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978-0-521-10564-4 - The Scientific Management of Hazardous Wastes

C. B. Cope, W. H. Fuller and S. L. Willetts

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W.H. FULLER

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Our interest in conclusions has been so great that the method of reaching them has been neglected: it mattered little how much prejudice or blind acceptance of authority was connected with them, so long as they were understood and remembered.

F.M. McMurry, 1909

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Introduction

The problems of the safe management and disposal of hazardous industrial waste have become widely recognised in the last few years. Public outcry and concern as a result of environmental damages caused by the uncontrolled dumping of hazardous wastes persuaded government authorities to devote resources to the scientific study of the environmental aspects involved. Much of this research has now been described in the scientific literature, though, naturally, the studies are continuing.

In this book, three independent scientists examine the results of these studies and the legislative framework which form the basis of hazardous waste disposal. The limits of our scientific knowledge are carefully defined and the ways in which this knowledge is extrapolated and applied to hazardous waste management are examined. Significant areas of uncertainty are identified and the authors have not been afraid to draw attention to the fallibility of certain interpretations.

For example, the current UK legislation is described and attention is drawn to loopholes in the laws and dual standards applied by the controlling authorities. In the chapters which examine British research work on disposal sites and test cell studies, anomalies are described in the methods used to collect and analyse samples. These anomalies may have led British authorities to underestimate the pollution hazards and environmental dangers which may result from current British disposal practices. The characteristic properties of landfill leachates are described and the near impossibility of treating leachates to conform to acceptable discharge standards is explained.

Clays and soils are often relied upon to attenuate the pollutants leaching from hazardous wastes. The book reviews research studies in this field and questions the reliability of the interpretations being made about British

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findings. American studies of geochemistry are examined in detail and the factors which affect pollutant attenuation are identified. Many of these factors are outside man's control in landfill situations. Environmental health aspects of hazardous waste are discussed, together with the methods used for measuring toxicity. The difficulties of studying toxic effects of pure chemicals are compounded when researchers have to pass judgement on heterogeneous mixtures of chemical wastes and their decomposition products.

Alternative methods to the landfill of hazardous wastes are examined and compared. Chemical treatment methods and incineration are reviewed and available capacities identified. The methods used for risk assessment are examined and their applicability to waste management is questioned. Costs and benefits are compared and the economic, risk and legal aspects of alternatives to landfill of hazardous waste are examined. The reasons why public acceptance and perception of risks will play an increasing role in future developments are discussed.