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

HEALTH HAZARD EVALUATION DETERMINATION
REPORT NO. 73-3-65

SUPERIOR METALS PRODUCTS, INCORPORATED
LIMA, OHIO 45801
SEPTEMBER 1973

I. TOXICITY DETERMINATION

It has been determined that kerosine vapors are not toxic at the concentrations measured within the Aluminum Department during near normal operating conditions. This determination is based upon environmental measurements in the workplace, analysis of the kerosine in use, employee interviews and on available literature regarding kerosine toxicity. During the day of evaluation (June 13, 1973) no significant symptoms were reported by employees and levels of kerosine were found to be far below levels believed to be toxic to employees.

It is recommended that the plant go ahead with plans to replace spray application of kerosine with brush on equipment on the burner cap piercing the machine which would reduce exposures to even lower levels.

II. DISTRIBUTION AND AVAILABILITY OF DETERMINATION REPORT

Copies of this 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 have been sent to:

a) Superior Metals Products, Inc., Lima, Ohio
b) Authorized Representative of Employees
c) U.S. Department of Labor - Region V
d) NIOSH - Region V

For the purposes of informing the approximately 10 "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 concentrations as used or found.

The National Institute for Occupational Safety and Health (NIOSH) received such a request from an authorized representative of employees regarding exposure to kerosine in use in the Aluminum Department of the Superior Metal Products, Inc. plant in Lima, Ohio.

Evaluation of this workplace by NIOSH was delayed approximately four months while investigators from the Occupational Safety and Health Administration of the U.S. Department of Labor completed their investigation of an employee complaint regarding safety hazards.

HEALTH HAZARD EVALUATION

The Aluminum Department is engaged in the manufacture of burner caps for gas ranges. The circular burner caps are formed from flat aluminum stock by a variety of mechanical press operations. At one point the 3-inch diameter burner caps are placed in a punch type machine which pierces holes around the circumference of the cap. Kerosine is sprayed onto each cap prior to piercing for lubrication. The piercing machine has two small open reservoirs of kerosine (approximately 1.5 quart) which supply two small tube nozzles which spray the kerosine. Kerosine vapors emanating from the spraying process and from the two open reservoirs are the subject of this evaluation.

The burner cap piercing machine is operated by one individual per shift. There are three to four other employees working in close proximity to this machine. A total of 10 workers from two work shifts can be potentially affected by the kerosine vapors.

B. Worksite Evaluation

On Wednesday, June 13, 1973, Messrs. Vandervort and Eddleston conducted an environmental evaluation of kerosine vapors in the work atmosphere of the Aluminum Department. In conjunction with environmental sampling, four employees were interviewed in a non-directed manner.

At the completion of this plant visit, the operation of the burner cap machine was discussed with plant management. They stated that a new brush application method of lubricating the burner caps prior to piercing was being developed and that it would be operational within a few months.

C. Evaluation Methods

1. Kerosine Vapor Air Sampling

Employee exposures to kerosine vapors were measured via personal air sampling equipment. Breathing zone and work area air samples were obtained using charcoal air sampling tubes. Charcoal tubes were returned to Cincinnati and analyzed by the gas chromatographic method reported by White et al.[1] A bulk sample of the kerosine was also analyzed.

2. Employee Interviews

Employees were asked non-directed questions regarding work related and non-work related health problems. Information regarding their employment history was also collected.

D. Evaluation Criteria

Evaluation of employee exposures to kerosine is complicated by the fact that kerosine is not a discreet substance, but rather a complex refined petroleum product composed of aliphatic, napthenic, and alkyl aromatic hydrocarbons. As such, no standard for human exposure to kerosine has been established. However, it has been suggested that an exposure limit of 500 ppm (parts of vapor or gas per million parts of contaminated air by volume) would be reasonable.[2] This level of exposure could only be permitted in situations where the aromatic content of the particular kerosine in use was known to be free of substances like benzene, toluene and xylene. In cases where these aromatics are found in the kerosine in use, a lower level of exposure would be appropriate depending upon the relative presence of benzene, toluene, and xylene, etc.

E. Evaluation Results

1. Kerosine Vapor Air Sampling

Two breathing zone and six area air samples were collected and analyzed. Laboratory results were reported in milligrams of kerosine which were converted to units of parts per million using an average molecular weight for kerosine correspnding to a twelve carbon alkane.

One breathing zone sample collected over a period of 124 minutes of near normal operation, showed the piercing machine operators exposure to be to an average of 11 ppm. A similar sample for

the restrike machine operator collected over a period of 112 minutes showed an average exposure to 13 ppm. Six area air samples collected at distances from 3 to 5 feet from the piercing machine showed concentrations ranging from 6 to 28 ppm. Area air samples were an average of 30 minutes in duration.

Analysis of the bulk sample of kerosine showed that it did not contain benzene, toluene, or xylene.

Since the burner cap piercing operation is highly repetitive (repeating several times per minute), it is felt that these samples are indicative of near normal working conditions.

2. Employee Interviews

Of the four employees interviewed, one complained of intermittant mild dizziness, drowsiness, and tingling of the ears during periods when air circulation in the Aluminum Department was low and the ambient temperature and humidity high. The other three employees did not relate any problems associated with exposure to kerosine vapors. On the day of evaluation employees did not complain of being affected by the kerosine.

V. REFERENCES

1. White, W.D., D.B. Taylor, P.A. Mauer and R.E. Kupel. A Convenient Optimized Method for the Analysis of Selected Solvent Vapors in the Industrial Atmosphere. Am. Ind. Hyg. Assoc. J., Vol. 31, March-April 1970.

2. Kerosine, API Toxicological Review. Second Edition, 1967. American Petroleum Institute, 1271 Ave. of the Americas, New York, New York.

VI. AUTHORSHIP AND ACKNOWLEDGMENTS

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