

MEMORANDUM

SUBJECT: Drinking Water Assessment for the "Inert" Herbicide Safener Dichlormid
(D258095, ID# 6F03344)

TO: Robert Forrest (PM 05) and Treva Alston (PM Team Reviewer)
Registration Division (7505C)

FROM: Alex Clem, Environmental Scientist, EFED, ERB3

Alex Clem 7/30/99

THRU: Daniel Rieder, Branch Chief, EFED, ERB3

Daniel Rieder 7/30/99

The screening estimates given below for potential drinking water exposure to the safener dichlormid (also designated as R-25788) in surface and ground water are based on environmental fate studies which EFED reviewed 12 Jan 1993 and on product chemistry data supplied with the present action. We are also including a fate and effects synopsis which HED requested for their standard overall exposure assessment and which is presented to their various committees. This information is also captured, as Susie Chun has requested, in Section III-9 of HED's exposure assessment form (attached). Because of the urgency of her request (e-mail attached), provisional results were e-mailed to Susie on 20 July 1999. The drinking water results have not changed.

The petitioner provided their own estimates for drinking water concentrations by fax to Kerry Leifer (29 Jun 1999, attached) using a 0.5 lb safener/acre application rate. However, HED has stipulated a rate of 0.372 lb safener/acre (see below). The petitioner's and EFED's estimates, with minor differences caused by selection of input values, are in essential agreement. Drinking water screening estimates based on EFED's current GENECC (for surface water) and SCI-GROW (for ground water) simulation models are:

*SURFACE WATER: 27 ug/L (ppb) at 0.5 lb/acre.
20 ug/L (ppb) at 0.372 lb/acre
(Acute and chronic exposures are equivalent.)*

*GROUND WATER: 0.05 ug/L (ppb) at 0.5 lb/acre
0.03 ug/L (ppb) at 0.372 lb/acre*

Environmental Fate and Effects Assessment Synopsis

Dichlormid was relatively short-lived in aerobic soil (aerobic soil "half-life" measured in one soil of approximately 7-12 days). Carbon dioxide was the only major identified aerobic soil metabolite. Its evolution from the centrally labeled carbonyl position indicates a high degree of mineralization of the dichlormid molecule. Other unidentified volatiles totaled less than approximately 3% of the dose. Minor amounts of several degradates extracted from the soil by

organic solvents were not identified. Significant amounts of other soil degradates were resistant to harsher extraction and presumably remain as bound residues. Dichlormid was stable against hydrolysis and photolysis in soil and water.

Dichlormid's low sorptivity to soil (median K_d of 0.45 and median K_{oc} of 39 mL/g in four soils) indicates high mobility. Based on its low sorptivity to soil, high solubility in water (4.4 g/L), and low octanol to water partitioning ratio ($K_{ow} = 69$), bioconcentration is not anticipated.

Drinking water exposure estimates are based on degradation and transport factors for dichormid coupled with EFED's current GENEEC and SCI-GROW screening models for surface and ground water, respectively. Model results in attached tables are for an *application rate of dichormid of 0.5 lbs/acre* (Zeneca supplied this rate to RD by fax on 29 June 99). If, instead, the rate selected is 0.372 lb/acre (3 lbs/acre of acetochlor x 12.4% dichlormid as given in paragraph III-1 of HED's standard form which is attached), then values are corrected by the proportionate multiplicative factor of $0.372/0.5 = 0.744$.

Based on previous EFED review (31 July 1991) of core studies on acute toxicity to freshwater fish and invertebrates, and on avian oral and subacute dietary effects, it was concluded that dichlormid was practically non-toxic to fish, invertebrates, and birds. Coupled with potential exposures in environmental compartments, adverse ecological effects are, therefore, not expected.

