Statement of

Dr. John F. Finklea, Director
National Institute for Occupational Safety and Health
Center for Disease Control
Department of Health, Education, and Welfare

Before the
Subcommittee on Agricultural Research and General Legislation
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16. Abstract (Limit: 200 words) This testimony concerns the role of a Task Group organized to investigate the effects of pesticide exposure on field workers in the United States in early 1972. The Task Group also examined the entire range of activities with pesticides from manufacture to application. During 1971 (NIOSH) developed a priority list for criteria documents to be developed and transmitted to OSHA for their consideration in setting new occupational health standards. Several organophosphorus insecticides appeared near the top of the list and criteria documents for several of these substances appeared between 1972 and 1976. These documents contain recommendations for permissible exposure limits, medical surveillance, labeling and posting, personal protective equipment and protective clothing, informing employees of hazards, work practices, sanitation, and monitoring and record keeping. NIOSH maintained close contact with the EPA during research on pesticides through a formal interagency agreement. NIOSH also cooperated on an international level in the area of pesticides through the World Health Organization. Letters have been sent to approximately 40 producers of pesticides and formulators requesting information on the use of biologic indicators of exposure, engineering controls, specifications for the conditions under which personal protective devices should be required, the need for medical examinations, work practice procedures, the type of records maintained, and the use of warning devices and labels as part of an effort to develop recommendations for all pesticides in general during their manufacture and formulation.

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Mr. Chairman and Members of the Subcommittee:

I am Dr. John F. Finklea, Director of the National Institute for Occupational Safety and Health (NIOSH). Accompanying me today is Dr. Jon May, senior scientist in the Division of Criteria Documentation and Standards Development. NIOSH has been concerned about the health and safety of workers exposed to pesticides from the earliest days of our existence as an Institute. In 1971, the pending restriction on the use of DDT for crop production and the general concern about other persistent organochlorine insecticides led a number of Federal agencies to predict that the decline in use of these insecticides would be offset by greatly increased production and use of the less environmentally persistent but more acutely toxic organophosphate and carbamate insecticides. Since it was known that methyl parathion and other organophosphate insecticides would replace DDT for controlling insect damage to cotton plants, it was feared that an outbreak of acute pesticide poisonings would occur during the 1972 cotton growing season.

Early in 1972, representatives of the President's Council on Environmental Quality (CEQ) met with representatives of the U.S. Department of Agriculture (USDA), Department of Defense (DOD), the Environmental Protection Agency (EPA), the Department of Interior (USDI), the Occupational Safety and Health Administration (OSHA), and NIOSH. These agencies agreed to participate in establishing a Task Group to investigate the situation and prepare a report. Although the primary thrust of the Task Group was to investigate the effects of pesticide residues on field workers, the Task Group report also focused attention on the entire pesticide industry - from manufacture to field application. The report of the Task Group documented what was known about the effects of pesticide

residues on the health of field workers and provided guidance for investigators concerning the conduct of field reentry research. Due partly to the stimulus provided by the Task Group's deliberations, the Environmental Protection Agency (EPA) promulgated federal pesticide field reentry standards.

During 1971, NIOSH developed a priority list for criteria documents to be developed and transmitted to OSHA for their consideration in setting new occupational health standards. The purpose of this list was to rank order chemicals and physical agents so that the Institute could address their potential occupational hazards on a "worst first" basis. The organophosphorus insecticides, parathion, methyl parathion, and malathion, appeared high up on the priority list, as did the carbamate insecticide carbaryl. Criteria documents for these substances were developed between 1972 and 1976. In addition, some 17 other NIOSH criteria documents, including formaldehyde and ethylene dibromide, have been developed for substances registered as pesticides. We have also completed a Special Occupational Hazard Review on ethylene oxide, which in addition to being a medical sterilant is a registered pesticide.

All of these pesticide criteria documents contain recommendations for (1) permissible exposure limits, (2) medical surveillance (including biologic monitoring for parathion and methyl parathion), (3) labeling and posting, (4) personal protective equipment and protective clothing, (5) informing employees of hazards, (6) work practices, (7) sanitation, and (8) monitoring and recordkeeping. These recommendations cover a great part of the spectrum of pesticide acute toxicity, from the extremely toxic parathion to the relatively non-toxic, but widely used, malathion.

We maintain coordination with EPA during our research on pesticides through a formal interagency agreement. We have been permitted access to EPA's pesticide data and their personnel have reviewed and commented on drafts of our criteria documents. I would like to emphasize that NIOSH recommendations can be used by both OSHA and EPA in their separate regulatory functions. This is exemplified in the case of the NIOSH criteria document concerning coal tar pitch and creosote. Although EPA already regulates creosote as a pesticide, NIOSH decided to include creosote in a criteria document because the health recommendations could be used both by OSHA in governing manufacturing and formulating processes and by EPA in protecting workers applying creosote in the wood preserving industry.

The Institute is also cooperating on an international scale in the area of pesticides, through the World Health Organization (WHO). In 1978, we will be working with several other countries in a WHO-sponsored effort to develop international occupational health standards for various chemicals, including pesticides.

