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LGP-ENVIRONMENTAL SAFETY

DIBROM

I. INTRODUCTION

This review is for dibrom (Naled) as the sole active ingredient and in combination with Kelthane, or sulfur, or endosulfan, or captan, or folpet, or karathane. No additional fish and wildlife studies are needed for reregistration. For classification of dibrom see below.

II. ENVIRONMENTAL SAFETY DATA USED

A. Mammalian

Rat acute oral LD_{50} = 272 mg/kg[1/]

B. Avian

Bobwhite LC_{50} = 2117 ppm[2/]

Pheasant LC_{50} = 2538 ppm[2/]

Mallard LC_{50} = 2724 ppm[2/]

C. Aquatic

Rainbow 72-hr LC_{50} = 0.15 ppm[3/]
Bluegill 96-hr LC_{50} = 0.18 ppm

III. ENVIRONMENTAL HAZARD CAUTIONS

A. Dibrom (as the sole active ingredient)

(1) Manufacturing Use (and Indoor Uses like Greenhouses):

"This pesticide is toxic to wildlife and fish. Keep out of lakes, streams or ponds".

(2) Nonaquatic Outdoor Uses (except those in RPAR or which need clarification: see (C) and (VI) below)

(a) Emulsiable Concentrates, Sprays, Dusts:

"This pesticide is toxic to wildlife and fish. Use with care when applying in areas frequented by wildlife or adjacent to any body of water. Birds and other wildlife in treated areas may be killed. Keep out of lakes, streams or ponds. Do not apply when weather conditions favor drift from target area".

These cautions should appear in the "Environmental Hazards" paragraph. If the label recommends mixing this pesticide with other pesticides, then a statement such as the following is necessary for the "Directions for Use" paragraph:

"Observe all cautions and limitations on labeling of all products used in mixtures".

(b) Granular Products: There appear to be no granular products registered.

B. Dibrom in combination with other actives

For dibrom formulations containing the active ingredients indicated in the Introduction refer to the appropriate environmental safety review for that chemical. A chemical more toxic than dibrom (such as endosulfan) will take precedence in environmental hazard cautions and in classification.

C. Other

(1) Uses in residential areas and municipalities:

Before classification and/or adequate labeling can be developed, directions for use of dibrom in municipalities and in residential areas must be more specific: i.e., for use along roadways, in garbage dumps, around parking lots. Further, all such uses must be nonaquatic and must not include areas in the RPAR Category unless suitable rebuttals (to presumption are presented and accepted. (see attached memo).

(2) Certain labels indicate spraying turf and soil surfaces around flowers, shrubs and trees "for general pest cleanup". Actual application rates per given area are not always given but instead are usually expressed as amount of product (ounces, pints) per amount of carrier (pints, quarts, gallons of water). These labels should be handled as suggested in the attached memo or as indicated under classification below.

IV. Waivers

None required for reregistration.

V. Data Required for Registration/Renewal

None required for registration renewal.

VI Classification/RPAR

A. General

All nonaquatic uses of naled are classified General except under the circumstances in (B) and (C) below.

B. RPAR

All aquatic uses of naled are classified RPAR. The following uses are considered definitely to be aquatic applications. These uses trigger acute RPAR based upon aquatic criteria. For rebuttal such uses will require extensive field monitoring studies and/or further clarification of the use pattern:

(1) rice,

(2) tidal marshes

(3) swamps

(4) woodlands

(5) forest and shade trees: conifers and broadleaf trees.

Other uses may fall into RPAR depending upon clarification of the use site.

C. Restricted/RPAR

(1) As indicated under (III) (C) (1) and (2) above certain use patterns need clarification as to rates of application and/or use sites. More specifically,:

(a) Uses of naled in municipalities and residential areas need clarification before classification.

(b) Any outdoor use of naled on ornamentals must specify use sites and application rates to be classified. Uses around the home can be considered for General classification if rates are <3.4# active ingredient/acre.

