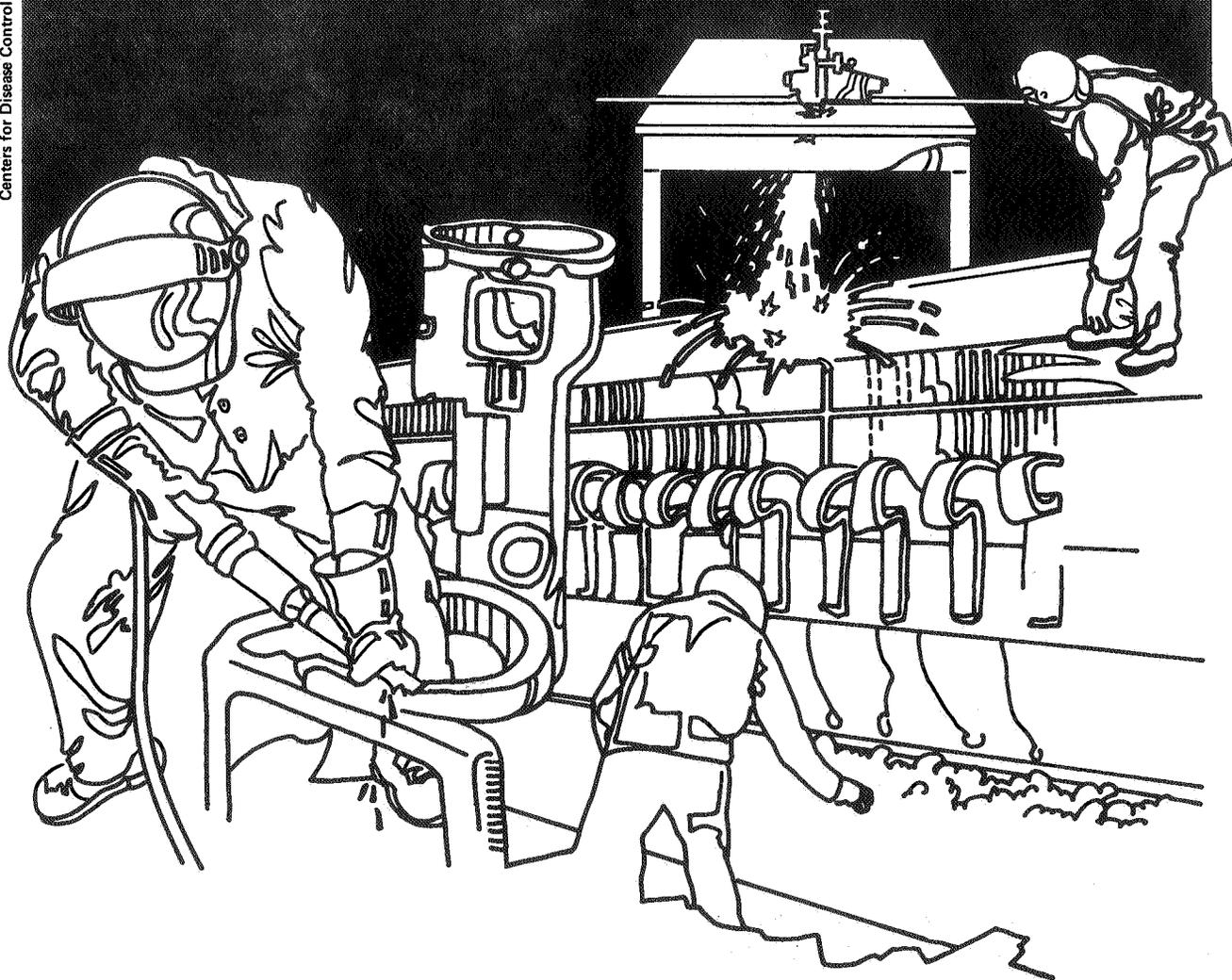


NIOSH



Health Hazard Evaluation Report

HETA 81-013-836
HERCULES INCORPORATED
COVINGTON, VIRGINIA

PREFACE

The Hazard Evaluations and Technical Assistance Branch of NIOSH conducts field investigations of possible health hazards in the workplace. These investigations are conducted under the authority of Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6) which authorizes the Secretary of Health and Human Services, following a written request from any employer or authorized representative of employees, to determine whether any substance normally found in the place of employment has potentially toxic effects in such concentrations as used or found.

