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

HEALTH HAZARD EVALUATION REPORT 73-48-64
GATES RUBBER COMPANY
BRAIDED HOSE DIVISION
DENVER, COLORADO
AUGUST 1973

I. TOXICITY DETERMINATION

Based on the results of NIOSH environmental-medical studies, it has been determined that the exposure to lead at the Gates Rubber Company in the Braided Hose Division is not in concentrations that are toxic to the workers.

The Gates Rubber Company is periodically monitoring all workers in this area by taking blood samples for lead analysis. This practice should be continued, and employees should be informed that their levels are within the safe limits. This would avoid repetition in environmental and biological sampling.

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) Gates Rubber Company, Denver, Colorado
b) Authorized Representative of Employees
c) U.S. Department of Labor, Region VIII
d) NIOSH - Region VIII

For purposes of informing approximately twenty (20) exposed employees, the employer will promptly "post" this report in a prominent place(s) near where affected 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 to evaluate the potential hazards associated with the alleged exposure to lead during the manufacture of braided hose at the Gates Rubber Company, Denver, Colorado.

IV. HEALTH HAZARD EVALUATION

A. Description of Process - Conditions of Use

Lead exposures in the Braided Hose Division of the Gates Rubber Company are likely to occur when the lead is recovered from the vulcanizing process during the manufacture of braided hose. Ten men were working with the lead furnaces; four of the remaining men were working on a floor directly above the furnaces; and the other men were working behind the furnaces in an area where the lead is extruded readily for the insertion of the braided hose. Those men with the highest exposures were, as anticipated, working directly with the lead recovery furnaces.

B. Evaluation Methods - Sampling and Analytical

Environmental samples for air lead concentration were collected on workers using the method described in Appendix I of the NIOSH Criteria Document[1] and analyzed by atomic absorption spectrophometric methods in NIOSH's laboratory in Salt Lake City.

Blood samples were obtained from workers in the Department and analyzed by techniques described in Appendix II, also in the NIOSH laboratory.

C. Evaluation Criteria

Environmental Standards:

The Occupational Health Standard as promulgated by the U.S. Department of Labor (Title 29, Chapter XVII, Part 1910, Subpart G, Section 1910.93, Table G-2) applicable to the substance for this evaluation is:

Substance	8-Hour Time Weighted Average
Lead	0.2 mg/M^3*

In addition, the recent Criteria Document[1] published by NIOSH recommends the adoption of an environmental standard of 0.15 mg/M^3 to the Department of Labor.

Biological Norms:

According to the results of studies on chronic lead poisoning in adults, toxicity rarely occurs below 80 µg/100 ml** whole blood.[2]

D. Evaluation Design, Results, and Discussion

Environmental

On May 29, 1973, a total of ten personal air samples were collected from workers to assay their airborne lead exposure. All samples were taken in the lead recovery area. Lead was found in all the samples, but concentrations were below the existing Federal standard. A follow-up survey was conducted on July 2, 1973, where an additional ten samples were collected. These samples were also below the established standard.

In summary, a total of twenty environmental samples were taken. These ranged from a high of 0.19 mg lead/M^3 to a low of less than 0.001 mg lead/M^3. The average for all twenty samples was 0.087 mg/M^3. Only two samples were above the NIOSH recommended level of 0.15, these being 0.17 and 0.19.

---

*mg/M^3 - Milligrams of contaminant per cubic meter of air.

**µg/100 ml - Micrograms of lead contained in 100 milliliters of whole blood.

Medical

To assess the possibility of chronic lead poisoning, blood samples were taken from seventeen workers in the lead recovery area, and three samples were taken from NIOSH employees as controls. These samples were analyzed for lead content by the NIOSH Western Area Occupational Health Laboratory. All workers had lead levels below 60 µg/100 ml whole blood, and all except one were below 35 µg/100 ml. The controls had values of 10, 11, and 11 µg/100 ml. According to the results of studies on chronic lead poisoning in adults, toxicity rarely occurs below 80 µg/100 ml whole blood.[2]

V. REFERENCES

1. Criteria for a Recommended Standard, Occupational Exposure to Inorganic Lead, HSM 73-11010, NIOSH, 1973.

2. Beeson & McDermott, Textbook of Medicine (1963, Philadelphia), page 1787.

VI. AUTHORSHIP AND ACKNOWLEDGMENTS

Report Prepared By: Bobby J. Gunter, Ph.D.
Industrial Hygienist, Region VIII
Denver, Colorado

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

Laboratory Analyses: Russell Hendricks, Ph.D., and Staff
PCAB, WAOHL
Salt Lake City, Utah

ABSTRACT

HEALTH HAZARD EVALUATION DETERMINATION

REPORT NO. 73-48-64

Toxic Substances: Lead

Industry: Manufacturing of Braided Garden Hose Rubber

Study Data: Workroom air concentrations (breathing zone and work area). Biological Samples (blood lead concentrations)

Study Results: The operation employs approximately twenty individuals. All these individuals were samples for blood lead concentrations. Breathing zone samples were also collected and analyzed for total lead. Three controls were also sampled for blood lead concentrations. Environmental and biological samples were all below the existing standard for lead. Tests were performed in May and July, 1973.

Toxicity Determination: Based on the results of NIOSH environmental-medical studies, it has been determined that the exposure to lead is not in concentrations that are toxic to the workers.