FILE COPY

DP Barcode : D191701, 191704
PC Code No : 108801, 111601
EEB Out : 7-7-93

To: Lawrence Fried
Product Manager
Registration Division (H7505C)

From: Anthony F. Maciorowski, Chief
Ecological Effects Branch/EFED (H7507C)

Attached, please find the EEB review of...

Reg./File # : 93TX0023, 93TX0024
Chemical Name : Metolachlor and Oxyfluorfen
Type Product : Herbicides
Product Name : Dual and Goal 1.6E
Company Name : CIBA-GEIGY and ROHM & HAAS
Purpose : Section 18 for the use of metolachlor and oxyfluorfen herbicides to contro monocotyledonous and dicotyledonous weeds in *Leucaena leucocephala*

Action Code : 515 Date Due : 07/02/93
Reviewer : Harry A. Winnik Date In EEB: 05/27/93

EEB Guideline/MRID Summary Table: The review in this package contains an evaluation of the following:

| GDLN NO | MRID NO | CAT | GDLN NO | MRID NO | CAT | GDLN NO | MRID NO | CAT |
|---|---|---|---|---|---|---|---|---|
| 71-1(A) | | | 72-2(A) | | | 72-7(A) | | |
| 71-1(B) | | | 72-2(B) | | | 72-7(B) | | |
| 71-2(A) | | | 72-3(A) | | | 122-1(A) | | |
| 71-2(B) | | | 72-3(B) | | | 122-1(B) | | |
| 71-3 | | | 72-3(C) | | | 122-2 | | |
| 71-4(A) | | | 72-3(D) | | | 123-1(A) | | |
| 71-4(B) | | | 72-3(E) | | | 123-1(B) | | |
| 71-5(A) | | | 72-3(F) | | | 123-2 | | |
| 71-5(B) | | | 72-4(A) | | | 124-1 | | |
| 72-1(A) | | | 72-4(B) | | | 124-2 | | |
| 72-1(B) | | | 72-5 | | | 141-1 | | |
| 72-1(C) | | | 72-6 | | | 141-2 | | |
| 72-1(D) | | | | | | 141-5 | | |

Y=Acceptable (Study satisfied Guideline)/Concur
P=Partial (Study partially fulfilled Guideline but additional information is needed
S=Supplemental (Study provided useful information but Guideline was not satisfied)
N=Unacceptable (Study was rejected)/Nonconcur

(1)

DP BARCODE: D191701

CASE: 284716 DATA PACKAGE RECORD DATE: 05/26/93
SUBMISSION: S441154 BEAN SHEET Page 1 of 1

* * * CASE/SUBMISSION INFORMATION * * *

CASE TYPE: EMERGENCY EXEMP ACTION: 515 SEC18 OC N-F/F USE
CHEMICALS: 108801 Metolachlor (ANSI) %

ID#: 93TX0023
COMPANY:
PRODUCT MANAGER: 41 REBECCA COOL 703-308-8417 ROOM: CS1
PM TEAM REVIEWER: LAWRENCE FRIED 703-308-8328 ROOM: CS1
RECEIVED DATE: 05/13/93 DUE OUT DATE: 07/02/93

* * * DATA PACKAGE INFORMATION * * *

DP BARCODE: 191701 EXPEDITE: N DATE SENT: 05/26/93 DATE RET.: / /
CHEMICAL: 108801 Metolachlor (ANSI)
DP TYPE: 001 Submission Related Data Package
ADMIN DUE DATE: 06/15/93 CSF: N LABEL: Y

| ASSIGNED TO | DATE IN | DATE OUT |
|---|---|---|
| DIV : EFED | 5/27/93 | / / |
| BRAN: EEB | 5/27/93 | / / |
| SECT: | / / | / / |
| REVR : | / / | / / |
| CONTR: | / / | / / |

* * * DATA REVIEW INSTRUCTIONS * * *

Please review the proposed use of metolachlor and oxyfluorfen on leucaena and determine whether or not the environmental impact will be significant.

