U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES ■ Public Health Service
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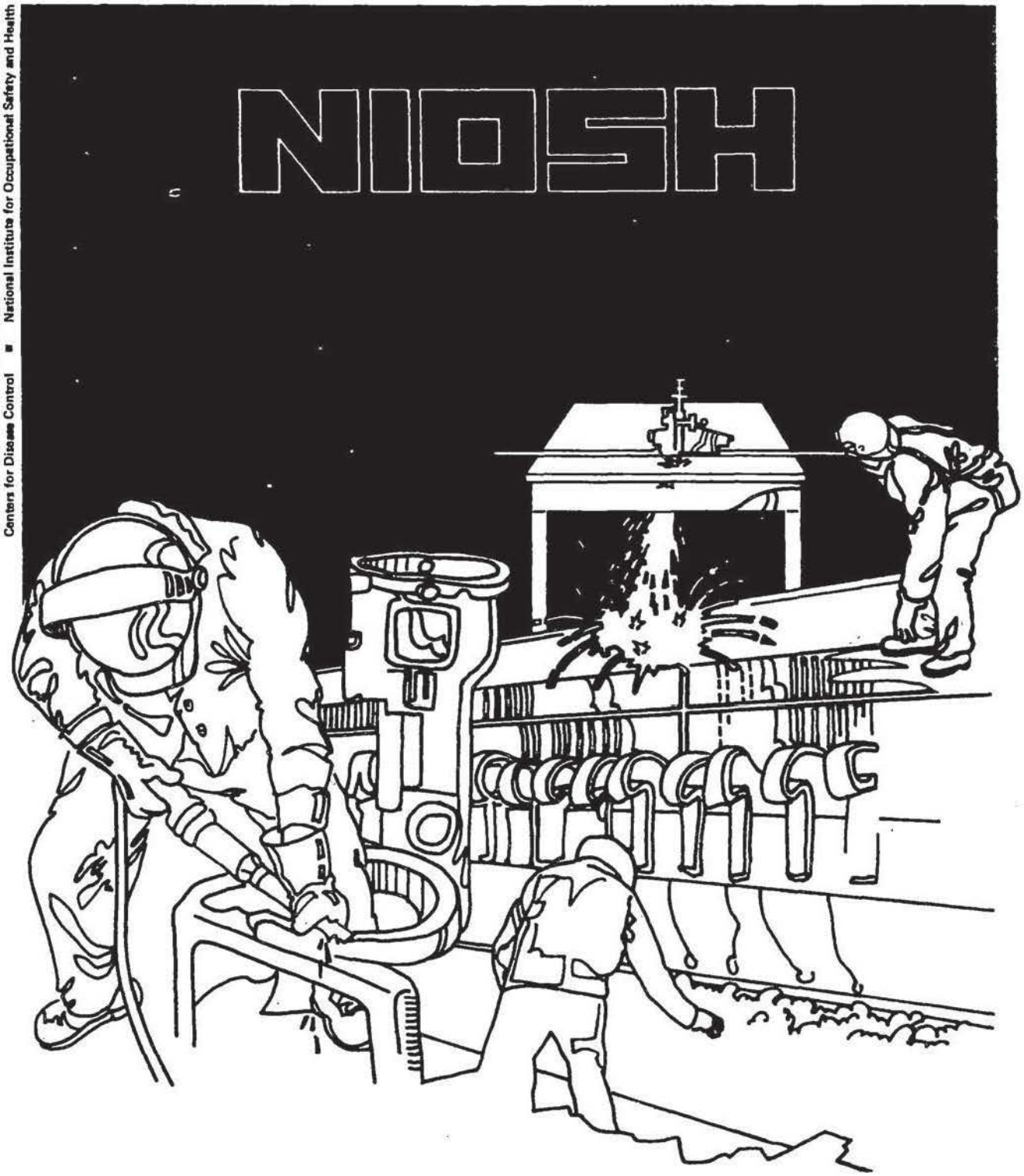
NIOSH



Health Hazard Evaluation Report

HETA 82-275-1285
C&P TELEPHONE COMPANY
CHARLESTON, WEST VIRGINIA

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NIOSH INVESTIGATORS:
Michael T. Donohue, PA-C
Raymond L. Ruhe, IH

I. SUMMARY

In June 1982, the National Institute for Occupational Safety and Health (NIOSH) received a request to conduct a Health Hazard Evaluation (HHE) at the C&P Telephone Company, Charleston, West Virginia, to evaluate complaints of a "shiny-like glitter" thought to be causing skin irritation and rash.

