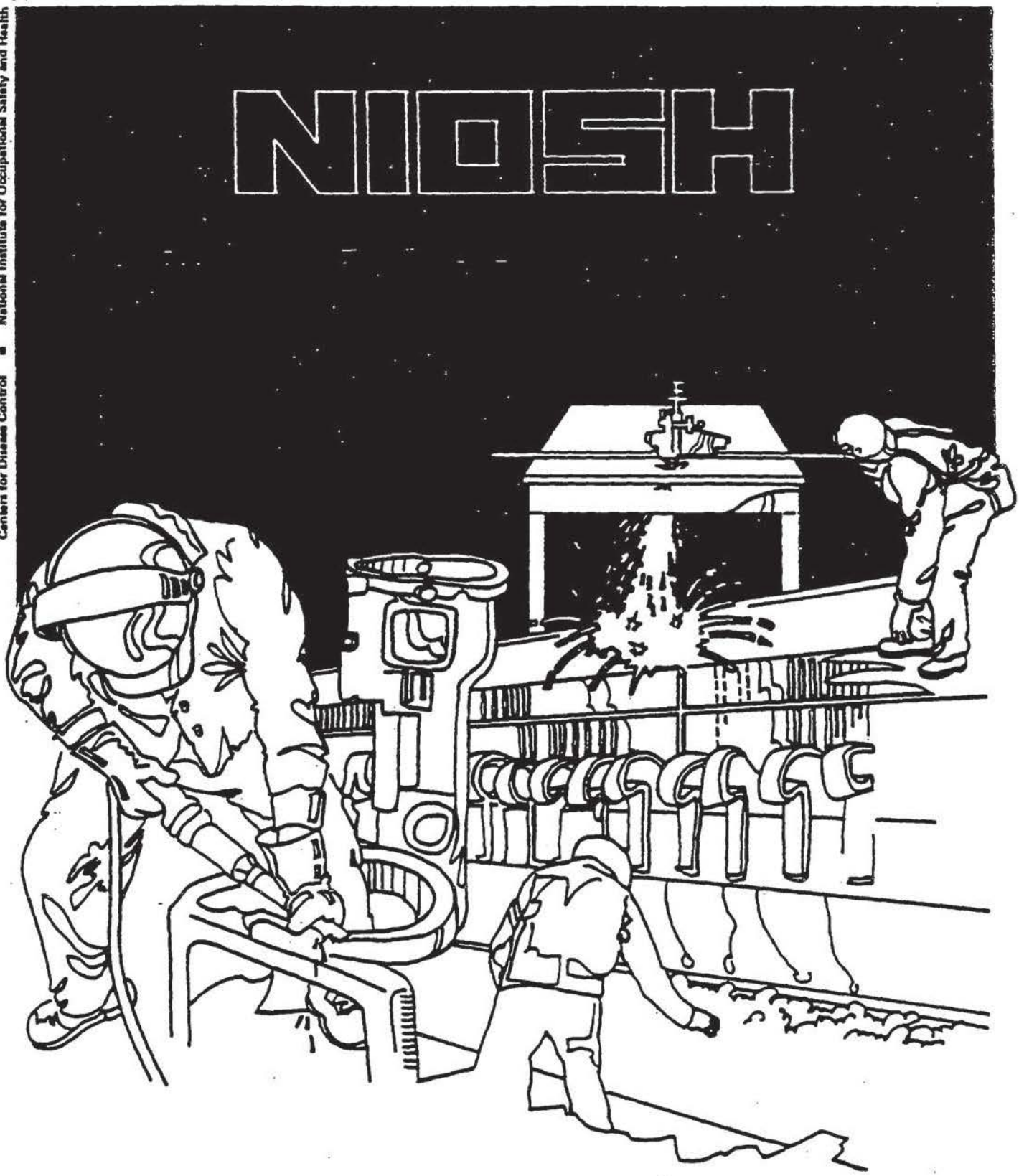
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES ■ Public Health Service
Centers for Disease Control ■ National Institute for Occupational Safety and Health