(c) Uses of naled in orchard situations (oranges, lemons, peaches etc.) are restricted when foliar applications (finished spray per acre) are ≥21.9# active ingredient/acre and are RPAR at ≥109.5# active ingredient/acre.

(d) Uses of naled in/or pastures, rangeland, lawns, and turf areas are restricted at rates of ≥1.75# active ingredient/acre and are RPAR at rates of ≥8.75# active ingredient/acre.

In reference to "transfer mechanisms" for naled, presently none are available until:

(1) certain use patterns as indicated above are clarified, and/or

(2) simulated field and/or field monitoring studies are performed.

Norman J. Cook NJC.
Environmental Safety Reviewer
August 11, 1976

CLASSIFICATION COMMENT - NALED

In the review of naled the most striking toxicity characteristics noted were those to aquatic organisms. (Naled also appears acutely toxic to avian species when oral intubation rather than dietary feeding is employed). Further, Naled's degradation product DDVP also is acutely toxic to aquatic organisms - even more-so than naled - and is more toxic than naled to mammals and birds. Considering the relatively short 1/2-life of naled in soil (approx. 5 hours) and in water (24 hours or less) it is recommended that any future reviews of naled consider the degradation product DDVP and its potential effects on nontarget organism.

It is recommended also that avian and aquatic reproduction studies be obtained because of naled's wide usage, numerous applications and its use in or near aquatic sites.

Dibrom: Environmental Chemistry

A. "Rate of Hydrolysis of Naled in Aqueous Solution"

	Half-life in Hours		
Temp.	pH 5	pH 7	pH 9
21°C	24.9	15.9	0.27
37°C	6.0	4.4	0.05

Rate of hydrolysis was more rapid at the basic pH and/or the higher temperature.

NOTE: No mention was made concerning sterility of water or exclusion of light.

B. 1/2 life in sterile sandy loam is 5 hours.

REFERENCES

1/ Acc. No. 050856 submitted by Chevron Chem. Co., Reg. No. 239-1721, Rec'd 2/28/74.

2/ Heath, Robert G., et. al., Lethal Dietary Toxicities of Environmental Pollutants to Birds, USDI, USFWS, Special Scientific Report - Wildlife No. 191, 1975.

3/ PP. No. 7F0532, Acc. No. 090646, Section C, Reference 28a, p.13, submitted by Chevron Chem. Co., Rec'd 9/20/66.

4/ Tucker, Richard K and D. Glen Crabtree, Handbook of Toxicity of Pesticides to Wildlife, BSFW, Denver Wildlife Research Center, Resource Publication No. 84, March, 1970.

5/ FWPCA. 1968. Water Quality Criteria. Report of the National Tech. Adm. Comm. to Secr. of the Interior. Fed. Water Pollution Contr. Adm. USDI. 234 p.

6/ Muncy, R. J., and A. D. Oliver. 1963. Toxicity of ten insecticides to the red crawfish, Procambarus clarki (Girard). Trans. Am. Fish. Soc. 92:428-431.

7/ Neumeyer, J.D. Gibbons and H. Trask. 1969. Pesticide Parts 1 and 2. Chemical Week 104 (April 12 and 26):37-68 and 37-68.

8/ Animal Biol. Lab., EPA-TSD, Test No. ? , July, 1968.

