DP Barcode :
PC Code No. : 101101
EFGWB Out : JAN 29, 1992

To: Robert Taylor
Product Manager PM 25
Special Review and Reregistration Division (H7508W)

From: Elizabeth Behl, Head (acting)
Ground Water Technology Section
Environmental Fate & Ground Water Branch/EFED (H7507C)

Thru: Henry Jacoby, Chief
Environmental Fate & Ground Water Branch/EFED (H7507C)

Attached, please find the EFGWB review of...

Reg./File # : _____

Chemical Name : Metribuzin

Type Product : Herbicide

Product Name : Sencor

Company Name : Miles, Inc. (Mobay Corporation)

Purpose : Review information concerning potential ground-water monitoring site in Missouri.

Action Code : 496 EFGWB #(s): 80665, 80666, 80668 Total Review Time: 0.5 days

EFGWB Guideline/MRID Summary Table: The review in this package contains...											
161-1		162-1		164-1		165-1		166-1			
161-2		162-2		164-2		165-2		166-2	site selection		
161-3		162-3		164-3		165-3		166-3			
161-4		162-4		164-4		165-4		167-1			
201-1		163-1		164-5		165-5		167-2			
202-1		163-3									

REGISTRATION DIVISION DATA REVIEW RECORD

[illegible] 4-14-88

17. [illegible]

[illegible] 4/6153 [illegible]

1. [illegible] NUMBER	3. ACTION CODE	4. ACCESSION NUMBER	TO BE COMPLETED BY PM
			5. RECORD NUMBER 220189
8125-270	4[illegible]		6. REFERENCE NUMBER 25
			7. DATE RECEIVED (EPA) 3/21/88
			8. STATUTORY DUE DATE
			9. PRODUCT MANAGER (PM) Taylor/VK Walters
[illegible]			[illegible]

14. CHECK IF APPLICABLE

☐ Substitute Chemical ☐ Part of [illegible]

☒ [illegible] ☒ Review [illegible]

TO BE COMPLETED BY RCB
11. DATE SENT TO HED/TSS 4-[illegible]-88
12. PRIORITY NUMBER 30
13. PROJECTED RETURN DATE 7-4-88

15. INSTRUCTIONS TO REVIEWER

A. HED ☐ Total Assessment - 3(c)(5)
☐ Incremental Risk Assessment - 3(c)(7) and/or E.L. Johnson memo of May 12, 1977.

C. ☐ BFSD
D. ☐ TSS/RD
E. ☐ Other

B. SPRD (Send Copy of Form to SPRD PM)
☐ Chemical Undergoing Active RPAR Review
☐ Chemical Undergoing Active Registration Standards Review

F. INSTRUCTIONS

Attn: McMasters Williams

Photographs of Site D, MissCo, Mo

Sh# 101101-Y

16. RELATED ACTIONS

17. 3(c)(1)(D)
☐ Use Any or All Available Information ☐ Use Only Attached Data
☐ Use Only the Attached Data for Formulation and Any or All Available Information on the Technical or Manufacturing Chemical.

18. REVIEWS SENT TO
☐ TB ☐ EEB ☐ EF ☐ PL
☐ RCB ☒ EFB ☐ CH ☐ BPSD

19.	To	TYPE OF REVIEW	Registration	Petition	EUP	SLN	Sec. 18	Inert	MNR. USE	Other
			NUMBER OF ACTIONS							
HED		TOXICOLOGY								
HED		ECOLOGICAL EFFECTS								
HED		RESIDUE CHEMISTRY								
HED	✓	ENVIRONMENTAL DATE	1							
RD/TSS		CHEMISTRY								
RD/TSS		EFFICACY								
RD/TSS		PRECAUTIONARY LABELING								
BFSD		ECONOMIC ANALYSIS								

20. ☐ Label Submitted with Application Attached

21. ☐ Confidential Statement of Formula

22. ☐ Representative Labels Showing Accepted Uses Attached

23. Date Returned to RD (to be completed by HED)

24. Include an Original and 4 (four) Copies of This Completed Form for Each Branch Checked for Review.

EPA Form 8570-13 (Rev. 11-81) PREVIOUS EDITIONS ARE OBSOLETE. 80668

REGISTRATION DIVISION DATA REVIEW RECORD

4-14-88

4-150-4

[illegible]	ACTION CODE	ACCESSION NUMBER	TO BE COMPLETED BY PM
[illegible]	[illegible]	[illegible]	5. RECORD NUMBER 220,191
			6. REFERENCE NUMBER 25
			7. DATE RECEIVED (EPA) 4/4/88
			8. STATUTORY DUE DATE
			9. PRODUCT MANAGER (PM) Taylor [illegible]
			10. PM TEAM NUMBER [illegible]
			TO BE COMPLETED BY PCB
			11. DATE SENT TO HED/TSS 4-23-88
			12. PRIORITY NUMBER 20
			13. PROJECTED RETURN DATE 7-4-88