On July 8-9, 1982, NIOSH investigators performed enviormental sampling and medical interviews. Samples were collected to evaluate exposures to airborne concentrations of fibrous glass, asbestos and total particulates. Also, bulk samples of ceiling tile and rubber finger tabs used by the workers were collected for analysis. Neither fibrous glass nor asbestos was demonstrated in any of the air samples. The ceiling tile sample contained fibrous glass, but no asbestos. The rubber finger tabs contained magnesium and aluminum silicates combined in varying ratios with calcium, potassium, and/or iron. The preparation from the dirty (used) tabs contained chloride compounds as a minor constituent; probably contributed by perspiration. The "shiny-like glitter" on the used finger tabs was identified as an aluminum containing compound.

The medical interviews indicated that workers had experienced eye and skin irritation during early April. Review of the maintenance cycle for the HVAC (heating, ventilation and air-conditioning), system indicated that it had been brought on line to begin its spring AC cycle during the first week of April. During the preceeding winter months electrical conduit and electronic cable had been run from the basement up through the building to the thirteenth floor. It appears that the aluminum filings (glitter) were most likely generated during the installation of these communication lines and were inadvertently introduced into the eleventh floor duct work. The "glitter" found on the rubber finger tab samples appears to be the same "glitter" that employees associated with their eye and skin irritation. The "glitter"/aluminum filings were most likely blown from the duct work into the directory assistance office when the AC unit was brought up to spring time performance level.

Based on these results NIOSH has determined that a temporary health hazard of skin rash did exist for some employees exposed to the "glitter" (aluminum filings), during April 1982. No fibrous glass or asbestos was detected in the air samples. Recommendations are made for minimizing any repeat occurrence of health problems due to glitter as well as general office safety and health.

KEYWORDS: SIC 4811 (Telephone Communications), glitter, office building, indoor air pollution, fibrous glass, asbestos, aluminum particles.

II. INTRODUCTION

On June 20, 1982 the National Institute for Occupational Safety and Health (NIOSH) received a request from the Communications Workers of America, Local 2001, for a health hazard evaluation at the Chesapeake and Potomic Telephone Company, Charleston, West Virginia. The request noted the presence a "shinny-like glitter" in the directory assistance operators work area, which was thought to be causing skin irritation and rash in some workers.

NIOSH conducted an opening conference on July 8, 1982 involving representatives from the union and management. Following the opening conference, a walk-through survey of the directory assistance work area was conducted. A combined environmental and medical survey was conducted during this visit. NIOSH distributed an Interim Report for this investigation in November of 1982.

III. BACKGROUND

This office building was completed in 1925 (original six floors), and occupied that same year by the Bell System. In 1973 an additional five stories were added to the original building. The building contains approximately 27,000 square feet per floor. The directory assistance (D.A.) offices are located on the 11th floor. There are no windows in the D.A. office. Smoking is allowed only in designated areas away from the operators work stations. The floor is carpeted and the work areas are cleaned nightly. There are no laboratory or parking facilities located in the building. The 11th floor is provided heating, ventilation and air-conditioning by a separate unit, independent of the buildings main HVAC system. The air provided to the D.A. offices on the 11th floor is filtered, humidified, and recirculated with 10% makeup air introduced from outside the building.

