US EPA ARCHIVE DOCUMENT

Date Out:
Chemical Code: 108801
DP Barcode(s): D207645

ENVIRONMENTAL FATE AND GROUND WATER BRANCH

(10-6-94)

Review Action

To: Walter Waldrop, PM #71
Special Review and Reregistration Division (7508W)

From: Elizabeth Behl, Section Head
Ground Water Technology Section
Environmental Fate & Ground Water Branch/EFED (7507C)

Thru: Henry Jacoby, Chief
Environmental Fate & Ground Water Branch/EFED (7507C)

Attached, please find the EFGWB review of...

Common Name:	Metolachlor	Trade name:	Dual
Company Name:	Ciba		
ID #:	108801		
Purpose:	Comment on ground-water risk mitigation measures proposed for metolachlor by Ciba.		

Type Product:	Action Code:	EFGWB #(s):	Review Time:
Herbicide	606	NA	1 day

STATUS OF STUDIES IN THIS PACKAGE: REQUIREMENTS

Guideline #	MRID	Status[1]

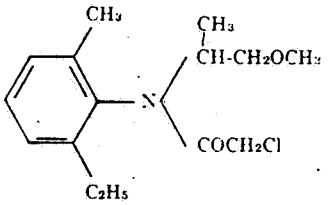
STATUS OF DATA ADDRESSED IN THIS PACKAGE:

Guideline #	Status[2]

[1]Study Status Codes: A=Acceptable U=Upgradeable C=Ancillary I=Invalid
[2]Data Requirement Status Codes: S=Satisfied P=Partially satisfied N=Not satisfied R=Reserved W=Waived

1. CHEMICAL:

Chemical name: 2-chloro-N-(2-ethyl-6-methylphenyl)-N-(2-meythoxy-1-methylethyl) acetamide
Common name: Metolachlor
Trade name: Dual
Structure:



2. TEST MATERIAL:

Not Applicable.

3. STUDY/ACTION TYPE:

Comment on ground-water risk mitigation proposal from Ciba.

4. STUDY IDENTIFICATION:

Letter from Karen S. Stumpf (Ciba) to Walt Waldrop (SRRD) dated September 12, 1994

5. REVIEWED BY:

Estella Waldman
Hydrologist
OPP/EFED/EFGWB/Ground-Water Section

Signature: Estella Waldman

Date: 10/04/94

6. APPROVED BY:

Elizabeth Behl
Section Head
OPP/EFED/EFGWB/Ground-Water Section

Signature: Elizabeth Behl

Date: 10-6-94

2

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

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

OCT - 7 1992

MEMORANDUM

RE: Ground-Water Risk Mitigation Proposals from Ciba for Metolachlor

FROM: Estella Waldman, Hydrologist
Ground Water Technology Section
Environmental Fate and Ground Water Branch (7507C)

Elizabeth Behl, Chief
Ground Water Technology Section
Environmental Fate and Ground Water Branch (7507C)

THRU: Henry Jacoby, Chief
Environmental Fate and Ground Water Branch
Environmental Fate and Effects Division (7507C)

TO: Walter Waldrop
Product Manager #71
Special Review and Reregistration Division

This memorandum is being written in response to the comments received from Ciba regarding the mitigation measures proposed by EFGWB for metolachlor in its science chapter for the RED. The recommendations made by EFGWB were intended to protect ground-water resources from contamination by metolachlor. Since metolachlor has been found in ground water from nonpoint and point sources at levels higher than those set for human health standards, there is cause for concern.

This response is formatted in a similar fashion to the letter submitted by Ciba (based on the original recommendations from EFGWB in the RED science chapter) as follows:

1. EFGWB again recommends that a number of prospective ground-water monitoring studies be conducted for metolachlor to determine its impact on ground-water quality. Ciba has

Recycled/Recyclable
Printed with Soy/Canola Ink on paper that contains at least 50% recycled fiber

3

agreed to conduct two prospective studies for metolachlor in worst case environments. EFGWB agrees that these studies will fulfill this recommendation.

2. The registrant should establish a ground-water monitoring program in cooperation with the states where metolachlor is used. Monitoring information will be used to determine appropriate label restrictions for metolachlor. EFGWB agrees that the 22-state monitoring program presently being conducted by Ciba will fulfill this recommendation.

