

## Book Reviews

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### *Kepone/Mirex/Hexachlorocyclopentadiene: An Environmental Assessment,*

A report prepared by the Coordinating Committee for Scientific and Technical Assessment of Pollution, the (U.S.) National Research Council (NRC), National Academy of Sciences (NAS), Washington, D.C. 20418, 1978, 73 pp. L.C. No: 78-58517; ISBN No. 0-309-02766-7.

Three relatively minor chemicals, of limited use, but with a major impact in the United States were examined closely by the National Academy. Two of these chemicals were the subject of papers in the 1978 U.S. National Conference on Control of Hazardous Material Spills in Miami, Florida: (1) Kepone, discharged into Hopewell, Virginia's sewer system and Chesapeake Bay, was (and still is) the center of much concern because of the contamination it caused; (2) in contrast to kepone's chronic discharge, hexachlorocyclopentadiene suddenly appeared in Louisville, Kentucky's sewer system contaminating much of that system as well as the wastewater treatment plant resulting in the forced discharge of 15 million gallons a day of raw sewage directly in the river without treatment. In December, 1976, NRC appointed a panel on Kepone/Mirex/Hex and "charged" them with providing the U.S. Environmental Protection Agency (EPA) with a critical assessment of the available scientific and technical knowledge of the ecological and human health effects of kepone, mirex and hexachlorocyclopentadiene (hex) as environmental pollutants — and to suggest areas where additional research was needed to provide a sounder basis for future regulatory action by EPA.

This short, but well written and documented book, has three chapters: (1) environmental distribution, transport and fate of kepone, mirex and hex, (2) exposure to humans and estimates of consequent risks and (3) environmental considerations. Prefacing the final chapters are two sections: (1) findings and research needs and (2) overview. One of the paragraphs in the first section on needs for future work is worth repeating: "In comparison with other environmental contaminants such as dieldrin, DDT and PCB's, the scientific literature about kepone, though growing, is incomplete; the knowledge of residue distribution and acute or chronic effects of mirex is substantial; and data on the environmental significance of hex are scarce. However, despite the relatively small quantities of kepone and mirex that have been released into the environment in the United States, environmental levels of these compounds are disproportionately high. Thus, while the magnitude of the hazards to human health and the environment posed by these residues cannot be determined accurately, assuming the worst set of circumstances, they could be substantial."

Kepone, mirex and hex are structurally quite similar. Starting with hex, one can obtain kepone by sulfonation followed by hydrolysis, or get mirex using  $\text{AlCl}_3$  plus hex. Alternatively, one can obtain mirex from kepone by reacting

with  $\text{PCl}_5$ . But their properties are different: kepone has a water solubility of 2000 ppb, hex 800 ppb and mirex only 1 ppb. All are difficult to identify; methods do exist to quantify kepone and mirex but not hex.

Kepone was used in South America for bananas and was put into U.S. ant traps. Mirex was used extensively in the U.S. against fire ants in the South. Hex is normally used as a precursor for other products. None was produced in major quantities (at least when compared to major commodities of the chemical industry; only  $1.5 \times 10^6$  kg of mirex were produced from 1959 to 1975) but all three have had a major environmental impact as indicated before (kepone and hex especially). A chart in the book reveals major areas of Lake Ontario, especially near the major cities (Niagara Falls, Rochester and Oswego) that have mirex concentrations in the sediment in excess of 10 ppb.

Although much information is contained in the book about these three chemicals, much is still unknown as evidenced by the final paragraph: "When analyzed according to the above criteria, there are simply too few data cogent, generalizations concerning the environmental impact of kepone, mirex and hex. In relative terms, there is growing, though incomplete literature, concerning kepone, there is a substantial body of knowledge of acute and chronic effects and residue distribution of mirex, and little is known with regard to the environmental significance of hex."

In summary, I think this short, readable, assessment of these three chemicals that have been so much in the news, should be read by those dealing with hazardous (toxic) chemicals. What can happen when toxic chemicals are used or misused must be always before us who produce, disseminate and apply them to the environment.

This book clearly elucidates what is known and not known about the human and environmental impact of three such toxic substances.

GARY F. BENNETT

*Drinking Water Detoxification*, edited by M.T. Gillies, Noyes Data Corporation, New Jersey, 1978, 348 pages, \$48.

The book summarises the new drinking water regulations proposed by the United States Environmental Protection Agency (USEPA) and the critical response by the American Water Works Association (AWWA) to these proposals. Amendments to the regulations on trihalomethanes and on organic compounds proposed by the Office of Water Supply Criteria and Standards Divisions of the USEPA are also presented. Processes for the removal of potentially harmful organic compounds from drinking water are outlined and special emphasis is given to the use of granular activated carbon by summarising the "Interim Treatment Guide for Controlling Organic Contaminants in Drinking Water using Granular Activated Carbon (GAC)" issued by the US Environmental Protection Agency. This guide contains discussions on the performance of