The work stations in the directory assistance offices are modular with four work areas at each station. Each work area is separated by partial partitions, all directory assistance listings are contained in loose leaf form atop each work area. Rubber finger tabs are provided by the employeer to any operator wanting them. A telephone headset with microphone is worn by each operator. Operators are rotated from station to station during the course of the work day, in order to provide coverage for each other during break periods. Each DA operator sits on a standard non adjustable straight back chair. Directory assistance operator efficiency is based on an office average of 55 calls per one-half hour. A random monitoring of calls is done at the rate of approximately 50 call observations per month. Call counts are done automatically at each work station. A "beep tone" is automatically sounded every 15 seconds during the monitoring of the operators. There were approximately 40 operators in each of the two directory assistance offices.

IV. EVALUATION DESIGN AND METHODS

A. Environmental

Two area samples for airborne fibrous glass were collected on the eleventh floor for approximately five hours, on cellulose ester membrane filters, mounted in open-faced cassettes using a battery-powered vacuum pump at a flow rate at 1.5 liters per minute (LPM) and prepared for electron microscopy (EM) analysis via the Zumwalde-Dement procedure outlined in NIOSH Publication No. 77-204. Fifty grid openings were scanned on each preparation at a microscope setting of 10,000X magnification.

The ceiling tile sample from the eleventh floor was prepared for EM analysis by ultrasonication in ethyl alcohol and evaporation of aliquots of the resulting suspension onto carbon-coated copper grids. The entire grids were scanned at 3300X magnification and X-ray analysis was performed on the fibrous structures present.

Four used rubber finger tabs along with one control also were ultrasonicated in ethyl alcohol and evaporated onto carbon-coated grids. Both grids preparations - the control tab and the four consolidated used tabs were scanned at 3300X magnification and X-ray analysis was performed on random particles over the entire grid.

Two area airborne total particulate samples were collected on the eleventh floor for approximately five hours on pre-weighed millipore M-5 PVC filter using a battery-powered vacuum pump at a flow rate at 1.5 LPM. The total particulate concentrations was determined by weighing the sample plus the filters on an electrobalance and substracting the previously determined tare weights of the filters. The tare and gross weighings were done in duplicate.

B. Medical

These complaints of skin irritation and rash had been previously investigated by the Charleston office of the Occupational Safety and Health Administration and the West Virginia State Health Department. The work done by each agency was reviewed prior to our site visit. Physicians who had examined some of the affected workers were consulted as well.

A review of the information generated by the State health department and OSHA provided NIOSH with valuable observations prior to our on site investigation. The character of the complaints were the same in both investigations. Employee's complained of skin and eye irritation. These reported symptoms all began during the second week of April. The only affected area in the building was the 11th floor directory assistance offices.

NIOSH interviewed the company doctor concerning this outbreak. Three workers had been seen by this physician and then referred to a consulting dermatologist. These people were patch tested and a skin

biopsy was done as well as KOH (potassium hydroxide mixture used to determine the prescence of fungal infections) preparations. In each case the patch test results were non reactive, the skin biopsy evidenced only necrotic tissue and the KOH preparations were all negative. A presumptive diagnosis of delusionary parasitosis was made in each of these cases.

During the afternoon of our walk-through investigation of the D.A. office, medical interviews were completed with ten of the D.A. operators.

V. RESULTS

A. Environmental

Fibrous glass was not detected in the air samples.

The ceiling tile sample contained fibrous glass, but no asbestos. The amount of fibrous glass present in the sample is less than 1% of the total particulate volume deposited on the grid.

The control and the used rubber finger tabs contained magnesium and aluminum silicates combined in varying ratios with calcium, potassium, and/or iron as the major constitutent. The four dirty used tabs contained chloride compounds as a minor constituent; probably contributed by perspiration.

The "shiny-like glitter" on the used finger tabs was identified as an aluminum-containing compound. No further identification of this material was attempted.

The total particulate air concentration ranged from less than detectable to 0.10 milligrams per cubic meter of air (mg/M^3) 8-hour TWA. The American Conference of Governmental Industrial Hygienists (ACGIH) Threshold Limit Value (TLV) for total particulates is 10 mg/M^3 8-hour TWA. The Occupational Safety and Health Administration (OSHA) Permissible Exposure Limit (PEL) is 15 mg/M^3 8-hour TWA.