3. The registrant and EPA will agree, as a condition of reregistration eligibility, to establish criteria for additional mitigation, suspension, and voluntary cancellation as a consequence of monitoring study results. The information presently available to the Agency indicates that metolachlor is a pesticide that has caused extensive ground-water contamination, although generally at levels that do not approach a human health advisory level. In the cases where this sort of pesticide contamination is present, EFGWB believes it is advisable to establish the above types of triggers.

   EFGWB commends Ciba for their plans to develop a program of Best Management Practices in the states where metolachlor is used. These programs should be useful in mitigating the movement of metolachlor to ground water. However, although the Agency fully supports the use of voluntary BMPs, it does not endorse Ciba's "two-tiered" approach to management (i.e., BMPs followed by State Management Plans if the BMPs are ineffective). The Agency believes that it is important to prevent the movement of pesticides to ground water, and that various strategies may be necessary to accomplish this goal. In other words, when voluntary programs are not successful at preventing the contamination of ground water by pesticides, it is necessary to implement regulatory measures (various label restictions, for example). State Management Plans, therefore, are recommended only in the instances where most other management and regulatory options have not been successful.

   EFGWB would like to point out an apparent misunderstanding related to Ciba's statement that "EF&GWB seems to be more concerned with levels of metolachlor in ground water above the HAL of 100 ppb." The Agency is concerned about: (1) any detection of a pesticide in ground water and (2) the concentrations of that pesticide that are detected in ground water. For this reason, State Management Plans triggers are predicated on the detection of a pesticide in ground water at some percentage of the human health advisory. If a detection exceeds this human health advisory, it indicates that the Plan and all other management strategies have failed. In other words, EFGWB looks at all detections of a pesticide in ground water, and is especially concerned when the levels reach or exceed a health advisory. As the registrant is aware, detections of metolachlor in ground water have exceeded the lifetime health advisory for adults. For this reason, EFGWB is concerned with the management of this chemical.

4. Metolachlor meets the proposed triggers for classification as a restricted use chemical for ground-water concerns. EFGWB recommends that metolachlor be considered a candidate

for restricted use for ground-water concerns. EFGWB would like to point out that no chemical will be classified as restricted use for ground-water concerns in the RED process, but that it can be considered as a candidate after the rule is finalized. The registrant has agreed that this is appropriate.

5. EFGWB recommends that metolachlor be considered for regulation under State Management Plans. EFGWB appreciates the registrant's efforts in working with the states to develop State Management Plans for metolachlor. The fact that an immunoassay has been developed will be extremely helpful in quantifying the extent of metolachlor contamination of ground water. The voluntary Best Management Practices program should also help in mitigating the effects of metolachlor contamination.

6. Metolachlor has been detected in ground water as a result of normal agricultural use at levels that exceed its lifetime Health Advisory level. Ciba should determine the areas that are vulnerable to ground-water contamination by metolachlor, and recommend label restrictions. Once again, EFGWB wants to stress that the Agency is concerned about any detection of a pesticide in ground water. Levels above the health advisories are of more concern than those below these health-based triggers, since detections above the health advisory indicate a failure of management strategies. For this reason, SMPs dictate that a trigger must be set below the health advisory. EFGWB appreciates that the label statements proposed by the registrant will reduce pesticide loading to surface water and help minimize contamination by point source mechanisms. However, we do not agree that these label statements will be effective in reducing ground-water contamination from nonpoint source mechanisms. EFGWB again recommends that additional restrictions for soil type, water table depth, etc. be developed to prevent additional contamination of ground water by metolachlor residues.

The Pesticide Management and Disposal Staff recommends one change in the language of the mixing and loading label statement. The sentence "Surface water **may** not be allowed to either flow over or from the pad...". should be changed to read "Surface water **shall** not be allowed to either flow over or from the pad..."

7. EFGWB would also like the registrant to clarify how the registration conditions placed on acetochlor were considered in their proposal for metolachlor.

5

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
METOLACHLOR
Last Update on October 4, 1994
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

LOGOUT	Reviewer: GW	Section Head:	Date:

Common Name: METOLACHLOR
Smiles Code: ClCC(=O)N(-c(c(cc1)C)c(c1)CC)C(COC)C
PC Code # :108801 CAS #:51218-45-2 Caswell #:

Chem. Name :2-CHLORO-N-(2-ETHYL-6-METHYLPHENYL)-N-(2-METHOXY-1-METHYLETHYL)ACETAMIDE
Action Type: Herbicide

Trade Names: DUAL
(Formul'tn): G, EC, FLOWABLE CONC.
Physical State:

Use Patterns (% Usage) :FIELD CROPS; ORNAMENTALS; TERRESTRIAL NON-CROP. GENERALLY APPLIED AS A PREPLANT OR PREEMERGENCE BROADCAST SPRAY.

