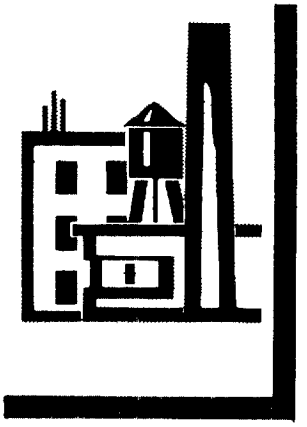
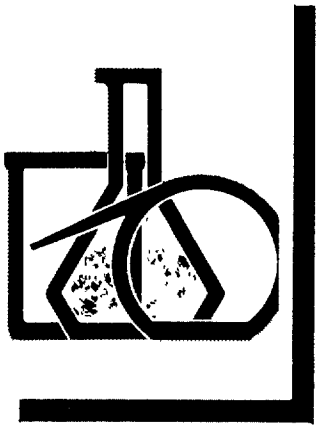
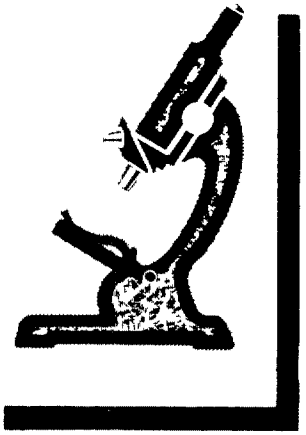
NIOSH

SPECIAL OCCUPATIONAL HAZARD REVIEW







ALDRIN/DIELDRIN

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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Public Health Service
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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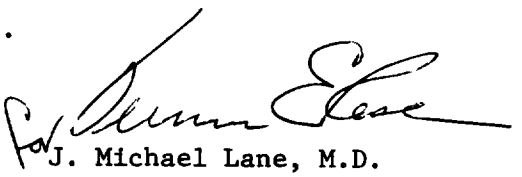
Preface

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 strategy of disseminating information about adverse health effects of chemical or physical agents encountered by workers. This approach is intended to assist employers in providing protection for employees from exposure to these hazards. The Special Hazard Review serves to support and complement the other major standards development or hazards documentation activities of the Institute. The purpose of Special Hazard Reviews is to analyze and document, from a health standpoint, the problems associated with a given industrial chemical, process, or physical agent considered to have a special effect or hazard including a potential for producing carcinogenic, mutagenic, or teratogenic effects, and to recommend the implementation of engineering controls and work practices to alleviate these problems. While the Special Hazard Review is not intended to supplant the more comprehensive NIOSH Criteria Document, nor the brief NIOSH Current Intelligence Bulletin, it is nevertheless prepared in such a way as to assist in the formulation of regulations.



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ACKNOWLEDGMENTS

Jimmy L. Perkins, M.S. of the Division of Criteria Documentation and Standards Development, Priorities and Research Analysis Branch, had program responsibility for this document and served as project officer. Clement Associates, Inc. under sub-contract to JRB Associates, Inc. developed the basic information for consideration by NIOSH staff and consultants under Contract 210-77-0006.

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 Aldrin/Dieldrin and a companion document prepared for DDT 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 Aldrin/Dieldrin and DDT reports will form the basis for NIOSH recommendations for international occupational health standards.

Although aldrin and dieldrin are no longer produced in the U.S., they may still be utilized for certain restricted uses, including subsurface ground insertion for termite control, dipping of non-food roots and tops, and mothproofing by using closed-system manufacturing processes (39 Federal Register 37246, October 18, 1974). Though the use of aldrin and dieldrin is banned in many foreign countries, these

insecticides are still manufactured in a number of European countries and are used throughout the world for public health purposes.

Although aldrin and dieldrin are more acutely toxic to humans than DDT, their acute oral toxicity is nevertheless quite low. The estimated human oral LD50 for the two insecticides is approximately 65 mg/kg. Like DDT, documented chronic toxicity in humans, clearly related to aldrin or dieldrin, is non-existent. Results of animal experiments, however, do indicate that aldrin and dieldrin have considerable potential for carcinogenic effects in humans. Aldrin and dieldrin were carcinogenic in mice in 20 experiments, having produced increased incidences of tumors, usually in males and females independently. Dieldrin, at dietary doses as low as 0.1 and 1 ppm, caused significant increases in both lung and liver tumors in mice. In 6 of 8 experiments with rats, aldrin and dieldrin induced the development of significantly more tumors than appeared in control rats though the sites of the tumors were inconsistent among the experiments.

Based on the demonstrated potentials for induction of tumors in both rats and mice by aldrin and dieldrin, NIOSH recommends that these two pesticides be controlled and handled in the workplace as suspected occupational carcinogens and that exposure be minimized to the greatest extent possible. With regard to airborne exposure, NIOSH recommends that workplace environmental limits no higher than 0.15 mg/cu m be established for both compounds. The recommended exposure limit is the lowest concentration detectable by the current NIOSH validated sampling and analytical methods (NIOSH methods S275 and S283). Workers should also avoid skin contact with aldrin and dieldrin, as these pesticides

can be absorbed through the skin. Percutaneous absorption is substantially increased when aldrin and dieldrin are dissolved in organic solvents.

CONTENTS