15. INSTRUCTIONS TO REVIEWER

A. HED ☐ Total Assessment - 3(c)(5)

☐ Incremental Risk Assessment - 3(c)(7) and/or E.L. Johnson memo of May 12, 1977.

C. ☐ BFSD

D. ☐ TSS/RD

E. ☒ Other

B. SPRD (Send Copy of Form to SPRD PM)

☐ Chemical Undergoing Active RPAR Review

☐ Chemical Undergoing Active Registration Standards Review

F. INSTRUCTIONS

Adm. Mentin Williams

Letter on [illegible] Water

[illegible]

16. RELATED ACTIONS

17. 3(c)(1)(D)

☐ Use Any or All Available Information ☐ Use Only Attached Data

☐ Use Only the Attached Data for Formulation and Any or All Available Information on the Technical or Manufacturing Chemical.

18. REVIEWS SENT TO

☐ TB ☐ EEB ☐ EF ☐ PL

☐ RCB ☒ EFB ☐ CH ☐ BFSD

19.	To	TYPE OF REVIEW	Registration	Petition	EUP	SLN	Sec. 18	Inert	MNR. USE	Other
HED		TOXICOLOGY								
HED		ECOLOGICAL EFFECTS								
HED		RESIDUE CHEMISTRY								
HED	✓	ENVIRONMENTAL DATE	1							
RD/TSS		CHEMISTRY								
RD/TSS		EFFICACY								
RD/TSS		PRECAUTIONARY LABELING								
BFSD		ECONOMIC ANALYSIS								

20. ☐ Label Submitted with Application Attached

21. ☐ Confidential Statement of Formula

22. ☐ Representative Labels Showing Accepted Uses Attached

23. Date Returned to RD (to be completed by HED)

24. Include an Original and 4 (four) Copies of This Completed Form for Each Branch Checked for Review.

EPA Form 8570-13 (Rev. 11-81) PREVIOUS EDITIONS ARE OBSOLETE.

80666

4/14/88

REGISTRATION DIVISION DATA REVIEW RECORD

(Confidential Business Information – Does Not Contain National Security Information (E.O. 12065))

46154 He B

PRODUCT NAME

[illegible]

1. IDENTIFYING NUMBER	2. ACTION CODE	3. ACCESSION NUMBER	TO BE COMPLETED BY PM
3125 270	491		5. RECORD NUMBER 220192
			6. REFERENCE NUMBER 25
			7. DATE RECEIVED (EPA) 4/14/88
			8. STATUTORY DUE DATE
			9. PRODUCT MANAGER (PM) Taylor / VK Walker
			10. PM TEAM NUMBER

14. CHECK IF APPLICABLE

☐ Public Health/Quarantine ☐ Minor Use

☐ Emergency Condition ☐ Part of 3(c)(2)

☒ Seasonal Concern ☒ Review Requires Less Than 4 Hours

TO BE COMPLETED BY PCB

11. DATE SENT TO HED/TSS 4-13-88

12. PRIORITY NUMBER 20

13. PROJECTED RETURN DATE 7-4-88

15. INSTRUCTIONS TO REVIEWER

A. HED ☐ Total Assessment - 3(c)(5)

☐ Incremental Risk Assessment - 3(c)(7) and/or E.L. Johnson memo of May 12, 1977.

B. SPRD (Send Copy of Form to SPRD PM)

☐ Chemical Undergoing Active RPAR Review

☐ Chemical Undergoing Active Registration Standards Review

C. ☐ BFSD

D. ☐ TSS/RD

E. ☒ Other

F. INSTRUCTIONS

Attn: Martin Williams

Site definition - Miss Co, Mo

Groundwater Monitoring

[illegible] 10/11/04

16. RELATED ACTIONS

17. 3(c)(1)(D)

☐ Use Any or All Available Information ☐ Use Only Attached Data

☐ Use Only the Attached Data for Formulation and Any or All Available Information on the Technical or Manufacturing Chemical.