Recognizing that developing recommendations for each of the hundreds of pesticides would be very costly and time consuming, NIOSH decided to develop a recommended occupational health standard to control exposure to all pesticides during their manufacture and formulation. It is during these operations that workers are most likely to be exposed to higher concentrations of pesticides. Recent widely publicized pesticide poisoning cases, such as kepone, leptophos, and DBCP, confirm the need for such a standard. The pesticide standard will contain recommendations on work practices, engineering controls, and medical surveillance that should be useful to employers and employees in both the manufacturing and formulating

segments of the pesticide industry. The recommended standard will also inform the employee of the hazards involved and the signs and symptoms of poisoning. As part of our regular criteria development process, the Institute announced in the Federal Register our intent to develop a recommended standard for pesticides and intermediates and requested that pertinent information be sent to NIOSH.

Letters were also sent to approximately 40 pesticide manufacturers and formulators requesting information on: (1) the use of biologic indicators of exposure, (2) engineering controls, (3) specifications for the conditions under which personal protective devices should be required, (4) the need for medical examinations, (5) work practice procedures, (6) the type of records of occupational exposure currently being utilized, and (7) warning devices and labels. In addition, inquiry was made as to whether a plant visit could be arranged. From these contacts, plant visits were arranged to twelve pesticide manufacturers and formulators. Visits were made to large and small facilities, manufacturing and formulating a variety of pesticides, located throughout the United States. We also contacted the National Agricultural Chemicals Association (NACA), which represents companies responsible for approximately 85 percent of the country's agricultural chemicals business. NACA was requested to assist us in obtaining information from its members that could be used in developing the pesticide criteria document.

A first draft of the pesticides document has been prepared under contract and has received an initial NIOSH review. Later drafts will be reviewed by representatives from industry, labor, academia, and State health departments, other Federal agencies and professional societies. The document is scheduled to be transmitted to OSHA in the summer of 1978. We

believe that adherence to the recommendations contained in the pesticide criteria document could dramatically improve the work environment of exposed employees and reduce the likelihood of future episodes of the kepone, leptophos, and DBCP type.

NIOSH has published two guides to assist employers and employees in working safely with pesticides. The "Health and Safety Guide for Pesticide Formulators" provides employers with guidelines for establishing a health and safety program for pesticide workers and lists OSHA regulations most applicable to pesticide formulating plants. "Working Safely with Pesticides" provides employees with basic information about how to stay safe and healthy when working with these chemicals. We have also developed a registry of over 2000 agricultural chemicals and pesticides listing references to published toxicity data.

NIOSH is also conducting several research projects to learn more about how to identify and prevent chronic health effects of exposure to pesticides. One project will examine pesticide workers with mixed exposures to pesticides in an attempt to determine which of these chemicals produce delayed neurotoxic effects at what levels of exposure. It is expected that greenhouse and nursery workers will comprise the study population because although there have been reports of neurological symptoms among these workers, the symptoms have not been definitely related to occupational exposures.

Another study has examined formulators of organophosphate pesticides in an attempt to identify practical and reliable test methods that could serve as early warning indicators of adverse health effects among these workers. A mortality study is also being conducted of pesticide

formulators to determine whether these workers seem to show excessive cause-specific death rates.

Two recent research grants have been funded by NIOSH to investigate occupational exposures to pesticides. One was conducted by the University of California at Berkeley to identify organophosphorus pesticide toxicity in agricultural field workers and to develop effective procedures to prevent poisoning among these workers who enter pesticide-treated workplaces. The other is now being conducted by the University of Miami to develop and test suitable protective clothing for agricultural pesticide workers.

In addition to the pesticides themselves, the Institute is also concerned about the potential health effects of the so-called inert components of pesticide formulations. Many pesticides work more efficiently when combined with materials which act as wetting or spreading agents, adhesives, penetrants, or emulsifiers. Also, pesticides are in most cases applied in dilute form. Certain household insect sprays are diluted with light petroleum fractions, which serve as solvents for the active ingredients. The Institute has already completed and transmitted to OSHA recommendations for the lower molecular weight aliphatic hydrocarbon solvents, including pentane, hexane, heptane, and octane and refined petroleum solvents, including petroleum ether, mineral spirits, Stoddard solvent, and kerosene. All of these solvents are used in the pesticide industry. In addition, dusts are usually diluted with finely powdered materials such as talc, clay, pyrophyllite, and diatomaceous earth. Although these materials are considered as being inert for pesticide labeling purposes, the Institute is concerned about their potential for producing adverse health effects.

A joint NIOSH-EPA assessment of control technology in the pesticide manufacturing and formulating industries is being conducted under contract with the Stanford Research Institute. The study will document the best available methods to control both occupational and community exposures.

NIOSH has also provided technical assistance to other Federal agencies investigating pesticide exposures. In July 1976, we assisted other Center for Disease Control personnel and the Agency for International Development in evaluating 2,800 cases of pesticide poisoning among workers in the Pakistan Malaria Control Program. Implementation of good work practices and stopping the use of two pesticide formulations halted the epidemic by September. An extensive training program and surveillance system for pesticide toxicity were implemented before the 1977 spraying season.

We also assisted the Department of Agriculture by evaluating their handling of pesticides, herbicides, and rodenticides at the Beltsville Agricultural Research Center. Although no immediate serious health hazards were found, NIOSH made recommendations for controlling exposures to prevent possible long range health effects.

Mr. Chairman, this concludes our summary of NIOSH activities in the area of pesticides. Dr. May and I will be pleased to attempt to answer any questions you or members of the Subcommittee may have.