Regards,

Larry Fried
308-8328

* * * ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION * * *

| DP BC | BRANCH/SECTION | DATE OUT | DUE BACK | INS | CSF | LABEL |
|---|---|---|---|---|---|---|
| 191698 | BAB | 05/26/93 | 06/15/93 | Y | N | Y |
| 191699 | EAB | 05/26/93 | 06/15/93 | Y | N | Y |

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DP BARCODE: D191704

CASE: 284717 DATA PACKAGE RECORD DATE: 05/26/93
SUBMISSION: S441155 BEAN SHEET Page 1 of 1

* * * CASE/SUBMISSION INFORMATION * * *

CASE TYPE: EMERGENCY EXEMP ACTION: 515 SEC18 OC N-F/F USE
CHEMICALS: 111601 Oxyfluorfen (ANSI)

ID#: 93TX0024
COMPANY:
PRODUCT MANAGER: 41 REBECCA COOL 703-308-8417 ROOM: CS1
PM TEAM REVIEWER: LAWRENCE FRIED 703-308-8328 ROOM: CS1
RECEIVED DATE: 05/13/93 DUE OUT DATE: 07/02/93

* * * DATA PACKAGE INFORMATION * * *

DP BARCODE: 191704 EXPEDITE: N DATE SENT: 05/26/93 DATE RET.: / /
CHEMICAL: 111601 Oxyfluorfen (ANSI)
DP TYPE: 001 Submission Related Data Package
ADMIN DUE DATE: 06/15/93 CSF: N LABEL: Y

| ASSIGNED TO | DATE IN | DATE OUT |
|---|---|---|
| DIV: EFED | 5/27/93 | / / |
| BRAN: EEB | 5/27/93 | / / |
| SECT: | / / | / / |
| REVR : | / / | / / |
| CONTR: | / / | / / |

* * * DATA REVIEW INSTRUCTIONS * * *

Please review the attached information and provide your recommendations on whether or not a significant impact to the environment will occur.

Regards,

Larry Fried
308-8328

* * * ADDITIONAL DATA PACKAGES FOR THIS SUBMISSION * * *

| DP BC | BRANCH/SECTION | DATE OUT | DUE BACK | INS | CSF | LABEL |
|---|---|---|---|---|---|---|
| 191702 | BAB | 05/26/93 | 06/15/93 | Y | N | Y |
| 191703 | EAB | 05/26/93 | 06/15/93 | Y | N | Y |

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ECOLOGICAL EFFECTS BRANCH REVIEW
SECTION 18

Metolachlor (Dual) and Oxyfluorfen (Goal)

100 Section 18 Application

100.1 **Nature and Scope of Emergency**

The Texas Department of Agriculture is requesting a specific exemption (Section 18) for the use of metolachlor (Dual Herbicide) and oxyfluorfen (Goal 1.6E Herbicide) for the control of monocotyledonous and dicotyledonous weeds on 332 acres of land devoted to the production of Leucaena leucocephala near McCoy, Texas in Atascosa County.

**100.2 Formulation Information**

ACTIVE INGREDIENTS

Dual

| | |
|---|---|
| Metolachlor | 86.4% |
| Inerts | 13.6% |

Goal 1.6E

| | |
|---|---|
| Oxyfluorfen | 19.4% |
| Inerts | 80.6% |

**100.3 Target Organisms**

monocotyledonous and dicotyledonous weeds

**100.4 Date, Duration**

The use period will be from April 23, 1993, to December 31, 1993.

**100.5 Application Methods, Directions, Rates**
(excerpted from the submission)

Product will be applied with ground application equipment. Dual Herbicide/Goal 1.6E Herbicide combination will be aplied at the rates of 2.8/0.6 lbs. a.i. per acre per application. Dual Herbicide/Goal 1.6E Herbicide will be applied at the rates of 44.8/48 ounces of product per acre. A maximum of 332 acres Leucaena leucocephala will be treated three times with the Dual Herbicide/Goal 1.6E Herbicide combination. On the assumption that 332 acres of Leucaena leucocephala will receive the maximum number of herbicide treatments per year (3), then the maximum quantity of active

ingredient (metolachlor and oxyfluorfen) required for this specific exemption will be 2788 pounds/597 pounds. This translates to 348.6 gallons of metolachlor and 373.5 gallons of oxyfluorfen.

Timing and frequency of use should be based upon one application as soon as weather conditions are favorable, a second in September and a third in December.

**100.6 Precautionary Labeling**

Dual

"Do not aply directly to water, to areas where surface water is present, or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment wash waters or rinsate."

Goal 1.6E

"Do not apply directly to water or wetlands. Do not contaminate water by cleaning of equipment of disposal of wases."

"This product is highly toxic to aquatic invertebrates, aquatic plants, wildlife and fish. Use with care when applying in areas frequented by wildlife or adjacent to any body of water or wetland area. Do not apply when weather conditions favor drift or erosion from target areas."

## 101 Hazard Assessment

### 101.1 Discussion

The Texas Department of Agriculture is requesting a specific exemption (Section 18) for the use of metolachlor (Dual Herbicide) and oxyfluorfen (Goal 1.6E Herbicide) for the control of monocotyledonous and dicotyledonous weeds on 332 acres of land devoted to the production of Leucaena leucocephala near McCoy, Texas in Atascosa County.

