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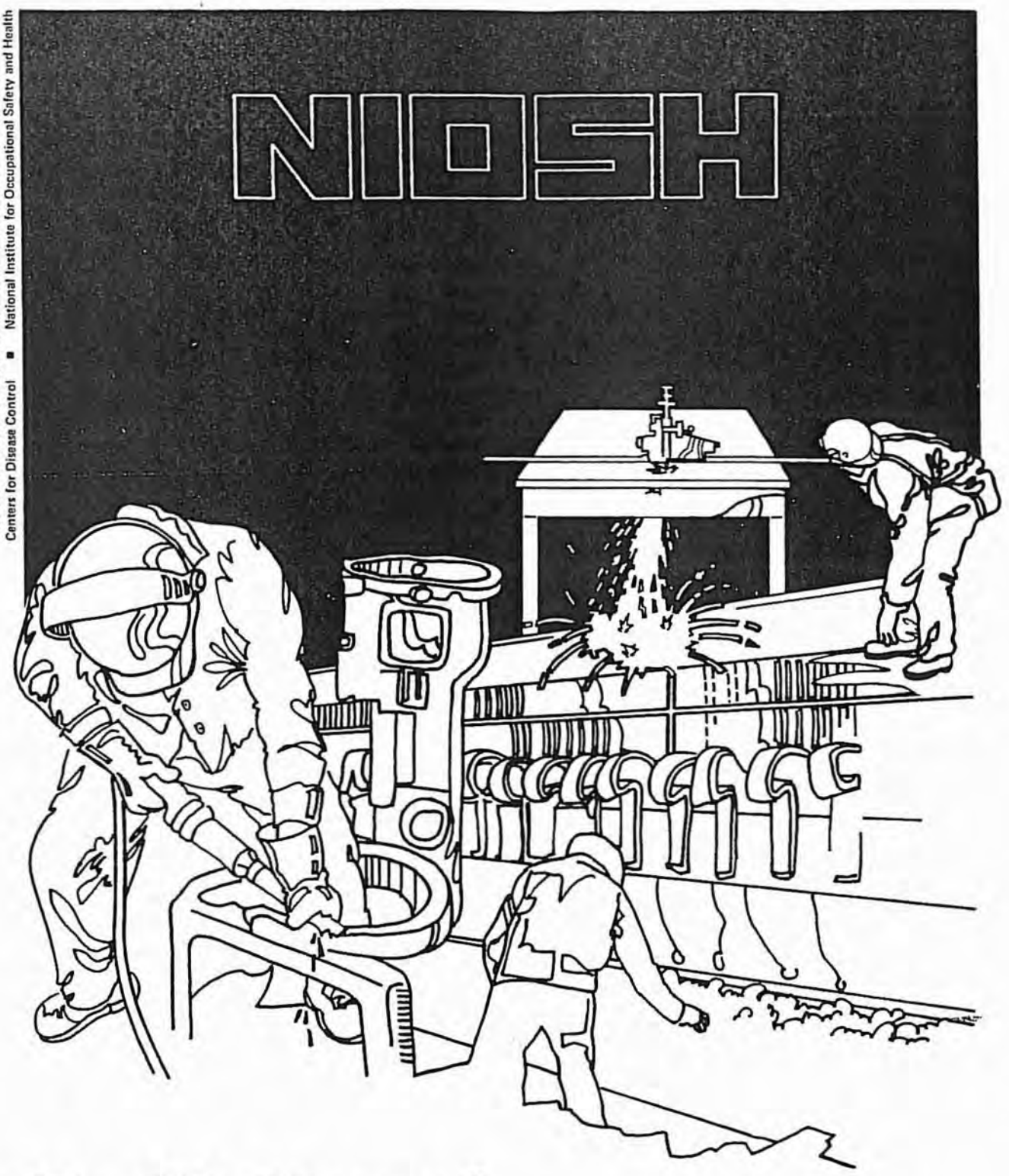

Health Hazard Evaluation Report

HETA 81-057-905
JEFFERSON COUNTY MENTAL HEALTH CENTER
WHEAT RIDGE, COLORADO

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 81-057-905
JUNE 1981
JEFFERSON COUNTY MENTAL HEALTH CENTER
WHEAT RIDGE, COLORADO

NIOSH INVESTIGATORS:
Bobby J. Gunter, Ph.D., IH

I. SUMMARY

In November 1980 the National Institute for Occupational Safety and Health (NIOSH) received a request from an employee of the Jefferson County Mental Health Center in Wheat Ridge, Colorado, to evaluate a potential health hazard to chemicals used in a printing machine at the mental health center.

