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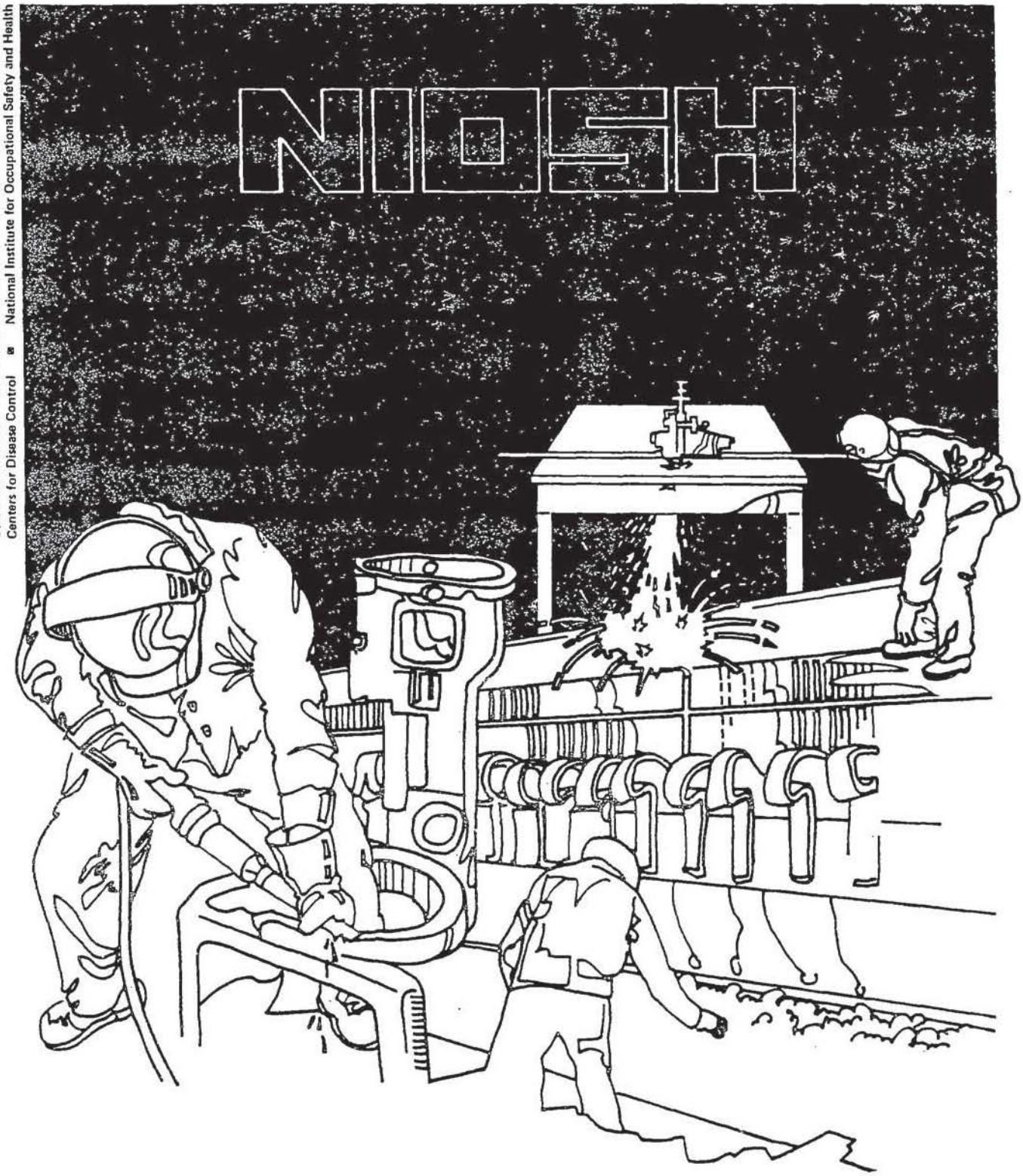

Health Hazard Evaluation Report

HETA 81-346-1022
ROBERT DORSEN, INC.
ROCKVILLE, MARYLAND

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 81-346-1022
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Robert Dorsen, Inc.
Rockville, Maryland

NIOSH INVESTIGATOR:
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I. SUMMARY

On June 1, 1981, the National Institute for Occupational Safety and Health (NIOSH) received a request from Robert Dorsen, Inc., Rockville, Maryland, to evaluate possible health hazards resulting from exposure to chemical fumes reportedly entering the office facility from a lithographic printing firm located in the lower level of the same building. Robert Dorsen employees were complaining of sporadic eye, nose, and throat irritation.

On August 27, 1981, a NIOSH industrial hygienists conducted environmental sampling within the Dorsen facility. NIOSH confirmed that the source of isopropanol vapors in the Dorsen offices is due to operations of the printing firm on the lower floor. Results of three area air samples showed concentrations of airborne isopropanol vapor averaging approximately 35 ppm (parts of isopropanol per million parts of air) at locations within the sales and display areas of the facility. Qualitative sample analysis indicated no airborne contaminants other than isopropanol. The current NIOSH recommended standard for occupational exposure to isopropanol is 400 ppm as averaged over a 10-hour work shift, and 800 ppm for any 15 minute peak exposure period.

On the basis of the environmental monitoring, NIOSH has determined that the concentrations of isopropanol measured in the Robert Dorsen, Inc. offices at the time of the survey are more a nuisance than a potential occupational health hazard. Recommendations for reduction of exposures are made in Section VI of this report.

Keywords: SIC 5732 (Radio and Television Stores)
lithographic printing, isopropanol.