Multiple applications are allowed but will not exceed three applications; one application as soon as weather conditions are favorable, a second in September and a third in December. On the assumption that 332 acres of Leucaena leucocephala will receive the maximum number of herbicide treatments per year (3), then the maximum quantity of active ingredient (metolachlor and oxyfluorfen) required for this specific exemption will be 2788 pounds/597 pounds. This translates to 348.6 gallons of metolachlor and 373.5 gallons of oxyfluorfen.

### 101.2 Likelihood of Adverse Effects on Nontarget Organisms[1]

Environmental Fate Data (information obtained from Environmental Fate and Groundwater Branch (EFGWB) Pesticide Environmental Fate One Line Summary)

(V) = validated study (S) = supplemental study

Oxyfluorfen
last update, 04/01/93)

- Oxyfluorfen is stable to hydrolysis at pH 4, 7, and 10. (V)
- The photolysis half-life in water is 2-7.5 days (S)
- Oxyfluorfen is stable to photolysis in soil (S)
- Oxyfluorfen has a half life of up to 120 - 130 weeks in silt loam aerobic soils and 556-596 days in

[1] Since EEB currently has no methods with which to assess hazard to non-target wildlife by a combination of chemicals, this review will only consider the individual hazards of oxyfluorfen and metolachlor to non-target wildlife. The hazard of the two chemicals used together may be less than, the same, or greater than their combined individual hazards.

SdLm. In SdLm and SiLm, the firsth half-life was not reached by the 393rd day. (S)

- In anaerobic soils Oxyfluorfen degraded to 2-7% of the applied in 60 days for SdLm and SiLm soils. and showed stable half lives of 554 and 605 days. (S)

- Runoff study showed that oxyfluorfen will not translocate to nearby aquatic compartments.

- Bluegill sunfish BCF: Muscle 605 X; Viscera 4360 X; whole Fish 2200 X. 83-94% depurates in 14 days. (V)

Metolachlor
last update, 03/10/92)

- Metolachlor is stable to hydrolysis at pH 5, 7, and 9. (V)

- In natural sun, only 8% of the parent degraded after 30 days (S)

- In natural sun and SiLm soil the photolysis half-life is 8 days (S)

- Metolachlor is stable in loamy sand for over 64 days (V)

- The anaerobic aquatic metabolism of metolachlor in sandy loam is 78 days (V)

- The aerobic aquatic metabolism of metolachlor in sandy loam is 47 days (V)

- Bluegill sunfish BCF: Edible 15 X; whole Fish 16 X. In edible tissues 70% was eliminated in 14 days. (V)

Terrestrial organisms

Oxyfluorfen

Oxyfluorfen is considered to be practically nontoxic on an acute oral basis to highly toxic on a subacute dietary basis to birds and practically nontoxic to mammals (Northern bobwhite $LC_{50}$ 390 ppm, $LD_{50}$ > 2150; Mallard $LC_{50}$ >4000 ppm; Rat $LD_{50}$ >5000).

If Oxyfluorfen is applied at 0.6 lbs. a.i./ Acre, the following residues (ppm) are expected to occur on terrestrial food items immediately after treatment as calculated using a nomograph presented in Hoerger and

Kenaga (1972) based on historical measured residue data.

Upper limits and typical limits of residue on differing groups of plants

(residues in ppm)

| | Upper Limit | Typical Limit |
|---|---|---|
| Range Grass (short) | 144.00 | 75.00 |
| Grass (long) | 66.00 | 55.20 |
| Leaves and Leafy Crops (vegetables and fruit) | 75.00 | 21.00 |
| Forage Crops (alfalfa, clover) | 34.80 | 19.80 |
| Pods Containing Seeds (legumes) | 7.20 | 1.80 |
| Fruit (cherries, peaches, grapes, citrus) | 4.20 | 0.90 |

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The data indicate that Oxyfluorfen is not expected to pose risk to nontarget mammals.

The residue limits surpass the trigger for restricted use (EEC $\geq$ 1/5 lowest avian $LC_{50}$) and approaches the unacceptable risk level (residues approach ½ the lowest avian $LC_{50}$ of 390 ppm = 195ppm). As such, Oxyfluorfen may pose an acute risk to nontarget birds at the proposed application rates. However due to the limited acreages expected to be treated (a maximum or 332 acres in one county), and the fact that upland birds do not typically feed in one site for 5 days on an exclusive diet of grass and leafy crops, the proposed use of Oxyfluorfen is not expected to pose a significant acute risk to avian wildlife.