B. Medical

Ten DA operators were interviewed, and seven reported what they believed to be health problems related to their work enviorment. Three of the workers were seen to have skin irritation which was confined to to their face, neck or forearms. At the time of this evaluation we were unable to observe any case of foreign body in the eye. Four of the operators complained of low back pain which we feel is attributable to postural problems caused by the chairs they sit in. All of the affected workers reported the onset of their symptoms occured in early April. These ten workers had an average of 8.5 years of employment with C&P. A commonly voiced complaint was that it was felt nothing had been done to help alleviate workplace health problems. NIOSH found that the workers had been told their symptoms were not real, but only the result of stress and/or their own psychological problems.

VI. DISCUSSION

Analysis of the environmental data indicates that at the time of this survey there was no overexposure to either asbestos or fibrous glass. The used rubber finger tabs contained an aluminum compound not found in the unused finger tabs. Medical interviews with seven of the "exposed" directory assistance operators detailed their belief that the cause of their irritative symptoms was due to the shiny glitter in the office air during the spring. A review of maintenance records found that communication lines were being run up through the building during the winter of 1981. It appears that during the installment of these lines, the 11th floor HVAC duct work had the aluminum compound filings inadvertantly introduced into it.

Maintenance records showed that the air conditioning system was brought on line April 12. We believe that the aluminum filings which had been inadvertentlv introduced into the 11th floor duct work were blown into the directory assistance offices and are most likely responsible for the workers symptoms. The onset of symptoms began the same week the air conditioning unit was brought on line. Since the irritative symptoms described by the workers occurred in conjunction with the start-up of the air conditioning system it is likely that the symptoms were related to the aluminum filings that were blown out of the HVAC system.

VII. RECOMMENDATIONS

1. Establish a periodic maintenance program on the air handling systems. Records should be generated and the entire system monitored on a regular basis. Particular care should be taken whenever work is being done either on or near the HVAC system. The integrity of the system should remain uncompromised.

2. Development of joint management-union education programs to address worker concerns and needs regarding materials used, health effects of contaminants in the workplace, work practices, and engineering controls, as well as more effective use of the labor-management health and safety committee are recommended.

3. Consideration should be given to employee comfort within the directory assistance office. Malfunction of the heating or air conditioning systems should be promptly addressed. The sense of well being of the workers may be affected by a tangible expression of concern for their comfort.

4. Chairs with adjustable heights and firm back supports are recommended for the directory assistance work areas.

VIII. References

1. NIOSH Manual of Analytical Methods, Vol. 6, NIOSH Publication #80-125, August 1980

2. Threshold Limit Values for Chemical Substances and Physical Agents in the Workroom Environment with Intended Changes for 1981, American Conference of Industrial Hygienists (ACGIH), Cincinnati, Ohio

3. ASHRAE Handbook, 1981 Fundamentals, American Society for Heating, Refrigerating and Air Conditioning Engineers, Inc, Atlanta, Georgia.

4. Office Hazards, How Your Job Can Make You Sick, Makower J., 1981, Tilden Press, 1737 Desales Street, N.W., Washington, D.C., 20036

IX. AUTHORSHIP AND ACKNOWLEDGEMENTS

Report Prepared by:

Michael T. Donohue, PA-C
Physician Assistant-Certified
Medical Section

Raymond L. Ruhe
Industrial Hygienist
Industrial Hygiene Section

Originating Office:

Hazard Evaluations and Technical Assistance Branch
Division of Surveillance, Hazard Evaluations, and Field Studies

X. DISTRIBUTION AND AVAILABILITY

Copies of this Determination Report are currently available upon request from NIOSH, Division of Standards Development and Technology Transfer, Information Resources and Dissemination Section, 4676 Columbia Parkway, Cincinnati, OH 45226. After 90 days, the report will be available through the National Technical Information Service (NTIS), Springfield, VA. 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. C&P Telephone Company
2. President, Local 2001, CWA
3. NIOSH, Region III
4. OSHA, Region III

For the purpose of informing the workers of the results of this NIOSH Health Hazard Evaluation, the employer shall promptly "post", for a period of 30 calender days this Determination Report in a prominent place(s) near where employees work.