UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

DATE: SEP 10 1980

SUBJECT: Estimated Environmental Concentration (EEC) and Fate Data for Metolachlor (EPA Reg. No. 100-597) Dual 8E

FROM: Willa Garner, Section Chief
Environmental Fate Branch (TS-769)

TO: Clayton Bushong, Branch Chief
Ecological Effects Branch (TS-769)

THRU: David Severn, Acting Branch Chief
Environmental Fate Branch (TS-769)

This is the response to your request of June 23, 1980, concerning the subject matter. It constitutes a summary profile of Metolachlor environmental fate and an assessment of its environmental concentration in the aquatic environment partly simulated by the EXAMS computer program.

1. Volatility: Metolachlor vapor pressure is ca 10^{-5} mm/Hg

2. Hydrolysis:

At 20°C	pHs = 5, 7, and 9;	t 1/2 = 200 days
	pH = 13 ;	t 1/2 = 97 days
At 50°C	pH = 5 ;	t 1/2 = 79 days
	pH = 9 ;	t 1/2 = 139 days
A6 70°C	pH = 5 ;	t 1/2 = 10 days
	pH = 9 ;	t 1/2 = 17 days

hydrolytic products: hydrolysis with 0.1N NaOH at 30°C resulted in the detection of 78% parent and 9% N-(2'methoxy-1'-methylethyl)-2-ethyl-6-methyl- hydroxyacetanilide at 5 days; at 28 days, the percentage was 51% and 37% of the same products.

3. Photodegradation:

In aqueous solution: relatively stable under natural sunlight, about 8% photolysis achieved at 30 days; 93.5% of the recovered was the parent compound.

In soil: in silt loam soil Metolachlor halflife is 7-8 days under natural sunlight.

4. Soil Metabolism/Field Dissipation: Review data indicate that at a time interval of 12 weeks, aerobic nonsterile and aged aerobic/anaerobic nonsterile tests resulted in a degradation pattern wherein about 18% of the applied was identified as N-(2'-methoxy-1'-methylethyl-2-ethyl-6-methyl-oxanilide. Another 10% of the initially applied amount was found as polar and water soluble unseparable products, while 41.7% of the total initial amount was found as Metolachlor.

TS/769/MNawar/rmk/X7347/8/11/80, retyped, 8/28/80

The field dissipation study under actual use conditions showed that Metolachlor applied alone dissipates to approximately 10% of applied amount in 60-160 days in the various soil types tested, and leaches to approximately 12 inches in loam and silty loam soils.

5. Aquatic Metabolism/Field Dissipation: Metolachlor is intended solely for terrestrial uses. No products formulated with Metolachlor have yet been proposed for aquatic uses that would require aquatic metabolism and associated water field dissipation studies.

6. Mobility:

Leaching: Review data show that 20-33% of the applied Metolachlor leaches more than 12" in sandy loam and sandy soils when an equivalent of 20" of rainfall is applied to a soil column. Insignificant leaching is expected in muck soils high in OM. Metolachlor residues, aerobically aged for 30 days in soil will also leach in soils low in OM.

Runoff: For the runoff consideration, the following is excerpted from the Metolachlor Generic Standard (p. 26): "During the midspring and early summer months when corn fields contain little or no vegetation to reduce runoff, more than 30% of the erosive rainfall occurs. The average monthly rainfall during April, May and June is approximately 3 inches (USDA YearBook, 1941). This results in greater than 40% of the annual runoff and causes a range 1-3" of water in most of the cornbelt; parts of Southern Illinois, however, lose up to 7 inches of runoff water (EPA-600/2-75-026 a, 1975). A runoff study by Dupre (1974) demonstrated that three simulated rainfalls (totaling 1.5 inches) remove 3.2% of the applied Metolachlor in runoff water and 1.4% in soil, from an expermental plot with an 8° slope. This study suggests that individual rainfall events of 0.5-3.0 inches may move 1.5% to 2.5% of soil incorporated Metolachlor from a treated field (Personal communication with Environmental Fate Branch, 1978). If Metolachlor is sprayed on the soil surface and not incorporated, the percentage of residues in runoff is expected to be greater than 2.5% for 2.5-3.0 inches of rain. This range of values appears to be reasonable in light of levels observed in field studies for various pesticides (Bailey, Leonard, and Swank, 1976). Both the 6E and 8E formulations of Metolachlor are registered for ground appliction at a maximum rate of 3 lb. ai/acre. Assuming field application and climatic conditions result in a loss of 2.5% of the applied Metolachlor, then each acre of treated field would contribute 0.075 lbs to an adjacent aquatic site. This amount of active ingredient in an acre foot of water would yield Metalochlor residues of 0.055 ppm in 6 inches of water and .0176 ppm in 12 inches of water."

Water dispersal: Because Metolachlor has never been proposed for aquatic uses, there are no water dispersal data available.

7. Octanol/water coef.: It has never been determined experimentally. However, using the water solubility (WS) of the compound, Metolachlor's KOW was calculated to equal 700.