DiSRom

CLASSIFICATION

PARAMETERS	ORGANISM	GENERAL	RESTRICTED	REBUTTABLE PRESUMPTION
	MAMMAL	<1/5 LD_{50}	≥ 1/5 LD_{50} to < LD_{50}	≥ LD_{50}
A	Rat [1]: _____:	<1/5(272 mg/kg or 5440 ppm) = <1088 ppm	>1088 ppm to <5440 ppm	≥5440 ppm
	AVIAN (see over)	< 1/5 LC_{50}	≥ 1/5 LC_{50} to < LC_{50}	≥ LC_{50}
B	Bobwhite[2]: Pheasant[2]: <1/5 (2538)=<507.6 ppm	<1/5(2117 ppm)=<423.4 ppm	≥423.4 ppm to <2117 ppm ≥507.6 ppm to <2538 ppm	≥2117 ppm ≥2538 ppm
	AQUATIC* (see over)	<1/10 LC_{50}	≥ 1/10 LC_{50} to 1/2 LC_{50}	>1/2 LC_{50}
C	Rainbow[3]: Bluegill[3]: <1/10(0.18)=<0.018 ppm	<1/10(.15ppm)=<0.015 ppm	≥ 0.015 ppm to 0.075 ppm ≥0.018 ppm to 0.09 ppm	≥0.075 ppm ≥0.09 ppm
D	The pesticide causes, under conditions of label use, or widespread and commonly recognized practice of use, only minor and no discernible adverse effects on the physiology, growth, population levels, or reproduction rates of non-target organisms, resulting from exposure to the product ingredients, their metabolites or degradation products, whether due to direct application or otherwise resulting from application such as through volatilization, drift, leaching or lateral movement in soil.		The pesticide causes, under conditions of label use, or widespread and commonly recognized practice of use, discernible adverse effects on the physiology growth, population levels, or reproduction rates of non-target organisms, resulting from exposure to the product ingredients, their metabolites, or degradation products, whether due to direct application or otherwise resulting from application, such as through volatilization, drift, leaching or lateral movement in soil.	Chronic Toxicity: Can reasonably be anticipated to result in significant local, regional, or natior population reductions in non-targ organisms, or fatality to membe of endangered spe cies.

*used only in cases where "direct application" to water is intended. (See W. Preston's Memo of January 14, 1976.)

Chemical: Dibrom

CLASSIFICATION (Cont.)

A. Avian LD_{50}'s:

ORGANISM	GENERAL	RESTRICTED	RPAR
Mallard[4/]	<1/5(52.2 mg/kg) = <10.44 mg/kg	≥10.44 mg/kg	≥52.2 mg/kg
Sharp-tailed[4/] Grouse	<1/5(64.9 mg/kg) = <12.98 mg/kg	≥12.98 mg/kg	≥64.9 mg/kg
Canada Geese[4/]	<1/5(36.9 mg/kg) = <7.38 mg/kg	≥ 7.37 mg/kg	≥36.9 mg/kg

B. Aquatic LC_{50}'s

ORGANISM	GENERAL	RESTRICTED	RPAR
Brook Trout[5/]	<1/10(0.078 ppm) = <0.0078 ppm	≥0.0078 ppm	>0.039 ppm
Daphnia[5/]	<1/10(0.0035 ppm)= <0.00035 ppm	≥0.00035 ppm	>0.00175 ppm
Stone Fly[5/]	<1/10(0.016 ppm) = <0.0016 ppm	≥0.0016 ppm	>0.008 ppm
Red Crawfish[6/]	<1/10(4.0 ppm) = <0.4 ppm	≥0.4 ppm	>2.0 ppm
Amphipod[5/]	<1/10(0.16 ppm) = <0.016 ppm	≥0.016 ppm	>0.08 ppm

Chemical DIBROM

RESIDUE GRITERIA - ENVIRONMENTAL

Rat LD_{50} = 220 mg/kg
Bird LC_{50} = 2117 ppm
Fish Daphnia LC_{50} = 0.0035 ppm .00035 ppm

APPLICATION RATE (LBS/A a.i.)

	MAMMAL			AVIAN			AQUATIC		
FEED/WATER	General	Restricted	RPAR	General	Restricted	RPAR	General	Restricted	RPAR
Foliar Application									
Forage	<18.8	≥18.8	≥94	<7.3	≥7.3	≥36.5			
Leafy Crop	< 8.8	≥ 8.8	≥44	<3.4	≥3.4	≥17			
Grass - Long	< 9.5	≥ 9.5	≥47.5	<3.85	≥3.85	≥19.25			
Grass - Short	< 4.5	≥ 4.5	≥22.5	<1.75	≥1.75	≥8.75			
~~Ornamentals~~ Orchards: Forage X3	<56.4	≥56.4	≥282	<21.9	≥21.9	≥109.5			
Trees	<158	≥158	≥790	<62	≥62	≥310			
~~Fruits~~ Seeds, (POD) Insects	<92	≥ 92	≥460	<36	≥36	≥180			
Soil Application									
No Incorporation									
Granular (mg/ft^2)									
Other (.1")	<4.94	≥4.94	≥24.7	<19.2	≥19.2	≥96			
Incorporation									
1"									
2"									
3"									
>3"									
Aquatic Application									
6" Layer H_2O							<0.00048	≥0.00048	≥0.00
Other									

