete hazard assessment to be made. EEB suggests that the study be a fish embryo-larvae study, preferably conducted on bluegill sunfish since it was found to be the most sensitive fish species and it is a species representative ot the ponds and other fish-bearing waters adjacent to proposed the use sites.

104.5 Additional Data Required

As stated above, a chronic aquatic fish study is essential for the completion of the last portion of this hazard analysis. Since bluegill sunfish was found to be the most sensitive fish species and is a species representative of waters adjacent to use sites, EEB recommends that an acceptable embryo-larvae study with measured concentrations in water be submitted on that species along with the previously required EFB monitoring study suggested in Creeger's review (1/3/80). The presence of numerous endangered fish species in close proximity to potential use sites indicates the importance of this study.

107 Conclusions

The Ecological Effects Branch recognizes that these products (Reg. # 707-149 and 707-150) already have registered uses for weed control in soybeans at 1/4th the application rate requested for peanuts and that that registration was granted based on faulty information about the leaching properties of this chemical. Consequently, EEB suggests that this registration be granted for peanuts on the condition that

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the registrant agrees to submit both a fish embryo-larvae study with measured toxicant concentrations in water and the monitoring study formerly requested by EFB within one year of the granting this registration. This request is made with full knowledge that data exist which indicate a low bioaccumulation potential. However, EEB has severe concerns remaining about the potential exposure and the reproductive effects this chemical may produce in the aquatic environment.

107.3 Environmental Hazards Labeling

Current labeling appears to be adequate at this time for Fish and Wildlife concerns.

107.4 Data Adequacy Conclusions

All the regular data requirements have been submitted and are adequate to support this registration.

107.5 Data Requests

A fish embryo-larvae study, preferably on bluegill sunfish, and EFB's former monitoring study are requested to support the granting of this registration as indicated above.

107.7 Recommendations

The Ecological Effects Branch suggests that this use on peanuts may be conditionally registered, if the registrant agrees to submit both a fish embryo-larvae study with measured toxicant concentrations in water and the monitoring study formerly requested by EFB within one year of the granting this registration. This request is made with the full knowledge that data exists which indicate a low bioaccumulation potential, because EEB has severe concerns remaining about potential exposure and the reproductive effects of this chemical may produce in the aquatic environment resulting from its leaching properties and its persistence. This concern is based on the knowledge that numerous endangered aquatic species are found in areas adjacent to potential use sites and that their populations be adversely effected by exposure to residues entering the aquatic environment.

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