GENEEC AND SCI-GROW TABLES SHOWING INPUT VALUES AND RESULTING ESTIMATED SCREENING LEVEL ENVIRONMENTAL CONCENTRATIONS (EEC)

SURFACE WATER

GENEEC EECs (PPB) RUN No. 3 FOR DICHLORMID ON CORN * INPUT VALUES *

RATE (#/AC) ONE (MULT)	APPLICATIONS NO.-INTERVAL	SOIL Kd	SOLUBILITY (PPM)	BUFFER (FT) % DRIFT	INCORP DEPTH (IN)
0.500 (0.500)	1 1	0.4	4388.0	0.0- 16.4	0.0

FIELD AND STANDARD POND HALFLIFE VALUES (DAYS)

METABOLIC (FIELD)	DAYS UNTIL RAIN/RUNOFF	HYDROLYSIS (POND)	PHOTOLYSIS (POND-EFF)	METABOLIC (POND)	COMBINED (POND)
35.70	2	N/A	0.00-	0.00	0.00

PEAK GEEC	AVERAGE 4 DAY GEEC	AVERAGE 21 DAY GEEC	AVERAGE 56 DAY GEEC
27.29	27.27	27.17	26.93

GROUND WATER

SCI-GROW EECs (PPB)
RUN No. 11 FOR DICHLORMID INPUT VALUES

APPL (#/AC) RATE	APPL. URATE NO. (#/AC/YR)	SOIL KOC	SOIL AEROBIC METABOLISM (DAYS)
.500	1	.500	39.2 11.9

GROUND-WATER SCREENING CONCENTRATIONS IN PPB

.046005

A=	6.900	B=	44.200	C=	.839	D=	1.645	RILP=	1.975
F=	-1.036	G=	.092	URATE=	.500	GWSC=			.046005

III. EXPOSURE ASSESSMENT

1. Is this a major agricultural chemical? Yes No
 Range of application rates:

The amount of dichlormid to be applied to crop plants will vary depending on which active ingredient it is being applied with. The maximum treatment rate proposed is 3 lb ai/A (with the ai being acetochlor). This formulation contains the most dichlormid (12.4%).

Frequency of applications:

APPLICATION TYPE	CONDITIONS
early preplant	≤ 30 days before planting
preplant incorporation	≤ 14 days before planting
preemergence surface	application to soil as a broadcast or banded application
postplant-preemergence	immediately after planting but prior to corn emergence
banding-preemergence	applied in a 10 to 14 inch band after planting but before emergence
broadcast- early post emergence	early postemergence up to 11 inch tall corn

2. Range of established tolerances: 0.05 ppm
 What metabolites require regulation? This is a safener. Only Dichlormid (parent) will be regulated.
3. Is this pesticide used on commodities highly consumed by infants and children (such as citrus fruit, pome fruit, cereal grains, milk, soybeans, etc.)? Yes No
 Used on corn only
4. Are residues likely to be removed by preparation such as washing, peeling, or cooking? Yes No
5. Available residue data sources for this pesticide:
 Field Studies
 FDA Monitoring Data
 PDP Monitoring Data
 Other: _____
6. Are real residues found in field trials and/or monitoring data? Yes No

7. Is there information available on % crop treated? Yes No

8. How are the DRES analyses refined?

Original DRES analysis was for active ingredient, acetochlor and not for the safener. Since no doses/endpoints selected for safener, no dietary analysis was completed.

ACUTE

- Tolerance levels
- Field Trials (HAFT)
- % CT
- Monitoring Data
- Monte Carlo Analysis

CHRONIC

- Tolerance levels
- Field Trials (Average)
- % CT
- Monitoring Data

9. In order to characterize potential drinking water exposure, provide a brief summary of the environmental fate assessment for this compound and any metabolite(s) that may potentially get into drinking water based on metabolite fate characteristics (e.g., is the compound or any of its metabolites mobile and persistent?).