Although Oxyfluorfen is stable and may be applied up to three times, insufficient data exist to assess the chronic risk of the use of Oxyfluorfen to avian species. EEB has received and reviewed two avian chronic studies (a one generation reproduction study in mallard duck and a one generation reproduction study in bobwith quail). However, since the maximum concentrations tested in both studies was 100 ppm and residues of greater than 100 ppm may be expected, neither study is sufficient to perform an assessment for chronic risk. In view of the current labeled uses of oxyfluorfen, both studies have been downgraded to supplemental and should be repeated so that valid MATCs may be established.

Metolachlor

Studies show that metolachlor is practically nontoxic to birds. An acute oral study resulted in an LD50 = 4640 mg/kg for mallard duck (MRID No. 15547). Avian dietary studies demonstrate an LC50 of >10,000 ppm for both mallard (MRID No. 16425) and bobwhite quail (MRID No. 16426).

One supplemental avian reproduction study for the mallard duck shows that the LOEL level is 300 ppm based on adult feed consumption and adult body weight (MRID No. 162292). No acceptable avian reproduction study is available for bobwhite quail.

Studies show that metolachlor is practically non-toxic to mammals ($LD_{50}$ > 2000 mg/kg).

If Metolachlor is applied at 2.8 lbs. a.i./ Acre, the following residues (ppm) are expected to occur on terrestrial food items immediately after treatment as calculated using a nomograph presented in Hoerger and Kenaga (1972) based on historical measured residue data.

Upper limits and typical limits of residue on differing groups of plants

(residues in ppm)

| | Upper Limit | Typical Limit |
|---|---|---|
| Range Grass (short) | 672.00 | 350.00 |
| Grass (long) | 308.00 | 257.60 |
| Leaves and Leafy Crops (vegetables and fruit) | 350.00 | 98.00 |
| Forage Crops (alfalfa, clover) | 162.40 | 92.40 |
| Pods Containing Seeds (legumes) | 33.60 | 8.40 |
| Fruit (cherries, peaches, grapes, citrus) | 19.60 | 4.20 |

The data indicate that Metolachlor is not expected to pose risk to nontarget terrestrial wildlife.

Aquatic Organism

Oxyfluorfen

Oxyfluorfen may be characterized as highly to moderately toxic to fish and aquatic invertebrates, respectively (Bluegill sunfish (Lepomis macrochirus) $LC_{50}$=200 ppb; Rainbow trout (Oncorhyncus mykiss) $LC_{50}$=410 ppb; Channel catfish (Ictaluras punctatus) $LC_{50}$=400 ppb; Daphnia magna $LC_{50}$=1.5 ppm).

Assuming 1% runoff, an aquatic EEC was calculated using the formula for unincorporated ground application (see attached). An application rate of 0.6 lbs. a.i./Acre is estimated to result in an EEC of 3.66 ppb. a.i. in a 1 acre pond 6 ft. deep. Since this level is less than 1/10 the $LC_{50}$ values for fish and invertebrates, the proposed use of Oxyfluorfen should not pose an acute risk to aquatic organisms. Since the EEC is less than the Fathead minnow (Pimephales promelas) MATC of > 38 ppb < 74 ppb, the proposed use of Oxyfluorfen should not pose a chronic risk to aquatic organisms.

Metolachlor

Metolachlor has been demonstrated to be moderately toxic to freshwater fish with a 96-hr LC50 of 10 ppm for the bluegill (MRID No. 18723), and 3.9 ppm for the rainbow trout (MRID No. 18722).

An acute aquatic invertebrate study shows a 48-hr EC50 of 25.1 ppm to Daphnia magna which characterizes metolachlor as slightly toxic to aquatic invertebrates in acute exposures (MRID No. ).

Assuming 5% runoff, an aquatic EEC was calculated using the formula for unincorporated ground application (see attached). An application rate of 2.8 lbs. a.i./Acre is estimated to result in an EEC of 85.4 ppb. a.i. in a 1 acre pond 6 ft. deep. Since this level is less than 1/10 the $LC_{50}$ values for fish and invertebrates, the proposed use of Metolachlor should not pose an acute risk to aquatic organisms.

The risk assessment on the basis of chronic data cannot be performed. A complete fish life cycle and an invertebrate life cycle study were submitted to the Agency. However, the studies do not satisfy the guideline requirements. The fish life cycle study was reviewed in 1979 and found to be acceptable. But; a reevaluation of the study classified it as invalid because of high mortality in solvent control and contamination of both solvent and non-solvent control. An invertebrate life cycle study was reviewed and found

unacceptable because the test concentrations were not measured analytically.