The printing machine is installed in a small room approximately 12 feet by 12 feet in the basement of the building. There is no ventilation. Therefore, each time the machine is either used or cleaned or printing materials are added, there is the possibility for the worker to be exposed. Examination of all cleaning and solvent materials used indicated that petroleum distillate, xylene, and toluene were the primary chemicals. Only one person is exposed for approximately two hours each day. Direct reading detector tube samples showed only trace quantities (10 to 15 mg/M^3) of xylene and toluene. Three long term air samples for petroleum distillate showed concentrations of 333 mg/M^3, 214 mg/M^3, and nondetectable. These levels are below the Occupational Safety and Health Administration (OSHA) standard of 2000 mg/M^3.

The one worker was interviewed. She had symptoms such as drowsiness, burning and tearing of eyes, respiratory irritation, and hair loss. All these symptoms including hair loss disappeared when the worker was away from her job for as little as one week. Ventilation should be installed in this printing room since exposure may exceed those found during this survey and pose a health hazard.

Although the environmental samples collected during this survey did not demonstrate overexposures at the printing machine, employee symptoms appear to result from the operation of the printing machine. Recommendations on preventing a health hazard at this work site are included in this report.

KEYWORDS: SIC 2732 (Book Printing), petroleum distillate, xylene, toluene, printing machines.

II. INTRODUCTION

NIOSH received a request in November 1980 from an employee of Jefferson County Mental Health Center in Wheat Ridge, Colorado, to determine if there was a health hazard from chemicals used in a printing machine at the Center. An environmental survey was conducted on March 31, 1981, to evaluate potential exposure to petroleum distillate, xylene, and toluene.

III. BACKGROUND

The Jefferson County Mental Health Center's printing room is located in the basement of the facility in a small room approximately 12 feet by 12 feet. There is no ventilation. This printing room is used approximately two hours per day. Only one employer (who is always the same person) works in this printing room.

IV. ENVIRONMENTAL DESIGN AND METHODS

The worker was interviewed. Her major complaints consisted of drowiness, burning and tearing of eyes, respiratory irritation, and hair loss. All these symptoms disappeared after the worker was away from the work place for approximately one week.

One breathing zone and two general room air samples for petroleum distillate were collected on organic vapor charcoal sampling tubes and analyzed according to NIOSH P&CAM Method No. 127. Direct reading detector tube samples were taken for xylene and toluene.

V. EVALUATION CRITERIA

A. Environmental

The two sources of criteria used to assess the workroom concentration of contaminants were (1) the NIOSH criteria for a recommended standard and (2) the Occupational Safety and Health Administration (OSHA) standards (19 CFR 1910), January 1978.

	Permissible Exposure Limit 8-Hour, Time-Weighted Exposure Basis
Petroleum Distillate	2000 mg/M^3 (OSHA)
Toluene	375 mg/M^3 (NIOSH) (OSHA)
Xylene	435 mg/M^3 (NIOSH) (OSHA)

mg/M^3 = milligrams of substance per cubic meter of air

Occupational health standards are established at levels designed to protect individuals occupationally exposed to toxic substances on an 8-hour per day, 40-hour per week basis over a normal working lifetime.

B. Toxicological

Petroleum Distillate[1] -- The petroleum distillate used in the printing industry and the one in use at this facility includes the distillate that distills between 95 degrees and 175 degrees Centigrade. These are chiefly aliphatic hydrocarbons chiefly of C_7 - C_{10} series. The composition may vary widely since anyone of several fractions within this boiling range may be used.