18. REVIEWS SENT TO

☐ TB ☐ EEB ☐ EF ☐ PL

☐ RCB ☒ EFB ☐ CH ☐ BFSD

19.	To	TYPE OF REVIEW	Registration	Petition	EUP	SLN	Sec. 18	Inert	MNR. USE	Other
HED		TOXICOLOGY								
HED		ECOLOGICAL EFFECTS								
HED		RESIDUE CHEMISTRY								
HED	✓	ENVIRONMENTAL DATE								
RD/TSS		CHEMISTRY								
RD/TSS		EFFICACY								
RD/TSS		PRECAUTIONARY LABELING								
BFSD		ECONOMIC ANALYSIS								

(NUMBER OF ACTIONS: Registration, Petition, EUP, SLN, Sec. 18, Inert, MNR. USE, Other)

20. ☐ Label Submitted with Application Attached

21. ☐ Confidential Statement of Formula

22. ☐ Representative Labels Showing Accepted Uses Attached

23. Date Returned to RD (to be completed by HED)

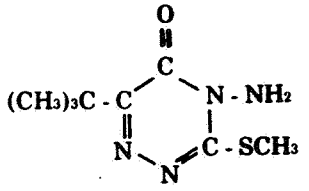
24. Include an Original and 4 (four) Copies of This Completed Form for Each Branch Checked for Review.

EPA Form 8570-13 (Rev. 11-81) PREVIOUS EDITIONS ARE OBSOLETE.

80665 4

1. CHEMICAL:

Chemical name: 4-amino-6-(1,1-dimethylethyl)-3-(methylthio)-1,2,4-triazin-5(4H)-one
Common name: Metribuzin
Trade name(s): Sencor
Structure:



2. TEST MATERIAL:

Not Applicable.

3. STUDY/ACTION TYPE:

Review information concerning potential ground-water monitoring site in Mississippi County, Missouri.

4. STUDY IDENTIFICATION:

1) Title: Letter from John S. Thornton to Robert J. Taylor (PM 25) concerning Metribuzin Ground Water Monitoring Project (March 18, 1988).

Author(s): John S. Thornton (Mobay Corporation)
Identifying No.: 3125-270
Record Number: 220189
Date Sent to EFED: 4/13/88

2) Title: Letter from John S. Thornton to Robert J. Taylor (PM 25) concerning Metribuzin Ground Water Monitoring Project (March 30, 1988).

Author(s): John S. Thornton (Mobay Corporation)
Identifying No.: 3125-270
Identification Code: 220191
Date Sent to EFED: 4/13/88

3) Title: Site Definition: Metribuzin Groundwater Monitoring Project/ Mississippi County, Missouri

Author(s): M. Scott Watson and Gregory C. Owens
Identifying No.: 3125-270
Identification Code: 220192
Date Sent to EFED: 4/13/88

All of the above submitted for:

Miles, Inc. (Mobay Chemical Corporation)
P.O. Box 4913
Kansas City, MO 64120-0013

5

5. REVIEWED BY:

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

Signature: Estella Waldman

Date: 1/24/92

6. APPROVED BY:

Elizabeth Behl
Acting Section Head
OPP/HED/EFED/Ground-Water Section

Signature: Dan Wells for EB

Date: 1/24/92

7. CONCLUSIONS:

In 1987, two soybean counties were chosen for the metribuzin small-scale ground-water monitoring studies. These counties were Champaign County, Illinois and Mississippi County, Missouri. Information submitted by Mobay indicated that the Mississippi, Missouri site (Site F) was not suitable for a study. Evidence included potential chemical contamination on the site, poor cooperation of the land owner, and evidence of site grading. Photographs depicting the potential contamination were submitted in EAB #80668 (3/18/88). EFGWB gave verbal approval to reject the site on 2/29/88.

EFGWB also indicated that it was not satisfied with the second site in Mississippi County (Site E), and requested that additional soil cores be drilled and analyzed. In EAB #80666 (3/30/88), Mobay agreed to send the additional data, and to suspend monitoring well installation on the site. The soil information was received on 4/1/88 in EAB #80665, and was reviewed by the Ground Water Section. EFGWB rejected this second potential site in Mississippi County after the soil characterization revealed the presence of restrictive clay layers.

