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MEMORANDUM

SUBJECT: Carbofuran poisoning statistics, HED Project No. 1-0678

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I. Introduction

In response to the request from the Special Review Branch, the Occupational and Residential Exposure Branch (OREB) has prepared a summary of poisoning statistics on carbofuran pointing out opportunities for risk mitigation.

II. Detailed Considerations

Mortality

During four years (1961, 1969, 1973, 1974), when all accidental deaths due to pesticides in the U.S. were counted, there were no deaths due to carbofuran (1). No accidental carbofuran deaths were reported in California from 1965 to 1977 or from 1982 to 1988 when all accidental deaths from pesticides were reported (2).

(1)

Hospitalized poisonings

The only available national source of data on occupational pesticide poisoning is the Third National Study of Hospitalized Pesticide Poisonings in the United States, 1977-1982 (3). This study funded by EPA, sampled 6 percent of the nation's hospitals and examined hospital records. On 38 percent of the hospital records the individual pesticide chemical could not be identified. Of the 814 estimated cases of occupational hospitalized poisoning per year during the 6 year period, 29 (3.5%) were due to carbofuran which ranked 4th among all the pesticides. This estimate is based on 14 observed cases and is subject to significant error, especially with the large percentage of unknown pesticides. When all types of poisonings are considered together (occupational, non-occupational, and intentional), carbofuran was responsible for an average of 34 cases per year which ranked 13th among all the pesticides.

California occupational poisoning data

The California Department of Food and Agriculture (CDFA) reported the total of occupational poisonings due to pesticides used in agriculture from 1980 through 1986 (4). These reports are based on physician diagnosed cases which must be reported to the State under California law. With 18 poisonings, carbofuran ranked 12th as a cause of systemic illness. In a separate study, the CDFA assessed the number of hospitalized pesticide poisonings during the same time period, counting the number of occupational cases, whether agriculturally-related or not (5). Aldicarb was responsible for 3 hospitalizations over the 7 year time period which ranked it 16th among all pesticide chemicals. From 1980 to 1986, 13 workers took off work for a total of 37 days due to carbofuran illness. Carbofuran was the 19th highest pesticide, in terms of numbers of workers off work. Another study by the California Dept. of Health Services identified six illnesses due aldicarb from 1982 through 1985 (6). Three of these six cases involved a relatively short period of exposure prior to illness of 3 days or shorter. Three of the six cases were categorized as accidents defined as events leading to massive exposure such as mechanical failures, hose breakage or spillage. In five of the six cases some type of safety violation was thought to be a contributing factor.

A study of 3,963 systemic poisonings in California from 1980 through 1986 compared number of cases with number of applications reported for the same time period (7). In California, applications of all restricted and nonrestricted pesticides by certified applicators must be reported. This preliminary analysis used cases that were confirmed as pesticide-related but not necessarily confirmed as definite or probable poisonings. Out of the total 3,963 cases analyzed, only 42 percent were considered definite or probable based on the older definitions used by CDFA. CDFA adopted

new definitions for these terms starting in 1987-88, which it is now using to reassess poisonings due parathion and mevinphos. Thus, the following analysis is preliminary, based on the older definitions, considered less reliable than those CDFA now uses and assumes that accuracy and reliability of reporting is independent of type of pesticide chemical.

The analysis included only those pesticides which had been responsible for two or more hospitalizations during the 1980 through 1986 time period. Carbofuran was responsible for 0.9 poisonings per 1,000 applications, above average compared to most other pesticides examined.

Table 1. Occupational pesticide illness in California from 1976 to 1987, by worker activity and type of illness.

Worker Activity	Systemic	Eyes	Skin	Total
Mixer/loader	12	5	0	17
Applicator	4	1	0	5
Exposure to residue on commodities	5	0	0	5
Coincidental exposure	3	0	1	4
Exposure to concentrate	2	0	0	2
Other	5	0	0	5
Total	31	6	1	38

As can be seen from table 1, most of the illness attributed to carbofuran in California are related to mixing and loading the pesticide, or 45 percent of the total. Reentry into treated fields has not been a problem in California. From 1976 to 1988, there have not been any reentry-related illnesses due to carbofuran. Residue can be a problem though as evidenced by the 5 poisonings due to exposure to residue on commodities.

III. Conclusion

Risk reduction measures for carbofuran appear warranted due to the above average incidence of occupational poisoning. California data suggest that application, mixing and loading, and other activities involving direct contact with the carbofuran pose the greatest risk.

