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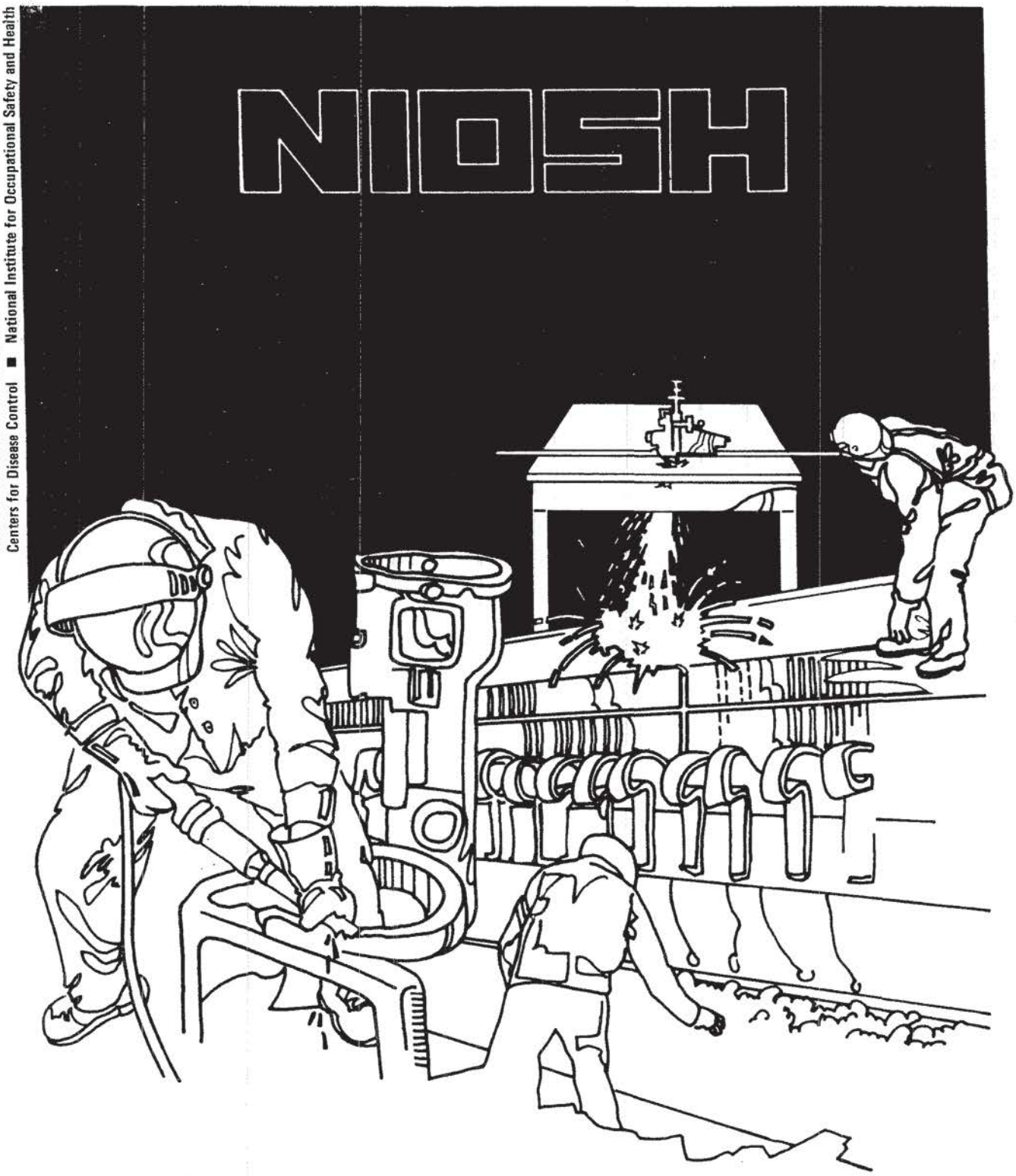

Health Hazard Evaluation Report

HETA 81-012-805
THE BUSINESS PHONE COMPANY
CINCINNATI, 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.

HETA 81-012-805
January 1981
The Business Phone Company
Cincinnati, Ohio

NIOSH INVESTIGATORS:
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I. SUMMARY

On September 30, 1980, the National Institute for Occupational Safety and Health (NIOSH) received and responded to a request for a health hazard evaluation at The Business Phone Company, Cincinnati, Ohio. The request stated that the employees had headaches and eye irritation which they thought might be related to chemical exposures at the workplace.

To determine if these symptoms were work-related, NIOSH conducted an environmental and medical evaluation of these employees. Air quality in the office was evaluated by using direct reading detector tubes. Measurable quantities of formaldehyde, ozone, nitrogen dioxide, and toluene were not found. Carbon monoxide was detected at a level of 4 parts per million (ppm); the NIOSH recommended limit is 35 ppm. No chemical odors from solvents used in a nearby ink manufacturing company were apparent to the investigators while in the office.

Ten of 14 employees interviewed at the time of the investigation noted symptoms which they thought might be attributable to the work environment. The most common symptoms included headache, eye irritation, and lethargy. It appeared that the major factor associated with presence of symptoms was the amount of time an individual spent in the office.

