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Committee on Water Quality Criteria

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This printing is an advance copy for forthcoming report EPA-R3-73-033, "Water Quality Criteria, 1972". It has been prepared in limited quantities without indices and final proofing in order to accomodate the orderly review and comment on EPA's proposed Water Quality Criteria required by the "Federal Water Pollution Control Act Ammendments of 1972". Notice of Availability of EPA's Water Quality Criteria was published in the Federal Register on October 26. These copies will be supplemented with indices which were still under preparation at the time of this printing.

MONS 041400

EPA Review Notice

This report was prepared under a contract financed by the United States Environmental Protection Agency and is approved by the Agency for publication as an important contribution to the scientific literature, but not as its sole criteria for standards setting purposes. Neither is it necessarily a reflection of the Agency's views and policies. The mention of trade names or commercial products does not constitute endorsement or recommendation for their use.

MONS 041401

POLYCHLORINATED BIPHENYLS (PCB)

Polychlorinated biphenyls (PCB) consist of a mixture of compounds only slightly soluble in water; highly soluble in fats, oils, and nonpolar liquids; and highly resistant to both heat and biological degradation. PCB have a wide variety of industrial uses, primarily as insulating fluid in electrical and heat transfer equipment (Interdepartmental Task Force 1972).[821]

Exposure to PCB is known to cause skin lesions (Schwartz and Peck (1943)[820] and to increase liver enzyme activity that may have a secondary effect on reproductive processes (Risebrough et al. 1968,[817] Street et al. 1969,[821] Wassermann et al. 1970[824]). It is not clear at this time whether the effects are due to PCB or its contaminants, the chlorinated dibenzofurans that are highly toxic (Bauer et al. 1961,[807] Schulz 1968,[819] Verrett 1970[824]). It is also not known whether the chlorinated dibenzofurans are produced by degradation of PCB as well as during its manufacture.

The occurrence of PCB in our waters has been documented repeatedly (*New Scientist* 1966,[815] Holmes et al. 1967,[816] Risebrough et al. 1968,[817] Jensen et al. 1969,[818] Koeman et al. 1969,[818] Schmidt et al. 1971,[816] Veith and Lee 1971[824]). They have been associated with sewage effluents (Holden 1970,[820] Schmidt et al. 1971[816]) and rainwater (Tarrant and Tatton 1968),[822] as well as releases and leakage. Failures of closed systems using PCB have caused some of the more well known releases (Kuratsune et al. 1969,[814] Duke et al. 1970[809]). It has been reported that the defined treatment process does little or nothing to remove PCB (Ahling and Jensen 1970).[806]

An epidemiological study on severe poisoning by rice oil contaminated with polychlorinated biphenyls in 1968 indicated that about 0.5 grams ingested over a period of approximately one month was sufficient to cause the *Yusho* disease. Many of those affected showed no signs of relief after about three years (Kuratsune et al. 1969).[814] Price and Welch (1971)[816] have estimated on the basis of 194 samples that 41 to 45 per cent of the general population of the U.S. may have PCB levels of 1.0 mg/kg or higher (wet weight) in adipose tissue. Therefore, it appears that PCB may accumulate in the body. On this basis it can be calculated that a daily intake of 0.02 mg would require about 70 years to be toxic. Applying a factor of safety of 10 would permit a daily intake of 0.002 mg, and assuming a two liter per day intake, suggests a permissible concentration in water to be 0.001 mg/l.

However, evaluation of the retention and accumulation of PCB from water instead of oil in humans is highly desirable. A study on rats with a single oral dose of 170 mg/kg showed urinary excretion (of PCB) to be limited, while 70 per cent of the dose was found in the feces during an eight week period (Yoshimura et al. 1971).[824] Information on PCB in the diet would also be helpful.

Conclusion

Because too little is known about the levels in waters, the retention and accumulation in humans, and the effects of very low rates of ingestion, no defensible recommendation can be made at this time.

MONS 041402