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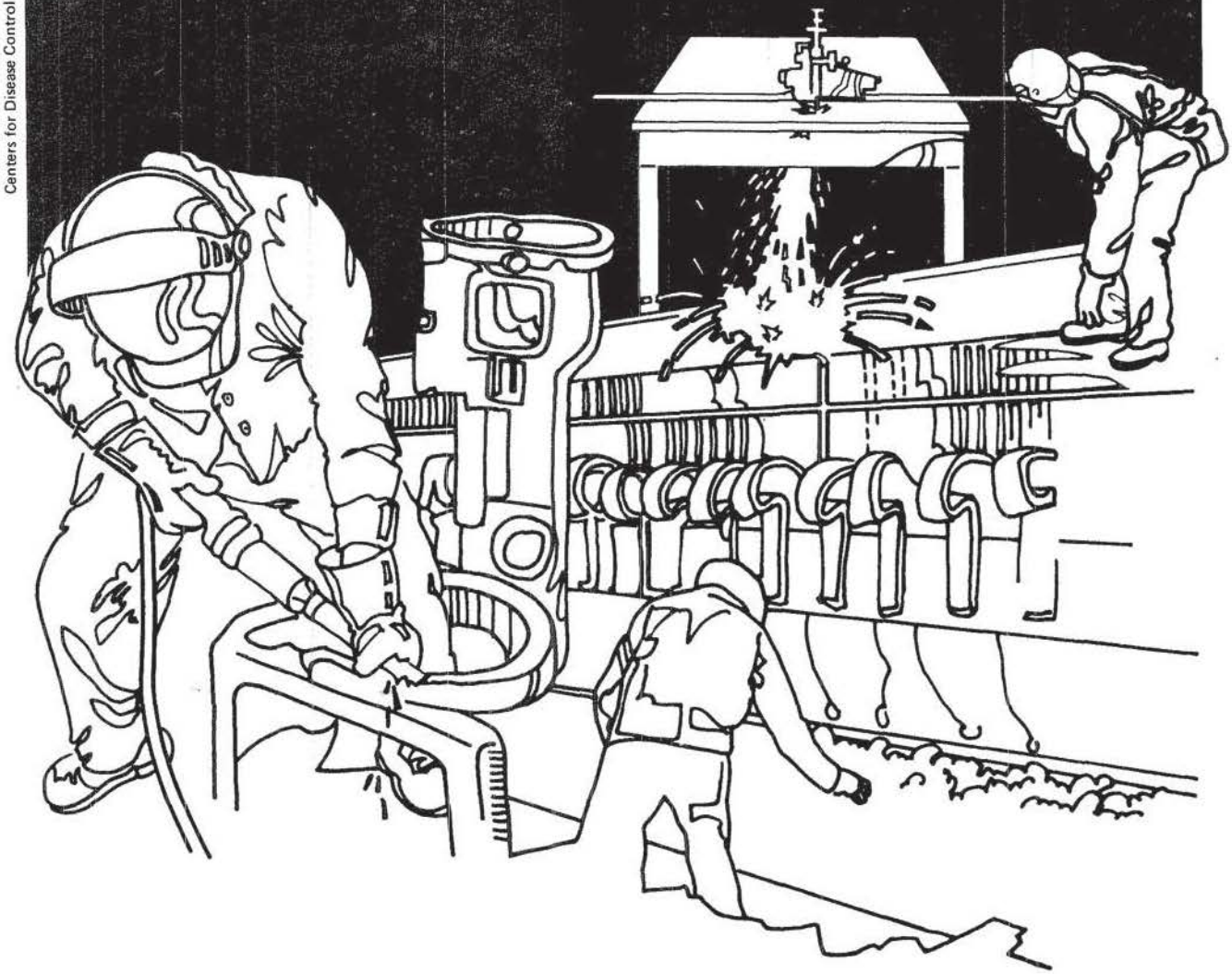

Health Hazard Evaluation Report

HETA 81-044-866
OHIO BUREAU OF EMPLOYMENT SERVICES
XENIA, OHIO

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.

HETA 81-044-866
APRIL 1981
OHIO BUREAU OF EMPLOYMENT SERVICES
XENIA, OHIO

NIOSH INVESTIGATORS:
Eric Jannerfeldt, M.D
Richard Hartle

I. SUMMARY

In October, 1980, the National Institute for Occupational Safety and Health (NIOSH) was requested to investigate a possible health hazard at the office of the Ohio Bureau of Employment Services (OBES) in Xenia, Ohio. The request, which was submitted by the State of Ohio Department of Industrial Relations, stated that in June 1980, there had been two incidents of possibly work-related acute health problems at the facility.