NIOSH



Health Hazard Evaluation Report

HETA 84-116-1486
BUTTE SHELTERED WORKSHOPS, INC.
BUTTE, MONTANA

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 84-116-1486
JULY 1984
BUTTE SHELTERED WORKSHOPS, INC.
BUTTE, MONTANA

NIOSH INVESTIGATOR:
Anne T. Albers

I. SUMMARY

In December, 1983, the National Institute for Occupational Safety and Health (NIOSH), was requested to evaluate worker exposures to napthalene during the manufacturing of felt boot liners at the Butte Sheltered Workshop Inc., Butte, Montana. On March 21 and 22, 1984, a NIOSH industrial hygienist conducted a survey to measure the exposure of all workers to airborne vapors of napthalene.

Fourteen personal air samples were collected. The concentration of napthalene in all of the samples was less than 0.001 milligrams per cubic meter (mg/M^3). NIOSH currently recommends that occu- pational exposure to napthalene be controlled to less than 50 mg/M^3 averaged over an 8-hour work day. None of the workers had active hand or eye irritation at the time of this evaluation.

On the basis of the industrial hygiene data, we concluded that no health hazard from exposure to napthalene existed at the time of this survey. Recommendations to help prevent any future problems are included in Section VIII of this report.

KEYWORDS: SIC 3131 (Boot and shoe, cut stock and findings), napthalene, felt, dermatitis.

II. INTRODUCTION

In December 1983, National Institute for Occupational Safety and Health (NIOSH) received a request from the management of the Butte Sheltered Workshop. The request was to evaluate potential exposures to naphthalene among employees working with felt treated with this chemical. The felt is purchased pre-treated with napthalene for mothproofing. An industrial hygiene evaluation was conducted on March 21 and 22, 1983 to evaluate potential exposures to napthalene. Personal air samples for napthalene were collected during the evaluation. None of the workers had active hand or eye irritation at the time of this evaluation.

III. BACKGROUND

The Butte Sheltered Workshop employs approximately twelve workers in its felt bootliner factory. Large sheets of felt about 1/4 inch thick measuring approximately 4 feet by 10 feet are cut into pieces (sole piece, right side piece, and left side piece) by a cutter and two helpers. The pieces are then assembled by the other workers using sewing machines. The felt is purchased pre-treated with napthalene for mothproofing. The bootliners are packed for shipment once a month by two workers. The workers add flakes of napthalene to the shipment boxes. Approximately 180 boxes are packaged and shipped each month. The workers have skin contact with the felt. Employees complain of eye irritation and the mothball smell.

NIOSH conducted a health hazard evaluation at the felt factory in September of 1983.[1] The evaluation was conducted at a time when production was low. All workers were monitored for napthalene exposure during the evaluation. On the basis of the industrial hygiene sampling results, a health hazard from exposure to napthalene did not exist. Another evaluation was advised during peak production. This latest survey, which is the subject of this report, was conducted at a time when production was high.

IV. EVALUATION DESIGN AND METHODS

A. Environmental

Personal air samples were collected on ORBO-42 solid sorbent sampling tubes using vacuum pumps operated at 50 cubic centimeters per minute (cc/minute). The samples were analyzed by NIOSH P & CAM (Physical and Chemical Analytical Method) S-292 with modifications.[2]

V. EVALUATION CRITERIA AND TOXICOLOGY

A. Environmental

As a guide to the evaluation of the hazards posed by workplace exposures, NIOSH field staff employ environmental evaluation criteria for assessment of a number of chemical and physical agents. These criteria are intended to suggest levels of time weighted average (TWA) exposures to which most workers may be exposed up to 10 hours per day, 40 hours per week for a working

lifetime without experiencing adverse health effects. Some substances also have recommended short-term exposure limits or ceiling values which are intended to supplement the TWA where there are recognized toxic effects from high, short-term exposures.