The Hazard Evaluations and Technical Assistance Branch also provides, upon request, medical, nursing, and industrial hygiene technical and consultative assistance (TA) to Federal, state, and local agencies; labor; industry and other groups or individuals to control occupational health hazards and to prevent related trauma and disease.

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

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MARCH, 1981
HERCULES INCORPORATED
COVINGTON, VIRGINIA

NIOSH INVESTIGATOR:
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I. SUMMARY

On September 29, 1980 NIOSH received a request from the United Paperworkers International Union, Local 884, for a health hazard evaluation at Hercules Incorporated, Covington, Virginia. The request stated that employees were exposed to dust containing bird droppings and that an employee had contracted a fungal disease, possibly as a result of this exposure.

During a site visit in November, 1980, fourteen dust and soil samples were collected from buildings at the plant and from the backyard of the dwelling of the diseased employee. Using established culture techniques it was determined that one of the samples, collected in a plant warehouse, contained Cryptococcus neoformans. The remaining samples were negative for pathogenic fungi.

Cryptococcus neoformans can cause disseminated fungal disease but since the specific fungus in the diseased employee has not been identified it is impossible to determine whether he contracted disease through exposure in his work-place.

On the basis of the environmental sampling performed at the plant, it was determined that, at the time of the investigation, there did exist a health hazard due to pathogenic fungi in one of the areas surveyed.

Incorporated in this report are recommendations regarding decontamination procedures, measures to prevent the accumulation of bird droppings in the plant warehouses, and information to potentially exposed employees.

KEYWORDS: SIC 3079 (Plastic Film), Cryptococcus neoformans, bird droppings

II. INTRODUCTION

Under the Occupational Safety and Health Act of 1970, NIOSH investigates the toxic effects of substances found in the workplace. The United Paperworkers International Union, Local 884, requested on September 29, 1980 that NIOSH investigate a possible health hazard at Hercules Incorporated, Covington, Virginia. According to the request workers were exposed to dust containing bird droppings and one employee had developed disseminated fungal disease, possibly as a result of this exposure.

III. BACKGROUND

Hercules Incorporated manufactures plastic film from polypropylene. The facilities are situated outside Covington in a semi-rural area. At this site the company has approximately 700 employees. Up until a few months ago the number of employees was 1400. However, due to a fire certain parts of the plant have recently been permanently closed .

The area indicated in the request, "A" building, is a five-story warehouse and storage building approximately 25 years old. On the upper floors various birds, mainly pigeons, have gained access to the interior of the building through broken windows and have reportedly nested in great numbers in certain areas, causing considerable accumulation of bird-droppings and nesting material.

A few years ago an effort was made to exterminate the birds and to clean up the contaminated areas but nesting with subsequent soiling, does still occur.

In the spring of 1980 an employee in the shipping department, which occupies the lower levels of "A" building, was diagnosed as having disseminated fungal disease. The employee was questioned by his physician whether he had been exposed to dust or soil containing bird droppings. The employee reported that several years ago he had worked in the bird infested areas of "A" building. He stated that he had often cleaned off dirt and dust from the objects he was handling and thus may have been exposed to dust containing bird droppings.

Since birds, albeit in lesser numbers than previously, are still infesting the building, the union requested that NIOSH determine whether a health hazard due to dust contaminated with bird droppings is currently present in the areas indicated in the request.

Various pathogenic fungi are found in soil and dust and the presence of bird droppings appears to facilitate and enhance the growth of several species. The most common fungi found in the continental U.S. are Cryptococcus neoformans, Histoplasma capsulatum, Blastomyces dermatitidis and Coccidioides immitis. In many areas, including Allegheny County where Covington is located, pathogenic fungi are commonly found in soil samples indicating a ubiquitous spread of the organism.

Infection is in most cases subclinical with very few overt symptoms and disseminated disease is rare. The actual incidence of infection is difficult to establish. However, concerning the pathogenic fungi for which serological tests have been developed, it has been shown that a considerable proportion of the population in areas where the fungi is present in the soil have been infected.

Infection is commonly caused by inhalation of the spores and in cases of disseminated disease, pulmonary lesions, including cavitation, are common although lesions may occur in practically all tissues and organs.