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Chemical: Dibrom/DDVP

CLASSIFICATION (Cont.)

CHEMICAL	ORGANISM	GENERAL	RESTRICTED	RPAR
Dibrom	Rat[1/]	<1088 ppm	>1088 ppm	≥5440 ppm
DDVP	Rat[7/]	<224 ppm	≥224 ppm	≥1120 ppm
Dibrom	Pheasant[2/]	<507.6 ppm	≥507.6 ppm	≥2538 ppm
DDVP	Pheasant[2/]	<113.6 ppm	≥113.6 ppm	≥568 ppm
Dibrom	Mallard[2/]	<544.8 ppm	≥544.8 ppm	≥2724 ppm
DDVP	Mallard[2/]	<263.4 ppm	≥263.4 ppm	≥1317 ppm
Dibrom	Rainbow[3/8/]	<0.015 ppm	≥0.015 ppm	>0.075 ppm
DDVP	Rainbow	<0.010 ppm	≥0.010 ppm	>0.050 ppm
Dibrom	Bluegill[3/]	<0.018 ppm	≥0.018 ppm	>0.09 ppm
DDVP	Bluegill[5/]	<0.070 ppm	≥0.070 ppm	>0.35 ppm
Dibrom	Mallard[4/]	<10.44 mg/kg	≥10.44 mg/kg	≥52.2 mg/kg
DDVP	Mallard[4/]	<1.56 mg/kg	≥1.56 mg/kg	≥7.8 mg/kg
Dibrom	Daphnia[5/]	<0.00035 ppm	≥0.00035 ppm	>0.00175 ppm
DDVP	Daphnia[5/]	<0.000007 ppm	≥0.000007 ppm	>0.000035 ppm
Dibrom	Stone fly[5/]	<0.0016 ppm	≥0.0016 ppm	>0.008 ppm
DDVP	Stone fly[5/]	<0.001 ppm	≥0.001 ppm	>0.005 ppm
Dibrom	Amphipod[5/]	<0.016 ppm	≥0.016 ppm	>0.08 ppm
DDVP	Amphipod[5/]	<0.0001 ppm	≥1.0001 ppm	>0.0005 ppm

CLASSIFICATION

PARAMETERS	ORGANISM	GENERAL	RESTRICTED	REBUTTABLE PRESUMPTION
A	MAMMAL	$<1/5\ LD_{50}$	$\geq 1/5\ LD_{50}$ to $< LD_{50}$	$\geq LD_{50}$
	Rat 7/ :	<1/5(56 mg/kg or 1120 ppm) = <224 ppm	≥224 ppm to <1120 ppm	≥1120 ppm
	_____ :			
B	AVIAN	$< 1/5\ LC_{50}$	$\geq 1/5\ LC_{50}$ to $< LC_{50}$	$\geq LC_{50}$
	Pheasant 2/:	<1/5(568 ppm) = <113.6 ppm	≥113.6 ppm to <568 ppm	≥568 ppm
	Mallard 2/:	<1/5(1317 ppm) = <263.4 ppm	≥263.4 ppm to <1317 ppm	≥1317 ppm
C	AQUATIC*	$<1/10\ LC_{50}$	$\geq 1/10\ LC_{50}$ to $1/2\ LC_{50}$	$>1/2\ LC_{50}$
	Rainbow 8/:	<1/10(0.10 ppm) = <0.010 ppm	≥0.01 ppm to 0.05 ppm	>0.05 ppm
	Bluegill 5/:	<1/10(0.70 ppm) = <0.0.070 ppm	≥0.07 ppm to 0.35 ppm	>0.35 ppm
D	The pesticide causes, under conditions of label use, or widespread and commonly recognized practice of use, only minor and no discernible adverse effects on the physiology, growth, population levels, or reproduction rates of non-target organisms, resulting from exposure to the product ingredients, their metabolites or degradation products, whether due to direct application or otherwise resulting from application such as through volatilization, drift, leaching or lateral movement in soil.		The pesticide causes, under conditions of label use, or widespread and commonly recognized practice of use, discernible adverse effects on the physiology growth, population levels, or reproduction rates of non-target organisms, resulting from exposure to the product ingredients, their metabolites, or degradation products, whether due to direct application or otherwise resulting from application, such as through volatilization, drift, leaching or lateral movement in soil.	Chronic Toxicity: Can reasonably be anticipated to result in significant local, regional, or nation population reductions in non-targ organisms, or fatality to membe of endangered spe cies.