The small quantities of carbon monoxide detected during this investigation are not hazardous, and environmental measurements revealed no other hazardous chemical exposures. The results of employee interviews suggest that symptoms may be work related in that they appear to be associated with amount of time spent in the office. Past NIOSH experience with similar situations has shown that several factors can contribute to development of symptoms, including problems related to ventilation, temperature control, humidity, and cigarette smoke.

KEYWORDS: SIC 3660 (Communications Equipment) sales office, irritation, lethargy, carbon monoxide, formaldehyde, ozone, nitrogen dioxide.

II. INTRODUCTION

On September 30, 1980, NIOSH received a request from three employees of The Business Phone Company, Springdale, Ohio to evaluate reports of eye irritation and headaches among employees. NIOSH investigators responded on the same day and evaluated the workplace by means of environmental samples and employee interviews.

III. BACKGROUND

The Business Phone Company, a subsidiary of Telecom, is a telephone sales company which provides telecommunications systems for area corporate and professional organizations. The office opened in October 1979 and is located in a 10 year old single-story building. There were 17 employees at the time of the study. Four of the employees, a bookkeeper, a secretary-receptionist, a secretary, and a telephone solicitor spent 100% of their work time in the office. The other employees included 5 salespersons, 3 management personnel, and 5 installers, who worked in and out of the office. The company shares a building with 2 other firms, a regional distribution office for a shoe sales company and an ink manufacturing plant. In the past, employees of the shoe company, which is located between the phone company and the ink plant, have noted symptoms which they attributed to emissions from the ink manufacture process. No recent modifications or renovations in the office were reported.

IV. MATERIALS AND METHODS

A. Environmental

A number of substances possibly found in an office can produce headache and irritation to the eyes, nose and respiratory tract. These include carbon monoxide, formaldehyde (from building insulation) and ozone (from duplicating machines). Similar effects can be produced by exposure to toluene and there was a potential for exposure in this office because of its use by a nearby ink manufacturer.

Environmentally, area samples were taken for carbon monoxide, formaldehyde, ozone, nitrogen dioxide and toluene using Draeger detector tubes. Measurements for each of these contaminants were taken at two representative locations in the office. In addition, a cursory evaluation of the ventilation system was conducted.

B. Medical

A NIOSH physician interviewed company employees. Employees were asked about job description, duration of employment, percent of work time spent in the office, and history of smoking and allergy. They were asked if they noted any symptoms which they thought might be related to their work or their place of employment, and specifically, if they noted headache, lethargy or irritation of eyes, nose, throat, or skin.

Because there was some concern that employees' symptoms could be related to vapors from the nearby ink manufacturing plant, we contacted representatives of the ink plant, the adjacent shoe company, and the Springdale City Health Commissioner for information about past exposures.

V. EVALUATION CRITERIA

The three primary sources of environmental evaluation criteria considered in this report are a) NIOSH Criteria Documents with recommended standards for occupational exposure, b) American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Values (TLV's) with supporting documentation, and c) Federal Occupational Health Standards as promulgated by the Occupational Safety and Health Administration (OSHA), U.S. Department of Labor (29 CFR 1910.1000). For the substances evaluated during this study, the primary environmental criteria are listed in Table I. Those which are the most stringent, and thus afford the best health protection for the worker, will be applied.

Occupational health exposure limits for individual substances are generally established at levels intended to protect workers occupationally exposed during an 8 or 10-hour work day, over a normal working lifetime.

VI. RESULTS

A. Environmental

Environmental sampling results appear in Table II. No formaldehyde, ozone, nitrogen dioxide or toluene was detectable; the limits of detection of were 0.5, 0.05, 0.5, and 5.0 ppm, respectively. Carbon monoxide was detected at 4 ppm, which is common in office environments where there is smoking.

Inspection of the ventilation system did not reveal any obvious problems, e.g., contamination of air supply due to improper location of intake and exhaust vents. Complaints concerning the inadequacy of the air conditioning system during the summer months may be due to the relatively greater radiant and conductive heat load of this office since it is the only office in the complex with 3 outside walls.

B. Medical

Interviews were conducted with the 14 employees present in the office on the day of the investigation. Ten of the 14 employees interviewed noted symptoms which they thought might be work-related. The most common symptoms noted included headache, (6/14, 42.9%), eye irritation (6/14, 42.9%), and lethargy (5/14, 35.7%). All four employees who wore contact lenses noted eye irritation when they wore them.

The ten employees who noted symptoms included seven women and three men. Their average duration of employment at the office was 6.3 months

(range 1-12 months). Their average amount of working time spent in the office was 76%, and nine of the ten spent more than 50% of their worktime in the office. Five of the ten symptomatic people were smokers (including one who had quit three weeks previously). Seven had present or past histories of allergy.

Four of the employees did not note symptoms that they thought might be work-related. They included three installers and one sale representative, all male. Their average duration of employment at the office was 4.5 months (range 3-5 months). Their average percent of working time spent in the office was 17%, and all spent less than 50% of their work time in the office. Two of the asymptomatic employees were smokers and two had a history of allergy.