8. RECOMMENDATIONS:

There are no recommendations at this time. Recommendations will follow the evaluation of the final report on the retrospective ground-water monitoring study for metribuzin (entitled "Small-Scale Retrospective Ground Water Monitoring Project for Metribuzin and Its Metabolites").

9. BACKGROUND:

Metribuzin (Sencor) was first registered for use in 1973. It is an aminotriazinone herbicide used to control grasses and broadleaf weeds on a variety of agricultural crops including alfalfa, asparagus, barley, carrots, field corn, lentils, peas, potatoes, sainfoin, soybeans, sugarcane, tomatoes, and wheat. It is also registered for use on fallow land (noncrop) and turfgrasses.

Metribuzin is applied either preemergence or early postemergence (USDA, 1988). Application rates range from 0.13 - 2.0 lb a.i. on most field and vegetable crops; 2 - 6 lb a.i. on sugarcane; and 1.0 - 7.5 lb a.i. on noncrop sites. According to the 1985 Registration Standard, metribuzin can be soil incorporated, surface applied, foliar applied, broadcast, or band incorporated. Application can be done by ground equipment, aerial equipment, or sprinkler irrigation. Metribuzin is a systemic herbicide that is absorbed by the plant root system, causing chlorosis, growth inhibition, and necrosis.

The MCL for metribuzin has not been established; the lifetime Health Advisory (HA) for a 70-kg adult has been established at 200 ppb. Metribuzin has been placed in Cancer Group D, indicating that it has not been classified (USEPA, 1991).

Metribuzin is stable to hydrolysis at pH 6 and 9. The photolysis half-life is estimated to be 15 days. The aerobic soil metabolism half-life ranges from 35 to 63 days in silt loam and sandy loam soils; the anaerobic soil metabolism half-life in silty clay soil was over 70 days. In the field, metribuzin dissipates with half-lives of less than 1 month to 6 months (USEPA, 1989a). Supplemental data indicate that the K_d's for metribuzin range from 1.32 (sandy loam) to 1.90 ml/g (silt loam), and that the K_{oc} is 41 ml/g (USEPA, 1989b).

There are three metabolites of metribuzin. These include 6-t-butyl-1,2,4-triazin-3,5-(2H,4H)-dione (DADK); 6-t-butyl-3-(methylthio)-1,2,4-triazin-5(4H)-one (DA); and 4-amino-6-butyl-1,2,4-triazin-3,5-(2H,4H)-dione (DK) (USEPA, 1989a) .

The EFGWB draft version of the 1991 Pesticides in Ground Water Database reports detections of metribuzin in 12 states. A total of 5,101 wells were analyzed for metribuzin; 205 of these had metribuzin residues. Metribuzin concentrations ranged from 0.001 to 25.10 µg/L.

The requirement for a ground-water monitoring study was issued in the June 1985 Registration Standard for metribuzin. The study was one of the four "pilot monitoring projects" to test various strategies for ground-water monitoring studies.

10. DISCUSSION:

The three documents submitted by Miles (Mobay) Chemical Company in 1988 are concerned with two potential sites for a ground-water monitoring study in Mississippi County, Missouri. The two sites were found unacceptable by EFGWB, and Miles Chemical Company terminated all work on the sites.

References

US Department of Agriculture. 1988. Herbicides: Chemistry, Degradation, and Mode of Action. ed's: Kearney, P.C. and Kaufman, D.D. Pesticide Degradation Laboratory/USDA/Agricultural Research Center. Marcel Dekker. New York.

USEPA. 1985. Guidance for the Reregistration of Pesticide Products Containing Metribuzin as the Active Ingredient. USEPA/OPP. Washington, D.C. June 1985.

_____. 1989a. Drinking Water Health Advisory: Pesticides. USEPA/Office of Drinking Water Health Advisories. Lewis Publishers. Chelsea, MI.