*used only in cases where "direct application" to water is intended. (See W. Preston's Memo of January 14, 1976.)

Chemical DDVP

RESIDUE GRITERIA - ENVIRONMENTAL

Rat LD_{50} = 56 mg/kg
Bird LC_{50} = 568 ppm
Fish Daphia LC_{50} =0.00007

APPLICATION RATE (LBS/A a.i.)

	MAMMAL			AVIAN			AQUATIC		
FEED/WATER	General	Restricted	RPAR	General	Restricted	RPAR	General	Restricted	RPAR
Foliar Application									
Forage	< 3.0	≥ 3.9	≥19.5	<1.95	≥1.95	≥9.75			
Leafy Crop	< 1.8	≥ 1.8	≥9.0	<0.92	≥0.92	≥4.6			
Grass - Long	< 2.05	≥2.05	≥10.25	<1.04	≥1.04	≥5.2			
Grass - Short	< 0.94	≥0.094	≥ 4.7	<0.047	≥0.47	≥2.35			
Ornamentals	<11.7	≥11.7	≥58.5	<5.85	≥5.85	≥29.25			
Trees	<33	≥33	≥165	<16.4	≥16.4	≥82			
Fruit, Seeds, Insects	<19	>19	≥ 95	< 9.6	≥ 9.6	≥48			
Soil Application									
No Incorporation									
Granular (mg/ft^2)									
Other (.1")	< 10.16	≥10.16	≥50.8	<5.15	≥5.15	≥25.75			
Incorporation									
1"									
2"									
3"									
>3"									
Aquatic Application									
6" Layer H_2O							<0.0000092	≥0.0000092	≥0.00046

(Dibrom breaks down to DDVP) A Comparison of Toxicity of Dibrom and DDVP

CHEMICAL	① (acute oral) RAT LD_{50}	② MALLARD Acute Oral LD_{50}	③ BOBWHITE dietary LC_{50}	④ PHEASANT dietary LC_{50}	⑤ MALLARD dietary LC_{50}	⑥ RAINBOW 96-hr LC_{50}	⑦ DAPHNIA 48-hour LC_{50}	⑧ STONEFLY 48-hour LC_{50}	⑨ AMPHIPOD 48-hour LC_{50}	⑩ BLUEGILL 96-hour LC_{50}
Dibrom	272 mg/kg 1/	52.2 mg/kg 4/	2117 ppm 2/	2538 ppm 2/	2724 ppm 2/	0.15 ppm 3/	0.0035 ppm 5/	0.016 ppm 5/	0.16 ppm 5/	0.180 ppm 3/
DDVP	56-80 mg/kg 7/	7.8 mg/kg 4/	---------	568 ppm 2/	1317 ppm 2/	0.10 ppm 8/	0.00007 ppm 5/	0.010 ppm 5/	0.001 ppm 5/	0.70 ppm 5/

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