8. Estimated Environmental Concentration:

A. - residues in terrestrial environment:

a) They are calculated assuming a single application of Dual 8E at a rate of 4 lb ai/A.

Foilar EECs	Max. EEC (ppm)
Short grasses	950
Long grasses	450
Leaves and leafy items	500
Dense foliage	230
Pods containing seeds	50

b) EECs in soil: The following maximum soil EECs were calculated using the standard that 1 lb ai/A of a chemical uniformly distributed in 3 inches of soil results in a soil concentration of 1 ppm.

Soil Layer (inches)	Max. EEC (ppm)
0.0-0.1	120
0-1	12
1-3	4
>3	<4

B - EECs in Aquatic Environment:

Small Pond 1 Acre surface area, 1 ft deep;

1. Assume 1/10 inch total runoff from a watershed.

2. Assume 3% runoff of the applied pesticide. At application rate of 3 lb ai/A, the pesticide concentration in the runoff is 3.9 ppm (ca 4 ppm).

3. Weight of water in the pond at 1 ft depth = 2.72×10^6 lbs. Weight of associated hydrosoil (defined here as top 2" of bottom sediment with 1.85 g/cc bulk density) in the pond = 0.84×10^6 lbs.

4. Assume pesticide reaching the equilibrium state immediately following its entry into the pond; it will partition between the pond soil and water with ka value = 0.43 (assuming soil OM of 0.5%).

5. Calculated pesticide total loading into the pond is 10.88 lbs.

6. Consequently calculated pesticide concentration in the pond is 3.54 ppm in the water and 1.52 ppm in the soil.

Stream: Flow rate of 10CFS

The EEC for a stream of 10CFS was simulated by the EXAMS computer model using the following data:

- M. Wt. of Metolachlor; 283.8
- Ka (same as pond) 0.43
- Solubility in ppm; 530
- Calculated EEC in pond water (in ppm) for a 2.5 ft. deep pond was used to generate the loading to 10 CFS stream [assumed to be 2.5 ft. deep]. Pesticide runoff loading to stream = 5.6×10^{-2} kg/hr.

The EXAMS stimulation yielded the following EECs in stream:

(a) in Hydrosoil (Sediment):
2.37×10^{-2} during loading (0 hr.)
2.78×10^{-6} 1 hr. after loading;
(b) in water:
5.52×10^{-2} during loading (0 hr.)
6.46×10^{-6} 1 hr. after loading.

Ontrack® 8E

Herbicide

For weed control on railroad
rights-of-way

30 Gallons
U.S. Standard Measure

Active Ingredient: Metolachlor: 2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-methoxy-1-methylethyl) acetamide	86.4%
Inert Ingredients:	13.6%
Total:	100.0%

Ontrack 8E contains 8 lbs. active
ingredient per gal.

Keep Out of Reach of Children.

Warning

See additional precautionary statements
at end of label.

EPA Reg. No. 100-

CIBA-GEIGY

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DIRECTIONS FOR USE AND CONDITIONS FOR SALE AND WARRANTY

IMPORTANT: Read the entire Directions for Use and the Conditions of Sale and Warranty before using this product.

Conditions of Sale and Warranty

The Directions for Use of this product reflect the opinion of experts based on field use and tests. The directions are believed to be reliable and should be followed carefully. However, it is impossible to eliminate all risks inherently associated with use of this product. Crop injury, ineffectiveness, or other unintended consequences may result because of such factors as weather conditions, presence of other materials, or the manner of use or application all of which are beyond the control of CIBA-GEIGY or the Seller. All such risks shall be assumed by the Buyer.

CIBA-GEIGY warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes referred to in the Directions for Use subject to the inherent risks referred to above. CIBA-GEIGY makes no other express or implied warranty of Fitness or Merchantability or any other express or implied warranty. In no case shall CIBA-GEIGY or the Seller be liable for consequential, special, or indirect damages resulting from the use or handling of this product. CIBA-GEIGY and the Seller offer this product, and the Buyer and user accept it, subject to the foregoing Conditions of Sale and Warranty, which may be varied only by agreement in writing signed by a duly authorized representative of CIBA-GEIGY.

Directions for Use

It is a violation of federal law to use this product in a manner inconsistent with its labeling.

Ontrack 8E plus Atratol® 80W or Princep® 80W Tank Mix Combination for Railroad Rights-of-Way

Use only for control of annual grass weeds, or annual broadleaf and grass weeds on railroad rights-of-way.

Broadcast the tank mixture of Ontrack 8E plus Atratol 80W or Princep 80W (Princep 4L or Princep Caliber™ 90W)* at rates of 4 pts. plus 6-12.5 lbs., respectively, in sufficient water for thorough ground and plant coverage to control barnyardgrass, crabgrass, dogbane, fall panicum, giant foxtail, kochia, little barley, pigweed, ragweed, ripgut brome, Russian thistle, ryegrass, sprangletop, volunteer wheat, wild oats, and witchgrass. Use the lower rates in the rate range for light weed infestations and the higher rates for heavier infestations.

