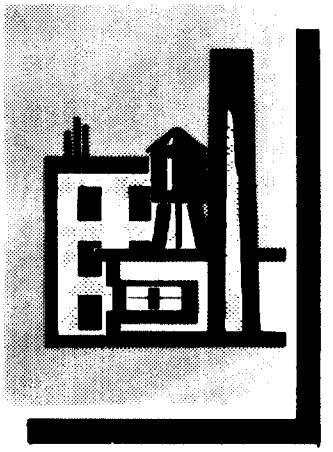
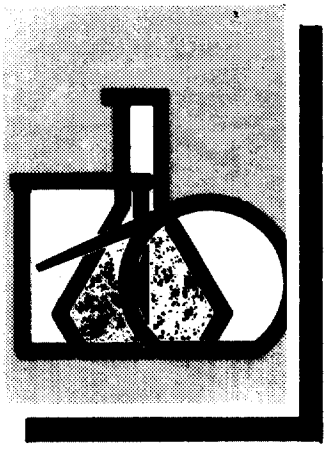
NIOSH

SPECIAL OCCUPATIONAL HAZARD REVIEW





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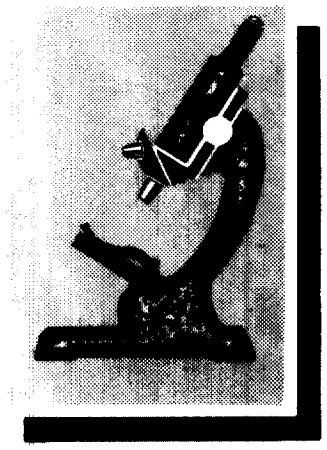

U. S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
Public Health Service
Center for Disease Control
National Institute for Occupational Safety and Health

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FOR

DDT

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Public Health Services
Center for Disease Control
National Institute for Occupational Safety and Health
Division of Criteria Documentation and Standards Development
Rockville, Maryland

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Mention of company names or products does not constitute endorsement by the National Institute for Occupational Safety and Health.

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PREFACE

The Occupational Safety and Health Act of 1970 emphasizes the need for standards to protect the health and safety of workers exposed to an ever-increasing number of potential hazards in their workplace. Pursuant to the fulfillment of this need, the National Institute for Occupational Safety and Health (NIOSH) has developed a reporting strategy intended to assist employers in providing personal protection for employees from exposure to carcinogenic, mutagenic, and teratogenic substances. This strategy involves the development of Special Occupational Hazard Reviews which serve to support and complement the other major criteria documentation activities of the Institute. It is the intent of a Special Occupational Hazard Review to document, from a health standpoint, the problems associated with a given industrial chemical or process. While Special Occupational Hazard Reviews are not intended to supplant the more comprehensive NIOSH Criteria Documents nor the less comprehensive NIOSH Current Intelligence Bulletins, they are nevertheless prepared in such a way as to be amenable to full regulatory usage if so desired. Dissemination of Special Occupational Hazard Reviews may be accomplished through appropriate trade associations, unions, industries, and members of the scientific community.

J. Michael Lane

J. Michael Lane, M.D.
Acting Director, National Institute
for Occupational Safety and Health

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The Division review staff for this document consisted of Jon R. May, Ph.D. (Chairman), J. Henry Wills, Ph.D., and Charles C. Hassett, Ph.D., consultant.

SUMMARY AND RECOMMENDATIONS

NIOSH, as a World Health Organization (WHO) Collaborating Center for Occupational Health, is participating in a continuing WHO program which involves the establishment of international recommendations for occupational health standards for toxic substances. It is anticipated that one group of substances to be considered will be pesticides. At the present time, the most economically important pesticides are insecticides belonging to the organochlorine, organophosphorus, and carbamate classes. NIOSH has previously documented the criteria for and recommended to the U.S. Department of Labor a series of occupational standards dealing with the widely used insecticides parathion, methyl parathion, malathion, and carbaryl. This document on DDT and a companion document prepared for Aldrin/Dieldrin serve as comprehensive reports on three of the most representative compounds of the organochlorine class of insecticides. Together with the NIOSH criteria documents on the four insecticides previously mentioned, the DDT and Aldrin/Dieldrin reports will form the basis for NIOSH recommendations for international occupational health standards.

DDT is produced and marketed in the United States but its use is restricted to specified applications by the U.S. Public Health Service and Department of Agriculture and for controlling body lice (37 Federal Register 13369, July 7, 1972). More importantly, DDT is widely used in agriculture and for vector control outside the U.S., although resistance to DDT in agricultural pests has increased since its introduction. Total worldwide use of DDT for the decade 1971-81 is predicted to be 94,000 metric tons/year.

The acute toxicity of DDT is relatively low, the estimated oral LD50 in humans being 250 mg/kg. Documented chronic toxicity in humans, clearly related to DDT, is non-existent, and, therefore, the results of experiments with animals must be used to predict chronic effects that may occur in humans. Most notable of these chronic effects is DDT's potential for producing cancer in animals. DDT has produced an increased incidence of tumors in mice in at least eleven experiments. Most tumors involved the liver but tumors of the lungs and lymphatic system have also been reported. In one experiment with mice, DDT induced an increased incidence of tumors at dietary levels as low as 2 and 10 ppm. In two of three experiments involving rats, increased occurrences of liver tumors of varying degrees of malignancy have been reported.

Based on the demonstrated potential of DDT for inducing tumors in both rats and mice, NIOSH recommends that DDT be controlled and handled in the workplace as a suspected occupational carcinogen and that exposure to DDT be minimized to the greatest extent possible. With regard to airborne exposure, NIOSH recommends that the workplace environmental limit be no higher than 0.5 mg/cu m, which is the lowest concentration detectable by the current NIOSH validated sampling and analytical method (NIOSH method S274). Workers should also avoid skin contact with DDT, as the pesticide can be absorbed through the skin. Percutaneous absorption is substantially increased when DDT is dissolved in organic solvents.