

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

HEALTH HAZARD EVALUATION DETERMINATION  
REPORT NO. 73-105-100

MERCIL PLATING COMPANY  
CHICAGO, ILLINOIS  
DECEMBER, 1973

I. TOXICITY DETERMINATION

It has been determined that acids in the electroplating processes of the Mercil Plating Company are not toxic as used or found. This determination is based on employee interviews, and observation of the work areas and of work practices.

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) Mercil Plating Company - Chicago, Illinois
- b) Authorized Representative of Employees
- c) U.S. Department of Labor - Region V
- d) NIOSH - Regional Program Director; Region V

For the purposes of informing the 20-25 "affected employees" the employer will promptly "post" the Determination 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 regarding employee exposure to various acids used in the electroplating processes at the Mercil Plating Company; Chicago, Illinois.

IV. HEALTH HAZARD EVALUATION

A. Plant Process - Conditions of Use

The Mercil Plating Company performs job electroplating of small parts furnished by customers. No specific product is processed and no parts are manufactured by the company.

There are two plating areas located in adjacent rooms, with 20-25 employees involved in the processes. The plant operates one shift per day for eight hours.

The metals plated include zinc, nickel, brass, copper, tin, cadmium, and silver, as requested. A black oxide line is also used occasionally. No chrome plating is performed. The acids used for the pre-treatment of the parts include hydrochloric, sulfuric, and nitric.

The plating systems are manually operated or semi-automated, requiring the workers to follow the material through the processes.

B. Evaluation Design and Methods

An observational investigation was conducted on September 21, 1973.

Fifteen employees were interviewed regarding any medical symptoms they may have experienced from working with the various plating chemicals.

Work practices were observed and local ventilation systems were checked using air flow indicators (smoke tubes).

C. Evaluation Criteria<sup>1</sup>

Many of the substances used in electroplating processes, including pre-treatments, are toxic if ingested. In addition some of them are corrosive to the skin and mucous membranes, some are liable to cause dermatitis and some are toxic if the vapors or mists are inhaled.

If allowed to remain on the skin of hands and arms, nickel solutions can be absorbed through cuts and abrasions or through enlarged pores causing a distressing and irritating dermatitis known as "nickel itch". The careless operator can become sensitized to the nickel and this sensitization, once acquired, is usually permanent.

If ingested, cyanides are extremely toxic but a far greater hazard is the formation of deadly hydrocyanic acid by contact of the cyanide solid or solution with acids. Great care should be taken in the storage of cyanides and of acids so that they can never come into

contact with each other. Cyanides can also cause dermatitis if allowed to remain in contact with the skin.

Strong acids and alkalies have a direct corrosive action on the skin, causing severe burns. In particular, splashing into the eyes can be very painful and can lead to loss of sight.

#### D. Evaluation Results and Discussion

Employee responses indicated no medical symptomatology consistent with exposure to acids or other substances used in the electroplating processes. —

The employees utilize safety glasses and/or face shields and gloves. The local ventilation systems were operative and functioning properly.

Based on these factors, it has been determined that the acids and other substances are not toxic as used or found.

#### V. REFERENCES

1. Encyclopedia of Occupational Health and Safety, Volume I, International Labour Office, CH 1211 Geneva 22, Switzerland, 1971, Special McGraw-Hill Edition, 1972.

#### VI. AUTHORSHIP AND ACKNOWLEDGMENTS

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