Empirical Form: $C_{15}H_{22}NO_2Cl$
Molecular Wgt.: Vapor Pressure: 1.30E -5 Torr
Melting Point : °C Boiling Point: °C
Log Kow : pKa: @ °C
Henry's : 9.16E -9 Atm. M3/Mol (Measured)

Solubility in ...					Comments
Water	5.30E 2	ppm	@20.0	°C	
Acetone	E	ppm	@	°C	
Acetonitrile	E	ppm	@	°C	
Benzene	E	ppm	@	°C	
Chloroform	E	ppm	@	°C	
Ethanol	E	ppm	@	°C	?
Methanol	E	ppm	@	°C	
Toluene	E	ppm	@	°C	
Xylene	E	ppm	@	°C	
	E	ppm	@	°C	
	E	ppm	@	°C	

Hydrolysis (161-1)
[V] pH 5.0:STABLE
[V] pH 7.0:STABLE
[V] pH 9.0:STABLE
[ ] pH :
[ ] pH :
[ ] pH :

6

Photolysis (161-2, -3, -4)
[S] Water:IN NATURAL SUN, ONLY 8% OF
[ ] :THE PARENT DEGRADED AFTER 30 days
[V] :70 days in natural sunlight; CGA-41638, CGA-51202,
[ ] :CGA-46129, CGA-50720 were main degradates

[V] Soil :8 DAYS,SiLm, NATURAL SUN, CGA-37735, CGA-51202, CGA-41638
[ ] Air :

Aerobic Soil Metabolism (162-1)
[V] 1/2 life=67 days; degradates were CGA-51202, CGA-37735, CGA-50720
[ ] CGA-41638, CGA-13656
[ ]
[ ]
[ ]
[ ]
[ ]

Anaerobic Soil Metabolism (162-2)
[V] 81 day 1/2 life; CGA-51202, CGA-37735, CGA-41638, CGA-13656,
[ ] CGA-50720
[ ]
[ ]
[ ]
[ ]
[ ]

Anaerobic Aquatic Metabolism (162-3)
[V] 78 DAYS IN SANDY LOAM
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]

Aerobic Aquatic Metabolism (162-4)
[V] 47 DAYS IN SANDY LOAM
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
METOLACHLOR
Last Update on October 4, 1994
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

Soil Partition Coefficient (Kd) (163-1)

	Sd	SI	Cl	%OM	pH	K
[ ]						
[S]	87	10	3	2.2	7.8	1.6
[S]	58	20	22	5.6	6.7	11.3
[S]	38	50	12	3.6	6.1	3.5
[S]	96	2	2	1.2	6.3	1.9

[ ] because of limitations of system valid information is on page 5

Soil Rf Factors (163-1)
[S] % RESIDUES IN LEACHATE FROM
[ ] 12" COLUMN LEACHED W/20"WATER
[ ] SdLm 36.4%
[ ] Sd 20.9
[ ] Lm 4.0
[ ] SiLm 0.4

Laboratory Volatility (163-2)
[v] with a detection limit of 0.035% of dose/day none was detected
[ ] at 0% humidity; at 100% humidity 0.05%/day of metolachlor volatiz

Field Volatility (163-3)
[ ]
[ ]

Terrestrial Field Dissipation (164-1)
[S] AFTER APPL 1 LB AIA TO LmSd, AND APPL 1.52" RAIN IN 7 DAYS,
[ ] >85% RESIDUE REMAINED IN SOIL.
[S] METOLACHLOR DISSIPATED TO APPROXIMATELY 10% OF APPLIED AMT,
[ ] IN 60-160 DAYS IN VARIOUS SOILS.
[S] applied at 6 lb/A in bare ground 1/2 life from 6 in was 7-10 days
[S] bare ground plot at 6 lb/A had 1/2 life of 159 days from top 6 in
[S] bare ground at 6 lb/A 1/2 life=124 days;beanplot at 4 lb/A 1/2
[ ] life=128 days from upper 6 inches in silty clay loam in Iowa
[S] bare ground at 6 lb/A in CA 1/2 life=97 days in loamy sand and in
[ ] adjacent plot planted to corn treated at 4 lb/A 1/2 life=132 days

