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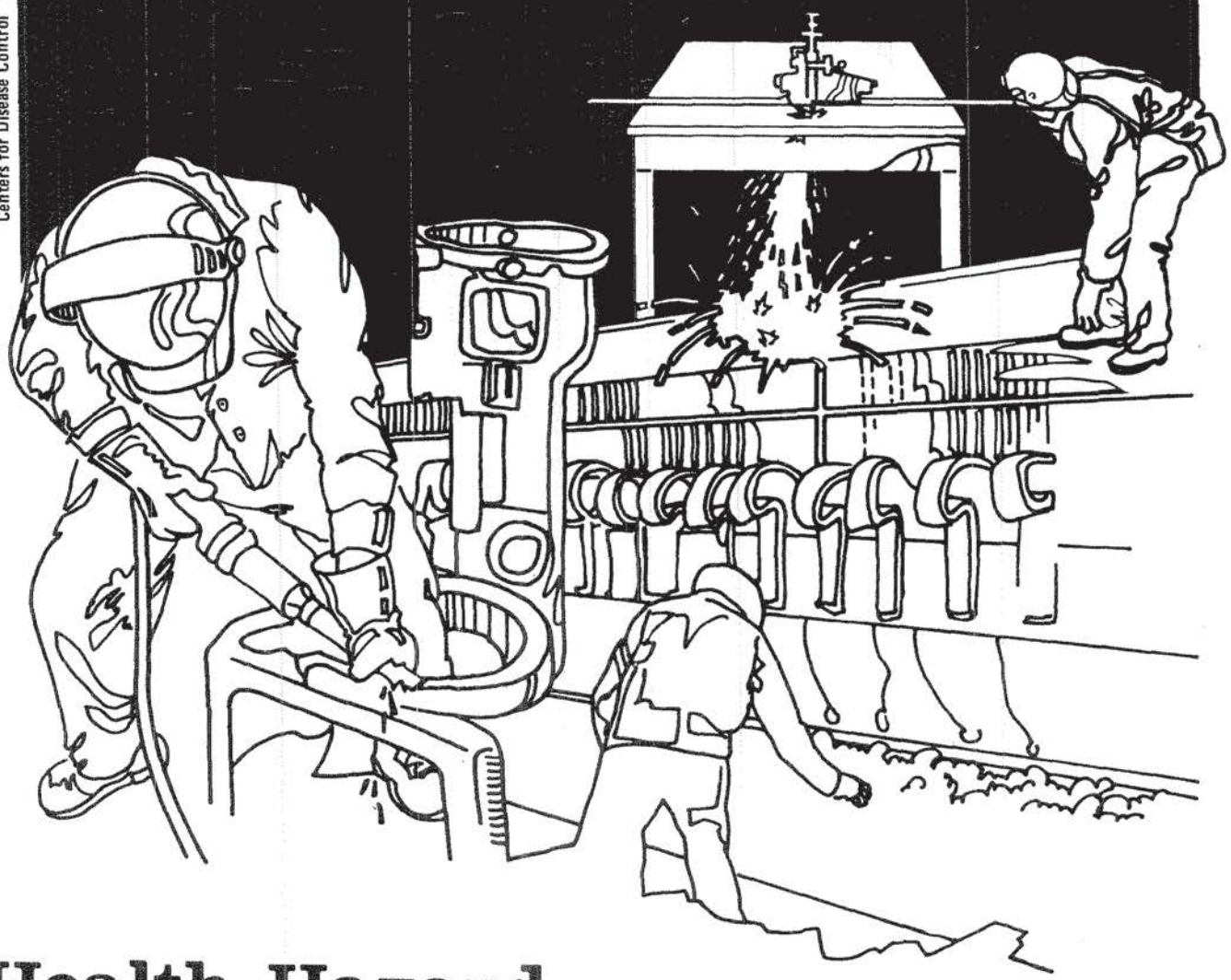

Health Hazard Evaluation Report

HHE 80-220-830
FENWICK, STONE, DAVIS AND WEST
PALO ALTO, CALIFORNIA

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. 699(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.

HE 80-220-830

MARCH, 1981

NIOSH INVESTIGATOR:

FENWICK, STONE, DAVIS AND WEST

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I. SUMMARY

In August, 1980, the National Institute for Occupational Safety and Health (NIOSH) received a request from the firm of Fenwick, Stone, Davis and West to determine the cause of the adverse health responses of headaches, sinus irritation, lethargy and fatigue experienced by an employee in their office.

An environmental survey was conducted on November 6-7, 1980. Air samples were collected for formaldehyde, carbon monoxide and carbon dioxide. Temperature and humidity measurements were made; and the ventilation system was evaluated.