It is, however, important to note that not all workers will be protected from adverse health effects if their exposures are maintained below these levels. A small percentage may experience adverse health effects because of individual susceptibility, a pre-existing medical condition, and/or a hypersensitivity (allergy).

In addition, some hazardous substances may act in combination with other workplace exposures, the general environment, or with medications or personal habits of the worker to produce health effects even if the occupational exposures are controlled at level set by the evaluation criterion. These combined effects are often not considered in the evaluation criteria. Also, some substances are absorbed by direct contact with the skin and mucous membranes, and thus potentially increase the overall exposure. Finally, evaluation criteria may change over the years as new information on the toxic effects of an agent become available.

The primary sources of environmental evaluation criteria for the workplace are: 1) NIOSH Criteria Documents and recommendations, 2) the American Conference of Governmental Industrial Hygienists' (ACGIH) Threshold Limit Values (TLV's), and 3) the U.S. Department of Labor (OSHA) occupational health standards. Often, the NIOSH recommendations and ACGIH TLV's are lower than the corresponding OSHA standards. Both NIOSH recommendations and ACGIH TLV's usually are based on more recent information than are the OSHA standards. The OSHA standards may be required to take into account the feasibility of controlling exposures in various industries where the agents are used. The NIOSH-recommended standards are based solely on concerns relating to the prevention of occupational disease. In evaluating the exposure levels and the recommendations for reducing these levels found in this report, it should be noted that industry is legally required to meet only those levels specified by an OSHA standard.

SUBSTANCE	EVALUATION CRITERIA	SOURCE
Naphthalene	50 mg/M3*	NIOSH, OSHA, TLV

* mg/M3 = milligrams of substance per cubic meter of air.

B. Toxicological

Napthalene(3) -- Napthalene is a colorless to brown solid with the odor of mothballs. Its major use is as a moth repellant and in dye manufacturing.

Napthalene can affect the body if it is inhaled, if it comes in contact with the eyes or skin, or if it is swallowed. Napthalene is a hemolytic agent, an irritant of the skin and eyes, and may cause cataracts.

Napthalene can be detected at or below the permissible exposure limit through its odor and irritant effects. The odor threshold of napthalene has been reported to be as low as 2 mg/M^3. Napthalene vapor has been reported to cause eye irritation at 79 mg/M^3 or above.[4]

Acute overexposures to napthalene may cause eye irritation, headache, confusion, excitement, malaise, sweating, nausea, vomiting, abdominal pain, and bladder irritation. Chronic low exposures may cause hypersensitivity dermatitis; chronic dermatitis is rare.

NIOSH currently recommends that occupational exposure to napthalene be controlled to less than 50 mg/M^3 (8-hour TWA).

VI. ENVIRONMENTAL RESULTS

Eleven personal air samples were collected for napthalene on March 21 and three personal air samples were collected for napthalene on March 22. The results are tabulated in Table 1. All of the samples had values less than 0.001 mg/M^3 of napthalene.

The workshop has natural ventilation but no forced ventilation (local exhaust, general mechanical, or local forced ventilation).

No packaging was performed during this evaluation. Splash-proof safety goggles and an eye-wash station were provided at the packaging workstation.

Workers did not wash their hands prior to eating and smoking during breaks.

None of the workers had active hand or eye irritation at the time of this evaluation.

VII. CONCLUSIONS

The results of the personal air samples showed no exposure to napthalene. A health hazard from exposure to napthalene did not exist at the time of this evaluation. This conclusion is based on the personal air sampling results.

VIII. RECOMMENDATIONS

1. The practice of providing and requiring packers to wear splash-proof safety goggles (when napthalene flakes may contact the eyes) should be continued. Contact lenses should not be worn when working with napthalene. The eye wash station should be continued to be maintained.

2. Workers should be provided with and required to wear impervious gloves during packaging.

3. Employees who handle napthalene or material containing napthalene should wash their hands thoroughly before eating, smoking or using toilet facilities.