The OBES handles job referrals and unemployment claims. The Bureau, which is located in a modern office building, has 44 employees and is visited by approximately 1000 persons every working day.

In June, 1980, several office employees and some visitors became acutely ill with breathing difficulties, dizziness and nausea. Subsequent environmental investigations, including air sampling, were conducted by the Department of Industrial Relations, the Environmental Protection Agency, Wright-Patterson AFB, Brehm Environmental Laboratories and the Monsanto Chemical Corporation but revealed no causative agent.

NIOSH performed environmental and medical surveys at the facility in January 1981. The ventilation system was investigated by measuring air-flow rates. Considering the often large number of persons present in the office and waiting area and that smoking is permitted throughout the office, it was concluded that deficiencies in the volume and distribution of air were present. No environmental sampling was performed.

During interviews, several employees stated that they experienced adverse health effects related to the office environment, the most common being eye irritation, breathing difficulties and dizziness.

Based on the results of this evaluation, NIOSH determined that a health hazard from exposure to the environment in the office did not exist at the time of this investigation. However, deficiencies in the ventilation system were observed which, in conjunction with high levels of tobacco smoke, may contribute to the adverse health effects periodically reported by a considerable proportion of the employees.

Recommendations to improve ventilation in the office are presented in Section VII of this report.

KEYWORDS: SIC 9441 (Administration of Social, Manpower, and Income Maintenance Programs), office, ventilation, eye irritation, breathing difficulties, dizziness

II. INTRODUCTION

On October 1, 1980, NIOSH received a request from the Ohio Department of Industrial Relations to evaluate possible hazards to employees at the Ohio Bureau of Employment Services (OBES) in Xenia, Ohio. The request stated that employees had experienced acute health problems and that these may have been caused by substances present in the working environment. An Interim Report regarding this evaluation was issued in December, 1980.

III. BACKGROUND

The OBES handles job referrals and unemployment claims. The bureau is situated in downtown Xenia in a one-story office building constructed in 1976. Total area of the office is approximately 6,000 sq.ft. and there are currently 44 employees, of which 34 are female. Over the last year there has been a considerable increase in the number of employees; while the office area has remained the same.

The office is open to the public and is visited by approximately 1000 persons every working day. The average duration of a visit is 30 minutes. During peak periods as many as 200 visitors may be present in the centrally located waiting area.

Smoking is allowed among employees and in designated waiting areas provided for visitors.

On June 26, 1980, several employees and some visitors became acutely ill and were taken to the local hospital emergency room. The predominant symptoms were breathing difficulties, dizziness and nausea. There were reports that an ammonia-like odor had been present in the office. The majority of the ill employees were working in the east part of the building; the area with the highest concentration of employees and visitors. All the ill employees were released from the hospital the same day and clinical diagnostic work failed to reveal any common cause.

The next day there was a renewed occurrence of similar cases of illness. The bureau was then moved to a temporary facility while the environment in the office was investigated by the State of Ohio Department of Industrial Relations, State of Ohio Environmental Protection Agency, Wright-Patterson AFB, Brehm Environmental Laboratories and the Monsanto Chemical Corporation. Draeger tube samples were taken for phosgene, chlorine, phosphine, and hydrogen cyanide. No detectable amounts were found for any of these compounds. Environmental air samples analyzed for benzene, toluene, C_2-C_4 benzene, and general hydrocarbons failed to show any definite environmental cause for the health problem, although the presence of low levels of Freon in the air in the office at the time of the investigations suggested that the symptoms may have been due to a refrigerant leak in the air-conditioning system. The ventilation system was subsequently modified and the air-conditioning system was inspected, cleaned and serviced.

IV. EVALUATION DESIGN AND PROCEDURES

In December, 1980, a NIOSH industrial hygienist and a medical epidemiologist visited the OBES, conducted a walk-through survey of pertinent areas and interviewed representatives of management and of the employees.

Based on information obtained during the initial visit, it was determined that a retrospective determination of the agent responsible for the acute illnesses in June 1980, was impossible. However, an evaluation of the health problems currently reported by the employees was performed.

A. Medical

Interviews were conducted with the employees that had developed acute health problems during the episodes in June, 1980. In addition to describing symptoms experienced during these episodes, information was also obtained concerning current adverese health effects among the employees.