_____. 1989b. Pesticide Environmental Fate One Line Summary. USEPA/OPP/EFED. December 14, 1989.

_____. 1991. Drinking Water Regulations and Health Advisories. USEPA/Office of Water. Washington, D.C. November 1991.

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
METRIBUZIN
Last Update on January 24, 1992
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

LOGOUT	Reviewer: EW	Section Head: DN	Date: 1/24/92

Common Name:METRIBUZIN
PC Code # :101101 CAS #:21087-64-9 Caswell #:

Chem. Name :4-AMINO-6-tert-BUTYL-3-(METHYLTHIO)-as-TRIZIN-5(4H)-ONE

Action Type:Herbicide

Trade Names:BAY 94337; LEXONE; SENCOR
(Formul'tn):WP, FLOWABLE CONC., DRY FLOWABLE CONC.,
Physical State:

Use :BROADLEAF WEEDS AND GRASSES IN SOYBEANS, POTATOES, BARLEY,
Patterns :WINTER WHEAT, ASPARAGUS, SUGARCANE, TOMATOES, LENTILS, PEAS,
(% Usage) :AND NONCROPLAND
:

Empirical Form: $C_8H_{14}N_4OS$
Molecular Wgt.: 214.29 Vapor Pressure: E -5 Torr
Melting Point : °C Boiling Point: °C
Log Kow : 1.65 pKa: @ °C
Henry's : 2.33E-10 Atm. M3/Mol (Measured)

Solubility in ...					Comments
Water	1.22E	3	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)
[ ] pH 5.0:
[ ] pH 7.0:
[ ] pH 9.0:
[ ] pH :
[ ] pH :
[ ] pH :

8

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
METRIBUZIN
Last Update on January 24, 1992
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

Photolysis (161-2, -3, -4)
[ ] **Water:**
[ ] :
[ ] :
[ ] :

[ ] **Soil :**
[ ] **Air :**

Aerobic Soil Metabolism (162-1)
[U] 40 days
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]

Anaerobic Soil Metabolism (162-2)
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]

Anaerobic Aquatic Metabolism (162-3)
[ ]
[ ]
[ ]
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Aerobic Aquatic Metabolism (162-4)
[ ]
[ ]
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[ ]

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
METRIBUZIN
Last Update on January 24, 1992
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Soil Partition Coefficient (Kd) (163-1)

	Sd	Si	Cl	%OM	pH	Kd
[S]	74	14	13	2.8	6.6	1.32
[S]	18	57	25	5.0	7.9	1.90
[S]	0	41	59	0.5	6.0	1.53
[ ]						
[ ]						

Soil Rf Factors (163-1)

	Sd	Si	Cl	%OM	pH	Rf
[S]	74	14	13	2.8	6.6	.60
[S]	56	21	23	0.6	5.5	.59
[S]	18	57	25	5.1	7.9	.62
[ ]						
[ ]						

Laboratory Volatility (163-2)
[ ]
[ ]

Field Volatility (163-3)
[ ]
[ ]

Terrestrial Field Dissipation (164-1)
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]
[ ]

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

Forestry Dissipation (164-3)
[ ]
[ ]

10

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
METRIBUZIN
Last Update on January 24, 1992
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Long-Term Soil Dissipation (164-5)
[ ]
[ ]

Accumulation in Rotational Crops, Confined (165-1)
[S] RESIDUES ACCUMULATED IN PEANUTS THAT WERE PLANTED
[ ] IN SdLm 246 DAYS AFTER APPL. OF 1 LB AIA

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

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

Bioaccumulation in Fish (165-4)
[ ]
[ ]

Bioaccumulation in Non-Target Organisms (165-5)
[ ]
[ ]

Ground Water Monitoring, Prospective (166-1)
[ ]
[ ]
[ ]
[ ]

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

Ground Water Monitoring, Large Scale Retrospective (166-3)
[ ]
[ ]
[ ]
[ ]

Ground Water Monitoring, Miscellaneous Data (158.75)
[ ] METRIBUZEN HAS BEEN DETECTED IN 12 STATES AT CONCENTRATIONS
[ ] RANGING FROM 0.001 TO 25.10 µG/L (PPB).
[ ]

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
METRIBUZIN
Last Update on January 24, 1992
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

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

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

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

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

Degradation Products

N-glucoside of 6-T-butyl-1,2,4-triazin-3,5(2H,4H)-dione (.047ppm)
6-t-butyl-3(methylthio)-1,2,4-triazin-5(4H)-one (.014 ppm)
4-amino-6-t-butyl-1,2,4-triazin-3,5(2H,4H)-dione (.005 ppm)
Concentrations shown represent data from organosoluble degradates in soil at 393 days posttreatment

Environmental Fate & Effects Division
PESTICIDE ENVIRONMENTAL FATE ONE LINE SUMMARY
METRIBUZIN
Last Update on January 24, 1992
[V] = Validated Study [S] = Supplemental Study [U] = USDA Data

Comments

Soil Koc = 41.

References:
Writer : PJH, EW

13