Serological tests have been developed for blastomycosis, histoplasmosis and coccidioidomycosis, but since cross reactions are common, definitive diagnosis must often rest upon visualization or cultivation of the responsible agent. Such diagnostic procedures are often impossible due to the location of the lesions. According to unpublished reports, disseminated disease may develop several years after initial infection.

V. EVALUATION DESIGN AND METHODS

A. Medical

Union and management representatives were interviewed concerning work practices in the areas indicated in the request and also concerning incidence of fungal disease or severe pneumonia among the employees.

The ill employee was interviewed to determine extent and time period of exposure to dust within the plant. His physician was also interviewed in an attempt to establish a definitive diagnosis. Information was sought concerning prevalence of various fungal diseases in Allegheny County where the plant is located.

B. Environmental

In November 1980, a walk through survey was performed during which several areas with considerable accumulations of bird droppings were identified in various plant buildings. Ten dust and soil samples were collected in these areas. Four soil samples were collected from the immediate area surrounding the dwelling of the ill employee.

The samples were analyzed by the Mycology Division at the Centers for Disease Control using the soil isolation procedures for systemic fungi developed by Toshi et.al¹. This method, which has high sensitivity and specificity, includes intraperitoneal injection of sample homogenate into mice and subsequent subculture of liver and spleen using modified Sabouraud's agar.

VI. RESULTS

A. Medical

During interviews with union and management representatives no reports of additional cases of disseminated fungal disease or severe pneumonia among the employees were obtained. It was stated that the number of employees presently exposed to bird droppings was small but that this number may have been greater in the past. It was also stated that the ill employee had, for the last 6-8 years, been working in an area free from bird droppings.

The attending physician stated that attempts to culture the pathogen from lung tissue obtained at biopsy had been unsuccessful and that the morphological characteristics of the fungi detected in slide preparations were consistent with several of the commonly occurring systemic pathogens.

The company maintains a clinic in the plant, staffed by a nurse. The clinic is equipped to treat minor injuries and complaints. Persons with severe injuries and complaints are referred to a physician. All new employees are examined medically, including a chest and lower-back x-ray. Yearly medical examinations are made available to all employees.

Serological surveys of military recruits from Allegheny county, have shown evidence of infection with Histoplasma capsulatum in 20-30 % of the persons examined. Similar surveys for other fungal diseases have not been performed in the area.

B. Environmental

One of the ten samples collected at the plant was shown to contain Cryptococcus neoformans. It was estimated that the positive sample contained more than 10^5 viable organisms per gram of dust. The remainder of the samples taken at the plant were negative as were the four samples collected in the neighborhood of the ill employee.

The positive sample had been collected in a storage area on the top floor of a warehouse building. At the time of the investigation no employees were working in this area.

Since sampling took place several years after the diseased employee had been last exposed and since fungal pathogens are commonly found in soil samples in Allegheny County it is impossible to establish a causal association between exposure and disease. In addition, the etiologic agent in the ill employee has not been identified. However, pathogenic fungi were present in at least one area in the plant and thus did constitute a health hazard to the employees, who on occasion, were required to enter this area.

VII. RECOMMENDATIONS

Broken windows and other openings should be covered in such a way that it is impossible for birds to gain access to the interior of the buildings in the plant. For areas and buildings where such enclosure is impossible, other appropriate measures such as regular extermination, should be considered.

Areas contaminated with bird droppings and nesting material should be thoroughly cleaned after appropriate disinfection. Specially trained personnel should be utilized for this purpose. They should employ appropriate work practices and should use protective equipment suitable for working with biologically hazardous materials.

Employees that have been working in the area where Cryptococcus neoformans was detected should be informed of their potential exposure so that possible cases of cryptococcosis will receive prompt medical attention.

VIII. REFERENCES

- 1) Davis, Dulbecco, Eisen, Ginsberg, Wood: Microbiology. Harper & Row, Hagerstown, 1973

IX. AUTHORSHIP AND ACKNOWLEDGEMENTS

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X. DISTRIBUTION AND AVAILABILITY

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Copies of this report have been sent to:

1. Hercules Incorporated, Covington, Virginia
2. United Paperworkers International Union, Local 884
3. NIOSH, Region III
4. Regional Administrator, Region III, OSHA

For the purpose of informing the employees of the results of this investigation, the employer shall promptly "post" for a period of 30 calendar days this Report in a prominent place(s) near where employees work.

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