The employees that had experienced work-related health effects were asked to provide names and addresses of the physicians they had consulted. These physicians were contacted and requested to complete a brief questionnaire pertaining to the diagnosis or symptoms and their possible etiology.

B. Environmental

A visual evaluation of the entire facility was conducted in an attempt to locate possible sources of environmental contamination. Items such as insulation materials, photo-copy machines, cleaning substances, and out-side pollution drawn into the facility, were ruled out as causative agents. Based on this inspection, along with the failure of the previous environmental testing conducted by other agencies to identify a definitive causative agent, it was decided that no environmental sampling was to be performed by NIOSH.

Informal conversations with affected employees revealed that the incidences of dizziness, breathing difficulties and eye irritation were generally experienced during periods when "client" visitation was at a peak. As a result, the ventilation system was examined for effectiveness in providing sufficient air exchange.

V. EVALUATION CRITERIA

While no standards exist for required air flow, the American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc. (ASHRAE) make the following recommendations for office buildings:

Air requirements based on floor area of office space:

Outdoor Air: 0.25 to 0.4 cubic feet/min(cfm)/square foot of office space(ft^2)

Total Air: 0.75 to 2.0 cfm/ft^2

Special consideration is given to areas where smoking is allowed. For example, when smokers are present, meeting rooms require 30 to 50 cfm/person of outdoor air.

VI. RESULTS AND DISCUSSION

A. Environmental

Air is supplied to the office area through 10 circular, louvered ceiling supply vents from a central heating and cooling system, and through two rectangular ceiling vents from a heat-pump system. The central-air system vents are positioned through-out the office area, while the heat-pump vents are centrally located. The return air vent for the heat-pump is located in the ceiling, near its supply vents. Two central-air return vents are located in the ceiling at either end of the office area. However, only one of these vents is operational; the other is not connected to the system. The ducting for this vent was not completed, and ends in a janitors closet located at the east end of the office (see Appendix A).

The following Summary Table presents results of air measurments performed in February, 1981.

SUPPLY AIR

Central Air System	3200 cfm
Heat Pump System	7400 cfm
Total	10,600 cfm

RETURN AIR

Central Air System	2300 cfm
Heat Pump System	2400 cfm
Central System/Janitor's Closet	900 cfm
Total	5600 cfm

It was not possible to access the duct-work at appropriate locations of either system to perform air velocity measurements. Therefore, the preceeding figures represent velocity measurements obtained at each supply and return vent and subsequent air volume calculations. These measurements are not as accurate as would have been obtained with air velocity determinations.

Assumming that 200 clients are present in the waiting area and that all return air is recirculated, the outdoor air supply in the office (supply air - return air) would be approximately 20.5 cfm/person, which exceeds the basic recommendation for office areas. However, when considering the close proximity of waiting clients, and the percentage of the clients who smoke, outdoor air recommendations for special circumstances should apply (ie. meeting rooms with smokers). The requirements put forth in this latter recommendation, 50 cfm/person with 30 cfm/person as a minimum, are not satisfied by the ventilation system at OBES.

Smoke tube tests demonstrated that very little air movement existed at the breathing zone level (5-6 ft. above floor level) throughout the office area.

B. Medical

Informal, non-directed interviews were conducted with eight employees, several of whom had become ill in June and had been taken to the local hospital where they had been examined. They had, however, not been informed of the results of the examinations. Regarding the current situation, they stated that the ventilation was inadequate and that the inside temperature often was excessive.

All respondents reported work-related symptoms, the most common being eye irritation, breathing difficulties and dizziness. These symptoms occurred daily and were most severe in the morning, approximately two hours after the office had been opened. They also contended that the problems were more frequent after the modification of the ventilation system that had taken place in July. Several respondents reported that their symptoms were more severe when there were a large number of persons in the waiting area and also stated that the often high concentrations of tobacco smoke in their work areas aggravated their problems.

Eleven physicians that had been consulted by employees with work related health problems were contacted and requested to complete questionnaires. Of the six that responded, three reported that their patients health problems may have been work-related but they were unable to provide specific information regarding symptomatology or etiology. One of them stated that hyperventilation may have been a contributing cause.

C. Discussion

The results of this investigation indicate that several employees are currently experiencing adverse health effects that may be associated with their working environment. Thorough environmental evaluation performed by other agencies has failed to reveal the presence of toxic substances. However, deficiencies in both the flow and the volume of the ventilation system were determined. These deficiencies in conjunction with high concentrations of tobacco smoke may contribute significantly to the symptoms that the employees are experiencing.