Formaldehyde concentrations were 0.05 and 0.06 ppm (NIOSH recommended standard - 1.0 ppm ceiling). There was less than 2 ppm of carbon monoxide (NIOSH recommended standard - 35 ppm). The carbon dioxide concentrations were 300-400 ppm which is in the normal range. The temperature ranged from 73 to 76°F and the relative humidity from 44 to 54%.

On the basis of the data in this evaluation, NIOSH could not definitely determine the cause of the symptoms occurring in one individual, while in the office area. Recommendations regarding the ventilation system, temperature and humidity are presented in section III of this report.

Keywords; - SIC 6611 (Law offices) formaldehyde, temperature, humidity, ventilation.

II. INTRODUCTION AND BACKGROUND

Fenwick, Stone, Davis and West is a law firm that conducts general office type work. They occupy the 8th floor of a 10 story office building in Palo Alto, California. In August 1980, NIOSH received a request from this firm to determine the cause of the adverse health responses of headaches, sinus irritation, lethargy and fatigue experienced by an employee.

The ventilation system is a central heating and freon refrigeration air conditioning system that serves the entire building. There is no provision for controlling the humidity. The temperature is controlled by thermostats located in each room.

The affected individual experiences irritation of the throat, nose, and sinus, and at times lethargy. When he is away from the office for business trips and vacations, the symptoms are not present. The pattern indicates it could be related to the office environment.

A written report including environmental results and recommendations was submitted to the requester on December 23, 1980.

III. RESULTS, DISCUSSIONS, AND RECOMMENDATIONS

Formaldehyde even in low concentration can produce symptoms of headache and nose, throat and sinus irritation. Lethargy and fatigue can be caused by temperatures in the high 70s and 80s, low humidity and/or elevated carbon dioxide levels.

The NIOSH recommended exposure limit for formaldehyde is 1.0 ppm. The formaldehyde concentrations measured were 0.05 to 0.06 ppm. This is very low; however, a small percentage of people will have problems even at these low concentrations. The source of the formaldehyde could not be determined. Formaldehyde can be found in some carpets, draperies, some insulation material, and furniture made from particle board. There was no insulation or particle board furniture or shelving found on the 8th floor. A scrap piece of the carpeting on this floor was analyzed and did not contain any formaldehyde. Since the entire building is on the same ventilation system and up to 90% of the air is recirculated, the formaldehyde could be coming from any of the 10 floors.

The temperatures ranged from 73 - 74.5° F. in the former office of the affected individual and from 75 to 76° F. in his present (Southwest) office. These temperatures are within the current presidential guidelines. A portable room air conditioner would lower the temperature in this office several degrees. Additional sun screening for the windows with the southern and western exposures would help a little bit. The thermostat in this office should be checked for accuracy.

The relative humidity ranged from 44% to 54%, which is in the desired range. The building ventilation system does not have a humidifier so the humidity is dependent on the outside weather conditions. A portable room humidifier could be used when the room humidity drops below 40%.

There was just a trace of carbon monoxide present (less than 2 ppm) which is not sufficient to cause headaches. The carbon dioxide concentrations ranged from 300-400 ppm which is the normal amount found in air. When the levels in a room get to 600 ppm and above, it indicates an insufficient amount of fresh air for the occupancy in that room.

The ventilation rate for the Southwest office provided by the building maintenance personnel is supposed to be 385 cfm per each of the 2 air inlets or 770 cfm total. Based on the size of the room this amounts to an air change every 2.5 minutes or 24 air changes per hour. This is an excellent ventilation rate. This supply air volume should be checked periodically to ensure that this rate is being maintained. The return air outlets and supply air inlets are all located in the ceiling. This arrangement causes a portion of the air to short-circuit directly to the return air. Since the desk is not directly under the outlets, the vanes in the inlet should be set so all the air goes down and away from the air outlets. This will provide for better mixing of the air in the room.

In summary, the low concentration of formaldehyde found (0.05 ppm) could cause slight nose, throat and sinus irration in a small percentage of people. When the temperature in the room gets to the high 70s and above and/or the humidity is low, a feeling of lethargy may exist. If a lot of persons are smoking in meeting rooms the cigarette smoke could cause headaches in some individuals.

IV DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of this complete Determination Report are currently available upon request from NIOSH, Division of Technical Services, Information Resources and Dissemination Section 4676, Columbia Parkway, Cincinnati, Ohio, 45226. After ninety (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. Fenwick, Stone, Davis and West.
2. U.S. Department of Labor, Occupational Safety and Health Administration, Region IX, San Francisco, California.
3. California Occupational Safety and Health Administration, San Francisco, California.

For the purpose of informing the affected employee, the employer shall promptly post this Determination Report in a prominent place near the work area of the affected employee for a period of thirty (30) calendar days.

V. ACKNOWLEDGMENTS

Report prepared and survey conducted by:

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