Exposure mitigation

OREB has reviewed carbofuran labels provided in the 1990 Crop Protection Chemicals Reference book. A summary of protective clothing requirements are as follows:

1) FMC Furadan 3G, 3 % a.i., Tox Category II. Wear long-sleeve clothing and protective gloves when handling.

2) FMC Furadan 4F, 44 % a.i., Tox Category I. Wear a pesticide respirator jointly approved by MESA and NIOSH. Wear goggles or face shield for eye protection when measuring or mixing. Wear long-sleeve clothing and protective gloves when handling.

3) FMC Furadan 5G, 5 % a.i., Tox Category II. Wear long-sleeve clothing and protective gloves when handling.

4) FMC Furadan 15G, 15 % a.i., Tox Category II. Wear long-sleeve clothing and protective gloves when handling.

5) Mobay Furadan 3G, 3 % a.i., Tox Category II. Wear long-sleeve clothing and protective gloves when handling.

6) Mobay Furadan 4F, 44 % a.i. Tox Category I. Protective clothing language identical fo FMC's, but buried after the use information. There is protective clothing language for field workers at the beginning of the labelling under recommended applications, which is prior to the use information.

All FMC and Mobay labels warn the user to wash after use, change clothing and bathe at the end of the day.

OREB recommends that the labelling for both companies products be upgraded and made consistent with the proposed Part 156 and Part 170 regulations. Such action will occur upon release of the Worker Protection Regulations, but should be speeded up for carbofuran. Mobay must make the signal words prominent and place them under the ingredients listing where users expect it. It is possible for a user to handle Mobay's Furadan 4 F and not know it is a Toxicity Category I pesticide.

The Furadan 4F and any other Toxicity I products must require the handlers to wear fabric coveralls worn over long sleeve shirt and long legged pants, socks, chemical resistant footwear, and chemical resistant gloves. The granular and other Toxicity Category II products must require the handlers to wear fabric coveralls over shirt and pants, socks, chemical resistant footwear, and chemical resistant gloves. The shirt and pants for these products may be long or short.

There is currently ambiguity as to which job functions constitute handling. Many users define it as mixing/loading only and therefore the current labels would leave applicators unprotected. Consistent with the proposed 40 CFR Part 170

regulations, the labels must clearly define handlers as any person who mixes, loads, transfers, applies, disposes of, or transports opened containers of carbofuran; who acts as a flagger; who cleans, adjusts, or repairs the parts of equipment containing carbofuran residues; or who enters an area being treated to assist in the application of carbofuran.

OREB would defer any action regarding the respirator requirement for Furadan 4F pending completion of the respirator decision logic selection guide. This selection guide will permit one to determine if a respirator is actually necessary based on both toxicity and potential exposure. OREB believes respirators should be on labels only if absolutely essential and then only if OPP is convinced they will provide realistic protection.

References

1. Hayes WJ, Vaughn WK. Mortality from pesticides in the United States in 1973 and 1974. Toxicology and Applied Pharmacology 42:235-252, 1977.

2. From various reports issued by the California Department of Food and Agriculture, Worker Health and Safety Branch, Sacramento, California. Included are reports number HS-322, HS-544, HS-545, HS-985, HS-1098, HS-1186, HS-1188, HS-1304, HS-1305, HS-1370, HS-1371, HS-1418, HS-1493, and HS-1541.

3. Keefe TJ, Savage EP, Wheeler HW. Third National Study of Hospitalized Pesticide Poisonings in the United States, 1977-1982. Unpublished report. (Colorado State University, Fort Collins, Colorado) 1990.

4. Edmiston S, Krieger R. Ranking of pesticides according to the number of systemic illnesses related to agricultural pesticide use in California, 1980-1986. Unpublished report. (California Department of Food and Agriculture, Sacramento, California)

5. Edmiston S. Pesticide-related illnesses/injuries ranked by number of persons hospitalized, 1980-1986. Unpublished report. (California Department of Food and Agriculture, Sacramento, California).

6. Brown SK, Ames RG, Mengle DC. Occupational illness from cholinesterase-inhibiting pesticides among agricultural applicators in California, 1982-1985. Archives of Environmental Health 44:34-39, 1989.

7. Blondell JM. MEMORANDUM: Pesticide Poisoning Information on Parathion and Mevinphos. May 19, 1988.

cc: Larry Dorsey (SACB)
Carbofuran File
Correspondence File
Circulation