II. BACKGROUND

The request for health hazard evaluation was submitted by an employer representative of Robert Dorsen, Inc. This facility is a retail sales establishment of stereophonic equipment and occupies the upper floor of a two-story building. It consists of an office area, a sales area, and a larger storage area. Two clerical and four sales workers are usually on duty during normal working hours. A limited number of workers are also present during the weekend. From the beginning of building occupancy, Robert Dorsen workers have complained of irritating odors in their work areas, causing irritation of the eyes, nose, and throat.

Located directly below this facility is a lithographic printing firm. This type of firm has occupied the lower floor of the building since R. Dorsen, Inc. has been in business.

III. MATERIALS AND METHODS

An environmental survey was conducted on August 27, 1981. A "walk-through" survey was the initial phase, followed by informal interviews of the office workers. Environmental samples were then collected at various locations in the work area.

A visual inspection of the work areas revealed openings in the floor of the storage room which probably contribute to the escape of fumes from the Litho establishment. Also, opened doors located at the bottom of the stairs near the entrance allow fumes to travel up and into the office areas. The most commonly used chemical in the Litho facility was isopropanol, reportedly used at a rate of about one gallon/day.

Informal interviews of clerical and sales personnel revealed that the most common complaint was burning of the eyes, nose, and throat. While an objectional odor could be perceived on essentially a continual basis, "bad days" (noticably higher concentrations of fumes leading to the mucus membrane irritation) were sporadic in nature. At least one worker interview indicated that the day of the NIOSH investigation "was a non-typical day, and that hardly any fume could be detected".

A number of chemicals are used in the Lithographic operation. Although the most abundant chemical is isopropanol, environmental sampling was conducted for a wide range of possible contaminants in the Dorsen facility. Air samples were collected on charcoal and silica gel at a flow rate of 0.2 liter/minute from pre-calibrated environmental sampling pumps. Bulk air samples were obtained (for determination of the type(s) of substance present) by placing a charcoal tube, silica gel tube, and passive dosimeter in an area perceived as having the greatest levels of contaminant (near a small opening in the floor of the storage area) for qualitative analysis. One silica gel tube and three charcoal tubes samples were placed at various locations in the facility for quantitative analysis.

IV. EVALUATION CRITERIA

At high concentrations, isopropanol is an irritant of the eyes and mucous membranes, and drowsiness, headache, and incoordination may also occur. In experimental studies, human subjects exposed to 400 ppm for three to five minutes had mild irritation of the eyes, nose, and throat, and at 800 ppm the irritation was not severe, but the majority of subjects considered the atmosphere uncomfortable. NIOSH has recommended that occupational exposures be limited to 400 ppm as averaged over a 10 hour work shift, with an 800 ppm limit for any 15 minute period. The current OSHA standard is 400 ppm for an 8-hr work shift.

V. RESULTS AND DISCUSSION

The charcoal tube, passive dosimeter, and silica gel tube obtained for qualitative analysis were desorbed with carbon disulfide and aliquots were injected into a gas chromatograph equipped with a flame ionization detector. All three showed identical chromatograms (except for peak height) indicating that the only contaminant present was isopropanol. Subsequent analysis of the charcoal tubes collected in the storage and sales area showed airborne concentrations of isopropanol at 35, 34, and 33 ppm.

VI. CONCLUSIONS AND RECOMMENDATIONS

During the time of the NIOSH investigation, airborne concentrations of isopropanol were recorded at approximately 34 ppm throughout the facility. While these concentrations are not severe enough to cause extensive health problems, interviews with workers suggests that episodes of high concentrations are sporadic, and it was noted by one worker that during the environmental sampling, exposures were perceived as low. Cause for excessive concentrations could not be determined. Discussions with the proprietor of the Litho establishment did not reveal circumstances which could possibly lead to excessive use of isopropanol. One possible source of the problem was use of the heating and air-conditioning system, which may have recirculated fume laden air into the sales facility. However, interviews with workers subsequent to the survey indicate that use of the system is not correlated with excessive exposures.

Observation of the lithographic operation did not indicate excessive exposure situations, nor were employees of the firm complaining of any job related health problems. Therefore, recommendations for exposure reduction within the Litho facility were not warranted.

In light of previous experimental studies showing slight irritation from exposure to isopropanol vapors at levels of 400 ppm, it can be concluded that either episodes of high exposures occur, greatly in excess of the levels measured during the NIOSH investigation, or that some workers in the sales facility have a low tolerance to the irritative effects of isopropanol. In either case, the following recommendations are made to reduce employee exposure:

1) Seal all floor openings in the storage area to prevent the entrance of isopropanol vapors.

2) The doors located at the bottom of the stairs near the front entrance should remain closed, and commercially available weather stripping should be applied around their perimeter to prevent the flow of vapors up and into the Dorsen facility (however, these doors should not be locked or sealed in such a way as to prevent their use during emergency situations).

3) If health effects continue to occur after implementation of the above recommendations, a log should be developed to document such occurences. This log should include the date, time, number of employees affected, duration, and other pertinent information such as unusual weather conditions. This information will be of value in any future investigations .

VII. AUTHORSHIP AND ACKNOWLEDGEMENTS

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VIII. DISTRIBUTION AND AVAILABILITY OF REPORT

Copies of this report are currently available upon request from NIOSH, Division of Standards Development and Technology Transfer, 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 22161.

1. Robert Dorsen, Inc.
2. Cam-Gar Litho, Inc.
3. U.S. Department of Labor, OSHA, Region III
4. NIOSH, Region III

For the purposes of informing the exposed employees, copies of this report shall be posted by the employer in a prominent place accessible to the employees, for a period of 30 calendar days.

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