4. General mechanical ventilation at the facility should be added to in order to provide a minimum ventilation rate of outdoor air of 7 (no smoking permitted) to 35 (smoking permitted) cubic feet per minute per person (cfm/person). This recommendation assumes that the air supply used for ventilation and the workroom air do not contain excessive contaminants which exceed concentrations known to damage health or cause discomfort.(5)

IX. REFERENCES

1. National Institute for Occupational Safety and Health. Health Hazard Evaluation Report 83-421. Cincinnati, Ohio: National Institute for Occupational Safety and Health, 1983. (DHEW (NIOSH) Publication No. HETA 83-421).

2. National Institute for Occupational Safety and Health . NIOSH Manual of Analytical Methods, Volume 3. Cincinnati, Ohio: National Institute for Occupational Safety and Health, 1977. (DHEW (NIOSH) Publication No. 77-157-C).

3. Proctor, N.H. and Hughes, J.P. Chemical Hazards of the Workplace. J.B. Lippincott Company, Philadelphia, 1978, p. 367.

4. American Industrial Hygiene Association. "Napthalene," Hygiene Guide Series, Detroit, Michigan, 1967.

5. American Society of Heating, Refrigerating, and Air-Conditioning Engineers, Inc. (ASHRAE). ASHRAE Standard 62-1981: Ventilation for Acceptable Indoor Air Quality. Atlanta, GA.: American Society of Heating, Refrigeration, and Air-Conditioning Engineers, Inc., 1981.

X. AUTHORSHIP AND ACKNOWLEDGMENTS

Report Prepared By:

Anne T. Albers
Industrial Hygienist
NIOSH, Region VIII
Denver, Colorado

Originating Office:

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

Report Typed By:

Kristi L. Ramsey
NIOSH, Region VIII.
Denver, Colorado

XII. DISTRIBUTION AND AVAILABILITY

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. 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. Sheltered Workshops, Inc.
2. U.S. Department of Labor/OSHA - Region VIII.
3. NIOSH - Region VIII.
4. Montana State Department of Health and Environmental Sciences.

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

PERSONAL AND GENERAL AREA AIR
CONCENTRATIONS OF NAPTHALENE

Butte Sheltered Workshop, Inc.
Butte, Montana
March 20 - 21, 1984

DATE	SAMPLE TYPE	JOB CLASSIFICATION/LOCATION	SAMPLING TIME	mg/M^3 NAPTHALENE
3/21/84	Personal	Supervisor/All locations	8:06AM - 3:07PM	<0.001
"	"	Secretary/Office	8:11AM - 3:12PM	"
"	"	Trainer/All locations	8:23AM - 2:30PM	"
"	"	Sewer/Sewing and cutting room	8:33AM - 3:16PM	"
"	"	Sewer/Sewing room	8:39AM - 3:18PM	"
"	"	Sewer/Sewing room	8:45AM - 3:20PM	"
"	"	Sewer/Sewing room	8:50AM - 3:27PM	"
"	"	Cutter/Cutting room	8:57AM - 3:24PM	"
"	"	Packer/Sewing room	9:05AM - 3:01PM	"
"	"	Inspector/Sewing room	9:11AM - 3:01PM	"
"	"	Pattern Tack Operator/Sewing	9:17AM - 3:29PM	"
3/22/84	"	Cutter/Cutting room	8:10AM - 3:04PM	"
"	"	Cutter's Helper/Cutting room	9:06AM - 3:02PM	"
"	"	Cutter's Helper/All locations	9:04AM - 3:03PM	"

EVALUATION CRITERIA 50

LABORATORY LIMIT OF DETECTION: 0.01 mg/sample

DEPARTMENT OF HEALTH AND HUMAN SERVICES
PUBLIC HEALTH SERVICE
CENTERS FOR DISEASE CONTROL
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
ROBERT A. TAFT LABORATORIES
4676 COLUMBIA PARKWAY, CINCINNATI, OHIO 45226

OFFICIAL BUSINESS
PENALTY FOR PRIVATE USE, $300

Third Class Mail

POSTAGE AND FEES PAID
U.S. DEPARTMENT OF HHS
HHS 396