For best results, apply immediately prior to weed emergence. The combination of Ontrack 8E plus Atratol 80W may also be applied after weeds emerge, but before they exceed 6 inches in height.

Note: Do not spray within 50 feet of lakes, rivers, streams, or any other body of water.

Precautions: Do not use near desirable trees, shrubs, plants or in greenhouses, or injury may occur.

*When using Princep 4L or Princep Caliber 90, use equivalent rates. One lb. of 80W equals 1.6 pts. of 4L or 0.9 lb. of Caliber 90.

Storage and Disposal

Do not contaminate water, food, or feed by storage or disposal. Open dumping is prohibited. Pesticide, spray mixture, or rinsate that cannot be used or chemically reprocessed should be disposed of in a landfill approved for pesticides or buried in a safe place away from water supplies.

This is a refillable container. If the container is to be refilled, do not rinse with any material or introduce any pesticide other than Ontrack 8E. Reseal and return the container to an authorized CIBA-GEIGY refilling facility. If the container is not to be refilled, triple rinse (or equivalent) and dispose of in an incinerator or landfill approved for pesticide containers, or bury in a safe place. Consult federal, state, or local disposal authorities for approved alternative procedures such as limited open burning.

This product may be stored at temperatures down to 30 degrees below 0°F.

Precautionary Statements

Hazards to Humans and Domestic Animals

WARNING

The active ingredient, metolachlor, may cause skin sensitization reactions in certain individuals. Wear protective clothing while handling or using this product. Causes skin and eye irritation. Do not get in eyes, on skin, or on clothing. May be fatal if inhaled. Do not breathe spray mist.

Harmful if swallowed or absorbed through the skin. Wash thoroughly after handling. Avoid contamination of food.

First Aid: In case of contact, immediately flush eyes and/or skin with plenty of water for at least 15 minutes. Call a physician. Remove and wash contaminated clothing before reuse.

Environmental Hazards

Keep out of any body of water. Do not apply where runoff is likely to occur. Do not contaminate water by cleaning of equipment or disposal of wastes. Do not apply when weather conditions favor drift from areas treated.

Atratol® trademark of CIBA-GEIGY

Ontrack® trademark of CIBA-GEIGY
U.S. Patent No. 3,937,730 (metolachlor)

Princep® trademark of CIBA-GEIGY for simazine

Agricultural Division
CIBA-GEIGY Corporation
Greensboro, North Carolina 27409

CGA 70L1

September 3, 1980

AUG 2 8 1980

PURDUE UNIVERSITY DEPARTMENT OF ENTOMOLOGY

26 August 1980

Dr. Jack A. Norton
Senior Regulatory Specialist
CIBA-GEIGY Corporation
P.O. Box 11422
Greensboro, NC 27409

Dear Dr. Norton:

Reference is made to your recent letter regarding your anticipated restrictions of Dual + Princep and Dual + Atratol for weed control on railroad rights-of-way.

Currently Purdue University plans and coordinates training programs for the National Railroad Contractors Association. Practically all of the persons who apply pesticides along railroad rights-of-way assemble annually in Indianapolis for a three-day training program on current procedures relating to application on railroads. The program is co-sponsored with the University and we handle all matters pertaining to Continuing Certification and new certification in behalf of the various states across the country. Special emphasis is placed each year on new products, new methods of application, various restrictions that are necessary, and environmental precautions. For example at our program this coming January, we will have topics which will include such information as the proper use of your herbicide chemicals.

We have reviewed your proposed label for Dual 8E with our specialists here and with responsible people in the using industry. We feel that the label restriction which indicates not to spray this product within 50 feet of lakes, rivers, streams, or other bodies of water is reasonable. Further, we have found this group of applicators to be among the most conscientious with whom we work and it seems reasonable to expect, with proper emphasis and training, that the restriction would be observed by certified commercial applicators applying herbicides along railroad rights-of-way.

Sincerely yours,

John V. Osmun
Pesticide Training &
Assessment Coordinator
Entomology Hall
West Lafayette, Indiana 47907

JVO/so

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NATIONAL RAILROAD CONTRACTORS ASSOCIATION
1418 5TH STREET SOUTH, HOPKINS, MN 55343
(612) 938-4777

July 22, 1980

Mr. Jack Norton
Regulatory Specialist
Ciba-Geigy Corporation
Greensboro, N.C. 27909

Dear Mr. Norton:

This has reference to your request for information concerning the application of chemical herbicides on industrial sites including railroads. Unless a herbicide is cleared for ditch bank application, a contract applicator will not spray DUAL 8E within 50 feet of any body of water. We feel that this is a reasonable limitation and should be included on the label.

We trust that this procedure adopted by our association will assist you in obtaining the approval of the label of DUAL 8E.

Yours very truly,

NATIONAL RAILROAD CONTRACTORS ASSOCIATION

D. E. Horne

Donald E. Horne
President

DEH/jes

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