Aquatic Dissipation (164-2)
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]

Forestry Dissipation (164-3)
[ ]
[ ]

Long-Term Soil Dissipation (164-5)
[ ]
[ ]

Accumulation in Rotational Crops, Confined (165-1)
[S] LETTUCE PLANT. 14 WKS POSTTREAT, HARVEST AT 26 WKS
[ ] CONTAIN.025 PPM C14 RESIDUES;

Accumulation in Rotational Crops, Field (165-2)
[ ]
[ ]

Accumulation in Irrigated Crops (165-3)
[ ]
[ ]

Bioaccumulation in Fish (165-4)
[V] BLUEGILL SUNFISH BCF: EDIBLE 15 X, WHOLE 69 X. IN 14 DAYS
[ ] DEPURATION, 70% OF THAT IN EDIBLE TISSUES WAS ELIMINATED.

Bioaccumulation in Non-Target Organisms (165-5)
[S] NO EFFECT ON FUNGI, BACTERIA, OR ACTINOMYCETES IN
[ ] LOAM SOILS TREATED AT 250 PPM.

Ground Water Monitoring, Prospective (166-1)
[ ] Protocols for two studies (Georgia, Wisconsin) in review (10/94).
[ ]
[ ]
[ ]

Ground Water Monitoring, Small Scale Retrospective (166-2)
[ ]
[ ]
[ ]
[ ]

Ground Water Monitoring, Large Scale Retrospective (166-3)
[S] SIXTY WELLS IN EACH OF FOUR STATES (GA, IL, IA, WI) SELECTED.
[ ] DETECTIONS IN 89 OF 920 SAMPLES IN 39 OF 240 WELLS (0.1-88 PPB).
[ ] CONC. AND FREQUENCIES OF DETECTIONS MAY BE HIGHER THAN REPORTED
[ ] DUE TO CHEMISTRY INADEQUACIES.

Ground Water Monitoring, Miscellaneous Data (158.75)
[S] Detected in ground water in AR, CT, DE, FL, IA, IL, IN, MA, MN,
[ ] MO, NE, NJ, NY, OH, PA, SD, TX, VA, VT, and WI. Concentrations
[ ] ranged up to 157 ppb (PGWDB, 1992).

Field Runoff (167-1)
[ ]
[ ]
[ ]
[ ]

Surface Water Monitoring (167-2)
[ ]
[ ]
[ ]
[ ]

Spray Drift, Droplet Spectrum (201-1)
[ ]
[ ]
[ ]
[ ]

Spray Drift, Field Evaluation (202-1)
[ ]
[ ]
[ ]
[ ]

Degradation Products

4-(2-methyl-6-ethylphenyl)-5-methylmorpholin (CGA-40919)
N-(2-hydroxyacetyl)-N-(1-methoxyprop-2-YL)-2-ethyl-6-methyl aniline (CGA-40172)
N-propen-1-OL-2-YL-N-chloroacetyl-2-methyl-6-ethylaniline=CGA-41638

163-1 valid studies for parent metolachlor
Freundlich Kad values were 0.108 in a sand soil, 0.77 in a loam so, 1.87 in a clay soil, and 2.16 in a sandy loam soil.

Freundlich Kad values for degradate CGA-51202 were 0.04 in a sand soil, 0.079 in a clay soil, 0.086 in a loam soil, and 0.17 in a sandy loam soil, indicating greater mobility than parent.

Comments

At 265 ppm in half-saturated aq soln exposed to nat. sunlight for 30 days, only 8% degraded; in art. sunlight for 15 days, 60% was degraded.
Aged resid. in columns of LmSd; 26% appl radioactiv. leached, and 87% remained in soil, 60% of applied in top 3".
Adsorption positively correlated with org. matter.
Carrots plant. 9 mos after appl 2 lbs AIA contd .06 ppm resud.
Wheat " " " " " " " " .03 ppm in grain
Metolachlor is rapidly metabolized and eliminated by animals.
Soil Koc = 200 (U)
Metolachlor was detected in ground water at pesticide dealer locations: Madison Co., SD (25-2,183 ppb); Dane Co., WI (12-3,500 ppb); Eau Claire Co., WI (12-3,500 ppb); Portage Co., WI (24-6,926 ppb).

References:
Writer : PJH; SLL; EW; KJC, GJT