**101.3 Endangered Species Considerations**

Oxyfluorfen

The only endangered species found in Atascosa County, Texas is the Ocelot. Since maximum residues do not exceed mammalian endangered species triggers, the proposed use of oxyfluorfen is not expected to pose risk to endangered wildlife.

**101.4 Adequacy of Data**

The available data were adequate to quantify the risks of this section 18.

**101.5 Adequacy of Labeling**

The following labeling would be required on any Oxyfluorfen label.

"This product is toxic to birds and aquatic invertebrates. Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Runoff may be hazardous to aquatic organisms in neighboring areas. Do not contaminate water when disposing of equipment washwater or rinsate."

The following labeling would be required on any Metolachlor label.

"Do not apply directly to water, or to areas where surface water is present or to intertidal areas below the mean high water mark. Do not contaminate water when disposing of equipment washwater or rinsate."

**102 Conclusions**

The data indicate that neither Oxyfluorfen or Metolachlor is expected to pose risk to nontarget mammals.

Although the expected residues of Oxyfluorfen do surpass the trigger for presumed hazard to nontarget birds (1/5 lowest avian $LC_{50}$ of 390 ppm = 195 ppm), due to the limited acreages involved and avian feeding habits this hazard is expected to be minimal.

Metolachlor is not expected to pose risk to nontarget avian wildlife.

The data indicate that the proposed use of Oxyfluorfen and Metolachlor should not pose an acute risk or chronic risk to aquatic organisms.

The only endangered species found in Atascosa County, Texas is the Ocelot. Since maximum residues do not exceed mammalian endangered species triggers, the proposed use of oxyfluorfen is not expected to pose risk to endangered wildlife.

Harry A. Winnik
Ecological Effects Branch
Environmental Fate and Effects Division (H7507C)

Henry Craven, Head, Section IV
Ecological Effects Branch
Environmental Fate and Effects Division (H7507C)

Anthony F. Maciorowski, Chief
Ecological Effects Branch
Environmental Fate and Effects Division (H7507C)

Attachments

AQUATIC EEC CALCULATION SHEET FOR Oxyfluorfen

I. For un-incorporated ground application

A. Runoff

0.6 lb(s) X 0.01 X (% runoff) 10 (A) = (from 10 A drainage basin) 0.06 lb(s) (total runoff

EEC of 1 lb a.i. direct application to 1 A pond 6 feet deep = 61 ppb

Therefore EEC = 61 ppb X 0.06 = 3.66 ppb

II. For Incorporated ground application

A. Runoff

---------lb(s) / --------- (cm) X (depth of incorporation) ---------X 10(A) = (% runoff) (10 A drainage basin) ERR lb(s) (total runoff)

Therefore, EEC = 61 ppb X ERR (lbs) = ERR ppb

III. For aerial application (or mist blower)

A. Runoff

---------lb(s) X 0.6 X (application efficiency) ---------X 10(A)= (% runoff) (10 A drainage basin) 0 (total runoff)

B. Drift

- lb(s) X 0.05 (5% drift) = 0 lb(s) (total drift)

Total loading = 0 lb(s) + (total runoff) 0 lb(s) = (total drift) 0 lb(s)

Therefore, EEC = 61 ppb X 0 lbs = 0 ppb

AQUATIC EEC CALCULATION SHEET FOR Matolachlor

I. For un-incorporated ground application

A. Runoff

2.8 lb(s) X 0.05 X (% runoff) 10 (A) = (from 10 A drainage basin) 1.4 lb(s) (total runoff

EEC of 1 lb a.i. direct application to 1 A pond 6 feet deep = 61 ppb

Therefore EEC = 61 ppb X 1.4 = 85.4 ppb

II. For Incorporated ground application

A. Runoff

---------lb(s) / --------- (cm) X (depth of incorporation) ---------X (% runoff) 10(A) = (10 A drainage basin) ERR lb(s) (total runoff)

Therefore, EEC = 61 ppb X ERR (lbs) = ERR ppb

III. For aerial application (or mist blower)

A. Runoff

---------lb(s) X 0.6 X (application efficiency) ---------X (% runoff) 10(A)= (10 A drainage basin) 0 (total runoff)

B. Drift

- lb(s) X 0.05 (5% drift) = 0 lb(s) (total drift)

Total loading = 0 lb(s) + (total runoff) 0 lb(s) = (total drift) 0 lb(s)

Therefore, EEC = 61 ppb X 0 lbs = 0 ppb