VII. RECOMMENDATIONS

Results of the ventilation survey indicate that remedial action is neccessary to complete the return-air duct work and that improvements in the air-distribution system are warranted.

1. Employ the services of a commercial heating and air-conditioning establishment to complete the duct-work for the return air system.

2. Develop methods to increase the down-ward area of effectiveness of the ventilation system; an area of air stagnation was detected throughout the office at the breathing zone level.

3. Smoking should be discouraged both in the office and in the waiting area.

VIII. AUTHORSHIP AND ACKNOWLEDGEMENTS

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IX. DISTRIBUTION AND AVAILABILITY

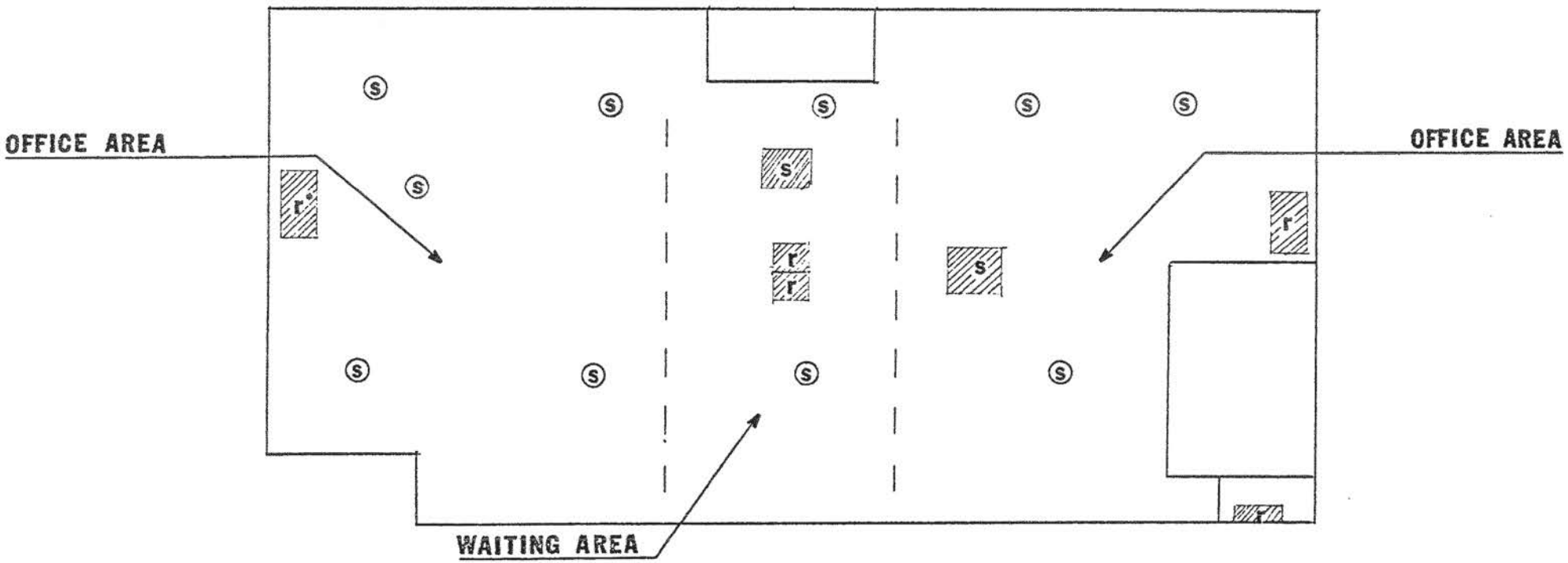
Copies of this Report are currently available upon request from NIOSH, Division of Technical Services, Information Resources and Dissemination Section, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days the report will be available through the National Technical Information Service (NTIS), Springfield, Virginia. Information regarding its availability through NTIS can be obtained from NIOSH, Publications Office at the Cincinnati address.

Copies of this report have been sent to:

1. Ohio Department of Industrial Relations, Columbus, Ohio
2. Ohio Bureau of Employment Services, Xenia, Ohio
3. NIOSH, Region V
4. Regional Administrator, Region V, OSHA

For the purpose of informing the employees at the Ohio Bureau of Employment Services, Xenia, Ohio of the results of this survey, the employer shall promptly "post" for a period of 30 calendar days this Report in a prominent place(s) near where employees work.

APPENDIX A



s – supply air

r – return air

r' – inoperative

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