Depression of the central nervous system is one of the symptoms of exposure. Prolonged exposure causes irritation to mucous membranes, skin irritation, and defatting dermatitis. Liver and kidney damage can occur if excessive exposure is long term.

This product should be used under well ventilated conditions. If airborne concentrations are high (excess of 1000 mg/M^3, the action level or one-half the TLV or OSHA standard), local exhaust ventilation should be used. For short exposure a respirator may be used.

Toluene[2] -- Toluene is slightly irritating to the eyes and mucous membranes. It is toxic by ingestion, inhalation, and skin absorption. Acute poisoning from toluene vapors is rare. Inhalation of 200 parts per million for an 8-hour period will cause impairment of coordination and reaction time. Toluene produces narcosis. There have been reports of chronic poisoning described as anemia and leucopenia Biopsy showed bone marrow hypoplasia.

Xylene[3] -- Xylene overexposures may cause headache, nausea, gastrointestinal disturbances, and dizzinees. Eye, noise, throat, and skin irritation are also common complaints when workers are exposed to xylene.

VI. ENVIRONMENTAL RESULTS

One breathing zone and two general room air samples were taken for petroleum distillate. Concentrations were 214 mg/M^3, 333 mg/^{3}, and nondetectable. Refer to Table 1 for environmental results.

Direct reading samples for both xylene and toluene showed trace quantities of 10 to 15 mg/M_3. These are below levels which would initiate a health hazard.

VII. DISCUSSION AND CONCLUSIONS

Based on the environmental sampling and an employee interview, a hazardous situation existed during this evaluation. The levels of petroleum distillate, xylene, and toluene found were rather low. It is evident that the worker is experiencing symptoms which could have been caused from previous high exposure to these solvents. Therefore, local exhaust ventilation should be installed to eliminate possible overexposures to these chemicals.

VIII. RECOMMENDATIONS

1. Workers should be informed on the potential dangers from exposure to petroleum distillate, xylene, and toluene.

2. Local exhaust ventilation should be installed in the printing room over the printing machine.

3. After the printing machine is ventilated, air monitoring should be performed to see if chemical exposures still exist.

IX. REFERENCES

1. Health and Safety in Printmaking: A Manual for Printmakers, Alberta Labour, January 1978.

2. Sax, N. Irving. Dangerous Properties of Industrial Materials, Fourth Edition, Van Nostrand Reinhold Company, New York, 1975, p. 1174.

3. Criteria for a Recommended Standard...Occupational Exposure to Xylene. HEW Publication No. (NIOSH) 75-168, 1976.

X. AUTHORSHIP AND ACKNOWLEDGMENTS

Report Prepared By:

Bobby J. Gunter, Ph.D.
Regional Industrial Hygienist
NIOSH, Region VIII
Denver, Colorado

Originating Office:

Hazard Evaluation and Technical Assistance Branch (HETAB)
Division of Surveillance, Hazard Evaluations, and Field Studies (DSHEFS)
NIOSH, Cincinnati, Ohio

Report Typed By:

Marilyn K. Schulenberg
NIOSH, Region VIII
Denver, Colorado

XI. 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. Jefferson County Mental Health Center.
2. U.S. Department of Labor/OSHA - Region VIII.
3. NIOSH - Region VIII.
4. Colorado Department of Health.
5. State Designated Agency.

For the purpose of informing affected employees, a copy of this report shall be posted in a prominent place accessible to the employees for a period of 30 calendar days.

TABLE 1

Breathing Zone and General Room Air Concentrations of
Petroleum Distillate in the Printing Room

Jefferson County Mental Health Center
Wheat Ridge, Colorado

March 31, 1981

Sample Number	Location	Sampling Time	mg/M^3 Petroleum Distillate
1	Operator's Breathing Zone	8:55 AM - 12:10 AM	333
2	General Room	8:55 AM - 12:10 AM	214
3	General Room	8:55 AM - 12:10 AM	*

EVALUATION CRITERIA: 2000 mg/M^3

LABORATORY LIMIT OF DETECTION: 0.1 mg/sample

* = below laboratory limit of detection

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PUBLIC HEALTH SERVICE
CENTERS FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
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