2,4-D/TOX

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Releasable

Sponsor

Date Out EFB: MAY 14 1980

To: Product Manager
TS-767

Through: Dr. Gunter Zweig, Chief
Environmental Fate Branch W. Garner

From: Review Section No. 1
Environmental Fate Branch

Attached please find the environmental fate review of:

Reg./File No.: 11683-EUP 2,3

Chemical: 2,4-D

Type Product: Aquatic Herbicide

Product Name: Weedar 64, Aqua-Kleen

Company Name: Water & Power Resources Service USDI, USA Corps of Engineers

Submission Purpose: EUP Aquatic Use of 2,4-D

ZBB Code: Section 5

Date in: 01-23-80 EFB#367

Date Completed May 6, 1980 EFB#368

Deferrals To:

[ ]	Ecological Effects Branch	Action Code 270
[ ]	Residue Chemistry Branch	Action Code 270
[ ]	Toxicology Branch	Due April 18, 1980

Introduction

- In a cooperative effort with the Corps of Engineers, the Bureau of Reclamation is requesting an EUP/OG2301 (11683-EUP 2,3) for the aquatic non-crop use of 2,4-D in reservoirs and other waters to control Eurasian watermilfoil, for one year (3-80/81).
- The EUP would involve the use of two registered 2,4-D products containing the following active ingredients.

  1. Dimethylamine salt (DMA) of 2,4-D-Dichlorophenoxyacetic acid (trade name WEEDAR 64®) and

  2. Butoxyethenol ester (EEB) of 2,4-dichlorophenoxy acetic acid (trade name AQUA-KLEEN).

- Previous environmental chemistry reviews pertinent to this submission are

EPA No. 876-222	12-9-76
PP#4G 1487 and EPA # 445048	5-15-74
PP# 1E1046	2-19-74
PP# 3E1390	11-15-73
PP# 1E1136	5-12-72

- The experimental program is designed to produce data on the dissipation of 2,4-D residues in treated waters and migration of water containing 2,4-D from treated areas when operational scale applications of the herbicide are made for control of the watermilfoil. Such data would aid in establishing the minimum time between herbicide application and safe use of water for domestic purposes and irrigation and the minimum safe distance between treatment sites and potable water or irrigation intakes; and investigate accumulation and persistance of 2,4-D residues in fish.

- The program is planned as follows:

Location/Use	Acres to be treated (plot size; # of plots)	Amt. of formulated product DMA 2,4 (gal)	BEE 2,4-D (lbs)
.Lake Seminole (FL/GA) Recreation Navig. Hydro Power	200A(50;4)	750	15,000
.Kerr Reservoir (OK) Recreation Navig. Hydro Power	140A(35;4)	525	10,500
.Fort Cobb Reservoir (OK) Recr-Irrig. Municipal water supply	120A(30;4)	450	9,000
.Banks Lake (WA) Irrig. Recr.	160A(40;4)	600	12,000
Totals	620 acres	2,325 gals.	46,500 lbs.

1. WEEDAR 64®, 4 lb. 2,4-D acid equivalent/gal.

2. Aqua-Kleen®, 20% 2,4-D acid equivalent by wt.

The two formulations will each be applied at rates of 20 and 40 lb. 2,4-D a.e/surface A in separate plots.

Directions for Use

- Application rates
- 5 and 10 gallons of WEEDAR 64®/A (20 lb. and 40 lb. of 2,4-D a-e/A).
- 100 and 200 pounds of AQUA-KLEEN®/A (20 lb. and 40 lb. of 2,4-D a-e/A).
- Application methods may be used: surface, subsurface, or aerial.
- Season and timing of application
  Optimum time for best control is soon after the Eurasian watermilfoil starts to grow,
  Lake Seminole - April to mid-June, Kerr Reservoir and Fort Cobb Reservoir - June, Banks Lake - July
- Precautions: All precautions given in the WEEDAR 64 and AQUA-KLEEN labelings are to be followed.
- For potable water: do not treat within 1/2 mile of any municipal or domestic water intake. Delay the use of water from treated areas for domestic purposes for a period of 3 weeks, or until residue analysis show that it contains no more than 0.1 ppm 2,4-D acid.
- Fishing is not to be permitted in treated areas within 7 days after the herbicide applications.

Discussion of Data

This submission incorporates data of previous submissions by reference and includes currently available data in appendices 1, 2 and 3 of section D of the report, Accession No. 099179. Areas covered include = (a) mechanisms of 2,4-degradation in aquatic environments; (b) dissipation of 2,4-D in treated waters; (c) 2,4-D residues in potable and irrigation water supplies; (d) uptake and metabolism of 2,4-D by fish and shellfish; and (e) safety and toxicity of 2,4-D.

A cursory review of these studies revealed the following information and conclusions:

1. Dilution of applied 2,4-D is the key factor, in treatment of relatively large surface aquatic areas, responsible for low residue levels in the water.

2. The rate of dissipation of 2,4-D residues at the point of application is affected by the treatment rate, water depth, mean temperature, and time after treatment.

3. Concentration of 2,4-D in water intakes can be reduced by applying the liquid formulation (DMA 2,4-D) outside the water treatment plants buffer zone and changing to granular application (Bee 2,4-D) within the buffer zone.

4. The major factors determining the location, concentration, and persistence of 2,4-D residue levels are considered to be the following:

   a. Hydraulic factors; i.e. rate and direction of current or bulk water flows,

   b. Volume of the water system influences the potential for dilution where residue concentrations are higher and they persist longer when 2,4-D treatments are made in small or closed water systems,

   c. Herbicide formulation and application rate,

   d. Water temperature, 2,4-D residues are more persistent in cooler waters if all other factors are constant,

   e. Elapsed time, i.e., time after treatment,

   f. Amount and type of vegetation where release of undergraded herbicide is possible upon death and decay of this vegetation causing a delay in the time of peak residue levels in the waters; and

   g. pH, alkalinity, DO, light penetration and history of previous herbicide use are factors of second order.

5. In connection with reservoir characterization, it seems likely that 2,4-D herbicide applications and resulting residues would perform similarly in all geographic areas of concern.

6. Studies on the accumulation and fate of 2,4-D in fish indicate that residues of 2,4-D are nonpersistent and are not bioaccumulated in fish as a result of exposure at the application

rate for weed control, and undergo little or no metabolic transformation, instead, it is rapidly excreted.

7. Higher rate applications of 2,4-D needed to control Eurasian watermilfoil would not exceed the established tolerance level (1.0 ppm); this concentration level is safe-guarded by the 5-10 day restriction imposed on fishing.

8. The maximum 2,4-D residues in crop commodities, irrigated with water containing the herbicide as a result of watermilfoil treatments, were either nondetectable or insignificant or were much lower than the established tolerance for various food crops (1.0 ppm).

Conclusion:

Environmental chemistry data reviewed for the past and current submission in connection with the proposed use of BEE 2,4-D and DMA 2,4-D, were found inadequate in most instances to allow conclusive assessment of the herbicides environmental hazards. This is so because the majority of the studies developed had many data gaps that precluded the establishment of the fate of these two formulations in non-crop aquatic environment.

Recommendation

It is determined that the EUP labeling restrictions and precautions will safeguard against any major environmental hazard of concern to EFB for the duration of the permit. Hence, EFB concurs with the EUP as proposed; and recommends that the petitioner must be required to clarify data gaps noted in all EC reviews prior to any consideration of future petitions. It is also important to note that the 2,4-D, DMA formulation should contain less than 1.0 ppm dimethyl nitrosamine.

Madeline Nawar/EFB Madeline Nawar 5/14
April 25, 1980