U.S. DEPARTMENT OF HEALTH, EDUCATION, AND WELFARE
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH
CINCINNATI, OHIO 45202

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 73-190-148

THE PURDY COMPANY
BURNHAM, ILLINOIS
OCTOBER 1974

I. TOXICITY DETERMINATION

It has been determined that airborne concentrations of napthol spirits in the AB Valve Room at the Purdy Company, Burnham, Illinois, are not toxic in the condition as used or found. This determination is based on environmental measurements taken, chemical data supplied by the manufacturer of the napthol spirits, and interviews conducted with affected employees. However, skin contact with the napthol spirits will result in removal of skin oils thus leading to skin crackage which would promote skin irritation and/or possible infection. This determination is based on interviews conducted with affected employees, chemical information supplied by the manufacturer, and a review of available literature pertaining to the napthol spirits. Recommendations regarding use of personal protective equipment and personal hygiene are made.

II. DISTRIBUTION AND AVAILABILITY OF REPORT

Copies of the Determination Report are available upon request from the Hazard Evaluation Services Branch, NIOSH, U.S. Post Office Building, Room 508, 5th and Walnut Streets, Cincinnati, Ohio 45202.

Copies of the Determination Report have been sent to:

a) Purdy Company, Burnham, Illinois
b) Authorized Representative of Employees
c) U.S. Department of Labor - Region V
d) NIOSH - Region V

For the purposes of informing the seven (7) "affected employees," the employer will promptly "post" the Determination Report in a prominent place(s) near where exposed employees work for a period of 30 calendar days.

III. INTRODUCTION

Section 20(a)(6) of the Occupational Safety and Health Act of 1970, 29 U.S.C. 669(a)(6), authorizes the Secretary of Health, Education, and Welfare, following a written request by 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 concentration as used or found.

The National Institute for Occupational Safety and Health (NIOSH) re-

ceived such a request from an authorized representative of employees of the Purdy Company, regarding exposure to napthol spirits used as a solvent in cleaning operations of small parts in the AB Valve Room.

IV. HEALTH HAZARD EVALUATION

A. Plant Process - Conditions of Use

The Purdy Company reconditions air brakes and wheel assemblies from locomotives and railroad cars. Approximately 25 people are involved in activities associated with removing the brakes from cars, repair of miscellaneous parts and cleaning and repairing brakes. Seven employees are employed in the area in question, the AB Valve Room. The napthol spirits is used as a cleaning solvent to clean brake parts. The solvent is dispensed from a can onto a rag. Four of the seven workers use the solvent most of the day and have hand contact with the solvent. The solvent is removed from the hands by using waterless hand cleaners and soap and water about twice a day. While dispensing the solvent, at the time of the survey, hand gloves were not used. As a ventilation mechanism, an exhaust fan draws air out of the AB Valve Room into a larger general work area.

B. Evaluation and Design

On February 1, 1974, NIOSH representatives conducted an observational survey of the facility. Pertinent information was obtained from the employer regarding plant processes, affected employees were interviewed and work procedures observed.

Detector tube measurements for aromatic and halogenated hydrocarbons were taken at the workbench in the AB Valve Room.

Smoke tube tests were taken in the AB Valve Room to ascertain exhaust ventilation efficiency.

Interviews were held with four directly affected employees regarding adverse effects from exposure to chemicals in use.

C. Evaluation Criteria

The napthol spirits is a solvent containing a combination of aliphatic-alicyclic-hydrocarbons. The aliphatic hydrocarbons act primarily as depressants to the central nervous system. Although vapors of these hydrocarbons are mildly irritating to the mucous membranes, the primary problem associated with the aliphatic hydrocarbon is dermatitis.

Toxicologically, the alicyclic hydrocarbons resemble the open chain aliphatic carbons acting as a central nervous system depressant with

a relatively low order of acute toxicity. They do not tend to accumulate in body tissue so that cumulative toxicity from exposure to low atmospheric concentrations is improbable. Repeated or prolonged contact with such a class of hydrocarbons may cause dermatitis.[1]

D. Evaluation Results and Discussions

Environmental

Detector tube measurements were taken in the AB Valve Room for "aromatic" hydrocarbons, since, at the time of the evaluation the general "nature" of the solvent was not known.

Four measurements (with the exhaust fan off) were made for the presence of aromatic hydrocarbons (toluene, benzene, xylene, etc.). Although measurements did show some type of contaminant present, it is not possible to quantify the readings, in that interferences from aliphatic and alicyclic hydrocarbon structures were present. The presence of aliphatic hydrocarbons as noted by the detector tube manufacturer, can cause erroneous readings.

Two measurements were made for the presence of halogenated hydrocarbons (methylene choride, chloroform, etc.) Detector tube measurements are designed to measure levels of halogenated hydrocarbons in the range of 10-2000 PPM. Measurements showed no detectable level.

Smoke tube tests taken to evaluate exhaust ventilation efficiency, showed the exhaust system to be functioning adequately when activated.

Two measurements for aromatic hydrocarbons were made while the fan was operating. When activated, no level of contaminant was detected.

Interviews with the four affected employees indicate no respiratory or biological effect associated with inhalation of the napthol spirits.

In consideration of detector tube measurements taken with fan operating, manufacturers chemical data pertaining to the napthol spirits, and employee interviews, the napthol spirits is not toxic from a respiratory mechanism. However, in view of the operations conducted in the AB Valve Room, the exhaust fan should be in operation at all times, especially when solvent cleaning operations are being effectuated.

Medical

All four workers who were interviewed stated that the napthol, especially when new or after a period of non-use, caused a burning sensation on the skin. Two of the four interviewed said skin cracks developed. The skin irritation is caused by direct contact with the napthol spirits, which, by its solvent action, removes skin oils thus causing dryness, itching, and cracking. The problem of irritation is best alleviated by a program of good personal hygiene and use of personal protective equipment. Durable hand gloves which are impervious to the napthol spirits should be

worn at all times while working with the solvent. When gloves cannot be worn, some protection is obtained by frequent application of protective barrier creams. However, misuse of these preparations accomplishes little more than establishing a false sense of security. Frequent washing of hands with soap and water is a must. Should irritation occur despite the above, prompt and expert medical advice should be sought.

V. REFERENCES

1. Fundamentals of Industrial Hygiene, NSC, p.55, 1971.

VI. AUTHORSHIP AND ACKNOWLEDGMENTS

Report Prepared By: Thomas F. Bloom
Assistant Regional Industrial Hygienist
NIOSH - Region V
Chicago, Illinois

Richard S. Kramkowski
Acting Regional Program Director
NIOSH - Region V
Chicago, Illinois
Project Officer

Originating Office: Jerome P. Flesch
Chief
Hazard Evaluation Services Branch
Cincinnati, Ohio