

US EPA ARCHIVE DOCUMENT



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY  
WASHINGTON, D.C. 20460

MEMORANDUM

MAR 23 1989

OFFICE OF  
PESTICIDES AND TOXIC SUBSTANCES

SUBJECT: Diquat Swimming Restriction

TO: R. Mountfort  
Product Manager 23  
Registration Division (H7505C)

FROM: Curt Lunchick *Curt Lunchick*  
Registration Standards and Special Review Section  
Science Analysis and Coordination Branch  
Health Effects Division (H7509C)

THRU: Albin Kocialski, Section Head *AK 3/23/89*  
Registration Standards and Special Review Section  
Science Analysis and Coordination Branch  
Health Effects Division (H7509C)

Please find below the SACB review of ....

HED Project #: 9-0745

RD or SRRD Record #: 239 170

Registration #: 239-1663

Caswell #: 402

Company Name: Chevron

Date Received: 01/31/89 Action Code: 660

Date Completed: 03/23/89 Review Time: 4 days

- Deferral to:  Biological Analysis Branch/BEAD
- Nondietary Exposure Branch
- TB - Insecticide/Rodenticide Support Section
- TB - Herbicide/Fungicide/Antimicrobial Support Section
- other ( \_\_\_\_\_ )

## 1.0 INTRODUCTION

The Chevron Chemical Company has submitted a request to have a 14-day swimming restriction removed from Diquat Water Weed Killer labels. In support of the request, Chevron has submitted a report entitled Diquat Swimming Exposure Risk Assessment (Ford, J.E., 5 December, 1988).

## 2.0 CHEVRON RISK ASSESSMENT

Chevron's rationale for removal of the 14 day restriction in swimming is based on diquat's physical/chemical properties and the toxicology of the compound. Diquat is applied to bodies of water at a label maximum concentration of 1.5 ppm. In addition the label warns against treating entire bodies of water that contain heavy amounts of weeds to prevent oxygen depletion. Diquat is a salt which tenaciously binds to sediment, plant material, and suspended particulates in the water and rapidly becomes unavailable for potential human exposure. The diquat that would remain available for potential human exposure would not be readily absorbed across human skin. Again the rationale is based on diquat being a highly ionized molecule which does not readily penetrate biological membranes.

Chevron also states that the acute toxicity profile of diquat is such that the diquat that is biologically available would not pose an undue risk. Diquat is a Toxicity Category II pesticide by the dermal and oral route of administration. The pesticide is in Toxicity Category III for acute inhalation exposure. Diquat is in Toxicity Categories II and IV for eye irritation and primary skin irritation, respectively. Chevron reviewed inquiries to its Chevron Emergency Information Center and did not find claims of systemic poisoning from dermal exposure to diquat.

Ethylene Dibromide (EDB) is a contaminate of diquat at levels that can not exceed 10 ppm of the final product. At the maximum label application rate of 1.5 ppm diquat, the maximum EDB concentration is approximately 20 ppt prior to any degradation or evaporation. Chevron calculated MOS's of 200,000 to 330,000 based on a NOEL of 2.0 mg/kg/day from a rat subchronic inhalation study. Chevron did not address the oncogenic issue regarding EDB.

Chevron concluded that the low degree of potential exposure to diquat and EDB are such that no adverse health effects would result from exposure to diquat-treated water.

## 3.0 DISCUSSION

The Science Analysis and Coordination Branch has reviewed various OPP evaluations of diquat. The evaluations are generally consistent with Chevron's evaluation of the physical/chemical and toxicity properties of diquat. The Environmental Fate and Groundwater Branch evaluated a variety of diquat environmental

fate studies. EFGWB concluded that diquat will readily bind to soil sediments, even when the soil is 92% sand (EFGWB #90315, P. Mastradone to L. Schnaubelt, 21 February 1989).

The Toxicology Branch chapter of the diquat registration standard (Doherty, J. to R. Mountfort, 4 February 1986) identifies the acute oral LD<sub>50</sub>-rats, acute dermal LD<sub>50</sub>-rabbits, acute inhalation LC<sub>50</sub>-rats, primary eye irritation-rabbits, and primary dermal irritation-rabbits as data gaps. The chapter states that the available data however, defines the approximate LD<sub>50</sub>'s for the dermal and oral routes. The data gaps derive from the existing studies inadequately defining the onset and duration of symptoms or the cause of death. The science chapter also concludes that based on available metabolism and pharmacokinetic data, diquat is poorly absorbed from the gastrointestinal tract. The Toxicology Branch "one-liners" list the oral and dermal LD<sub>50</sub>'s of diquat as Toxicity Category II but did not assign categories for the one primary eye study and one primary dermal irritation study evaluated. The "one-liners" also refer to a dermal penetration study and concluded that the dermal absorption of diquat through human skin is 0.3%.

A risk assessment was also conducted for the EDB contamination of diquat (Burin, G., Memorandum to R. Mountfort, 27 September 1984). The assessment concluded that a EDB level of 0.4 ppb in drinking water would produce a lifetime cancer risk of  $6 \times 10^{-4}$  for a 60 kg individual consuming 2 liters of water per day. Since the maximum concentration of EDB in diquat treated water would be 20 ppt or 1/20 of the 0.4 ppb, the lifetime risk would be  $3 \times 10^{-5}$  for an individual consuming 2 liters of treated pond water per day while swimming daily. It is considered highly unlikely that an individual is going to swim in diquat treated water daily and consume 2 liters of that water daily for a lifetime.

#### 4.0 CONCLUSION

Diquat readily binds to soil sediments in treated water and becomes unavailable for human exposure after mixing in the water.

The diquat available for human exposure is poorly absorbed through the human gastrointestinal tract and skin which further reduces the potential internal dosage of diquat.

Diquat is a Toxicity Category II pesticide by the oral and dermal routes of exposure.

The lifetime oncogenic risk to the EDB contaminant in diquat is  $3 \times 10^{-5}$  assuming the ingestion of 2 liters of pond water daily over a lifetime by a swimmer.

Based on these conclusions, the Science Analysis and Coordination Branch does not oppose the label amendment request of Chevron Chemical Company to remove the 14 day swimming restriction from the Ortho Diquat Water Weed Killer label. The Science Analysis and Coordination Branch will support the removal of the 14 day swimming restriction only if a 24 hour swimming restriction is required. The 24 hour restriction is to permit mixing of diquat throughout the water and subsequent binding to soil sediments and plant material in the water. The 24 hour restriction is derived from the proposed 40 CFR Part 170 regulations which would require a 24 hour interim reentry interval for pesticides with a LD<sub>50</sub> in Toxicity Category II. Chevron may elect to submit data on available concentrations of diquat in treated water after application. HED would evaluate this data and if necessary refine the 24 hour restriction.



Curt Lunchick

Reregistration and Special Review Section  
Science Analysis and Coordination Branch  
Health Effects Division (H7509C)