Dichlormid is relatively short-lived in aerobic soil (aerobic soil "half-life" measured in one soil of approximately 7-12 days). The only major metabolite identified was carbon dioxide. The compound is stable against both hydrolysis and photolysis. Its low sorptivity to soil (median Kd of 0.45 and median Koc of 39 mL/g in four soils) indicates high mobility. Based on its physical properties, bioconcentration is not anticipated.

Discuss the method used for drinking water exposure assessment (e.g., indicate which models are used or describe the monitoring data used).

Drinking water exposure estimates are based on EFED's current GENECC and SCI-GROW screening models for surface and ground water, respectively. Model results given below in tables are for an application rate of dichormid of 0.5 lbs/acre (Zeneca supplied this rate to RD by fax on 29 June 99). If, instead, the rate selected is 0.372 lb/acre (3 lbs/acre of acetochlor x 12.4% dichlormid as given in paragraph III.1. above), then values are corrected by the proportionate multiplicative factor of $0.372/0.5 = 0.744$. Both results are provided below.

SURFACE WATER: 27 ug/L (ppb) at 0.5 lb/acre. (Acute and chronic exposures are equivalent.)

20 ug/L (ppb) at 0.372 lb/acre

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GROUND WATER: 0.05 ug/L (ppb) at 0.5 lb/acre
0.03 ug/L (ppb) at 0.372 lb/acre

SCI-GROW EECs (IN PPB)

RUN No. 11 FOR DICHLORMID INPUT VALUES

APPL (#/AC) RATE	APPL. URATE NO. (#/AC/YR)	SOIL KOC	SOIL AEROBIC METABOLISM (DAYS)
.500	1	.500	39.2
			11.9

GROUND-WATER SCREENING CONCENTRATIONS IN PPB

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A=	6.900	B=	44.200	C=	.839	D=	1.645	RILP=	1.975
F=	-1.036	G=	.092	URATE=	.500	GWSC=	.046005		

10. Is there potential for non-dietary exposure to infants and children (residential exposure)?


Yes

No

If so, characterize:

Alex Clem

07/20/99 07:24 PM

To: Susie Chun/DC/USEPA/US@EPA
cc: Treva Alston/DC/USEPA/US@EPA
Subject: Re: dichlormid - fqpa meeting 

Susie,

I have provisionally completed the redlined Section III.9. in your attachment (attached at the end of this message). Treva is still trying to secure some additional fate and product chemistry information for me, but I don't think the "water numbers" will change.

Alex



dichlormidfqpaquestion

Susie Chun



Susie Chun

07/15/99 09:17 AM



To: Alex Clem/DC/USEPA/US@EPA
cc:
Subject: dichlormid - fqpa meeting

Alex,

Sorry for the short notice but could you please fill out the water section for the fqpa committee meeting and e-mail it back to me. The tox person taking the chemical to HIARC and FQPA is hoping to take it next Thursday.

I've attached the exposure section and redlined the water part.

I really am sorry and appreciate your help. Thanks.

Susie Chun
305-2249



dichlormidfqpaquestions

8

Sheet1

703-305-0599

R-25788 (DICHAORMID)

FAX TO KERRY LEIFER

SCI-GROW

1 page

Inputs :-

Application rate	0.5 lb/ac		
Median Koc	39.2	(values 38, 40.3, 35.5 & 49.4)	Ref. RR89-030B
Mean T1/2	7.5 days		Ref. RR90-014B

Screening Ground Water Concentrations = 0.01 ppb

GENEEC

Inputs :-

Application rate	0.5 lb/ac	(pre-em)	
Lowest Koc	35.5	(values 38, 40.3, 35.5 & 49.4)	Ref. RR89-030B
Longest T1/2	7.5 days		Ref. RR90-014B
Solubility	4388 mg/l		
Photolysis	Stable		
Aquatic degradation	No data		

Screening Surface Water Concentrations = 24.85 ppb Instantaneous peak conc.
24.63 ppb 56 day average

W. Hillebrecht

9