It appears the major factor associated with presence of symptoms at The Business Phone Company is amount of time spent in the office.

There was no apparent association between location in the office or duration of employment in the office and presence of symptoms. There was no apparent association between an individual's smoking habits and presence of symptoms. Some of the employees also noted no seasonal change in symptoms and no association between symptoms and day of the work week. Although there was a higher prevalence of allergy among symptomatic persons, allergic histories included reactions to bee stings and sulfa drugs and contact dermatitis from nickel and poison ivy. Such allergic reactions do not necessarily indicate an individual is at greater risk of developing symptoms from common airborne allergens.

All of the asymptomatic individuals were males, but this finding may be related to job category. The four asymptomatic persons had jobs that required them to spend large amounts of time outside the office. Most of the women employees spent more time in the office than the asymptomatic individuals.

Inquiries at the personnel manager's office of the shoe company revealed that, in the past, employees there have experienced headache, nausea, and watery eyes associated with odors that seemed to come from the adjacent ink manufacturing plant. Those most affected were situated closest to the wall separating the two companies or in the section closest to the ink manufacture area. The ink company was temporarily closed during late 1979 and early 1980 for structural changes to comply with building and fire code regulations. Since their reopening, there have been fewer episodes at the shoe company of symptoms associated with odors. The last such episode reported to the Springdale City Health Commissioner occurred on August 12, 1980.

There is no evidence that the symptoms at the phone company are due to exposure to vapors emitted from the ink manufacturing plant. Unlike the symptoms at the shoe company, the symptoms experienced at the phone company were not associated with an odor or with a geographic pattern of distribution in the office. The shoe company is located between the ink manufacturing plant and the phone company; and, as noted, there have not been any recent complaints of odors or symptoms at the shoe company.

Several of the symptomatic employees at The Business Phone Company offered possible explanations for their symptoms. Some thought their lethargy might be related to the intense heat of the past summer, during which the office air conditioning was inadequate. Eye irritation when wearing contact lenses was noted in one case prior to working in the office, and in another case it was also noted in other situations when exposed to cigarette smoke. Headaches were thought possibly to be related to summer heat, cigarette smoke, or job stress.

In the past, NIOSH has been called upon to investigate similar symptoms in office workplaces. In some of these investigations, no definite causative agent was identified. Rather, it was felt that several factors may have been contributing to the development of symptoms, including problems related to ventilation, temperature control, humidity, and cigarette smoke.

VII. RECOMMENDATIONS

1. Adequacy and efficiency of the ventilation, humidification, and air conditioning systems should be determined and improvements made where necessary.

2. Reorganizing the office into smoking and non-smoking areas might decrease symptoms in non-workers.

3. Affected individuals may benefit from taking work breaks outside the office in the open air.

4. The symptoms noted may be caused by a variety of conditions. It is possible that an individual's symptoms are related to some factor other than a group exposure. It would be unwise for an individual to assume that all symptoms are related to work-related exposures or job stress; and persons experiencing problems which they perceive severe enough to warrant medical attention should seek the advice and consultation of their private physicians.

VIII. AUTHORSHIP AND ACKNOWLEDGEMENTS

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IX. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of this report are currently available upon request from NIOSH, Division of Technical Services, Publications Dissemination, 4676 Columbia Parkway, Cincinnati, Ohio 45226. After 90 days, the report will be available through the National Technical Information Service (NTIS), Springfield, Virginia 21161.

Copies of this report have been sent to:

1. The Business Phone Company
2. NIOSH, Region V
3. OSHA, Region V
4. Health Commissioner, Springdale, O.
5. Cincinnati Shoe Company
6. Springdale Fire Department
7. Southwestern Ohio Air Pollution Control Agency
8. Croda Ink Corporation
9. Linden Medical Group, Inc.

TABLE I

Permissible Exposure Limits for Various Substances
The Business Phone Company
Cincinnati, Ohio

Substance	NIOSH[a]	ACGIH[b]	OSHA[c]
Formaldehyde	1 ppm[d]	2 ppm	3 ppm
Ozone	-----	0.1 ppm	0.1 ppm
Nitrogen Dioxide	1 ppm	3 ppm	5 ppm
Carbon Monoxide	35 ppm	50 ppm	50 ppm
Toluene	100 ppm	100 ppm	200 ppm

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a NIOSH Criteria for Recommended Standards
b American Conference of Governmental Industrial Hygienists Threshold Limit Values (TLV's)
c Occupational Safety and Health Administration Standards
d Parts of substance per million parts of air, by volume.

TABLE II

Results of Colorimetric Samples
The Business Phone Company
Cincinnati, Ohio

September 30, 1980

Substance	Area	Reading (ppm)*
Formaldehyde	Front part of main office	< 0.5
	Rear part of main office	< 0.5
Ozone	Front part of main office	< 0.05
	Rear part of main office	< 0.05
Nitrogen Dioxide	Front part of main office	< 0.5
	Rear part of main office	< 0.5
Carbon Monoxide	Front part of main office	4
	Rear part of main office	4
Toluene	Front part of main office	< 5
	Rear part of main office	< 5

* Parts of substance per million parts of air.

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